University of Calcutta

CBCS Syllabus

Bengali

Chemistry

Commerce

Economics

English

Geography

History

Mathematics

Physical Education

Physics

Political Science

Sanskrit

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 24 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 13.07.2018 (vide Item No.18) approved the corrected version of the Bengali (Honours / General / LCC2 / AECC1) syllabus replacing the existing Bengali (Honours / General / LCC2 / AECC1) syllabus (as notified in Notification No.CSR/ 12/18 dated 04.06.2018) , laid down in the accompanying pamphlet.

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 6th August, 2018

(Debabrata Manna)
Deputy Registrar (Acting)

কলিকাতা বিশ্ববিদ্যালয়

২০১৮

স্নাতক বাংলা পাঠক্রম

সাম্মানিক

সাধারণ

ও

AECC-1

ইউ.জি.সি নির্দেশিত সিবিসিএস অনুসারে

(উত্তর লেখার ক্ষেত্রে পরীক্ষার্থীদের পশ্চিমবঙ্গ বাংলা আকাদেমি-র বানানবিধি অনুসরণ করতে হবে)

কলিকাতা বিশ্ববিদ্যালয়

২০১৮

স্নাতক বাংলা পাঠক্রম

সাম্মানিক

ইউ.জি.সি নির্দেশিত সিবিসিএস অনুসারে

(উত্তর লেখার ক্ষেত্রে পরীক্ষার্থীদের পশ্চিমবঙ্গ বাংলা আকাদেমি-র বানানবিধি অনুসরণ করতে হবে)

স্নাতক সাম্মানিক বাংলা— 140 (114 + 26) Credits

A) Discipline Centric Core Course (CC)–6 Credit Each

BNG-A-CC-1-1-Th-Tu	বাংলা সাহিত্যের ইতিহাস (১৮০০ খ্রিঃ পর্যন্ত)
BNG-A-CC-1-2-Th-Tu	বর্ণনামূলক ভাষাবিজ্ঞান ও বাংলা ভাষা
BNG-A-CC-2-3-Th-Tu	বাংলা সাহিত্যের ইতিহাস (উনিশ শতক)
BNG-A-CC-2-4-Th-Tu	বাংলা সাহিত্য : প্রবেশক পাঠ
BNG-A-CC-3-5-Th-Tu	বাংলা সাহিত্যের ইতিহাস (বিশ শতক)
BNG-A-CC-3-6-Th-Tu	ঐতিহাসিক ভাষাবিজ্ঞান
BNG-A-CC-3-7-Th-Tu	কথাসাহিত্য
BNG-A-CC-4-8-Th-Tu	প্রাগাধুনিক সাহিত্য
BNG-A-CC-4-9-Th-Tu	ছন্দ, অলঙ্কার ও কাব্যতত্ত্ব
BNG-A-CC-4-10-Th-Tu	প্রবন্ধ ও বিবিধ রচনা
BNG-A-CC-5-11-Th-Tu	সাহিত্যের রূপ ও রীতি
BNG-A-CC-5-12-Th-Tu	নাটক ও নাট্যমঞ্চ
BNG-A-CC-6-13-Th-Tu	আধুনিক বাংলা কাব্য-কবিতা
BNG-A-CC-6-14-Th-Tu	সংস্কৃত, ইংরেজি ও প্রতিবেশী (হিন্দী) সাহিত্যের ইতিহাস

B) Discipline Specific Elective (DSE)– 6 Credits Each

BNG-A-DSE-A-5-1-Th-Tu	বাংলার সমাজ ও সংস্কৃতির ইতিহাস
BNG-A-DSE-A-5-2-Th-Tu	বাংলাদেশের সাহিত্য
BNG-A-DSE-A-6-3-Th-Tu	বাংলা গোয়েন্দা সাহিত্য, কল্পবিজ্ঞান আশ্রয়ী রচনা এবং অলৌকিক কাহিনি
BNG-A-DSE-A-6-4-Th-Tu	তুলনামূলক সাহিত্য
BNG-A-DSE-B-5-1-Th-Tu	বাংলা শিশু-কিশোর সাহিত্য
BNG-A-DSE-B-5-2-Th-Tu	দেশভাগ ও বাংলা সাহিত্য
BNG-A-DSE-B-6-3-Th-Tu	চরিত সাহিত্য, আত্মচরিত ও ভ্রমণ সাহিত্য
BNG-A-DSE-B-6-4-Th-Tu	লোকসংস্কৃতি ও লোকসাহিত্য

C) Skill Enhancement Couse (SEC)–2 Credit Each

BNG-A-SEC-A-3-1-Th	মুদ্রণ ও প্রকাশনা
BNG-A-SEC-A-3-2-Th	ব্যবহারিক বাংলা-১
BNG-A-SEC-B-4-1-Th	ব্যবহারিক বাংলা ও সাহিত্য গবেষণার পদ্ধতিবিজ্ঞান
BNG-A-SEC-B-4-2-Th	ব্যবহারিক বাংলা-২

D) Ability Enhancement Compulsory Course (AECC)–2 Credits

BNG-AECC-1-1Th

স্নাতক বাংলা (সাম্মানিক) পাঠক্রমের সেমেস্টার ভিত্তিক বিভাজন

	SEM-1	SEM-2	SEM-3	SEM-4	SEM-5	SEM-6
A) Core Course 6 Credits each (5TH + 1TU)	● BNG-A-CC-1-1-TH-TU ● BNG-A-CC-1-2-TH-TU	● BNG-A-CC-2-3-TH-TU ● BNG-A-CC-2-4-TH-TU	● BNG-A-CC-3-5-TH-TU ● BNG-A-CC-3-6-TH-TU ● BNG-A-CC-3-7-TH-TU	● BNG-A-CC-4-8-TH-TU ● BNG-A-CC-4-9-TH-TU ● BNG-A-CC-4-10-TH-TU	● BNG-A-CC-5-11-TH-TU ● BNG-A-CC-5-12-TH-TU	● BNG-A-CC-6-13-TH-TU ● BNG-A-CC-6-14-TH-TU
B) Elective Courses 6 Credits each (5TH + 1TU)						
i) Generic Elective (GE)	☒	☒	☒	☒		
ii) Discipline Specific Elective (DSE)					DSE-A- বর্গের প্রথম দুটি কোর্স (অর্থাৎ কোর্স 1 ও 2) থেকে **একটি** এবং DSE-B- বর্গের প্রথম দুটি কোর্স (অর্থাৎ কোর্স 1 ও 2) থেকে **একটি** নিয়ে মোট **দুটি** কোর্স নির্বাচন করতে হবে।	DSE-A- বর্গের শেষ দুটি কোর্স (অর্থাৎ কোর্স 3 ও 4) থেকে **একটি** এবং DSE-B- বর্গের শেষ দুটি কোর্স (অর্থাৎ কোর্স 3 ও 4) থেকে **একটি** নিয়ে মোট **দুটি** কোর্স নির্বাচন করতে হবে।
C) Skill Enhancement Course (SEC) 2 Credits Each (2TH)			যে-কোনো একটি ● BNG-A-SEC-A-3-1-TH ● BNG-A-SEC-A-3-2-TH	যে-কোনো একটি ● BNG-A-SEC-B-4-1-TH ● BNG-A-SEC-B-4-2-TH		
D) Ability Enhancement Compulsory Course (AECC) 2 Credits (2TH)	● BNG-AECC-1-1-TH	☒				
Total Marks/ Credits	400/20	400/20	500/26	500/26	400/24	400/24

Note : বাংলা ছাড়া পাঠ্য অন্য কোর্স বোঝাতে ☒ চিহ্নটি ব্যবহার করা হয়েছে।

Discipline Centric Core Course (CC)
(সাম্মানিক বাংলা)

- স্নাতক সাম্মানিক বাংলা পাঠক্রমে 'Discipline Centric Core Course' স্তরে ৮৪ ক্রেডিট-এর মোট ১৪টি কোর্স ছয় (৬)টি সেমেস্টারে পড়তে হবে।
- ৬ (৫ + ১) ক্রেডিট-এর প্রতিটি কোর্সের পূর্ণমান ১০০। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট CC-র ক্লাসে পড়ুয়ার উপস্থিতির জন্য বরাদ্দ। ১০ নম্বর কোর্সভিত্তিক ধারাবাহিক মূল্যায়ন বা ইন্টারন্যাল অ্যাসেসমেট-এর জন্য এবং ১৫ নম্বর কোর্সভিত্তিক টিউটোরিয়াল-এর জন্য বরাদ্দ। বাকি ৬৫ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট কর্তৃপক্ষের তত্ত্বাবধানে লিখিত পরীক্ষা নেওয়া হবে। প্রতিটি সেমেস্টারে পনেরো সপ্তাহ করে ক্লাস হবে ধরে নিয়ে Class Hours/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- ৬৫ নম্বরের লিখিত পরীক্ষায় ১০ নম্বরের তিনটি ব্যাখ্যামূলক, ৫ নম্বরের ৪টি বোধমূলক এবং ১ নম্বরের ১৫টি সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্নের উত্তর দিতে হবে। নিচের তালিকায় প্রশ্নপত্রের ধারণা পাওয়া যাবে।

প্রশ্ন নং	প্রশ্নের ধরন ও বিকল্প সংক্রান্ত নিয়ম	প্রশ্নের মান
১	মডিউল-১ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
২	মডিউল-২ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৩	মডিউল-৩ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৪	মডিউল-১ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৫	মডিউল-২ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৬	মডিউল-৩ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৭	মডিউল-১, মডিউল-২ এবং মডিউল-৩ থেকে একটি করে প্রসঙ্গ/বিষয় নিয়ে টীকা-ধর্মী প্রশ্ন হবে। তিনটির মধ্যে যে-কোনো একটি লিখতে হবে।	৫
৮	প্রত্যেকটি মডিউল থেকে কমপক্ষে **তিনটি** করে প্রশ্ন নিয়ে মোট **পনেরটি** সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্ন দেওয়া হবে। এক্ষেত্রে কোনো বিকল্প থাকবে না।	১ × ১৫

BNG-A-CC-1-1-TH-TU
বাংলা সাহিত্যের ইতিহাস (১৮০০ খ্রিঃ পর্যন্ত)

উদ্দেশ্য : বাংলা ভাষা ও সাহিত্যের উদ্ভবের সময়কাল থেকে ১৮০০ খ্রিস্টাব্দ পর্যন্ত বাংলা সাহিত্যের বিভিন্ন ধারার সঙ্গে শিক্ষার্থীদের পরিচিতি ঘটানো এই পাঠের উদ্দেশ্য।

মডিউল-১

	Class Hours		
	Th	**Tu**	**IA Exam**
বাংলা ভাষা ও সাহিত্যের ইতিহাস সম্পর্কিত সাধারণ ধারণা	২৩	৬	১
বাংলা সাহিত্যের যুগবিভাগ— প্রসঙ্গ ও বিতর্ক			
বাংলা ভাষা ও সাহিত্যের আদি পর্বের গতিপ্রকৃতি ও নিদর্শন সমূহ			
চর্যাপদ			
শ্রীকৃষ্ণকীর্তন			

মডিউল -২

অনুবাদ সাহিত্য-ভাগবত, রামায়ণ ও মহাভারত	২৩	৬	১
বৈষ্ণব পদাবলী— বিদ্যাপতি, চণ্ডীদাস, জ্ঞানদাস, গোবিন্দদাস			
চৈতন্য-চরিত সাহিত্য— চৈতন্যভাগবত, শ্রীচৈতন্যচরিতামৃত			

মডিউল-৩

মঙ্গলকাব্যের উদ্ভব ও বিকাশ	২৩	৬	১
মনসামঙ্গল, ধর্মমঙ্গল, চণ্ডীমঙ্গল ও অন্নদামঙ্গল			
প্রণয়োপাখ্যান— শাহ মহম্মদ সগীর, দৌলত কাজী ও আলাওল			
শাক্ত পদাবলী— রামপ্রসাদ সেন ও কমলাকান্ত ভট্টাচার্য			

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বাঙ্গালা সাহিত্যের ইতিহাস (১-২)— সুকুমার সেন
- ❑ বাংলা সাহিত্যের রূপরেখা (১-২)— গোপাল হালদার
- ❑ বাংলা সাহিত্যের ইতিবৃত্ত (১-৫)— অসিতকুমার বন্দ্যোপাধ্যায়
- ❑ বাংলা সাহিত্যের ইতিকথা (১-২)— ভূদেব চৌধুরী
- ❑ বাঙালি জাতি ও বাংলা সাহিত্য (১-২)— আহমেদ শরীফ
- ❑ মধ্যযুগের বাংলা সাহিত্যের তথ্য ও কালক্রম — সুখময় মুখোপাধ্যায়
- ❑ বাংলা মঙ্গলকাব্যের ইতিহাস— আশুতোষ ভট্টাচার্য
- ❑ বাংলা সাহিত্যের ইতিহাস (আদি ও মধ্যযুগ)— দেবেশকুমার আচার্য

BNG-A-CC-1-2-TH-TU

বর্ণনামূলক ভাষাবিজ্ঞান ও বাংলাভাষা

উদ্দেশ্য : সাহিত্যের সাম্মানিক পর্যায়ের ছাত্র হিসেবে বাংলা ভাষাতত্ত্ব ও শব্দতত্ত্ব সম্পর্কে ধারণা থাকা অত্যন্ত গুরুত্বপূর্ণ। সেই লক্ষ্যপূরণে এই কোর্সটি তৈরি করা হয়েছে।

মডিউল-১

	Class Hours		
	Th	**Tu**	**IA Exam**
ধ্বনি, বর্ণ, অক্ষর— সংজ্ঞার্থ ও পারস্পরিক সম্পর্ক	২৩	৬	১
উচ্চারণস্থান ও উচ্চারণপ্রকৃতি অনুযায়ী বাংলা স্বর ও ব্যঞ্জনধ্বনিগুলির পরিচয়			
মৌলিক স্বরধ্বনি ও স্বনিমের ধারণা			
বাংলা ভাষার শব্দ ভাণ্ডার			

মডিউল-২

শব্দ বিবর্তন, বাংলা ভাষার ধ্বনি পরিবর্তনের রীতি ও প্রকৃতি	২৩	৬	১
বাংলা শব্দার্থ পরিবর্তনের ধারা, বাংলা ভাষার উপভাষা			

মডিউল-৩

বাংলা ভাষার রূপতাত্ত্বিক আলোচনা— বচন, লিঙ্গ, পুরুষ, সমাস, বিভক্তি, কারক, প্রত্যয়, ক্রিয়ার কাল ও অব্যয়	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ সাধারণ ভাষাবিজ্ঞান ও বাঙলা ভাষা— রামেশ্বর শ'
- ❑ ভাষার ইতিবৃত্ত— সুকুমার সেন
- ❑ ভাষাবিদ্যা পরিচয়— পরেশচন্দ্র ভট্টাচার্য
- ❑ বাংলা ভাষা পরিক্রমা (১-২)— পরেশচন্দ্র মজুমদার
- ❑ উপভাষা চর্চার ভূমিকা— মণিরুজ্জামান
- ❑ ভাষাতত্ত্ব অনুশীলন— মণিরুজ্জামান
- ❑ বাংলা ভাষার ব্যাকরণ ও তার ক্রমবিকাশ— নির্মল দাশ

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বাংলা সাহিত্যের ইতিহাস (উনিশ শতক)

উদ্দেশ্য : ঔপনিবেশিক আধুনিকতার সংস্পর্শে এসে আমাদের চিন্তা-চেতনা, জীবনমান ও সাহিত্যে যে আধুনিকতার সঞ্চার ঘটেছিল তার সঙ্গে শিক্ষার্থীদের পরিচিত করানোই এই কোর্সের উদ্দেশ্য।

মডিউল-১ : কাব্য-কবিতা ও নাটক-প্রহসন

		Class Hours		
		Th	**Tu**	**IA Exam**
ক.	বাংলা কাব্যে আধুনিকতার সঞ্চার— প্রেক্ষাপট ও স্বরূপ	১৩	৬	১
	ঈশ্বরচন্দ্র গুপ্ত, রঙ্গলাল বন্দ্যোপাধ্যায়			
	মধুসূদন দত্ত, হেমচন্দ্র বন্দ্যোপাধ্যায়, নবীনচন্দ্র সেন			
	বিহারীলাল চক্রবর্তী, রবীন্দ্রনাথ ঠাকুর, গিরীন্দ্রমোহিনী দাসী			
খ.	আধুনিক বাংলা নাটকের উদ্ভব ও বিকাশ	১০		
	মধুসূদন দত্ত, দীনবন্ধু মিত্র			
	অমৃতলাল বসু, গিরিশচন্দ্র ঘোষ, রবীন্দ্রনাথ ঠাকুর			

মডিউল-২ : কথাসাহিত্য ও সাময়িক পত্র

ক.	নকশা-কথাগদ্য থেকে উপন্যাস— বাংলা উপন্যাসের উদ্ভব ও বিকাশ	১৩	৬	১
	ভবানীচরণ বন্দ্যোপাধ্যায়, প্যারীচাঁদ মিত্র, কালীপ্রসন্ন সিংহ			
	বঙ্কিমচন্দ্র চট্টোপাধ্যায়, তারকনাথ গঙ্গোপাধ্যায়			
	রমেশচন্দ্র দত্ত, স্বর্ণকুমারী দেবী			
	বাংলা ছোটগল্পের উদ্ভবের প্রেক্ষাপট ও রবীন্দ্রনাথ			
খ.	বাংলা সাময়িক পত্রের উদ্ভব ও বিকাশ	১০		
	সংবাদ প্রভাকর, তত্ত্ববোধিনী পত্রিকা, বিবিধার্থ সংগ্রহ, মাসিক পত্রিকা, সোমপ্রকাশ, বঙ্গদর্শন, ভারতী			

মডিউল-৩ : গদ্য ও প্রবন্ধ

বাংলা সাহিত্যে গদ্য রীতি গৃহীত হওয়ার পটভূমি	২৩	৬	১
বাংলা গদ্যের চর্চা ও বিকাশে শ্রীরামপুর মিশন ও ফোর্ট উইলিয়ম কলেজের ভূমিকা			
বাংলা গদ্যের বিকাশে বিভিন্ন সাময়িক পত্রের অবদান			
বাংলা গদ্য ও প্রবন্ধ সাহিত্যের বিকাশে রামমোহন রায়, ঈশ্বরচন্দ্র বিদ্যাসাগর, অক্ষয়কুমার দত্ত, প্যারীচাঁদ মিত্র, কালীপ্রসন্ন সিংহ, বঙ্কিমচন্দ্র চট্টোপাধ্যায়, মীর মশাররফ হোসেন ও বিবেকানন্দের অবদান			

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বাঙ্গালা সাহিত্যের ইতিহাস (৩-৪ খণ্ড)— সুকুমার সেন
- ❑ বাংলা গদ্য সাহিত্যের ইতিহাস— সজনীকান্ত দাস
- ❑ বাংলা সাহিত্যে গদ্য— সুকুমার সেন
- ❑ বাংলা সাহিত্যের ইতিবৃত্ত (৬-৮)— অসিতকুমার বন্দ্যোপাধ্যায়
- ❑ বাংলা সাহিত্যের ইতিকথা (৩-৪)— ভূদেব চৌধুরী
- ❑ আধুনিক বাংলা কাব্য— তারাপদ মুখোপাধ্যায়
- ❑ উনিশ শতকের গীতিকাব্য— অরুণকুমার মুখোপাধ্যায়

- বাংলা সাময়িক পত্রের ইতিবৃত্ত (১ম খণ্ড)— সন্দীপ দত্ত
- Bengali Literature in the Nineteenth Century– Sushil Kr. De
- বাংলা সাময়িক পত্র— ব্রজেন্দ্রলাল বন্দ্যোপাধ্যায়
- বাংলা নাটকের ইতিহাস— অজিতকুমার ঘোষ
- গদ্যরীতি পদ্যরীতি— পবিত্র সরকার

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বাংলা সাহিত্য : প্রবেশক পাঠ

উদ্দেশ্য : বাংলা ভাষা ও সাহিত্যের ইতিহাস সম্পর্কে প্রাথমিক জ্ঞানার্জনের পর এখানে শিক্ষার্থীরা সাহিত্যের রসাস্বাদনের সুযোগ পাবে। সাহিত্যের পাঠকে যতটা সম্ভব আনন্দদায়ক করে তোলাই এক্ষেত্রে লক্ষ্য।

মডিউল-১ : কবিতা

	Class Hours		
	Th	**Tu**	**IA Exam**
লুই পা— চর্যাপদ-১ বড়ু চণ্ডীদাস— কে না বাঁশী বাএ বড়ায়ি কালিনী নই কূলে বিদ্যাপতি— এ সখি হামারি দুখের নাহি ওর চণ্ডীদাস— সই কেবা শুনাইল জ্ঞানদাস— সুখের লাগিয়া এ ঘর বাঁধিনু রামপ্রসাদ সেন— মা নিম খাওয়ালে চিনি বলে লালন ফকির— সব লোকে কয় লালন কি জাত মধুসূদন দত্ত— হে বঙ্গ ভাণ্ডারে তব রবীন্দ্রনাথ ঠাকুর— বলাকা কাজী নজরুল ইসলাম— কাণ্ডারী হুঁশিয়ার জীবনানন্দ দাশ— সুচেতনা নীরেন্দ্রনাথ চক্রবর্তী— দেশ দেখাচ্ছ অন্ধকারে শামসুর রাহমান— আমার ভালবাসা শঙ্খ ঘোষ— বাবরের প্রার্থনা শক্তি চট্টোপাধ্যায়— অবনী বাড়ি আছো জয় গোস্বামী— রয় যে কাঙাল শূন্য হাতে	২৩	৬	১

মডিউল ২ : কথাসাহিত্য

ক	বঙ্কিমচন্দ্র চট্টোপাধ্যায়— কপালকুণ্ডলা	১৫	৬	১
খ	শরৎচন্দ্র চট্টোপাধ্যায়— অভাগীর স্বর্গ পরশুরাম— লম্বকর্ণ সতীনাথ ভাদুড়ী— চরণদাস এম. এল. এ সমরেশ বসু— আদাব	৮		

মডিউল-৩ : নাটক ও গদ্য প্রবন্ধ

ক	দীনবন্ধু মিত্র — নীলদর্পণ	১৩	৬	১
খ	রবীন্দ্রনাথ ঠাকুর— বাজেকথা	১০		
	প্রমথ চৌধুরী— বইপড়া			
	অবনীন্দ্রনাথ ঠাকুর— সৌন্দর্যের সন্ধান			
	সোফিয়া খাতুন— উনবিংশ শতাব্দীর নারীবিপ্লব			

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ চর্যাগীতি পরিক্রমা— নির্মল দাশ
- ❑ শ্রীকৃষ্ণকীর্তন— অমিত্রসূদন ভট্টাচার্য (সম্পাদিত)
- ❑ মধ্যযুগের কবি ও কাব্য— শঙ্করীপ্রসাদ বসু
- ❑ রবিরশ্মি— চারুচন্দ্র ভট্টাচার্য
- ❑ বঙ্গ সাহিত্যে উপন্যাসের ধারা— শ্রীকুমার বন্দ্যোপাধ্যায়
- ❑ বাংলা উপন্যাসের ইতিহাস— ক্ষেত্র গুপ্ত
- ❑ বঙ্কিমচন্দ্র— সুবোধচন্দ্র সেনগুপ্ত
- ❑ বঙ্কিম সরণী— প্রথমনাথ বিশী
- ❑ বাংলা উপন্যাসের কালান্তর— সরোজ বন্দ্যোপাধ্যায়
- ❑ সাহিত্যে ছোটগল্প— নারায়ণ গঙ্গোপাধ্যায়
- ❑ বাংলা সাহিত্যের ছোটগল্প ও গল্পকার— ভূদেব চৌধুরী
- ❑ কালের পুত্তলিকা— অরুণকুমার মুখোপাধ্যায়
- ❑ একালের গদ্য-পদ্য আন্দোলনের দলিল— সত্য গুহ
- ❑ বাংলা ছোটগল্প : প্রসঙ্গ ও প্রকরণ— বীরেন্দ্র দত্ত
- ❑ বাংলা গদ্যরীতির ইতিহাস— অরুণকুমার মুখোপাধ্যায়
- ❑ বাংলা সাহিত্যে নবযুগ— শশিভূষণ দাশগুপ্ত
- ❑ আধুনিক বাংলা সাহিত্য— মোহিতলাল মজুমদার
- ❑ বঙ্কিমচন্দ্রের উপন্যাস : শিল্পরীতি— ক্ষেত্র গুপ্ত।

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বাংলা সাহিত্যের ইতিহাস (বিংশ শতক)

উদ্দেশ্য : এই কোর্সের মাধ্যমে বিশ শতকের বাংলা সাহিত্যের গতিপ্রকৃতি এবং স্বরূপ সম্পর্কে জ্ঞানার্জন করবে পড়ুয়ারা।

মডিউল-১ : কাব্য-কবিতা ও নাটক

		Class Hours		
		Th	**Tu**	**IA Exam**
ক.	রবীন্দ্রনাথ ঠাকুর	১৫	৩	১
	সত্যেন্দ্রনাথ দত্ত, যতীন্দ্রনাথ সেনগুপ্ত, মোহিতলাল মজুমদার, কাজী নজরুল ইসলাম			
	জীবনানন্দ দাশ, সুধীন্দ্রনাথ দত্ত, বুদ্ধদেব বসু, বিষ্ণু দে			
	সমর সেন, সুভাষ মুখোপাধ্যায়, সুকান্ত ভট্টাচার্য, বীরেন্দ্র চট্টোপাধ্যায়,			
	সুনীল গঙ্গোপাধ্যায়, শক্তি চট্টোপাধ্যায়, কবিতা সিংহ			
খ.	রবীন্দ্রনাথ ঠাকুর, দ্বিজেন্দ্রলাল রায়	৮	৩	
	বিজন ভট্টাচার্য, তুলসী লাহিড়ী			
	মন্মথ রায়, উৎপল দত্ত, বাদল সরকার			

মডিউল-২ : কথাসাহিত্য

রবীন্দ্রনাথ ঠাকুর	২৩	৬	১
শরৎচন্দ্র চট্টোপাধ্যায় (ঔপন্যাসিক)			
জগদীশ গুপ্ত (গল্পকার), পরশুরাম (গল্পকার)			
প্রেমেন্দ্র মিত্র (গল্পকার), মানিক বন্দ্যোপাধ্যায়			
বিভূতিভূষণ বন্দ্যোপাধ্যায়, তারাশঙ্কর বন্দ্যোপাধ্যায়			
সতীনাথ ভাদুড়ী, সুবোধ ঘোষ (গল্পকার)			
সোমেন চন্দ (গল্পকার), সমরেশ বসু (গল্পকার)			
আশাপূর্ণা দেবী, সৈয়দ ওয়ালিউল্লাহ			

মডিউল-৩ : গদ্য-প্রবন্ধ ও সাময়িকপত্র

ক.	রবীন্দ্রনাথ ঠাকুর	১৩	৩	১
	রামেন্দ্রসুন্দর ত্রিবেদী			
	প্রমথ চৌধুরী			
	মোহিতলাল মজুমদার			
	বুদ্ধদেব বসু			
	গোপাল হালদার			
	সৈয়দ মুজতবা আলী			
খ.	ভারতী, সবুজপত্র, নারায়ণ	১০	৩	
	কল্লোল, কালিকলম, প্রগতি			
	প্রবাসী, ভারতবর্ষ, শনিবারের চিঠি			
	পরিচয়, কবিতা, কৃত্তিবাস,			

সহায়ক গ্রন্থ (নির্বাচিত)

- বাঙ্গালা সাহিত্যের ইতিহাস (৫ম খণ্ড)— সুকুমার সেন
- বাংলা সাহিত্যের ইতিকথা (৩-৪)— ভূদেব চৌধুরী
- রবীন্দ্রানুসারী কবিসমাজ— অরুণকুমার মুখোপাধ্যায়
- আমার কালের কয়েকজন কবি— জগদীশ ভট্টাচার্য
- রবীন্দ্রনাট্য পরিক্রমা— উপেন্দ্রনাথ ভট্টাচার্য
- রবীন্দ্রনাট্য প্রবাহ— প্রমথনাথ বিশী
- বাংলা নাটকের ইতিহাস— অজিতকুমার ঘোষ
- বঙ্গসাহিত্যে উপন্যাসের ধারা— শ্রীকুমার বন্দ্যোপাধ্যায়
- আধুনিকতা ও রবীন্দ্রনাথ— আবু সয়ীদ আইয়ুব
- সাহিত্য টীকা— সনৎকুমার মিত্র
- বাংলা সাময়িকপত্রের ইতিবৃত্ত (২য় খণ্ড) সন্দীপ দত্ত
- বাংলা প্রবন্ধ সাহিত্যের ধারা (১, ২ খণ্ড)— অধীর দে
- কল্লোলের কাল— জীবেন্দ্র সিংহ রায়

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ঐতিহাসিক ভাষাবিজ্ঞান

উদ্দেশ্য : প্রাচীন ভারতীয় আর্যভাষা থেকে আধুনিক ভারতীয় আর্যভাষা হিসেবে বাংলা ভাষার উদ্ভব ও বিকাশের প্রতিটি পর্যায়ের সাহিত্যিক নিদর্শনের সহায়তায় সেই সেই পর্যায়ের ভাষাগত বৈশিষ্ট্য সম্পর্কে শিক্ষার্থীদের ধারণা দেওয়া।

মডিউল-১

	Class Hours		
	Th	**Tu**	**IA Exam**
ভাষা, ভাষাপরিবার প্রাচীন ভারতীয় আর্যভাষা থেকে আধুনিক ভারতীয় আর্যভাষা হিসেবে বাংলা ভাষার উদ্ভবের গতিরেখা	২৩	৬	১

মডিউল-২

প্রাচীন বাংলা ভাষার ভাষাতাত্ত্বিক লক্ষণ—প্রেক্ষিত চর্যাপদ আদি-মধ্য বাংলা ভাষার ভাষাতাত্ত্বিক লক্ষণ— প্রেক্ষিত শ্রীকৃষ্ণকীর্তন	২৩	৬	১

মডিউল -৩

অন্ত-মধ্য বাংলা ভাষার ভাষাতাত্ত্বিক লক্ষণ— প্রেক্ষিত অন্নদামঙ্গল আধুনিক বাংলা ভাষার ভাষাতাত্ত্বিক লক্ষণ— প্রেক্ষিত পরিব্রাজক (স্বামী বিবেকানন্দ)	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ভাষা-প্রকাশ বাঙ্গালা ব্যাকরণ— সুনীতিকুমার চট্টোপাধ্যায়
- সংস্কৃত ও প্রাকৃত ভাষার ক্রমবিকাশ (১-২ খণ্ড)— পরেশচন্দ্র মজুমদার
- বাংলা ভাষা পরিক্রমা— পরেশচন্দ্র মজুমদার
- ভাষা-জিজ্ঞাসা— শিশিরকুমার দাশ
- ভাষার ইতিবৃত্ত— সুকুমার সেন
- সাধারণ ভাষাবিজ্ঞান ও বাংলা ভাষা— রামেশ্বর শ'
- আধুনিক ভাষাতত্ত্ব— আবদুল কালাম মনজুর মোরশেদ
- বাঙ্গালা ভাষার ইতিবৃত্ত— মুহম্মদ শহীদুল্লাহ
- বাংলা ভাষা— পার্বতীচরণ ভট্টাচার্য

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কথাসাহিত্য

উদ্দেশ্য : তৃতীয় সেমেস্টারে বাংলা সাহিত্যের আধুনিক পর্যায়ের ইতিহাস এবং ভাষাবিজ্ঞান বিষয়ে জ্ঞানার্জনের পাশাপাশি শিক্ষার্থীরা এই কোর্সটি পড়বে। আধুনিক সময়ের জটিলতা, ব্যষ্টি ও সমষ্টির দ্বন্দ্ব, বাঙালির পারিবারিক জীবনে নারীর অবস্থান, পরিবেশ সম্পর্কিত ভাবনা এবং মানুষের লড়াই-সংগ্রামের নানা প্রবণতাকে পড়ুয়াদের চেনানোর চেষ্টা করা হবে এই কোর্সের মাধ্যমে।

মডিউল-১ : উপন্যাস (যে-কোনো একটি)

	Class Hours		
	Th	**Tu**	**IA Exam**
যোগাযোগ— রবীন্দ্রনাথ ঠাকুর দেনাপাওনা— শরৎচন্দ্র চট্টোপাধ্যায়	২৩	৬	১

মডিউল -২ : উপন্যাস (যে-কোনো একটি)

পদ্মানদীর মাঝি— মানিক বন্দ্যোপাধ্যায় অরণ্যের অধিকার— মহাশ্বেতা দেবী	২৩	৬	১

মডিউল-৩ : ছোটগল্প

ক.	রবীন্দ্রনাথ ঠাকুরের ছোটগল্প : নিশীথে, একরাত্রি, সুভা, অতিথি, ল্যাবরেটরী	১১	৩	১
খ	একালের ছোটগল্প সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত) পাঠ্য : পয়োমুখম : জগদীশ গুপ্ত মহানগর : প্রেমেন্দ্র মিত্র ফসিল : সুবোধ ঘোষ এখন প্রেম : তপোবিজয় ঘোষ প্লাবনকাল : সুচিত্রা ভট্টাচার্য	১২	৩	

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বঙ্গ সাহিত্যে উপন্যাসের ধারা— শ্রীকুমার বন্দ্যোপাধ্যায়
- ❑ রবীন্দ্রনাথের উপন্যাস চেতনালোক ও শিল্পরূপ— সৈয়দ আকরম হোসেন
- ❑ বাংলা উপন্যাসের কালান্তর— সরোজ বন্দ্যোপাধ্যায়
- ❑ রবীন্দ্রনাথ— সুবোধচন্দ্র সেনগুপ্ত
- ❑ শরৎচন্দ্র— সুবোধচন্দ্র সেনগুপ্ত
- ❑ শরৎচন্দ্র : পুনর্বিচার— অরুণকুমার মুখোপাধ্যায়
- ❑ রবীন্দ্র ছোটগল্পের শিল্পরূপ— তপোব্রত ঘোষ
- ❑ রবীন্দ্র উপন্যাসের নির্মাণশিল্প— গোপিকানাথ রায়চৌধুরী
- ❑ রবীন্দ্রনাথের ছোটগল্প ও উপন্যাস— উপেন্দ্রনাথ ভট্টাচার্য
- ❑ বাংলা ছোটগল্প : প্রসঙ্গ ও প্রকরণ— বীরেন্দ্র দত্ত
- ❑ কথা ও সাহিত্যে রবীন্দ্রনাথ— বিশ্বপতি চৌধুরী
- ❑ রবীন্দ্র সাহিত্যের নরনারী (১ম খণ্ড)— গোপীমোহন সিংহ রায়
- ❑ ঔপন্যাসিক মানিক বন্দ্যোপাধ্যায়— সরোজমোহন মিত্র
- ❑ রবীন্দ্র সাহিত্যের ভূমিকা— নীহাররঞ্জন রায়
- ❑ রবীন্দ্রনাথ/রাজনৈতিক ব্যক্তিত্ব— অরবিন্দ পোদ্দার
- ❑ রবীন্দ্র-মানস— অরবিন্দ পোদ্দার

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প্রাগাধুনিক সাহিত্য

উদ্দেশ্য : প্রাগাধুনিক সাহিত্যের এই কোর্সটির মাধ্যমে শিক্ষার্থীরা সাহিত্যের রসাস্বাদনের পাশাপাশি যাতে বাঙালির সমাজ ও ধর্ম-সংস্কৃতির বিবর্তনের গতিরেখাটিকেও অনুধাবন করতে পারে সেদিকে লক্ষ্য রাখা হয়েছে।

মডিউল-১ বৈষ্ণব পদাবলী (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ)

	Class Hours		
	Th	**Tu**	**IA Exam**
প্রারম্ভিক আলোচনা নীরদনয়নে নীর ঘন সিঞ্চনে আজু হাম কি পেখলুঁ নবদ্বীপ চন্দ দাঁড়াইয়া নন্দের আগে গোপাল কান্দে অনুরাগে ঘরের বাহিরে দণ্ডে শতবার রূপ লাগি আঁখি ঝুরে গুণে মন ভোর এমন পিরীতি কভু নাহি দেখি শুনি সখি কি পুছসি অনুভব মোয় কণ্টক গাড়ি কমল সম পদতল মন্দির বাহির কঠিন কপাট কি মোহিনী জান বধুঁ কি মোহিনী জান বধুঁ তুমি যে আমার প্রাণ অঙ্কুর তপন তাপে যদি জারব বহুদিন পরে বধুঁয়া এলে তাতল সৈকত বারি-বিন্দুসম	২৩	৬	১

মডিউল-২

চণ্ডীমঙ্গল (১-ম খণ্ড)— মুকুন্দ চক্রবর্তী (**কলিকাতা বিশ্ববিদ্যালয় সংস্করণ**)	২৩	৬	১

মডিউল-৩ : শাক্ত পদাবলী (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ)

প্রারম্ভিক আলোচনা গিরিবর, আর আমি পারিনে হে, প্রবোধ দিতে উমারে (বাল্যলীলা) গিরি, এবার আমার উমা এলে (আগমনী) কবে যাবে বল গিরিরাজ (ঐ) বারে বারে কহ রাণি, গৌরী আনিবারে (ঐ) ওহে হর গঙ্গাধর, কর অঙ্গীকার (ঐ) গিরিরাণি, এই নাও তোমার উমারে (ঐ) ওরে নবমী নিশি, না হইও রে (বিজয়া) ওহে প্রাণনাথ গিরিবর হে (ঐ) কেবল আসার আশা, ভবে আসা (ভক্তের আকুতি) মাগো তারা ও শঙ্করি (ঐ) মা আমায় ঘুরাবে কত (ঐ) আমি কি দুখেরে ডরাই? (ঐ) আমায় দেও মা তবিলদারী (ঐ) এমন দিন কি হবে তারা (ঐ)	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ মধ্যযুগের কবি ও কাব্য— শঙ্করীপ্রসাদ বসু
- ❑ চন্ডীদাস ও বিদ্যাপতি— শঙ্করীপ্রসাদ বসু
- ❑ শ্রীরাধার ক্রমবিকাশ— শশিভূষণ দাশগুপ্ত
- ❑ বৈষ্ণব রস প্রকাশ— ক্ষুদিরাম দাস
- ❑ বঙ্গে বৈষ্ণবধর্ম— রমাকান্ত চক্রবর্তী
- ❑ শাক্ত পদাবলী— জাহ্নবীকুমার চক্রবর্তী
- ❑ শাক্তগীতি পদাবলী— অরুণকুমার বসু
- ❑ বাংলা মঙ্গলকাব্যের ইতিহাস— আশুতোষ ভট্টাচার্য
- ❑ চন্ডীমঙ্গল— সুকুমার সেন সম্পাদিত
- ❑ চন্ডীমঙ্গল— ক্ষুদিরাম দাস সম্পাদিত
- ❑ ভারতের শক্তি সাধনা ও শক্তি সাহিত্য— শ্রীশশিভূষণ দাশগুপ্ত
- ❑ বাংলার কাব্য— হুমায়ুন কবির
- ❑ কবিকঙ্কণ মুকুন্দের চণ্ডীমঙ্গল বীক্ষা ও সমীক্ষা— বিশ্বনাথ রায়
- ❑ চন্ডীমঙ্গল— সনৎকুমার নস্কর

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ছন্দ, অলঙ্কার ও কাব্যতত্ত্ব

উদ্দেশ্য : সাহিত্যের শিক্ষার্থীদের ছন্দ, অলঙ্কার ও কাব্যতত্ত্ব বিষয়ে তত্ত্বজ্ঞান থাকা প্রয়োজন। এই কোর্স শিক্ষার্থীদের কাব্য-কবিতা পাঠকে গভীরতর করবে।

মডিউল-১ : ছন্দ

	Class Hours		
	Th	**Tu**	**IA Exam**
কবিতা ও ছন্দ— সাধারণ আলোচনা	২৩	৬	১
দল/অক্ষর, কলা/মাত্রা, যতি, যতিলোপ, পর্ব, পঙ্‌ক্তি/চরণ, ছত্র, পদ			
বাংলা ছন্দের ত্রিধারা			
মিশ্রবৃত্ত/তানপ্রধান/অক্ষরবৃত্ত— উদাহরণসহ বৈশিষ্ট্য			
সরল কলাবৃত্ত/কলাবৃত্ত/ধ্বনি প্রধান/মাত্রাবৃত্ত— উদাহরণসহ বৈশিষ্ট্য			
দলবৃত্ত/শ্বাসাঘাত প্রধান/বলবৃত্ত/স্বরবৃত্ত/ছড়ার ছন্দ/লৌকিক ছন্দ— উদাহরণসহ বৈশিষ্ট্য			
বাংলা ছন্দের কয়েকটি রূপবন্ধের পরিচয় ও উদাহরণসহ আলোচনা— পয়ার, সনেট, অমিত্রাক্ষর, মুক্তক, গদ্যছন্দ			
ছন্দোলিপি প্রণয়ন (পর্ব, পদ, পঙ্‌ক্তি, লয়, মাত্রা ও রীতির উল্লেখ বাঞ্ছনীয়)			

মডিউল-২ : অলংকার

কবিতা ও অলঙ্কার— সাধারণ আলোচনা	২৩	৬	১
উদাহরণসহ সংজ্ঞা— অনুপ্রাস, শ্লেষ, যমক, বক্রোক্তি			
উদাহরণসহ সংজ্ঞা— উপমা, রূপক, সমাসোক্তি, উৎপ্রেক্ষা অপহ্নুতি, দৃষ্টান্ত, ব্যতিরেক, বিরোধ, অর্থান্তরন্যাস, ব্যাজস্তুতি			
অলংকার নির্ণয়			

মডিউল-৩ : কাব্যতত্ত্ব

কাব্য জিজ্ঞাসা— অতুলচন্দ্র গুপ্ত (পাঠ্য— ধ্বনি ও রস)	১৫	৩	১
অনুকরণতত্ত্ব	৮	৩	

সহায়ক গ্রন্থ (নির্বাচিত)

- বাংলা ছন্দের মূলসূত্র— অমূল্যধন মুখোপাধ্যায়
- নূতন ছন্দ পরিক্রমা— প্রবোধচন্দ্র সেন
- বাংলা ছন্দ পরিচয়— নীলরতন সেন
- অলংকার চন্দ্রিকা— শ্যামাপদ চক্রবর্তী
- বাঙলা ছন্দ— জীবেন্দ্র সিংহ রায়
- বাঙলা অলংকার— জীবেন্দ্র সিংহ রায়
- কাব্যবিচার— সুরেন্দ্রনাথ দাশগুপ্ত
- কাব্যতত্ত্ব বিচার— দুর্গাশঙ্কর মুখোপাধ্যায়
- সাহিত্য বিবেক— বিমলকুমার মুখোপাধ্যায়
- ছন্দতত্ত্ব ছন্দরূপ— পবিত্র সরকার
- কাব্যতত্ত্ব— অ্যারিস্টটল (শিশিরকুমার দাশ অনূদিত)
- অ্যারিস্টটলের পোয়েটিক ও সাহিত্যতত্ত্ব— সাধনকুমার ভট্টাচার্য

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প্রবন্ধ ও বিবিধ রচনা

উদ্দেশ্য : বাংলা প্রবন্ধে দার্শনিকতা বা চিন্তার প্রসার ঘটেছে উনিশ শতকের মধ্যভাগ থেকেই। সমাজ, রাষ্ট্র, শিক্ষা, বিজ্ঞান, ভাষা, সাহিত্য, ধর্ম, দর্শন— নানা বিষয়েই বাঙালি চিন্তকগণ প্রবন্ধের মাধ্যমে তাঁদের ভাবনাকে ব্যক্ত করেছেন। রবীন্দ্রনাথের ছিন্নপত্রেও বিশ্ববোধের এক অনন্য রূপ ব্যক্ত হয়েছে। এই কোর্সটির মাধ্যমে শিক্ষার্থীরা সমাজ ও সাহিত্য সম্পর্কিত বিচিত্র বিষয়ে সমৃদ্ধ হতে পারবে।

মডিউল-১

		Class Hours		
		Th	**Tu**	**IA Exam**
ক	কমলাকান্তের দপ্তর— বঙ্কিমচন্দ্র চট্টোপাধ্যায় পাঠ্য : একা-কে গায় ওই, আমার মন, পতঙ্গ, বিড়াল	১১	৩	১
খ	একালের প্রবন্ধ সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত) পাঠ্য প্রবন্ধ : সংস্কৃতির সামাজিক দূরত্ব— বিনয় ঘোষ, শিক্ষা ও বিজ্ঞান— সতেন্দ্রনাথ বসু যে দেশে বহু ধর্ম বহু ভাষা— অন্নদাশঙ্কর রায় সাহিত্যের রাজনীতি— সরোজ আচার্য	১২	৩	

মডিউল-২

ক	সাহিত্য— রবীন্দ্রনাথ ঠাকুর পাঠ্য : সাহিত্যের তাৎপর্য, সাহিত্যের বিচারক, সৌন্দর্যবোধ	১১	৩	১
খ	একালের সমালোচনা সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত) পাঠ্য প্রবন্ধ : আধুনিক সাহিত্য— গোপাল হালদার রবীন্দ্রনাথ ও উত্তরসাধক— বুদ্ধদেব বসু পাশ্চাত্য ও প্রাচ্য সমালোচনার ধারা— সুবোধচন্দ্র সেনগুপ্ত উপন্যাস ও সমাজবাস্তবতা— আখতারুজ্জামান ইলিয়াস	১২	৩	

মডিউল-৩

ছিন্নপত্র— রবীন্দ্রনাথ ঠাকুর পত্রসংখ্যা— ১০, ১৮, ৩০, ৬৪, ৬৭, ৭৭, ৮১, ১০২, ১০৬, ১০৮	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ চিন্তানায়ক বঙ্কিমচন্দ্র— ভবতোষ দত্ত
- ❑ বঙ্কিমচন্দ্রের সাহিত্য জিজ্ঞাসা— বিষ্ণুপদ ভট্টাচার্য
- ❑ রবীন্দ্রসাহিত্য পাঠ— হরপ্রসাদ মিত্র
- ❑ রবীন্দ্রচর্যা— দেবীপদ ভট্টাচার্য
- ❑ রবীন্দ্রনন্দন তত্ত্ব— বিমলকুমার মুখ্যোপাধ্যায়
- ❑ বঙ্কিমচন্দ্র— মোহিতলাল মজুমদার
- ❑ বঙ্কিমমানস— অরবিন্দ পোদ্দার
- ❑ বাংলা প্রবন্ধ সাহিত্যের ধারা (১, ২ খণ্ড)— অধীর দে
- ❑ সমালোচনা-সাহিত্য পরিচয়— কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত

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সাহিত্যের রূপ ও রীতি

উদ্দেশ্য : সাহিত্যের রূপবৈচিত্র ও গঠনরীতি সম্পর্কে এই কোর্সে ধারণা প্রদান করা হবে। সাহিত্যের বিভিন্ন সংরূপের রূপ ও আঙ্গিক সম্পর্কে জ্ঞানার্জনের পাশাপাশি শিক্ষার্থীরা সাহিত্যের বিবর্তন সম্পর্কেও ধারণা লাভ করতে পারবে।

মডিউল-১ কাব্য-কবিতা ও নাটক

		Class Hours		
		Th	Tu	IA Exam
ক	কবিতার বিভিন্ন রূপকল্প— মহাকাব্য, গীতিকবিতা, কবিগান, সনেট, হাইকু, রুবাই ও লিমেরিক	১০	৩	১
খ	নাটকের বিভিন্ন রূপকল্প— ট্র্যাজেডি, কমেডি, প্রহসন, কাব্যনাটক, নৃত্যনাট্য, সামাজিক নাটক, পৌরাণিক নাটক, অ্যাবসার্ড নাটক ও একাঙ্ক নাটক	১৩	৩	

মডিউল-২ : উপন্যাস ও ছোটগল্প

উপন্যাসের রূপকল্প ও শ্রেণিকরণ— নকশাধর্মী উপন্যাস, রোমান্সধর্মী উপন্যাস, সামাজিক উপন্যাস, ঐতিহাসিক উপন্যাস, রাজনৈতিক উপন্যাস, আঞ্চলিক উপন্যাস, মনস্তাত্ত্বিক উপন্যাস, চেতনাপ্রবাহরীতির উপন্যাস	২৩	৬	১
ছোটগল্পের প্রকৃতি			
ছোটগল্প ও রূপকথা			
অনুগল্প			
উপন্যাস ও ছোটগল্পের তুলনা			

মডিউল-৩ প্রবন্ধ, সমালোচনা ও অন্যান্য সংরূপ

প্রবন্ধের প্রকার— বস্তুনিষ্ঠ, ব্যক্তিনিষ্ঠ, লঘু প্রবন্ধ ও গবেষণা-প্রবন্ধ	২৩	৬	১
সমালোচনা সাহিত্য			
ভ্রমণ সাহিত্য, ডায়েরি, পত্রসাহিত্য, রম্যরচনা, জীবনী ও আত্মজীবনী/স্মৃতিকথা			

সহায়ক গ্রন্থ (নির্বাচিত)

- সাহিত্য সন্দর্শন— শ্রীশচন্দ্র দাস
- সাহিত্য ও সমালোচনার রূপরীতি— উজ্জ্বলকুমার মজুমদার
- সাহিত্য : রূপ-বিচিত্রা— অপূর্বকুমার রায়
- সাহিত্যের রূপরীতি ও অন্যান্য প্রসঙ্গ— কুন্তল চট্টোপাধ্যায়
- বাংলা সাহিত্যের রূপরীতি— শুদ্ধসত্ত্ব বসু
- সাহিত্যকোষ : কথাসাহিত্য— অলোক রায়
- সাহিত্য বিচার : তত্ত্ব ও প্রয়োগ— বিমলকুমার মুখোপাধ্যায়
- A Glossary of Literary Terms— M.H. Abrams

BNG-A-CC-5-12-TH-TU

নাটক ও নাট্যমঞ্চ

উদ্দেশ্য : নাট্যমঞ্চ ও নাটকের বিকাশ পরস্পরের সাপেক্ষ ও পরিপূরক। সামাজিক বাস্তবতার দর্পণ হিসেবে নাট্যসাহিত্য পাঠের পাশাপাশি পড়ুয়ারা নাট্যমঞ্চের বিকাশকেও বিবেচনার মধ্যে রাখবে এই উদ্দেশ্যে কোর্সটি করা হয়েছে।

মডিউল-১

	Class Hours		
	Th	**Tu**	**IA Exam**
বুড় সালিকের ঘাড়ে রোঁ— মধুসূদন দত্ত	৮	২	১
মুক্তধারা— রবীন্দ্রনাথ ঠাকুর	১৫	৪	

মডিউল-২

কারাগার— মন্মথ রায়	৮	২	১
টিনের তলোয়ার— উৎপল দত্ত	১৫	৪	

মডিউল-৩ : রঙ্গমঞ্চের ইতিহাস

লেবেডফ ও বেঙ্গলি থিয়েটার, নবীন বসুর শ্যামবাজার থিয়েটার, বেলগাছিয়া নাট্যশালা, জোড়াসাঁকো নাট্যশালা, বাগবাজার অ্যামেচার থিয়েটার (শ্যামবাজার নাট্যসমাজ)	২৩	৬	১
ন্যাশানাল থিয়েটার (প্রথম ও দ্বিতীয় পর্ব),			
নাট্যনিয়ন্ত্রণ বিল			
গণনাট্য ও নবনাট্য আন্দোলনের কাল			

সহায়ক গ্রন্থ (নির্বাচিত)

- নাটকের কথা— অজিতকুমার ঘোষ
- বাংলা নাট্যমঞ্চের ইতিহাস— ব্রজেন্দ্রনাথ বন্দ্যোপাধ্যায়
- রবীন্দ্রনাট্য সমীক্ষা : রূপক-সাংকেতিক— দুর্গাশঙ্কর মুখোপাধ্যায়
- কালের মাত্রা ও রবীন্দ্রনাটক— শঙ্খ ঘোষ
- বাংলা থিয়েটারের ইতিহাস— দর্শন চৌধুরী
- রবীন্দ্রসাহিত্যের নরনারী (৩য় খণ্ড) — গোপীমোহন সিংহ রায়
- কবি শ্রীমধুসূদন— মোহিতলাল মজুমদার
- গণনাট্য আন্দোলন— দর্শন চৌধুরী
- বাংলা নাট্যমঞ্চের রূপরেখা— দুর্গাশঙ্কর মুখোপাধ্যায়
- নাট্যমঞ্চ নাট্যরূপ— পবিত্র সরকার
- রঙ্গমঞ্চে বাংলা নাটকের প্রয়োগ— অজিতকুমার ঘোষ
- নাট্যতত্ত্ব ও নাট্যমঞ্চ— অজিতকুমার ঘোষ

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আধুনিক বাংলা কাব্য-কবিতা

উদ্দেশ্য : ঔপনিবেশিক আধুনিকতার সংস্পর্শে এসে আমাদের কাব্যে যে নবযুগের সঞ্চার হয়েছিল, তার বিভিন্ন পর্বকে পড়ুয়ারা অনুধাবন করতে পারবে এই কোর্সটির মাধ্যমে।

মডিউল-১

	Class Hours		
	Th	**Tu**	**IA Exam**
বীরাঙ্গনা কাব্য— মধুসূদন দত্ত পাঠ্য : দুষ্মন্তের প্রতি শকুন্তলা, সোমের প্রতি তারা, দ্বারকানাথের প্রতি রুক্মিনী, দশরথের প্রতি কেকয়ী, লক্ষ্মণের প্রতি শূর্পনখা এবং নীলধ্বজের প্রতি জনা	২৩	৬	১

মডিউল-২

ক.	সোনার তরী— রবীন্দ্রনাথ ঠাকুর পাঠ্য : সোনার তরী, বৈষ্ণব কবিতা, বসুন্ধরা, নিরুদ্দেশ যাত্রা	১৩	৩	১
খ.	সঞ্চিতা— কাজী নজরুল ইসলাম পাঠ্য— বিদ্রোহী, অভিশাপ, দারিদ্র্য, নারী	১০	৩	

মডিউল-৩

একালের কবিতা সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ) পাঠ্য : ক) রাত্রি— জীবনানন্দ দাশ, সোহংবাদ— সুধীন্দ্রনাথ দত্ত সংগতি— অমিয় চক্রবর্তী, রবীন্দ্রনাথের প্রতি— বুদ্ধদেব বসু প্রচ্ছন্ন স্বদেশ— বিষ্ণু দে	১২	৩	১
খ) বধূ— সুভাষ মুখোপাধ্যায়, বোধন— সুকান্ত ভট্টাচার্য বৃক্ষ— কবিতা সিংহ, স্মৃতির শহরে— সুনীল গঙ্গোপাধ্যায় আমার নাম ভারতবর্ষ— অমিতাভ দাশগুপ্ত	১১	৩	

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ কবি শ্রীমধুসূদন— মোহিতলাল মজুমদার
- ❑ মধুসূদন কবি আত্মা ও কাব্যশিল্প— ক্ষেত্র গুপ্ত
- ❑ মধুসূদন : কবি ও নাট্যকার— সুবোধচন্দ্র সেনগুপ্ত
- ❑ রবীন্দ্র সরণী— প্রমথনাথ বিশী
- ❑ রবীন্দ্রকাব্য পরিক্রমা— উপেন্দ্রনাথ ভট্টাচার্য
- ❑ আধুনিক বাংলা কাব্য পরিচয়— দীপ্তি ত্রিপাঠী
- ❑ আধুনিক কবিতার দিগ্‌বলয়—অশ্রুকুমার শিকদার
- ❑ আমার কালের কয়েকজন কবি— জগদীশ ভট্টাচার্য
- ❑ আধুনিক বাংলা কবিতায় ইউরোপীয় প্রভাব— মঞ্জুভাষ মিত্র
- ❑ বাংলা কবিতার চালচিত্র— সুমিতা চক্রবর্তী
- ❑ নজরুলের কবিতা : অসংযমের শিল্প— ক্ষেত্র গুপ্ত

- ❑ জনগণের কবি কাজী নজরুল ইসলাম— কল্পতরু সেনগুপ্ত
- ❑ নিঃশব্দের তর্জনী— শঙ্খ ঘোষ
- ❑ আধুনিক কবিতার ইতিহাস— অলোকরঞ্জন দাশগুপ্ত ও দেবীপ্রসাদ বন্দ্যোপাধ্যায়
- ❑ কবিতার মিল ও অমিল— শিশিরকুমার দাশ
- ❑ এই কাব্য এই হাতছানি— শক্তি চট্টোপাধ্যায়
- ❑ বাংলা কবিতার কালান্তর — সরোজ বন্দ্যোপাধ্যায়

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সংস্কৃত, ইংরেজি ও প্রতিবেশী (হিন্দী) সাহিত্যের ইতিহাস

উদ্দেশ্য : বাংলা সাহিত্যের সামগ্রিক পরিচয় পাওয়ার পর শিক্ষার্থী সংস্কৃত, ইংরেজি এবং প্রতিবেশী (হিন্দী) সাহিত্যের ইতিহাস সম্পর্কে প্রাথমিক পরিচয় লাভ করবে এবং সেই আলোকে বাংলা সাহিত্য সম্পর্কেও তার মূল্যায়ন আরো স্বচ্ছ হয়ে উঠবে।

মডিউল-১ সংস্কৃত সাহিত্যের সংক্ষিপ্ত ইতিহাস

	Class Hours		
	Th	**Tu**	**IA Exam**
কালিদাস (কবি ও নাট্যকার)	২৩	৬	১
ভবভূতি			
বাণভট্ট			
শূদ্রক			
জয়দেব			

মডিউল-২ : ইংরেজি সাহিত্যের সংক্ষিপ্ত ইতিহাস

নাটক— উইলিয়ম শেক্সপিয়র, জর্জ বার্নার্ড শ', স্যামুয়েল বেকেট	২৩	৬	১
কাব্য— উইলিয়ম ওয়ার্ডসওয়ার্থ, পি.বি. শেলি, জন কীটস, টি.এস এলিয়ট			
কথাসাহিত্য—ওয়াল্টার স্কট, চার্লস ডিকেন্স, ভার্জিনিয়া উলফ্			

মডিউল-৩ : প্রতিবেশী সাহিত্যের সংক্ষিপ্ত ইতিহাস : হিন্দী (পঠন-পাঠন হবে বাংলায়)

ভারতেন্দু হরিশচন্দ্র, মুন্সী প্রেমচাঁদ	২৩	৬	১
মহাদেবী বর্মা, সূর্যকান্ত ত্রিপাঠী নিরালা, ফণীশ্বরনাথ রেণু			

সহায়কগ্রন্থ (নির্বাচিত)

- ❑ সংস্কৃত সাহিত্যের রূপরেখা— বিমানচন্দ্র ভট্টাচার্য
- ❑ সংস্কৃত সাহিত্য পরিক্রমা— করুণাসিন্ধু দাস
- ❑ সংস্কৃত সাহিত্যের দশরত্ন— সুখেন্দুসুন্দর গঙ্গোপাধ্যায়
- ❑ সংস্কৃত সাহিত্যের ইতিহাস— ধীরেন্দ্রনাথ বন্দ্যোপাধ্যায়
- ❑ ইংরাজী সাহিত্যের ইতিহাস— শ্রীকুমার বন্দ্যোপাধ্যায়
- ❑ ইংরাজী সাহিত্যের সংক্ষিপ্ত ইতিহাস— সত্যপ্রসাদ সেনগুপ্ত
- ❑ ইংরাজী সাহিত্যের রূপরেখা— গোপাল হালদার
- ❑ ইংরেজী সাহিত্য পরিচয় — অরবিন্দ পোদ্দার
- ❑ ইংরেজী সাহিত্যের ইতিহাস— কুন্তল চট্টোপাধ্যায়
- ❑ হিন্দী সাহিত্যের ইতিহাস— বিজয়েন্দ্র স্নাতক (অনুবাদ—জ্যোতির্ময় দাশ)
- ❑ হিন্দী সাহিত্যের ইতিহাস— রামবহাল তেওয়ারী
- ❑ আধুনিক হিন্দী সাহিত্য : গতি ও প্রকৃতি— বিপ্লব চক্রবর্তী

Discipline Specific Elective (DSE)– 6 Credit each
(সাম্মানিক বাংলা)

- সাম্মানিক স্নাতক (বাংলা) পাঠক্রমে 'Discipline Specific Elective (DSE)' স্তরে ২৪ ক্রেডিট-এর মোট ৪টি কোর্স পড়তে হবে। প্রদত্ত আটটি কোর্সকে দুটি বর্গে (A এবং B) বিভক্ত করা হয়েছে। A- বর্গের প্রথম দুটি কোর্স (অর্থাৎ কোর্স 1 এবং 2) থেকে যে-কোনো একটি কোর্স এবং B-বর্গের প্রথম দুটি কোর্স (অর্থাৎ কোর্স 1 এবং 2) থেকে যে-কোন একটি কোর্স নিয়ে মোট দুটি কোর্স পড়ুয়ারা পঞ্চম সেমেস্টারে পাঠ্য হিসেবে নির্বাচন করবে। ষষ্ঠ সেমেস্টারেও A- বর্গের শেষের দুটি কোর্স (অর্থাৎ কোর্স 3 এবং 4) থেকে একটি এবং B- বর্গের শেষের দুটি কোর্স (অর্থাৎ কোর্স 3 এবং 4) থেকে একটি নিয়ে মোট দুটি কোর্স পাঠ্য হিসেবে পড়ুয়ারা নির্বাচন করবে।
- ৬ ক্রেডিট-এর প্রতিটি কোর্সের পূর্ণমান ১০০। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট DSE-র ক্লাসে পড়ুয়ার উপস্থিতির জন্য বরাদ্দ। ১০ নম্বর কোর্সভিত্তিক ধারাবাহিক মূল্যায়ন বা ইন্টারন্যাল অ্যাসেসমেন্ট-এর জন্য এবং ১৫ নম্বর কোর্সভিত্তিক টিউটোরিয়াল-এর জন্য বরাদ্দ। বাকি ৬৫ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট কর্তৃপক্ষের তত্ত্বাবধানে লিখিত পরীক্ষা নেওয়া হবে। প্রতিটি সেমেস্টারে পনেরো সপ্তাহ করে ক্লাস হবে এটা ধরে নিয়ে Class Hours/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- ৬৫ নম্বরের লিখিত পরীক্ষায় ১০ নম্বরের তিনটি ব্যাখ্যামূলক, ৫ নম্বরের ৪টি বোধমূলক এবং ১ নম্বরের ১৫টি সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্নের উত্তর দিতে হবে। নিচের তালিকায় প্রশ্নপত্রের ধারণা পাওয়া যাবে।

প্রশ্ন নং	প্রশ্নের ধরন ও বিকল্প সংক্রান্ত নিয়ম	প্রশ্নের মান
১	মডিউল-১ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
২	মডিউল-২ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৩	মডিউল-৩ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৪	মডিউল-১ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৫	মডিউল-২ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৬	মডিউল-৩ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৭	মডিউল-১, মডিউল-২ এবং মডিউল-৩ থেকে একটি করে প্রসঙ্গ/বিষয় নিয়ে টীকা-ধর্মী প্রশ্ন হবে। তিনটির মধ্যে যে-কোনো একটি লিখতে হবে।	৫
৮	প্রত্যেকটি মডিউল থেকে কমপক্ষে **তিনটি** করে প্রশ্ন নিয়ে মোট **পনেরটি** সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্ন দেওয়া হবে। এক্ষেত্রে কোনো বিকল্প থাকবে না।	১ × ১৫

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বাংলার সমাজ ও সংস্কৃতির ইতিহাস

উদ্দেশ্য : বাংলা ভাষার উদ্ভবের সময়কাল থেকে আধুনিক কাল পর্যন্ত বাঙালি জাতির সাংস্কৃতিক বিকাশের গতিরেখার সঙ্গে শিক্ষার্থীদের পরিচয় ঘটানোই এই কোর্সের উদ্দেশ্য।

মডিউল-১ :

	Class Hours		
	Th	**Tu**	**IA Exam**
বাংলা ও বাঙালি জাতির ভৌগোলিক ও নৃতাত্ত্বিক পরিচয়	২৩	৬	১
বাংলার সমাজ কাঠামো ও অর্থনৈতিক ভিত্তি			
বাংলার রাজনৈতিক ইতিহাস			
বাংলার ধর্ম			
চৈতন্য-সংস্কৃতি			
বাঙালির সাংস্কৃতিক স্বরূপ			

মডিউল-২

ঔপনিবেশিক আধুনিকতার অভিঘাত— শিক্ষায়, ধর্ম সংস্কারে ও মুক্ত চিন্তায়	২৩	৬	১
কৃষক আন্দোলন, নীল বিদ্রোহ, ফকির আন্দোলন			
ধর্ম, সমাজ ও শিক্ষা সংস্কারের উদ্দেশ্যে গঠিত সভা-সমিতি (১৯ শতক)			

মডিউল-৩

বঙ্গভঙ্গ ও বয়কট-স্বদেশী আন্দোলন,	২৩	৬	১
প্রান্তবর্গ/দলিত জনগোষ্ঠীর জাগরণ			
বাঙালি মুসলমানের স্বতন্ত্র জাতিসত্তার সন্ধান			
দেশভাগ, উদ্বাস্তু সমস্যা ও ভাষা আন্দোলন			
খাদ্য আন্দোলন ও নকশাল আন্দোলন			

সহায়ক গ্রন্থ (নির্বাচিত)

- বাঙ্গালীর ইতিহাস— নীহাররঞ্জন রায়
- History of Medieval Bengal — রমেশচন্দ্র মজুমদার
- বাংলা দেশের ইতিহাস— রমেশচন্দ্র মজুমদার
- বাঙ্গালার ইতিহাস (অখণ্ড)— রাখালদাস বন্দ্যোপাধ্যায়
- বাঙ্গালীর সংস্কৃতি— সুনীতিকুমার চট্টোপাধ্যায়
- রামতনু লাহিড়ী ও তৎকালীন বঙ্গসমাজ— শিবনাথ শাস্ত্রী
- বাংলার ইতিহাস— সুভাষ মুখোপাধ্যায়
- সংস্কৃতির বিশ্বরূপ— গোপাল হালদার
- বাঙলা ও বাঙালীর বিবর্তন— অতুল সুর
- সংস্কৃতির রূপান্তর— গোপাল হালদার
- চৈতন্য-প্রসঙ্গ— বঙ্গীয় সাহিত্য পরিষদ প্রকাশিত
- বাংলার কাব্য— হুমায়ুন কবির
- ঔপনিবেশিক বাংলার সমাজ চিত্র— চিত্তব্রত পালিত
- দেশ বিভাগ : পশ্চাৎ ও নেপথ্য কাহিনী— ভবানীপ্রসাদ চট্টোপাধ্যায়
- যুক্ত বাংলার শেষ অধ্যায়— কালীপদ বিশ্বাস
- পলাশি থেকে পার্টিশান— শেখর বন্দ্যোপাধ্যায়
- নীল বিদ্রোহ— পুলক চন্দ্র
- বাঙালির দর্শন— আমিনুল ইসলাম
- স্বাধীন ভারতের সাম্যবাদী আন্দোলন : রাজনীতি ও গতিপ্রকৃতি— শোভনলাল দত্তগুপ্ত
- সাহিত্য সমাজ ইতিহাস— পশ্চিমবঙ্গ ইতিহাস সংসদ প্রকাশিত
- বাংলার রেনেশাঁস— সুশোভন সরকার
- বাংলার নবজাগৃতি— বিনয় ঘোষ
- কলকাতা : ইতিহাসের দিনলিপি— নীরদবরণ হাজরা
- সংস্কৃতির ভাঙা সেতু— আখতারুজ্জামান ইলিয়াস
- শতাব্দীর প্রতিধ্বনি— অতুল সুর
- উত্তাল চল্লিশ : অসমাপ্ত বিপ্লব— অমলেন্দু সেনগুপ্ত
- জোয়ারভাটায় ষাট-সত্তর— অমলেন্দু সেনগুপ্ত
- হাজার বছরের বাঙালির সংস্কৃতি— গোলাম মুরশিদ

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বাংলাদেশের সাহিত্য

উদ্দেশ্য : দেশভাগের পর পূর্ববঙ্গ তথা বাংলাদেশে বাংলা সাহিত্যের এক সমৃদ্ধ ধারা গড়ে উঠেছে। বাংলা সাহিত্যের পাঠ বাংলাদেশের সাহিত্য ব্যতিরেকে সম্পূর্ণতা লাভ করতে পারে না, এই বিবেচনাতেই কোর্সটির পরিকল্পনা করা হয়েছে।

মডিউল-১ : কথাসাহিত্য

		Class Hours		
		Th	Tu	IA Exam
ক.	সূর্য দীঘল বাড়ী— আবু ইসহাক	১৩	৩	১
খ.	প্যাপিরাস প্রকাশিত **বাংলাদেশের গল্প** গ্রন্থ থেকে নিচের গল্পগুলি পাঠ্য : আত্মজা ও একটি করবী গাছ —হাসান আজিজুল হক খোয়াই নদীর বাঁক বদল— সেলিনা হোসেন সুন্দর মানুষ— বিপ্রদাস বড়ুয়া যুগলবন্দি— আখতারুজ্জামান ইলিয়াস মহাকালের খাঁড়া— কায়েস আহমেদ	১০	৩	

মডিউল-২ : কবিতা ও নাটক

ক.	সপ্তর্ষি প্রকাশিত **বাংলাদেশের শ্রেষ্ঠ কবিতা** — রণজিৎ দাশ ও সাজ্জাদ শরীফ সম্পাদিত। পাঠ্য কবিতা : স্বাধীনতা তুমি— শামসুর রাহমান আমি কিংবদন্তীর কথা বলছি (অংশ)— আবু জাফর ওবাইদুল্লাহ সোনালী কাবিন ১৩— আল মাহমুদ তোমাকে অভিবাদন, প্রিয়তমা— শহীদ কাদরী নগর ধ্বংসের আগে— রফিক আজাদ জুই ফুলের চেয়ে শাদা ভাতই অধিক সুন্দর— মহাদেব সাহা মানুষ— নির্মলেন্দু গুণ এবাদত নামা ১৩— ফরহাদ মজহার তোমার দূরত্ব নিত্য আমার ক্রোধের দিনে— দাউদ হায়দার বাতাসে লাশের গন্ধ— রুদ্র মুহম্মদ শহিদুল্লাহ	১৩	৩	১
খ.	কবর— মুনীর চৌধুরী	১০	৩	

মডিউল -৩ : প্রবন্ধ

অরুণ সেন ও আবুল হাসনাত সম্পাদিত ***বাঙালি ও বাংলাদেশ*** (নয়াউদ্যোগ) গ্রন্থ থেকে নিম্নলিখিত প্রবন্ধগুলি পাঠ্য : অভিভাষণ— মুহম্মদ শহীদুল্লাহ ❑ বাঙালির আত্মপরিচয়ের সূত্রপাত— আবু জাফর শামসুদ্দীন ❑ ভাষা সংস্কার ও বাঙালি চেতনার বিকৃতি— আহমদ শরীফ ❑ মুসলমানদের স্বদেশ প্রত্যাবর্তন— বদরুদ্দীন উমর ❑ দ্বি-জাতিতত্ত্বের সত্যমিথ্যা— সিরাজুল ইসলাম চৌধুরী ❑ স্বরূপের সন্ধানে— আনিসুজ্জামান ❑ বাংলাদেশ : পালিয়ে বেড়ায় দৃষ্টি এড়ায়— হাসান আজিজুল হক ❑ মার্চের স্বপ্ন— মুনতাসীর মামুন	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বাংলাদেশের সাহিত্য ও সংস্কৃতি— বিশ্বজিৎ ঘোষ
- ❑ বাংলা দেশের প্রবন্ধ সাহিত্য— আবুল কাসেম ফজলুল হক
- ❑ বাংলাদেশের উপন্যাস : বিষয় ও শিল্পরূপ— রফিকুল্লাহ খান

- বাংলাদেশের থিয়েটার— নৃপেন্দ্র সাহা (সম্পাদিত)
- বাংলাদেশের কবিতা :সমবায়ী স্বরতন্ত্র— রফিকুল্লাহ খান
- বাংলাদেশের ছোটগল্পের শিল্পরূপ— চঞ্চলকুমার বোস
- সংস্কৃতির ভাঙা সেতু— আখতারুজ্জামান ইলিয়াস
- ভাষা আন্দোলনের দলিলপত্র— রতনলাল চক্রবর্তী (সম্পাদিত)
- রাজনৈতিক চেতনা : বাংলাদেশের কবিতা— আমিনুর রহমান সুলতান
- বাংলাদেশের আধুনিক কাব্য পরিচয়— দীপ্তি ত্রিপাঠী
- পূর্ববাংলার রাজনীতি-সংস্কৃতি ও কবিতা— সাঈদ-উর রহমান
- বাংলাদেশের কবিতায় ব্যক্তি ও সমাজ— দিলারা হাফিজ
- বাঙালি মুসলমানের সামাজিক ইতিহাস : কতিপয় প্রসঙ্গ— হাবির রহমান

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বাংলা গোয়েন্দা সাহিত্য, কল্পবিজ্ঞান আশ্রয়ী রচনা এবং অলৌকিক কাহিনি

উদ্দেশ্য : সাহিত্যের পাঠ এবং আস্বাদনে কিশোরদের অভ্যাস তৈরি হয়ে ওঠে গোয়েন্দা গল্প, কল্পবিজ্ঞানের কাহিনি অথবা ভূতের গল্পের মধ্য দিয়ে। তাদের চেনা ক্ষেত্রকেই পড়ুয়ারা এখানে বিদ্যায়তনিক পাঠ শৃঙ্খলায় অধ্যয়ন করতে শিখবে।

মডিউল-১

	Class Hour		
	Th	**Tu**	**IA Exam**
শজারুর কাঁটা— শরদিন্দু বন্দ্যোপাধ্যায়	২৩	৬	১

মডিউল-২

শঙ্কু সমগ্র (আনন্দ পাব.)— সত্যজিৎ রায় পাঠ্য সমূহ : ব্যোমযাত্রীর ডায়রি, প্রফেসর শঙ্কু ও ম্যাকাও, প্রফেসর শঙ্কু ও গোলক-রহস্য, প্রফেসর শঙ্কু ও রোবু, হিপনোজেন, মহাকাশের দূত, শঙ্কু ও আদিম মানুষ, শঙ্কু ও ফ্র্যাঙ্কেনস্টাইন	২৩	৬	১

মডিউল-৩

সব ভুতুড়ে— লীলা মজুমদার	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- সত্যজিৎ রায়— পশ্চিমবঙ্গ বাংলা আকাদেমি
- এক দুর্লভ মানিক— অমিত্রসূদন ভট্টাচার্য
- ক্রাইম কাহিনীর কালক্রান্তি— সুকুমার সেন

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তুলনামূলক সাহিত্য

উদ্দেশ্য : এই কোর্সে ধ্রুপদি সাহিত্যের সঙ্গে আধুনিক সাহিত্যের অথবা এই পর্যায়েরই বিভিন্ন ভাষায় লেখা সাহিত্যের তুলনামূলক পাঠ করা হবে। এর মধ্য দিয়ে পড়ুয়াদের সাহিত্য সংক্রান্ত চেতনার প্রসার ঘটনোই উদ্দেশ্য।

মডিউল-১

	Class Hours		
	Th	**Tu**	**IA Exam**
কালিদাস ও রবীন্দ্রনাথ	১২	৩	১
জয়দেব ও বাংলা সাহিত্য	১১	৩	

মডিউল-২

শেক্সপীয়র ও বাংলা সাহিত্য	১২	৩	১
এলিয়ট ও বাংলা কবিতা	১১	৩	

মডিউল-৩

রবীন্দ্রনাথ ও ভারতীয় সাহিত্য	১৫	৩	১
শরৎচন্দ্র ও মুন্সী প্রেমচাঁদ	৮	৩	

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ সংস্কৃতানুশীলনে রবীন্দ্রনাথ— সুখময় ভট্টাচার্য
- ❑ কালিদাস ও রবীন্দ্রনাথ— বিষ্ণুপদ ভট্টাচার্য
- ❑ কালিদাস ও রবীন্দ্রনাথ— নরেশচন্দ্র জানা
- ❑ বাংলা কাব্যে পাশ্চাত্য প্রভাব— উজ্জ্বলকুমার মজুমদার
- ❑ বাংলা কাব্যে ইউরোপীয় প্রভাব— মঞ্জুভাষ মিত্র
- ❑ কবি জয়দেব ও গীতগোবিন্দ— হরেকৃষ্ণ মুখোপাধ্যায়
- ❑ অলৌকিক সংলাপ— শিশিরকুমার দাশ
- ❑ রবীন্দ্রনন্দন তত্ত্ব— বিমলকুমার মুখোপাধ্যায়
- ❑ ত্রয়ী : বাল্মীকি কালিদাস রবীন্দ্রনাথ— শশিভূষণ দাশগুপ্ত
- ❑ বাঙালির ইংরেজি সাহিত্যচর্চা; স্বপন চক্রবর্তী
- ❑ ঘুমের দরজা ঠেলে— চিন্ময় গুহ
- ❑ এলিয়ট বিষ্ণু দে ও আধুনিক বাংলা কবিতা— বিনয়কুমার মাহাতা

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বাংলা শিশু-কিশোর সাহিত্য

উদ্দেশ্য : বাংলা শিশু-কিশোর সাহিত্যের সুগভীর ঐতিহ্য রয়েছে। সেখান থেকে কিছু নির্বাচিত পাঠকে এখানে পড়ুয়ারা বিদ্যায়তনিক পাঠ-শৃঙ্খলায় অধ্যয়ন করতে শিখবে।

মডিউল-১

	Class Hour		
	Th	**Tu**	**IA Exam**
ক্ষীরের পুতুল— অবনীন্দ্রনাথ ঠাকুর	১৩	৩	১
ঠাকুরমার ঝুলি—দক্ষিণারঞ্জন মিত্র মজুমদার পাঠ্যসমূহ— কিরণমালা ● সাতভাই চম্পা ● সুখু আর দুখু	১০	৩	

মডিউল-২

আবোল তাবোল— সুকুমার রায় পাঠ্যসমূহ— আবোল তাবোল ● খিচুড়ি ● সৎপাত্র ● একুশে আইন ● নারদ! নারদ! ● গন্ধ বিচার	১১	৩	১
ছড়াসমগ্র — অন্নদাশঙ্কর রায় পাঠ্যসমূহ : লন্ডনের শীত ● খুকু ও খোকা ● পক্ষিরাজ ● কাটাকুটি খেলা ● অবাক চা পান ● ঢাকাই ছড়া ● সোনার হরিণ	১২	৩	

মডিউল-৩

বাদশাহী আংটি —সত্যজিৎ রায়	১১	৩	১
সবুজ দ্বীপের রাজা — সুনীল গঙ্গোপাধ্যায়	১২	৩	

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বাংলার শিশুসাহিত্য— বুদ্ধদেব বসু
- ❑ শতাব্দীর শিশুসাহিত্য— খগেন্দ্রনাথ মিত্র
- ❑ বাংলা শিশুসাহিত্যের ক্রমবিকাশ— আশা গঙ্গোপাধ্যায়
- ❑ প্রসঙ্গ : অন্নদাশঙ্কর রায়— কলকাতা পৌরসংস্থা প্রকাশিত

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দেশভাগ ও বাংলা সাহিত্য

উদ্দেশ্য : বাঙালি জাতির ইতিহাসে দেশভাগের একটি গভীরমূল এবং সুদূরপ্রসারী অভিঘাত রয়েছে। দেশভাগকে ঘিরে বাঙালির সামূহিক এবং ব্যক্তিক বিপন্নতা, বিপর্যয় এবং অসহায়ত্বের সাক্ষ্যবাহী নির্বাচিত কিছু সাহিত্যকে এখানে পাঠ্য করা হয়েছে।

মডিউল-১ : উপন্যাস

	Class Hours		
	Th	**Tu**	**IA Exam**
নীলকণ্ঠ পাখির খোঁজে— অতীন বন্দ্যোপাধ্যায়	২৩	৬	১

মডিউল-২ : ছোটগল্প

এপার গঙ্গা ওপার গঙ্গা— জ্যোতির্ময়ী দেবী গণনায়ক— সতীনাথ ভাদুড়ী ছেলেমানুষী— মানিক বন্দ্যোপাধ্যায় পালঙ্ক— নরেন্দ্রনাথ মিত্র ড্রেসিং টেবিল— সলিল চৌধুরী করুণকন্যা— রমাপদ চৌধুরী রাজা আসে রাজা যায়— প্রফুল্ল রায় জটায়ু— দীপেন্দ্রনাথ বন্দ্যোপাধ্যায়	২৩	৬	১

মডিউল-৩ : কবিতা

পুব-পশ্চিম— অচিন্ত্যকুমার সেনগুপ্ত খুকু ও খোকা— অন্নদাশঙ্কর রায় ১৫ই আগস্ট ১৯৪৭—দীনেশ দাস জল দাও— বিষ্ণু দে পারাপার— সুভাষ মুখোপাধ্যায় বাংলা, হায় বাংলা— মঙ্গলাচরণ চট্টোপাধ্যায় তোমাকে বলেছিলাম— নীরেন্দ্রনাথ চক্রবর্তী দেশহীন — শঙ্খ ঘোষ ধাত্রী—সুনীল গঙ্গোপাধ্যায় সমরেন্দ্র সেনগুপ্ত —ভাষাদেশ	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বাংলা ছোটগল্পে দেশবিভাগ— সানজিদা আখতার
- ❑ ভূমিকা (রক্তমণির হারে গ্রন্থ)— দেবেশ রায়
- ❑ ভূমিকা (ভেদ-বিভেদ গ্রন্থ)— মানবেন্দ্র বন্দ্যোপাধ্যায়
- ❑ যুক্তবঙ্গের স্মৃতি— অন্নদাশঙ্কর রায়
- ❑ আমার জন্মভূমি/স্মৃতিময় বাংলাদেশ— ধনঞ্জয় দাশ
- ❑ ভাঙা বাংলা ও বাংলা সাহিত্য— অশ্রুকুমার শিকদার
- ❑ বাংলা উপন্যাসে দেশভাগ ও দেশত্যাগ— তারক সরকার
- ❑ দেশভাগ দেশত্যাগ— সন্দীপ বন্দ্যোপাধ্যায়
- ❑ যুক্ত বাংলার শেষ অধ্যায়— কালীপদ বিশ্বাস
- ❑ দেশ বিভাগ : পশ্চাৎ ও নেপথ্য কাহিনী— ভবানী প্রসাদ চট্টোপাধ্যায়
- ❑ বাংলা মধ্যবিত্তের আত্মবিকাশ— কামরুদ্দিন আহমেদ

- ❑ পূর্ব বাংলার সমাজ ও রাজনীতি— কামরুদ্দিন আহমেদ
- ❑ আমার দেখা রাজনীতির পঞ্চাশ বছর— আবুল মনসুর আহমেদ
- ❑ আমার জীবন ও বিভাগ পূর্ব বাংলার রাজনীতি— আবুল হাসিম
- ❑ কালের পুত্তলিকা— অরুণকুমার মুখোপাধ্যায়
- ❑ দেশভাগ : নির্বাসিতের আখ্যান— তপোধীর ভট্টাচার্য
- ❑ বিষাদবৃক্ষ— মিহির সেনগুপ্ত

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চরিত সাহিত্য, আত্মচরিত ও ভ্রমণ সাহিত্য

উদ্দেশ্য : চরিত সাহিত্য ও আত্মচরিত পাঠের মধ্য দিয়ে পড়ুয়ারা ব্যক্তি চৈতন্যদেব কিংবা ব্যক্তি রবীন্দ্রনাথকে যেমন চিনবে তেমনি তাঁদের সময়কালের ধারণাটিকেও আয়ত্ত করতে পারবে। সুখপাঠ্য দেশে-বিদেশে পাঠের মধ্য দিয়েও ব্যক্তি মুজতবা এবং তাঁর বিচিত্র জীবন অভিজ্ঞতার সঙ্গে পরিচিত হবে পড়ুয়ারা।

মডিউল ১

	Class Hours		
	Th	**Tu**	**IA Exam**
চৈতন্যভাগবত (আদ্যলীলা)— বৃন্দাবন দাস	২৩	১	১

মডিউল-২

জীবনস্মৃতি— রবীন্দ্রনাথ ঠাকুর	১৫	৬	১

মডিউল-৩

দেশে-বিদেশে— সৈয়দ মজুতবা আলী	১৫	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ চৈতন্য-প্রসঙ্গ— বঙ্গীয় সাহিত্য পরিষৎ প্রকাশিত
- ❑ জীবনী, আত্মজীবনী ও রবীন্দ্রনাথ— শিশিরকুমার দাশ
- ❑ জীবনের স্বরলিপি : পশ্চিমের মুখর জানালা— বিজয়কুমার দত্ত

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লোকসংস্কৃতি ও লোকসাহিত্য

উদ্দেশ্য : বাঙালি এবং তার সংস্কৃতিকে জানতে গেলে আমাদের লোকসংস্কৃতি ও লোকসাহিত্যের পাঠ নেওয়া খুবই জরুরি। বাংলার সমৃদ্ধ লোক-ঐতিহ্যের থেকে নির্বাচিত কয়েকটি প্রসঙ্গই এখানে পড়ুয়াদের চর্চার জন্য রাখা হচ্ছে।

মডিউল-১

	Class Hour		
	Th	**Tu**	**IA Exam**
লোকসংস্কৃতি ও লোকসাহিত্যের সাধারণ পরিচয়	২৩	৬	১
টাইপ ও মোটিফ ইনডেক্স (বৈশিষ্ট্য ও প্রয়োগ শিক্ষার প্রাথমিক পাঠ)			
বাংলার ব্রত ও পার্বন (বিশেষ পাঠ : পুণ্যিপুকুর, মাঘমন্ডল, সেঁজুতি)			

মডিউল-২

লোকছড়া	২৩	৬	১
লোকনৃত্য (বিশেষ পাঠ : ছৌ, রায়বেশে, গম্ভীরা)			
ধাঁধা			

মডিউল-২

বাংলা প্রবাদ	২৩	৬	১
লোকগান (বিশেষ পাঠ : বাউল, ভাটিয়ালী, ভাওয়াইয়া)			
লোককথা			

সহায়ক গ্রন্থ (নির্বাচিত) :

- বাংলার ব্রত— অবনীন্দ্রনাথ ঠাকুর
- বাংলার লোক সাহিত্য— আশুতোষ ভট্টাচার্য
- লোকসংস্কৃতির সীমানা ও স্বরূপ— পল্লব সেনগুপ্ত
- ফোকলোর পরিচিতি ও পঠন-পাঠন— মযহারুল ইসলাম
- বাংলা প্রবাদ— সুশীলকুমার দে
- বাংলার ধাঁধার ভূমিকা— নির্মলেন্দু ভৌমিক
- বাংলা ছড়ার ভূমিকা— নির্মলেন্দু ভৌমিক
- বাংলা লোককথার টাইপ ও মোটিফ ইনডেক্স— দিব্যজ্যোতি মজুমদার
- লোক সংস্কৃতি পাঠের ভূমিকা— তুষার চট্টোপাধ্যায়
- বঙ্গীয় লোকসংস্কৃতিকোষ— বরুণ চক্রবর্তী
- বাংলা লোকসঙ্গীত : ভাটিয়ালি গান— ওয়াকিল আহমেদ
- বাউল ফকির কথা— সুধীর চক্রবর্তী

Skill Enhancement Course (SEC)– 2 Credits each

(সাম্মানিক বাংলা)

- স্নাতক (বাংলা) সাম্মানিক পাঠক্রমের শিক্ষার্থীদের 'Skill Enhancement Course (SEC)' স্তরে ৪ (২ × ২) ক্রেডিট-এর মোট ২টি কোর্স পড়তে হবে। এখানে প্রদত্ত ৪টি কোর্সকে দুটি বর্গে (A এবং B) বিভক্ত করা হয়েছে। A- বর্গের যে-কোনো একটি কোর্স তৃতীয় সেমেস্টারে এবং B- বর্গের যে-কোনো একটি কোর্স চতুর্থ সেমেস্টারে পড়ুয়ারা নির্বাচন করবে।
- প্রতিটি সেমেস্টারে পনেরো সপ্তাহ করে ক্লাস হবে এটা ধরে নিয়ে Class Hours/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- ২ ক্রেডিট-এর প্রতিটি কোর্সের পূর্ণমান ১০০। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট SEC-র ক্লাসে পড়ুয়ার উপস্থিতির জন্য এবং ১০ নম্বর কোর্সভিত্তিক ধারাবাহিক মূল্যায়ন বা ইন্টারন্যাল অ্যাসেসমেন্ট-এর জন্য বরাদ্দ। বাকি ৮০ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট কর্তৃপক্ষের তত্ত্বাবধানে লিখিত পরীক্ষা নেওয়া হবে।
- ৮০ নম্বরের লিখিত পরীক্ষায় ১০ নম্বরের তিনটি ব্যাখ্যামূলক, ৫ নম্বরের ৬টি বোধমূলক এবং ১ নম্বরের ২০টি সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্নের উত্তর দিতে হবে। নিচের তালিকায় প্রশ্নপত্রের ধারণা পাওয়া যাবে

প্রশ্ন নং	প্রশ্নের ধরন ও বিকল্প ও সংক্রান্ত নিয়ম	প্রশ্নের মান
১	মডিউল-১ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
২	মডিউল-২ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৩	মডিউল-৩ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৪	প্রত্যেকটি মডিউল থেকে কমপক্ষে **একটি** করে প্রশ্ন নিয়ে মোট **আটটি** প্রশ্ন দেওয়া হবে। পরীক্ষার্থীকে যে-কোনো **ছয়টি** প্রশ্নের উত্তর দিতে হবে।	৫ × ৬
৫.	প্রত্যেকটি মডিউল থেকে কমপক্ষে **চারটি** করে প্রশ্ন নিয়ে মোট **কুড়িটি** সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্ন দেওয়া হবে। এক্ষেত্রে কোনো বিকল্প থাকবে না।	১ × ২০

BNG-A-SEC-A-3-1-TH

মুদ্রণ ও প্রকাশনা

উদ্দেশ্য : বাংলা মুদ্রণ ও প্রকাশনা সংক্রান্ত সাধারণ জ্ঞানার্জন করবে পড়ুয়ারা।

মডিউল-১

	Class Hours	
	Th	**IA Exam**
পাণ্ডুলিপি প্রস্তুতি	১০	১
বাংলা যুক্তাক্ষরের ধারণা		
সংগ্রহ-সম্পাদনা ও সংকলন সম্পর্কে ধারণা		
কভার, টাইটেল পেজ, গ্রন্থ/পত্রিকার পঞ্জিকরণ সংক্রান্ত ধারণা		

মডিউল-২

এম. এস. ওয়ার্ড, পেজ মেকার	১০	১
কোরেল ড্র, ইনডিজাইন		

মডিউল-৩

প্রুফ সংশোধন (দৃষ্টিহীন পড়ুয়াদের জন্য অশুদ্ধি সংশোধন থাকবে)	১০	১
ছাপার প্রযুক্তি, স্টিচিং, বাইন্ডিং, মার্কেটিং সম্পর্কিত সাধারণ ধারণা		

সহায়ক গ্রন্থ (নির্বাচিত)

- যখন ছাপাখানা এলো— শ্রীপান্থ
- দুই শতকের বাংলা মুদ্রণ ও প্রকাশন— চিত্তরঞ্জন বন্দ্যোপাধ্যায় (সম্পাদিত)
- বাংলা পাণ্ডুলিপি পাঠ ও পরিক্রমা— ত্রিপুরা বসু
- মুদ্রণের সংস্কৃতি ও বাংলা বই— স্বপন চক্রবর্তী (সম্পাদিত)
- উনিশ শতকের বাংলা ছাপাখানা— আশিস খাস্তগীর
- গবেষণাপত্র : অনুসন্ধান ও রচনা— জগমোহন মুখোপাধ্যায়
- লেখক ও সম্পাদকের অভিধান— সুভাষ ভট্টাচার্য (সম্পাদিত)
- মাষ্টারিং Micorsoft Office Power Point — বাপ্পি আশরাফ
- ডায়নামিক মেমরি কম্পিউটার কোর্স— দেবেন্দ্র সিং মিনহাস

BNG-A-SEC-A-3-2-TH

ব্যবহারিক বাংলা-১

উদ্দেশ্য : পরবর্তী জীবনে পেশা হিসেবে যে-সব পড়ুয়া নাটক অথবা সিনেমা-সিরিয়ালকে কিংবা আবৃত্তি শিল্পকে গ্রহণ করতে চাইবে, তারা ঐ সব বিষয়ের প্রাথমিক ধ্যানধারণা পাবে এই কোর্স থেকে।

মডিউল-১

	Class Hours	
	Th	**IA Exam**
গল্পসূত্র থেকে কাহিনি নির্মাণ	১০	১
গল্প/উপন্যাস থেকে নাট্যরূপ/ চিত্রনাট্য নির্মাণ		

মডিউল-২

বাংলা ভাষার/শব্দের সঠিক উচ্চারণ	১০	১
ছন্দ সম্পর্কিত জ্ঞান, আবৃত্তিচর্চা		

মডিউল-৩

সাহিত্য ও চলচ্চিত্র— পারস্পরিক সম্পর্ক	১০	১
বাংলা সাহিত্যের চলচ্চিত্রায়ণ বিশেষ পাঠ : ক্ষুধিত পাষাণ, পথের পাঁচালী, বাড়ি থেকে পালিয়ে		

সহায়ক গ্রন্থ (নির্বাচিত) :

- চলচ্চিত্রের অভিধান— ধীমান দাশগুপ্ত
- বিষয় চলচ্চিত্র— সত্যজিৎ রায়
- বাংলা চলচ্চিত্রের ইতিহাস— নির্মাল্য আচার্য ও দিব্যেন্দু পালিত (সম্পাদিত)
- রবীন্দ্রনাথের সিনেমা সিনেমার রবীন্দ্রনাথ— চণ্ডী মুখোপাধ্যায়
- মৃণাল সেনের ফিল্মযাত্রা— শিলাদিত্য সেন
- কবিতার ক্লাস— নীরেন্দ্রনাথ চক্রবর্তী
- বিষয় আবৃত্তি— অমিয় চট্টোপাধ্যায়, দেবদুলাল বন্দ্যোপাধ্যায়
- বাংলা সিনেমার ইতিকথা : দুই বাংলার চলচ্চিত্র (১৯০৩-২০১৪)— চণ্ডী মুখোপাধ্যায়
- চলচ্চিত্র : চিন্তাবীজ রবের ব্রেসঁ (ভাষান্তর : সন্দীপন ভট্টাচার্য)
- চলচ্চিত্র মানুষ এবং আরো কিছু— ঋত্বিককুমার ঘটক
- সিনেমার ইতিবৃত্তান্ত— পার্থ রাহা
- বাংলা বলো— পবিত্র সরকার
- কি লিখি কেন লিখি— নীরেন্দ্রনাথ চক্রবর্তী

BNG-A-SEC-B-4-1-TH

ব্যবহারিক বাংলা ও সাহিত্য গবেষণার পদ্ধতিবিজ্ঞান

উদ্দেশ্য : শিক্ষার্থীদের জীবনের নানা প্রয়োজনকে সুষ্ঠভাবে এবং নিয়মমাফিক সমাধা করতে সহায়তা করবে এই কোর্সটি।

মডিউল-১

	Class Hours	
	Th	**IA Exam**
সংবাদপত্রে অথবা ব্যক্তিগতভাবে প্রচারের লক্ষ্যে প্রতিবেদন রচনা	১০	১
চিঠিপত্র রচনা—বিভিন্ন প্রকার সহ		
কাল্পনিক সাক্ষাৎকার রচনা		

মডিউল-২

ছাপা মাধ্যম এবং বৈদ্যুতিন মাধ্যমের জন্য বিজ্ঞাপন রচনা	১০	১
অনুবাদের ভাষা ও শৈলী		
ইংরেজি থেকে বাংলা অনুবাদ		

মডিউল-৩

গবেষণার রীতি ও নির্মাণ পদ্ধতি, গবেষণার আদর্শ বিন্যাসক্রম	১০	১
তথ্য সংগ্রহ, উদ্ধৃতির প্রয়োগ, কপিরাইট আইন		
পাদটীকা/প্রান্তটীকা/সূত্র নির্দেশ, গ্রন্থপঞ্জি ও নির্ঘন্ট প্রণয়ন বিধি		

সহায়ক গ্রন্থ (নির্বাচিত)

- গণজ্ঞাপন : তত্ত্ব ও প্রয়োগে— পার্থ চট্টোপাধ্যায়
- সেকাল একালের সংবাদ পরিবেশনের ধারা ও বিচিত্র সংবাদ— বৈদ্যনাথ বন্দ্যোপাধ্যায়
- গবেষণাপত্র : অনুসন্ধান ও রচনা— জগমোহন মুখোপাধ্যায়

BNG-A-SEC-B-4-2-TH

ব্যবহারিক বাংলা-২

উদ্দেশ্য : যে-সব সাহিত্যরূপ পড়ুয়ারা পড়ছে/পড়েছে তা কীভাবে তৈরি হয়ে ওঠে, তার কলাকৌশলগুলি সম্পর্কে এখানে হাতে কলমে তাদের ধারণা দেওয়া হবে। তার সঙ্গে বানান এবং IPA ও রোমীয় লিপি সংক্রান্ত ব্যবহারিক জ্ঞানও দিতে চাওয়া হয়েছে এই কোর্সে।

মডিউল-১ : সৃজনশীল রচনা

	Class Hours	
	Th	**IA Exam**
গল্প রচনা (সামাজিক/পারিবারিক/ব্যক্তিক কোনো প্রসঙ্গ/বিষয় অবলম্বনে কমবেশি ৩০০ শব্দে গল্প লিখতে দেওয়া হবে)	১০	১
প্রবন্ধ রচনা (সামাজিক/পারিবারিক/ব্যক্তিক অথবা সাহিত্য বিষয়ক কোনো প্রসঙ্গ/বিষয় অবলম্বনে কমবেশি ৩০০ শব্দে প্রবন্ধ লিখতে দেওয়া হবে)		

মডিউল-২

বাংলা বানানের বিবর্তন সম্পর্কে সাধারণ ধারণা	১০	১
পশ্চিমবঙ্গ বাংলা আকাদেমির বানান বিধি		

মডিউল-৩

আন্তর্জাতিক ধ্বনিমূলক বর্ণমালা (IPA)	১০	১
রোমীয় লিপি		

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ সাধারণ ভাষাবিজ্ঞান ও বাংলাভাষা— রামেশ্বর শ'
- ❑ কি লিখি কেন লিখি— নীরেন্দ্রনাথ চক্রবর্তী
- ❑ বাংলা বানান বিধি— পরেশচন্দ্র মজুমদার
- ❑ বাংলা বানান সংস্কার, সমস্যা ও সম্ভাবনা— পবিত্র সরকার

কলিকাতা বিশ্ববিদ্যালয়

২০১৮

স্নাতক বাংলা পাঠক্রম

সাধারণ

ইউ.জি.সি নির্দেশিত সিবিসিএস অনুসারে

(উত্তর লেখার ক্ষেত্রে পরীক্ষার্থীদের পশ্চিমবঙ্গ বাংলা আকাদেমি-র বানানবিধি অনুসরণ করতে হবে)

স্নাতক সাধারণ বাংলা

A)i) Discipline Centric Core Course (CC)/Generic Elective (GE)*– 6 Credits Each

BNG-G-CC/GE-1-1-Th-Tu	বাংলা সাহিত্যের ইতিহাস (আধুনিক যুগ)
BNG-G-CC/GE-2-2-Th-Tu	ঐতিহাসিক ভাষাবিজ্ঞান, ছন্দ ও অলঙ্কার
BNG-G-CC/GE-3-3-Th-Tu	বাংলা কাব্যকবিতা ও নাটক
BNG-G-CC/GE-4-4-Th-Tu	বাংলা কথাসাহিত্য ও প্রবন্ধ

*** এই চারটি কোর্স থেকেই দুটি কোর্স সাম্মানিক বাংলা ছাড়া অন্য বিষয়ের সাম্মানিক প্রোগ্রামের পড়ুয়ারা Generic Elective (GE)-পর্যায়ের পাঠ্য হিসেবে গ্রহণ করবে/করতে পারে।**

***কলা বিভাগের সাধারণ (General) প্রোগ্রামের যে-সমস্ত শিক্ষার্থী Discipline Centric Core Course (CC) পর্যায়ের পাঠ্য হিসেবে বাংলা গ্রহণ করেনি এবং LCC(2) পর্যায়েও পাঠ্য হিসেবে বাংলা বিকল্পটি (MIL গুলির মধ্যে) গ্রহণ করেনি— শুধুমাত্র তারাই Generic Elective (GE)-পর্যায়ে এখান থেকে প্রথম দুটি কোর্স পাঠ্য হিসেবে নির্বাচন করতে পারে।**

A)ii) Language Core Course [LCC(2)] – 6 Credits Each

BNG-G-LCC(2)-4-1-Th-Tu	বাংলা ভাষাবিজ্ঞান ও সাহিত্যের রূপভেদ ও কাব্য
BNG-G-LCC(2)6-2-Th-Tu	সাময়িকপত্র ও কথাসাহিত্য

B) Discipline Specific Elective (DSE) – 6 Credits Each

BNG-G-DSE-A-5-1-Th-Tu	বাংলার সমাজ ও সংস্কৃতির ইতিহাস
BNG-G-DSE-A-5-2-Th-Tu	বাংলা গোয়েন্দা সাহিত্য, কল্পবিজ্ঞান আশ্রয়ী রচনা এবং অলৌকিক কাহিনি
BNG-G-DSE-B-6-1-Th-Tu	দেশভাগ ও বাংলা সাহিত্য
BNG-G-DSE-B-6-2-Th-Tu	লোকসংস্কৃতি ও লোকসাহিত্য

C) Skill Enhancement Course (SEC) – 2 Credits Each

BNG-G-SEC-A-3/5-1-Th	মুদ্রণ ও প্রকাশন
BNG-G-SEC-A-3/5-2-Th	ব্যবহারিক বাংলা-১
BNG-G-SEC-B-4/6-1-Th	ব্যবহারিক বাংলা ও সাহিত্য গবেষণার পদ্ধতিবিজ্ঞান
BNG-G-SEC-B-4/6-2-Th	ব্যবহারিক বাংলা-২

D) Ability Enhancement Compulsory Course (AECC)– 2 Credits

BNG-AECC-1-1-Th

স্নাতক বাংলা (সাধারণ) পাঠক্রমের সেমেস্টার ভিত্তিক বিভাজন

	SEM-1	SEM-2	SEM-3	SEM-4	SEM-5	SEM-6
A) Core Course (CC) 6 Credits each	● BNG-G-CC-1-1-TH-TU + ☒	● BNG-G-CC-2-2-TH-TU + ☒	● BNG-G-CC-3-3-TH-TU + ☒	● BNG-G-CC-4-4-TH-TU + ☒		
Language (LCC)			☒	● BNG-G-LCC(2)-4-1-TH-TU	☒	● BNG-G-LCC(2)-6-2-TH-TU
B) Elective Courses 6 Credits each						
i) Generic Elective (GE)	☒	☒				
ii) Discipline Specific Elective (DSE)					যে-কোনো একটি ● BNG-G-DSE-A-5-1-TH-TU ● BNG-G-DSE-A-5-2-TH-TU ● + ☒	যে-কোনো একটি ● BNG-G-DSE-B-6-1-TH-TU/ ● BNG-G-DSE-B-6-2-TH-TU ● + ☒
C) Skill Enhancement Course (SEC) 2 Credits Each			যে-কোনো একটি (এখানে অথবা পঞ্চম সেমেস্টারে) ● BNG-G-SEC-A-3/5-1-TH ● BNG-G-SEC-A-3/5-2-TH //// + ☒	যে-কোনো একটি (এখানে অথবা ষষ্ঠ সেমেস্টারে) ● BNG-G-SEC-B-4/6-1-TH ● BNG-G-SEC-B-4/6-2-TH //// + ☒	যে-কোনো একটি (এখানে অথবা তৃতীয় সেমেস্টারে) ● BNG-G-SEC-A-3/5-1-TH ● BNG-G-SEC-A-3/5-2-TH //// + ☒	যে-কোনো একটি (এখানে অথবা চতুর্থ সেমেস্টারে) ● BNG-G-SEC-B-4/6-1-TH ● BNG-G-SEC-B-4/6-2-TH //// + ☒
D) Ability Enhancement Compulsory Course (AECC) 2 Credits	● BNG-AECC-1-1-TH	☒				
Total Marks/ Credits	400/20	400/20	400/20	400/20	400/20	400/20

Note : বাংলা ছাড়া পাঠ্য অন্য কোর্স বোঝাতে ☒ চিহ্নটি ব্যবহার করা হয়েছে।

Discipline Centric Core Course (CC)/ Generic Elective (GE) [For Honours students other than Bengali(H)] – 6 Credits Each
(সাধারণ বাংলা)

- স্নাতক সাধারণ (বাংলা) পাঠক্রমে 'Discipline Centric Core Course' স্তরে ২৪ ক্রেডিট-এর মোট ৪টি কোর্স প্রথম ৪টি সেমেস্টারে পড়তে হবে।
- এই চারটি কোর্স থেকেই দুটি কোর্স সাম্মানিক বাংলা ছাড়া অন্য বিষয়ের সাম্মানিক প্রোগ্রামের পড়ুয়ারা Generic Elective (GE)-পর্যায়ের পাঠ্য হিসেবে গ্রহণ করবে/করতে পারে।
- কলা বিভাগের সাধারণ (General) প্রোগ্রামের যে-সমস্ত শিক্ষার্থী Discipline Centric Core Course (CC) পর্যায়ের পাঠ্য হিসেবে বাংলা গ্রহণ করেনি এবং LCC(2) পর্যায়েও পাঠ্য হিসেবে বাংলা বিকল্পটি (MIL গুলির মধ্যে) গ্রহণ করেনি— শুধুমাত্র তারাই Generic Elective (GE)-পর্যায়ে এখান থেকে প্রথম দুটি কোর্স পাঠ্য হিসেবে নির্বাচন করতে পারে।
- ৬ (৫ + ১) ক্রেডিট-এর প্রতিটি কোর্সের পূর্ণমান ১০০। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট CC-র ক্লাসে পড়ুয়ার উপস্থিতির জন্য বরাদ্দ। ১০ নম্বর কোর্সভিত্তিক ধারাবাহিক মূল্যায়ন বা ইন্টারন্যাল অ্যাসেসমেন্ট-এর জন্য এবং ১৫ নম্বর কোর্সভিত্তিক টিউটোরিয়াল-এর জন্য বরাদ্দ। বাকি ৬৫ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট কর্তৃপক্ষের তত্ত্বাবধানে লিখিত পরীক্ষা নেওয়া হবে। প্রতিটি সেমেস্টারে পনেরো সপ্তাহ করে ক্লাস হবে ধরে নিয়ে Class Hours/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- ৬৫ নম্বরের লিখিত পরীক্ষায় ১০ নম্বরের তিনটি ব্যাখ্যামূলক, ৫ নম্বরের ৪টি বোধমূলক এবং ১ নম্বরের ১৫টি সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্নের উত্তর দিতে হবে। নিচের তালিকায় প্রশ্নপত্রের ধারণা পাওয়া যাবে।

প্রশ্ন নং	প্রশ্নের ধরন ও বিকল্প সংক্রান্ত নিয়ম	প্রশ্নের মান
১	মডিউল-১ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
২	মডিউল-২ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৩	মডিউল-৩ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৪	মডিউল-১ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৫	মডিউল-২ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৬	মডিউল-৩ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৭	মডিউল-১, মডিউল-২ এবং মডিউল-৩ থেকে একটি করে প্রসঙ্গ/বিষয় নিয়ে টীকা-ধর্মী প্রশ্ন হবে। তিনটির মধ্যে যে-কোনো একটি লিখতে হবে।	৫
৮	প্রত্যেকটি মডিউল থেকে কমপক্ষে **তিনটি** করে প্রশ্ন নিয়ে মোট **পনেরটি** সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্ন দেওয়া হবে। এক্ষেত্রে কোনো বিকল্প থাকবে না।	১ × ১৫

BNG-G-CC/GE-1-1-TH-TH
বাংলা সাহিত্যের ইতিহাস (আধুনিক যুগ)

উদ্দেশ্য : ১৮০০ খ্রিস্টাব্দ পরবর্তী সময়কালে বাংলা সাহিত্যের বিভিন্ন ধারার বিবর্তনের গতিরেখার সঙ্গে শিক্ষার্থীদের পরিচিতি ঘটানো এই কোর্সের উদ্দেশ্য।

মডিউল-১ : গদ্য ও প্রবন্ধ

	Class Hours		
	Th	**Tu**	**IA Exam**
শ্রীরামপুর মিশন, ফোর্ট উইলিয়ম কলেজ	২৩	৬	১
রাজা রামমোহন রায়, ঈশ্বরচন্দ্র বিদ্যাসাগর, অক্ষয়কুমার দত্ত			
প্যারীচাঁদ মিত্র, কালীপ্রসন্ন সিংহ			
বঙ্কিমচন্দ্র চট্টোপাধ্যায়, রবীন্দ্রনাথ ঠাকুর			
প্রমথ চৌধুরী, বুদ্ধদেব বসু			

মডিউল-২ : কাব্য-কবিতা ও নাটক

ক.	ঈশ্বরচন্দ্র গুপ্ত, রঙ্গলাল বন্দ্যোপাধ্যায়	১৩	৩	১
	মধুসূদন দত্ত, বিহারীলাল চক্রবর্তী			
	রবীন্দ্রনাথ ঠাকুর, কাজী নজরুল ইসলাম			
	যতীন্দ্রনাথ সেনগুপ্ত, জীবনানন্দ দাশ, সুভাষ মুখোপাধ্যায়			
খ.	মধুসূদন দত্ত, দীনবন্ধু মিত্র	১০	৩	
	গিরিশচন্দ্র ঘোষ, রবীন্দ্রনাথ ঠাকুর			
	দ্বিজেন্দ্রলাল রায়, বিজন ভট্টাচার্য			

মডিউল-৩ : উপন্যাস ও ছোটগল্প

বাংলা উপন্যাসের উদ্ভব ও বিকাশ	২৩	৬	১
বঙ্কিমচন্দ্র চট্টোপাধ্যায়, রবীন্দ্রনাথ ঠাকুর, শরৎচন্দ্র চট্টোপাধ্যায়			
বিভূতিভূষণ বন্দ্যোপাধ্যায়, তারাশঙ্কর বন্দ্যোপাধ্যায়, মানিক বন্দ্যোপাধ্যায়			

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ বাঙ্গালা সাহিত্যের ইতিহাস (৩-৫ খণ্ড)— সুকুমার সেন
- ❑ বাংলা গদ্য সাহিত্যের ইতিহাস— সজনীকান্ত দাস
- ❑ বাংলা সাহিত্যে গদ্য— সুকুমার সেন
- ❑ বাংলা সাহিত্যের ইতিবৃত্ত (৬-৯)— অসিতকুমার বন্দ্যোপাধ্যায়
- ❑ বাংলা সাহিত্যের ইতিকথা (৩-৪)— ভূদেব চৌধুরী
- ❑ আধুনিক বাংলা কাব্য— তারাপদ মুখোপাধ্যায়
- ❑ উনিশ শতকের গীতিকাব্য— অরুণকুমার মুখোপাধ্যায়
- ❑ বাংলা সাময়িক পত্র— ব্রজেন্দ্রনাথ বন্দ্যোপাধ্যায়
- ❑ বাংলা নাটকের ইতিহাস— অজিতকুমার ঘোষ
- ❑ গদ্যরীতি পদ্যরীতি— পবিত্র সরকার
- ❑ রবীন্দ্রানুসারী কবিসমাজ— অরুণকুমার মুখোপাধ্যায়
- ❑ আমার কালের কয়েকজন কবি— জগদীশ ভট্টাচার্য
- ❑ রবীন্দ্রনাট্য পরিক্রমা— উপেন্দ্রনাথ ভট্টাচার্য
- ❑ রবীন্দ্রনাট্য প্রবাহ— প্রমথনাথ বিশী
- ❑ বাংলা নাটকের ইতিহাস— অজিত কুমার ঘোষ
- ❑ বঙ্গসাহিত্যে উপন্যাসের ধারা— শ্রীকুমার বন্দ্যোপাধ্যায়
- ❑ সাহিত্য টীকা— সনৎকুমার মিত্র
- ❑ বাংলা প্রবন্ধ সাহিত্যের ধারা (১, ২ খণ্ড)— অধীর দে
- ❑ বাংলা সাহিত্যের ইতিহাস (আধুনিক যুগ)— দেবেশকুমার আচার্য

BNG-G-CC/GE-2-2-TH-TU

ঐতিহাসিক ভাষাবিজ্ঞান, ছন্দ ও অলঙ্কার

উদ্দেশ্য : বাংলা ভাষার উদ্ভব ও বিকাশ সম্পর্কে শিক্ষার্থীকে ধারণা দেওয়া হবে। কাব্য নির্মানের অন্যতম উপাদান হিসেবে ছন্দ ও অলঙ্কারের সংক্ষিপ্ত পাঠও এই কোর্স থেকে গ্রহণ করবে পড়ুয়ারা।

মডিউল-১ : ঐতিহাসিক ভাষাবিজ্ঞান

	Class Hours		
	Th	**Tu**	**IA Exam**
প্রাচীন ভারতীয় আর্যভাষা থেকে আধুনিক ভারতীয় আর্যভাষা হিসেবে বাংলা ভাষার উদ্ভবের গতিরেখা	২৩	৬	১
আদি-মধ্য বাংলা ভাষার ভাষাতাত্ত্বিক লক্ষণ— প্রেক্ষিত শ্রীকৃষ্ণকীর্তন			

মডিউল-২ : ছন্দ

অক্ষর, দল, কলা, মাত্রা, যতি, পর্ব, পদ, পঙ্‌ক্তি/চরণ— সংজ্ঞা ও উদাহরণসহ প্রতিটির ধারণা	২৩	৬	১
বাংলা ছন্দের ত্রিধারা— সংজ্ঞা, বৈশিষ্ট্য ও উদাহরণ			
ছন্দোলিপি প্রণয়ন (পর্ব, পদ, পঙ্‌ক্তি, লয়, মাত্রা ও রীতির উল্লেখ বাঞ্ছনীয়)			

মডিউল-৩ : অলংকার

অলংকার সম্পর্কে সাধারণ ধারণা	২৩	৬	১
অনুপ্রাস, যমক, শ্লেষ, বক্রোক্তি, উপমা, রূপক, উৎপ্রেক্ষা, সমাসোক্তি, ব্যাজস্তুতি, ব্যতিরেক— সংজ্ঞা ও উদাহরণ			
অলংকার নির্ণয়			

সহায়ক গ্রন্থ (নির্বাচিত)

- ভাষা-প্রকাশ বাঙ্গালা ব্যাকরণ— সুনীতিকুমার চট্টোপাধ্যায়
- সংস্কৃত ও প্রাকৃত ভাষার ক্রমবিকাশ (১-২ খণ্ড)— পরেশচন্দ্র মজুমদার
- বাংলা ভাষা পরিক্রমা— পরেশচন্দ্র মজুমদার
- ভাষা-জিজ্ঞাসা— শিশিরকুমার দাশ
- ভাষার ইতিবৃত্ত— সুকুমার সেন
- সাধারণ ভাষাবিজ্ঞান ও বাংলা ভাষা— রামেশ্বর শ'
- আধুনিক ভাষাতত্ত্ব— আবদুল কালাম মনজুর মোরশেদ
- বাংলা ছন্দের মূলসূত্র— অমূল্যধন মুখোপাধ্যায়
- নূতন ছন্দ পরিক্রমা— প্রবোধচন্দ্র সেন
- বাংলা ছন্দ পরিচয়— নীলরতন সেন
- অলংকার চন্দ্রিকা— শ্যামাপদ চক্রবর্তী
- বাঙলা ছন্দ— জীবেন্দ্র সিংহ রায়
- বাঙলা অলংকার— জীবেন্দ্র সিংহ রায়
- ছন্দতত্ত্ব ছন্দরূপ— পবিত্র সরকার

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বাংলা কাব্য-কবিতা ও নাটক

উদ্দেশ্য : বাংলা ভাষা ও সাহিত্যের ইতিহাস এবং ছন্দ অলঙ্কার সম্পর্কে পাঠ গ্রহণের পর শিক্ষার্থীরা এই কোর্সে সাহিত্যের আস্বাদন করবে। বাংলা কাব্যের বিবর্তনের ধারাটিও তাদের কাছে স্পষ্ট হবে।

মডিউল-১ : প্রাগাধুনিক কবিতা

	Class Hours		
	Th	**Tu**	**IA Exam**
বৈষ্ণব পদাবলী (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ) নির্বাচিত পদসমূহ : নীরদনয়নে নীর ঘন সিঞ্চনে আজু হাম কি পেখলুঁ নবদ্বীপ চন্দ দাঁড়াইয়া নন্দের আগে গোপাল কান্দে অনুরাগে ঘরের বাহিরে দন্ডে শতবার রূপ লাগি আঁখি ঝুরে গুণে মন ভোর এমন পিরীতি কভু নাহি দেখি শুনি সখি কি পুছসি অনুভব মোয় কণ্টক গাড়ি কমল সম পদতল মন্দির বাহির কঠিন কপাট কি মোহিনী জান বধুঁ কি মোহিনী জান বধুঁ তুমি যে আমার প্রাণ অঙ্কুর তপন তাপে যদি জারব বহুদিন পরে বধুঁয়া এলে তাতল সৈকত বারি-বিন্দুসম	২৩	৬	১

মডিউল-২ : আধুনিক কবিতা

ক.	**পুনশ্চ**— রবীন্দ্রনাথ ঠাকুর নির্বাচিত কবিতা— ছেলেটা, সাধারণ মেয়ে, বাঁশি, প্রথম পূজা	১০	৩	১
খ.	**একালের কবিতা সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ)** নির্বাচিত কবিতা : নষ্টনীড়— সমর সেন, আমার ভারতবর্ষ—বীরেন্দ্র চট্টোপাধ্যায় দেশ দেখাচ্ছ অন্ধকারে—নীরেন্দ্রনাথ চক্রবর্তী, কেউ কথা রাখেনি—সুনীল গঙ্গোপাধ্যায়	১৩	৩	

মডিউল-৩ : বাংলা নাটক

রাজা ও রানী— রবীন্দ্রনাথ ঠাকুর	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- মধ্যযুগের কবি ও কাব্য— শঙ্করীপ্রসাদ বসু
- চণ্ডীদাস ও বিদ্যাপতি— শঙ্করীপ্রসাদ বসু
- শ্রীরাধার ক্রমবিকাশ : দর্শনে ও সাহিত্যে— শশিভূষণ দাশগুপ্ত
- বৈষ্ণব রস প্রকাশ— ক্ষুদিরাম দাস
- রবীন্দ্র কাব্য পরিক্রমা— উপেন্দ্রনাথ ভট্টাচার্য
- রবীন্দ্র নাট্য পরিক্রমা— উপেন্দ্রনাথ ভট্টাচার্য
- রবীন্দ্র নাট্য প্রবাহ— প্রমথনাথ বিশী
- আধুনিক বাংলা কাব্য পরিচয়— দীপ্তি ত্রিপাঠী
- আমার কালের কয়েকজন কবি— জগদীশ ভট্টাচার্য

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বাংলা কথাসাহিত্য ও প্রবন্ধ

উদ্দেশ্য : এই কোর্সে বাংলা কথাসাহিত্য এবং প্রবন্ধ সাহিত্যের পাঠ দেওয়া হবে।

মডিউল-১ : উপন্যাস

	Class Hours		
	Th	**Tu**	**IA Exam**
পল্লীসমাজ— শরৎচন্দ্র চট্টোপাধ্যায়	২৩	৬	১

মডিউল-২ : ছোটগল্প

একালের ছোটগল্প সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ) পাঠ্য : পুঁই মাচা— বিভূতিভূষণ বন্দ্যোপাধ্যায় না— তারাশঙ্কর বন্দ্যোপাধ্যায় হারানের নাতজামাই— মানিক বন্দ্যোপাধ্যায় অশ্বমেধের ঘোড়া—দীপেন্দ্রনাথ বন্দ্যোপাধ্যায় মতিলাল পাদরী— কমলকুমার মজুমদার ছিন্নমস্তা— আশাপূর্ণা দেবী	২৩	৬	১

মডিউল-৩ : প্রবন্ধ

সংকলন— রবীন্দ্রনাথ ঠাকুর পাঠ্য প্রবন্ধ সমূহ— শিক্ষার মিলন, পূর্ব ও পশ্চিম, মেঘদূত, কেকাধ্বনি	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- বঙ্গ সাহিত্যে উপন্যাসের ধারা— শ্রীকুমার বন্দ্যোপাধ্যায়
- শরৎচন্দ্র— সুবোধচন্দ্র সেনগুপ্ত
- রবীন্দ্র সৃষ্টি সমীক্ষা— শ্রীকুমার বন্দ্যোপাধ্যায়
- বাংলা ছোটগল্প— শিশিরকুমার দাশ
- মানিক বন্দ্যোপাধ্যায় : জীবনদৃষ্টি ও শিল্পরীতি— গোপিকানাথ রায়চৌধুরী
- কালের পুত্তলিকা— অরুণকুমার মুখোপাধ্যায়
- রবীন্দ্র সৃষ্টি সমীক্ষা— শ্রীকুমার বন্দ্যোপাধ্যায়
- সাহিত্যে ছোটগল্প— নারায়ণ গঙ্গোপাধ্যায়
- বাংলা উপন্যাসের কালান্তর— সরোজ বন্দ্যোপাধ্যায়
- বাংলা ছোটগল্প : প্রসঙ্গ ও প্রকরণ— বীরেন্দ্র দত্ত

LCC(2)– BENGALI

(সাধারণ)

স্নাতক (কলা) সাধারণ বিভাগের সমস্ত শিক্ষার্থীকেই LCC(2) [MIL/Alternative English]- স্তরে ৬ ক্রেডিট করে মোট ১২ ক্রেডিটের দুটি কোর্স নির্বাচন করতে হবে

(যে সমস্ত স্নাতক (সাধারণ) পড়ুয়ারা Core Course হিসেবে বাংলা গ্রহণ করেছে তারাও LCC(2) পর্যায়ে MIL গুলির মধ্যে বাংলা বিকল্পটি গ্রহণ করতে পারে— সেই দিকটি বিবেচনার মধ্যে রেখেই নিচের কোর্স দুটি তৈরি করা হয়েছে।)

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বাংলা ভাষা বিজ্ঞান, সাহিত্যের রূপভেদ ও কাব্য

উদ্দেশ্য : বি.এ. সাধারণ বিভাগের পড়ুয়াদের জন্য এই কোর্সটিতে বাংলা ভাষাতত্ত্ব, সাহিত্যের রূপভেদের পাশাপাশি মধুসূদন দত্তের কাব্যপাঠের মধ্য দিয়ে শিক্ষার্থীদের ভাষা এবং সাহিত্য সম্পর্কে প্রাথমিক ধারণা তৈরি হবে।

মডিউল -১ : বাংলা ভাষাবিজ্ঞান

	Class Hours		
	Th	**Tu**	**IA Exam**
বাংলা ভাষার শব্দভাণ্ডার	২৩	৬	১
বাংলা শব্দার্থ পরিবর্তনের ধারা			
বাংলাভাষার ধ্বনি পরিবর্তনের রীতি ও প্রকৃতি			

মডিউল-২ : সাহিত্যের রূপভেদ

মহাকাব্য, গীতিকবিতা	২৩	৬	১
ট্রাজেডি, কমেডি			
পৌরাণিক নাটক, ঐতিহাসিক নাটক ও সামাজিক নাটক			
রোমান্স ও উপন্যাস			
সামাজিক উপন্যাস ও ঐতিহাসিক উপন্যাস			
ছোটগল্পের সঙ্গে উপন্যাসের তুলনা			
প্রবন্ধ ও সাহিত্য সমালোচনা			

মডিউল-৩ : কাব্য

মেঘনাদবধ কাব্য— মাইকেল মধুসূদন দত্ত (প্রথম সর্গ)	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত

- ❑ সাধারণ ভাষাবিজ্ঞান ও বাংলা ভাষা— রামেশ্বর শ'
- ❑ বাংলা ভাষার ব্যাকরণ ও তার ক্রমবিকাশ— নির্মল দাশ
- ❑ উচ্চতর বাংলা ব্যাকরণ— বামনদেব চক্রবর্তী
- ❑ মধুসূদনের কবি আত্মা ও কাব্যশিল্প— ক্ষেত্র গুপ্ত
- ❑ সাহিত্য সন্দর্শন— শ্রীশচন্দ্র দাস
- ❑ সাহিত্য ও সমালোচনার রূপরীতি— উজ্জ্বলকুমার মজুমদার
- ❑ সাহিত্য : রূপ-বিচিত্রা— অপূর্বকুমার রায়
- ❑ সাহিত্যের রূপরীতি ও অন্যান্য প্রসঙ্গ— কুন্তল চট্টোপাধ্যায়
- ❑ বাংলা সাহিত্যের রূপরীতি— শুদ্ধসত্ত্ব বসু
- ❑ সাহিত্যকোষ : কথাসাহিত্য— অলোক রায়
- ❑ সাহিত্য বিচার : তত্ত্ব ও প্রয়োগ— বিমলকুমার মুখোপাধ্যায়

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সাময়িক পত্র ও কথাসাহিত্য

উদ্দেশ্য : এই কোর্সে আধুনিক বাঙালির চিন্তা চেতনার বাহক হিসেবে বাংলা সাময়িক পত্রের ভূমিকার কথা জানার পাশাপাশি পড়ুয়ারা উপন্যাস ও ছোটগল্পের রসাস্বাদন করতে পারবে।

মডিউল-১ : সাময়িক পত্র

	Class Hours		
	Th	**Tu**	**IA Exam**
দিগদর্শন, সমাচার দর্পন সংবাদ প্রভাকর, তত্ত্ববোধিনী পত্রিকা বঙ্গদর্শন, ভারতী সবুজপত্র কল্লোল, কালিকলম, প্রগতি পরিচয়, কবিতা	২৩	৬	১

মডিউল-২ : উপন্যাস

রজনী— বঙ্কিমচন্দ্র চট্টোপাধ্যায়	২৩	৬	১

মডিউল-৩ : ছোটগল্প

একালের গল্প সঞ্চয়ন (কলিকাতা বিশ্ববিদ্যালয় সংস্করণ) পাঠ্য গল্প : ছোটলোক— বনফুল চোর— জ্যোতিরিন্দ্র নন্দী রেকর্ড— নারায়ণ গঙ্গোপাধ্যায় অন্তঃসলিলা— সাবিত্রী রায় আদাব— সমরেশ বসু টোবাটেক সিং— সাদাত হোসেন মন্টো	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- বাংলা সাময়িক পত্র— ব্রজেন্দ্রনাথ বন্দ্যোপাধ্যায়
- বাংলা সাময়িকপত্রের ইতিবৃত্ত (১, ২)— সন্দীপ দত্ত
- বঙ্কিমচন্দ্র— সুবোধচন্দ্র সেনগুপ্ত
- বঙ্কিম সরণী— প্রমথনাথ বিশী
- বাংলা ছোটগল্প : প্রসঙ্গ ও প্রকরণ— বীরেন্দ্র দত্ত

Discipline Specific Elective (DSE)– 6 Credit Each
(সাধারণ বাংলা)

- স্নাতক (কলা) সাধারণ বিভাগের শিক্ষার্থীরা **(যারা CC হিসেবে বাংলা গ্রহণ করবে)** Discipline Specific Elective (DSE)-স্তরে পাঠ্য হিসেবে A- বর্গ থেকে যে-কোনো একটি পঞ্চম সেমেস্টারে এবং B- বর্গ থেকে যে-কোনো একটি ষষ্ঠ সেমেস্টারে নির্বাচন করবে।
- ৬ ক্রেডিট-এর প্রতিটি কোর্সের পূর্ণমান ১০০। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট DSE-র ক্লাসে পড়ুয়ার উপস্থিতির জন্য বরাদ্দ। ১০ নম্বর কোর্সভিত্তিক ধারাবাহিক মূল্যায়ন বা ইন্টারন্যাল অ্যাসেসমেন্ট-এর জন্য এবং ১৫ নম্বর কোর্সভিত্তিক টিউটোরিয়াল-এর জন্য বরাদ্দ। বাকি ৬৫ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট কর্তৃপক্ষের তত্ত্বাবধানে লিখিত পরীক্ষা নেওয়া হবে। প্রতিটি সেমেস্টারে পনেরো সপ্তাহ করে ক্লাস হবে ধরে নিয়ে Class Hours/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- ৬৫ নম্বরের লিখিত পরীক্ষায় ১০ নম্বরের তিনটি ব্যাখ্যামূলক, ৫ নম্বরের ৪টি বোধমূলক এবং ১ নম্বরের ১৫টি সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্নের উত্তর দিতে হবে। নিচের তালিকায় প্রশ্নপত্রের ধারণা পাওয়া যাবে।

প্রশ্ন নং	প্রশ্নের ধরন ও বিকল্প সংক্রান্ত নিয়ম	প্রশ্নের মান
১	মডিউল-১ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
২	মডিউল-২ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৩	মডিউল-৩ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৪	মডিউল-১ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৫	মডিউল-২ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৬	মডিউল-৩ থেকে একটি বোধমূলক প্রশ্ন। একটি বিকল্প থাকবে।	৫
৭	মডিউল-১, মডিউল-২ এবং মডিউল-৩ থেকে একটি করে প্রসঙ্গ/বিষয় নিয়ে টীকা-ধর্মী প্রশ্ন হবে। তিনটির মধ্যে যে-কোনো একটি লিখতে হবে।	৫
৮	প্রত্যেকটি মডিউল থেকে কমপক্ষে **তিনটি** করে প্রশ্ন নিয়ে মোট **পনেরটি** সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্ন দেওয়া হবে। এক্ষেত্রে কোনো বিকল্প থাকবে না।	১ × ১৫

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বাংলার সমাজ ও সংস্কৃতির ইতিহাস

উদ্দেশ্য : বাংলা ভাষার উদ্ভবের সময়কাল থেকে আধুনিক কাল পর্যন্ত বাঙালি জাতির সাংস্কৃতিক বিকাশের গতিরেখার সঙ্গে শিক্ষার্থীদের পরিচয় ঘটানোই এই কোর্সের উদ্দেশ্য।

মডিউল-১ :

	Class Hours		
	Th	**Tu**	**IA Exam**
বাংলা ও বাঙালি জাতির ভৌগোলিক ও নৃতাত্ত্বিক পরিচয়	২৩	৬	১
বাংলার সমাজ কাঠামো ও অর্থনৈতিক ভিত্তি			
বাংলার রাজনৈতিক ইতিহাস			
বাংলার ধর্ম			
চৈতন্য-সংস্কৃতি			
বাঙালির সাংস্কৃতিক স্বরূপ			

মডিউল-২

ঔপনিবেশিক আধুনিকতার অভিঘাত— শিক্ষায়, ধর্ম সংস্কারে ও মুক্ত চিন্তায়	২৩	৬	১
কৃষক আন্দোলন, নীল বিদ্রোহ, ফকির আন্দোলন			
ধর্ম, সমাজ ও শিক্ষা সংস্কারের উদ্দেশ্যে গঠিত সভা-সমিতি (১৯ শতক)			

মডিউল-৩

বঙ্গভঙ্গ ও বয়কট-স্বদেশী আন্দোলন,	২৩	৬	১
প্রান্তবর্গ/দলিত জনগোষ্ঠীর জাগরণ			
বাঙালি মুসলমানের স্বতন্ত্র জাতিসত্তার সন্ধান			
দেশভাগ, উদ্বাস্তু সমস্যা ও ভাষা আন্দোলন			
খাদ্য আন্দোলন ও নকশাল আন্দোলন			

সহায়ক গ্রন্থ (নির্বাচিত)

- বাঙ্গালীর ইতিহাস— নীহাররঞ্জন রায়
- History of Medieval Bengal — রমেশচন্দ্র মজুমদার
- বাংলা দেশের ইতিহাস— রমেশচন্দ্র মজুমদার
- বাঙ্গালার ইতিহাস (অখণ্ড)— রাখালদাস বন্দ্যোপাধ্যায়
- বাঙ্গালীর সংস্কৃতি— সুনীতিকুমার চট্টোপাধ্যায়
- রামতনু লাহিড়ী ও তৎকালীন বঙ্গসমাজ— শিবনাথ শাস্ত্রী
- বাংলার ইতিহাস— সুভাষ মুখোপাধ্যায়
- সংস্কৃতির বিশ্বরূপ— গোপাল হালদার
- বাঙলা ও বাঙালীর বিবর্তন— অতুল সুর
- সংস্কৃতির রূপান্তর— গোপাল হালদার
- চৈতন্য-প্রসঙ্গ— বঙ্গীয় সাহিত্য পরিষদ প্রকাশিত
- বাংলার কাব্য— হুমায়ুন কবির
- ঔপনিবেশিক বাংলার সমাজ চিত্র— চিত্তব্রত পালিত
- দেশ বিভাগ : পশ্চাৎ ও নেপথ্য কাহিনী— ভবানীপ্রসাদ চট্টোপাধ্যায়
- যুক্ত বাংলার শেষ অধ্যায়— কালীপদ বিশ্বাস
- পলাশি থেকে পার্টিশান— শেখর বন্দ্যোপাধ্যায়
- নীল বিদ্রোহ— পুলক চন্দ্র
- বাঙালির দর্শন— আমিনুল ইসলাম
- স্বাধীন ভারতের সাম্যবাদী আন্দোলন : রাজনীতি ও গতিপ্রকৃতি— শোভনলাল দত্তগুপ্ত
- সাহিত্য সমাজ ইতিহাস— পশ্চিমবঙ্গ ইতিহাস সংসদ প্রকাশিত
- বাংলার রেনেশাঁস— সুশোভন সরকার
- বাংলার নবজাগৃতি— বিনয় ঘোষ
- কলকাতা : ইতিহাসের দিনলিপি— নীরদবরণ হাজরা
- সংস্কৃতির ভাঙা সেতু— আখতারুজ্জামান ইলিয়াস
- শতাব্দীর প্রতিধ্বনি— অতুল সুর
- উত্তাল চল্লিশ : অসমাপ্ত বিপ্লব— অমলেন্দু সেনগুপ্ত
- জোয়ারভাটায় ষাট-সত্তর— অমলেন্দু সেনগুপ্ত
- হাজার বছরের বাঙালির সংস্কৃতি— গোলাম মুরশিদ

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বাংলা গোয়েন্দা সাহিত্য, কল্পবিজ্ঞান আশ্রয়ী রচনা এবং অলৌকিক কাহিনি

উদ্দেশ্য : সাহিত্যের পাঠ এবং আস্বাদনে কিশোরদের অভ্যাস তৈরি হয়ে ওঠে গোয়েন্দা গল্প, কল্পবিজ্ঞানের কাহিনি অথবা ভূতের গল্পের মধ্য দিয়ে। তাদের চেনা ক্ষেত্রকেই পড়ুয়ারা এখানে বিদ্যায়তনিক পাঠ শৃঙ্খলায় অধ্যয়ন করতে শিখবে।

মডিউল-১

	Class Hour		
	Th	**Tu**	**IA Exam**
শজারুর কাঁটা— শরদিন্দু বন্দ্যোপাধ্যায়	২৩	৬	১

মডিউল-২

শঙ্কু সমগ্র (আনন্দ পাব.)— সত্যজিৎ রায় পাঠ্য সমূহ : ব্যোমযাত্রীর ডায়রি, প্রফেসর শঙ্কু ও ম্যাকাও, প্রফেসর শঙ্কু ও গোলক-রহস্য, প্রফেসর শঙ্কু ও রোবু, হিপনোজেন, মহাকাশের দূত, শঙ্কু ও আদিম মানুষ, শঙ্কু ও ফ্র্যাঙ্কেনস্টাইন	২৩	৬	১

মডিউল-৩

সব ভুতুড়ে— লীলা মজুমদার	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ সত্যজিৎ রায়— পশ্চিমবঙ্গ বাংলা আকাদেমি
- ❑ এক দুর্লভ মানিক— অমিত্রসূদন ভট্টাচার্য
- ❑ ক্রাইম কাহিনীর কালক্রান্তি— সুকুমার সেন

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দেশভাগ ও বাংলা সাহিত্য

উদ্দেশ্য : বাঙালি জাতির ইতিহাসে দেশভাগের একটি গভীরমূল এবং সুদূরপ্রসারী অভিঘাত রয়েছে। দেশভাগকে ঘিরে বাঙালির সামূহিক এবং ব্যক্তিক বিপন্নতা, বিপর্যয় এবং অসহায়ত্বের সাক্ষ্যবাহী নির্বাচিত কিছু সাহিত্যকে এখানে পাঠ্য করা হয়েছে।

মডিউল-১ : উপন্যাস

	Class Hours		
	Th	**Tu**	**IA Exam**
নীলকণ্ঠ পাখির খোঁজে— অতীন বন্দ্যোপাধ্যায়	২৩	৬	১

মডিউল-২ : ছোটগল্প

এপার গঙ্গা ওপার গঙ্গা— জ্যোতির্ময়ী দেবী গণনায়ক— সতীনাথ ভাদুড়ী ছেলেমানুষী— মানিক বন্দ্যোপাধ্যায় পালঙ্ক— নরেন্দ্রনাথ মিত্র ড্রেসিং টেবিল— সলিল চৌধুরী করুণকন্যা— রমাপদ চৌধুরী রাজা আসে রাজা যায়— প্রফুল্ল রায় জটায়ু— দীপেন্দ্রনাথ বন্দ্যোপাধ্যায়	২৩	৬	১

মডিউল-৩ : কবিতা

পুব-পশ্চিম— অচিন্ত্যকুমার সেনগুপ্ত খুকু ও খোকা— অন্নদাশঙ্কর রায় ১৫ই আগস্ট ১৯৪৭—দীনেশ দাস জল দাও— বিষ্ণু দে পারাপার— সুভাষ মুখোপাধ্যায় বাংলা, হায় বাংলা— মঙ্গলাচরণ চট্টোপাধ্যায় তোমাকে বলেছিলাম— নীরেন্দ্রনাথ চক্রবর্তী দেশহীন — শঙ্খ ঘোষ ধাত্রী—সুনীল গঙ্গোপাধ্যায় সমরেন্দ্র সেনগুপ্ত —ভাষাদেশ	২৩	৬	১

সহায়ক গ্রন্থ (নির্বাচিত)

- বাংলা ছোটগল্পে দেশবিভাগ— সানজিদা আখতার
- ভূমিকা (রক্তমণির হারে গ্রন্থ)— দেবেশ রায়
- ভূমিকা (ভেদ-বিভেদ গ্রন্থ)— মানবেন্দ্র বন্দ্যোপাধ্যায়
- যুক্তবঙ্গের স্মৃতি— অন্নদাশঙ্কর রায়
- আমার জন্মভূমি /স্মৃতিময় বাংলাদেশ— ধনঞ্জয় দাশ
- ভাঙা বাংলা ও বাংলা সাহিত্য— অশ্রুকুমার শিকদার
- বাংলা উপন্যাসে দেশভাগ ও দেশত্যাগ— তারক সরকার
- দেশভাগ দেশত্যাগ— সন্দীপ বন্দ্যোপাধ্যায়
- যুক্ত বাংলার শেষ অধ্যায়— কালীপদ বিশ্বাস
- দেশ বিভাগ : পশ্চাৎ ও নেপথ্য কাহিনী— ভবানী প্রসাদ চট্টোপাধ্যায়
- বাংলা মধ্যবিত্তের আত্মবিকাশ— কামরুদ্দিন আহমেদ

- ❑ পূর্ব বাংলার সমাজ ও রাজনীতি— কামরুদ্দিন আহমেদ
- ❑ আমার দেখা রাজনীতির পঞ্চাশ বছর— আবুল মনসুর আহমেদ
- ❑ আমার জীবন ও বিভাগ পূর্ব বাংলার রাজনীতি— আবুল হাসিম
- ❑ কালের পুত্তলিকা— অরুণকুমার মুখোপাধ্যায়
- ❑ দেশভাগ : নির্বাসিতের আখ্যান— তপোধীর ভট্টাচার্য
- ❑ বিষাদবৃক্ষ— মিহির সেনগুপ্ত

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লোকসংস্কৃতি ও লোকসাহিত্য

উদ্দেশ্য : বাঙালি এবং তার সংস্কৃতিকে জানতে গেলে আমাদের লোকসংস্কৃতি ও লোকসাহিত্যের পাঠ নেওয়া খুবই জরুরি। বাংলার সমৃদ্ধ লোক-ঐতিহ্যের থেকে নির্বাচিত কয়েকটি প্রসঙ্গই এখানে পড়ুয়াদের চর্চার জন্য রাখা হচ্ছে।

মডিউল-১

	Class Hour		
	Th	**Tu**	**IA Exam**
লোকসংস্কৃতি ও লোকসাহিত্যের সাধারণ পরিচয়	২৩	৬	১
টাইপ ও মোটিফ ইনডেক্স (বৈশিষ্ট্য ও প্রয়োগ শিক্ষার প্রাথমিক পাঠ)			
বাংলার ব্রত ও পার্বন (বিশেষ পাঠ : পুণ্যিপুকুর, মাঘমন্ডল, সেঁজুতি)			

মডিউল-২

লোকছড়া	২৩	৬	১
লোকনৃত্য (বিশেষ পাঠ : ছৌ, রায়বেশে, গম্ভীরা)			
ধাঁধা			

মডিউল-২

বাংলা প্রবাদ	২৩	৬	১
লোকগান (বিশেষ পাঠ : বাউল, ভাটিয়ালী, ভাওয়াইয়া)			
লোককথা			

সহায়ক গ্রন্থ (নির্বাচিত) :

- ❑ বাংলার ব্রত— অবনীন্দ্রনাথ ঠাকুর
- ❑ বাংলার লোক সাহিত্য— আশুতোষ ভট্টাচার্য
- ❑ লোকসংস্কৃতির সীমানা ও স্বরূপ— পল্লব সেনগুপ্ত
- ❑ ফোকলোর পরিচিতি ও পঠন-পাঠন— মযহারুল ইসলাম
- ❑ বাংলা প্রবাদ— সুশীলকুমার দে
- ❑ বাংলার ধাঁধার ভূমিকা— নির্মলেন্দু ভৌমিক
- ❑ বাংলা ছড়ার ভূমিকা— নির্মলেন্দু ভৌমিক
- ❑ বাংলা লোককথার টাইপ ও মোটিফ ইনডেক্স— দিব্যজ্যোতি মজুমদার
- ❑ লোক সংস্কৃতি পাঠের ভূমিকা— তুষার চট্টোপাধ্যায়
- ❑ বঙ্গীয় লোকসংস্কৃতিকোষ— বরুণ চক্রবর্তী
- ❑ বাংলা লোকসঙ্গীত : ভাটিয়ালি গান— ওয়াকিল আহমেদ
- ❑ বাউল ফকির কথা— সুধীর চক্রবর্তী

Skill Enhancement Course (SEC)– 2 Credits Each

(সাধারণ বাংলা)

- স্নাতক সাধারণ পাঠক্রমের শিক্ষার্থীরা (যারা CC হিসেবে বাংলা গ্রহণ করবে) 'Skill Enhancement Course (SEC)' স্তরে ৪ (২ × ২) ক্রেডিট-এর মোট ২টি কোর্স পড়বে। প্রদত্ত A- বর্গ থেকে যে-কোনো একটি কোর্স তৃতীয় অথবা পঞ্চম সেমেস্টারে এবং B- বর্গ থেকে যে-কোনো একটি কোর্স চতুর্থ অথবা ষষ্ঠ সেমেস্টারে পড়তে হবে। প্রতিটি সেমেস্টারে পনেরো সপ্তাহ করে ক্লাস হবে ধরে নিয়ে Class Hours/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- ২ ক্রেডিট-এর প্রতিটি কোর্সের পূর্ণমান ১০০। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট SEC-র ক্লাসে পড়ুয়ার উপস্থিতির জন্য এবং ১০ নম্বর কোর্সভিত্তিক ধারাবাহিক মূল্যায়ন বা ইন্টারন্যাল অ্যাসেসমেন্ট-এর জন্য বরাদ্দ। বাকি ৮০ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট কর্তৃপক্ষের তত্ত্বাবধানে লিখিত পরীক্ষা নেওয়া হবে।
- ৮০ নম্বরের লিখিত পরীক্ষায় ১০ নম্বরের তিনটি ব্যাখ্যামূলক, ৫ নম্বরের ৬টি বোধমূলক এবং ১ নম্বরের ২০টি সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্নের উত্তর দিতে হবে। নিচের তালিকায় প্রশ্নপত্রের ধারণা পাওয়া যাবে

প্রশ্ন নং	প্রশ্নের ধরন ও বিকল্প ও সংক্রান্ত নিয়ম	প্রশ্নের মান
১	মডিউল-১ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
২	মডিউল-২ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৩	মডিউল-৩ থেকে একটি ব্যাখ্যামূলক প্রশ্ন। একটি বিকল্প থাকবে।	১০
৪	প্রত্যেকটি মডিউল থেকে কমপক্ষে **একটি** করে প্রশ্ন নিয়ে মোট **আটটি** প্রশ্ন দেওয়া হবে। পরীক্ষার্থীকে যে-কোনো **ছয়টি** প্রশ্নের উত্তর দিতে হবে।	৫ × ৬
৫.	প্রত্যেকটি মডিউল থেকে কমপক্ষে **চারটি** করে প্রশ্ন নিয়ে মোট **কুড়িটি** সংক্ষিপ্ত উত্তরভিত্তিক/তথ্যমূলক প্রশ্ন দেওয়া হবে। এক্ষেত্রে কোনো বিকল্প থাকবে না।	১ × ২০

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মুদ্রণ ও প্রকাশনা

উদ্দেশ্য : বাংলা মুদ্রণ ও প্রকাশনা সংক্রান্ত সাধারণ জ্ঞানার্জন করবে পড়ুয়ারা।

মডিউল-১

	Class Hours	
	Th	**IA Exam**
পাণ্ডুলিপি প্রস্তুতি	১০	১
বাংলা যুক্তাক্ষরের ধারণা		
সংগ্রহ-সম্পাদনা ও সংকলন সম্পর্কে ধারণা		
কভার, টাইটেল পেজ, গ্রন্থ/পত্রিকার পঞ্জিকরণ সংক্রান্ত ধারণা		

মডিউল-২

এম. এস. ওয়ার্ড, পেজ মেকার	১০	১
কোরেল ড্র, ইনডিজাইন		

মডিউল-৩

প্রুফ সংশোধন (দৃষ্টিহীন পড়ুয়াদের জন্য অশুদ্ধি সংশোধন থাকবে)	১০	১
ছাপার প্রযুক্তি, স্টিচিং, বাইন্ডিং, মার্কেটিং সম্পর্কিত সাধারণ ধারণা		

সহায়ক গ্রন্থ (নির্বাচিত)

- যখন ছাপাখানা এলো— শ্রীপান্থ
- দুই শতকের বাংলা মুদ্রণ ও প্রকাশন— চিত্তরঞ্জন বন্দ্যোপাধ্যায় (সম্পাদিত)
- বাংলা পাণ্ডুলিপি পাঠ ও পরিক্রমা— ত্রিপুরা বসু
- মুদ্রণের সংস্কৃতি ও বাংলা বই— স্বপন চক্রবর্তী (সম্পাদিত)
- উনিশ শতকের বাংলা ছাপাখানা— আশিস খাস্তগীর
- গবেষণাপত্র : অনুসন্ধান ও রচনা— জগমোহন মুখোপাধ্যায়
- লেখক ও সম্পাদকের অভিধান— সুভাষ ভট্টাচার্য (সম্পাদিত)
- মাষ্টারিং Micorsoft Office Power Point — বাপ্পি আশরাফ
- ডায়নামিক মেমরি কম্পিউটার কোর্স— দেবেন্দ্র সিং মিনহাস

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ব্যবহারিক বাংলা-১

উদ্দেশ্য : পরবর্তী জীবনে পেশা হিসেবে যে-সব পড়ুয়া নাটক অথবা সিনেমা-সিরিয়ালকে কিংবা আবৃত্তি শিল্পকে গ্রহণ করতে চাইবে, তারা ঐ সব বিষয়ের প্রাথমিক ধ্যানধারণা পাবে এই কোর্স থেকে।

মডিউল-১

	Class Hours	
	Th	**IA Exam**
গল্পসূত্র থেকে কাহিনি নির্মাণ	১০	১
গল্প/উপন্যাস থেকে নাট্যরূপ/ চিত্রনাট্য নির্মাণ		

মডিউল-২

বাংলা ভাষার/শব্দের সঠিক উচ্চারণ	১০	১
ছন্দ সম্পর্কিত জ্ঞান		
আবৃত্তিচর্চা		

মডিউল-৩

সাহিত্য ও চলচ্চিত্র— পারস্পরিক সম্পর্ক	১০	১
বাংলা সাহিত্যের চলচ্চিত্রায়ণ বিশেষ পাঠ : ক্ষুধিত পাষাণ, পথের পাঁচালী, বাড়ি থেকে পালিয়ে		

সহায়ক গ্রন্থ (নির্বাচিত) :

- চলচ্চিত্রের অভিধান— ধীমান দাশগুপ্ত
- বিষয় চলচ্চিত্র— সত্যজিৎ রায়
- বাংলা চলচ্চিত্রের ইতিহাস— নির্মাল্য আচার্য ও দিব্যেন্দু পালিত (সম্পাদিত)
- রবীন্দ্রনাথের সিনেমা সিনেমার রবীন্দ্রনাথ— চণ্ডী মুখোপাধ্যায়
- মৃণাল সেনের ফিল্মযাত্রা— শিলাদিত্য সেন
- কবিতার ক্লাস— নীরেন্দ্রনাথ চক্রবর্তী
- বিষয় আবৃত্তি— অমিয় চট্টোপাধ্যায়, দেবদুলাল বন্দ্যোপাধ্যায়
- বাংলা সিনেমার ইতিকথা : দুই বাংলার চলচ্চিত্র (১৯০৩-২০১৪)— চণ্ডী মুখোপাধ্যায়
- চলচ্চিত্র : চিন্তাবীজ রবের ব্রেসঁ (ভাষান্তর : সন্দীপন ভট্টাচার্য)
- চলচ্চিত্র মানুষ এবং আরো কিছু— ঋত্বিককুমার ঘটক
- সিনেমার ইতিবৃত্তান্ত— পার্থ রাহা
- বাংলা বলো— পবিত্র সরকার
- কি লিখি কেন লিখি— নীরেন্দ্রনাথ চক্রবর্তী

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ব্যবহারিক বাংলা ও সাহিত্য গবেষণার পদ্ধতিবিজ্ঞান

উদ্দেশ্য : শিক্ষার্থীদের জীবনের নানা প্রয়োজনকে সুষ্ঠভাবে এবং নিয়মমাফিক সমাধা করতে সহায়তা করবে এই কোর্সটি।

মডিউল-১

	Class Hours	
	Th	**IA Exam**
সংবাদপত্রে অথবা ব্যক্তিগতভাবে প্রচারের লক্ষ্যে প্রতিবেদন রচনা	১০	১
চিঠিপত্র রচনা—বিভিন্ন প্রকার সহ		
কাল্পনিক সাক্ষাৎকার রচনা		

মডিউল-২

ছাপা মাধ্যম এবং বৈদ্যুতিন মাধ্যমের জন্য বিজ্ঞাপন রচনা	১০	১
অনুবাদের ভাষা ও শৈলী		
ইংরেজি থেকে বাংলা অনুবাদ		

মডিউল-৩

গবেষণার রীতি ও নির্মাণ পদ্ধতি, গবেষণার আদর্শ বিন্যাসক্রম	১০	১
তথ্য সংগ্রহ, উদ্ধৃতির প্রয়োগ, কপিরাইট আইন		
পাদটীকা/প্রান্তটীকা/সূত্র নির্দেশ, গ্রন্থপঞ্জি ও নির্ঘন্ট প্রণয়ন বিধি		

সহায়ক গ্রন্থ (নির্বাচিত)

- গণজ্ঞাপন : তত্ত্ব ও প্রয়োগে— পার্থ চট্টোপাধ্যায়
- সেকাল একালের সংবাদ পরিবেশনের ধারা ও বিচিত্র সংবাদ— বৈদ্যনাথ বন্দ্যোপাধ্যায়
- গবেষণাপত্র : অনুসন্ধান ও রচনা— জগমোহন মুখোপাধ্যায়

BNG-G-SEC-B-4/6-2-TH

ব্যবহারিক বাংলা-২

উদ্দেশ্য : যে-সব সাহিত্যরূপ পড়ুয়ারা পড়ছে/পড়েছে তা কীভাবে তৈরি হয়ে ওঠে, তার কলাকৌশলগুলি সম্পর্কে এখানে হাতে কলমে তাদের ধারণা দেওয়া হবে। তার সঙ্গে বানান এবং IPA ও রোমীয় লিপি সংক্রান্ত ব্যবহারিক জ্ঞানও দিতে চাওয়া হয়েছে এই কোর্সে।

মডিউল-১ : সৃজনশীল রচনা

	Class Hours	
	Th	**IA Exam**
গল্প রচনা (সামাজিক/পারিবারিক/ব্যক্তিক কোনো প্রসঙ্গ/বিষয় অবলম্বনে কমবেশি ৩০০ শব্দে গল্প লিখতে দেওয়া হবে)	১০	১
প্রবন্ধ রচনা (সামাজিক/পারিবারিক/ব্যক্তিক অথবা সাহিত্য বিষয়ক কোনো প্রসঙ্গ/বিষয় অবলম্বনে কমবেশি ৩০০ শব্দে প্রবন্ধ লিখতে দেওয়া হবে)		

মডিউল-২

বাংলা বানানের বিবর্তন সম্পর্কে সাধারণ ধারণা	১০	১
পশ্চিমবঙ্গ বাংলা আকাদেমির বানান বিধি		

মডিউল-৩

আন্তর্জাতিক ধ্বনিমূলক বর্ণমালা (IPA)	১০	১
রোমীয় লিপি		

সহায়ক গ্রন্থ (নির্বাচিত)

- ❑ সাধারণ ভাষাবিজ্ঞান ও বাংলাভাষা— রামেশ্বর শ'
- ❑ কি লিখি কেন লিখি— নীরেন্দ্রনাথ চক্রবর্তী
- ❑ বাংলা বানান বিধি— পরেশচন্দ্র মজুমদার
- ❑ বাংলা বানান সংস্কার, সমস্যা ও সম্ভাবনা— পবিত্র সরকার

কলিকাতা বিশ্ববিদ্যালয়

২০১৮

স্নাতক পাঠক্রম

(কলা, বিজ্ঞান ও বাণিজ্যসহ সমস্ত বিভাগের পড়ুয়াদের জন্য)

Ability Enhancement Compulsory Course (AECC-1) MIL (Bengali)

ইউ.জি.সি নির্দেশিত সিবিসিএস অনুসারে

(উত্তর লেখার ক্ষেত্রে পরীক্ষার্থীদের পশ্চিমবঙ্গ বাংলা আকাদেমি-র বানানবিধি অনুসরণ করতে হবে)

AECC-1 [MIL (Bengali)]–2 Credits

BNG-AECC-1-1-TH

- স্নাতক কলা, বাণিজ্য, বিজ্ঞান বিভাগের যে-সমস্ত পড়ুয়া AECC-1 স্তরে MIL হিসেবে বাংলা বিকল্পটি গ্রহণ করবে তাদের জন্য প্রথম সেমেস্টারে ২ ক্রেডিটের এই কোর্সটি পাঠ্য।
- সেমেস্টারে মোট পনেরো সপ্তাহ ক্লাস হবে ধরে নিয়ে Class Hour/Teaching Hours-এর হিসেব দেওয়া হয়েছে।
- এই কোর্সটি ১০০ নম্বরের। এর মধ্যে ১০ নম্বর সংশ্লিষ্ট ক্লাসে পড়ুয়ার উপস্থিতির জন্য এবং ১০ নম্বর কোর্সভিত্তিক আভ্যন্তর মূল্যায়নের জন্য বরাদ্দ থাকবে।
- অবশিষ্ট ৮০ নম্বরের জন্য বিশ্ববিদ্যালয়ের সংশ্লিষ্ট দপ্তর পরীক্ষা নেবে। **৪টি মডিউল থেকে ১০টি করে ২ নম্বরের মোট ৪০টি MCQ ধর্মী প্রশ্ন হবে।**

মডিউল-১ : প্রবন্ধ (কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত *ভাষাপাঠ সঞ্চয়ন-এ সংকলিত*)

	Class Hours
পাঠ্য প্রবন্ধ : স্বদেশী সমাজ— রবীন্দ্রনাথ ঠাকুর বাঙ্গালা ভাষা— স্বামী বিবেকানন্দ স্ত্রী জাতির অবনতি— বেগম রোকেয়া অপবিজ্ঞান— রাজশেখর বসু	৯

মডিউল-২ : ছোটগল্প (কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত *ভাষাপাঠ সঞ্চয়ন-এ সংকলিত*)

পাঠ্যগল্প : রবীন্দ্রনাথ ঠাকুর লিখিত পোস্টমাস্টার, ছুটি, জীবিত ও মৃত এবং বলাই	৯

মডিউল-৩ : কবিতা (কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত *ভাষাপাঠ সঞ্চয়ন-এ সংকলিত*)

নৈবেদ্য— রবীন্দ্রনাথ ঠাকুর পাঠ্য : বৈরাগ্য সাধনে মুক্তি সে আমার নয় (৩০), শতাব্দীর সূর্য আজি রক্ত মেঘ-মাঝে (৬৪), স্বার্থের সমাপ্তি অপঘাতে (৬৫), তোমার ন্যায়ের দণ্ড প্রত্যেকের করে (৭০), চিত্ত যেথা ভয় শূন্য উচ্চ যেথা শির (৭২), শক্তিদম্ভ স্বার্থলোভ মারীর মতন (৯২)	৬

মডিউল-৪ : পরিভাষা

কলিকাতা বিশ্ববিদ্যালয় প্রকাশিত ভাষাপাঠ সঞ্চয়ন-এ নির্ধারিত ২৫০টি পরিভাষা	৬

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

COURSE CURRICULUM UNDER CHOICE BASED CREDIT SYSTEM

SYLLABUS

FOR

BACHELOR
IN CHEMISTRY (HONOURS)

UNIVERSITY OF CALCUTTA

Course Structure

Course Credits

	Theory+ Practical
Core Course (CC)	
Theory (14 Papers of 4 credits each)	14×4= 56
Practical (14 Papers of 2 credits each)	14×2=28
Discipline Specific ElectiveCourse*(DSE)	
Theory (4 Papers of 4 credits each)	4×4=16
Practical(4 Papers of 2 credits each)	4×2=8
Generic Elective (GE)	
Theory (4 Papers of 4 credits each)	4×4=16
Practical(4 Papers of 2 credits each)	4×2=8
Ability Enhancement Compulsory Course (AECC)	
(2 Papers of 2 credits each)	2×2=4
Environmental Science	
English/MIL Communication	
SkillEnhancement Elective Course(SEC)	
(2 Papers of 2 credits each)	2×2=4
Total credit	**140**

***Optional Dissertation or project work in place of one Discipline Specific Elective paper (6 credits) in 6th Semester**

CORE COURSES FOR B. SC. HONOURS (CHEMISTRY)

SEM	CODE*	PAPER	BRIEF DESCRIPTION
1	CEMA-CC-1-1-TH	INORGANIC CHEMISTRY-1 ORGANIC CHEMISTRY -1A	Acid-base and redox reactions Basics of Organic Chemistry
	CEMA-CC-1-1- P	PRACTICALS**	
	CEMA-CC-1-2-TH	PHYSICAL CHEMISTRY-1 ORGANIC CHEMISTRY -1B	Kinetic theory, Chemical kinetics Stereochemistry
	CEMA-CC-1-2-P	PRACTICALS	
2	CEMA-CC-2-3-TH	ORGANIC CHEMISTRY -2	Reaction Mechanism
	CEMA-CC-2-3-P	PRACTICALS	
	CEMA-CC-2-4-TH	INORGANIC CHEMISTRY-2	Chemical Bonding
	CEMA-CC-2-4-P	PRACTICALS	
3	CEMA-CC-3-5-TH	PHYSICAL CHEMISTRY-2	Chemical Thermodynamics
	CEMA-CC-3-5-P	PRACTICALS	
	CEMA-CC-3-6-TH	INORGANIC CHEMISTRY-3	s and p Block Elements
	CEMA-CC-3-6-P	PRACTICALS	
	CEMA-CC-3-7-TH	ORGANIC CHEMISTRY -3	Alkenes, Alkynes, Carbonyls
	CEMA-CC-3-7-P	PRACTICALS	
4	CEMA-CC-4-8-TH	ORGANIC CHEMISTRY - 4	Organic Synthesis, Spectroscopy
	CEMA-CC-4-8-P	PRACTICALS	
	CEMA-CC-4-9-TH	PHYSICAL CHEMISTRY- 3	Applications of Thermodynamics, Quantum Mechanics
	CEMA-CC-4-9-P	PRACTICALS	
	CEMA-CC-4-10-TH	INORGANIC CHEMISTRY-4	Coordination Chemistry, d & f elements
	CEMA-CC-4-10-P	PRACTICALS	
5	CEMA-CC-5-11-TH	PHYSICAL CHEMISTRY -4	Quantum Chemistry, Statistical Thermodynamics
	CEMA-CC-5-11-P	PRACTICALS	
	CEMA-CC-5-12-TH	ORGANIC CHEMISTRY -5	Cyclic Compounds, Biomolecules
	CEMA-CC-5-12-P	PRACTICALS	
6	CEMA-CC-6-13-TH	INORGANIC CHEMISTRY-5	Bioinorganic and Organometallic Chemistry
	CEMA-CC-6-13-P	PRACTICALS	
	CEMA-CC-6-14-TH	PHYSICAL CHEMISTRY -5	Molecular Spectroscopy, Photochemistry
	CEMA-CC-6-14-P	PRACTICALS	

*** The Course code indicates subject-type of course-semester number-paper number-theory /practical [e.g. CEMA-CC-1-1-TH/P stands for Chemistry HonoursCore Course- First Semester- Paper 1- Theoretical /Practical]**

**** Practicals are based on the corresponding theoretical papers.**

Discipline Specific Courses (DSE)
For Semester 5

Any One from the following

DSE-A1:MOLECULAR MODELLING & DRUG DESIGN

DSE-A2: APPLICATIONS OF COMPUTERS IN CHEMISTRY

Any One from the following

DSE-B1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE

DSE-B2: NOVEL INORGANIC SOLIDS

For Semester 6

Any One from the following

DSE-A3: GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS

DSE-A4: ANALYTICAL METHODS IN CHEMISTRY

Any One from the following

DSE-B3:POLYMER CHEMISTRY

DSE-B4: DISSERTATION

SKILL ENHANCEMENT COURSES (SEC)

SEC-A For Semester 3 [Any one]

SEC 1 – MATHEMATICS AND STATISTICS FOR CHEMISTS
SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY

SEC-B For Semester 4 [Any one]

SEC 3 – PHARMACEUTICALS CHEMISTRY
SEC4 - PESTICIDE CHEMISTRY

Important Guidelines

- **General Electives (GE) are to be taken preferably from Physics and Mathematics disciplines.**
- **All graphs for Physical / Inorganic Courses must be done using standard Spreadsheet Software**
- **Each college should take necessary measures to ensure they should have the following facilities:**

  1. UV-VIS Spectrophotometer with printer.
  2. FT-IR spectrophotometer with printer.
  3. Internet facility.
  4. Requisite number of computers (One computer for 3-4 students).

For proper maintenance of above mentioned facilities, clean & dry AC rooms are mandatory.

- **Each lecture is of 1 hr duration for both theory and practical classes.**

CORE COURSES (HONOURS) IN CHEMISTRY[CEM-A]

SEMESTER-1

CEMA-CC-1-1-TH :

(Credits: Theory-04, Practicals-02)

INORGANIC CHEMISTRY-1

Theory: 40 Lectures

Extra nuclear Structure of atom (14 Lectures)

Quantum numbers and their significance, Schrödinger's wave equation, significance of ψ and ψ^2. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of *s*, *p*, *d* and *f* orbitals. Pauli's Exclusion Principle, Hund's rules and multiplicity, Exchange energy, Aufbau principle and its limitations, Ground state Term symbols of atoms and ions for atomic number upto 30.

Acid-Base reactions (12 Lectures)

Acid-Base concept: Arrhenius concept, theory of solvent system (in H_2O, NH_3, SO_2 and HF), Bronsted-Lowry's concept, relative strength of acids, Pauling's rules. Lux-Flood concept, Lewis concept, group characteristics of Lewis acids, solvent levelling and differentiating effects.Thermodynamic acidity parameters, Drago-Wayland equation.Superacids, Gas phase acidity and proton affinity; HSAB principle.Acid-base equilibria in aqueous solution (Proton transfer equilibria in water), pH, buffer.Acid-base neutralisation curves; indicator, choice of indicators.

Redox Reactions (14 Lectures)

Ion-electron method of balancing equation of redox reaction.Elementary idea on standard redox potentials with sign conventions, Nernst equation (without derivation).Influence of complex formation, precipitation and change of pH on redox potentials; formal potential.Feasibility of a redox titration, redox potential at the equivalence point, redox indicators.Redox potential diagram (Latimer and Frost diagrams) of common elements and their applications.Disproportionation and comproportionation reactions (typical examples).

Electroanalytical methods: Basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pKa values

Solubility and solubility effect – common ion effect and their applications to the precipitation and separation of common metallic ions as hydroxides, sulfides, phosphates, carbonates, sulfates and halides.

Reference Books

1. Lee, J. D. *Concise Inorganic Chemistry*,5th Ed., Wiley India Pvt. Ltd., 2008.
2. Douglas, B.E. and McDaniel, D.H. *Concepts & Models of Inorganic Chemistry* Oxford, 1970.
3. Day, M.C. and Selbin, J. *Theoretical Inorganic Chemistry*, ACS Publications, 1962.
4. Atkin, P. *Shriver & Atkins' Inorganic Chemistry*, 5th Ed., Oxford University Press (2010).
5. Cotton, F.A., Wilkinson, G. and Gaus, P.L., *Basic Inorganic Chemistry 3rdEd.;* Wiley India.
6. Sharpe, A.G., *Inorganic Chemistry*, 4th Indian Reprint (Pearson Education) 2005.
7. Huheey, J. E.; Keiter, E.A, & Keiter, R.L. *Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed.*, Harper Collins 1993, Pearson,2006.
8. Atkins, P.W. & Paula, J. *Physical Chemistry*, Oxford Press, 2006.
9. Mingos, D.M.P., *Essential trends in inorganic chemistry*. Oxford University Press (1998).
10. Winter, M. J., The Orbitron, http://winter.group.shef.ac.uk/orbitron/ (2002). An illustrated gallery of atomic and molecular orbitals.
11. Burgess, J., *Ions in solution: basic principles of chemical interactions.* Ellis Horwood (1999).

ORGANIC CHEMISTRY-1A

Theory: 20 Lectures

Basics of Organic Chemistry

Bonding and Physical Properties **(18 Lectures)**

Valence Bond Theory: concept of hybridisation, shapes of molecules, resonance (including hyperconjugation); calculation of formal charges and double bond equivalent (DBE); orbital pictures of bonding (sp^3, sp^2, sp: C-C, C-N & C-O systems and *s-cis* and *s-trans* geometry for suitable cases).
Electronic displacements: inductive effect, field effect, mesomeric effect, resonance energy; bond polarization and bond polarizability; electromeric effect; steric effect, steric inhibition of resonance.
MO theory: qualitative idea about molecular orbitals, bonding and antibonding interactions, idea about σ, σ^*, π, π^*, n – MOs; concept of HOMO, LUMO and SOMO; sketch and energy levels of π MOs of i) acyclic p orbital system (C=C, conjugated diene, triene, allyl and pentadienyl systems) ii) cyclic p orbital system (neutral systems: [4], [6] annulenes; charged systems: 3-,4-,5-membered ring systems); Hückel's rules for aromaticity up to [8] annulene (including mononuclear heterocyclic compounds up to 6-membered ring); concept of antiaromaticity and homoaromaticity; non-aromatic molecules; Frost diagram (qualitative drawing).
Physical properties: influence of hybridization on bond properties: bond dissociation energy (BDE) and bond energy; bond distances, bond angles; concept of bond angle strain; melting point/boiling point and solubility of common organic compounds in terms of covalent & non-covalent intermolecular forces; polarity of molecules and

dipole moments; relative stabilities of isomeric hydrocarbons in terms of heat of hydrogenation and heat of combustion data.

General Treatment of Reaction Mechanism I (02 Lectures)

Mechanistic classification: ionic, radical and pericyclic (definition and example); reaction type: addition, elimination and substitution reactions (definition and example); nature of bond cleavage and bond formation: homolytic and heterolytic bond fission, homogenic and heterogenic bond formation; curly arrow rules in representation of mechanistic steps; reagent type: electrophiles and nucleophiles (elementary idea).

Reference Books

1. Finar, I. L. *Organic Chemistry (Volume 1),* Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Sykes, P. *A guidebook to Mechanism in Organic Chemistry*, Pearson Education, 2003.
4. Carey, F. A., Guiliano, R. M.*Organic Chemistry*, Eighth edition, McGraw Hill Education, 2012.

CEMA-CC-1-1-P(45 Lectures)

**** During examination marks of the experiments will be set in 2:1 ratio for Inorganic and Organic experiments respectively.**

1) INORGANIC CHEMISTRY: I (1) LAB (30 Lectures)

Acid and Base Titrations: (DEMO ONLY)

1. Estimation of carbonate and hydroxide present together in mixture
2. Estimation of carbonate and bicarbonate present together in a mixture.
3. Estimation of free alkali present in different soaps/detergents.

Oxidation-Reduction Titrations:

1. Estimation of Fe(II) using standardized $KMnO_4$ solution
2. Estimation of oxalic acid OR sodium oxalate in a given mixture
3. Estimation of Fe(II) and Fe(III) in a given mixture using $K_2Cr_2O_7$ solution.
4. Estimation of Fe(III) and Mn(II) in a mixture using standardized $KMnO_4$ solution
5. Estimation of Fe(III) and Cu(II) in a mixture using $K_2Cr_2O_7$.

6. Estimation of Fe(III) and Cr(III) in a mixture using $K_2Cr_2O_7$.

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis* 6th Ed., Pearson, 2009.
2. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

2) ORGANIC CHEMISTRY: O (1A) LAB (15 Lectures)

Separation based upon solubility, by using common laboratory reagents like water (cold,hot), dil. HCl, dil. NaOH, dil. $NaHCO_3$, *etc*., of components of a binary solid mixture; purification of **any one** of the separated components by crystallization and determination of its melting point. The composition of the mixture should be of the following types **[ANY THREE]**: *p*-Nitrobenzoic acid/*p*-Aminobenzoic acid; *p*-Nitrotolune/*p*-Anisidine; benzoic acid/naphthalene; urea/phenyl benzoate; *p*-toluidine/benzophenone; *p*-chlorobenzoic acid/ benzophenone, Benzoic acid/Anthracene; Glucose/Biphenyl; Benzoic acid/Benzophenone; Urea/Benzophenone. **Use of pH paper** is recommended.

Reference Books

1. Bhattacharyya, R. C, *A Manual of Practical Chemistry.*
2. Vogel, A. I. *Elementary Practical Organic Chemistry*, Part 2: *Qualitative Organic Analysis*, CBS Publishers and Distributors.
3. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009).
4. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. *Practical Organic Chemistry*,*5th Ed.*, Pearson (2012).
5. Dutta, S, *B. Sc. Honours Practical Chemistry*, Bharati Book Stall.

CEMA-CC-1-2-TH :

(Credits: Theory-04, Practicals-02)

PHYSICAL CHEMISTRY-1

Theory(40 Lectures)

Kinetic Theory and Gaseous state (20 Lectures)

Kinetic Theory of gases: Concept of pressure and temperature; Collision of gas molecules; Collision diameter; Collision number and mean free path; Frequency of binary collisions (similar and different molecules); Wall collision and rate of effusion

Maxwell's distribution of speed and energy: Nature of distribution of velocities, Maxwell's distribution of speeds in one, two and three dimensions; Kinetic energy distribution in one, two and three dimensions, calculations of average, root mean square and most probable values in each case; Calculation of number of molecules having energy $\geq \varepsilon$, Principle of equipartition of energy and its application to calculate the classical limit of molar heat capacity of gases

Real gas and virial equation: Deviation of gases from ideal behavior; compressibility factor; Boyle temperature; Andrew's and Amagat's plots; van der Waals equation and its features; its derivation and application in explaining real gas behaviour, other equations of state (Berthelot, Dietrici); Existence of critical state, Critical constants in terms of van der Waals constants; Law of corresponding states; virial equation of state; van der Waals equation expressed in virial form and significance of second virial coefficient; Intermolecular forces (Debye, Keesom and London interactions; Lennard-Jones potential - elementary idea)

Transport processes (08 Lectures)

Diffusion : Fick's law, Flux, force, phenomenological coefficients & their inter-relationship (general form), different examples of transport properties

Viscosity: General features of fluid flow (streamline flow and turbulent flow); Newton's equation, viscosity coefficient; Poiseuille's equation (with derivation); principle of determination of viscosity coefficient of liquids by falling sphere method and using Ostwald's viscometer. Temperature variation of viscosity of liquids and comparison with that of gases.Relation between viscosity coefficient of a gas and mean free path.

Chemical kinetics (12 Lectures)

Rate law, order and molecularity: Introduction of rate law, Extent of reaction; rate constants, order; Forms of rates of First, second and nth order reactions; Pseudo first order reactions (example using acid catalyzed hydrolysis of methyl acetate); Determination of order of a reaction by half-life and differential method; Rate-determining step and steady-state approximation – explanation with suitable examples;) Opposing reactions, consecutive reactions and parallel reactions (with explanation of kinetic and thermodynamic control of products; all steps first order)

Role of Temperature : Temperature dependence of rate constant; Arrhenius equation, energy of activation;

Homogeneous catalysis: Homogeneous catalysis with reference to acid-base catalysis; Enzyme catalysis; Michaelis-Menten equation, Lineweaver-Burk plot, turn-over number.

Reference Books

1. **Levine, I. N. *Physical Chemistry*, 6th Edition McGraw-Hill India**
2. **Castellan, G. W. *Physical Chemistry*, Narosa**
3. **McQuarrie, D. A. & Simons, J. D. *Physical Chemistry: A Molecular Approach*, Viva Press**
4. **Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India**

5. Engel, T. & Reid, P. *Physical Chemistry*, 3rd Edition Pearson India
6. Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry*, 10th Edition Oxford University Press
7. Maron, S. & Prutton *Physical Chemistry*
8. Ball, D. W. *Physical Chemistry*, Thomson Press
9. Mortimer, R. G. *Physical Chemistry*, Elsevier
10. Laidler, K. J. *Chemical Kinetics*, Pearson
11. Glasstone, S. & Lewis, G.N. *Elements of Physical Chemistry*
12. Rakshit, P.C., *Physical Chemistry* Sarat Book House
13. Moore, W. J. *Physical Chemistry*, Orient Longman

ORGANIC CHEMISTRY-IB

Theory (20 Lectures)

Stereochemistry I (17 Lectures)

Bonding geometries of carbon compounds and representation of molecules: tetrahedral nature of carbon and concept of asymmetry; Fischer, sawhorse, flying wedge and Newman projection formulae and their inter translations.

Concept of chirality and symmetry: symmetry elements, molecular chirality and centre of chirality; asymmetric and dissymmetric molecules; enantiomers and diastereomers; concept of stereogenicity, chirotopicity and pseudoasymmetry; chiral centres and number of stereoisomerism: systems involving 1/2/3-chiral centre(s) (AA, AB, ABA and ABC types).

Relative and absolute configuration: D/L and *R/S* descriptors; *erythro/threo* and *meso* nomenclature of compounds; *syn/anti* nomenclatures for aldols; *E*/*Z* descriptors for C=C, conjugated diene, triene, C=N and N=N systems; combination of *R/S*- and *E/ Z*-isomerisms.

Optical activity of chiral compounds: optical rotation, specific rotation and molar rotation; racemic compounds, racemisation (through cationic, anionic, radical intermediates and through reversible formation of stable achiral intermediates); resolution of acids, bases and alcohols *via* diastereomeric salt formation; optical purity and enantiomeric excess; invertomerism of chiral trialkylamines.

General Treatment of Reaction Mechanism II (03 Lectures)

Reactive intermediates: carbocations (carbenium and carbonium ions), non-classical cabocations, carbanions, carbon radicals, carbenes: generation and stability, structure using orbital picture and electrophilic/nucleophilic behavior of reactive intermediates (elementary idea).

Reference Books

1. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

3. Sykes, P. *A guidebook to Mechanism in Organic Chemistry*, Pearson Education, 2003.
4. Carey, F. A., Guiliano, R. M. *Organic Chemistry*, Eighth edition, McGraw Hill Education, 2012.
5. Eliel, E. L. & Wilen, S. H. *Stereochemistry of Organic Compounds*, Wiley: London, 1994.
6. Nasipuri, D. *Stereochemistry of Organic Compounds*, Wiley Eastern Limited.
7. Clayden, J., Greeves, N. & Warren, S. *Organic Chemistry*, Second edition, Oxford University Press, 2012.
8. Keeler, J., Wothers, P. *Chemical Structure and Reactivity – An Integrated approach*, Oxford University Press.
9. Smith, J. G. *Organic Chemistry*, Tata McGraw-Hill Publishing Company Limited.
10.Fleming, I. *Molecular Orbitals and Organic Chemical Reactions*, Reference/Student Edition, Wiley, 2009.
11. James, J., Peach, J. M. *Stereochemistry at a Glance*, Blackwell Publishing, 2003.
12. Robinson, M. J. T., *Stereochemistry*, Oxford Chemistry Primer, OxfordUniversity Press, 2005.

CEMA-CC-1-2-P:

(45 Lectures)

**** During examination marks of the experiments will be set in 2:1 ratio for Physical and Organic experiments respectively.**

1) PHYSICAL CHEMISTRY: P (1) LAB (30 Lectures)

Experiment 1: Study of kinetics of decomposition of H_2O_2

Experiment 2: Study of kinetics of acid-catalyzed hydrolysis of methyl acetate

Experiment 3: Study of viscosity of unknown liquid (glycerol, sugar) with respect to water.

Experiment 4: Study of the variation of viscosity with the concentration of the solution

Experiment 5: Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)

Reference Books

1. Viswanathan, B., Raghavan, P.S. *Practical Physical Chemistry* Viva Books (2009)
2. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson
3. Harris, D. C. *Quantitative Chemical Analysis*. 9th Ed., Freeman (2016)
4. Palit, S.R., De, S. K. *Practical Physical Chemistry* Science Book Agency
5. Levitt, B. P. edited *Findlay's Practical Physical Chemistry* Longman Group Ltd.

6. Gurtu, J. N., Kapoor, R., *Advanced Experimental Chemistry* S. Chand & Co. Ltd.
7. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

2) ORGANIC CHEMISTRY: O (1B) LAB (15 Lectures)

Determination of boiling point of common organic liquid compounds [**ANY FIVE**]*n*-butyl alcohol, cyclohexanol, ethyl methyl ketone, cyclohexanone, acetylacetone,isobutyl methyl ketone, isobutyl alcohol, acetonitrile, benzaldehyde and acetophenone. [Boiling points of the chosen organic compounds should preferably be within 180^0C].

SEMESTER-2

CEMA-CC-2-3-TH :

(Credits: Theory-04, Practicals-02)

ORGANIC CHEMISTRY-2

Theory: 60 Lectures

StereochemistryII (20 Lectures)

Chirality arising out of stereoaxis: stereoisomerism of substituted cumulenes with even and odd number of double bonds; chiral axis in allenes, spiro compounds, alkylidenecycloalkanes and biphenyls;related configurational descriptors ($R_a/S_{a)}$; atropisomerism; racemisation of chiral biphenyls.

Concept of prostereoisomerism: prostereogenic centre; concept of (*pro*)^n-*chirality*: topicity of ligands and faces (elementary idea); *pro-R/pro-S*, *pro-E/pro-Z* and *Re/Si* descriptors;*pro-r* and *pro-s* descriptors of ligands on propseudoasymmetric centre.

Conformation*:* conformational nomenclature: eclipsed, staggered, *gauche*, *syn*and *anti*; dihedral angle, torsion angle;Klyne-Prelog terminology; *P/M* descriptors; energy barrier of rotation, concept of torsional and steric strains; relative stability of conformers on the basis of steric effect, dipole-dipole interaction and H-bonding; *butane gauche* interaction; conformational analysis of ethane, propane, *n*-butane, 2-methylbutane and 2,3-dimethylbutane; haloalkane, 1,2-dihaloalkanes and 1,2-diols (up to four carbons); 1,2-halohydrin; conformation of conjugated systems (*s-cis* and*s-trans*).

General Treatment of Reaction Mechanism III (20 lectures)

Reaction thermodynamics*:*free energy and equilibrium, enthalpy and entropy factor, calculation of enthalpy change *via* BDE, intermolecular & intramolecular reactions.

*Concept of organic acids and bases:*effect of structure, substituent and solvent on acidityand basicity; proton sponge; comparison between nucleophilicity and basicity; application of thermodynamic principles in acid-base equilibria.

Tautomerism*:*prototropy (keto-enol, nitro - *aci*-nitro, nitroso-oximino, diazo-amino and enamine-imine systems); valence tautomerism and ring-chain tautomerism; composition of the equilibrium in different systems (simple carbonyl; 1,2- and 1,3-dicarbonyl systems, phenols and related systems), factors affecting keto-enol tautomerism; application of thermodynamic principles in tautomeric equilibria.

Reaction kinetics*:* rate constant and free energy of activation; free energy profiles for one-step, two-step and three-step reactions; catalyzed reactions: electrophilic and nucleophilic catalysis; kinetic control and thermodynamic control of reactions; isotope effect: primary and β-secondary kinetic isotopic effect (k_H /k_D); principle of microscopic reversibility; Hammond's postulate.

Substitution and Elimination Reactions (20 Lectures)

Free-radical substitution reaction*:* halogentaion of alkanes, mechanism (with evidence) and stereochemical features; reactivity-selectivity principle in the light of Hammond's postulate.

Nucleophilic substitution reactions*:* substitution at sp^3 centre[systems: alkyl halides, allyl halides, benzyl halides, alcohols, ethers, epoxides, α-halocarbonyls]:mechanisms (with evidence),relative rates& stereochemical features: S_N1, S_N2, S_N2', S_N1' (allylic rearrangement) and S_Ni; effectsof solvent, substrate structure, leaving group and nucleophiles (including ambident nucleophiles, cyanide & nitrite); substitutions involving NGP (with hetero atoms and aryl groups); role of crown ethers and phase transfer catalysts.

Elimination reactions*:* E1, E2, E1cB and Ei (pyrolytic *syn* eliminations); formation of alkenes and alkynes; mechanisms (with evidence), reactivity, regioselectivity (Saytzeff/Hofmann)and stereoselectivity; comparison between substitution and elimination.

Reference Books

1. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Sykes, P. *A guidebook to Mechanism in Organic Chemistry*, Pearson Education, 2003.
4. Carey, F. A., Guiliano, R. M.*Organic Chemistry*, Eighth edition, McGraw Hill Education, 2012.
5. Eliel, E. L. &Wilen, S. H. *Stereochemistry of Organic Compounds*, Wiley: London, 1994.
6**.** Nasipuri, D.*Stereochemistry of Organic Compounds,* Wiley Eastern Limited.
7. Clayden, J., Greeves, N. &Warren, S. *Organic Chemistry*, Second edition, Oxford UniversityPress, 2012.
8. Keeler, J., Wothers, P.*Chemical Structure and Reactivity – An Integrated approach*, Oxford University Press.
9. Smith, J. G. *Organic Chemistry*, Tata McGraw-Hill Publishing Company Limited.
10.Fleming, I. *Molecular Orbitals and Organic Chemical Reactions*, Reference/StudentEdition,Wiley, 2009.
11. James, J., Peach, J. M. *Stereochemistry at a Glance*, Blackwell Publishing, 2003.
12. Robinson, M. J. T., *Stereochemistry*, Oxford Chemistry Primer, OxfordUniversity Press, 2005.
13. Maskill, H., *Mechanisms of Organic Reactions*, Oxford Chemistry Primer, OxfordUniversity Press.

CEMA-CC-2-3-P:

(45Lectures)

Organic Preparations

A.The following reactions **(any eight)**are to be performed, noting the yield of the crude product:

1. Nitration of aromatic compounds
2. Condensation reactions
3. Hydrolysis of amides/imides/esters
4. Acetylation of phenols/aromatic amines
5. Brine mediated benzoylation of amines/amino acids.
6. Side chain oxidation of aromatic compounds
7. Diazo coupling reactions of aromatic amines
8. Bromination of anilides using green approach (Bromate-Bromide method)
9. Redox reaction including solid-phase method
10. Green 'multi-component-coupling' reaction
11. Selective reduction of *m*-dinitrobenzene to *m*-nitroaniline

Students must also calculate percentage yield, based upon isolated yield (crude) and theoretical yield.

B. Purification of the crude product is to be made by crystallisation from water/alcohol, crystallizationafter charcoal treatment, or sublimation, whichever is applicable.

C. Melting point of the purified product is to be noted.

Reference Books

1. Vogel, A. I. *Elementary Practical Organic Chemistry*, Part 1: *Small scale Preparations*, CBS Publishers and Distributors.

2. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education(2009).
3. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. *Practical Organic Chemistry, 5th Ed.* Pearson (2012).
4. Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis*, University Press (2000).
5. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015.

CEMA-CC-2-4-TH :

(Credits: Theory-04, Practicals-02)

INORGANIC CHEMISTRY-2

Theory: 60 Lectures

Chemical Bonding-I **(20 Lectures)**

(i) *Ionic bond:* General characteristics, types of ions, size effects, radius ratio rule and its application and limitations. Packing of ions in crystals.Born-Landé equation with derivation and importance of Kapustinskii expression for lattice energy.Madelung constant, Born-Haber cycle and its application, Solvation energy.Defects in solids (elementary idea). Solubility energetics of dissolution process

(ii) *Covalent bond:* Polarizing power and polarizability, ionic potential,Fazan's rules. Lewis structures, formal charge. Valence Bond Theory. The hydrogen molecule (Heitler-London approach), directional character of covalent bonds, hybridizations, equivalent and non-equivalent hybrid orbitals, Bent's rule, Dipole moments, VSEPR theory, shapes of molecules and ions containing lone pairs and bond pairs (examples from main groups chemistry) and multiple bonding (σ and π bond approach).

Chemical Bonding-II **(30 Lectures)**

(i) Molecular orbital concept of bonding (The approximations of the theory, Linear combination of atomic orbitals (LCAO)) (elementary pictorial approach): sigma and pi-bonds and delta interaction, multiple bonding. Orbital designations: *gerade*, *ungerade*, HOMO, LUMO. Orbital mixing,. MO diagrams of H_2, Li_2, Be_2, B_2, C_2, N_2, O_2, F_2, and their ions wherever possible; Heteronuclear molecular orbitals: CO, NO, NO^+, CN^-, HF, BeH_2, CO_2 and H_2O. Bond properties: bond orders, bond lengths.
(ii) *Metallic Bond:* Qualitative idea of valence bond and band theories. Semiconductors and insulators, defects in solids.
(iii) *Weak Chemical Forces:* Hydrogen bonding (theories of hydrogen bonding, valence bond treatment), receptor-guest interactions, Halogen bonds. Effects of chemical force, melting and boiling points.

Radioactivity **(10 Lectures)**

Nuclear stability and nuclear binding energy. Nuclear forces: meson exchange theory. Nuclear models (elementary idea): Concept of nuclear quantum number, magic numbers. Nuclear Reactions: Artificial radioactivity, transmutation of elements, fission, fusion and spallation. Nuclear energy and power generation.Separation and uses of isotopes. Radio chemical methods: principles of determination of age of rocks and minerals, radio carbon dating, hazards of radiation and safety measures.

Reference Books

1. Lee, J. D. *Concise Inorganic Chemistry, 5th Ed.*, Wiley India Pvt. Ltd., 2008.
2. Huheey, J. E.; Keiter, E.A. & Keiter, R.L. *Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed.*, Harper Collins 1993, Pearson, 2006.
3. Douglas, B.E. and McDaniel, D.H. *Concepts & Models of Inorganic Chemistry* Oxford, 1970.
4. Porterfield, H. W., *Inorganic Chemistry,* Second Edition, Academic Press, 2005.
5. Purecell, K.F. and Kotz, J.C., *An Introduction toInorganic Chemistry*, Saunders: Philadelphia, 1980.
6. Cotton, F.A., Wilkinson, G., & Gaus, P.L. *Basic Inorganic Chemistry 3rd Ed.;* Wiley India.
7. Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).
8. Albright, T., *Orbital interactions in chemistry*, John Wiley and Sons (2005).
9. Mingos, D.M.P., *Essential trends in inorganic chemistry*. Oxford University Press (1998).
10. Miessler, G. L., Fischer, P. J., Tarr, D. A., *Inorganic Chemistry*, Pearson, 5th Edition.
11. Kaplan, I., *Nuclear Physics*, Addison-Wesley Publishing Company Inc. London, 1964.
12. Friedlander, G., Kennedy, J. W., Macias, E. S. And Miller, J. M., *Nuclear and Radiochemistry*, Wiley, 1981.

CEMA-CC-2-4-P:(45 Lectures)

Iodo-/ Iodimetric Titrations

1. Estimation of Vitamin C
2. Estimation of (i) arsenite and (ii) antimony iodimetrically
3. Estimation of available chlorine in bleaching powder.

Estimation of metal content in some selective samples

1. Estimation of Cu in brass.
2. Estimation of Cr and Mn in Steel.
3. Estimation of Fe in cement.

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis* 6th Ed., Pearson, 2009.
2. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

SEMESTER-3

CEMA-CC-3-5-TH :

(Credits: Theory-04, Practicals-02)

PHYSICAL CHEMISTRY-2

Theory: 60 Lectures

Chemical Thermodynamics I (10 Lectures)

1st law of Thermodynamics: Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics;Concept of heat, work, internal energy and statement of first law; enthalpy, *H*; relation between heat capacities, calculations of *q*, *w*, Δ*U* and Δ*H* for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions; Joule's experiment and its consequence

Thermochemistry:Standard states; Heats of reaction; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; Laws of thermochemistry; bond energy, bond dissociation energy and resonance energy from thermochemical data, Kirchhoff's equations ; Adiabatic flame temperature.

Chemical Thermodynamics II (20 Lectures)

Second Law:Need for a Second law; statement of the second law of thermodynamics; Concept of heat reservoirs and heat engines; Carnot cycle; Carnot engine and refrigerator; Kelvin – Planck and Clausius statements and equivalence of the two statements with entropic formulation; Carnot's theorem; Values of §dQ/T and Clausius inequality;Physical concept of Entropy; Entropy is a measure of the microscopic disorder of the system. Entropy change of systems and surroundings for various processes and transformations; Entropy and unavailable work; Auxiliary state functions (G and A) and their variation with T, P and V. Criteria for spontaneity and equilibrium.

Thermodynamic relations: Maxwell's relations; Gibbs- Helmholtz equation, Joule-Thomson experiment and its consequences; inversion temperature; Joule-Thomson coefficient for a van der Waals gas; General heat capacity relations

Systems of Variable Composition:

Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs-Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions inmixing of ideal gases. Activities and activity coefficients.Fugacity and fugacity coefficient.

Applications of Thermodynamics – I (06 Lectures)

Chemical Equilibrium:

Thermodynamic conditions for equilibrium, degree of advancement; van't Hoff's reaction isotherm (deduction from chemical potential); Variation of free energy with degree of advancement; Equilibrium constant and standard Gibbs free energy change; Van't Hoff's reaction isobar and isochore from different standard states; Le Chatelier's principle and its derivation, variation of equilibrium constant under different conditions Nernst's distribution law; Application- (eg. dimerization of benzene in benzoic acid). Solvent Extraction.

ELECTROCHEMISTRY: (24 Lectures)

(i) Conductance and transport number

Ion conductance; Conductance and measurement of conductance, cell constant, specific conductance and molar conductance; Variation of specific and equivalent conductance with dilution for strong and weak electrolytes; Kohlrausch's law of independent migration of ions; Equivalent and molar conductance at infinite dilution and their determination for strong and weak electrolytes; Debye –Huckel theory of Ion atmosphere (qualitative)-asymmetric effect, relaxation effect and electrophoretic effect; Debye-Huckel limiting law-brief qualitative description. Estimation of activity coefficient for electrolytes using Debye-Huckel limiting law. Ostwald's dilution law; Ionic mobility; Application of conductance measurement (determination of solubility product and ionic product of water); Conductometric titrations.Transport number, Principles of Hittorf's and Moving-boundary method; Wien effect, Debye-Falkenhagen effect, Walden's rule

(ii) Ionic equilibrium:

Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono-, di-and triprotic acids (exact treatment).

Salt hydrolysis- calculation of hydrolysis constant, degree of hydrolysis and pH for different salts (exact Treatment).Determination of hydrolysis constant conductometrically. Buffer solutions; derivation of Henderson equation and its applications; buffer capacity, buffer range, buffer action . Qualitative treatment of acid – base titration curves (calculation of pH at various stages). Theory of acid–base indicators; selection of indicators and their limitations.

Multistage equilibrium in polyelectrolyte systems; hydrolysis and hydrolysis constants

(iii) Electromotive Force: Rules of oxidation/reduction of ions based on half-cell potentials,; Chemical cells, reversible and irreversible cells with examples; Electromotive force of a cell and its measurement, Thermodynamic derivation of Nernst equation; Standard electrode (reduction) potential and its application to different kinds of half-cells. Application of EMF measurements in determining (i) free energy, enthalpy and entropy of a cell reaction, (ii) equilibrium constants, and (iii) pH values, using hydrogen, quinone-hydroquinone and glass electrodes

Concentration cells with and without transference, liquid junction potential; determination of activity coefficients and transference numbers; Potentiometric titrations (acid-base, redox, precipitation)

Reference Books

1. **Levine, I. N. *Physical Chemistry*, 6th Edition , McGraw-Hill India**
2. **Castellan, G. W. *Physical Chemistry*, Narosa**
3. **McQuarrie, D. A. & Simons, J. D. *Physical Chemistry: A Molecular Approach*, Viva Press**
4. **Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India**
5. Engel, T. & Reid, P. *Physical Chemistry*, 3rd Edition ,Pearson India
6. Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry*, 10th Edition, Oxford University Press
7. Maron, S. & Prutton , *Physical Chemistry*
8. Ball, D. W. *Physical Chemistry*, Thomson Press
9. Mortimer, R. G. *Physical Chemistry*, 2nd Edition, Elsevier
10. Glasstone, S. & Lewis, G.N. *Elements of Physical Chemistry*
11. Rakshit, P.C., *Physical Chemistry*,Sarat Book House
12. Moore, W. J. *Physical Chemistry*, Orient Longman
14. Denbigh, K. *The Principles of Chemical Equilibrium* ,Cambridge
15. Zemansky, M. W. & Dittman, R.H. *Heat and Thermodynamics*, Tata-McGraw-Hil
16. Glasstone, S. An Introduction to Electrochemistry, East-West Press .
17. Klotz, I.M., Rosenberg, R. M.*Chemical Thermodynamics:Basic Concepts and Methods* , 7th Edition, Wiley

CEMA-CC-3-5-P:(45 Lectures)

Experiment 1: Conductometric titration of an acid (strong, weak/ monobasic, dibasic, and acid mixture) against strong base.
Experiment 2: Study of saponification reaction conductometrically
Experiment 3: Verification of Ostwald's dilution law and determination of K_a of weak acid
Experiment 4: Potentiometric titration of Mohr's salt solution against standard $K_2Cr_2O_7$ and $KMnO_4$solution
Experiment 5: Determination of K_{sp} for AgCl by potentiometric titration of $AgNO_3$ solution against standard KCl solution
Experiment 6: Determination of heat of neutralization of a strong acid by a strong base

Reference Books

1. Viswanathan, B., Raghavan, P.S. *Practical Physical Chemistry* Viva Books (2009)
2. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson
3. Harris, D. C. *Quantitative Chemical Analysis*. 9th Ed., Freeman (2016)

4. Palit, S.R., De, S. K. *Practical Physical Chemistry* Science Book Agency
5. Levitt, B. P. edited *Findlay's Practical Physical Chemistry* Longman Group Ltd.
6. Gurtu, J. N., Kapoor, R., *Advanced Experimental Chemistry* S. Chand & Co. Ltd.
7. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

CEMA-CC-3-6-TH :

(Credits: Theory-04, Practicals-02)

INORGANIC CHEMISTRY-3

Theory: 60 Lectures

Chemical periodicity **(15 Lectures)**

Modern IUPAC Periodic table, Effective nuclear charge, screening effects and penetration, Slater's rules, atomic radii, ionic radii (Pauling's univalent), covalent radii, lanthanide contraction. Ionization potential, electron affinity and electronegativity (Pauling's, Mulliken's and Allred-Rochow's scales) and factors influencing these properties, group electronegativities.Group trends and periodic trends in these properties in respect of s-, p- and d-block elements.Secondary periodicity, Relativistic Effect, Inert pair effect.

Chemistry of *s* and *p* Block Elements **(30 Lectures)**

Relative stability of different oxidation states, diagonal relationship and anomalous behaviour of first member of each group. Allotropy and catenation.Hydrides and their classification ionic, covalent and interstitial.Basic beryllium acetate and nitrate.Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses.Beryllium hydrides and halides.Boric acid and borates, boron nitrides, borohydrides (diborane) and graphitic compounds, silanes, Oxides and oxoacids of nitrogen, phosphorus, sulphur and chlorine.Peroxo acids of sulphur, sulphur-nitrogen compounds, interhalogen compounds, polyhalide ions, pseudohalogens, fluorocarbons and basic properties of halogens.

Noble Gases:
Occurrence and uses, rationalization of inertness of noble gases, Clathrates; preparation and properties of XeF_2, XeF_4 and XeF_6; Nature of bonding in noble gas compounds (Valence bond treatment and MO treatment for XeF_2 and XeF_4). Xenon-oxygen compounds. Molecular shapes of noble gas compounds (VSEPR theory).

Inorganic Polymers:
Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspects and applications of silicones and siloxanes.Borazines, silicates and phosphazenes.

Coordination Chemistry-I **(15 Lectures)**

Coordinate bonding: double and complex salts. Werner's theory of coordination complexes, Classification of ligands, Ambidentate ligands, chelates, Coordination numbers, IUPAC nomenclature of coordination complexes (up to two metal centers), Isomerism in coordination compounds, constitutional and stereo isomerism, Geometrical and optical isomerism in square planar and octahedral complexes.

Reference Books

1. Lee, J. D. *Concise Inorganic Chemistry, 5th Ed.*, Wiley India Pvt. Ltd., 2008.
2. Huheey, J. E.; Keiter, E.A, & Keiter, R.L. *Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed.*, Harper Collins 1993, Pearson, 2006.
3. Douglas, B.E. and McDaniel, D.H. *Concepts & Models of Inorganic Chemistry* Oxford, 1970.
4. Porterfield, H. W., *Inorganic Chemistry,* Second Edition, Academic Press, 2005.
5. Purecell, K.F. and Kotz, J.C., *An Introduction toInorganic Chemistry*, Saunders: Philadelphia, 1980.
6. Cotton, F.A., Wilkinson, G., & Gaus, P.L. *Basic Inorganic Chemistry 3rd Ed.;* Wiley India.
7. Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).
8. Albright, T., *Orbital interactions in chemistry*, John Wiley and Sons (2005).
9. Mingos, D.M.P., *Essential trends in inorganic chemistry*. Oxford University Press (1998).
10. Miessler, G. L., Fischer, P. J., Tarr, D. A., *Inorganic Chemistry,* Pearson, 5th Edition.
11. Kaplan, I., *Nuclear Physics,* Addison-Wesley Publishing Company Inc. London, 1964.
12. Friedlander, G., Kennedy, J. W., Macias, E. S. And Miller, J. M., *Nuclear and Radiochemistry*, Wiley, 1981.

CEMA-CC-3-6-P:(45 Lectures)

Complexometric titration

1. Zn(II)
2. Zn(II) in a Zn(II) and Cu(II) mixture.
3. Ca(II) and Mg(II) in a mixture.
4. Hardness of water.
5. Al(III) in Fe(III) and Al(III) in a mixture

Chromatography of metal ions

Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions:

1. Ni (II) and Co (II)
2. Fe (III) and Al (III)

Gravimetry

1. Estimation of Ni(II) using Dimethylglyoxime (DMG).
2. Estimation of copper as CuSCN.
3. Estimation of Al(III) by precipitating with oxine and weighing as $Al(oxine)_3$ (aluminiumoxinate).
4. Estimation of chloride.

Reference Books

3. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis* 6th Ed., Pearson, 2009.
4. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

CEMA-CC-3-7-TH :

(Credits: Theory-04, Practicals-02)

ORGANIC CHEMISTRY-3

Theory: 60 Lectures

Chemistry of alkenes and alkynes (15 Lectures)

Addition to C=C:mechanism (with evidence wherever applicable), reactivity, regioselectivity (Markownikoff and anti-Markownikoff additions) and stereoselectivity; reactions: hydrogenation, halogenation, hydrohalogenation, hydration, oxymercuration-demercuration, hydroboration-oxidation, epoxidation, *syn* and *anti*-hydroxylation, ozonolysis, addition of singlet and triplet carbenes; Simmons-Smith cyclopropanation reaction; electrophilic addition to diene (conjugated dienes and allene); radical addition: HBr addition; mechanism of allylic and benzylic bromination in competition with brominations across C=C; use of NBS; Birch reduction of benzenoid aromatics; interconversion of *E*- and *Z*- alkenes; contra-thermodynamic isomerization of internal alkenes.

Addition to C≡C (in comparison to C=C*):*mechanism, reactivity, regioselectivity(Markownikoff and anti-Markownikoff addition) and stereoselectivity; reactions:hydrogenation, halogenations, hydrohalogenation, hydration, oxymercuration-demercuration, hydroboration-oxidation, dissolving metal reduction of alkynes (Birch); reactions of terminal alkynes by exploring its acidity; interconversion of terminal and non-terminal alkynes.

Aromatic Substitution (10 Lectures)

Electrophilic aromatic substitution*:*mechanisms and evidences in favour of it; orientation and reactivity; reactions: nitration, nitrosation, sulfonation, halogenation, Friedel-Crafts reaction; one-carbonelectrophiles (reactions: chloromethylation,

Gatterman-Koch, Gatterman, Houben-Hoesch,Vilsmeier-Haack, Reimer-Tiemann, Kolbe-Schmitt); *Ipso* substitituion.

Nucleophilic aromatic substitution*:*addition-elimination mechanism and evidences in favour of it; S_N1 mechanism; cine substitution (benzyne mechanism), structure of benzyne.

Carbonyl and Related Compounds (30 Lectures)

Addition to C=O: structure, reactivity and preparation of carbonyl compounds; mechanism (with evidence), reactivity, equilibrium and kinetic control; formation of hydrates, cyanohydrins and bisulphite adduct; nucleophilic addition-elimination reactions with alcohols, thiolsand nitrogen- based nucleophiles;reactions: benzoin condensation, Cannizzaro and Tischenko reactions, reactions with ylides: Wittig and Corey-Chaykovsky reaction; Rupe rearrangement, oxidations and reductions: Clemmensen, Wolff-Kishner, $LiAlH_4$, $NaBH_4$, MPV, Oppenauer, Bouveault-Blanc, acyloin condensation; oxidation of alcohols with PDC and PCC; periodic acid and lead tetraacetate oxidation of 1,2-diols.

Exploitation of acidity of α-H of C=O*:* formation of enols and enolates; kinetic and thermodynamic enolates; reactions (mechanism with evidence):halogenation of carbonyl compounds under acidic and basic conditions, Hell-Volhard-Zelinsky (H. V. Z.) reaction, nitrosation, SeO_2 (Riley) oxidation; condensations (mechanism with evidence): Aldol,Tollens', Knoevenagel, Claisen-Schmidt, Claisen ester including Dieckmann, Stobbe; Mannich reaction,Perkin reaction, Favorskii rearrangement; alkylation of active methylene compounds; preparation and synthetic applications of diethyl malonate and ethyl acetoacetate; specific enol equivalents (lithium enolates, enamines and silyl enol ethers) in connection with alkylation, acylation and aldol type reaction.

Nucleophilic addition to α,β-unsaturated carbonyl system*:*general principle and mechanism (with evidence); direct and conjugate addition, addition of enolates (Michael reaction), Stetter reaction, Robinson annulation.

Substitution at sp^2 carbon (C=O system): mechanism (with evidence): $B_{AC}2$, $A_{AC}2$, $A_{AC}1$, $A_{AL}1$ (inconnection to acid and ester); acid derivatives: amides, anhydrides & acyl halides (formation and hydrolysis including comparison).

Organometallics(5 Lectures)

Grignard reagent*; Organolithiums; Gilman cuprates:* preparation and reactions (mechanism with evidence); addition of Grignard and organolithium to carbonyl compounds; substitution on -COX; directed ortho metalation of arenes using organolithiums, conjugate addition by Gilman cuprates; Corey-House synthesis; abnormal behaviour of Grignard reagents; comparison of reactivity among Grignard, organolithiums and organocopper reagents; Reformatsky reaction; Blaise reaction; concept of *umpolung.*

Reference Books

1. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

2. Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Sykes, P. *A guidebook to Mechanism in Organic Chemistry*, Pearson Education, 2003.
4. Carey, F. A., Guiliano, R. M.*Organic Chemistry*, Eighth edition, McGraw Hill Education, 2012.
5. Loudon, G. M. *Organic Chemistry*, Fourth edition, Oxford University Press, 2008.
6. Norman, R.O. C., Coxon, J. M. *Principles of Organic Synthesis*, Third Edition, Nelson Thornes, 2003.
7. Clayden, J., Greeves, N. &Warren, S. *Organic Chemistry*, Second edition, Oxford UniversityPress, 2012.
8. Graham Solomons, T.W., Fryhle, C. B. *Organic Chemistry*, John Wiley & Sons, Inc.
9. Smith, J. G. *Organic Chemistry*, Tata McGraw-Hill Publishing Company Limited.
10. March, J. *Advanced Organic Chemistry*, Fourth edition, Wiley.
11. Jenkins, P. R., *Organometallic Reagents in Synthesis*, Oxford Chemistry Primer, Oxford University Press.
12. Ward, R. S., *Bifunctional Compounds*, Oxford Chemistry Primer, Oxford University Press.

CEMA-CC-3-7-P:(45 Lectures)

A. Identification of a Pure Organic Compound

Solid compounds: oxalic acid, tartaric acid, citric acid, succinic acid, resorcinol, urea, glucose, cane sugar, benzoic acid and salicylic acid

Liquid Compounds: formic acid, acetic acid, methyl alcohol, ethyl alcohol, acetone, aniline, dimethylaniline, benzaldehyde, chloroform and nitrobenzene

B. Quantitative Estimations:

Each student is required to perform all the experiments [Any**FIVE** will be set in the examination]
1. Estimation of glycine by Sörensen's formol method
2. Estimation of glucose by titration using Fehling's solution
3. Estimation of sucrose by titration using Fehling's solution
4. Estimation of aromatic amine (aniline) by bromination (Bromate-Bromide) method
5. Estimation of acetic acid in commercial vinegar
6. Estimation of urea (hypobromite method)
7. Estimation of saponification value of oil/fat/ester

Reference Books

1. Bhattacharyya, R. C, *A Manual of Practical Chemistry.*
2. Vogel, A. I. *Elementary Practical Organic Chemistry*, Part 2: *Qualitative Organic Analysis*, CBS Publishers and Distributors.
3. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009).

4. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. *Practical Organic Chemistry,5th Ed.*, Pearson (2012).
5. Dutta, S, *B. Sc. Honours Practical Chemistry*, Bharati Book Stall.
6. Arthur, I. Vogel, *Quantitative Organic Analysis*, Pearson
7. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

SEMESTER-4

CEMA-CC-4-8-TH :

(Credits: Theory-04, Practicals-02)

ORGANIC CHEMISTRY-4

Theory: 60 Lectures

Nitrogen compounds(12 Lectures)

Amines: Aliphatic & Aromatic*:*preparation, separation (Hinsberg's method) and identification of primary, secondary and tertiary amines; reaction (with mechanism): Eschweiler–Clarke methylation,diazo coupling reaction, formation and reactions of phenylenediamines, diazomethane and diazoacetic ester.

Nitro compounds (aliphatic and aromatic): preparation and reaction (with mechanism): reduction under different conditions; Nef carbonyl synthesis, Henry reaction and conjugate addition of nitroalkane anion.

Alkylnitrile and isonitrile: preparation and reaction (with mechanism): Thorpe nitrile condensation, von Richter reaction.

Diazonium salts and their related compounds: reactions (with mechanism) involving replacement of diazo group; reactions: Gomberg, Meerwein, Japp-Klingermann.

Rearrangements(14 Lectures)

Mechanism with evidence and stereochemical features for the following:

Rearrangement to electron-deficient carbon: Wagner-Meerwein rearrangement, pinacol rearrangement, dienone-phenol; Wolff rearrangement in Arndt-Eistert synthesis, benzil-benzilic acid rearrangement, Demjanov rearrangement, Tiffeneau–Demjanov rearrangement.

Rearrangement to electron-deficient nitrogen: rearrangements: Hofmann, Curtius, Lossen, Schmidt and Beckmann.

Rearrangement to electron-deficient oxygen: Baeyer-Villiger oxidation, cumene hydroperoxide-phenol rearrangement and Dakin reaction.

Aromatic rearrangements:Migration from oxygen to ring carbon: Fries rearrangement and Claisen rearrangement.

Migration from nitrogen to ring carbon: Hofmann-Martius rearrangement**,** Sommelet Hauser rearrangement, Fischer-Hepp rearrangement, *N*-azo to *C*-azo rearrangement, Bamberger rearrangement, Orton rearrangement and benzidine rearrangement.

The Logic of Organic Synthesis(14 Lectures)

*Retrosynthetic analysis:*disconnections; synthons, donor and acceptor synthons; natural reactivity and *umpolung*; latent polarity in bifunctional compounds: illogical electrophiles and nucleophiles; synthetic equivalents; functional group interconversion and addition (FGI and FGA); C-C disconnections and synthesis: one-group and two-group (1,2- to 1,5-dioxygenated compounds), reconnection (1,6-dicarbonyl);protection-deprotection strategy (alcohol, amine, carbonyl, acid).
*Strategy of ring synthesis:*thermodynamic and kinetic factors; synthesis of large rings, application of high dilution technique.
Asymmetric synthesis: stereoselective and stereospecific reactions; diastereoselectivity and enantioselectivity (only definition); diastereoselectivity: addition of nucleophiles to C=O adjacent to a stereogenic centre: Felkin-Anh model.

Organic Spectroscopy **(20 Lectures)**

UV Spectroscopy: introduction;types of electronic transitions, end absorption; transition dipole moment and allowed/forbidden transitions; chromophores and auxochromes; Bathochromic andHypsochromic shifts; intensity of absorptions (Hyper-/Hypochromic effects); application of Woodward's Rules for calculation of λ_{max} for the following systems: conjugated diene, *α,β*-unsaturated aldehydes and ketones(alicyclic, homoannular and heteroannular); extended conjugated systems (dienes, aldehydes and ketones); relative positions of λ_{max} considering conjugative effect, steric effect, solvent effect, effect of pH; effective chromophore concentration: keto-enol systems; benzenoid transitions.
IR Spectroscopy: introduction;modes of molecular vibrations(fundamental and non-fundamental);IR active molecules; application of Hooke's law, force constant; *fingerprint region* and its significance; effect of deuteration; overtone bands; vibrational coupling in IR; characteristic and diagnostic stretching frequencies of C-H, N-H, O-H, C-O, C-N, C-X, C=C (including skeletal vibrations of aromatic compounds), C=O, C=N, N=O, C≡C, C≡N; characteristic/diagnostic bending vibrations are included; factors affecting stretching frequencies: effect of conjugation, electronic effects, mass effect, bond multiplicity, ring-size, solvent effect, H-bonding on IR absorptions; application in functional group analysis.
*NMR Spectroscopy:*introduction;nuclear spin;NMR active molecules;basic principles of Proton Magnetic Resonance; choice of solvent and internal standard; equivalent and non-equivalent protons; chemical shift and factors influencing it; ring current effect;significance of the terms: up-/downfield, shielded and deshielded protons; spin coupling and coupling constant (1st order spectra); relative intensities of *first-order* multiplets: Pascal's triangle; chemical and magnetic equivalence in NMR ; anisotropic effects in alkene, alkyne, aldehydes and aromatics; NMR peak area, integration; relative peak positions with coupling patterns of common organic compounds (both aliphatic and benzenoid-aromatic); rapid proton exchange; interpretation of NMR spectra of simple compounds.
Applications of IR, UV and NMR spectroscopy for identification of simple organic molecules.

Reference Books

1. Finar, I. L. *Organic Chemistry (Volume 1),* Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. *Organic Chemistry* (*Volume 2: Stereochemistry and the Chemistry of Natural Products*), Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
3. Norman, R.O. C., Coxon, J. M. *Principles of Organic Synthesis*, Third Edition, Nelson Thornes, 2003.
4. Clayden, J., Greeves, N., Warren, S., *Organic Chemistry*, Second edition, Oxford University Press 2012.
5. Silverstein, R. M., Bassler, G. C., Morrill, T. C. *Spectrometric Identification of Organic Compounds*, John Wiley and Sons, INC, Fifth edition.
6. Kemp, W. *Organic Spectroscopy*, Palgrave.
7. Pavia, D. L. *et al. Introduction to Spectroscopy*, 5th Ed. Cengage Learning India Ed. (2015). 8. Dyer, J. *Application of Absorption Spectroscopy of Organic Compounds*, PHI Private Limited
9. March, J. *Advanced Organic Chemistry*, Fourth edition, Wiley.
10. Harwood, L. M., *Polar Rearrangements*, Oxford Chemistry Primer, Oxford University Press.
11. Bailey, Morgan, Organonitrogen Chemistry, Oxford Chemistry Primer, Oxford University Press.
12. Warren, S. *Organic Synthesis the Disconnection Approach*, John Wiley and Sons.
13. Warren, S., *Designing Organic Synthesis*, Wiley India, 2009.
14. Carruthers, W. *Modern methods of Organic Synthesis*, Cambridge University Press.
15. Willis, C. A., Wills, M., *Organic Synthesis*, Oxford Chemistry Primer, Oxford University Press

CEMA-CC-4-8-P:(45 Lectures)

Experiment: Qualitative Analysis of Single Solid Organic Compounds

1. Detection of special elements (N, S, Cl, Br) by Lassaigne's test
2. Solubility and classification (solvents: H_2O, 5% HCl, 5% NaOH and 5% $NaHCO_3$)
3. Detection of the following functional groups by systematic chemical tests: aromatic amino ($-NH_2$), aromatic nitro ($-NO_2$), amido ($-CONH_2$, including imide), phenolic –OH, carboxylic acid (-COOH), carbonyl (distinguish between -CHO and >C=O); only one test for each functional group is to be reported.
4. Melting point of the given compound
5. Preparation, purification and melting point determination of a crystalline derivative of the given compound.
6. Identification of the compound through literature survey.

Each student, during laboratory session, is required to carry out qualitative chemical tests for all the special elements and the functional groups with relevant derivatisation in known and unknown (**at least six)** organic compounds.

Reference Books

1. Vogel, A. I. *Elementary Practical Organic Chemistry*, Part 2: *Qualitative Organic Analysis*, CBS Publishers and Distributors.

2. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009).
3. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. *Practical Organic Chemistry*, 5th Ed., Pearson (2012).
4. Clarke, H. T., *A Handbook of Organic Analysis (Qualitative and Quantitative)*, Fourth Edition, CBS Publishers and Distributors (2007). 5. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015.

CEMA-CC-4-9-TH :

(Credits: Theory-04, Practicals-02)

PHYSICAL CHEMISTRY 3

Theory: 60 Lectures

Application of Thermodynamics – II (20 lectures)

Colligative properties: Vapour pressure of solution; Ideal solutions, ideally diluted solutions and colligative properties; Raoult's law; Thermodynamic derivation using chemical potential to derive relations between the four colligative properties [(i) relative lowering of vapour pressure, (ii) elevation of boiling point, (iii) Depression of freezing point, (iv) Osmotic pressure] and amount of solute. Applications in calculating molar masses of normal, dissociated and associated solutes in solution;Abnormal colligative properties.

Phase Equilibrium: Definitions of phase, component and degrees of freedom; Phase rule and its derivations; Definition of phase diagram; Phase diagram for water, CO_2, Sulphur.
First order phase transition and Clapeyron equation; Clausius-Clapeyron equation - derivation and use; Ehrenfest Classification of phase transition.
Binary solutions: Liquid vapour equilibrium for two component systems Ideal solution at fixed temperature and pressure; Principle of fractional distillation; Duhem-Margules equation; Henry's law; Konowaloff's rule; Positive and negative deviations from ideal behaviour; Azeotropic solution; Liquid-liquid phase diagram using phenol- water system; Solid-liquid phase diagram; Eutectic mixture
Three component systems, water-chloroform-acetic acid system, triangular plots

Foundation of Quantum Mechanics (25 Lectures)

Beginning of Quantum Mechanics: Black body radiation (Concept only) Wave-particle duality, light as particles: photoelectric and Compton effects; electrons as waves and the de Broglie hypothesis; Uncertainty relations (without proof)
Wave function: Postulates of Quantum Mechanics, Schrodinger time-independent equation; nature of the equation, acceptability conditions for the wave functions and probability interpretations of wave function Vector representation of wave function. Orthonormality of wave function.

Concept of Operators: Elementary concepts of operators, eigenfunctions and eigenvalues; Linear operators; Commutation of operators, commutator and uncertainty relation; Expectation value; Properties of Hermitian operator; Complete set of Eigenfunctions.Expansion of Eigenfunctions.

Particle in a box: Setting up of Schrodinger equation for one-dimensional box and its solution; Comparison with free particle eigenfunctions and eigenvalues. Properties of PB wave functions (normalisation, orthogonality, probability distribution); Expectation values of x, x^2, p_x and p_x^2 and their significance in relation to the uncertainty principle; Extension of the problem to two and three dimensions and the concept of degenerate energy levels.

Crystal Structure ***(15 Lectures)***

Bravais Lattice and Laws of Crystallography: Types of solid, Bragg's law of diffraction; Laws of crystallography (Haüy's law and Steno's law); Permissible symmetry axes in crystals; Lattice, space lattice, unit cell, crystal planes, Bravais lattice. Packing of uniform hard sphere, close packed arrangements (fcc and hcp); Tetrahedral and octahedral voids. Void space in p-type, F-type and I-type cubic systems

Crystal planes: Distance between consecutive planes [cubic, tetragonal and orthorhombic lattices]; Indexing of planes, Miller indices; calculation of d_{hkl}; Relation between molar mass and unit cell dimension for cubic system; Bragg's law (derivation).Determination of crystal structure: Powder method; Structure of NaCl and KCl crystals.

Specific heat of solid: Coefficient of thermal expansion, thermal compressibility of solids; Dulong –Petit's law; Perfect Crystal model, Einstein's theory – derivation from partition function, limitations; Debye's T^3 law – analysis at the two extremes

Reference Books

1. **Levine, I. N. *Physical Chemistry*, 6th Edition , McGraw-Hill India**
2. **Castellan, G. W. *Physical Chemistry*, Narosa**
3. **McQuarrie, D. A. & Simons, J. D. *Physical Chemistry: A Molecular Approach*, Viva Press**
4. **Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India**
5. Engel, T. & Reid, P. *Physical Chemistry*, 3rd Edition ,Pearson India
6. Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry*, 10th Edition, Oxford University Press
7. Maron, S. & Prutton , *Physical Chemistry*
8. Ball, D. W. *Physical Chemistry*, Thomson Press
9. Mortimer, R. G. *Physical Chemistry*, 2nd Edition, Elsevier
10. Atkins, P. W. *Molecular Quantum Mechanics*, 5th edition ,Oxford
11. Levine, I. N. *Quantum Chemistry*, 7th Edition, Pearson India
12. Sannigrahi A.B, Quantum Chemistry,2nd Edition, Books and Allied Pvt Ltd.
13. Denbigh, K. *The Principles of Chemical Equilibrium* Cambridge University Press
14. Zemansky, M. W. & Dittman, R.H. *Heat and Thermodynamics*, Tata-McGraw-Hil

CEMA-CC-4-9-P :(45 Lectures)

Experiment 1: Kinetic study of inversion of cane sugar using a Polarimeter (Preferably Digital)

Experiment 2: Study of Phase diagram of Phenol-Water system.

Experiment 3: Determination of partition coefficient for the distribution of I_2 between water and CCl_4

Experiment 4: Determination of pH of unknown solution (buffer), by colour matching method

Experiment 5: pH-metric titration of acid (mono- and di-basic) against strong base

Experiment 6 : pH-metric titration of a tribasic acidagainst strong base.

Reference Books

1. Viswanathan, B., Raghavan, P.S. *Practical Physical Chemistry* Viva Books (2009)
2. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson
3. Harris, D. C. *Quantitative Chemical Analysis*. 9th Ed., Freeman (2016)
4. Palit, S.R., De, S. K. *Practical Physical Chemistry* Science Book Agency
5. Levitt, B. P. edited *Findlay's Practical Physical Chemistry* Longman Group Ltd.
6. Gurtu, J. N., Kapoor, R., *Advanced Experimental Chemistry* S. Chand & Co. Ltd.
7. *Practical Workbook Chemistry (Honours), UGBS, Chemistry,* University of Calcutta, 2015

CEMA-CC-4-10-TH

(Credits: Theory-04, Practicals-02)

INORGANIC CHEMISTRY-4

Theory: 60 Lectures

Coordination Chemistry-II

(30 Lectures)

VB description and its limitations. Elementary Crystal Field Theory: splitting of d^n configurations in octahedral, square planar and tetrahedral fields, crystal field stabilization energy (CFSE) in weak and strong fields; pairing energy. Spectrochemical series.Jahn- Teller distortion.Octahedral site stabilization energy (OSSE).Metal-ligand bonding (MO concept, elementary idea), sigma- and pi-bonding in octahedral complexes (qualitative pictorial approach) and their effects on the oxidation states of transitional metals (examples). Magnetism and Colour: Orbital and spin magnetic moments, spin only moments of d^n ions and their correlation with effective magnetic

moments, including orbital contribution; quenching of magnetic moment: super exchange and antiferromagnetic interactions (elementary idea with examples only); d-d transitions; L-S coupling; qualitative Orgel diagrams for $3d^1$ to $3d^9$ ions. Racah parameter. Selection rules for electronic spectral transitions; spectrochemical series of ligands; charge transfer spectra (elementary idea).

Chemistry of d- and f- block elements (15 Lectures)

Transition Elements:
General comparison of 3d, 4d and 5d elements in term of electronic configuration, oxidation states, redox properties, coordination chemistry.

Lanthanoids and Actinoids:
General Comparison on Electronic configuration, oxidation states, colour, spectral and magnetic properties; lanthanide contraction, separation of lanthanides (ion-exchange method only).

Reaction Kinetics and Mechanism (15 Lectures)

Introduction to inorganic reaction mechanisms. Substitution reactions in square planar complexes, Trans- effect and its application in complex synthesis, theories of trans effect, Mechanism of nucleophilic substitution in square planar complexes, Thermodynamic and Kinetic stability, Kinetics of octahedral substitution, Ligand field effects and reaction rates, Mechanism of substitution in octahedral complexes.

Reference Books

1. Huheey, J. E.; Keiter, E.A. & Keiter, R.L. *Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed.*, Harper Collins 1993, Pearson,2006.
2. Greenwood, N.N. & Earnshaw A. *Chemistry of the Elements*, Butterworth-Heinemann, 1997.
3. Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., *Advanced Inorganic Chemistry 6th Ed. 1999.*,Wiley.
4. Miessler, G. L. & Donald, A. Tarr. *Inorganic Chemistry* 4th Ed., Pearson, 2010.
5. Purecell, K.F. and Kotz, J.C., *An Introduction toInorganic Chemistry*, Saunders: Philadelphia, 1980.
6. Mingos, D.M.P., *Essential trends in inorganic chemistry*. Oxford University Press (1998).

CEMA-CC-4-10-P (45 Lectures)

Inorganic preparations

1. $[Cu(CH_3CN)_4]PF_6/ClO_4$
2. *Cis* and *trans* $K[Cr(C_2O_4)_2\ (H_2O)_2]$

3. Potassium diaquadioxalatochromate(III)
4. Tetraamminecarbonatocobalt (III) ion
5. Potassium tris(oxalato)ferrate(III)
6. Tris-(ethylenediamine) nickel(II) chloride.
7. $[Mn(acac)_3]$ and $Fe(acac)_3]$ (acac= acetylacetonate)

Instrumental Techniques

1. Measurement of 10Dq by spectrophotometric method.
2. Determination of λ_{max} of $[Mn(acac)_3]$ and $[Fe(acac)_3]$ complexes.

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis* 6th Ed., Pearson, 2009.
2. *Inorganic Synthesis*, Vol. 1-10.

SEMESTER-5

CEMA-CC-5-11-TH :

(Credits: Theory-04, Practicals-02)

PHYSICAL CHEMISTRY - 4

Theory: 60 Lectures

Quantum Chemistry II **(30 Lectures)**

Simple Harmonic Oscillator:Setting up of One dimensional Schrödinger equation and discussion of solution and wave functions. Classical turning points, Expectation values of x, x^2, p_x and p_x^2 .

Angular momentum: Commutation rules, quantization of square of total angular momentum and z-component; Rigid rotator model of rotation of diatomic molecule; Schrödinger equation, transformation to spherical polar coordinates; Separation of variables. Spherical harmonics; Discussion of solution

Hydrogen atom and hydrogen-like ions: Setting up of Schrödinger equation in spherical polar coordinates, Separation of variables, Solution of angular Part (φ part only), quantization of energy (only final energy expression); Real wave functions. Average and most probable distances of electron from nucleus; Setting up of Schrödinger equation for many-electron atoms (He, Li)Need for approximation methods. Statement of variation theorem and application to simple systems(particle-in-a-box, harmonic oscillator, hydrogen atom).

LCAO :Born-Oppenheimer approximation. Covalent bonding, valence bond and molecular orbital approaches, LCAO-MO treatment of H_2^+; Bonding and antibonding orbitals; Qualitative extension to H_2; Comparison of LCAO-MO and VB treatments of H_2 and their limitations.(only wavefunctions, detailed solutionnot required) and their limitations.

Statistical Thermodynamics **(20 Lectures)**

Configuration: Macrostates, microstates and configuration; calculation with harmonic oscillator; variation of W with E; equilibrium configuration

Boltzmann distribution: Thermodynamic probability, entropy and probability, Boltzmann distribution formula (with derivation); Applications to barometric distribution; Partition function, concept of ensemble - canonical ensemble and grand canonical ensembles

Partition function: molecular partition function and thermodynamic properties,

3^{rd} law: Absolute entropy, Plank's law, Calculation of entropy, Nernst heat theorem

Adiabatic demagnetization: Approach to zero Kelvin, adiabatic cooling, demagnetization, adiabatic demagnetization – involved curves

Numerical Analysis **(10 Lectures)**

Roots of Equation:Numerical methods for finding the roots of equations: Quadratic Formula, Iterative Methods (e.g., Newton Raphson Method).
Least-Squares Fitting.Numerical Differentiation.Numerical Integration(Trapezoidal and Simpson's Rule)

Reference Books

1. **Levine, I. N. *Physical Chemistry*, 6th Edition McGraw-Hill India**
2. **Castellan, G. W. *Physical Chemistry*, Narosa**
3. **McQuarrie, D. A. & Simons, J. D. *Physical Chemistry: A Molecular Approach*, Viva Press**
4. **Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India**
5. Engel, T. & Reid, P. *Physical Chemistry*, 3rd Edition Pearson India
6. Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry*, 10th Edition Oxford University Press
7. Levine, I. N. *Quantum Chemistry*, 7th Edition,Pearson India
8. Maron, S. & Prutton *Physical Chemistry*
9. Ball, D. W. *Physical Chemistry*, Thomson Press
10. Mortimer, R. G. *Physical Chemistry*, Elsevier
11. Glasstone, S. & Lewis, G.N. *Elements of Physical Chemistry*
12. Rakshit, P.C., *Physical Chemistry* Sarat Book House
14. Klotz, I.M., Rosenberg, R. M. *Chemical Thermodynamics:Basic Concepts and Methods* , Wiley
15. Sannigrahi A.B, Quantum Chemistry,2nd Edition, Books and Allied Pvt Ltd.
16. Atkins, P. W. *Molecular Quantum Mechanics*, 5th edition ,Oxford
17. Moore, W. J. *Physical Chemistry*, Orient Longman
18. Nash, L. K. *Elements of Statistical Thermodynamics*, Dover
19. V. Rajaraman, Computer Oriented Numerical Methods, PHI Learning, 2013
20. V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997
21. Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995

CEMA-CC-5-11-P :(45 Lectures)

Computer programs(Using FORTRAN or C or C ++) based on numerical methods :

Programming 1: Roots of equations: (e.g. volume of van der Waals gas and comparison with ideal gas, pH of a weak acid)

Programming 2: Numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, Potentiometric titrations)

Programming 3: Numerical integration (e.g. entropy/ enthalpy change from heat capacity data), probability distributions (gas kinetic theory) and mean values

Reference Books

1. McQuarrie, D. A. *Mathematics for PhysicalChemistry*. University Science Books (2008)

2. Mortimer, R. *Mathematics for Physical Chemistry*. 3rd Ed. Elsevier (2005)
3. Yates, P. *Chemical Calculations*. 2nd Ed. CRC Press (2007)
4. Harris, D. C. *Quantitative Chemical Analysis*. 6th Ed., Freeman (2007) Chapters 3-5
5. Let us C, Yashvant Kanetkar, BPB Publication, 15th Edition, 2016

CEMA-CC-5-12-TH :

(Credits: Theory-04, Practicals-02)

ORGANIC CHEMISTRY - 5

Theory: 60 Lectures

Carbocyles and Heterocycles **(16 lectures)**

*Polynuclear hydrocarbonsand their derivatives:*synthetic methods include Haworth, Bardhan-Sengupta, Bogert-Cook and other useful syntheses (with mechanistic details);fixation of double bonds and Fries rule;reactions (with mechanism) of naphthalene, anthraceneand phenanthrene and their derivatives.
*Heterocyclic compounds:*Biological importance of heterocycles referred in the syllabus; 5- and 6-membered rings with one heteroatom; reactivity, orientation and important reactions (with mechanism) of furan, pyrrole,thiophene and pyridine; synthesis (including retrosynthetic approach and mechanistic details): pyrrole: Knorr synthesis, Paal-Knorr synthesis, Hantzsch; furan: Paal-Knorr synthesis, Feist-Benary synthesis and its variation; thiophenes: Paal-Knorr synthesis, Hinsberg synthesis; pyridine: Hantzsch synthesis;benzo-fused 5-and 6-membered rings with one heteroatom: reactivity, orientation and important reactions (with mechanistic details) of indole, quinoline and isoquinoline; synthesis (including retrosynthetic approachand mechanistic details): indole: Fischer,quinoline: Skraup, isoquinoline: Bischler-Napieralski synthesis.

Cyclic Stereochemistry **(10 Lectures)**

*Alicyclic compounds:*concept of I-strain (Baeyer's strain theory); conformational analysis: cyclohexane, mono and disubstituted cyclohexane; symmetry properties and optical activity; topomerisation; ring size and ease of cyclisation; conformation & reactivity in cyclohexane system: consideration of steric and stereoelectronic requirements; elimination (E2, E1), nucleophilic substitution (S_N1, S_N2, S_Ni, NGP), merged substitution-elimination; rearrangements; oxidation of cyclohexanol, esterification, saponification, lactonisation, epoxidation, pyrolytic *syn* elimination and fragmentation reactions.

Pericyclic reactions **(08 Lectures)**

Mechanism, stereochemistry, regioselectivity in case of

Electrocyclic reactions: FMO approach involving 4π- and 6π-electrons (thermal and photochemical) and corresponding cycloreversion reactions.
Cycloaddition reactions: FMOapproach, Diels-Alder reaction, photochemical [2+2] cycloadditions.
*Sigmatropic reactions:*FMO approach,sigmatropic shifts and their order; [1,3] and [1,5] H shifts and [3,3] shifts with reference to Claisen and Cope rearrangements.

Carbohydrates (14 Lectures)

Monosaccharides: Aldoses up to 6 carbons; structure of D-glucose & D-fructose (configuration & conformation); ring structure of monosaccharides (furanose and pyranose forms): Haworth representations and non-planar conformations; anomeric effect (including stereoelectronic explanation); mutarotation; epimerization; reactions (mechanisms in relevant cases): Fischer glycosidation, osazone formation, bromine-water oxidation, HNO_3 oxidation, selective oxidation of terminal $–CH_2OH$ of aldoses, reduction to alditols, Lobry de Bruyn-van Ekenstein rearrangement; stepping–up (Kiliani-Fischer method) and stepping–down (Ruff's &Wohl's methods) of aldoses; end-group-interchange of aldoses; acetonide (isopropylidene and benzylidene protections; ring size determination; Fischer's proof of configuration of (+)-glucose.
Disaccharides: Glycosidic linkages, concept of glycosidic bond formation by glycosyl donor-acceptor, structure of sucrose, inversion of cane sugar.

Biomolecules (12 Lectures)

*Aminoacids:*synthesis with mechanistic details: Strecker, Gabriel; acetamido malonic ester, azlactone, Bücherer hydantoin synthesis, synthesis involving diketopiperizine, isoelectric point, zwitterions; electrophoresis, reaction (with mechanism): ninhydrin reaction, Dakin-West reaction; resolution of racemic amino acids.
*Peptides:*peptide linkage and its geometry; syntheses (with mechanistic details) of peptides using *N*-protection & C-protection, solid-phase (Merrifield) synthesis; peptide sequence: *C*-terminal and *N*-terminal unit determination (Edman, Sanger and 'dansyl'methods); partial hydrolysis; specific cleavage of peptides; use of CNBr.
*Nucleic acids:*pyrimidine and purine bases (only structure & nomenclature); nucleosides and nucleotides corresponding to DNA and RNA;mechanism for acid catalysed hydrolysis of nucleosides (both pyrimidine and purine types); comparison of alkaline hydrolysis of DNA and RNA; elementary idea of double helical structure of DNA (Watson-Crick model); complimentary base–pairing in DNA.

Reference Books

1. Clayden, J., Greeves, N., Warren, S. *Organic Chemistry*, Second edition, Oxford University Press 2012.
2. Eliel, E. L. & Wilen, S. H. *Stereochemistry of Organic Compounds*, Wiley: London.
3. Nasipuri, D. *Stereochemistry of Organic Compounds*, Wiley Eastern Limited.
4. Fleming, I. *Molecular Orbitals and Organic Chemical reactions*, Reference/Student Edition, Wiley, 2009.
5. Fleming, I. *Pericyclic Reactions*, Oxford Chemistry Primer, Oxford University Press.

6. Gilchrist, T. L. & Storr, R. C. *Organic Reactions and Orbital symmetry*, Cambridge University Press.
7. Finar, I. L. *Organic Chemistry (Volume 1),* Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
8. Finar, I. L. *Organic Chemistry* (*Volume 2: Stereochemistry and the Chemistry of Natural Products*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
9. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
10. Loudon, G. M. *Organic Chemistry*, Fourth edition, Oxford University Press.
11. James, J., Peach, J. M. *Stereochemistry at a Glance*, Blackwell Publishing, 2003.
12. Robinson, M. J. T., *Stereochemistry*, Oxford Chemistry Primer, Oxford University Press, 2005.
13. Davis, B. G., Fairbanks, A. J., *Carbohydrate Chemistry*, Oxford Chemistry Primer, Oxford University Press.
14. Joule, J. A. Mills, K. *Heterocyclic Chemistry*, Blackwell Science.
15. Acheson, R.M. *Introduction to the Chemistry of Heterocyclic compounds*, John Wiely & Sons (1976).
16. Gilchrist, T. L. *Heterocyclic Chemistry*, 3rd edition, Pearson.
17. Davies, D. T., *Heterocyclic Chemistry*, Oxford Chemistry Primer, Oxford University Press

CEMA-CC-5-12-P:(45 Lectures)

A. Chromatographic Separations

1. TLC separation of a mixture containing 2/3 amino acids
2. TLC separation of a mixture of dyes (fluorescein and methylene blue)
3.Column chromatographic separation of mixture of dyes
4.Paper chromatographic separation of a mixture containing 2/3 amino acids
5. Paper chromatographic separation of a mixture containing 2/3 sugars

B. **Spectroscopic Analysis of Organic Compounds**

1. Assignment of labelled peaks in the ^{1}H NMR spectra of the known organic compounds explaining the relative δ-values and splitting pattern.
2. Assignment of labelled peaks in the IR spectrum of the same compound explaining the relative frequencies of the absorptions (C-H, O-H, N-H, C-O, C-N, C-X, C=C, C=O, N=O, C≡C, C≡N stretching frequencies; **characteristic bending vibrations are included**).
3. The students must record full spectral analysis of **at least 15 (fifteen)** compounds from the following list:

(i) 4′-Bromoacetanilide (ii) 2-Bromo-4'-methylacetophenone (iii) Vanillin (iv) 2′-Methoxyacetophenone (v) 4-Aminobenzoic acid (vi) Salicylamide (vii) 2′-Hydroxyacetophenone (viii) 1,3-Dinitrobenzene (ix) *trans*-Cinnamic acid (x) Diethyl fumarate (xi) 4-Nitrobenzaldehyde (xii) 4′-Methylacetanilide (xiii) Mesityl oxide (xiv) 2-Hydroxybenzaldehyde (xv) 4-Nitroaniline (xvi) 2,3-Dimethylbenzonitrile (xvii) Pent-

1-yn-3-ol (xviii) 3-Nitrobenzaldehyde (xix) 3-Aminobenzoic acid (xx) Ethyl 3-aminobenzoate (xxi) Ethyl 4-aminobenzoate (xxii) 3-nitroanisole.

Reference Books

1. *Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry, 5th Ed.*, Pearson (2012).

3. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education.

SEMESTER- 6

CEMA-CC-6-13-TH:

(Credits: Theory-04, Practicals-02)

INORGANIC CHEMISTRY-5

Theory: 60 Lectures

Theoretical Principles in Qualitative Analysis (10 Lectures)

Basic principles involved in analysis of cations and anions and solubility products, commonion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate) and need to remove them after Group II.

Bioinorganic Chemistry (25 Lectures)

Elements of life: essential and beneficial elements, major, trace and ultratrace elements. Basic chemical reactions in the biological systems and the role of metal ions (specially Na^+, K^+, Mg^{2+}, Ca^{2+}, $Fe^{3+/2+}$, $Cu^{2+/+}$, and Zn^{2+}). Metal ion transport across biological membrane Na^+/ K^+-ion pump. Dioxygen molecule in life. Dioxygen management proteins: Haemoglobin, Myoglobin, Hemocyanine and Hemerythrin. Hydrolytic enzymes: carbonate bicarbonate buffering system and carbonic anhydrase and carboxyanhydrase A. Toxic metal ions and their effects, chelation therapy (examples only), Pt and Au complexes as drugs (examples only), metal dependent diseases (examples only)

Organometallic Chemistry (25 Lectures)

Definition and classification of organometallic compounds on the basis of bond type.Concept of hapticity of organic ligands.18-electron and 16-electron rules (pictorial MO approach).Applications of 18-electron rule to metal carbonyls, nitrosyls, cyanides. General methods of preparation of mono and binuclear carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls.pi-acceptor behaviour of CO, synergic effect and use of IR data to explain extent of back bonding. Zeise's salt: Preparation, structure, evidences of synergic effect. Ferrocene: Preparation and reactions (acetylation, alkylation, metallation, Mannich Condensation). Reactions of organometallic complexes: substitution, oxidative addition, reductive elimination and insertion reactions.

Catalysis by Organometallic Compounds

Study of the following industrial processes

1. Alkene hydrogenation (Wilkinson's Catalyst)
2. Hydroformylation
3. Wacker Process
4. Synthetic gasoline (Fischer Tropsch reaction)

5. Ziegler-Natta catalysis for olefin polymerization.

Reference Books

1. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company 1994.
2. Huheey, J. E.; Keiter, E.A. & Keiter, R.L. *Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed.*, Harper Collins 1993, Pearson,2006.
3. Greenwood, N.N. & Earnshaw A. *Chemistry of the Elements*, Butterworth-Heinemann, 1997.
4. Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., *Advanced Inorganic Chemistry 6th Ed. 1999.*,Wiley.
5. Bertini, I., Gray, H. B., Lippard, S.J., Valentine, J. S., Viva, 2007.
6. Basolo, F, and Pearson, R.C. *Mechanisms of Inorganic Chemistry*, John Wiley & Sons, NY, 1967.
7. Purecell, K.F. and Kotz, J.C., *An Introduction toInorganic Chemistry*, Saunders: Philadelphia, 1980.
8. Powell, P. *Principles of Organometallic Chemistry*, Chapman and Hall, 1988.
9. Collman, J. P. *et al. Principles and Applications of Organotransition MetalChemistry*. Mill Valley, CA: University Science Books, 1987.
10. Crabtree, R. H. *The Organometallic Chemistry of the Transition Metals*. New York, NY: John Wiley, 2000.

CEMA-CC-6-13-P: (45 Lectures)

Qualitative semimicro analysis of mixtures containing not more than three radicals. Emphasis should be given to the understanding of the chemistry of different reactions.

Cation Radicals: Na^{+},K^{+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Al^{3+}, Cr^{3+}, Mn^{2+}/Mn^{4+}, Fe^{3+}, Co^{2+}/Co^{3+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, Cd^{2+} (Demo), Bi^{3+} (Demo), Sn^{2+}/Sn^{4+}, As^{3+}/As^{5+}, $Sb^{3+/5+}$ (Demo), NH_4^{+}, Mg^{2+} (Demo).

Anion Radicals: F^{-}, Cl^{-}, Br^{-}, BrO_3^{-}, I^{-}, IO_3^{-}, SCN^{-}, S^{2-}, SO_4^{2-}, NO_3^{-}, NO_2^{-}, PO_4^{3-}, AsO_4^{3--}, BO_3^{3-}, CrO_4^{2-} / $Cr_2O_7^{2-}$, $Fe(CN)_6^{4-}$, $Fe(CN)_6^{3-}$.

Insoluble Materials: Al_2O_3(ig), Fe_2O_3(ig), Cr_2O_3(ig), SnO_2, $SrSO_4$, $BaSO_4$, CaF_2, $PbSO_4$.

Reference Books

1. Svehla, G., *Vogel's Qualitative Inorganic Analysis*, Pearson Education, 2012.*2. Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015

CEMA-CC-6-14-TH:

(Credits: Theory-04, Practicals-02)

PHYSICAL CHEMISTRY-5

Theory: 60 Lectures

Molecular Spectroscopy (25 Lectures)

Interaction of electromagnetic radiation with molecules and various types of spectra;
Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution
Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration, Diatomic vibrating rotator, P, Q, R branches
Electronic Spectroscopy: Potential energy curves (diatomic molecules), Frank-Condon principle and vibrational structure of electronic spectra; Frank Condon factor. Bond dissociation and principle of determination of dissociation energy (ground state); Decay of excited states by radiative and non-radiative paths; Pre-dissociation; Fluorescence and phosphorescence, Jablonskii diagram;

Raman spectroscopy: Classical Treatment. Rotational Raman effect; Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion

Photochemistry and Theory of reaction rate: (15 Lectures)

Lambert-Beer's law: Characteristics of electromagnetic radiation, Lambert-Beer's law and its limitations, physical significance of absorption coefficients; Laws of photochemistry, Stark-Einstein law of photochemical equivalence quantum yield, actinometry, examples of low and high quantum yields
Rate of Photochemical processes: Photochemical equilibrium and the differential rate of photochemical reactions, Photostationary state; HI decomposition, H_2-Br_2 reaction, dimerisation of anthracene; photosensitised reactions, quenching; Role of photochemical reactions in biochemical processes, chemiluminescence

Collision theory of reaction rate (detailed treatment). Lindemann theory of unimolecular reaction; Outline of Transition State theory (classical treatment) . Primary Kinetic Salt Effect.

Surface phenomenon (15 Lectures)

Surface tension and energy:

Surface tension, surface energy, excess pressure, capillary rise and surface tension; Work of cohesion and adhesion, spreading of liquid over other surface; Vapour pressure over curved surface; Temperature dependence of surface tension

Adsorption:

Physical and chemical adsorption; Freundlich and Langmuir adsorption isotherms; multilayer adsorption and BET isotherm (no derivation required); Gibbs adsorption isotherm and surface excess; Heterogenous catalysis (single reactant);

Colloids:

Lyophobic and lyophilic sols, Origin of charge and stability of lyophobic colloids, Coagulation and Schultz-Hardy rule, Zeta potential and Stern double layer (qualitative idea), Tyndall effect; Electrokinetic phenomena (qualitative idea only); Stability of colloids and zeta potential; Micelle formation

Dipole moment and polarizability: **(05 Lectures)**

Polarizability of atoms and molecules, dielectric constant and polarisation, molar polarisation for polar and non-polar molecules; Clausius-Mosotti equation and Debye equation (both without derivation) and their application; Determination of dipole moments

Reference Books

1. **Levine, I. N. *Physical Chemistry*, 6th Edition , McGraw-Hill India**
2. **Castellan, G. W. *Physical Chemistry*, Narosa**
3. **McQuarrie, D. A. & Simons, J. D. *Physical Chemistry: A Molecular Approach*, Viva Press**
4. **Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India**
5. Engel, T. & Reid, P. *Physical Chemistry*, 3rd Edition ,Pearson India
6. Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry*, 10th Edition, Oxford University Press
7. Maron, S. & Prutton , *Physical Chemistry*
8. Ball, D. W. *Physical Chemistry*, Thomson Press
9. Mortimer, R. G. *Physical Chemistry*, 2nd Edition, Elsevier
10. Banwell, C. N. Fundamentals of Molecular Spectroscopy, Tata-McGraw-Hill
11. Barrow, G. M. Molecular Spectroscopy, McGraw-Hill
12. Hollas, J.M. Modern Spectroscopy, Wiley India
13. McHale, J. L. Molecular Spectroscopy, Pearson Education
14. Wayne, C. E. & Wayne, R. P. Photochemistry, OUP
15. Brown, J. M. Molecular Spectroscopy, OUP

CEMA-CC-6-14-P: (45 Lectures)

Experiment 1: Determination of surface tension of a liquid using Stalagmometer
Experiment 2: Determination of the indicator constant of an acid base indicator spectrophotometrically
Experiment 3: Verification of Beer and Lambert's Law for $KMnO_4$ and $K_2Cr_2O_7$ solution
Experiment 4: Study of kinetics of $K_2S_2O_8$ + KI reaction, spectrophotometrically
Experiment 5: Determination of pH of unknown buffer, spectrophotometrically
Experiment 6: Determination of CMC of a micelle from Surface Tension Measurement.

Reference Books

1. Viswanathan, B., Raghavan, P.S. *Practical Physical Chemistry* Viva Books (2009)
2. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson
3. Harris, D. C. *Quantitative Chemical Analysis*. 6th Ed., Freeman (2007)
4. Palit, S.R., De, S. K. *Practical Physical Chemistry* Science Book Agency
5. Levitt, B. P. edited *Findlay's Practical Physical Chemistry* Longman Group Ltd.
6. Gurtu, J. N., Kapoor, R., *Advanced Experimental Chemistry* S. Chand & Co. Ltd.

DISCIPLINE SPECIFIC ELECTIVE COURSES

Semester 5

1. Any one from DSEA-1 and DSEA-2
2. Any one from DSEB-1 and DSEB-2

Semester 6

3. Any one from DSEA-3 and DSEA-4
4. Any one from DSEB-3 and DSEB-4

DSE-A

DSE A-1: MOLECULAR MODELLING AND DRUG DESIGN

(Credits: Theory-04, Practicals-02)
Theory: 60 Lectures

Introduction to Molecular Modelling: (8 Lectures)
Introduction. Useful Concepts in Molecular Modelling: Coordinate Systems. Potential Energy Surfaces. Molecular Graphics Surfaces.

Force Fields: (12 Lectures)
Bond Stretching.Angle Bending.Introduction to nonbonded interactions. Electrostatic interactions.van der Waals Interactions. Hydrogen bonding in Molecular Mechanics.Force Field Models for the Simulation of Liquid Water.

Energy Minimization and Computer Simulation: (12 Lectures)
Minimization and related methods for exploring the energy surface. Non-derivative method, First and second order minimization methods. Computer simulation methods.Simple thermodynamic properties and Phase Space Boundaries. Analyzing the results of a simulation and estimating Errors

Molecular Dynamics & Monte Carlo Simulation: (16 Lectures)
Molecular Dynamics Simulation Methods.Molecular Dynamics using simple models. Molecular Dynamics with continuous potentials. Molecular Dynamics at constant temperature and pressure. Metropolis method.Monte Carlo simulation of molecules.

Structure Prediction and Drug Design: (12 Lectures)
Structure prediction - Introduction to comparative Modeling.Sequence alignment. Constructing and evaluating a comparative model. Predicting protein structures by 'Threading', Molecular docking. Structure based de novo ligand design, QSAR.

Reference Books:

1. A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.
2. J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.
3. Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008.

PRACTICAL- DSE A-1: MOLECULAR MODELLING & DRUG DESIGN

(45 Lectures)

i. Compare the optimized C-C bond lengths in ethane, ethene, ethyne and benzene. Visualize the molecular orbitals of the ethane σ bonds and ethene, ethyne, benzene and pyridine π bonds.
ii. (a) Perform a conformational analysis of butane. (b) Determine the enthalpy of isomerization of *cis* and *trans* 2-butene.
iii. Visualize the electron density and electrostatic potential maps for LiH, HF, N2, NO and CO and comment. Relate to the dipole moments. Animate the vibrations of these molecules.
iv. (a) Relate the charge on the hydrogen atom in hydrogen halides with their acid character. (b) Compare the basicities of the nitrogen atoms in ammonia, methylamine, dimethylamine and trimethylamine.
v. (a) Compare the shapes of the molecules: 1-butanol, 2-butanol, 2-methyl-1-propanol, and 2-methyl-2-propanol. Note the dipole moment of each molecule. (b) Show how the shapes affect the trend in boiling points: (118 ºC, 100 ºC, 108 ºC, 82 ºC, respectively).
vi. Build and minimize organic compounds of your choice containing the following functional groups. Note the dipole moment of each compound: (a) alkyl halide (b) aldehyde (c) ketone (d) amine (e) ether (f) nitrile (g) thiol (h) carboxylic acid (i) ester (j) amide.
vii. (a) Determine the heat of hydration of ethylene. (b) Compute the resonance energy of
benzene by comparison of its enthalpy of hydrogenation with that of cyclohexene.
viii. Arrange 1-hexene, 2-methyl-2-pentene, (*E*)-3-methyl-2-pentene, (*Z*)-3-methyl-2-pentene, and 2,3-dimethyl-2-butene in order of increasing stability.
ix. (a) Compare the optimized bond angles H2O, H2S, H2Se. (b) Compare the HAH bond
angles for the second row dihydrides and compare with the results from qualitative MO theory.
Note: Software: ChemSketch, ArgusLab (www.planaria-software.com), TINKER 6.2 (dasher.wustl.edu/ffe), WebLab Viewer, Hyperchem, VMD, or any similar software.

Reference Books:

1) A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.
2) J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.

3) Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008.

DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Computer Programming Basics (FORTRAN): (Lectures: 20)

Elements ofFORTRAN Language.FORTRAN Keywords and commands, Logical and Relational Operators, iteration, Array variables, Matrix addition and multiplication.Function and Subroutine.

Introduction to Spreadsheet Software(MS Excel): (Lectures 25)

Creating a Spreadsheet, entering and formatting information, basic functions and formulae, creating charts, tables and graphs. Incorporating tables and graphs into word processing documents, simple calculations.

Solution of simultaneous equations(for eg: in chemical Equilibrium problems) using Excel **SOLVER** Functions. Use of Excel **Goal Seek** function.

Numerical Modelling: Simulation of pH metric titration curves, Excel functions **LINEST** and Least Squares. Numerical Curve Fitting, Regression, Numerical Differentiation and Integration

Statistical Analysis: (Lectures: 15)

Gaussian Distribution and Errors in Measurement and their effect on data sets. Descriptive Statistics using Excel, Statistical Significance Testing, the T test and the F test.

Reference Books

1. McQuarrie, D. A. Mathematics for Physical Chemistry University Science Books (2008).
2. Mortimer, R. Mathematics for Physical Chemistry. 3rd Ed. Elsevier (2005).
3. Steiner, E. The Chemical Maths Book Oxford University Press (1996).
4. Yates, P. Chemical calculations. 2nd Ed. CRC Press (2007).
5. Harris, D. C. Quantitative Chemical Analysis. 6th Ed., Freeman (2007) Chapters 3-5.

6. Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)
7. Noggle, J. H. Physical chemistry on a Microcomputer. Little Brown & Co. (1985).
8. S. R. Crouch, F. J. Holler, Applications of MS Excel in Analytical Chemistry, Thomson, 2004.
9. V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997
10. Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995

PRACTICALS DSE-A-2: APPLICATIONS OF COMPUTERS IN CHEMISTRY

(45 Lectures)

(At least 10 experiments are to be performed.)

1. Plotting of Graphs using a spreadsheet. (Planck's Distribution Law, Maxwell Boltzmann Distribution Curves as a function of temperature and molecular weight)
2. Determination of vapour pressure from Van der Waals Equation of State.
3. Determination of rate constant from Concentration-time data using **LINEST** function.
4. Determination of Molar Extinction Coefficient from Absorbent's data using **LINEST** function.
5. Determination of concentration simultaneously using Excel **SOLVER** Function.(For eg: Determination of $[OH^-]$, $[Mg^{2+}]$ and $[H_3O^+]$ from K_{sp} and K_w data of $Mg(OH)_2$.)
6. Simultaneous Solution of Chemical Equilibrium Problems to determine the equilibrium compositions from the Equilibrium Constant data at a given Pressure and Temperature.
7. Determination of Molar Enthalpy of Vaporization using Linear and Non Linear Least squares fit.
8. Calculation and Plotting of a Precipitation Titration Curve with MS Excel.
9. Acid-Base Titration Curve using Excel **Goal Seek** Function.
10. Plotting of First and Second Derivative Curve for pH metric and Potentiometric titrations .
11. Use of spreadsheet to solve the 1D Schrodinger Equation(Numerov Method).
12. Michaelis-Menten Kinetics for Enzyme Catalysis using Linear and Non - Linear Regression

Reference Books

1. Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)
2. S. R. Crouch, F. J. Holler, Applications of MS Excel in Analytical Chemistry, Thomson, 2004.
3. Levine, I. N. Physical Chemistry, Tata McGraw-Hill ,6th Edition

DSE-A-3: GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Introduction to Green Chemistry: (04 Lectures)

What is Green Chemistry? Need for Green Chemistry.Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry

Principles of Green Chemistry and Designing a Chemical synthesis: (16 Lectures)

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following:

- Designing a Green Synthesis using these principles; Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products , Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.
- Prevention/ minimization of hazardous/toxic products reducingtoxicity.

- Green solvents–supercritical fluids, water as a solvent for organic reactions, ionic liquids, PEG, solventless processes.
- Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy.
- Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry.

Examples of Green Synthesis/ Reactions and some real world cases: (20lectures)

1. Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis)
2. Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents: Diels-Alder reaction and Decarboxylation reaction
3. Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)
4. Green counterpart of common organic reactions: Aldol, Friedel-Crafts, Michael, Knoevenagel, Cannizzaro, benzoin condensation and Dieckmann condensation.
5. Rearrangement reactions by green approach: Fries rearrangement, Claisen rearrangement, Beckmann rearrangement, Baeyer-Villiger oxidation.

Future Trends in Green Chemistry: (12 Lectures)

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions.Green chemistry in sustainable development.

Alkaloids **(5 Lectures)**

Hoffmann's exhaustive methylation, Emde's modification, Structure elucidation Natural occurrence, General structural features, Isolation and their physiological action.Synthesis of Hygrine.Medicinal importance of Nicotine, Hygrine, Quinine, Morphine, Cocaine and Reserpine.

Terpenes **(3 Lectures)**

Occurrence, classification, isoprene rule; Elucidation of stucture and synthesis of Citral.

Reference Books

1. Anastas, P.T. & Warner, J.K.: *Green Chemistry - Theory and Practical*, Oxford University Press (1998).
2. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker (2001).
3. Cann, M.C. & Connely, M.E. *Real-World cases in Green Chemistry*, American Chemical Society, Washington (2000).
4.Ryan, M.A. & Tinnesand, M. *Introduction to Green Chemistry*, American Chemical Society, Washington (2002).
5. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, 2nd Edition, 2010.
6. Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.
7. Finar, I. L. *Organic Chemistry* (*Volume 2*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

PRACTICALS-DSE-A-3: GREEN CHEMISTRY

(45 Lectures)

(Any **SIX** of the following list)

1. Acetylation of primary amine (preparation of acetanilide).
2. [4+2] Cycloaddition reaction (Diels-Alder reaction between furan and maleic anhydride).
3. Preparation of biodiesel from vegetable/waste cooking oil.
4. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.
5. Pinacol-pinacolone rearrangement reaction (preparation of benzopinacolone).
6. Solid state synthesis of benzilic acid from benzil.
7. Benzoin condensation using thiamine hydrochloride as a catalyst instead of potassium cyanide.
8. Green multicomponent synthesis (three component coupling).
9. Base catalysed aldol condensation (synthesis of dibenzal propanone from benzaldehyde and acetone).
10. Bromination of *trans*-stilbene using bromide/bromate mixture.
11. Preparation and characterization of gold nanoparticles using tea leaves.
12. Extraction of D-limonene from orange peel using liquid carbon dioxide.

13. Electrophilic aromatic substitution reaction (nitration of salicylic acid).
14. Green radical coupling reaction.

Reference Books

1. Anastas, P.T & Warner, J.C. *Green Chemistry: Theory and Practice,*OxfordUniversity Press (1998).
2. Kirchoff, M. & Ryan, M.A. *Greener approaches to undergraduate chemistryexperiment*. American Chemical Society, WashingtonDC (2002).
3. Ryan, M.A. *Introduction to Green Chemistry*, Tinnesand; (Ed), American Chemical Society, WashingtonDC (2002).
4. Sharma, R.K.; Sidhwani, I.T. & Chaudhari, M.K. I.K. *Green Chemistry Experiment:A monograph International Publishing House Pvt Ltd. New Delhi*. Bangalore CISBN978-93-81141-55-7 (2013).
5. Cann, M.C. & Connelly, M. E. *Real world cases in Green Chemistry*, American Chemical Society (2008).
6. Cann, M. C. & Thomas, P. *Real world cases in Green Chemistry*, American Chemical Society (2008).
7. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, 2nd Edition, 2010.
8. Pavia, D.L., Lampman, G.M., Kriz, G.S. & Engel, R.G. *Introduction to OrganicLaboratory Techniques: A Microscale and Macro Scale Approach,* W.B.Saunders,1995.

DSE-A4: ANALYTICAL METHODS IN CHEMISTRY

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Optical methods of analysis: (30 Lectures)

Origin of spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law.

UV-Visible Spectrometry: Basic principles of instrumentation (choice of source,monochromator and detector) for single and double beam instrument;
Basic principles of quantitative analysis: estimation of metal ions from aqueous solution,geometrical isomers, keto-enol tautomers. Determination of composition of metal complexes using Job's method of continuous variation and mole ratio method.
Infrared Spectrometry: Basic principles of instrumentation (choice of source, monochromator& detector) for single and double beam instrument; sampling techniques.

Structural illustration through interpretation of data, Effect and importance of isotope substitution.

Flame Atomic Absorption and Emission Spectrometry: Basic principles of instrumentation(choice of source, monochromator, detector, choice of flame and Burner designs. Techniques of atomization and sample introduction; Method of background correction, sources of chemical interferences and their method of removal. Techniques for the quantitative estimation of trace level of metal ions from water samples.

Thermal methods of analysis: (8 Lectures)

Theory of thermogravimetry (TG), basic principle of instrumentation.
Techniques for quantitative estimation of Ca and Mg from their mixture.

Electroanalytical methods: (7 Lectures)

Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pKa values.

Separation techniques: (15 Lectures)

Solvent extraction: Classification, principle and efficiency of the technique.

Mechanism of extraction: extraction by solvation and chelation.
Technique of extraction: batch, continuous and counter current extractions.

Qualitative and quantitative aspects of solvent extraction: extraction of metal ions from aqueous solution, extraction of organic species from the aqueous and nonaqueous media.

Chromatography: Classification, principle and efficiency of the technique.
Mechanism of separation: adsorption, partition & ion exchange.
Development of chromatograms: frontal, elution and displacement methods.

Qualitative and quantitative aspects of chromatographic methods of analysis: IC, GLC, GPC, TLC and HPLC.

Stereoisomeric separation and analysis: Measurement of optical rotation, calculation of Enantiomeric excess (ee)/ diastereomeric excess (de) ratios and determination of enantiomeric composition using NMR, Chiral solvents and chiral shift reagents. Chiral chromatographic techniques using chiral columns (GC and HPLC).

Role of computers in instrumental methods of analysis.

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6thEd.,* Pearson, 2009.
2. Willard, H.H. *et al.*: *Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.

3. Christian, G.D. *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D.C.: *Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age International Publisher, 2009.
6. Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Ed.
7. Mikes, O. *Laboratory Hand Book of Chromatographic & Allied Methods*, Elles Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.
8. Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974.

PRACTICALS-DSE-A-4: ANALYTICAL METHODS IN CHEMISTRY

(45 Lectures)

I. Separation Techniques by:

Chromatography:

(a) Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography. Reporting the R_f values.

(b)Separate a mixture of Sudan yellow and Sudan Red by TLC technique and identify them on the basis of their R_f values.

(c) Chromatographic separation of the active ingredients of plants, flowers and juices by TLC

Solvent Extractions:

To separate a mixture of Ni^{2+}& Fe^{2+} by complexation with DMG and extracting the Ni^{2+}-DMG complex in chloroform, and determine its concentration by spectrophotometry.

II. Analysis of soil:

(i) Determination of pH of soil.
(ii) Estimation of calcium, magnesium, phosphate

III. Ion exchange:

Determination of exchange capacity of cation exchange resins and anion exchange resins.

IV. Spectrophotometry

1. Determination of pKa values of indicator using spectrophotometry.
2. Determination of chemical oxygen demand (COD).
3. Determination of Biological oxygen demand (BOD).

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6thEd.,* Pearson, 2009.
2. Willard, H.H. *et al.*: *Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, G.D. *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D.C.*Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age International Publisher, 2009.
6. Skoog, D.A. Holler F.J. and Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Edition.
7. Mikes, O. & Chalmes, R.A. *Laboratory Handbook of Chromatographic & AlliedMethods*, Elles Harwood Ltd. London.
8. Ditts, R.V. *Analytical Chemistry: Methods of separation.*Van Nostrand, New York, 1974.

DSE-B

DSE-B-1: INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Silicate Industries: (16 Lectures)

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses).Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

Ceramics: Important clays and feldspar, ceramic, their types and manufacture. Hightechnology ceramics and their applications, superconducting and semiconducting oxides, fullerenes carbon nanotubes and carbon fibre.

Cements: Classification of cement, ingredients and their role, Manufacture of cement and thesetting process, quick setting cements.

Fertilizers: (8 Lectures)

Different types of fertilizers. Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates; polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate.

Surface Coatings: (10 Lectures)

Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings.Paints and pigments-formulation, composition and related properties. Oil paint, Vehicle, modified oils, Pigments, toners and lakes pigments, Fillers, Thinners, Enamels, emulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Wax polishing, Water and Oil paints, additives, Metallic coatings (electrolytic and electroless), metal spraying and anodizing.

Batteries: (6 Lectures)

Primary and secondary batteries, battery components and their role, Characteristics of Battery.Working of following batteries: Pb acid, Li-Battery, Solid state electrolyte battery.Fuel cells, Solar cell and polymer cell.

Alloys: **(10 Lectures)**

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demanganization, desulphurization dephosphorisation) and surface treatment (Arand heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

Catalysis: **(6 Lectures)**

General principles and properties of catalysts, homogenous catalysis (catalytic steps and examples) and heterogenous catalysis (catalytic steps and examples) and their industrial applications, Deactivation or regeneration of catalysts.

Phase transfer catalysts, application of zeolites as catalysts.

Chemical explosives: **(4 Lectures)**

Origin of explosive properties in organic compounds, preparation and explosive properties of lead azide, PETN, cyclonite (RDX).Introduction to rocket propellants.

Reference Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics*, Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
5. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
6. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas Publications, New Delhi.
7. Sharma, B.K. & Gaur, H. *Industrial Chemistry*, Goel Publishing House, Meerut (1996).

PRACTICALS-DSE B-1: INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

(45 Lectures)

1. Determination of free acidity in ammonium sulphate fertilizer.
2. Estimation of Calcium in Calcium ammonium nitrate fertilizer.
3. Estimation of phosphoric acid in superphosphate fertilizer.
4. Electroless metallic coatings on ceramic and plastic material.
5. Determination of composition of dolomite (by complexometric titration).
6. Analysis of (Cu, Ni); (Cu, Zn) in alloy or synthetic samples.
7. Analysis of Cement.

8. Preparation of pigment (zinc oxide).

Reference Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics*, Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
5. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
6. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas
7. Publications, New Delhi.
8. Sharma, B.K. & Gaur, H. *Industrial Chemistry*, Goel Publishing House, Meerut (1996).

DSE B-2: NOVEL INORGANIC SOLIDS

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Synthesis and modification of inorganic solids: (10 Lectures)

Conventional heat and beat methods, Co-precipitation method, Sol-gel methods,Hydrothermal method, Ion-exchange and Intercalation methods.

Inorganic solids of technological importance: (10 Lectures)

Solid electrolytes – Cationic, anionic, mixed Inorganic pigments – coloured solids, white and
black pigments.
Molecular material and fullerides, molecular materials & chemistry – one-dimensionalmetals, molecular magnets, inorganic liquid crystals.

Nanomaterials: (10 Lectures)

Overview of nanostructures and nanomaterials: classification.
Preparation of gold and silver metallic nanoparticles, self-assembled nanostructures-control
of nanoarchitecture-one dimensional control. Carbon nanotubes and inorganic nanowires.Bio-inorganic nanomaterials, DNA and nanomaterials, natural and antisical nanomaterials,
bionano composites.

Introduction to engineering materials for mechanical construction: (10 Lectures)

Composition, mechanical and fabricating characteristics and applications of various types of
cast irons, plain carbon and alloy steels, copper, aluminum and their alloys like duralumin,
brasses and bronzes cutting tool materials, super alloys thermoplastics, thermosets andcomposite materials.

Composite materials(10 Lectures)

Introduction, limitations of conventional engineering materials, role of matrix in composites,classification, matrix materials, reinforcements, metal-matrix composites, polymer-matrixcomposites, fibre-reinforced composites, environmental effects on composites, applicationsof composites.

Speciality polymers: (10 Lectures)

Conducting polymers - Introduction, conduction mechanism, polyacetylene,
polyparaphenylene and polypyrole, applications of conducting polymers, Ion-exchange resins
and their applications. Ceramic & Refractory: Introduction, classification, properties, raw
materials, manufacturing and applications.

Reference Books:

• Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)
• Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.
• Frank J. Ovens, Introduction to Nanotechnology

PRACTICAL – DSEB-2: NOVEL INORGANIC SOLIDS

(45 Lectures)

1. Determination of cation exchange method
2. Determination of total difference of solids.
3. Synthesis of hydrogel by co-precipitation method.
4. Synthesis of silver and gold metal nanoparticle

Reference Book

• Fahan, *Materials Chemistry*, Springer (2004).

DSE-B-3: POLYMER CHEMISTRY

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Introduction and history of polymeric materials: (04 Lectures)

Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers, Texture of Polymers.

Functionality and its importance: (08 Lectures)
Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization.Bi-functional systems, Poly-functional systems.

Kinetics of Polymerization: (08 Lectures)

Mechanism and kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic) and coordination polymerizations, Mechanism and kinetics of copolymerization, polymerization techniques.

Crystallization and crystallinity: (04 Lectures)

Determination of crystalline melting point and degree of crystallinity, Morphology of crystalline polymers, Factors affecting crystalline melting point.

Nature and structure of polymers: **(04 Lectures)**

Structure Property relationships.

Determination of molecular weight of polymers: (08 Lectures)
(*Mn*,*Mw*, etc) by end group analysis,viscometry, light scattering and osmotic pressure methods. Molecular weight distribution and its significance.Polydispersity index.

Glass transition temperature (Tg) and determination of Tg: **(08 Lectures)**
Free volume theory, WLFequation, Factors affecting glass transition temperature (Tg).

Polymer Solution: (08 Lectures)
Criteria for polymer solubility, Solubility parameter, Thermodynamicsof polymer solutions, entropy, enthalpy, and free energy change of mixing of polymers solutions, Flory- Huggins theory, Lower and Upper critical solution temperatures.

Properties of Polymer: **(08 Lectures)**
(Physical, thermal, Flow & Mechanical Properties).

Brief introduction to preparation, structure, properties and application of the following

polymers: polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride) and related polymers, poly(vinyl acetate) and related polymers, acrylic polymers, fluoro polymers,
polyamides and related polymers. Phenol formaldehyde resins (Bakelite, Novalac), polyurethanes, silicone polymers, polydienes,

Polycarbonates, Conducting Polymers, [polyacetylene, polyaniline, poly(p-phenylene sulphide polypyrrole, polythiophene)].

Reference Books

1. R.B. Seymour & C.E. Carraher: *Polymer Chemistry: An Introduction,* Marcel Dekker, Inc. New York, 1981.
2. G. Odian: *Principles of Polymerization*, 4th Ed. Wiley, 2004.
3. F.W. Billmeyer: *Textbook of Polymer Science*, 2nd Ed. Wiley Interscience, 1971.
4. P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.
5. R.W. Lenz: *Organic Chemistry of Synthetic High Polymers.* Interscience Publishers, New York, 1967.

PRACTICALS – DSE- B-3: POLYMER CHEMISTRY

(45 Lectures)

Polymer synthesis

1. Free radical solution polymerization of styrene (St) / Methyl Methacrylate (MMA) / Methyl Acrylate (MA) / Acrylic acid (AA).
   a) Purification of monomer
   b) Polymerization using benzoyl peroxide (BPO) / 2,2'-azo-bis-isobutylonitrile (AIBN)
2. Preparation of nylon 66/6
3. Interfacial polymerization, preparation of polyester from isophthaloyl chloride (IPC) and phenolphthalein
4. Redox polymerization of acrylamide
5. Precipitation polymerization of acrylonitrile
6. Preparation of urea-formaldehyde resin
7. Preparations of novalac resin/ resold resin.
8. Microscale Emulsion Polymerization of Poly(methylacrylate).

Polymer characterization

1. Determination of molecular weight by viscometry:
   (a) Polyacrylamide-aq.$NaNO_2$ solution
   (b) (Poly vinyl proplylidine (PVP) in water
2. Determination of the viscosity-average molecular weight of poly(vinyl alcohol) (PVOH) and the fraction of "head-to-head" monomer linkages in the polymer.
3. Determination of molecular weight by end group analysis: Polyethylene glycol (PEG) (OH group).
4. Testing of mechanical properties of polymers.
5. Determination of hydroxyl number of a polymer using colorimetric method.

Polymer analysis

1. Estimation of the amount of HCHO in the given solution by sodium sulphite method
2. Instrumental Techniques
3. IR studies of polymers
4. DSC analysis of polymers
5. Preparation of polyacrylamide and its electrophoresis

*at least 7 experiments to be carried out.

Reference Books

1. M.P. Stevens, *Polymer Chemistry: An Introduction*, 3rd Ed., OxfordUniversity Press, 1999.
2. H.R. Allcock, F.W. Lampe & J.E. Mark, *Contemporary Polymer Chemistry*, 3rd ed. Prentice-Hall (2003)
3. F.W. Billmeyer, *Textbook of Polymer Science*, 3rd ed. Wiley-Interscience (1984)
4. J.R. Fried, *Polymer Science and Technology*, 2nd ed. Prentice-Hall (2003)
5. P. Munk & T.M. Aminabhavi, *Introduction to Macromolecular Science*, 2nd ed. John Wiley & Sons (2002)
6. L. H. Sperling, *Introduction to Physical Polymer Science*, 4th ed. John Wiley & Sons (2005)
7. M.P. Stevens, *Polymer Chemistry: An Introduction* 3rd ed. OxfordUniversity Press (2005).
8. Seymour/ Carraher's Polymer Chemistry, 9th ed. by Charles E. Carraher, Jr. (2013).

DSE B-4 : Dissertation

(Credits: 06)

In a total of 105 lecture hours, a student has to carry out research /review on a topic as assigned by the respective college. A project report and digital presentation will be required for the assessment of the student at the end of the semester.

SKILL ENHANCEMENT COURSES

SEC-A [SEMESTER 3]

SEC 1 – Mathematics and Statistics for Chemists

(Credits: 2 Lectures: 30)

1.Functions, limits, derivative, physical significance, basic rules of differentiation, maxima and minima, applications in chemistry,Error function, Gamma function, exact and inexact differential, Taylor and McLaurin series, Fourier series and Fourier Transform, Laplace transform, partial differentiation, rules of integration, definite and indefinite integrals. **(08 Lectures)**

2.**Differential equations**: Separation of variables, homogeneous, exact, linearequations, equations of second order, series solution method.

(04 Lectures)

3**. Probability**:Permutations, combinations and theory of probability**(03 Lectures)**

4.**Vectors, matrices and determinants:** Vectors, dot, cross and triple products, introduction to matrix algebra, addition and multiplication of matrices, inverse, adjoint and transpose of matrices, unit and diagonal matrices.

(04 Lectures)

5. **Qualitative and quantitative aspects of analysis:**
Sampling, evaluation of analytical data, errors, accuracy and precision, methods of their expression, normal law of distribution if indeterminate errors, statistical test of data; F, Q and t test, rejection of data, and confidence intervals. **(03 Lectures)**

6. **Analysis and Presentation of Data***:* Descriptive statistics. Choosing and using statistical tests.Chemometrics. Analysis of variance (ANOVA), Correlation and regression, fitting of linear equations, simple linear cases, weighted linear case, analysis

of residuals, general polynomial fitting, linearizing transformations, exponential function fit. Basic aspects of multiple linear regression analysis. **(08 Lectures)**

Reference Books

1.The Chemical Maths Book, E. Steiner, Oxford University Press (1996).
2. Hibbert, D. B. & Gooding, J. J. (2006) *Data analysis for chemistry*.
OxfordUniversity Press.
3. Higher Engineering Mathematics, Grewal B.S., Khanna Publishers, 43rd Edition.
4. Advanced Engineering Mathematics, Kreyszig Erwin, Wiley, 10th Edition

SEC 2 – ANALYTICAL CLINICAL BIOCHEMISTRY

(Credits: 2 Lectures:30)

Carbohydrates: Biological importance of carbohydrates, Metabolism, Cellular currency of energy (ATP), Glycolysis, Alcoholic and Lactic acid fermentations, Krebs cycle.
Isolation and characterization of polysachharides.
Proteins: Classification, biological importance; Primary and secondary and tertiary structures of proteins: α-helix and β- pleated sheets, Isolation, characterization, denaturation of proteins.
Enzymes: Nomenclature, Characteristics (mention of Ribozymes), and Classification; Active site, Mechanism of enzyme action, Stereospecificity of enzymes, Coenzymes and cofactors, Enzyme inhibitors, Introduction to Biocatalysis: Importance in "Green Chemistry" and Chemical Industry.
Lipids: Classification. Biological importance of triglycerides and phosphoglycerides and cholesterol; Lipid membrane, Liposomes and their biological functions and underlying applications.
Lipoproteins: Properties, functions and biochemical functions of steroid hormones. Biochemistry of peptide hormones.
Structure of DNA (Watson-Crick model) and RNA, Genetic Code, Biological roles of DNA and RNA: Replication, Transcription and Translation, Introduction to Gene therapy.
Biochemistry of disease: A diagnostic approach by blood/ urine analysis.
Blood: Composition and functions of blood, blood coagulation. Blood collection and preservation of samples.Anaemia, Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin.
Urine: Collection and preservation of samples. Formation of urine.Composition and estimation of constituents of normal and pathological urine.

Hands On Practical
Identification and estimation of the following:
1. Carbohydrates – qualitative and quantitative.
2. Lipids – qualitative.
3. Determination of the iodine number of oil.
4. Determination of the saponification number of oil.
5. Determination of cholesterol using Liebermann- Burchard reaction.

6. Proteins – qualitative.
7. Isolation of protein.
8. Determination of protein by the Biuret reaction.
9. Determination of nucleic acids

Reference Books

1. Cooper, T.G. Tool of Biochemistry. Wiley-Blackwell (1977).
2. Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).
3. Varley, H., Gowenlock, A.H & Bell, M.: Practical Clinical Biochemistry, Heinemann, London (1980).
4. Devlin, T.M., Textbook of Biochemistry with Clinical Correlations, John Wiley & Sons, 2010.
5. Berg, J.M., Tymoczko, J.L. & Stryer, L. Biochemistry, W.H. Freeman, 2002.
6. Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.
7. Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.
8. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods, D. Van Nostrand & Co., 1961.

SEC-B [SEMESTER 4]

SEC 3 – PHARMACEUTICALS CHEMISTRY

(Credits: 2 Lectures: 30)

Drugs & Pharmaceuticals

Drug discovery, design and development; Basic Retrosynthetic approach. Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents (Aspirin, paracetamol, lbuprofen); antibiotics (Chloramphenicol); antibacterial and antifungal agents (Sulphonamides; Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir), Central Nervous System agents (Phenobarbital, Diazepam),Cardiovascular (Glyceryl trinitrate), antilaprosy (Dapsone), HIV-AIDS related drugs (AZT- Zidovudine).

Fermentation

Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.

Hands On Practical

1. Preparation of Aspirin and its analysis.
2. Preparation of magnesium bisilicate (Antacid).

Reference Books

1. Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.
2. Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.
3. Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi.

SEC-4 PESTICIDE CHEMISTRY

(Credits: 02, 30 Lectures)

General introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides, structure activity relationship, synthesis and technical manufacture and uses of representative pesticides in the following classes:Organochlorines(DDT, Gammexene,); Organophosphates (Malathion, Parathion); Carbamates (Carbofuranand carbaryl); Quinones (Chloranil), Anilides (Alachlor and Butachlor).

Hands on Practicals

1 To calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications.

2 Preparation of simple organophosphates, phosphonates and thiophosphates

Reference Book:

• R. Cremlyn: *Pesticides*, John Wiley.

GENERAL ELECTIVE COURSE IN CHEMISTRY

Course Structure (B.Sc. General)

Course Credits

	Theory+ Practical
Core Course (CC)	
Theory (12 Papers of 4 credits each)	12×4=48
Practical (12 Papers of 2 credits each)	12×2=24
Discipline Specific Elective Course*(DSE)	
Theory (6 Papers of 4 credits each)	6×4=24
Practical(6 Papers of 2 credits each)	6×2=12
Ability Enhancement Compulsory Course (AECC)	
(2 Papers of 2 credits)	2×2=4
Environmental Science	
English/MIL Communication	
Skill Enhancement Elective Course (SEC)	
(4 Papers of 2 credits)	4×2=8
Total credit	**120**

B.SC. (GENERAL) CHEMISTRY [CEM-G]

CORE /GENERIC COURSES

SEM	COURSE CODE [CEM-G]	PAPER
1	CC1/GE1	PAPER 1
2	CC2/GE2	PAPER 2
3	CC3/GE3	PAPER 3
4	CC4/GE4	PAPER 4

DISCIPLINE SPECIFIC ELECTIVE [DSE] COURSES

DSE- A

DSEA-1 : Novel Inorganic Solids
DSEA-2: Inorganic Materials of Industrial Importance

DSE-B

DSEB-1 : Green Chemistry and Chemistry of Natural Products
DSEB-2: Analytical Methods in Chemistry

SKILL ENHANCEMENT COURSES [SEC]

SEC(A): (Any one either in semester III or V)
SEC1 : Basic Analytical Chemistry
SEC2– Analytical Clinical Biochemistry

SEC(B) (Any one either in semester IV or VI)

SEC 3 – PHARMACEUTICALS CHEMISTRY
SEC 4 - PESTICIDE CHEMISTRY

CC1/ GE 1:

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Kinetic Theory of Gases and Real gases

Concept of pressure and temperature; Collision of gas molecules; Collision number and mean free path. Nature of distribution of velocities, Maxwell's distribution of speed and kinetic energy; Average velocity, root mean square velocity and most probable velocity; Principle of equipartition of energy Deviation of real gases from ideal behavior; compressibility factor; Boyle temperature; Andrew's and Amagat's plots; van der Waals equation and its features; Existence of critical state, Critical constants in terms of van der Waals constants; Law of corresponding states.

Liquids

Definition of Surface tension, its dimension and principle of its determination using stalagmometer; Viscosity of a liquid and principle of determination of coefficient of viscosity using Ostwald viscometer; Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only)

Chemical Kinetics

Introduction of rate law, Order and molecularity; Extent of reaction; rate constants; Rates of First, second and nth order reactions and their Differential and integrated forms (with derivation); Pseudo first order reactions; Determination of order of a reaction by halfhalf-life and differential method. Temperature dependence of rate constant; Arrhenius equation, energy of activation;

Atomic Structure

Bohr's theory for hydrogen atom (simple mathematical treatment), atomic spectra of hydrogen and Bohr's model, Sommerfeld's model, quantum numbers and their significance, Pauli's exclusion principle, Hund's rule, electronic configuration of many-electron atoms, *Aufbau* principle and its limitations.

Chemical Periodicity

Classification of elements on the basis of electronic configuration: general characteristics of s-, p-, d- and f-block elements. Positions of hydrogen and noble gases. Atomic and ionic radii, ionization potential, electron affinity, and electronegativity; periodic and group-wise variation of above properties in respect of s- and p- block elements.

Acids and bases

Brönsted–Lowry concept, conjugate acids and bases, relative strengths of acids and bases, effects of substituent and solvent, differentiating and leveling solvents. Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept and solvent system concept. Hard and soft acids and bases (HSAB concept), applications of HSAB process.

Fundamentalsof Organic Chemistry

Electronic displacements: inductive effect, resonance and hyperconjugation; nucleophiles and electrophiles; reactive intermediates: carbocations, carbanions and free radicals.

Stereochemistry

Different types of isomerism; geometrical and optical isomerism; concept of chirality and optical activity (upto two carbon atoms); asymmetric carbon atom; interconversion of Fischer and Newman representations; enantiomerism and diastereomerism, *meso* compounds; *threo* and

erythro, D and L, *cis* and *trans* nomenclature; CIP Rules: *R/S* (only one chiral carbon atoms) and *E/Z* nomenclature.

Nucleophilic Substitution and Elimination Reactions
Nucleophilic substitutions: S_N1 and S_N2 reactions; eliminations: E1 and E2 reactions (elementary mechanistic aspects); Saytzeff and Hofmann eliminations.

CC1/GE 1 Practical: 45 Lectures

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.

2. Estimation of oxalic acid by titrating it with $KMnO_4$.

3. Estimation of water of crystallization in Mohr's salt by titrating with $KMnO_4$.

4. Estimation of Fe (II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator.

5. Estimation of Cu (II) ions iodometrically using $Na_2S_2O_3$.

6.Estimation of Fe(II) and Fe(III) in a given mixture using $K_2Cr_2O_7$ solution.

CC2/GE 2:

(Credits: Theory-04, Practicals-02)
Theory: 60 Lectures

Chemical Thermodynamics:
Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics; Concept of heat, work, internal energy and statement of first law; enthalpy, H; relation between heat capacities, calculations of q, w, ΔU and ΔH for reversible, irreversible and free expansion of gases.
Standard states; Heats of reaction; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; Laws of thermochemistry, Kirchhoff's equations. Statement of the second law of thermodynamics; Concept of heat reservoirs and heat engines; Carnot cycle; Physical concept of Entropy; Entropy change of systems and surroundings for various processes and transformations; Auxiliary state functions (G and A) and Criteria for spontaneity and equilibrium.

Chemical Equilibrium:
Thermodynamic conditions for equilibrium, degree of advancement; Variation of free energy with degree of advancement; Equilibrium constant and standard Gibbs free energy change; Definitions of K_P, K_C and K_X and relation among them; van't Hoff's reaction isotherm, isobar and isochore from different standard states; Shifting of equilibrium due to change in external parameters e.g. temperature and pressure; variation of equilibrium constant with addition to inert gas; Le Chatelier's principle

Solutions
Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions; Vapour pressure-composition and temperature-composition curves of ideal and non-ideal solutions; Distillation of solutions; Lever rule; Azeotropes
Nernst distribution law and its applications, solvent extraction

Phase Equilibria
Phases, components and degrees of freedom of a system, criteria of phase equilibrium; Gibbs Phase Rule; Derivation of Clausius – Clapeyron equation and its importance in phase equilibria; Phase diagrams of one-component systems (water and CO_2)

Solids
Forms of solids, crystal systems, unit cells, Bravais lattice types, Symmetry elements; Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices; Miller indices of different planes and interplanar distance, Bragg's law;

Aliphatic Hydrocarbons
Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structures.
Alkanes: (up to 5 Carbons). *Preparation:* catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis.
Alkenes: (up to 5 Carbons). *Preparation:* elimination reactions: dehydration of alcohols and dehydrohalogenation of alkyl halides; *cis* alkenes (partial catalytic hydrogenation) and *trans* alkenes (Birch reduction). *Reactions:* addition of bromine, addition of HX [Markownikoff's (with mechanism) and anti-Markownikoff's addition], hydration, ozonolysis.
Alkynes: (up to 5 Carbons). *Preparation:* acetylene from CaC_2; by dehalogenation of tetra halides and dehydrohalogenation of vicinal dihalides.

Reactions: formation of metal acetylides, hydration reaction.

Error Analysis and Computer Applications
*Error analysis***:** accuracy and precision of quantitative analysis, determinate, indeterminate, systematic and random errors; methods of least squares and standard deviations.
Computer applications: general introduction to computers, different components of a computer; hardware and software; input and output devices; binary numbers and arithmetic; Introduction to computer languages.

Redox reactions
Ion-electron method of balancing equation of redox reaction. Elementary idea on standard redox potentials with sign conventions, Nernst equation (without derivation). Influence of complex formation, precipitation and change of pH on redox potentials; formal potential. Feasibility of a redox titration, redox potential at the equivalence point, redox indicators

CC2/GE 2 Practical: 45 Lectures

Experiment 1: Study of kinetics of acid-catalyzed hydrolysis of methyl acetate

Experiment 2: Study of kinetics of decomposition of H_2O_2 (Clock Reaction)

Experiment 3: Study of viscosity of unknown liquid (glycerol, sugar) with respect to water.

Experiment 4: Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)

Experiment 5:Preparation of buffer solutions and find the pH of an unknown buffer solution by colour matching method

Experiment 6: Determination of surface tension of a liquid using Stalagmometer

CC3/GE 3:

(Credits: Theory-04, Practicals-02)
Theory: 60 Lectures

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Chemical Bonding and Molecular Structure
Ionic Bonding: General characteristics of ionic bonding. Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.

Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements.
Concept of resonance and resonating structures in various inorganic and organic compounds.

MO Approach: Rules for the LCAO method, bonding and antibonding MOs and their characteristics for *s-s*, *s-p* and *p-p* combinations of atomic orbitals, nonbonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods. (including idea of *s- p* mixing) and heteronuclear diatomic molecules such as CO, NO and NO^+. Comparison of VB and MO approaches.

Comparative study of p-block elements:
Group trends in electronic configuration, modification of pure elements, common oxidation states, inert pair effect, and their important compounds in respect of the following groups of elements:
i) B-Al-Ga-In-Tl
ii) C-Si-Ge-Sn-Pb
iii) N-P-As-Sb-Bi
iv) O-S-Se-Te
v) F-Cl-Br-I

Transition Elements (3*d* series)
General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, Fe and Cu.
Lanthanoids and actinoids: Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides (ion exchange method only).

Coordination Chemistry
Werner's coordination theory, Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6). Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Drawbacks of VBT. IUPAC system of nomenclature

ELECTROCHEMISTRY

1) Ionic Equilibria
Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water; Ionization of weak acids and bases, pH scale, common ion effect; Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts; Buffer solutions; Solubility and solubility product of sparingly soluble salts – applications of solubility product principle

2) Conductance
Conductance, cell constant, specific conductance and molar conductance; Variation of specific and equivalent conductance with dilution for strong and weak electrolytes; Kohlrausch's law of independent migration of ions; Equivalent and molar conductance at infinite dilution and their determination for strong and weak electrolytes; Ostwald's dilution
law; Application of conductance measurement (determination of solubility product and ionic product of water); Conductometric titrations (acid-base)
Transport Number and principles Moving-boundary method

3) Electromotive force
Faraday's laws of electrolysis, rules of oxidation/reduction of ions based on half-cell potentials, applications of electrolysis in metallurgy and industry; Chemical cells, reversible and irreversible cells with examples; Electromotive force of a cell and its measurement, Nernst equation; Standard electrode (reduction) potential; Electrochemical series;

Concentration cells with and without transference, liquid junction potential; pH determinationusing hydrogen electrode and quinhydrone; Qualitative discussion of potentiometric titrations (acid-base, redox, precipitation)

Aromatic Hydrocarbons
Benzene: Preparation: from phenol, by decarboxylation, from acetylene. *Reactions*: electrophilic substitution reaction (general mechanism); nitration (with mechanism), halogenations (chlorination and bromination), and Friedel-Crafts reaction (alkylation and acylation) (up to 4 carbons on benzene).

Organometallic Compounds
Introduction; *Grignard reagents*: *Preparations* (from alkyl and aryl halide); Reformatsky reaction.

Aryl Halides
Preparation: (chloro- and bromobenzene): from phenol, Sandmeyer reactionand effect of nitro substituent (activated nucleophilic substitution

CC3/GE 3 Practical: 45 Lectures

Qualitative semimicro analysis of mixtures containing two radicals. Emphasis should be given to the understanding of the chemistry of different reactions.

Cation Radicals: Na^{+},K^{+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Al^{3+}, Cr^{3+}, Mn^{2+}/Mn^{4+}, Fe^{3+}, Co^{2+}/Co^{3+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, Sn^{2+}/Sn^{4+}, NH_4^{+}.
Anion Radicals: F^{-}, Cl^{-}, Br^{-}, BrO_3^{-}, I^{-}, IO_3^{-}, SCN^{-}, S^{2-}, SO_4^{2-}, NO_3^{-}, NO_2^{-}, PO_4^{3-}, AsO_4^{3--}, BO_3^{3-}, CrO_4^{2-} / $Cr_2O_7^{2}$

CC4/GE 4:
(Credits: Theory-04, Practicals-02)
Theory: 60 Lectures

Alcohols, Phenols and Ethers
Alcohols: (up to 5 Carbons).
Preparation: 1°-, 2°- and 3°- alcohols: using Grignard reagent, reduction of aldehydes, ketones, carboxylic acid and esters; *Reactions:* With sodium, oxidation (alkaline $KMnO_4$, acidic dichromate).
Diols: Pinacol- pinacolone rearrangement (with mechanism) (*with symmetrical diols* only).
Phenols: Preparation: cumene hydroperoxide method, from diazonium salts; acidic nature of phenols; *Reactions:* electrophilic substitution: nitration and halogenations; Reimer -Tiemann reaction, Schotten –Baumann reaction, Fries rearrangementand Claisen rearrangement.
Ethers: Preparation: Williamson's ether synthesis; *Reaction*: cleavage of ethers with HI.

Carbonyl Compounds
Aldehydes and Ketones (aliphatic and aromatic): (Formaldehye, acetaldehyde, acetone and benzaldehyde): *Preparation:* from acid chlorides, from nitriles and from Grignard reagents; general properties of aldehydes and ketones; *Reactions:* with HCN, $NaHSO_3$, NH_2-G derivatives and with Tollens' and Fehling's reagents; iodoform test; aldol condensation (with mechanism);

Cannizzaro reaction (with mechanism), Wittig reaction, benzoin condensation; Clemmensen reduction, Wolff- Kishner reduction

Carboxylic Acids and Their Derivatives

Carboxylic acids (aliphatic and aromatic): strength of organic acids: comparative study with emphasis on factors affecting pK values; *Preparation:* acidic and alkaline hydrolysis of esters ($B_{Ac}2$ and $A_{AC}2$ mechanisms only) and from Grignard reagents.

*Carboxylic acid derivatives (*aliphatic*):* (up to 5 carbons). *Preparation:* acid chlorides, anhydrides, esters and amides from acids; *Reactions:* Interconversion among acid derivatives. *Reactions:*Claisen condensation; Perkin reaction.

Amines and Diazonium Salts

Amines (aliphatic and aromatic): strength of organic bases; *Preparation*: from alkyl halides, Hofmann degradation;

Reactions: with HNO_2 (distinction of 1°-, 2°- and 3°- amines), Schotten – Baumann reaction , Diazo coupling reaction (with mechanism).

Diazonium salts: Preparation: from aromatic amines; *Reactions:* conversion to benzene, phenol, benzoic acid and nitrobenzene.

Nitro compounds (aromatic): reduction under different conditions (acidic, neutral and alkaline).

Amino Acids and Carbohydrates

Amino Acids: Preparations (glycine and alanine only)*:* Strecker synthesis, Gabriel's phthalimide synthesis; general properties; zwitterion, isoelectric point.

Carbohydrates: classificationand general properties; glucose and fructose: constitution; osazone formation; oxidation-reduction reactions; ascending (Kiliani –Fischer method) and descending (Ruff's method) in monosaccharides (aldoses only); mutarotation

Crystal Field Theory

Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of D. Spectrochemical series. Comparison of CFSE for O_h and T_d complexes, Tetragonal distortion of octahedral geometry.

Jahn-Teller distortion, Square planar coordination

Quantum Chemistry & Spectroscopy

Spectroscopy and its importance in chemistry. Wave-particle duality. Link between spectroscopy and quantum chemistry. Electromagnetic radiation and its interaction with matter. Types of spectroscopy. Difference between atomic and molecular spectra

Postulates of quantum mechanics, quantum mechanical operators.

Free particle. Particle in a 1-D box (complete solution), quantization, normalization of wave functions, concept of zero-point energy.

Rotational Motion: Schrödinger equation of a rigid rotator and brief discussion of its results (solution not required). Quantization of rotational energy levels.

Microwave (pure rotational) spectra of diatomic molecules. Selection rules. Structural information derived from rotational spectroscopy.

Vibrational Motion: Schrödinger equation of a linear harmonic oscillator and brief discussion of its results (solution not required). Quantization of vibrational energy levels. Selection rules, IR spectra of diatomic molecules.

CC4/GE 4 Practical: 45 Lectures

1.Qualitative Analysis of Single Solid Organic Compound(s)

Experiment A: Detection of special elements (N, Cl, and S) in organic compounds.
Experiment B: Solubility and Classification (solvents: H_2O, dil. HCl, dil. NaOH)
Experiment C: Detection of functional groups: Aromatic-NO_2, Aromatic -NH_2, -COOH, carbonyl (no distinction of –CHO and >C=O needed), -OH (phenolic) in solid organic compounds.
Experiments A - C with unknown (at least 6) solid samples containing not more than two of the above type of functional groups should be done.

2.Identification of a pure organic compound

Solid compounds: oxalic acid, tartaric acid, succinic acid, resorcinol, urea, glucose, benzoic acid and salicylic acid.
Liquid Compounds:methyl alcohol, ethyl alcohol, acetone, aniline, dimethylaniline, benzaldehyde, chloroform and nitrobenzene

Reference Books

1. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry* Cengage Learning India Pvt. Ltd., New Delhi (2009).
2. Mahan, B.H. *University Chemistry* 3rd Ed. Narosa (1998). 3. Petrucci, R.H. *General Chemistry* 5th Ed. Macmillan Publishing Co.: New York (1985).
4. Chugh, K.L., Agnish, S.L. *A Text Book of Physical Chemistry* Kalyani Publishers
5. N. G. Mukherjee *Quantum Chemistry, molecular Spectroscopy and Photochemistry*.Archana Publishing Center,(2010*).*
6. Bahl, B.S., Bahl, A., Tuli, G.D., *Essentials of Physical Chemistry* S. Chand & Co. ltd.
7. Palit, S. R., *Elementary Physical Chemistry* Book Syndicate Pvt. Ltd.
8. N. G. Mukherjee, *Elementary Physical Chemistry* Archana Publishing Center,(2014*).*
9. Mandal, A. K. *Degree Physical and General Chemistry* Sarat Book House
10. Pahari, S., *Physical Chemistry* New Central Book Agency
11. Palit, S.R., *Practical Physical Chemistry* Science Book Agency
12. Mukherjee, N.G., *Selected Experiments in Physical Chemistry* J. N. Ghose & Sons
13. Dutta, S.K., *Physical Chemistry Experiments* Bharati Book Stall
14.*Practical Workbook Chemistry (Honours), UGBS, Chemistry*, University of Calcutta, 2015
15. Banerjee, S. P. *A Text Book of Analytical Chemistry*, The New Book Stall.
16. Gangopadhyay, P. K. *Application Oriented Chemistry*, Book Syndicate.
17. Mondal, A. K & Mondal, S. *Degree Applied Chemistry*, Sreedhar Publications
18. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry,* R. Chand & Co.: New Delhi (2011).
19. Ghosal, Mahapatra & Nad, *An Advanced Course in Practical Chemistry,* New Central
20. Sethi, A. *Conceptual Organic Chemistry;* New Age International Publisher.
21. Parmar, V. S. *A Text Book of Organic Chemistry*, S. Chand & Sons.
22. Madan, R. L. *Organic Chemistry*, S. Chand & Sons.
23. Wade, L. G., Singh, M. S., *Organic Chemistry, Pearson.*

24. Finar, I. L. *Organic Chemistry* (*Volume 1*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
25. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
26. Bahl, A. & Bahl, B.S. *Advanced Organic Chemistry*, S. Chand, 2010.
27. Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
28. Shriver, D.F. & Atkins, P.W. *Inorganic Chemistry*, Oxford University Press.
29. Wulfsberg, G. *Inorganic Chemistry*, Viva Books Pvt. Ltd.
30. Rodgers, G.E. *Inorganic & Solid State Chemistry*, Cengage Learning India Ltd., 2008.

DSE (A)

Any one from the following

DSE A-1: NOVEL INORGANIC SOLIDS

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Synthesis and modification of inorganic solids: (10 Lectures)

Conventional heat and beat methods, Co-precipitation method, Sol-gel methods, Hydrothermal method, Ion-exchange and Intercalation methods.

Inorganic solids of technological importance: (10 Lectures)

Solid electrolytes – Cationic, anionic, mixed Inorganic pigments – coloured solids, white and black pigments.
Molecular material and fullerides, molecular materials & chemistry – one-dimensionalmetals, molecular magnets, inorganic liquid crystals.

Nanomaterials: (10 Lectures)

Overview of nanostructures and nanomaterials: classification.
Preparation of gold and silver metallic nanoparticles, self-assembled nanostructures-control of nanoarchitecture-one dimensional control. Carbon nanotubes and inorganic nanowires.Bio-inorganic nanomaterials, DNA and nanomaterials, natural and antisical nanomaterials, bionano composites.

Introduction to engineering materials for mechanical construction: (10 Lectures)

Composition, mechanical and fabricating characteristics and applications of various types of cast irons, plain carbon and alloy steels, copper, aluminum and their alloys like duralumin, brasses and bronzes cutting tool materials, super alloys thermoplastics, thermosets andcomposite materials.

Composite materials (10 Lectures)

Introduction, limitations of conventional engineering materials, role of matrix in composites,classification, matrix materials, reinforcements, metal-matrix composites, polymer-matrixcomposites, fibre-reinforced composites, environmental effects on composites, applicationsof composites.

Speciality polymers: (10 Lectures)

Conducting polymers - Introduction, conduction mechanism, polyacetylene, polyparaphenylene and polypyrole, applications of conducting polymers, Ion-exchange resins and their applications. Ceramic & Refractory: Introduction, classification, properties, raw

materials, manufacturing and applications.

Reference Books:

• Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)
• Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.
• Frank J. Ovens, Introduction to Nanotechnology

PRACTICAL – DSEA-1 : NOVEL INORGANIC SOLIDS

(45 Lectures)

1. Determination of cation exchange method
2. Determination of total difference of solids.
3. Synthesis of hydrogel by co-precipitation method.
4. Synthesis of silver and gold metal nanoparticle

Reference Book

• Fahan, *Materials Chemistry*, Springer (2004).

DSE-A-2: INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Silicate Industries: (16 Lectures)

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses).Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

Ceramics: Important clays and feldspar, ceramic, their types and manufacture. Hightechnology ceramics and their applications, superconducting and semiconducting oxides, fullerenes carbon nanotubes and carbon fibre.

Cements: Classification of cement, ingredients and their role, Manufacture of cement and thesetting process, quick setting cements.

Fertilizers: (8 Lectures)

Different types of fertilizers. Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates; polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate.

Surface Coatings: (10 Lectures)

Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings. Paints and pigments-formulation, composition and related properties. Oil paint, Vehicle, modified oils, Pigments, toners and lakes pigments, Fillers, Thinners, Enamels, emulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Wax polishing, Water and Oil paints, additives, Metallic coatings (electrolytic and electroless), metal spraying and anodizing.

Batteries: (6 Lectures)

Primary and secondary batteries, battery components and their role, Characteristics of Battery. Working of following batteries: Pb acid, Li-Battery, Solid state electrolyte battery. Fuel cells, Solar cell and polymer cell.

Alloys: (10 Lectures)

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demanganization, desulphurization dephosphorisation) and surface treatment (Arand heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

Catalysis: (6 Lectures)

General principles and properties of catalysts, homogenous catalysis (catalytic steps and examples) and heterogenous catalysis (catalytic steps and examples) and their industrial applications, Deactivation or regeneration of catalysts.

Phase transfer catalysts, application of zeolites as catalysts.

Chemical explosives: (4 Lectures)

Origin of explosive properties in organic compounds, preparation and explosive properties of lead azide, PETN, cyclonite (RDX). Introduction to rocket propellants.

Reference Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics*, Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
5. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
6. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas

Publications, New Delhi.
7. Sharma, B.K. & Gaur, H. *Industrial Chemistry,* Goel Publishing House, Meerut (1996).

PRACTICALS-DSE A2 LAB INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

(45 Lectures)

1. Determination of free acidity in ammonium sulphate fertilizer.
2. Estimation of Calcium in Calcium ammonium nitrate fertilizer.
3. Estimation of phosphoric acid in superphosphate fertilizer.
4. Electroless metallic coatings on ceramic and plastic material.
5. Determination of composition of dolomite (by complexometric titration).
6. Analysis of (Cu, Ni); (Cu, Zn) in alloy or synthetic samples.
7. Analysis of Cement.
8. Preparation of pigment (zinc oxide).

Reference Books

1. E. Stocchi: *Industrial Chemistry,* Vol-I, Ellis Horwood Ltd. UK.
2. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics,* Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
5. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
6. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry,* Vikas
7. Publications, New Delhi.
8. Sharma, B.K. & Gaur, H. *Industrial Chemistry,* Goel Publishing House, Meerut (1996).

DSE(B)

Any one from the following

DSE-B1: GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Introduction to Green Chemistry: (04 Lectures)

What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry

Principles of Green Chemistry and Designing a Chemical synthesis: (16 Lectures)

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following:

- Designing a Green Synthesis using these principles; Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products , Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.
- Prevention/ minimization of hazardous/toxic products reducingtoxicity.

- Green solvents–supercritical fluids, water as a solvent for organic reactions, ionic liquids, PEG, solventless processes.
- Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy.
- Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry.

Examples of Green Synthesis/ Reactions and some real world cases: (20lectures)

1. Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis)
2. Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents: Diels-Alder reaction and Decarboxylation reaction
3. Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine)
4. Green counterpart of common organic reactions: Aldol, Friedel-Crafts, Michael, Knoevenagel, Cannizzaro, benzoin condensation and Dieckmann condensation.
5. Rearrangement reactions by green approach: Fries rearrangement, Claisen rearrangement, Beckmann rearrangement, Baeyer-Villiger oxidation.

Future Trends in Green Chemistry: (12 Lectures)

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions. Green chemistry in sustainable development.

Alkaloids **(5 Lectures)**

Hoffmann's exhaustive methylation, Emde's modification, Structure elucidation Natural occurrence, General structural features, Isolation and their physiological action. Synthesis of Hygrine. Medicinal importance of Nicotine, Hygrine, Quinine, Morphine, Cocaine and Reserpine.

Terpenes **(3 Lectures)**

Occurrence, classification, isoprene rule; Elucidation of stucture and synthesis of Citral.

Reference Books

1. Anastas, P.T. & Warner, J.K.: *Green Chemistry - Theory and Practical*, Oxford University Press (1998).
2. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker (2001).
3. Cann, M.C. & Connely, M.E. *Real-World cases in Green Chemistry*, American Chemical Society, Washington (2000).
4. Ryan, M.A. & Tinnesand, M. *Introduction to Green Chemistry*, American Chemical Society, Washington (2002).
5. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, 2nd Edition, 2010.
6. Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.

PRACTICALS-DSE-B1 LAB GREEN CHEMISTRY

(45 Lectures)

1. Acetylation of primary amine (preparation of acetanilide).
2. [4+2] Cycloaddition reaction (Diels-Alder reaction between furan and maleic anhydride).
3. Preparation of biodiesel from vegetable/waste cooking oil.
4. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.
5. Pinacol-pinacolone rearrangement reaction (preparation of benzopinacolone).
6. Solid state synthesis of benzilic acid from benzil.
7. Benzoin condensation using thiamine hydrochloride as a catalyst instead of potassium cyanide.
8. Green multicomponent synthesis (three component coupling).
9. Base catalysed aldol condensation (synthesis of dibenzal propanone from benzaldehyde and acetone).
10. Bromination of *trans*-stilbene using bromide/bromate mixture.
11. Preparation and characterization of gold nanoparticles using tea leaves.
12. Extraction of D-limonene from orange peel using liquid carbon dioxide.
13. Electrophilic aromatic substitution reaction (nitration of salicylic acid).
14. Green radical coupling reaction.

Reference Books

1. Anastas, P.T & Warner, J.C. *Green Chemistry: Theory and Practice,* Oxford University Press (1998).
2. Kirchoff, M. & Ryan, M.A. *Greener approaches to undergraduate chemistryexperiment*. American Chemical Society, WashingtonDC (2002).
3. Ryan, M.A. *Introduction to Green Chemistry*, Tinnesand; (Ed), American Chemical Society, WashingtonDC (2002).
4. Sharma, R.K.; Sidhwani, I.T. & Chaudhari, M.K. I.K. *Green Chemistry Experiment:A monograph International Publishing House Pvt Ltd. New Delhi*. Bangalore CISBN978-93-81141-55-7 (2013).
5. Cann, M.C. & Connelly, M. E. *Real world cases in Green Chemistry*, American Chemical Society (2008).
6. Cann, M. C. & Thomas, P. *Real world cases in Green Chemistry*, American Chemical Society (2008).
7. Lancaster, M. *Green Chemistry: An Introductory Text* RSC Publishing, 2nd Edition, 2010.
8. Pavia, D.L., Lampman, G.M., Kriz, G.S. & Engel, R.G. *Introduction to OrganicLaboratory Techniques: A Microscale and Macro Scale Approach*, W.B.Saunders,1995.
9. Finar, I. L. *Organic Chemistry* (*Volume 1*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

DSE-B2: ANALYTICAL METHODS IN CHEMISTRY

(Credits: Theory-04, Practicals-02)

Theory: 60 Lectures

Optical methods of analysis: (30 Lectures)

Origin of spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law.

UV-Visible Spectrometry: Basic principles of instrumentation (choice of source,monochromator and detector) for single and double beam instrument;
Basic principles of quantitative analysis: estimation of metal ions from aqueous solution,geometrical isomers, keto-enol tautomers. Determination of composition of metal complexes using Job's method of continuous variation and mole ratio method.
Infrared Spectrometry: Basic principles of instrumentation (choice of source, monochromator& detector) for single and double beam instrument; sampling techniques.

Structural illustration through interpretation of data, Effect and importance of isotope substitution.

Flame Atomic Absorption and Emission Spectrometry: Basic principles of instrumentation(choice of source, monochromator, detector, choice of flame and Burner

designs. Techniques of atomization and sample introduction; Method of background correction, sources of chemical interferences and their method of removal. Techniques for the quantitative estimation of trace level of metal ions from water samples.

Thermal methods of analysis: (8 Lectures)

Theory of thermogravimetry (TG), basic principle of instrumentation.
Techniques for quantitative estimation of Ca and Mg from their mixture.

Electroanalytical methods: (7 Lectures)

Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence points. Techniques used for the determination of pKa values.

Separation techniques: (15 Lectures)

Solvent extraction: Classification, principle and efficiency of the technique.

Mechanism of extraction: extraction by solvation and chelation.
Technique of extraction: batch, continuous and counter current extractions.

Qualitative and quantitative aspects of solvent extraction: extraction of metal ions from aqueous solution, extraction of organic species from the aqueous and nonaqueous media.

Chromatography: Classification, principle and efficiency of the technique.
Mechanism of separation: adsorption, partition & ion exchange.
Development of chromatograms: frontal, elution and displacement methods.

Qualitative and quantitative aspects of chromatographic methods of analysis: IC, GLC, GPC, TLC and HPLC.

Stereoisomeric separation and analysis: Measurement of optical rotation, calculation of Enantiomeric excess (ee)/ diastereomeric excess (de) ratios and determination of enantiomeric composition using NMR, Chiral solvents and chiral shift reagents. Chiral chromatographic techniques using chiral columns (GC and HPLC).

Role of computers in instrumental methods of analysis.

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6thEd.*, Pearson, 2009.
2. Willard, H.H. *et al.*: *Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, G.D. *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D.C.: *Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age International Publisher, 2009.
6. Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Ed.
7. Mikes, O. *Laboratory Hand Book of Chromatographic & Allied Methods*, Elles

Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.
8. Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974.

PRACTICALS- DSE-B-2: ANALYTICAL METHODS IN CHEMISTRY

(45 Lectures)

I. Separation Techniques by:

Chromatography:

(a) Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography. Reporting the R_f values.

(b)Separate a mixture of Sudan yellow and Sudan Red by TLC technique and identify them on the basis of their R_f values.

(c) Chromatographic separation of the active ingredients of plants, flowers and juices by TLC

Solvent Extractions:

To separate a mixture of Ni^{2+}& Fe^{2+} by complexation with DMG and extracting the Ni^{2+}-DMG complex in chloroform, and determine its concentration by spectrophotometry.

II. Analysis of soil:

(i) Determination of pH of soil.
(ii) Estimation of calcium, magnesium, phosphate

III. Ion exchange:

Determination of exchange capacity of cation exchange resins and anion exchange resins.

IV. Spectrophotometry

1. Determination of pKa values of indicator using spectrophotometry.
2. Determination of chemical oxygen demand (COD).
3. Determination of Biological oxygen demand (BOD).

Reference Books

1. Mendham, J., *A. I. Vogel's Quantitative Chemical Analysis 6thEd.*, Pearson, 2009.
2. Willard, H.H. *et al.*: *Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, G.D. *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D.C.*Exploring Chemical Analysis*, 9th Ed. New York, W.H. Freeman, 2016.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry*. New Age International Publisher, 2009.
6. Skoog, D.A. Holler F.J. and Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Edition.
7. Mikes, O. & Chalmes, R.A. *Laboratory Handbook of Chromatographic & AlliedMethods*, Elles Harwood Ltd. London.
8. Ditts, R.V. *Analytical Chemistry: Methods of separation.*Van Nostrand, New York, 1974.

SKILL ENHANCEMENT COURSES (SEC)

SEC(A)

SEC1 : Basic Analytical Chemistry

(Credits 2 , 30 lectures)

Introduction: Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.

Analysis of soil: Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators

a. Determination of pH of soil samples.

b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.

Analysis of water: Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.

a. Determination of pH, acidity and alkalinity of a water sample.

b. Determination of dissolved oxygen (DO) of a water sample.

Analysis of food products: Nutritional value of foods, idea about food processing and food preservations and adulteration.

a. Identification of adulterants in some common food items like coffee powder, asafoetida, chilli powder, turmeric powder, coriander powder and pulses, etc.

b. Analysis of preservatives and colouring matter.

Chromatography: Definition, general introduction on principles of chromatography, paper chromatography, TLC etc.

a. Paper chromatographic separation of mixture of metal ion (Fe3+ and Al3+).

b. To compare paint samples by TLC method.

Ion-exchange: Column, ion-exchange chromatography etc.

Determination of ion exchange capacity of anion / cation exchange resin (using batch procedure if use of column is not feasible).

Analysis of cosmetics: Major and minor constituents and their function

a. Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate.

b. Determination of constituents of talcum powder: Magnesium oxide, Calcium oxide, Zinc oxide and Calcium carbonate by complexometric titration.

Suggested Applications (Any one):

a. To study the use of phenolphthalein in trap cases.

b. To analyze arson accelerants.

c. To carry out analysis of gasoline.

Suggested Instrumental demonstrations:

a. Estimation of macro nutrients: Potassium, Calcium, Magnesium in soil samples by flame photometry.

b. Spectrophotometric determination of Iron in Vitamin / Dietary Tablets.

c. Spectrophotometric Identification and Determination of Caffeine and Benzoic Acid in Soft Drink.

Reference Books:

1. Willard, H. H. *Instrumental Methods of Analysis*, CBS Publishers.

2. Skoog & Lerry. *Instrumental Methods of Analysis*, Saunders College Publications, New

York.
3. Skoog, D.A.; West, D.M. & Holler, F.J. *Fundamentals of Analytical Chemistry 6th Ed.*, Saunders College Publishing, Fort Worth (1992).
4. Harris, D. C. *Quantitative Chemical Analysis*, W. H. Freeman.
5. Dean, J. A. *Analytical Chemistry Notebook*, McGraw Hill.
6. Day, R. A. & Underwood, A. L. *Quantitative Analysis*, Prentice Hall of India.
7. Freifelder, D. Physical Biochemistry *2nd Ed.*, W.H. Freeman and Co., N.Y. USA (1982).
8. Cooper, T.G. *The Tools of Biochemistry*, John Wiley and Sons, N.Y. USA. 16 (1977).
9. Vogel, A. I. *Vogel's Qualitative Inorganic Analysis 7th Ed.*, Prentice Hall.
10. Vogel, A. I. Vogel's *Quantitative Chemical Analysis 6th Ed.*, Prentice Hall.
11. Robinson, J.W. *Undergraduate Instrumental Analysis 5th Ed.*, Marcel Dekker, Inc., New York

SEC2 – ANALYTICAL CLINICAL BIOCHEMISTRY

(Credits: 2 Lectures:30)

Carbohydrates: Biological importance of carbohydrates, Metabolism, Cellular currency of energy (ATP), Glycolysis, Alcoholic and Lactic acid fermentations, Krebs cycle.
Isolation and characterization of polysachharides.
Proteins: Classification, biological importance; Primary and secondary and tertiary structures of proteins: α-helix and β- pleated sheets, Isolation, characterization, denaturation of proteins.
Enzymes: Nomenclature, Characteristics (mention of Ribozymes), and Classification; Active site, Mechanism of enzyme action, Stereospecificity of enzymes, Coenzymes and cofactors, Enzyme inhibitors, Introduction to Biocatalysis: Importance in "Green Chemistry" and Chemical Industry.
Lipids: Classification. Biological importance of triglycerides and phosphoglycerides and cholesterol; Lipid membrane, Liposomes and their biological functions and underlying applications.
Lipoproteins: Properties, functions and biochemical functions of steroid hormones. Biochemistry of peptide hormones.
Structure of DNA (Watson-Crick model) and RNA, Genetic Code, Biological roles of DNA and RNA: Replication, Transcription and Translation, Introduction to Gene therapy.
Biochemistry of disease: A diagnostic approach by blood/ urine analysis.
Blood: Composition and functions of blood, blood coagulation. Blood collection and preservation of samples. Anaemia, Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin.
Urine: Collection and preservation of samples. Formation of urine. Composition and estimation of constituents of normal and pathological urine.

Reference Books

1. Cooper, T.G. Tool of Biochemistry. Wiley-Blackwell (1977).
2. Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).
3. Varley, H., Gowenlock, A.H & Bell, M.: Practical Clinical Biochemistry, Heinemann, London (1980).
4. Devlin, T.M., Textbook of Biochemistry with Clinical Correlations, John Wiley & Sons, 2010.
5. Berg, J.M., Tymoczko, J.L. & Stryer, L. Biochemistry, W.H. Freeman, 2002.
6. Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.
7. Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.

8. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods, D. Van Nostrand & Co., 1961.

SEC(B)

SEC 3 – PHARMACEUTICALS CHEMISTRY

(Credits: 2 Lectures: 30)

Drugs & Pharmaceuticals

Drug discovery, design and development; Basic Retrosynthetic approach. Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents (Aspirin, paracetamol, lbuprofen); antibiotics (Chloramphenicol); antibacterial and antifungal agents (Sulphonamides; Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir), Central Nervous System agents (Phenobarbital, Diazepam),Cardiovascular (Glyceryl trinitrate), antilaprosy (Dapsone), HIV-AIDS related drugs (AZT- Zidovudine).

Fermentation

Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.

Reference Books

1. Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.
2. Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.
3. Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi.

SEC 4 - PESTICIDE CHEMISTRY

(Credits: 02)

30 Lectures

General introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides, structure activity relationship, synthesis and technical manufacture and uses of representative pesticides in the following classes: Organochlorines (DDT, Gammexene,); Organophosphates (Malathion, Parathion); Carbamates (Carbofuran and carbaryl); Quinones (Chloranil), Anilides (Alachlor and Butachlor).

Reference Book:

• R. Cremlyn: *Pesticides*, John Wiley.

UNIVERSITY OF CALCUTTA

NISHAT ALAM
Secretary,
Councils for Undergraduate Studies,
University of Calcutta.

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Ref. No. CUS/154/17

Dated the 26th May, 2017

To
The Principals
of all the Undergraduate Colleges
offering B.Com (Honours & General) courses
affiliated to the University of Calcutta.

Sir/Madam,

The undersigned is directed to forward you the University Notification No. CSR/26/17, dt. 26.05.2017 containing new course structure, syllabi and revised admission regulations for three-year B.Com. (*Honours & General*) Courses of Studies.

The above shall be effective for the students getting admission to the three-year six-semester B.Com. (Honours & General) Courses of Studies under CBCS, from the academic session 2017-18 and onwards.

The said notification along with detail course structure, syllabi and admission regulations are available in the Calcutta University website.

Thanking you,

Yours faithfully,

26/05/17

(NISHAT ALAM)
Secretary

26/5/17

Enclo.: C.U. Notification No. CSR/26/17, dt. 26.05.2017

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 26 /17

It is notified for information of all concerned that the Syndicate in its meeting dated 23.05.2017 (vide Item No.46) resolved to approve the **New Course Structure & Syllabi and revised Admission Regulations for the B.Com. (Honours and General)** courses of study under this University as laid down in the accompanying pamphlet.

The above shall be effective for the students getting admission to the 3-year 6-Semester B.Com. (Honours and General) courses of study under CBCS, from the academic session 2017-2018 and onwards.

SENATE HOUSE
KOLKATA-700073
The 26th May, 2017

(Prof. Dr. Rajagopal Dhar Chakraborti)

Registrar

PART-B

Regulations relating to Admission for the Three-Year B.Com. (Honours & General) Courses of Studies conducted by the University of Calcutta

Admission Qualifications

1. A candidate who has passed the Higher Secondary (10+2) or its equivalent Examination is eligible to seek admission to the 1st year of the 3-year B.Com. (Honours/General) Course of Studies provided he/she has also passed in English having full marks not being less than 100 and fulfills the conditions as laid down in clause 2.

   Candidates who have passed the Higher Secondary (10+2) Vocational Examination in Business & Commerce conducted by the West Bengal State Council of Vocational Education and Training shall be eligible to seek admission to the B.Com. (General) 1st year Course of Studies under this University. However, no candidate shall be allowed admission after a lapse of more than 5 years from the year of passing the previous qualifying examination.

   (**Explanation:** The year of admission shall not be taken into account while calculating five years from the year of passing the previous qualifying Examination).

   For the purpose of determining eligibility for admission to the B.Com. Honours Courses, aggregate marks shall be calculated by adding the marks in top-four subjects in order of marks secured by a candidate. However, marks in compulsory Environmental Education/Studies shall not be taken into account for calculation of aggregate marks. However, If the subject "Environmental Science" is studied as an elective subject of 100 marks, it may be taken into account for the purpose of determining the aggregate marks.

2. (a) A candidate taking up B.Com. Honours Course in a subject must have obtained:
   i. A minimum of 50% marks in the aggregate and 45% marks in the subject or related subject at the previous qualifying examination.

   OR

   ii. 55% marks in the subject or related subject at the previous qualifying examination.

(b) However, candidates belonging to the Scheduled Caste or Scheduled Tribe Community taking up Honours Course of Study mast have obtained a minimum of 40% marks in the aggregate or 40% marks in the subject or related subject at the previous qualifying examination, as the case may be.

(c) **Seat reservation for admission in the first year class of three-year degree courses of studies shall be guided by the West Bengal State Higher Educational Institutions (Reservation in Admission), Act, 2013 and the West Bengal State Higher Educational Institutions (Reservation in Admission) Rules, 2014.**

(d)Following subjects be treated as related subjects for admission to B.Com. Honours courses:

Accountancy, Business Economics including Business Mathematics, Business Organization, Mathematics, Business Mathematics, Economics, Statistics, Business Studies, Office and Secretarial Practice, Financial Accounting, Elements of Cost Accountancy & Auditing, Book Keeping, Commerce, Cost Accountancy & Principle of Management, Commercial Law and preliminaries of Auditing, Costing and Taxation.

(e)A candidate shall be allowed to take up B.Com. (General) Course if he/she had passed the subject(s) at the previous qualifying examination as mentioned below:

Accountancy/ Business Economics including Business Mathematics/ Business Organization/ Mathematics/ Economics/ Statistics/ Commerce/ Accounts/ Business Studies/ Financial Accounting/ Office and Secretarial Practice/ Elements of Cost Accountancy and Auditing/ Book Keeping/ Business Mathematics/ Cost Accountancy & Principle of Management, , Commercial Law and preliminaries of Auditing, Costing and Taxation.

3. Students who have passed the Higher Secondary (10+2) Examination or its equivalent from the All India Boards/Councils (i.e. CBSE, ISC and National Institute of Open Schooling) need not require to submit the Migration Certificate for getting Registration under this University.

4. A candidate who is admitted to the Honours or General Course of Studies may take any of the four DSE (Discipline Specific Elective) Courses, two courses in each of the 5^{th} and 6^{th} Semester (as offered by the College).

5. B.Com. Honours & General Course Curricula / Structure

B.Com. Honours Course Structure under Semesterised CBCS

Year I: Semester I

		Marks	Credit Hours	
AECC 1.1Chg	**Language:** Communicative English - 50 Indian Language - 50	**100**	**2**	
GE 1.1 Chg	Microeconomics I & Statistics (50+50)	**100**	**6**	
CC 1.1 Chg	Business Laws	**100**	**6**	
CC 1.2 Chg	Principles of Management	**100**	**6**	
CC 1.1 Ch	Financial Accounting - I	**100**	**6**	
			26	

Year 1: Semester II

		Marks	Credit Hours	
GE 2.1 Chg	E-Commerce & Business Communication (50+50)	**100**	**6**	
CC2.1 Chg	Company Law	**100**	**6**	
CC 2.2 Chg	Marketing Management and Human Resource Management	**100**	**6**	
CC 2.1Ch	Cost and Management Accounting - I	**100**	**6**	
			24	

Year 2: Semester III

		Marks	Credit Hours	
SEC 3.1 Chg	Information Technology & Its Application in Business (Theory -50 + Practical- 50)	**100**	**4**	
GE 3.1 Chg	Business Mathematics & Statistics	**100**	**6**	
CC3.1 Ch	Financial Accounting II	**100**	**6**	
CC3.2 Ch	Indian Financial System	**100**	**6**	
			22	

Year 2: Semester IV

		Marks	Credit Hours	
GE 4.1 Chg	Microeconomics II & Indian Economy (50+50)	**100**	**6**	
CC 4.1 Chg	Entrepreneurship Development and Business Ethics	**100**	**6**	
CC 4.1 Ch	Taxation I	**100**	**6**	
CC 4.2 Ch	Cost and Management Accounting -II	**100**	**6**	
			24	

Year 3: Semester V

		Marks	Credit Hours	
CC 5.1Ch	Auditing & Assurance	**100**	**6**	
CC 5.2 Ch	Taxation II	**100**	**6**	
DSE 5.1 A*	Economics II and Advanced Business Mathematics	**100**	**6**	
DSE 5.2 A*	Corporate Accounting	**100**	**6**	
			24	

Options:

*Or DSE 5.1 M (Consumer Behaviour and Sales Management -50+50)
& DSE 5.2 M (Product & Pricing Management and Marketing Communication (50+50)

*Or DSE 5.1T (Public Finance and Taxation)
& DSE 5.2 T (Direct Tax: Laws and Practice)

*Or DSE 5.1 **e-**B (Fundamentals of Computer)
& DSE 5.2 e-B DBMS and System Analysis &Design (50+50)

Year 3: Semester VI

		Marks	Credit Hours	
AECC 6.1Chg	Environmental Studies	**100**	**2**	
SEC 6.1Chg	Computerised Accounting and e-Filing of Tax Returns	**100**	**4**	
CC 6.1 Ch	Project Work	**100**	**6**	
DSE 6.1 A**	Financial Reporting and Financial Statement Analysis	**100**	**6**	
DSE 6.2 A**	Financial Management	**100**	**6**	
			24	

Chg: Common for Honours and General; **Ch:** Core Course for Honours

Options:

******Or DSE 6.1 M (Retail Management and Marketing of Services (50+50)
& DSE 6.2 M (Rural Marketing and International Marketing (50+50)

**Or DSE 6.1 T (Indirect Tax: Laws and Practices)
& DSE 6.2 T (Tax Procedures and Planning)

**Or DSE 6.1 e-B (Internet & WWW and Functional e-Business System (50+50)
& DSE 6.2 e-B(Computer Applications and e-Business Applications – Practical (50+50)

Summary for B.Com. Hons.

		Marks	Credit Hours	
Ability Enhancement Compulsory Course (AECC)	Two Papers	**200**	**2 x 2 = 4**	
Skill Enhancement Elective Course (SEC)	Two Papers	**200**	**2x4 = 8**	
Generic Elective (GE)	Four Papers	**400**	**4 x 6 = 24**	
CORE COURSE (CC)	Fourteen Papers	**1400**	**14x 6 = 84**	
Discipline Specific Elective (DSE)	Four Papers	**400**	**4 x 6 = 24**	
		2600	**Total 144**	

B. B.Com. General Course Structure under Semesterised CBCS

Year I: Semester I

		Marks	Credit Hours	
AECC 1.1Chg	**Language:** Communicative English - 50 Indian Language - 50	**100**	**2**	
GE 1.1 Chg	Microeconomics I & Statistics	**100**	**6**	
CC 1.1 Chg	Business Laws	**100**	**6**	
CC 1.2 Chg	Principles of Management	**100**	**6**	
CC 1.1 Cg	Financial Accounting - I	**100**	**6**	
			26	

Year 1: Semester II

		Marks	Credit Hours	
GE 2.1 Chg	E-Commerce & Business Communication (50+50)	**100**	**6**	
CC 2.1 Chg	Company Law	**100**	**6**	
CC 2.2 Chg	Marketing Management & Human Resource Management	**100**	**6**	
CC 2.1Cg	Cost and Management Accounting I	**100**	**6**	
			24	

Year 2: Semester III

		Marks	Credit Hours	
SEC 3.1 Chg	Information Technology & Its Application in Business (Theory -50 + Practical- 50)	**100**	**4**	
GE 3.1 Chg	Business Mathematics & Statistics	**100**	**6**	
CC 3.1 Cg	Financial Accounting II	**100**	**6**	
			16	

Year 2: Semester IV

		Marks	Credit Hours	
GE 4.1 Chg	Microeconomics II & Indian Economy (50+50)	**100**	**6**	
CC 4.1 Chg	Entrepreneurship Development and Business Ethics	**100**	**6**	
CC 4.1 Cg	Taxation I	**100**	**6**	
CC 4.2 Cg	Cost and Management Accounting -II	**100**	**6**	
			24	

Year 3: Semester V

		Marks	Credit Hours	
CC 5.1 Cg	Auditing & Assurance	**100**	**6**	
DSE 5.1 A*	Taxation II	**100**	**6**	
DSE 5.2 A*	Corporate Accounting	**100**	**6**	
			18	

Options:

*Or DSE 5.1 M (Consumer Behaviour and Sales Management -50+50)
& DSE 5.2 M (Product & Pricing Management and Marketing Communication (50+50)
*Or DSE 5.1T (Public Finance and Taxation)
& DSE 5.2 T (Direct Tax: Laws and Practice)

*Or DSE 5.1 **e**-B (Fundamentals of Computer)
& DSE 5.2 e-B DBMS and System Analysis &Design (50+50)

Year 3: Semester VI

		Marks	Credit Hours	
AECC 6.1Chg	Environmental Studies	**100**	**2**	
SEC 6.1 Chg	Computerised Accounting and e-Filing of Tax Returns	**100**	**4**	
DSE 6.1 A**	Financial Reporting and Financial Statement Analysis	**100**	**6**	
DSE 6.2 A**	Financial Management	**100**	**6**	
			18	

Chg: Common for Honours and General; **Cg:** Core Course for General
Options:

******Or DSE 6.1 M (Retail Management and Marketing of Services (50+50)
& DSE 6.2 M (Rural Marketing and International Marketing (50+50)

**Or DSE 6.1 T (Indirect Tax: Laws and Practices)
& DSE 6.2 T (Tax Procedures and Planning)

**Or DSE 6.1 e-B (Internet & WWW and Functional e-Business System (50+50)
& DSE 6.2 e-B(Computer Applications and e-Business Applications – Practical (50+50)

Summary for B.Com. General

		Marks	Credit Hours	
Ability Enhancement Compulsory Course (AECC)	Two Papers	**200**	**2 x 2 = 04**	
Skill Enhancement Elective Course (SEC)	Two Papers	**200**	**2x4 = 08**	
Generic Elective (GE)	Four Papers	**400**	**4 x 6 = 24**	
CORE COURSE (CC)	Eleven Papers	**1100**	**11 x 6 =66**	
Discipline Specific Elective (DSE)	Four Papers	**400**	**4 x 6 = 24**	
		2300	**Total 126**	

Extracts from UGC CBCS Model for B.Com. Hons Syllabi (Page 2)

Notes:

1. For Practical Lab based

a. Core Courses BCH 1.2 (Financial Accounting), BCH 3.2 (Income-tax Law and Practice), BCH 3.4 (Business Statistics), BCH 4.2 (Business Mathematics), and BCH 5.2 (Fundamentals of Financial Management) there shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

b. Core Courses BCH 4.3 (Computer Applications in Business) and Discipline Specific Elective BCH Group A (e) (Computerised Accounting System), there shall be 4 Credit Hrs. for Lectures + Two Credit hrs. (4 Practical Periods per week per batch) for Practical Lab

c. Skill Enhancement Elective Course BCH 3.5(E-Commerce), there shall be 3 Credit Hrs. for Lectures + One Credit hrs. (2 Practical Periods per week per batch) for Practical Lab

2. For other core and elective papers, there shall be 5 lectures and one Tutorial (per batch)

From above, It appears that:

- **one credit** represents **one lecture hour** for theoretical papers and there will be **one credit hour for tutorial** for each of theoretical papers / subjects.
- For practical lab based papers, **one credit represents two practical periods** and there will be no tutorial for practical papers/subjects.

Therefore, it is suggested that:

AECC: 2 credit hours means 2 lecture hours, i.e., 120 minutes lectures or three (3) periods of 40 mins each per week.

SEC (involving lab): 4 credit hours may be divided into two credit hours for lectures (3 periods of 40 mins) and 2 credit hours for practical (4 practical periods per batch) per week

GE, CC and DSE: 6 credit hours means 5 credit hours for lectures (300 mins for lectures, i.e., 7-8 periods of 40 mins each) and 1 tutorial hour for each group/ batch of students per week.

University of Calcutta

B.Com. Syllabus (Honours)
under Semesterised CBCS

2017

University of Calcutta

Proposed B.Com. Honours Course Structure under CBCS

Year I: Semester I

		Marks	Credit Hours	
AECC 1.1Chg	**Language:** Communicative English - 50 Indian Language - 50	**100**	**2**	
GE 1.1 Chg	Microeconomics I & Statistics (50+50)	**100**	**6**	
CC 1.1 Chg	Business Laws	**100**	**6**	
CC 1.2 Chg	Principles of Management	**100**	**6**	
CC 1.1 Ch	Financial Accounting - I	**100**	**6**	
			26	

Year 1: Semester II

		Marks	Credit Hours	
GE 2.1 Chg	E-Commerce & Business Communication (50+50)	**100**	**6**	
CC2.1 Chg	Company Law	**100**	**6**	
CC 2.2 Chg	Marketing Management and Human Resource Management	**100**	**6**	
CC 2.1Ch	Cost and Management Accounting - I	**100**	**6**	
			24	

Year 2: Semester III

		Marks	Credit Hours	
SEC 3.1 Chg	Information Technology & Its Application in Business (Theory -50 + Practical- 50)	**100**	**4**	
GE 3.1 Chg	Business Mathematics & Statistics	**100**	**6**	
CC3.1 Ch	Financial Accounting II	**100**	**6**	
CC3.2 Ch	Indian Financial System	**100**	**6**	
			22	

Year 2: Semester IV

		Marks	Credit Hours	
GE 4.1 Chg	Microeconomics II & Indian Economy (50+50)	**100**	**6**	
CC 4.1 Chg	Entrepreneurship Development and Business Ethics	**100**	**6**	
CC 4.1 Ch	Taxation I	**100**	**6**	
CC 4.2 Ch	Cost and Management Accounting -II	**100**	**6**	
			24	

Year 3: Semester V

		Marks	Credit Hours	
CC 5.1Ch	Auditing & Assurance	**100**	**6**	
CC 5.2 Ch	Taxation II	**100**	**6**	
DSE 5.1 A*	Economics II and Advanced Business Mathematics	**100**	**6**	
DSE 5.2 A*	Corporate Accounting	**100**	**6**	
			24	

Options:

*Or DSE 5.1 M (Consumer Behaviour and Sales Management -50+50)
& DSE 5.2 M (Product & Pricing Management and Marketing Communication (50+50)

*Or DSE 5.1T (Public Finance and Taxation)
& DSE 5.2 T (Direct Tax: Laws and Practice)

*Or DSE 5.1 **e**-B (Fundamentals of Computer)
& DSE 5.2 e-B DBMS and System Analysis &Design (50+50)

Year 3: Semester VI

		Marks	Credit Hours	
AECC 6.1Chg	Environmental Studies	**100**	**2**	
SEC 6.1Chg	Computerised Accounting and e-Filing of Tax Returns	**100**	**4**	
CC 6.1 Ch	Project Work	**100**	**6**	
DSE 6.1 A**	Financial Reporting and Financial Statement Analysis	**100**	**6**	
DSE 6.2 A**	Financial Management	**100**	**6**	
			24	

Chg: Common for Honours and General; **Ch:** Core Course for Honours

Options:

**Or DSE 6.1 M (Retail Management and Marketing of Services (50+50)
& DSE 6.2 M (Rural Marketing and International Marketing (50+50)

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& DSE 6.2 T (Tax Procedures and Planning)

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& DSE 6.2 e-B(Computer Applications and e-Business Applications – Practical (50+50)

Summary for B.Com. Hons.

		Marks	Credit Hours	
Ability Enhancement Compulsory Course (AECC)	Two Papers	**200**	**2 x 2 = 4**	
Skill Enhancement Elective Course (SEC)	Two Papers	**200**	**2x4 = 8**	
Generic Elective (GE)	Four Papers	**400**	**4 x 6 = 24**	
CORE COURSE (CC)	Fourteen Papers	**1400**	**14x 6 = 84**	
Discipline Specific Elective (DSE)	Four Papers	**400**	**4 x 6 = 24**	
		2600	**Total 144**	

Extracts from UGC CBCS Model for B.Com. Hons Syllabi (Page 2)

Notes:

1. For Practical Lab based

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GE, CC and DSE: 6 credit hours means 5 credit hours for lectures (300 mins for lectures, i.e., 7-8 periods of 40 mins each) and 1 tutorial hour for each group/ batch of students per week.

CONTENTS

GE 1.1 Chg

Microeconomics I & Statistics (50+50)

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Microeconomics I

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit:I Demand and Consumer behaviour
Concept of demand, demand function, law of demand, derivation of individual and market demand curves, shifting of the demand curve; elasticity of demand.
Consumer behaviour: Marshallian utility approach and Indifference Curve approach; utility maximization conditions . Income-Consumption Curve (ICC) and Price-Consumption Curve (PCC): Derivation of demand curve from PCC.

[L-15/Marks:15]

Unit: II Production and Cost
Production function: Short-run and Long-run; Relation among Total Product, Average Product and Marginal Product, Law of returns to a variable factor, Law of Returns to Scale; Concepts of Iso-quant and iso-cost line; Conditions for optimization (graphical approach).
Cost: Accounting and Economic Costs; Social and Private Costs; Short-run and Long-run Costs; Relation between Average and Marginal Costs; Determination of LAC curve from SAC curves, LMC.

[L-10/Marks:10]

Unit: III Perfect Competition
Concept of Perfectly Competitive market: Assumptions, Profit maximization conditions;
Related concepts of Total Revenue, Average Revenue and Marginal Revenue, Short-run and Long-run
equilibrium of a firm; determination of short-run supply curve of a firm, measuring producer surplus under perfect competition, Stability analysis– Walrasian and Marshallian, demand-supply analysis including impact of taxes and subsidy**.**

[L-15/Marks – 15]

Suggested Readings

• Pindyke and Rubinfeld, Micro Economics, Pearson
• Gould & Ferguson, Micro Economic Theory
• Banerjee & Majumdar, Business Economics and Business Environment, ABS
• Banerjee & Majumdar, Banijjik Arthaniti –o- Banijjik Paribesh(Bengali)
• Dwivedi, D.N., Managerial Economics, Vikash Publications
• Mankiw.N.G., Principles of Microeconomics, Cengage
• Das, P. & Sengupta A., Economics , Oxford
• Samuelson & Nordhaus, Macroeconomics, McGraw Hill

Module II: Statistics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

1. **Fundamentals:**Definition of Statistics, Scope and limitation of Statistics,Attribute and variable,Primary and secondary data, Method of data collection, Tabulation of data, Graphs and charts, Frequency distribution, Diagrammatic presentation of frequency distribution. **[8 L /8Marks]**
2. **Measures of Central Tendency:**Meaning of central tendency, Common measures – mean (A.M., G.M., H.M.) median and mode, Partition values- quartiles, deciles and percentiles, Applications of different measures. [8 L /8Marks]
3. **Measures of Dispersion:**Meaning of dispersion,Common measure– range, quartile deviation, mean deviation and standard deviation; Relative measures of dispersion,Combinedstandard deviation,Applications of different measures. [8 L /8Marks]
4. **Moments, Skewness and Kurtosis:** Different types of moments and their relationships, Meaning of skewness and kurtosis, Different measures of skewness, Measure of kurtosis,Applications of different measures. [8 L /8Marks]
5. **Interpolation:** Finite differences, Polynomial function, Newton's forward and backward interpolation formula, Lagrange's interpolation formula. [8 L /8Marks]

Suggested Readings:

- Business Mathematics and Statistics- N G Das & J K Das (Tata McGraw Hill)
- Statistical Methods in Business and Social Science – G. V. Shenoy and M. Pant (Macmillan)
- Business Statistics – R. S. Bhardwaj (Excel Books)
- Statistics for Management – Levin, Rubin and Rastogi (Pearson Education)
- Statistics for Management, Srivastava and Rego, McGraw Hill
- Hazarika Padmalochan, A Text Book of Business Statistics, S.Chand
- Kellor & Arora, Business Statistics, Cengage
- Pillai and Bhagwati, Business Statistics, S.Chand
- Business Mathematics & Statistics – J. Chakraborti (Dey Book Concern)
- Business Mathematics & Statistics – R K Ghosh & S Saha (New Central Book Agency(P) Ltd
- Elementary Business Mathematics & Statistics – Dr. Priyotosh Khan (Elegant Publication)
- Business Mathematics & Statistics – Dr. S N De (Chhaya Prakashani)
- Business Mathematics & Statistics – N K Nag & S K Nag (Kalyani Publishers)
- Business Mathematics & Statistics – Dr. Ranjit Dhar (Dishari Prakashani)

CC 1.1 Chg

Business Laws

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1: The Indian Contract Act, 1872 [No of classes 30 / Marks 30]
a) Contract – meaning, characteristics and kinds, Essentials of a valid contract
b) Offer and acceptance (Definition, Rules, Communication and Revocation of offer and acceptance)
c) Consideration (Definition, Elements, Types, Rules), "No Consideration No Contract" and its exceptions; Capacity to Parties (Definition and Types)
d) Consent, Free consent, Coercion, Undue Influence, Fraud, Misrepresentation, Mistake
e) Legality of objects and Consideration
f) Void and Voidable agreements – Definition, Types and Distinction
g) Discharge of a contract – Modes of discharge, Breach and Remedies against breach of contract
h) Specific Contracts - Contingent contracts, Quasi, Contract of Indemnity, Guarantee, Bailment, Pledges

Unit 2: The Sale of Goods Act, 1930 [No of classes 10 / Marks 10]
a) Contract of sale, meaning and difference between sale and agreement to sell
b) Conditions and warranties
c) Transfer of ownership in goods including sale by a non-owner
d) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer

Unit 3: Partnership Laws [No of classes 20 / Marks 20]
A) The Partnership Act, 1932
a. Definition – Partner, Partnership
b) Nature and Characteristics of Partnership
c) Types of Partners
d) Registration of a Partnership Firms and consequences of non-registration
e) Rights and Duties of Partners
f) Dissolution of firms – meaning and grounds

B) The Limited Liability Partnership Act, 2008
a) Definition
b) Salient Features of LLP
c) Advantages and disadvantages of LLP
d) Differences between: LLP and Partnership, LLP and Company
e) Incorporation of LLP

Unit 4: The Negotiable Instruments Act 1881 [No of classes 10 / Marks 10]
a) Definition, Features, Types, Parties of Negotiable Instruments: Promissory Note, bill of exchange, Cheque (Definition and Types)
b) Endorsement: Types of Endorsement
c) Holder and Holder in Due Course, Privileges of Holder in Due Course.

d) Dishonour of Negotiable Instruments: Modes, Consequences, Notice of Dishonour; Noting and Protesting
e) Discharge of Negotiable Instruments: Meaning and Modes

Unit 5: Consumers Protection Act, 1986 [No of classes 10 / Marks 10]

a) Objectives and features of Consumers Protection Act
b) Definitions – Complainant, Complaint, Consumer, Consumer Dispute, Defect, Deficiency, District Forum, Person
c) Unfair trade practices
d) Consumer Protection Council (Central, State and District – their constitutions and objectives)
e) Consumer Dispute Redressal Agencies: Composition and jurisdiction of District forum, State Commission and National Commission

(If any new provisions are enacted in place of the existing provisions, the syllabus will accordingly include such new provisions in place of existing provisions with effect from such date as prescribed by Calcutta University. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus)

Suggested Readings

- Kumar Ravindra, Legal Aspects of Business, Cengage
- Tulsian & Tulsian, Business Laws, S.Chand
- Kapoor N.D., Business Laws, Sultan Chand
- Das S.K. & Roy P., Business Regulatory Framework, OUP
- Gulsan S.S., Business Laws, Excel Books
- Roychowdhury, Bhattacharjee & Datta, Business Regulatory Framework, Elegant Publishers
- Bhadra, Satpati and Mitra, Ainer Ruprekha (Bengali Version), Dishari

CC 1.2 Chg

Principles of Management

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit-1: Introduction:
No. of classes: 16 / Marks: 16
Management-definition, importance, functions, nature-as profession, science and art, universality of management; levels of management; managerial tasks and skills.
Different Schools of Thoughts: Classical School-contributions of Taylor and Henri Fayol; Neo-classical school-Human Relations approach and Behavioral Science Approach; Modern School; System approach and Contingency approach.

Unit-2: Planning:
No. of classes: 16 / Marks: 16
Concept, importance, steps, types, premises, barriers to effective planning and remedial measures; strategic planning-concept forecasting –concept, techniques.

Unit-3: Organizing:
No. of classes: 16 / Marks: 16
Concept, importance, principles, different organization models-line and staff; Functional; Departmentation-need, basis, principles, Delegation of Authority-elements, steps barriers; Centralization and Decentralization of Authority; Span of Management; concept and determining factors.

Unit-4: Directing and Staffing:
No. of classes: 16 / Marks: 16
Directing: concepts, importance of directing,
Leadership: Concept, importance, types, leadership traits, Tannenbaum & Schmidt's Model and Blake & Mouton's Model.
Staffing: concepts, importance

Unit- 5: Motivation, Co-ordination and Control:
No. of classes: 16 / Marks: 16
Motivation: Concept, importance, importance of need theory, and contributions of McGregor, Maslow, Herzberg.
Coordination: concepts, importance, principles and implementation techniques.
Control: concepts, importance and tools of control.

Suggested Readings

- Kaul, Principle and Practice of Management, Vikash
- Koontz & Weirich, Essentials of Management, TMH
- Koontz, Weirich & Cannice, Management, McGraw Hill
- Stoner & Freeman, Management , PHI
- Drucker, P.F., Managing Challanges for the 21st Century, Butterworth, Oxford
- Mitra, J., & Somani, N., Principles of Management and Business Communications, Oxford

CC 1.1 Ch
FINANCIAL ACCOUNTING – I
Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

FINANCIAL ACCOUNTING – I

Unit	Topic	Details	Marks allotted	No. of Lectures
1	Introduction	• Nature of accounting; Users of accounting information; Qualitative characteristics of accounting information. • Double entry book keeping system – Basic accounting equation, meaning of assets, liabilities, equity, revenue and expenses. Accounting Cycle - Recording of transaction: Journal, Ledger and preparation of Trial Balance. • Bases of accounting; cash basis and accrual basis. • Basic concepts and conventions: entity, money measurement, going concern, cost, realisation, accruals, periodicity, consistency, prudence (conservatism), materiality, matching and full disclosures.	5	5
2	Concepts for determination of business income	• Revenue recognition: Meaning of revenue; objective; timing of recognition. Recognition of expenses. • Inventories: meaning. Significance of inventory valuation. Lower of cost or market rule; Inventory ascertainment and reconciliation.	15	15

		• The nature of depreciation. The accounting concept of depreciation. Factors in the measurement of depreciation. Methods of computing depreciation: straight line method and diminishing balance method; Disposal of depreciable assets; change in estimate and method of charging depreciation. Accounting for depreciation: Asset-depreciation, Asset-provision. • Reserves and provisions: Meaning; Objective; Types & Accounting		
		• Capital and revenue expenditures and receipts: general introduction only. • Adjustment and rectification		
3	Introduction to Accounting Standard	Financial accounting standards: concept, benefits, procedure for issuing accounting standards in India. Need for a global standard, IFRS (concept only).	10	10
	Introduction to Accounting Theory	Concept of accounting theory; relation with practice; GAAP; Capital – capital maintenance concepts; Limitations of Historic Cost accounting; Introduction to Fair Value accounting		
4	Final accounts of Trading Concern	Preparation of financial statements: of sole proprietorship business entities from a trial balance – Manufacturing, Trading, P/L A/c and Balance Sheet	15	15
5	Financial statements from Incomplete records and of NPO	Preparation of financial statements: a) from incomplete records b) of non-profit organisation	10	12
6	Accounting for special sales transaction	• Consignment: Basic features; difference with sales. Recording in the books of Consignor – at cost & at invoice price, Valuation of unsold stock; Ordinary commission. Treatment and valuation of abnormal & normal loss. Special commission; Del credere commission (with and without bad debt) - use of Consignment Debtors A/C. Recording in the books of Consignee • Accounting for sale on approval	25	23
	Sectional and Self balancing ledger	• Concept of sectional balancing, preparation of control accounts. Self balancing Ledger: advantages; Recording process; preparation of Adjustment accounts.		

	Insurance claim for loss of stock and for loss of profit	• Loss of stock: Physical & ownership concept; concept of under-insurance and average clause; computation of claim – with price change; consideration of unusual selling line; price reduction etc. • Loss of profit: Concept – insured & uninsured standing charges, GP rate, short sales and increased cost of working, average clause and computation of claim (simple type)		

Relevant Accounting Standards issued by the Institute of Chartered Accountants of India are to be followed.

Suggested Reading:

• Sukla, Grewal, Gupta: Advanced Accountancy Vol. I, S Chand
• R. L.Gupta & Radheswamy, Advanced Accountancy Vol. I, S. Chand
• Maheshwari & Maheshwari, Advanced Accountancy Vol. I, Vikash Publishing House Pvt. Ltd.
• Sehgal & Sehgal, Advanced Accountancy Vol. I, Taxman Publication
• B. Banerjee, Regulation of Corporate Accounting & Reporting in India, World Press.
• Hanif & Mukherjee, Financial Accounting, McGraw Hill
• Frank Wood, Business Accounting Vol 1, Pearson
• Tulsian, Financial Accounting, Pearson
• Mukherjee and Mukherjee, Financial Accounting I, Oxford
• Accounting Standards issued by ICAI

Year 1: Semester II

		Marks	Credit Hours	
GE 2.1 Chg	E-Commerce & Business Communication (50+50)	**100**	**6**	
CC2.1 Chg	Company Law	**100**	**6**	
CC 2.2 Chg	Marketing Management and Human Resource Management	**100**	**6**	
CC 2.1Ch	Cost and Management Accounting - I	**100**	**6**	
			24	

GE 2.1 Chg

E-Commerce & Business Communication (50+50)

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
E-Commerce

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Introduction [10 Marks, Class: 10]

E-Commerce-meaning, nature, concepts, types; e-commerce business models B2B [concept, major activities, types of B to B market (independent, buyer oriented, supplier oriented, e-market place)], B2C [portals, e-tailer, content provider, transaction broker, real life examples of B2C], C2C, C2B, etc.; forces behind e-commerce, e-Governance [meaning, types, significance, real life examples].

Unit 2: E-CRM and SCM [8 Marks, Class: 8]

E-CRM-definition, features, goals of E-CRM business framework, phases of E-CRM, types of E-CRM, Functional components of E-CRM, strategies for E-CRM solutions; SCM-definition, features, types of supply chain.

Unit 3: Digital Payment [8 Marks, Class: 8]

Methods of e-payments [Debit Card, Credit Card, Smart Cards, e-Money], electronic or digital wallet, digital signature (procedures, working and legal provisions), payment gateways [Core Banking Solution or CBS, Mobile Payment, UPI, NCPI, International Payments], Online banking [meaning, concepts, importance, electronic fund transfer, automated clearing house, automated ledger posting], risks involved in e-payments.

Unit 4: ERP [8 Marks, Class: 8]

Definition, features, major characteristics, levels of ERP, benefits of ERP, enterprise potential of ERP, modules of ERP, phases of ERP implementation, limitations of ERP.

Unit 5: New Trends in E-Commerce [6 Marks, Class: 6]

Social Commerce-concept, definition, features; Digital Marketing-definition, objectives, methods, limitations; Advertisement in Social Media-objectives, advantages and disadvantages, procedures

Suggested Readings

- P. T. Joseph**,** *E-Commerce: An Indian Perspective,* PHI Learning
- Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, *E-Commerce: Fundamentals and Applications,* Wiley.
- Laudon, *E-Commerce,* Pearson Education India
- Schneider G., E-Business, Cengage
- Bhaskar, B., E–Commerce, McGraw Hill

Module II

Business Communication

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Introduction [8 Marks, Class: 8]

Definition, objectives, importance, elements, process, forms, models, principles of effective communication, barriers to communication and remedial measures, role of communication in conflict resolution

Unit 2: Types of Communication [6 Marks, Class: 6]

Formal and informal communication, Grapevine, Characteristics of corporate communication, Characteristics of corporate communication, Communication network

Unit 3: Tools of Communication [6 Marks, Class: 6]

Emergence of communication technology, Modern Forms of communication, Fax, E-mail, Video Conferencing

Unit 4: Drafting [20 Marks, Class: 20]

Notice, Circular, Resolution & Minutes, Report, CV writing, Business letter writing- Offer letter, Quotation, Status enquiry, Confirmation, Execution, Refusal and cancellation of order, Recommendation, Credit collection, Claim, Bank loan

. Suggested Readings

- Anjanee, S. & Bhavana Adhikari, *Business Communication*, TMH
- Chaturvedi &Chaturvedi, *Business Communication : Concepts*, *Cases and Applications*, Pearson
- M.K.Shegal &Vandana Khetarpal, Business Communication, Excel Books
- R.K.Madhukar, *Business Communication*, Vikash Publishing House Pvt. Ltd.
- Rao, Kumar & Bindu, Business Communication, Cengage
- Khanna, Puja., Business Communication, Vikash
- Raman & Sharma, Technical Communication, Oxford
- Lesikar, Flatley et al, Business Communication, McGraw Hill

CC2.1 Chg

Company Law

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1: INTRODUCTION TO COMPANY[No of classes 16 / Marks 16]

Meaning and Definition – Features –, High Lights of Companies Act 2013 - Body Corporate ,Kinds of Companies (Concept, Definition and Features) – One Person Company, Private Company, Public Company, Company limited by Guarantee, Company limited by Shares, Holding Company, Subsidiary Company, Government Company, Associate Company, Small Company, Foreign Company, Listed Company, Dormant company , Lifting of corporate veil.

Unit 2: FORMATION OF A COMPANY[No of classes 16 / Marks 16]

Steps in formation of a Company, Promotion Stage, Meaning of Promoter, Position of Promoter & Functions of Promoter, Incorporation Stage – Meaning, Contents, Forms of Memorandum of Association & Articles of Association and its alteration, Distinction between Memorandum of Association and Articles of Association, Doctrines of constructive notice and Indoor management, Certificate of Incorporation, Subscription Stage – Meaning & contents of Prospectus, Types, Misstatement in prospectus and its consequences.

Unit 3: COMPANY ADMINISTRATION[No of classes 16 / Marks 16]

Director (Concept and Definition), DIN, Qualification, Disqualification, Appointment, Position, Rights, Duties, Power, Resignation, Liabilities, Removal and Resignation of director. Key Managerial Personnel (Definition, Appointment and Qualifications) – Managing Director, Whole time Directors, the Companies Secretary, Chief Financial Officer, Resident Director, Independent Director, Women director.

Unit 4: SHARE CAPITAL & DEBENTURE[No of classes 16 / Marks 16]

Share, Share Capital - Types and Definition, Allotment and Forfeiture, Calls on Shares, ESOP, Buyback, Sweat Equity, Bonus, Right, Capital Reduction, Share Certificate, D-mat System, Transfer and Transmission, Redemption of Preference Shares, Debenture – Definition, Types, Rules Regarding Issue of Debenture.

Unit 5: CORPORATE MEETINGS[No of classes 16 / Marks 16]

Corporate Meetings - Shareholder and Board, Types of Meetings – Annual General Meeting Extraordinary General meeting, Minutes of Proceedings of General Meeting, Meeting of BOD and other meetings (Section 118), Requisite of Valid Meeting- Notice, Agenda, Chairman, Quorum, Proxy, Resolutions, Minutes, Postal Ballot, E- voting, Video Conferencing, Board Meetings and Resolutions

(If any new provisions are enacted in place of the existing provisions, the syllabus will accordingly include such new provisions in place of existing provisions with effect from such date as prescribed by Calcutta University. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus)

Suggested Readings

- Kumar Rabindra, Legal Aspects of Business, Cengage
- Bhadra, Satpati and Mitra, Ainer Ruprekha (Bengali Version), Dishari
- Kapoor, N.D., Corporate Law, S.Chand
- Arora, Bansal, Corporate Law, Oxford
- Roychowdhury, Bhattacharjee & Datta, Business Regulatory Framework, Elegant Publishers

CC 2.2 Chg

Marketing Management and Human Resource Management

Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
Marketing Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Introduction:
No. of classes: 8 / Marks: 8

Nature, scope and importance of marketing; Selling vs Marketing; Marketing mix, Marketing environment: concept, importance, and components (Economic, Demographic, Technological, Natural, Socio-Cultural and Legal).

Unit 2: Consumer Behaviour and Market segmentation:
No. of classes: 8 / Marks: 8
Consumer Behaviour: Nature and Importance, Factors influencing consumer buying behaviour.
Market segmentation: concept, importance and bases; Product differentiation vs. market segmentation.

Unit 3: Product:
No. of classes: 8 / Marks: 8
Concept and importance, Product classifications; Concept of product mix; Branding, packaging and labeling; Product life-cycle; New Product Development Process.

Unit 4: Pricing, Distribution Channels and Physical Distribution
No. of classes: 8 / Marks: 8
Pricing: Significance. Factors affecting price of a product. Pricing policies and strategies.
Distribution Channels and Physical Distribution: Channels of distribution - meaning and importance; Types of distribution channels; Factors affecting choice of distribution channel.

Unit 5: Promotion and Recent developments in marketing:
No. of classes: 8 / Marks: 8
Promotion: Nature and importance of promotion; Communication process; Types of promotion: advertising, personal selling, public relations & sales promotion, and their distinctive characteristics.
Recent developments in marketing: Social Marketing, online marketing, direct marketing, services marketing, green marketing, Rural marketing; Consumerism.

Suggested Readings:

- Kotler & Keller, Marketing Management, Pearson
- Ramaswamy and Namakumari, Marketing Management, McMillan
- Bhagwati, Pillai, Marketing Management, S.Chand
- Verma & Duggal, Marketing Management, Oxford
- Venugopal, P., Marketing Management, Sage
- Saxena, Marketing Management, McGraw Hill

Module II
Human Resource Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Nature and Scope
No. of classes: 8 / Marks: 8
Concept and meaning of HR, Understanding the Nature and Scope of HRM, Functions and importance.

Unit 2: Human Resource Planning
No. of classes: 8 / Marks: 8
Definition, Need and Features of Human Resource Planning, factors affecting Human Resource Planning.

Unit 3: Recruitment and Selection
No. of classes: 8 / Marks: 8
Definition of Recruitment, Source, need and importance of Recruitment, Recruitment Policy – process – sources of Recruitment Definition of Selection, Steps in selection.

Unit 4: Training and Development
No. of classes: 8 / Marks: 8
Training and Development Meaning and purpose of training, Benefits of training to organisation and employees -Training methods.

Unit 5: Job Evaluation and Performance Appraisal
No. of classes: 8 / Marks: 8
Job evaluation - objectives, scope, method, Job analysis, Job description, Job Specification - basic concept and significance,
Performance Appraisal - Concept

Suggested Readings:

- Mahajan, Reeta, Human Resource Management, Vikash
- Haldar & Sarkar, Human Resource Management, Oxford
- Sinha, Sekhar & Bala, Human Resource Management, Cengage
- Jyothi & Venkatesh, Human Resource Management, Oxford
- Wilton, N., An Introduction to Human Resource Management, Sage
- Dessler & Varkkey, Human Resource Management, Pearson

CC 2.1Ch
COST AND MANAGEMENT ACCOUNTING – I

Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Content	Marks	Lecture
1.	**Introduction**	• Definition of Costing, Objectives of Cost Accounting; Management Accounting and difference with Cost Accounting; Installing a Cost Accounting System, Essentials of a good Cost Accounting System. • **Cost concepts, terms and classification of costs**: Cost, Cost object, Cost units and Cost Centres, Types	**10**	**6**

		of costs, classification of costs- Direct-Indirect, Elementwise, Functionwise, Behaviourwise, Sunk Cost, opportunity Cost. **Costing Methods and Techniques** (introduction only).		
2	**Material Costs**	• *Purchase of materials*: Organisation, purchase procedure, documentation, determination of material purchase costs. • *Storage of materials*: Need for storage, location and types, functions of a storekeeper, requisition, receipt, issue and transfer of materials, storage record, accounting for materials cost. • *Materials control*: Organisation; Tools: Just-in-Time Purchase; various stock levels, Economic Ordering Quantity and ABC Analysis; Periodic Inventory, Perpetual Inventory, Physical verification; Discrepancies in stock and their treatment. • Methods of Pricing Material Issues: FIFO, LIFO, and Weighted Average. • Treatment of Normal and Abnormal Loss of Materials	**10**	**10**
3	**Employee Cost and Incentive Systems**	• Introduction, Recording labour cost: Attendance and payroll procedures (Time-keeping, Time-Booking, Payroll procedure, Payment of wages-Piece rate, differential piece rate, time rate); Idle time (causes and treatment in Cost Accounting), Overtime (its effect and treatment in Cost Accounting), Labour turnover (Causes, impact and methods of calculating labour turnover). • Main Principles for sound system of wage incentive schemeslabour utilisation; System of Wage Payment and Incentives(Halsey, Halsey-weir, Rowan and Emerson • System of Incentive Schemes for Indirect Workers; Component of wages cost for costing purpose.	**10**	**12**
4	**Overhead and Cost Statement**	**Overhead** • *Introduction:* Definition, Classification of Overhead-Functional and Behavioural. • *Manufacturing Overheads:* Allocation and apportionment of Overhead; Absorption of Overhead: various methods and their application; Treatment of under absorption/over absorption of overheads. • *Administration and Selling & Distribution Overheads and their charging:* an introduction only • Preparation of Cost Sheet and estimation	**20**	**20**
5	**Cost Book-keeping**	**Cost Book-keeping** • Non-Integrated System: Meaning & Features; Ledgers Maintained; Accounts prepared; General/Cost Ledger Adjustment Account; Meaning of Closing Balance in Various Accounts; Disadvantages. • Reconciliation: Need for reconciliation; Items causing differences between Cost and Financial Profits and their reconciliation.	**10**	**8**

6	**Costing Methods**	• **Job Costing** (Job cost cards and databases, Collecting direct costs of each job, Attributing overhead costs to jobs, Applications of job costing). **Batch Costing** • **Contract Costing** - Progress payments, Retention money, Escalation clause, Contract accounts, Accounting for material, Accounting for plant used in a contract, Contract Profit and Balance sheet entries. • **Service Costing and Output Costing-** Introduction; Motor Transport Costing only • **Process Costing:** Meaning, Features, Process vs Job Costing, Principles of cost ascertainment for Materials, Labour & Overhead; Normal loss, Abnormal loss and gain and preparation of process accounts. Inter-process profit (simple cases). Valuation of WIP and Equivalent units (excluding intermediary process).	**20**	**24**
			80	**80**

Suggested Readings

- Horngren, Datar & Rajan, Cost Accounting,- A Managerial Emphasis, Pearson
- B.Banerjee, Cost Accounting, PHI
- Jawahar Lal & Seema Srivastava, Cost Accounting, TMH
- M.Y.Khan & P.K.Jain, Management Accounting, TMH
- Atkinson, Management Accounting, Pearson
- Bhattacharyya, Ashish K., Cost Accounting for Business Manageres, Elsevier
- Ravi M Kishore, Cost and management Accounting, Taxmann
- Mitra, J.K., Cost & Management Accounting, Oxford
- Hanif, M., Cost & Management Accounting, McGraw Hill
- Drury, Colin., Management and Cost Accounting, Cengage
- Satish Inamdar, Cost & Management Accounting, Everest Publishing House

- Bhattacharyya, Ashish K., Cost Accounting for Business Manageres, Elsevier
- Ravi M Kishore, Cost and management Accounting, Taxmann

Year 2: Semester III

		Marks	Credit Hours	
SEC 3.1 Chg	Information Technology & Its Application in Business (Theory -50 + Practical- 50)	**100**	**4**	
GE 3.3 Chg	Business Mathematics & Statistics	**100**	**6**	
CC3.1 Ch	Financial Accounting II	**100**	**6**	
CC3.2 Ch	Indian Financial System	**100**	**6**	

SEC 3.1 Chg

Information Technology & Its Application in Business
(Theory -50 + Practical- 50)

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Information Technology and Its Application in Business (Theory)

(Marks: 50)

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit1: Information Technology and Business [8 Marks, Class: 8]

Concepts of data, information and computer based information system, impact of information technology on business [business data processing, intra-organizational and inter-organizational communication by using network technology, business process outsourcing and knowledge process outsourcing], types of Information System- Transaction Processing System (TPS), Management Information System (MIS), Decision Support System (DSS), Knowledge Management System (KMS) and their implementation at managerial levels [operational, tactical and strategic].

Unit 2: Data Organization and Data Base Management System [10 Marks, Class: 10]

(a) Data Organisation: Character, field, record, file and database, types of data processing systems [Serial, Batch, Real-time, Online, Centralized, Distributed], File Organizations [Sequential, Direct, Indexed-Sequential, Relative], Traditional file organisation vs. Database file organisation.

(b) Database Management System: Concept of database management system (DBMS), definition, importance of DBMS, important terms of database [Entity, Attribute, Keys- Primary, Foreign and Candidate, Referential Integrity, Table, Views, Data Dictionary], types of database [Hierarchical, Network and Relational], basic ideas of Data Warehouse and Data Mining (definition, importance, advantages and disadvantages), Big data analysis- Concept.

Unit 3: Internet and Its Applications [8 Marks, Class: 8]

Meaning of Internet, IPAddress [IPv4, IPv6], URL, Domain Name System, Internet Protocols - TCP/IP, UDP, FTP, TELNET[brief ideas only], HTML, DHTML AND XML [Concepts only], Ethical Hacking, Cloud Computing, Mobile Computing, Internet of Things, Ethical issues in Social Networking.

Unit 4: Security and Encryption [8 Marks, Class: 8]

Need and concepts, dimension, definition and scope of e-security, security threats- Malicious Codes (Virus, Trozan Horse, Worm, Spyware, Ransomware), Hacking, Spoofing, Sniffing, Phishing, Spamming, Denial of Service (DoS) attacks, Technology solutions [Confidentiality: (Data Encryption & Decryption, Symmetric and asymmetric encryption), Security Implementation: Firewall, DMZ (De Militarized Zone), SSL, HTTPs, Significance of Website Auditing].

Unit 5: IT Act. 2000 and Cyber Crimes [6 Marks, Class: 6]

IT Act 2000- Definitions of different terms, Digital signature, Electronic Governance, Attribution, Acknowledgement and Dispatch of Electronic Records, Regulation of Certifying Authorities, Digital Signatures Certificates, Duties of Subscribers, Penalties and Adjudication, Appellate Tribunal, Offences and Cyber-crimes.

Module II

Information Technology and Its Application in Business (Practical)

(Marks: 50)

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1: Word Processing [5 Marks, Class: 5]

Working with word document- Editing text, Find and Replace text, Formatting, Spell check, Autocorrect, Auto text; Bullets and numbering, Tabs, Paragraph Formatting, Indent, Page Formatting, Header and footer, Macros, Drop cap; Tables: Inserting, Filling and formatting a Table, Inserting Pictures and Video; Mail Merge- including linking with Database, Printing documents.

Creating Business Documents using the above facilities

Unit 2: Preparing Presentations [5 Marks, Class: 5]

Basics of presentations: Slides, Fonts, Drawing, Editing; Inserting: Tables, Images, texts, Symbols, Media; Design; Transition; Animation, Hyperlink and Slideshow.

Creating Business Presentations using above facilities.

Unit 3: Spreadsheet and its Business Applications [16Marks, Class: 16]

Managing worksheets- Formatting, Entering data, Editing, and Printing a worksheet; Handling operators in formula, Project involving multiple spreadsheets, Organizing Charts and graphs, Pivot Table.

Spreadsheet Functions: Mathematical [SUMIF, SQRT, SUBTOTAL, SUMPRODUCT etc.], Statistical [AVERAGE, STDEV, VAR, CORRELATION, REGRESSION etc.], Financial [PMT, RATE, PV, FV, NPER, IRR, NPV, Data Table Etc.] Logical [AND, OR, IF etc.], Date and Time, lookup and reference, Database and Text functions.

Creating Spreadsheet in the area of: Loan and Lease statement; Ratio Analysis; Payroll Statements; Capital Budgeting; Depreciation Accounting; Graphical Representation of Data; Frequency Distribution and its Statistical Parameters; Correlation and Regression

Unit 4: Database Management System [8 Marks, Class: 8]

Creation of Tables, Multiple Table Handling-Defining Relationship [Foreign Key], Simple and Conditional Queries, Types of Queries [Update, Delete, Append], Forms, Reports, Introduction to SQL through Basic Commands.

Applying DBMS in the areas of Accounting, Inventory, HRM and its accounting, Managing the data records of Employees, Suppliers and Customers.

Unit 5: Website Designing **[6 Marks, Class: 6]**

Introduction to HTML; Tags and Attributes: Text Formatting, Fonts, Hypertext Links, Tables, Images, Lists, Forms, Frames, Cascading Style Sheets.

Suggested Readings

- Thareja, IT & Application, Oxford
- Aurora, Computer Fundamentals, Vikash
- Sinha & Sinha, Fundamentals of Computers, BPB Publications
- Dhar, P., Fundamental of IT and Its Application in Business, APH

GE 3.3 Chg
Business Mathematics & Statistics
Marks 100

Module I
Business Mathematics
Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

1 **Permutations and Combinations:** Definition, Factorial Notation, Theorems on Permutation, Permutations with repetitions, Restricted Permutations;Theorems on Combination, Basic identities, Restricted Combinations**.** **[8 L /8Marks]**

2 **Set Theory**: Definition of set, Presentation of sets, Different types of sets- Null set, Finite and infinite Sets, Universal set, Subset, Power set etc.; Set Operations, Law of algebra of Sets. **[8 L /8Marks]**

3 **Binomial Theorem:** Statement of the theorem for positive integral index, General term, Middle term, Simple properties of binomial coefficients. **[8 L /8Marks]**

4 **Logarithm:** Definition, Base and Index of Logarithm, General properties of Logarithm, Common Problems**.** **[8 L /8Marks]**

5 **Compound Interest and Annuities:**Simple AP and GP Series, Different types of interest rates, Net present value, Types of annuities, Continuous compounding, Valuation of simple loans and debentures, Problems relating to Sinking Funds. **[8 L /8Marks]**

Module II
Statistics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

6. **Correlation and Association:**Bivariate data, Scatter diagram, Pearson's correlationcoefficient, Spearman's rank correlation, Measures of association of attributes.

[8 L /8Marks]

7. **Regression Analysis:** Least squares method, Simple regression lines, properties of regression, Identification of regression lines. **[8 L /8Marks]**
8. **Index Numbers:** Meaning and types of index numbers, Problems of constructing index numbers, Construction of price and quantity indices, Test of adequacy, errors in index numbers, Chain base index numbers; Base shifting, Splicing, Deflating, Consumer price index and its uses.

[8 L /8Marks]

9. **Time Series Analysis:** Causes of variation in time series data, Components of time series, additive and multiplicative models, Determination of trend by semi-average, moving average and least squares(of linear, quadratic and exponential trend) methods; Computation of seasonal Indices by simple average, ratio-to-moving average, ratio-to-trend and link relative methods; Simple forecasting through time series data. **[8 L /8Marks]**
10. Probability Theory: Meaning of probability; Different definitions of probability; Conditional probability; Compound probability; Independent events, Simple problems.

[8 L /8Marks]

Suggested Readings

- Business Mathematics and Statistics- N G Das & J K Das (Tata McGraw Hill)
- Statistics for Business Decisions – J. K .Das (Academic Publishers)
- Basic Mathematics and its Application in Economics – S. Baruah (Macmillan)
- Mathematics for Economics and Business – R. S. Bhardwaj (Excel Books)
- Mathematics and Statistics for Management – K B Akhilesh and S Balasubrahmanyam (Vikash Publishing House Pvt.Ltd.)
- Business Statistics – G. C. Beri (Tata McGraw Hill)
- Fundamentals of Statistics – S.C.Gupta (Himalaya Publishing House)
- Statistics for Business and Economics – D. R. Anderson, D. J. Sweeney and T. A.
- Williams (Thomson Asia Pvt Ltd)
- Text Book of Business Mathematics , Padmalochan Hazarika, S.Chand
- Business Mathematics, Jameeruddin, Khanna & Bhamdri, Vikash
- Business Mathematics & Statistics – J. Chakraborti (Dey Book Concern)
- Business Mathematics & Statistics – R K Ghosh & S Saha (New Central Book Agency(P) Ltd
- Rajaretnam, Statistics for Social Sciences, Sage
- Elementary Business Mathematics & Statistics – Dr. Priyotosh Khan (Elegant Publication)
- Business Mathematics & Statistics – Dr. S N De (Chhaya Prakashani)
- Business Mathematics & Statistics – N K Nag & S K Nag (Kalyani Publishers)
- Business Mathematics & Statistics – Dr. Ranjit Dhar (Dishari Prakashani)

CC3.1Ch: FINANCIAL ACCOUNTING – II

Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

FINANCIAL ACCOUNTING – II

Unit	Topic	Details	Marks allotted	No. of lectures
1	Partnership accounts-I	Correction of appropriation items with retrospective effect. Change in constitution of firm – change in P/S ratio, admission, retirement and retirement cum admission – treatment of Goodwill, revaluation of assets & liabilities (with/without alteration of books), treatment of reserve and adjustment relating to capital; treatment of Joint Life Policy, Death of a partner	15	15
2	Partnership accounts-II	Accounting for dissolution of firm – insolvency of one or more partner, consideration of private estate and private liabilities. Piecemeal distribution – surplus capital basis; maximum possible loss basis.	15	15
3	Branch accounting	Concept of Branch; different types of Branches. Synthetic method – preparation of Branch account. Preparation of Branch Trading and P/L account. (at cost & at IP) – normal and abnormal losses. Analytical method – preparation of Branch Stock, Adjustment etc A/C (at cost & at IP) – normal & abnormal losses Independent branch – concept of wholesale profit	10	10
4	Hire purchase and Instalment payment system	Meaning; difference with Installment payment system; Recording of transaction in the books of buyer – allocation of interest – use of Interest Suspense a/c – partial and complete repossession Books of Seller – Stock and Debtors A/C (with repossession) Books of Seller – H.P. Trading A/C without HP Sales and HP Debtors and General Trading A/c (with repossession) Concept of operating and financial lease – basic concept only.	10	10

5	Departmental accounts	Concept, objective of preparation of departmental accounts; apportionment of common cost; Preparation of Departmental Trading and P/L account, Consolidated Trading and P/L account; inter departmental transfer of goods at cost, cost plus and at selling price and elimination of unrealized profit.	10	10
6	Investment Accounts	Maintenance of Investment Ledger; Preparation of Investment Account (transaction with brokerage, STT, cum & ex-interest), Valuation of Investment under FIFO and Average method; Investment Account for Shares (with Right Shares, Bonus Shares and Sale of Right). Relevant Accounting Standard.	10	10
7	Business Acquisition and Conversion of partnership into limited company	• Profit/ loss prior to incorporation; Accounting for Acquisition of business. • Conversion of Partnership into Limited Company – with and without same set of books	10	10
			80	**80**

Relevant Accounting Standards issued by the Institute of Chartered Accountants of India are to be followed.

Suggested Reading

• Sukla, Grewal, Gupta: Advanced Accountancy Vol. I & II, S Chand
• R. L.Gupta & Radheswamy, Advanced Accountancy Vol. I & II, S. Chand
• Maheshwari & Maheshwari, Advanced Accountancy Vol. I & II, Vikash Publishing House Pvt. Ltd.
• Sehgal & Sehgal, Advanced Accountancy Vol. I & II, Taxman Publication
• L.S.Porwal, Accounting Theory, Tata Mcgraw Hill
• Gokul Sinha, Accounting Theory & Management Accounting,
• B. Banerjee, Regulation of Corporate Accounting & Reporting in India, World Press.
• Frank Wood, Business Accounting Vol 1&II, Pearson
• Tulsian, Financial Accounting, Pearson
• Hanif & Mukherjee, Financial Accounting, Vol II, McGraw Hill
• Accounting Standards issued by ICAI

CC3.2 Ch

Indian Financial System

Full Marks:100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit:I Financial System and Its Components
Meaning, Significance and Role of the Financial System; Components of the Financial System; The structure of Indian Financial System.

[L-10/Marks:10]

Unit:II Financial Markets
(a) Money Market: Functions and Instruments; Role of Central Bank; Indian Money Market: An Overview, Call Money Market, Treasury Bills Market, Commercial Paper (CP) Market, Certificate of Deposit (CD) Market; Concepts- Repo, Reverse Repo; Recent trends in the Indian money market.

[L-10/Marks 10]

(b) Capital Market: Functions and Instruments; Primary and Secondary Markets- Functions and inter-relationship, Methods of New Issues; Indian debt market and equity market; Market Intermediaries- Brokers, Sub-Brokers; Role of Stock Exchanges in India; Recent trends in the Indian capital market.

[L-20/Marks:20]

Unit: III Financial Institutions
Commercial banking: Functions of Commercial Banks, Credit creation by commercial banks and its limitations; Reserve bank of India: Functions, Credit Control and Monetary Policy; Development Financial Institutions in India: NABARD, EXIM Bank, SIDBI; Life Insurance and General Insurance Companies in India: Functions; Mutual Funds: Concept of Mutual Fund, Types of Mutual Funds(open ended and close ended); Role of Mutual Funds in Indian capital market; Non-Banking Financial Companies (NBFCs):Definition, Functions, Regulations of RBI over NBFCs. **[L-20/Marks:20]**

Unit: IV Financial Services
Merchant Banks: Functions and Role, SEBI Regulations; Credit Rating: Objectives and Limitations, SEBI Regulations; Credit Rating Institutions and their functions. **[L-10/Marks:10]**

Unit: V Investors' Protection
Concept of investors' protection; Grievances regarding new issue market and Stock Exchange transactions, and the Grievance Redressal Mechanism; Role of SEBI, judiciary and the media.

[L-10/Marks:10]

Suggested Readings

- Khan, M. Y., Indian Financial System-Theory and Practice, TMH
- Bhole, L. M., Financial Markets and Institutions, TMH
- Majumder S., Indian Financial System
- Nayak and Sana, Indian Financial System, Rabindra Library
- Basu, A, Mazumdar, D, Datta S., Indian Financial System, ABS

• Gurusamy, Financial Services, TMH
• Pathak, B., Indian Financial System, Pearson
• Bhattacharyya S., Indian Financial System, Oxford University Press
• Saha, S.S., Indian Financial System and Markets, McGraw Hill
• Saha, S.S., Capital Markets and Securities Law, Taxmann

Year 2: Semester IV

		Marks	Credit Hours	
GE 4.1 Chg	Microconomics I & Indian Economy (50+50)	**100**	**6**	
CC 4.1 Chg	Entrepreneurship Development and Business Ethics	**100**	**6**	
CC 4.1 Ch	Taxation I	**100**	**6**	
CC 4.2 Ch	Cost and Management Accounting -II	**100**	**6**	
			24	

GE 4.1 Chg

Microeconomics-II & Indian Economy (50+50)

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Microeconomics-II

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit: I Monopoly

Concept of Monopoly: Sources of monopoly power; Short-run and Long-run equilibrium of a monopoly firm; Price discrimination; Social Cost of Monopoly (concept only).

[L-10/Marks:10]

Unit: II Imperfect Competition
Concept of Imperfectly Competitive market; Monopolistic Competition: Features and examples; Oligopoly: Non-Collusive Oligopoly: Sweezy's Kinked demand Curve Model, Collusive Oligopoly: Cartel (concept with example) **[L-15/Marks:15]**

Unit: III Factor Price Determination

Introduction; Marginal Productivity Theory of Distribution; Marginal Productivity Theory of Wage, Demand Curve of Labour, Supply Curve of Labour; Wage Determination in an Imperfectly Competitive Labour Market: Case of Collective Bargaining, Factors determining the power of trade unions to raise wages; Theory of Rent: Ricardian Theory of Rent, Modern Theory of Rent,Quasi-rent; Theory of Profit: Gross Profit and Net Profit, Accounting Profit and Normal Profit, Different Theories of Determination of Profit; Concept of Interest: Gross Interest and Net Interest, Classic Theory of Interest Rate Determination.

[**L-15/Marks 15]**

Suggested Readings

• Pindyke and Rubinfeld, Micro Economics, Pearson
• Gold & Ferguson, Micro Economic Theory
• Banerjee & Majumdar, Business Economics and Business Environment, ABS
• Banerjee & Majumdar, Banijjik Arthaniti –o- Banijjik Paribesh(Bengali),ABS
• Ratan Khasnabish & Ranesh Roy, Banijjik Arthaniti –o- Bharoter arthanaitik Paribesh(Bengali)
- Divedi, D.N., Managerial Economics, Vikash Publications
- Mankiw.N.G., Principles of Microeconomics, Cengage
- Das, P. & Sengupta A., Economics , Oxford
- Samuelson & Nordhaus, Macroeconomics, McGraw Hill

Module II
Indian Economy

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit:I Basic Issues in Economic Development
Concepts and measures of development and underdevelopment; Concept of national income: GDP,GNP,NDP,NNP,NI (concepts only). **[L 5/ Marks:5]**

Unit:II Basic Features of Indian Economy
Sectoral distribution of National Income and Occupational Structure; Structural Change in Indian Economy, issue of Service-led Growth. **[L 10/ Marks:10]**

Unit:III Sectoral Trends and Issues

(a) **Agricultural Sector**: Problem of low productivity; Green Revolution and its impact; Land Reforms; Problems of rural credit and marketing.
(b) **Industry and Service Sector**: An overview of industrial growth during pre-reform and post-reform

period; Role of Public Sector: its performance and the issue of disinvestment; Role of MSME sector, problems faced by the MSME Sector; Role of the Service Sector: growth of banking and insurance sector during the post-reform period.
(c) **External Sector**: Problem of unfavourable balance of payments and policy measures.

[L 15/ Marks:15]

Unit:IV Social Issues in Indian Economy
Problem of Poverty, Poverty alleviation measures; Problem of Unemployment and the policy measures.

[L 10/ Marks:10]

Suggested Readings

•Dutt & Sundaram, Indian Economy, S.Chand
• Mishra &Puri, Indian Economy, Himalaya Publishing House
• Uma Kapila, Indian Economy
• Joydeb Sarkhel & Swapan Kr. Roy, Bharoter arthanaiti(Bengali)
• Banerjee & Majumdar, Business Economics and Business Environment,ABS
• Banerjee & Majumdar, Banijjik Arthaniti –o- Banijjik Paribesh(Bengali),ABS
• Ratan Khasnabish & Ranesh Roy, Banijjik Arthaniti –o- Bharoter arthanaitik Paribesh(Bengali)
- Prakash, B.A., Indian Economy, Pearson
- Fernando, Indian Economy, Pearson

CC 4.1 Chg
Entrepreneurship Development and Business Ethics

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
Entrepreneurship Development

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit-1: Introduction:
No. of classes: 10 / Marks: 10
Meaning, elements, determinants and importance of entrepreneurship and creative behavior; Entrepreneurship and Micro, Small and Medium Enterprises, Role of family business in India; The contemporary role models in Indian business: their values, business philosophy and behavioural orientations; Conflict in family business and its resolution.

Unit-2:
No. of classes: 10 / Marks: 10
Public and private system of stimulation, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, Role of industries/entrepreneur's associations and self-help groups, The concept, role and functions of business incubators, angel investors, venture capital and private equity fund.

Unit-3:
No. of classes: 10 / Marks: 10
Sources of business ideas and tests of feasibility. Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report

Unit-4:
No. of classes: 10 / Marks: 10
Mobilizing Resources - Mobilizing resources for start-up. Accommodation and utilities; Preliminary contracts with the vendors, suppliers, bankers, principal customers; Basic start-up problems;

Module II
Business Ethics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Business Ethics
No. of classes: 8 / Marks: 8
Introduction – Meaning - Scope – Types of Ethics – features – Factors influencing Business Ethics – significance of Business Ethics - Arguments for and against business ethics- Basics of business ethics - Corporate Social Responsibility and Business Ethics

Unit 2: Principles of Business Ethics
No. of classes: 8 / Marks: 8

Introduction – Meaning – Element – Ethics, Morale, Business ethics, Ethical dilemma [basic idea, features and significance of each of element]

Unit 3: Ethics in Management
No. of classes: 8 / Marks: 8
Introduction – Ethics in HRM – Ethics in Marketing — Ethics in Accounting and finance - Work place Ethics - Value and Ethics.

Unit 4: Corporate Culture
No. of classes: 8 / Marks: 8
Meaning – Role – Functions – Impact of Corporate Culture – Globalization and cross culture issues in ethics, Corporate Code of ethics

Unit 5: Ethics & Corporate Governance
No. of classes: 8 / Marks: 8
Concept of Corporate Governance, Scope, Reports on Corporate Governance and its benefits and limitations-- Corporate Governance and Business Ethics [Brief Concept]

Suggested Readings:

- Kuratko and Rao, *Entrepreneurship: A South Asian Perspective*, Cengage Learning.
- Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship*, McGraw-Hill Education
- Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai,
- Himalaya Publishing House.
- Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
- Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
- Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi:
- Prentice-Hall of India. ISBN-81-203-1690-8.
- Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi:
- ASEED.
- SS Khanka, *Entrepreneurial Development*, S. Chand & Co, Delhi.
- Hifrich, Manimala, Peters & Shepherd, *Entrepreneurship*, McGraw-Hill
- Kumar Arya, Entrepreneurship, Pearson
- Bamford and Bruton, Entrepreneurship, McGraw Hill
- SIDBI Reports on Small Scale Industries Sector.
- Roy, Entrepreneurship, Oxford
- Albuquerque, Business Ethics, Oxford
- Ferrell, Fraedrich, Farrell, Business Ethics, Cengage

Note: Latest edition of text books may be used.

CC 4.1 Ch

TAXATION-I

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1 :

a) Basic Concepts and Definitions under IT Act
Assessee, Previous year, Assessment year, Person, Income, Sources of income, Heads of income, Gross total income, Total income, Maximum marginal rate of tax, Tax Evasion, Tax avoidance, Tax planning.

b) Residential Status and Incidence of Tax
Residential status of all persons except company

c) Incomes which do not form part of Total Income
Except section 10AA.

d) Agricultural Income

Definition, determination of agricultural and non-agricultural Income, assessment of tax liability when there are both agricultural and non-agricultural income

(L-10 / M-10)

Unit 2 : Heads of Income and Provisions governing Heads of Income

a) *Salaries*

b) *Income from House property* **(L-30 / M-30)**

Unit 3 : Heads of Income and Provisions governing Heads of Income

a) *Profits and Gains of Business and Profession*

Special emphasis on sec. 32, 32AC, 32AD, 35, 35D, 36(i)(ib), (ii), (iii), (iv), (vii), 37, 37(2B), 40A(2), 40A(3), 43B, (Excluding presumptive taxation)

b) *Capital Gains*

Meaning and types of capital assets, basic concept of transfer, cost of acquisition, cost of improvement and indexation, computation of STCG and LTCG, exemptions u/s 54, 54B, 54EC and 54F, capital gain on transfer of bonus shares, right entitlement and right shares, taxability of STCG and LTCG.

c) *Income from Other Sources*

Basis of charge excluding deemed dividend **(L-25 / M-25)**

Unit 4 : a) Income of other Persons included in Assessee's Total Income

Remuneration of spouse, income from assets transferred to spouse and Son's wife, income of minor.

b) Set off and Carry Forward of Losses

Mode of set off and carry forward, inter source and inter head set off, carry forward and set off of losses u/s 71B, 72, 73, 74, 74A.

c) Deductions from Gross Total Income

Basic concepts, deductions u/s 80C, 80CCC, 80CCD, 80CCE, 80D, 80DD, 80DDB, 80E, 80G, 80GG, 80GGC, 80TTA, 80U

d) Rebate u/s 87A (L-15 M-15)

If any new legislations/provisions are enacted in place of the existing legislations/provisions, the syllabus will accordingly include such new legislations/provisions in place of existing legislations/provisions with effect from such date as prescribed by CALCUTTA UNIVERSITY. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus.

Suggested Readings

- Singhnia V.K., and Singhania K, Direct Tax Law and Practice, Taxmann
- Lal and Vashist, Direct Taxes, Pearson
- Ahuja and Gupta, Direct Taxes Law And Practice, Bharat
- Manoharan & Hari, Direct Tax Laws, Snow White
- Roy, S. K., Principles and Practice of Direct & Indirect Taxes, ABS
- Sengupta, C.H., Direct & Indirect Taxes, Dey Book Concern

Latest edition of the books may be read.

CC 4.2 Ch

Cost and Management Accounting -II

Full Marks – 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Content	Marks	Hours
1	**Joint Product & By product**	Meaning, treatment and apportionment of cost; decision relating further processing	**20**	**18**
	Activity Based Costing	Problems of traditional costing; meaning of Activity Based Costing; cost analysis under ABC; application of ABC (Simple problems)		
2	**Budget and Budgetary Control**	Budget and Budgetary Control; The budget manual, principal budget factor, preparation and monitoring procedures, Fixed and Flexible budget, preparation of functional budgets – concepts, cash budget, flexible budget.	**10**	**12**
3	**Standard Costing**	Standard Costs and Standard Costing; Uses, & Importance. Differences with Budgetary Control, Preliminary Steps. Classification of Standards. Analysis and computation of Materials, Labour and Overhead Costs (concepts only) Variances	**20**	**20**
4	**CVP Analysis, Marginal Costing**	**CVP Analysis** Introduction; CVP Assumptions and Uses; Break-Even Analysis: BE Point and Margin of Safety; Graphical presentation of CVP Relationship; Profit Graph **Marginal Costing and Management Decisions –** Marginal Costing vis-à-vis Absorption Costing; Cost statement under marginal costing and absorption costing; Marginal Costing Techniques.	**20**	**15**
5	**Short-term Decision Making**	Marginal Cost and decision relating Product Pricing; Product Mix; Make or Buy; Choosing among alternatives and closing down or suspending an activity. (with simple type of problems)	**10**	**15**
		Total	**80**	**80**

Suggested Readings

- Horngren, Foster & Rajan, Cost Accounting,- A Managerial Emphasis, Pearson
- B.Banerjee, Cost Accounting, PHI
- Jawahar Lal & Seema Srivastava, Cost Accounting, TMH
- M.Y.Khan & P.K.Jain, Management Accounting, TMH
- Atkinson, Management Accounting, Pearson
- Bhattacharyya, Ashish K., Cost Accounting for Business Manageres, Elsevier
- Ravi M Kishore, Cost and management Accounting, Taxmann
- Hanif, M., Cost and Managment Accounting, TMH
- Mitra, J.K., Cost and Management Accounting, Oxford
- Drury, C., Management and Cost Accounting, Cengage

Year 3: Semester V

		Marks	Credit Hours	
CC 5.1Ch	Auditing & Assurance	**100**	**6**	
CC 5.2 Ch	Taxation II	**100**	**6**	
DSE 5.1 A*	Economics II and Advanced Business Mathematics	**100**	**6**	
DSE 5.2 A*	Corporate Accounting	**100**	**6**	
			24	

CC 5.1Ch
Auditing & Assurance
Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

UNIT – I CONCEPT, NEED AND PURPOSE OF AUDIT (10M 10L)

- Definition-Nature-Scope and Objectives of Independent Financial Audit
- Basic Principles Governing an Audit, Concept of Auditor's Independence
- Errors and Fraud-Concepts, Means of doing Fraud, Auditor's Responsibility towards Detection and Prevention of Fraud, Difference between Audit and Investigation
- Classification of Audit- Organization Structure wise (Statutory, Non-statutory); Objective wise (Internal and Independent Financial Audit); Periodicity wise (Periodical, Continuous, Interim, Final); Technique wise (Balance Sheet, Standard, Systems, EDP);
- Standards on Auditing (SA)- Concept and Purpose

(This unit should be studied with SA 200[REVISED] and SA 240[REVISED])

UNIT – II AUDIT PROCEDURES AND TECHNIQUES (15M 15L)

- Auditing Engagement-Audit Planning- Audit Programme (Concept)
- Documentation: Audit Working Paper, Ownership and Custody of Working Papers-Audit file (Permanent and Current) – Audit Note Book- Audit Memorandum.
- Audit Evidence – Concept, Need, Procedures to obtain Audit Evidence
- Routine Checking, Test Checking and Auditing in Depth
- Concept of Analytical Procedure and Substantive Testing in Auditing.
- Audit of Educational Institutions, Hospitals and Hotels

(This unit should be studied with SA 210, SA 230, SA 300, SA 500, SA 520 and SA 530)

UNIT – III AUDIT RISK AND INTERNAL CONTROL SYSTEM (10M 10L)

- Audit Risk – Concept and Types only.
- Internal Control- Definition, Objectives
- Internal Check- Definition, Objectives
- Internal Audit- Definition, Objectives, Regulatory Requirement, Reliance by Statutory Auditor on Internal Auditor's Work

(This unit should be studied with SA 610)

UNIT – IV VOUCHING, VERIFICATION AND VALUATION (10M 10L)

- **Vouching:** Meaning, Objectives - Difference with Routine Checking – Factors to be Considered during Vouching - Vouching of Following Items: i) **Receipts:** Cash Sale, Collection from Debtors, Interest and Dividend from Investment, Sale of Fixed Assets. ii**) Payments:** Cash Purchase, Payment to Creditors, Payment of Wages and Salaries, Advertisement Expenses, Travelling Expenses, Research and Development Expenditure, Prepaid Expenses.
- **Verification and Valuation:** Concept, Objectives, Importance, Difference with Vouching, Difference between Verification and Valuation, Verification of following items: **i) Non-Current Assets:** Goodwill, Patent and Copy Right, Leasehold Land, Plant and Machinery, **ii) Investments iii) Current Assets:** Inventory, Loan and Advance, Cash and Bank Balances **iv) Non-current Liability**: Secured Loan **v) Current Liability**: Trade Payables (Sundry Creditors).

UNIT - V COMPANY AUDIT (15M 15L)

- Qualification, Disqualification, Appointment and Rotation, Removal and Resignation, Remuneration, Rights, Duties and Liabilities of Company Auditor
- Branch Audit and Joint Audit
- Depreciation – Concept and Provisions of the Companies Act
- Divisible Profit and Dividend (Final, Interim and Unclaimed/Unpaid): Provisions of the Act, Legal Decisions and Auditor's Responsibility

UNIT – VI AUDIT REPORT AND CERTIFICATE (10M 10L)

- Definition – Distinction between Report and Certificate- Different Types of Report
- Contents of Audit Report (As per Companies Act and Standards on Auditing)
- True and Fair View – Concept
- Materiality – Concept and Relevance

(This unit should be studied with SA 700)

UNIT – VII OTHER THRUST AREAS (10M 10L)

- Cost Audit – Concepts, Objectives Relevant Provisions of Companies Act
- Management Audit - Concepts, Objectives, Advantages
- Tax Audit – Concepts, Objectives, Legal Provisions
- Social Audit – Propriety Audit – Performance Audit – Environment Audit (Concepts only)

Notes:

1) **The provisions of the Companies Act, 1956 which are still in force would form part of the syllabus till the time their corresponding or new provisions of the Companies Act, 2013 are enforced.**
2) **If new Laws or Rules are enacted in place of the existing laws and rules, the syllabus would include the corresponding provisions of such new laws and rules with immediately following Academic Year.**
3) **Students are expected to develop analytical mind for answering problem based questions along with the theoretical questions.**

Suggested Readings:

- Tandon et al, Practical Auditing, S.Chand
- Gupta & Arora, Fundamentals of Auditing, TMH
- Jha, A., Auditing, Taxmann
- Basu, S. K., Auditing and Assurance, Pearson
- Ghosh, J., Contemporary Auditing and Assurance, Elegant Publishing
- **Standards on Audit (SA) issued by the Institute of Chartered Accountants of India**

CC 5.2 Ch
TAXATION-II
Full Marks – 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
Direct Tax

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Computation of Total Income and Tax Payable

a) Rate of tax applicable to different assesses (except corporate assessee)
b) Computation of tax liability of an individual, Firm (excluding application of AMT) **(L-15 / M-15)**

Unit 2 : TAX MANAGEMENT

a) Provision for Filing of Return
Date of filing of return, relevant forms of return, different types of returns, return by whom to be signed, PAN, TAN

b) Assessment of Return
Self assessment u/s140A, Summary assessment u/s 143(1), Scrutiny assessment u/s 143(3) and Best judgement assessment u/s 144.

c) Advance Tax
Who is liable to pay, due dates and computation of advance tax (excluding corporate assessees)

d) Interest & Fees
Section 234A, 234B, 234C, 234F (simple problems on interest and fees)

e) TDS
Provisions regarding TDS from salary, interest on securities, horse racing, lottery**.** **(L-25 / M-25)**

Module II
INDIRECT TAXES

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 3 : Central Sales Tax
Definitions, incidence and levy of tax, exemptions and exclusions, forms under CST, determination of turnover and tax payable, registration of dealers.
(L-8 / M-10)

Unit 4 : West Bengal Value Added Tax
Concepts and general principles, features, advantages and disadvantages, definitions, incidence and levy of tax, Rates of VAT, Calculation of VAT liability, Input tax credit (including on Capital goods), small dealers and composition scheme, registration of

dealers, cancellation of registration certificate.

(L-12 / M-10)

Unit 5 : Central Excise

Basic concepts, conditions and taxable event for levy of excise duty, Goods and excisable goods, Manufacture and deemed manufacture, Definitions of factory, broker or commission agent, wholesale dealer, sale or purchase, valuation – MRP, transaction value. **(L-12 / M-10)**

Unit 6 : Customs

Basic concepts, Taxable event, Territorial water, Indian customs water, Goods, Types of Customs duties – Basic, Additional, Protective, Safeguard, Counter-veiling duty on subsidised goods, Anti Dumping, Valuation of Custom Duty. **(L-8 / M-10)**

The indirect tax portion of this paper will be replaced by the Goods & Service Tax Law whenever the law is enforced and accordingly revised syllabus will be announced.
If any new legislations/provisions are enacted in place of the existing legislations/provisions, the syllabus will accordingly include such new legislations/provisions in place of existing legislations/provisions with effect from such date as prescribed by CALCUTTA UNIVERSITY. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus.

Suggested Readings

- Datey V.S., Indirect Taxes Law And Practice, Taxmann
- Sanjeev Kumar, Systematic Approach to Indirect Taxes, Bharat
- Bangar and Bangar, Students' Gide to Indirect Taxes, Aadhya Prakashan.
- Sengupta, C.H., Direct & Indirect Taxes, Dey Book Concern
- Roy, S. K., Principles and Practice of Direct & Indirect Taxes, ABS

Latest edition of the books may be read.

DSE 5.1 A
Macroeconomics and Advanced Business Mathematics (50+50)

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Macroeconomics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit – I:Introduction

Concepts and variables of Macroeconomics. **[L 2 / Marks:2]**

Unit – II: National Income Accounting
Concepts and measurement of National Income (numerical examples preferred); Circular flow of income – Real and Nominal GDP –Implicit deflator. **[L 6 / Marks:6]**

Unit – III: Determination of Equilibrium Level of National Income
Simple Keynesian Model; Consumption, saving and investment functions – National income determination; Investment multiplier, Government expenditure multiplier, Tax multiplier, Balanced Budget multiplier. **[L 10 / Marks:10]**

Unit – IV: Commodity market and Money market equilibrium
Concept of demand for Money: Liquidity Preference Approach; Derivation of IS and LM curves –Shifts of IS and LM curves-equilibrium in IS-LM model – Effectiveness of monetary and fiscal policies. **[L 10 / Marks:10]**

Unit – V: Money, Inflation and Unemployment
Concept of supply of money; Measures of money supply – High powered money – Money multiplier. Concept of Inflation – Demand-pull and Cost-push theories of inflation – Monetary and fiscal policies to control inflation; Unemployment: Voluntary and Involuntary, Frictional and Natural Rate of Unemployment (Concepts only). **[L 12 / Marks:12]**

Suggested Readings

- W. H. Branson, Macro Economic Theory and Policy
- Joydeb Sarkhel, Macro Economic Theory
- Mazumdar & Chatterjee, Macroeconomics & Advanced Business Mathematics, ABS
- Dornbusch, Fischer & Startz, Macroeconomics, TMH
- Samuelson & Nordhaus, Macroeconomics, McGraw Hill

Module II

Advanced Business Mathematics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

1 **Functions,Limit and Continuity**: Definition of functions, Classification of functions, Different types of functions(excluding trigonometrical functions), Elementary ideas of limit and continuity through the use of simple algebraic functions. **[8 L /8Marks]**

2 **Differentiation and Integration**: Derivative and its meaning; Rules of differentiation; Geometrical interpretation; Significance of derivative as rate measure; Second order derivatives; Integration as anti-derivative process; Standard forms; Integration by substitution. **[8 L /8Marks]**

3 **Applications of Derivativeand Integration**: Maximum and minimum values ; Cost function ; Demand function ; Profit function; Increasing and decreasing functions ; Rate measure, Applied problems on Average cost (AC), Average variable cost (AVC), Marginal cost (MC), Marginal revenue (MR), Simple area calculation by integration method. **[8 L /8Marks]**

4 **Determinants**: Determinants upto third order, Elementary properties of determinants, Minors and co-factors, Solution of a system of linear equations by Cramer's Rule (up to three variables). **[8 L /8Marks]**

5 **Matrix**: Definition of matrix, Types of matrices, Operations on matrices (addition, subtraction, multiplication), Adjoint of a matrix, Inverse of a matrix , Solution of a system of linear equations by matrix inversion method (up to three variables).

[8 L /8Marks]

Suggested Readings

- Basic Mathematics and its Application in Economics – S. Baruah (Macmillan)
- Mathematics for Economics and Business – R. S. Bhardwaj (Excel Books)
- Mathematical Analysis for Economists - R. G. D. Allen(Macmillan)
- Mathematics for Management – M. Raghavachari (Tata McGraw-Hill)
- Mathematics for Business, Economics and Social Science – F. S. Budnick(Tata McGraw Hill)
- Advanced Business Mathematics – J. Chakraborti (Dey Book Concern)
- Advanced Business Mathematics – R K Ghosh & S Saha (New Central Book Agency(P) Ltd
- Advanced Business Mathematics – Dr. Priyotosh Khan (Elegant Publication)
- Advanced Business Mathematics – Dr. S N De (Chhaya Prakashani)
- Advanced Business Mathematics - N K Nag & S K Nag (Kalyani Publishers)
- Advanced Business Mathematics – Dr. Ranjit Dhar (Dishari Prakashani)

DSE 5.2 A
CORPORATE ACCOUNTING
Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

CORPORATE ACCOUNTING

Unit	Topic	Details	Marks allotted	No. of lectures
1	Company – Introduction And Accounting for Shares & debentures	• Meaning of Company; Maintenance of Books of Accounts; Statutory Books; Annual Return • Issue of Shares – issue, forfeiture, reissue, issue other than in cash consideration and issue to the promoters; Pro-rata issue of shares. Issue of debentures. Sweat equity. • Right and Bonus Share – Rules, Accounting • Underwriting of shares and debentures: Rules; Determination of Underwriters Liability – with marked, unmarked & firm underwriting; Accounting. • Employee Stock Option Plan – meaning; rules; Vesting Period; Exercise Period. Accounting for ESOP. Meaning and Accounting of ESPS.	20	20
2	Buy back and Redemption of preference shares	• Buy Back of Securities – meaning, rules and Accounting. • Redemption of Preference Shares – Rules and Accounting (with and without Bonus Shares)	10	10
3	Company Final Accounts	Introduction to Schedule III; Treatment of Tax; transfer to reserve, Dividend and applicable tax (out of current profit, out of past reserve); Preparation of Statement of Profit & Loss and Balance Sheet. (tax on net profit without recognizing deferred tax)	15	15
4	Redemption of debenture	Redemption of Debenture – Important Provisions, Accounting for Redemption: by conversion, by lot, by purchase in the open market (cum and ex-interest), held as Investment and Use of Sinking Fund	10	10
5	Valuation	Goodwill – valuation using different methods,i.e., Average Profit, Super Profit, Capitalisation and Annuity. Shares – Valuation using different methods: Asset approach, Earnings approach, Dividend Yield, Earnings-Price, Cum-div and Ex-div, Majority and Minority view and Fair Value	10	10

6	Company Merger And Reconstruction	• Amalgamation, Absorption and Reconstruction– Meaning; relevant standard and meaning of different terms, Accounting in the books of Transferor Company. Accounting in the books of Transferee (based on relevant accounting standard); inter-company transactions (excluding inter-company share holding). • Internal reconstruction – meaning, provisions and Accounting, Surrender of Shares for redistribution; preparation of Balance Sheet after reconstruction	15	15
		Total	80	80

Relevant Accounting Standards issued by the Institute of Chartered Accountants of India are to be followed.

Suggested Reading

• Sukla, Grewal, Gupta: Advanced Accountancy Vol. II, S Chand
• R. L.Gupta & Radheswamy, Advanced Accountancy Vol. II, S. Chand
• Maheshwari & Maheshwari, Advanced Accountancy Vol. II, Vikash Publishing
• Sehgal & Sehgal, Advanced Accountancy Vol. I II, Taxman Publication
• Hanif & Mukherjee, Financial Accounting, Vol III , TMH
• • Frank Wood, Business Accounting Vol II, Pearson
• V.K.Goyal, Corprate Accounting, Excel Books
• Rajasekaran, Corporate Accounting, Pearson
• Accounting Standards issued by ICAI

DSE Papers

SEMESTER V

DSE 5.1 M : Consumer Behaviour & Sales Management (50+50)

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Consumer Behaviour Marks

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Consumer Behaviour
No. of Classes 8 / Marks 8

• Concept : Application of Consumer Behaviour Knowledge
• Consumer Behaviour Model
• Market Segmentation
• Marketing Ethics

Unit 2 : Determinants of Consumer Behaviour
No. of Classes 8 / Marks 8

• Consumer as an Individual, Need, Motivation
• Personality, Perception, Learning Attitude
• Communication persuasion
• Consumers in their Social & Cultural Setting, the family, Social class, cross cultural consumer behaviour

Unit 3 : Consumer Decision-making Process
No. of Classes 8/ Marks 8

• Personal Influence & Opinion
• Leadership Process
• Diffusion of innovations
• Consumer decision making process

Unit 4 : Consumer Behaviour & Society
No. of Classes 8 / Marks 8

• Health - care Marketing
• Political marketing
• Social Marketing
• Environmental Marketing
• Public Policy & Consumer Protection

Unit 5 : Consumer Behaviour and Market Research
No. of Classes 8 / Marks 8

• Relevance of Marketing Information System
• Market Research in assessing Consumer Behaviour

Suggested Readings:

- Suhiffman & Kanuk, Consumer Behaviour, PHI
- Loudon & Bitta, Consumer Behaviour, TMH
- Bennet & Kassarjian, Consumer Behaviour, PHI
- Batra & Kazmi, Consumer Behaviour, Text & cases, Excel Books
- Beri, Marketing Research, TMH
- Bradley, marketing Research. Oxford University Press
- Schiffman and Kannak, Consumer Behaviour, Pearson Education

Module II : Sales Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Sales Organization
No. of Classes 8 / Marks 8

• Purpose and General principles of organization
• Every-growing complexity of Sales Organisation
• Different Models of Sales Organisation
• Factors determining Sales Organisation Structure
• Decentralised Structure
• Common problems associated with Structuring the Sales Organisation
• Modification of Sales Organisation
• Tasks of Chief Sales Executive

Unit 2 : Designing the Sales Force
No. of Classes 8 / Marks 8

• Objectives
• Strategies
• Structure size
• Sales force Compensation

Unit 3 : Managing the Sales Force
No. of Classes 8/ Marks 8

• Recruitment
• Selection
• Placement
• Transfer
• Training and Development
• Grievances handling of Sales Force
• Motivating Leading and Communicating with the Sales Force
• Performance Evaluation of Sale Force

Unit 4 : Personal Selling and Salesmanship
No. of Classes 8 / Marks 8

• Buyer-Seller Dyads
• Theories of selling
• Personal Selling as a Career
• Steps in Personal Selling – Methods of Approaching a Customer
• Handing Customer Objections
• Negotiations – Barganing and Negotiation Approaches, Bargaining Strategies and Tactics during Negotation

Unit 5 : Marketing Channels and Selection
No. of Classes 8 / Marks 8

• Need
• Functions
• Levels
• Identifying and Analyzing Customers' needs for Products Services
• Developing channel Objective, Selection of Appropriate Channel
• Selection of Appropriate channels
• Motivating, Leading, Communicating with the Channel Members
• Performance Evaluation of the Channel Members
• Modifying Channel Arrangements

Suggested Readings:

- Cundiff, Still and Govoni, Sales management, PHI
- Smith, Sales Management, PHI
- Kotler, Marketing Management, PHI
- Zieglar, et al Sales Promotion and Modern Merchandising
- Stem, Ansary and Coughlan Marketing Channels, PHI
- Warmer, Marketing and Distribution, Macmillan, New York
- Pyle, Marketing Principles, Macmillan, New York
- Doughlas, et al Fundamentals of Logistics and Distributions, TMH
- Gupta, Sales and Distribution Management, Excel Books
- Havaldar & Cavale, Sales and Distribution Management, McGraw Hill
- Hawkins, Motherbaugh & Mookerjee, Consumer Behaviour, McGraw Hill
- Schiffman, Wisenblit & Kumar, Consumer Behaviour, Pearson

DSE 5.2 M : Product & Pricing Management & Marketing Communication

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Product & Pricing Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction to Product Management

No. of Classes 8 / Marks 8

• Product: Basic concept of product, levels, Importance in Marketing Mix, Product Mix Decisions
• Product-Life-Cycle: Concept, strategies related to different stages of PLC.
• Product Portfolio: Concept, Importance, BCG Model

Unit 2 : Marketing Environment and Market segmentation

No. of Classes 8/ Marks 8

• Marketing Environment: concept, Importance, Micro-environmental factors and Macro-environmental factors (Demographic, Economic, Natural, Technological, Socio-Cultural & Political-Legal)
• Market segmentation: Concept, Importance and bases

Unit 3 : New Product Development

No. of Classes 8 / Marks 8

Concept
Importance
Stages
Reasons for failure of a new product
Adoption process.

Unit 4 : Packaging and Branding:

No. of Classes 8 / Marks 8

Packaging:
• Concept
• Importance
• Packaging Strategies
• Legal and Ethical aspects of packaging
Branding:
• Concept
• Importance
• Positioning and repositioning strategies
• Basic concepts of Brand equity

Unit 4 : Pricing Management:

No. of Classes 8 / Marks 8

• Concept
• Important features of pricing as an element of Marketing Mix
• Importance of pricing in consumer buying process
• Determining factors of effective pricing
• Pricing methods
• Pricing in the Indian context
• Regulatory Price Environment

Suggested Reading:

- Kotler and Kellar, Marketing Management, Pearson

- William and Ferrell, Marketing, Houghton Miffin McGraw-Hill
- Neelamegham, Marketing in India: Cases and Readings, Vikas Publishing
- Majumder, Product Management in India, PHI
- McCarthy and Perreault, Basic Marketing Managerial Approach, Irwin, Homewood, Illinois
- Srivastava, R. K., product Management & New product Development, Excel Book
- Ramaswamy and namakumari, Marketing Management, Macmillan India
- Srinivasan Case Studies in marketing: The India Context, PHI
- Baker & Hart, Product Strategy and Management, Pearson

Module II: Marketing Communication

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Communication Process
No. of Classes 8 / Marks 8

• Importance of communication
• Steps involved in the process of Communication
• Barriers to Marketing Communication
• Social Media, Digital Marketing- Concepts

Unit 2 : Communication Mix
No. of Classes 8 / Marks 8

• Advertising : Definition & Importance
• Different Adverting Function
• Types of Advertising
• Advertising Process
• Setting Advertising Objective
• Budget
• Economic aspects of Advertising

Unit 3 : Advertising Process
No. of Classes 8 / Marks 8

• Advertising Appeal
• Copy Writing
• Headline
• Illustration
• Message
• Copy Type
• Campaign Planning
• Different Types of Media
• Media Planning
• Scheduling

Unit 4 : Impact of Advertising
No. of Classes 8 / Marks 8

• Advertising Agency Roles
• Relationships with Clients
• Role of Advertising Department
• Measuring Advertising Effectiveness
• Legal and Ethical Aspects of Advertising

Unit 5 : Sales Promotion
No. of Classes 8/ Marks 8

• Meaning
• Nature and Function
• Types
• Sales Promotion Techniques (Sample Distribution, Coupon, Price off premium plan, Consumer contests, Displays Demonstration, Trade Fairs and Exhibitions
• Role of Sales force
• Limitation of Sales Promotion

Suggested Readings:

- Batra and Myers, Advertising Management, Prentice Hall
- Sengupta, Brand Positioning Strategies for Competitive Advantage, TMH
- Cundiff, Still and Govoni, Sales Management, Prentice Hall
- Rossiter and Percy, Advertising and Promotion Management, MacGraw-Hill Sundage,
- Fryburger and Rotzoll, Advertising Theory and Practice, AITBS
- Belch and Belch, Advertising and Promotion, McGraw Hill

DSE 5.1T
PUBLIC FINANCE AND TAXATION

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1: **Origin and Development of Public Finance (8 L /8 Marks)**

- *Meaning, The rationale for State intervention – market failure, externalities, public goods*
- *Public finance and private finance, principle of maximum social advantage*

Unit 2: **Taxation and Government Revenue (12 L /12 Marks)**

- *Benefit approach, Ability to pay approach*
- *Impact and incidence of taxation, Direct and indirect taxes, Excess burden of taxes*
- *Sources and classification of public revenues*

Unit 3: **Government Expenditure** **(4L /4Marks)**

- Provision of public goods and merit goods, redistribution objective of public expenditure

Unit 4: **Impact of Taxation and Public Expenditure** **(8 L /8Marks)**

- *Effect on production, investment, distribution and stability*

Unit 5: **Public Debt – Meaning, Impact and Management** (8 L /8Marks)

Unit 6: **Development of Federal Finance in India** **(8 L /8 Marks)**

- *The constitutional arrangements, Finance Commissions*

Unit 7: **Central Finances in India** **(8 L /8 Marks)**

- *Sources and uses of funds, effects of Fiscal Policy*
- *Different concepts of Deficit- Impact of deficit*

Unit 8: **State Finances** **(8 L /8 Marks)**

- *Sources and uses of funds, issues of federalism*

Unit 9: **Fiscal Reforms in India** **(8 L /8 Marks)**

- *Changing scenario of Indian tax Structure, FRBM Act*

Unit 10: **Issue of Public Debt in India –Internal and External** **(8 L /8 marks)**

Suggested Readings:

- Musgrave, R., The Theory of Public Finance, McGraw Hill
- Musgrave & Musgrave, Public Finance in Theory and Practice, McGraw Hill
- Bhargava B.M., The Theory and Working of Union Public of India
- Vaish & Agarwal, Public Finance, Willy Eastern
- Rosen, S.H. & Gayer, T., Public Finance, McGraw Hill

DSE 5.2 T

DIRECT TAX LAW AND PRACTICE

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1 : **a) Residential Status and Incidence of Tax**

Residential status of a company & tax incidence. Income deemed to accrue or arise in India u/s 9.

b) Incomes which do not form part of Total Income
Sec 10(11A), 10(12A), 10(30), 10(31), 10(34) read with sec. 115BBDA, 10(35), 10(43) and 10AA. (L-10/M-10)

Unit 2 : **Heads of Income and Provisions Governing Heads of Income**

a) *Profits and gains of business or profession*
Advance level discussion with special emphasis on presumptive taxation

b) *Capital Gains*
Advance level discussion with special emphasis on transfer, treatment u/s 45(1A), 45(2), 45(3), 45(4), 45(5), Transfer of assets between holding and subsidiary company, and exemptions.

c) *Income from other sources*
Advance level discussion with special emphasis on gift and deemed dividend. (L-25 / M-25)

Unit 3 : **a) Income of other Persons included in Assessee's Total Income**
Revocable transfer of assets, Income from assets transferred to the benefit of spouse and son's wife, conversion of self acquired property into joint family property.

b) Deductions from Gross Total Income
Deductions u/s 80IAB, 80IAC, 80IBA, 80IE, 80JJ, 80JJAA
(L-10/ M-10)

Unit 4 : a) *Relief U/S 89*
b) *Double Taxation Relief*
c) *Business Restructuring – Amalgamation, Demerger, Stump Sale with special reference to treatment of depreciation and capital gains.*
(L-10 / M-10)

Unit 5 : **Computation of Total Income and Tax Payable**
Advance level problems on computation of total income and tax liability of an individual, HUF, Firm, LLP and AOP (including application of AMT)
(L-25 / M-25)

Suggested Readings

- *Singhnia V.K., and Singhania K, Direct Tax Law and Practice, Taxmann*
- *Lal and Vashist, Direct Taxes, Pearson*
- *Ahuja and Gupta, Direct Taxes Law And Practice, Bharat*
- *Manoharan and Hari, Direct Tax Laws, Snowwhite*

Latest edition of the books may be read.

DSE 5.1eB
FUNDAMENTALS OF COMPUTER

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1. Computer Basics: Characteristics of computer. Generations of computer. Type of computer – Mainframe, Mini, Micro (desktop, laptop and handheld), Super Computer. Inside a Computer – Power supply (SMPS), Motherboard, Ports and interfaces, Expansion Cards, memory Chips, Ribbon Cables, Storage devices, Processor. [15 lectures / 12 Marks]

Unit 2. **CPU organistion and architecture**: Arithmetic/Logic Unit (ALU), control Unit (CU), Registers, System Bus, Processor to Memory Communication Processor to I/O devices Communication. [12 lectures / 12 Marks]

Unit 3. Memory organization: Memory representation, Cache memory, Primary memory – RAM and ROM. Functions of RAM and ROM. Different types of RAM and ROM. Secondary memory – Magnetic and optical storage devices (brief description of different types). Storage organization of a Magnetic disk. Mass storage devices – RAID, Automated Tape Library. [10 lectures / 10 Marks]

Unit 4. **Input and Output devices**: Major types and their functions. [6 lectures / 6 Marks]

Unit 5. Operating System: Concept, types, functions. [6 lectures / 6 Marks]

Unit 6. Problem Solving Tools: Algorithm. Flowcharts- Concepts, advantages and disadvantages of flowcharts, Problem solving using flowcharts.
Decision Tables - Concepts, advantages and disadvantages of decision tables, Problem solving using decision tables. [10 lectures / 12 Marks]

Unit 7. Data communication and Computer networks: Transmission Modes - Simplex, Half-Duplex, Full Duplex. Analog and digital transmission. Synchronous and Asynchronous transmission.

Multiplexing. Network Concept, Types - LAN, WAN, MAN, VAN, SAN.
Various Topologies - Bus, Star, Ring, Mesh, Tree**.** Protocol Models - OSI, TCP/IP
[16 lectures/ 16 Marks]

Unit 8. Multimedia essentials: Definition, building blocks of multimedia**,** multimedia system, multimedia application. [5 lectures / 6 Marks]

Suggested Readings:

- ITLESL, Introduction to Computer Science, Pearson Education
- ITLESL, Introduction to Information Technology, Pearson Education
- .Sinha & Sinha, Fundamentals of Computers, BPB Publication.
- .Rajaraman, Fundamentals of Computers, PHI

DSE 5.2 eB

DATABASE MANAGEMENT SYSTEM & SYSTEM ANALYSIS AND DESIGN

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: DATABASE MANAGEMENT SYSTEM

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1. Introduction to DBMS: Concepts of database and database management system(DBMS). Data abstraction. Architecture – three schema architecture. Administration roles. (L8 /M8)
Unit 2. Data models: hierarchical model, network model and relational model. (L6 /M6)
Unit 3. Database languages: Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language(DCL). (L6 /M6)
Unit 4. SQL – An Overview: SQL constructs, embedded SQL , Query & Query Optimization Techniques. (L6 /M6)
Unit 5. Database design: Design phases - conceptual, logical and physical . ER diagram and model. (L6 /M6)
Unit 6. Database Normalisation: Concept. Normal forms - 1NF, 2NF, 3NF, BCNF. (L4 /M4)
Unit 7. Indexing; Single level indexing - Primary, Clustering, Secondary. Multilevel indexing. (L4 /M4)

Suggested Readings:

- Korth, Data Base System Concepts, TMH
- Leon,Data Base Management System, VIKAS
- Ivan Bayross, PL/SQL Programming

Module II:SYSTEM ANALYSIS AND DESIGN

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1. Overview of System analysis and design: system concepts. System Development models – Waterfall model, Spiral model. System development methods – major steps. (L8 /M8)
Unit 2. Phases in System Development: Problem definition. Analysis. Design. Implementation. Evaluation. (L6 /M6)
Unit 3. Information requirement analysis: Process modelling with physical and logical data flow

diagrams. (L10 /M10)

Unit 4. System design: Process descriptions, Input/output controls, object modeling, Database design, User Interface design, Documentation, Data Dictionary, Development methodologies: Top down, bottom up, structured chart, decision table, decision tree. (L10 /M10)

Unit 5. Testing – Unit, integration, system, Acceptance, regression, Test Case generation. (L6 /M6)

Suggested Reading:

• Parthasarathi, System Analysis & Design, EPH

• Raja Raman, Analysis & Design of Information Systems, PHI

Year 3: Semester VI

		Marks	Credit Hours	
AECC 6.1Chg	Environmental Studies	**100**	**2**	
SEC 6.1Chg	Computerised Accounting and e-Filing of Tax Returns (70+30)	**100**	**4**	
CC 6.1 Ch	Project Work	**100**	**6**	
DSE 6.1 A**	Financial Reporting and Financial Statement Analysis	**100**	**6**	
DSE 6.2 A**	Financial Management	**100**	**6**	
			24	

SEC 6.1Chg

COMPUTERISED ACCOUNTING SYSTEM and E-FILING OF TAX RETURN

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit-1: Computerized Accounting Package: Using Generic Software [40 Marks, Class: 40]

(a) Company creation, ledger creation, order processing, accounting voucher, inventory voucher, memorandum voucher, invoicing, multiple godown handling, Transfer of materials across godowns, Bank Reconciliation,
(b) Cost Centre, Cost Category, Bill of Material (BoM), Budget and Controls
(c) Payroll Accounting
(d) TDS, GST
(e) Back up & Restore, Export and Import data

Unit 2: Designing Computerized Accounting System [15 Marks, Class:15]

(a) Introduction to DBMS Package – Table, Query, Form and Report
(b) Designing Computerized Accounting System using DBMS Package
Creating a voucher entry Form, Preparing ledgers, trial balance, profit & loss a/c, and balance sheet with Form wizard and Report
(c) Designing Payroll System for Accounting using Form, Query, and Report

Unit-3: E-filing of Tax return [25 Marks, Class: 25]

(a) Preparation and submission of the Income Tax Return (ITR) offline/online for individual taxpayer [e-filing without using DSC and with using DSC, EVC]
(b) View form 26AS,Upload return, View e-file returns, e-verification
(c) Use of e-tax calculator (including interest calculation u/s 234A, 234B, 234C)
(d) E-Pay tax (Challan No./ITNS 280, ITNS 281)
(e) Preparation and submission online form 10E [Relief u/s 89(1)]

Project Work: **Assignment based for each and every topic should be prepared**

- Software: Singhania, V.K., E-Filing of Income Tax Returns and Computations of Tax, Taxmann
- Software: "Excel Utility", incometaxindiaefiling.gov.in

CC 6.1 Ch
Project Work (Project Report - 50 + Viva-Voce Examination - 50)
Full Marks 100

DSE 6.1 A
FINANCIAL REPORTING AND FINANCIAL STATEMENT ANALYSIS

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

FINANCIAL REPORTING AND FINANCIAL STATEMENT ANALYSIS

Unit	Topic	Details	Marks allotted	No. of lectures
1	Holding Company	Meaning of Holding Company & Subsidiary Company; relevant standard; Consolidation of Balance Sheets of Parent & Subsidiary (only one); Minority Interest – Basic principles and preparation of CBS; CBS with loss balance of Subsidiary Treatment for: Revaluation of Assets of Subsidiary, Intra-	15	15

		group Transactions, Holding of different securities. Consideration of dividend paid or proposed by Subsidiary in CBS; Bonus Shares issued or proposed to be issued by Subsidiary (excluding shares acquired on different dates by the Parent company, chain and cross holding)		
2	Accounting Standards	Conceptual Framework, Presentation of Financial Statements (Ind AS 1), Property, Plant and Equipment (Ind AS 16), Earnings per share (Ind AS 33), [Basic Definitions & Theoretical Concepts, Scope]	15	15
3	Fund Flow Statement	Concept of fund, meaning, nature, various sources And applications, advantages & limitations of Fund Flow Statement.	20	5
4	Cash Flow Statement	Meaning, objectives, difference with Fund Flow Statement; activity classification and preparation and presentation as per relevant Accounting Standard.		15
5	Introduction to Financial Statements Analysis	Nature and Component of Financial Statement; Meaning and Need for FSA, Traditional & Modern approaches to FSA, Parties interested in FSA. • Comparative Statement – meaning, preparation, uses, merits and demerits • Common -size Statement – meaning, preparation, uses, merits and demerits • Trend Analysis – meaning, determination, uses, merits and demerits	10	12
6	Accounting Ratios for FSA	Meaning, objective, Classification of Accounting Ratios, Advantages & Limitations Preparation of Classified Financial Statements and Statement of Proprietor's Fund from the given Ratios. Computation, Analysis and Interpretation of important ratios for measuring –Liquidity, Solvency, Capital Structure, Profitability and Managerial Effectiveness.	20	18
			80	80

Suggested Readings:

- R. L.Gupta & Radheswamy, Advanced Accountancy Vol. II, S. Chand
- Maheshwari & Maheshwari, Advanced Accountancy Vol. II, Vikash Publishing
- Sehgal & Sehgal, Advanced Accountancy Vol. I II, Taxman Publication

- Accounting Standards issued by ICAI
- L.S.Porwal, Accounting Theory, Tata Mcgraw Hill
- Gokul Sinha, Accounting Theory & Management Accounting,
- B. Banerjee, Regulation of Corporate Accounting & Reporting in India, World Press.
- Lev, Financial Statement Analysis-a new approach, Prentice Hall
- Foster G, Financial Statement Analysis, Prentice Hall
- White, Sondhi& Fred, Analysis and Use of Financial Statement, John Wiley
- Bernstein & Wild, Financial Statement Analysis; theory, application & interpretation, Mcgraw Hill
- Ormiston, Understanding Financial Statement, Pearson
- Bhattacharyya, Asish K., Introduction to Financial Statement Analysis, Elsevier
- Hanif & Mukherjee, Financial Accounting, Vol III, McGraw Hill
- Subramanyam, K.R. and Wild, Financial Statement Analysis, McGraw Hill

DSE 6.2 A

FINANCIAL MANAGEMENT

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Content	Marks	Hours
1	**Introduction**	▪ Important functions of Financial Management ▪ Objectives of the firm: Profit maximisation vs. Value maximisation ▪ Role of Chief Financial Officer. ▪ Financial environment in which a firm has to operate	**10**	**10**
	Basic Concepts	• Time Value of Money: concept and reasons • Compounding and Discounting techniques • Concepts of Annuity and Perpetuity. • Risk-return relationship (concepts only)		
2	**Sources of Finance and Cost of Capital**	• Different sources of finance; long term and short term sources • Cost of capital: concept, relevance of cost of capital, Implicit and Explicit cost, specific costs (its computation) and weighted average cost (its computation) , rationale of after tax weighted average cost of capital, marginal cost of capital (its computation).	**10**	**10**
3	**Leverage and Capital Structure Theories**	• EBIT-EPS analysis and its limitations. Financial break even, point of indifference • Leverage- Business Risk and Financial Risk - Operating and financial leverage, Trading on Equity • Capital Structure decisions - Capital structure patterns, designing optimum capital structure, Constraints, Features of sound capital structure,	**10**	**10**

		Various capital structure theories (excluding M-M model).		
4	**Working Capital Management (1)**	• Introduction; Meaning and various concepts of Working Capital • Management of Working Capital and Issues in Working Capital • Estimating Working Capital Needs; Operating or Working Capital Cycle.	**10**	**10**
5	**Working Capital Management (2)**	▪ Policies relating Current Assets – Conservative, Aggressive and Balanced ▪ Various sources of finance to meet working capital requirements; Financing current assets: Strategies of financing (Matching, Conservative, and Aggressive policies) ▪ Management of components of working capital (debtors management only–credit period -simple type)	**10**	**10**
6	**Capital Expenditure Decisions (1)**	• Purpose, Distinguishing features, Objectives & Process, Understanding different types of projects • Concept of Cash flow; Cash flow vis-à-vis Profit and determination of Cash flow • Techniques of Decision making: Non-discounted and Discounted Cash flow Approaches • Payback Period method, Accounting Rate of Return and their relative merits and demerits	**10**	**10**
7	**Capital Expenditure Decisions (2)**	• Discounted Payback Period, Net Present Value, Profitability Index and Benefit Cost ratio, Internal Rate of Return, relative merits and demerits of the methods.(excluding replacement decision) • Ranking of competing projects, Ranking of projects with unequal lives. Capital Rationing.	**10**	**10**
8	**Dividend Decisions**	▪ Meaning, Nature and Types of Dividend, Dividend and Retention; concept of pay-out ratio, retention ratio and growth. ▪ Dividend policies and formulating a dividend policy ▪ Dividend Theories: Walter's Model, Gordon's Model,	**10**	**10**
		Total	**80**	**80**

Suggested Readings

- M.Y.Khan & P.K.Jain, Financial Management, TMH
- Van Horne, Financial Management & Policy, Pearson
- Van Horne, Fundamentals of Financial Management, PHI
- Banerjee, B., Financial Policy & Management Accounting, PHI
- Chandra,P., Financial Management, TMH
- Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.
- Pandey, I.M. *Financial Management.* Vikas Publications.
- Majumdar, Ali and Nesha, Financial Management, ABS
- Kothari, R, Financial Management, Sage

DSE 6.1 M
Retail Management and Marketing of Services (50+50)

Full Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Retail Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction to Retailing
No. of Classes 8 / Marks 8

• Relevant Concept
• Importance
• Function

Unit 2 : Retailing in India
No. of Classes 8 / Marks 8

• Factors determining Growth of Retailing in India
• Impact of Retail in Nation's Economy
• Key Drivers of the Indian Retails Industry

Unit 3 : Retail Formats
No. of Classes 8 / Marks 8

• Concept
• Types of Retailing – Multi Channel Retailing, Single Channel Retailing
• Product factors of Retail format
• Location factors of Retail format
• Current Indian Scenario

Unit 4 : Pricing in Retail
No. of Classes 8 / Marks 8

• Price factors of Retail format
• Importance of Retail Pricing
• Factors affecting Retail Pricing
• Approaches to Product Pricing

Unit 5 : Promotion in Retail
No. of Classes 8 / Marks 8

• Need and Objective of Promotional Mix in Retailing
• Promotional Mix and Strategy development
• Customer Relationship Management

Suggested Reading

- Madaan, Fundamentals of Retailing, Tata McGraw-Hill
- Pradhan, S., Retailing Management, McGraw Hill
- Seshanna & Prasad, Retail Management, McGraw Hill
- Berman, Evans & Mathur, Retail Management, Pearson

Module II: Marketing of Services

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction to Services Marketing & Services and economy of a country
No. of Classes 8 / Marks 8

• Concept of services
• Types
• Function
• Nature
• Characteristics
• Understanding Services Customers
• Impact of service marketing in the economy of a country

Unit 2 : Issues in Marketing of Services
No. of Classes 8 / Marks 8

• Service- Product or Packages
• Pricing in Services
• Place in Services
• Promotion of Service
• People in Services
• Physical Evidence
• Process Management

Unit 3 : Service Marketing Management
No. of Classes 8 / Marks 8

• Managing Services Quality
• Relationship marketing - Concept
• Service Communication Mix
• Communication Strategy

Unit 4 : Consumer Behaviour and Service
No. of Classes 8 / Marks 8

• Consumer Behaviour consideration
• Guidelines for Developing Service Communications
• Consumer Decision making process & ethical issues (concepts, factors influence decision making process, ethical decision making methods)

Unit 5 : Service Marketing in Non-profit and profit Organisations
No. of Classes 8 / Marks 8

Travel and Tourism
Financial Services
Information Technology Services
Media Services
Health Care Services
Educational Services

Suggested Reading

- Verma, H. V., Services Marketing, Pearson
- Venugopal and Raghu, Services Marketing, Himalaya Publishing Ltd.
- Ravi Shankar, Services Marketing : The Indian Perspective, Excel Books
- Rampal & Gupta, Services Marketing, Concepts, Applications & Cases, Galgotia
- Apte, Services Marketing, Oxford University Press

DSE 6.2 M
Rural Marketing and International Marketing (50+50)

Full Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Rural Marketing

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Rural Marketing and Environment
No. of Classes 8 / Marks 8

• Concept
• Importance
• Rural vs. Urban Marketing
• Geographic
• Economic
• Socio-Cultural
• Infrastructural factors
• Their influence on Rural Marketing Operation

Unit 2 : Rural Consumer
No. of Classes 8 / Marks 8

• Characteristics
• Attitudes
• Behaviour
• Buying Patterns and Influences

Unit 3 : Rural Marketing Strategies
No. of Classes 8 / Marks 8

• Segmenting Rural markets
• Product Planning for Rural markets
• Market Size
• Packaging and Branding Decisions
• Pricing Decisions

Unit 4 : Promotion and Distribution in Rural Markets
No. of Classes 8 / Marks 8

• Promotion in Rural Markets
• Distribution Channels and Logistics in Rural Markets

Unit 5 : Marketing of Agricultural Products
No. of Classes 8 / Marks 8

• Pricing
• Distribution of Agricultural Products
• Role of Government
• Other organization in Marketing Agricultural products
• Co-operative Marketing
• Problems in Agricultural Marketing

Suggested Readings:

- Rajagopal, Management of Rural Business, Wheeler
- Neelamegham, Marketing in India : Cases and Redings, Vikas Publishing
- Mathur, U. C., Rural Marketing, Wheeler
- Nyyar and Ramaswamy, Globallization and Agricutural Marketings, Rawat Publishers
- Mamoria, Agricultural marketing, Himalaya Publisheing House
- Kashyap, P., Rural Marketing, Pearson

Module II: International Marketing

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction
No. of Classes 8 / Marks 8

• Definition
• Nature and Scope of International Marketing
• International Marketing Environment (Basic Concepts) PESTL-SOWC
• Market Entry (When-Why-How)
• Entry Strategy (Concept - Features - Advantages and Disadvantages)

Unit 2 : Product/ Service Planning for International Market
No. of Classes 8 / Marks 8

Categorization (Standardisation / Adaptation) of Product/ Service Planning
• Packaging and Labelling
• Quality
• After Sales services

Unit 3 : International Pricing
No. of Classes 8 / Marks 8

• Factors influencing International Price
• Pricing Strategy
• Export Price
• Price Quotation and Payment Terms

Unit 4 : Promotion and Distribution of Product/Service Abroad
No. of Classes 8/ Marks 8

Promotional Tools:
• Sales literature
• Direct Mail
• Personal Selling
• Advertising
• Trade Fairs and Exhibitions
• Distribution Channels (Categorization – Features - advantages and disadvantages)
• Logistics (Meaning – Categorization - advantages and disadvantages)
• Selection and management of Foreign Sales Agents

Unit 5 : Import and Export Policies and Practices in India
No. of Classes 8/ Marks 8

• EXIM Policy - An Overview
• Trends in India’s Foreign Trade
• Steps in Starting an Export Business

• Documentation and Procedure
• Legal Aspects
• Export Finance
• Export Risk Insurance
• Export Assistance and Incentives
• Export Oriented Unit
• Export Processing Zone

Suggested Readings

- Bhattacharyya and Varsney, International Marketing Management, Sultan Chand
- Bhattacharyya, Export Marketing Strategies for Success, Global Press
- Keegan, Multinational Marketing Management, Prentice Hall
- Kriplani, International Marketing, Prentice Hall
- Taggart and Mott, The Essence of International Business, Prentice Hall
- Kotler, Principles of Marketing, Prentice Hall
- Caterora and Keavenay, Marketing : an International Perspective, Irwin, Homewood, Illinois
- Paliwala, The Essence of International Marketing, Prentice Hall
- Vasudeva, International Marketing, Excel Books
- Pateora, Graham and Salwan, International Marketing, McGraw Hill

DSE 6.1 T Indirect Tax: Laws and Practices

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Full Marks – 100

Unit 1 : a) Basic Concepts

Concepts of Indirect Tax, Difference between Direct and Indirect Tax, Indirect tax structure in India, Proposed changes in indirect tax structure in India.

b) **Central Excise** (L-25 / M-25)

Unit 2 : WB VAT (L 15 / M 15)

Unit 3 : Customs (L 20 / M 20)

Unit 4 : Central Sales Tax (L 10 / M 10)

Unit 5 : Service Tax (L 10 / M 10)

Suggested Readings

- Datey V.S., Indirect Taxes Law And Practice, Taxmann
- Sanjeev Kumar, Systematic Approach to Indirect Taxes, Bharat
- Bangar and Bangar, Students' Gide to Indirect Taxes, Aadhya Prakashan.

This Paper will be replaced by Goods & Service Tax Law whenever the law is enforced and accordingly revised syllabus will be announced.

Latest edition of the books may be read.

Paper DSE 6.2T
TAX PROCEDURE AND PLANNING
Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: TAX PROCEDURE

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Return of Income and Assessment

a) Different Returns & Forms for all types of assessees
b) Assessments and Reassessments (basic concepts)

(L 15 / M 15)

Unit 2 :
a) Advance Tax (all types of assessees)
b) Interest & Fees
c) Advance Ruling for Non-resident (L 10 / M 10)

Unit 3 :
a) TDS
b) Refund of Excess Payment (L 5 / M 5)

Unit 4 :
a) Penalties and Prosecutions
b) Appeals and Revisions
c) Income Tax Authorities (L 10 / M 10)

Module II: TAX PLANNING

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Basic Concepts

a) Concept and difference between tax planning, tax avoidance, tax evasion and tax management.
b) Objectives, requisites, factors and types of tax planning
c) Tax on distributed Profit and on units of mutual fund.

(L 5 / M 5)

Unit 2 : Tax Planning-I

a) Tax Planning under different Heads of Income
b) Tax Planning on Deductions under Chapter VIA (L 10/M 10)

Unit 3 : Tax Planning-II

a) Setting up a New Business : Location, nature and form of business.
b) Financial Management Decisions : Capital structure, dividend policy, deemed dividend and bonus shares.
c) Tax Planning related to sale of scientific research assets.

d) Tax Planning related to Amalgamation, Demerger and conversion of company into LLP.
e) Transfer of assets between Holding & Subsidiary company
f) Tax planning with reference to receipt of insurance premium.
g) Own fund versus borrowed fund for financing of assets.
h) Sale in domestic market or export

(L15 / M 15)

Unit 4 :
a) Tax planning in relation to Employees Compensation
b) Basic Concepts of transfer pricing, APA.
c) Relief for Double Taxation (covering more than one foreign country) (L10 / M 10)

Suggested Readings

- Singhania V.K., and Singhania K, Direct Tax Law and Practice, Taxmann
- Lal and Vashist, Direct Taxes, Pearson
- Ahuja & Gupta Corporate Tax Planning Management, Bharat Law House.
- Singhania V.K., and Singhania M, Corporate Tax Planning and Business Tax Procedure, Taxmann.

Latest edition of the books may be read.

DSE 6.1 e-B
Internet & WWW and Functional e-Business System (50+50)

Full Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: INTERNET AND WORLD WIDE WEB

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1. Working of the internet with TCP/IP: Origin of TCP/IP. TCP/IP communication architecture, Internet Architecture, Working of TCP/IP,TCP/IP Applications - FTP, Telnet, Simple Mail Transfer Protocol, Network File System. **(L10 /M10)**

Unit 2. Internet Concepts: WWW, Internet and E-Commerce, Linking to the Internet, Internet Address, Internet Tools- Information Retrieval tools (ftp, Gopher),Communication Tools(Email, FTP, Telnet, Usenet), Multimedia Information Tools(Home page),Information Search Tools(Archie, Veronica, WAIS). Domain Name System. **(L12 /M12)**

Unit 3. Intranet and Extranet: Intranet, Intranet vs. Groupware, Intranet Hardware, Intranet Software, Intranet Services (Web (HTTP) Publishing, HTML,), Communication Systems (Email, Fax), Software used in Electronic mail, Electronic Meeting Systems(Audio conferencing, Video Conferencing, Groupware), Extranet**.** **(L6 /M6)**

Unit 4. Internet Security: Security on the internet, Network and Website Security Risks, Site Hacking, Security Incidents on the internet security and email, network and website security, Firewall(Concept, Components and Constituents, Benefits), Enterprise wide security Framework,

secure physical infrastructure). **(L12 /M12)**

Module II: FUNCTIONAL E-BUSINESS SYSTEM

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1. Applications of E-Business: Direct Marketing and Selling, Value Chain Integration, Supply Chain Management, Corporate Purchasing, Financial and Information Services, Obstacles in adopting E-Business Applications. **(L6 /M6)**
Unit 2. E-Strategy: Information and Strategy, The virtual value chain planning E-Business project, E-Business strategy and knowledge management**.** **(L 4 /M 4)**
Unit 3. Customer –effective Web design: Requirements of Intelligent Websites, Website Goals and Objectives, planning the budget, analyzing website structure, fixed versus flexible webpage design, choosing a page size, website development tools, design alternatives, outsourcing web design, testing and maintaining websites**.** **(L6 /M6)**
Unit 4. Electronic Payment Systems-Overview of Electronic Payment Systems, Customer to Merchant Payments, Peer to Peer Payments. Electronic Banking, Electronic Fund Transfers. **(L6 /M6)**
Unit 5. E-Business Marketing Concepts: Basic marketing concepts for internet marketing, EBusiness marketing and branding strategies, Strengthening the customer relationship. **(L4 /M4)**
Unit 6. E-Commerce and Online service industries: Online financial services. Online travel services. Online career services. **(L4 /M4)**
Unit 7. Mobile Commerce- Wireless Spectrum, WAP - Origins of WAP, WAP Architecture. Wireless Datagram Protocol(WDP), Short Message Services, General Packet Radio Service(GPRS),Wireless Technology (CDMA, GSM), Different generations in Wireless Communication, Mobile commerce and its future in India**.** **(L10 /M 10)**

Suggested Readings:

• S. Jaiswal, Doing Business on the Internet E-COMMERCE (Electronic Commerce for Business), Galgotia Publications.
• P.T.Joseph, E-Commerce An Indian Perspective, S.J., PHI.
• Kenneth C. Laudon, Carol Guerico Traver, 3.E-Commerce Business.Technology, Society, Pearson Education.
• Schneider, E-Commerce, Thomson Publication

DSE 6.2 e-B
COMPUTER APPLICATION (Practical) & E-BUSINESS APPLICATION (Practical)

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
COMPUTER APPLICATION (Practical)

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: C++ **[20 classes / 20 marks]**
Unit 2: Use of Accounting software package – ACE, TALLY **[20 classes / 20 marks]**

Module II :E-BUSINESS APPLICATION (Practical)

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: HTML & DHTML **[20 classes / 20 marks]**
Unit 2: JAVA **[20 classes / 20 marks]**

1. Oops Concept and Introduction to JAVA. 2. An overview of Java. 3. Data Types - variables and arrays. 4. Operators, Control statements. 5. Classes and objects. 6. Inheritance. 7. String and string buffer. 8. Exception handling. 9. Applets.

M: Marks allotted to the Unit**; L:** No. of Lectures/ Classes for the Unit

University of Calcutta

B.Com. Syllabus (General)

under Semesterised CBCS

2017

University of Calcutta

B.Com. General Course Structure under Semesterised CBCS

Year I: Semester I

		Marks	Credit Hours	
AECC 1.1Chg	**Language:** Communicative English - 50 Indian Language - 50	**100**	**2**	
GE 1.1 Chg	Microeconomics I & Statistics	**100**	**6**	
CC 1.1 Chg	Business Laws	**100**	**6**	
CC 1.2 Chg	Principles of Management	**100**	**6**	
CC 1.1 Cg	Financial Accounting - I	**100**	**6**	
			26	

Year 1: Semester II

		Marks	Credit Hours	
GE 2.1 Chg	E-Commerce & Business Communication (50+50)	**100**	**6**	
CC 2.1 Chg	Company Law	**100**	**6**	
CC 2.2 Chg	Marketing Management & Human Resource Management	**100**	**6**	
CC 2.1Cg	Cost and Management Accounting I	**100**	**6**	
			24	

Year 2: Semester III

		Marks	Credit Hours	
SEC 3.1 Chg	Information Technology & Its Application in Business (Theory -50 + Practical- 50)	**100**	**4**	
GE 3.1 Chg	Business Mathematics & Statistics	**100**	**6**	
CC 3.1 Cg	Financial Accounting II	**100**	**6**	
			16	

Year 2: Semester IV

		Marks	Credit Hours	
GE 4.1 Chg	Microeconomics II & Indian Economy (50+50)	**100**	**6**	
CC 4.1 Chg	Entrepreneurship Development and Business Ethics	**100**	**6**	
CC 4.1 Cg	Taxation I	**100**	**6**	
CC 4.2 Cg	Cost and Management Accounting -II	**100**	**6**	
			24	

Year 3: Semester V

		Marks	Credit Hours	
CC 5.1 Cg	Auditing & Assurance	**100**	**6**	
DSE 5.1 A*	Taxation II	**100**	**6**	
DSE 5.2 A*	Corporate Accounting	**100**	**6**	
			18	

Options:

*Or DSE 5.1 M (Consumer Behaviour and Sales Management -50+50)
& DSE 5.2 M (Product & Pricing Management and Marketing Communication (50+50)
*Or DSE 5.1T (Public Finance and Taxation)
& DSE 5.2 T (Direct Tax: Laws and Practice)

*Or DSE 5.1 **e**-B (Fundamentals of Computer)
& DSE 5.2 e-B DBMS and System Analysis &Design (50+50)

Year 3: Semester VI

		Marks	Credit Hours	
AECC 6.1Chg	Environmental Studies	**100**	**2**	
SEC 6.1 Chg	Computerised Accounting and e-Filing of Tax Returns	**100**	**4**	
DSE 6.1 A**	Financial Reporting and Financial Statement Analysis	**100**	**6**	
DSE 6.2 A**	Financial Management	**100**	**6**	
			18	

Chg: Common for Honours and General; **Cg:** Core Course for General
Options:

**Or DSE 6.1 M (Retail Management and Marketing of Services (50+50)
& DSE 6.2 M (Rural Marketing and International Marketing (50+50)

**Or DSE 6.1 T (Indirect Tax: Laws and Practices)
& DSE 6.2 T (Tax Procedures and Planning)

**Or DSE 6.1 e-B (Internet & WWW and Functional e-Business System (50+50)
& DSE 6.2 e-B(Computer Applications and e-Business Applications – Practical (50+50)

Summary for B.Com. General

		Marks	Credit Hours	
Ability Enhancement Compulsory Course (AECC)	Two Papers	**200**	**2 x 2 = 04**	
Skill Enhancement Elective Course (SEC)	Two Papers	**200**	**2x4 = 08**	
Generic Elective (GE)	Four Papers	**400**	**4 x 6 = 24**	
CORE COURSE (CC)	Eleven Papers	**1100**	**11 x 6 =66**	
Discipline Specific Elective (DSE)	Four Papers	**400**	**4 x 6 = 24**	
		2300	**Total 126**	

Extracts from UGC CBCS Model for B.Com. Hons Syllabi (Page 2)

Notes:

1. For Practical Lab based

a. Core Courses BCH 1.2 (Financial Accounting), BCH 3.2 (Income-tax Law and Practice), BCH 3.4 (Business Statistics), BCH 4.2 (Business Mathematics), and BCH 5.2 (Fundamentals of Financial Management) there shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

b. Core Courses BCH 4.3 (Computer Applications in Business) and Discipline Specific Elective BCH Group A (e) (Computerised Accounting System), there shall be 4 Credit Hrs. for Lectures + Two Credit hrs. (4 Practical Periods per week per batch) for Practical Lab

c. Skill Enhancement Elective Course BCH 3.5(E-Commerce), there shall be 3 Credit Hrs. for Lectures + One Credit hrs. (2 Practical Periods per week per batch) for Practical Lab

2. For other core and elective papers, there shall be 5 lectures and one Tutorial (per batch)

From above, It appears that:

- **one credit** represents **one lecture hour** for theoretical papers and there will be **one credit hour for tutorial** for each of theoretical papers / subjects.
- For practical lab based papers, **one credit represents two practical periods** and there will be no tutorial for practical papers/subjects.

Therefore, it is suggested that:

AECC: 2 credit hours means 2 lecture hours, i.e., 120 minutes lectures or 3 periods of 40 mins each per week.

SEC (involving lab): 4 credit hours may be divided into two credit hours for lectures (3 periods of 40 mins) and 2 credit hours for practical (4 practical periods per batch) per week

GE, CC and DSE: 6 credit hours means 5 credit hours for lectures (300 mins for lectures, i.e., 7-8 periods of 40 mins each) and 1 tutorial hour for each group/ batch of students per week.

CONTENTS

GE 1.1 Chg

Microeconomics I & Statistics (50+50)

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Microeconomics I

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit:I Demand and Consumer behaviour
Concept of demand, demand function, law of demand, derivation of individual and market demand curves, shifting of the demand curve; elasticity of demand.
Consumer behaviour: Marshallian utility approach and Indifference Curve approach; utility maximization conditions . Income-Consumption Curve (ICC) and Price-Consumption Curve (PCC): Derivation of demand curve from PCC.

[L-15/Marks:15]

Unit: II Production and Cost
Production function: Short-run and Long-run; Relation among Total Product, Average Product and Marginal Product, Law of returns to a variable factor, Law of Returns to Scale; Concepts of Iso-quant and iso-cost line; Conditions for optimization (graphical approach).
Cost: Accounting and Economic Costs; Social and Private Costs; Short-run and Long-run Costs; Relation between Average and Marginal Costs; Determination of LAC curve from SAC curves, LMC.

[L-10/Marks:10]

Unit: III Perfect Competition
Concept of Perfectly Competitive market: Assumptions, Profit maximization conditions;
Related concepts of Total Revenue, Average Revenue and Marginal Revenue, Short-run and Long-run equilibrium of a firm; determination of short-run supply curve of a firm, measuring producer surplus under perfect competition, Stability analysis– Walrasian and Marshallian, demand-supply analysis including impact of taxes and subsidy**.**

[L-15/Marks – 15]

Suggested Readings
- Pindyke and Rubinfeld, Micro Economics, Pearson
- Gould & Ferguson, Micro Economic Theory
- Banerjee & Majumdar, Business Economics and Business Environment, ABS
- Banerjee & Majumdar, Banijjik Arthaniti –o- Banijjik Paribesh(Bengali)

- Dwivedi, D.N., Managerial Economics, Vikash Publications
- Mankiw.N.G., Principles of Microeconomics, Cengage
- Das, P. & Sengupta A., Economics , Oxford
- Samuelson & Nordhaus, Macroeconomics, McGraw Hill

Module II
Statistics (50 marks)

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

1. **Fundamentals:**Definition of Statistics, Scope and limitation of Statistics,Attribute and variable,Primary and secondary data, Method of data collection, Tabulation of data, Graphs and charts, Frequency distribution, Diagrammatic presentation of frequency distribution. **[8 L /8Marks]**
2. **Measures of Central Tendency:**Meaning of central tendency, Common measures – mean (A.M., G.M., H.M.) median and mode, Partition values- quartiles, deciles and percentiles, Applications of different measures. **[8 L /8Marks]**
3. **Measures of Dispersion:**Meaning of dispersion,Common measure– range, quartile deviation, mean deviation and standard deviation; Relative measures of dispersion,Combinedstandard deviation,Applications of different measures. **[8 L /8Marks]**
4. **Moments, Skewness and Kurtosis:** Different types of moments and their relationships, Meaning of skewness and kurtosis, Different measures of skewness, Measure of kurtosis,Applications of different measures**.** **[8 L /8Marks]**
5. **Interpolation:** Finite differences, Polynomial function, Newton's forward and backward interpolation formula, Lagrange's interpolation formula**.** **[8 L /8Marks]**

Suggested Readings:

- Business Mathematics and Statistics- N G Das & J K Das (Tata McGraw Hill)
- Statistical Methods in Business and Social Science – G. V. Shenoy and M. Pant (Macmillan)
- Business Statistics – R. S. Bhardwaj (Excel Books)
- Statistics for Management – Levin, Rubin and Rastogi (Pearson Education)
- Statistics for Management, Srivastava and Rego, McGraw Hill
- Hazarika Padmalochan, A Text Book of Business Statistics, S.Chand
- Kellor & Arora, Business Statistics, Cengage
- Pillai and Bhagwati, Business Statistics, S.Chand
- Business Mathematics & Statistics – J. Chakraborti (Dey Book Concern)
- Business Mathematics & Statistics – R K Ghosh & S Saha (New Central Book Agency(P) Ltd
- Elementary Business Mathematics & Statistics – Dr. Priyotosh Khan (Elegant Publication)
- Business Mathematics & Statistics – Dr. S N De (Chhaya Prakashani)
- Business Mathematics & Statistics – N K Nag & S K Nag (Kalyani Publishers)
- Business Mathematics & Statistics – Dr. Ranjit Dhar (Dishari Prakashani)

CC 1.1 Chg

Business Laws

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1: The Indian Contract Act, 1872 [No of classes 30 / Marks 30]
a) Contract – meaning, characteristics and kinds, Essentials of a valid contract
b) Offer and acceptance (Definition, Rules, Communication and Revocation of offer and acceptance)
c) Consideration (Definition, Elements, Types, Rules), "No Consideration No Contract" and its exceptions; Capacity to Parties (Definition and Types)
d) Consent, Free consent, Coercion, Undue Influence, Fraud, Misrepresentation, Mistake
e) Legality of objects and Consideration
f) Void and Voidable agreements – Definition, Types and Distinction
g) Discharge of a contract – Modes of discharge, Breach and Remedies against breach of contract
h) Specific Contracts - Contingent contracts, Quasi, Contract of Indemnity, Guarantee, Bailment, Pledges

Unit 2: The Sale of Goods Act, 1930 [No of classes 10 / Marks 10]
a) Contract of sale, meaning and difference between sale and agreement to sell
b) Conditions and warranties
c) Transfer of ownership in goods including sale by a non-owner
d) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer

Unit 3: Partnership Laws [No of classes 20 / Marks 20]
A) The Partnership Act, 1932
a. Definition – Partner, Partnership
b) Nature and Characteristics of Partnership
c) Types of Partners
d) Registration of a Partnership Firms and consequences of non-registration
e) Rights and Duties of Partners
f) Dissolution of firms – meaning and grounds

B) The Limited Liability Partnership Act, 2008
a) Definition
b) Salient Features of LLP
c) Advantages and disadvantages of LLP
d) Differences between: LLP and Partnership, LLP and Company
e) Incorporation of LLP

Unit 4: The Negotiable Instruments Act 1881 [No of classes 10 / Marks 10]
a) Definition, Features, Types, Parties of Negotiable Instruments: Promissory Note, bill of exchange, Cheque (Definition and Types)
b) Endorsement: Types of Endorsement
c) Holder and Holder in Due Course, Privileges of Holder in Due Course.
d) Dishonour of Negotiable Instruments: Modes, Consequences, Notice of Dishonour; Noting and Protesting
e) Discharge of Negotiable Instruments: Meaning and Modes

Unit 5: Consumers Protection Act, 1986 **[No of classes 10 / Marks 10]**

a) Objectives and features of Consumers Protection Act
b) Definitions – Complainant, Complaint, Consumer, Consumer Dispute, Defect, Deficiency, District Forum, Person
c) Unfair trade practices
d) Consumer Protection Council (Central, State and District – their constitutions and objectives)
e) Consumer Dispute Redressal Agencies: Composition and jurisdiction of District forum, State Commission and National Commission

(If any new provisions are enacted in place of the existing provisions, the syllabus will accordingly include such new provisions in place of existing provisions with effect from such date as prescribed by Calcutta University. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus)

Suggested Readings

- Kumar Ravindra, Legal Aspects of Business, Cengage
- Tulsian & Tulsian, Business Laws, S.Chand
- Kapoor N.D., Business Laws, Sultan Chand
- Das S.K. & Roy P., Business Regulatory Framework, OUP
- Gulsan S.S., Business Laws, Excel Books
- Roychowdhury, Bhattacharjee & Datta, Business Regulatory Framework, Elegant Publishers
- Bhadra, Satpati and Mitra, Ainer Ruprekha (Bengali Version), Dishari

CC 1.2 Chg

Principles of Management

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit-1: Introduction:

No. of classes: 16 / Marks: 16

Management-definition, importance, functions, nature-as profession, science and art, universality of management; levels of management; managerial tasks and skills.

Different Schools of Thoughts: Classical School-contributions of Taylor and Henri Fayol; Neo-classical school-Human Relations approach and Behavioral Science Approach; Modern School; System approach and Contingency approach.

Unit-2: Planning:
No. of classes: 16 / Marks: 16
Concept, importance, steps, types, premises, barriers to effective planning and remedial measures; strategic planning-concept forecasting –concept, techniques.

Unit-3: Organizing:
No. of classes: 16 / Marks: 16
Concept, importance, principles, different organization models-line and staff; Functional; Departmentation-need, basis, principles, Delegation of Authority-elements, steps barriers; Centralization and Decentralization of Authority; Span of Management; concept and determining factors.

Unit-4: Directing and Staffing:
No. of classes: 16 / Marks: 16
Directing: concepts, importance of directing,
Leadership: Concept, importance, types, leadership traits, Tannenbaum & Schmidt's Model and Blake & Mouton's Model.
Staffing: concepts, importance

Unit- 5: Motivation, Co-ordination and Control:
No. of classes: 16 / Marks: 16
Motivation: Concept, importance, importance of need theory, and contributions of McGregor, Maslow, Herzberg.
Coordination: concepts, importance, principles and implementation techniques.
Control: concepts, importance and tools of control.

Suggested Readings

- Kaul, Principle and Practice of Management, Vikash
- Koontz & Weirich, Essentials of Management, TMH
- Koontz, Weirich & Cannice, Management, McGraw Hill
- Stoner & Freeman, Management , PHI
- Drucker, P.F., Managing Challanges for the 21st Century, Butterworth, Oxford
- Mitra, J., & Somani, N., Principles of Management and Business Communications, Oxford

CC 1.1 Cg
FINANCIAL ACCOUNTING – I
Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

FINANCIAL ACCOUNTING – I

Unit	Topic	Details	Marks allotted	No. of Lectures
1	Introduction	• Nature of accounting; Users of accounting information; Qualitative characteristics of accounting information. • Double entry book keeping system – Basic accounting equation, meaning of assets, liabilities, equity, revenue and expenses. Accounting Cycle - Recording of transaction: Journal, Ledger and preparation of Trial Balance. • Bases of accounting; cash basis and accrual basis. • Basic concepts and conventions: entity, money measurement, going concern, cost, realisation, accruals, periodicity, consistency, prudence (conservatism), materiality, matching and full disclosures.	5	5
2	Concepts for determination of business income	• Revenue recognition: Meaning of revenue; objective; timing of recognition. Recognition of expenses. • Inventories: meaning. Significance of inventory valuation. Lower of cost or market rule; Inventory ascertainment and reconciliation.	15	15
		• The nature of depreciation. The accounting concept of depreciation. Factors in the measurement of depreciation. Methods of computing depreciation: straight line method and diminishing balance method; Disposal of depreciable assets; change in estimate and method of charging depreciation. Accounting for depreciation: Asset-depreciation, Asset-provision. • Reserves and provisions: Meaning; Objective; Types & Accounting		
		• Capital and revenue expenditures and receipts: general introduction only. • Adjustment and rectification		
3	Introduction to Accounting Standard	Financial accounting standards: concept, benefits, procedure for issuing accounting standards in India. Need for a global standard, IFRS (concept only).	10	10
	Introduction to Accounting Theory	Concept of accounting theory; relation with practice; GAAP; Capital – capital maintenance concepts; Limitations of Historic Cost accounting; Introduction to Fair Value accounting		
4	Final accounts of Trading Concern	Preparation of financial statements: of sole proprietorship business entities from a trial balance – Manufacturing, Trading, P/L A/c and Balance Sheet	15	15

5	Financial statements from Incomplete records and of NPO	Preparation of financial statements: a) from incomplete records b) of non-profit organisation	10	12
6	Accounting for special sales transaction	• Consignment: Basic features; difference with sales. Recording in the books of Consignor – at cost & at invoice price, Valuation of unsold stock; Ordinary commission. Treatment and valuation of abnormal & normal loss. Special commission; Del credere commission (with and without bad debt) - use of Consignment Debtors A/C. Recording in the books of Consignee • Accounting for sale on approval	25	23
	Sectional and Self balancing ledger	• Concept of sectional balancing, preparation of control accounts. Self balancing Ledger: advantages; Recording process; preparation of Adjustment accounts.		
	Insurance claim for loss of stock and for loss of profit	• Loss of stock: Physical & ownership concept; concept of under-insurance and average clause; computation of claim – with price change; consideration of unusual selling line; price reduction etc. • Loss of profit: Concept – insured & uninsured standing charges, GP rate, short sales and increased cost of working, average clause and computation of claim (simple type)		

Relevant Accounting Standards issued by the Institute of Chartered Accountants of India are to be followed.

Suggested Reading:

• Sukla, Grewal, Gupta: Advanced Accountancy Vol. I, S Chand
• R. L.Gupta & Radheswamy, Advanced Accountancy Vol. I, S. Chand
• Maheshwari & Maheshwari, Advanced Accountancy Vol. I, Vikash Publishing House Pvt. Ltd.
• Sehgal & Sehgal, Advanced Accountancy Vol. I, Taxman Publication
• B. Banerjee, Regulation of Corporate Accounting & Reporting in India, World Press.
• Hanif & Mukherjee, Financial Accounting, McGraw Hill
• Frank Wood, Business Accounting Vol 1, Pearson
• Tulsian, Financial Accounting, Pearson
• Mukherjee and Mukherjee, Financial Accounting I, Oxford
• Accounting Standards issued by ICAI

Year 1: Semester II

		Marks	Credit Hours	
GE 2.1 Chg	E-Commerce & Business Communication (50+50)	**100**	**6**	
CC2.1 Chg	Company Law	**100**	**6**	
CC 2.2 Chg	Marketing Management and Human Resource Management	**100**	**6**	
CC 2.1Ch	Cost and Management Accounting - I	**100**	**6**	
			24	

GE 2.1 Chg

E-Commerce & Business Communication (50+50)

Marks: 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
E-Commerce

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Introduction [10 Marks, Class: 10]

E-Commerce-meaning, nature, concepts, types; e-commerce business models B2B [concept, major activities, types of B to B market (independent, buyer oriented, supplier oriented, e-market place)], B2C [portals, e-tailer, content provider, transaction broker, real life examples of B2C], C2C, C2B, etc.; forces behind e-commerce, e-Governance [meaning, types, significance, real life examples].

Unit 2: E-CRM and SCM [8 Marks, Class: 8]

E-CRM-definition, features, goals of E-CRM business framework, phases of E-CRM, types of E-CRM, Functional components of E-CRM, strategies for E-CRM solutions; SCM-definition, features, types of supply chain.

Unit 3: Digital Payment [8 Marks, Class: 8]

Methods of e-payments [Debit Card, Credit Card, Smart Cards, e-Money], electronic or digital wallet, digital signature (procedures, working and legal provisions), payment gateways [Core Banking Solution or CBS, Mobile Payment, UPI, NCPI, International Payments], Online banking

[meaning, concepts, importance, electronic fund transfer, automated clearing house, automated ledger posting], risks involved in e-payments.

Unit 4: ERP [8 Marks, Class: 8]

Definition, features, major characteristics, levels of ERP, benefits of ERP, enterprise potential of ERP, modules of ERP, phases of ERP implementation, limitations of ERP.

Unit 5: New Trends in E-Commerce [6 Marks, Class: 6]

Social Commerce-concept, definition, features; Digital Marketing-definition, objectives, methods, limitations; Advertisement in Social Media-objectives, advantages and disadvantages, procedures

Suggested Readings

- P. T. Joseph**,** *E-Commerce: An Indian Perspective*, PHI Learning
- Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, *E-Commerce: Fundamentals and Applications,* Wiley.
- Laudon, *E-Commerce*, Pearson Education India
- Schneider G., E-Business, Cengage
- Bhaskar, B., E–Commerce, McGraw Hill

Module II

Business Communication

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Introduction **[8 Marks, Class: 8]**

Definition, objectives, importance, elements, process, forms, models, principles of effective communication, barriers to communication and remedial measures, role of communication in conflict resolution

Unit 2: Types of Communication **[6 Marks, Class: 6]**

Formal and informal communication, Grapevine, Characteristics of corporate communication, Characteristics of corporate communication, Communication network

Unit 3: Tools of Communication **[6 Marks, Class: 6]**

Emergence of communication technology, Modern Forms of communication, Fax, E-mail, Video Conferencing

Unit 4: Drafting **[20 Marks, Class: 20]**

Notice, Circular, Resolution & Minutes, Report, CV writing, Business letter writing- Offer letter, Quotation, Status enquiry, Confirmation, Execution, Refusal and cancellation of order, Recommendation, Credit collection, Claim, Bank loan

Suggested Readings

- Anjanee, S. & Bhavana Adhikari, *Business Communication*, TMH
- Chaturvedi &Chaturvedi, *Business Communication : Concepts, Cases and Applications*, Pearson
- M.K.Shegal &Vandana Khetarpal, Business Communication, Excel Books
- R.K.Madhukar, *Business Communication*, Vikash Publishing House Pvt. Ltd.
- Rao, Kumar & Bindu, Business Communication, Cengage
- Khanna, Puja., Business Communication, Vikash
- Raman & Sharma, Technical Communication, Oxford
- Lesikar, Flatley et al, Business Communication, McGraw Hill

CC2.1 Chg

Company Law

Marks: 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1: INTRODUCTION TO COMPANY[No of classes 16 / Marks 16]

Meaning and Definition – Features –, High Lights of Companies Act 2013 - Body Corporate ,Kinds of Companies (Concept, Definition and Features) – One Person Company, Private Company, Public Company, Company limited by Guarantee, Company limited by Shares, Holding Company, Subsidiary Company,

Government Company, Associate Company, Small Company, Foreign Company, Listed Company, Dormant company , Lifting of corporate veil.

Unit 2: FORMATION OF A COMPANY[No of classes 16 / Marks 16]

Steps in formation of a Company, Promotion Stage, Meaning of Promoter, Position of Promoter & Functions of Promoter, Incorporation Stage – Meaning, Contents, Forms of Memorandum of Association & Articles of Association and its alteration, Distinction between Memorandum of Association and Articles of Association, Doctrines of constructive notice and Indoor management, Certificate of Incorporation, Subscription Stage – Meaning & contents of Prospectus, Types, Misstatement in prospectus and its consequences.

Unit 3: COMPANY ADMINISTRATION[No of classes 16 / Marks 16]

Director (Concept and Definition), DIN, Qualification, Disqualification, Appointment, Position, Rights, Duties, Power, Resignation, Liabilities, Removal and Resignation of director. Key Managerial Personnel (Definition, Appointment and Qualifications) – Managing Director, Whole time Directors, the Companies Secretary, Chief Financial Officer, Resident Director, Independent Director, Women director.

Unit 4: SHARE CAPITAL & DEBENTURE[No of classes 16 / Marks 16]

Share, Share Capital - Types and Definition, Allotment and Forfeiture, Calls on Shares, ESOP, Buyback, Sweat Equity, Bonus, Right, Capital Reduction, Share Certificate, D-mat System, Transfer and Transmission, Redemption of Preference Shares, Debenture – Definition, Types, Rules Regarding Issue of Debenture.

Unit 5: CORPORATE MEETINGS[No of classes 16 / Marks 16]

Corporate Meetings - Shareholder and Board, Types of Meetings – Annual General Meeting Extraordinary General meeting, Minutes of Proceedings of General Meeting, Meeting of BOD and other meetings (Section 118), Requisite of Valid Meeting- Notice, Agenda, Chairman, Quorum, Proxy, Resolutions, Minutes, Postal Ballot, E- voting, Video Conferencing, Board Meetings and Resolutions

(If any new provisions are enacted in place of the existing provisions, the syllabus will accordingly include such new provisions in place of existing provisions with effect from such date as prescribed by Calcutta University. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus)

Suggested Readings

- Kumar Rabindra, Legal Aspects of Business, Cengage
- Bhadra, Satpati and Mitra, Ainer Ruprekha (Bengali Version), Dishari
- Kapoor, N.D., Corporate Law, S.Chand
- Arora, Bansal, Corporate Law, Oxford
- Roychowdhury, Bhattacharjee & Datta, Business Regulatory Framework, Elegant Publishers

CC 2.2 Chg

Marketing Management and Human Resource Management

Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Marketing Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Introduction:
No. of classes: 8 / Marks: 8
Nature, scope and importance of marketing; Selling vs Marketing; Marketing mix, Marketing environment: concept, importance, and components (Economic, Demographic, Technological, Natural, Socio-Cultural and Legal).

Unit 2: Consumer Behaviour and Market segmentation:
No. of classes: 8 / Marks: 8
Consumer Behaviour: Nature and Importance, Factors influencing consumer buying behaviour.
Market segmentation: concept, importance and bases; Product differentiation vs. market segmentation.

Unit 3: Product:
No. of classes: 8 / Marks: 8
Concept and importance, Product classifications; Concept of product mix; Branding, packaging and labeling; Product life-cycle; New Product Development Process.

Unit 4: Pricing, Distribution Channels and Physical Distribution
No. of classes: 8 / Marks: 8
Pricing: Significance. Factors affecting price of a product. Pricing policies and strategies.
Distribution Channels and Physical Distribution: Channels of distribution - meaning and importance; Types of distribution channels; Factors affecting choice of distribution channel.

Unit 5: Promotion and Recent developments in marketing:
No. of classes: 8 / Marks: 8
Promotion: Nature and importance of promotion; Communication process; Types of promotion: advertising, personal selling, public relations & sales promotion, and their distinctive characteristics.
Recent developments in marketing: Social Marketing, online marketing, direct marketing, services marketing, green marketing, Rural marketing; Consumerism.

Suggested Readings:

- Kotler & Keller, Marketing Management, Pearson
- Ramaswamy and Namakumari, Marketing Management, McMillan
- Bhagwati, Pillai, Marketing Management, S.Chand
- Verma & Duggal, Marketing Management, Oxford
- Venugopal, P., Marketing Management, Sage
- Saxena, Marketing Management, McGraw Hill

Module II

Human Resource Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Nature and Scope
No. of classes: 8 / Marks: 8
Concept and meaning of HR, Understanding the Nature and Scope of HRM, Functions and importance.

Unit 2: Human Resource Planning
No. of classes: 8 / Marks: 8
Definition, Need and Features of Human Resource Planning, factors affecting Human Resource Planning.

Unit 3: Recruitment and Selection
No. of classes: 8 / Marks: 8
Definition of Recruitment, Source, need and importance of Recruitment, Recruitment Policy – process – sources of Recruitment Definition of Selection, Steps in selection.

Unit 4: Training and Development
No. of classes: 8 / Marks: 8
Training and Development Meaning and purpose of training, Benefits of training to organisation and employees -Training methods.

Unit 5: Job Evaluation and Performance Appraisal
No. of classes: 8 / Marks: 8
Job evaluation - objectives, scope, method, Job analysis, Job description, Job Specification - basic concept and significance,
Performance Appraisal - Concept

Suggested Readings:

- Mahajan, Reeta, Human Resource Management, Vikash
- Haldar & Sarkar, Human Resource Management, Oxford
- Sinha, Sekhar & Bala, Human Resource Management, Cengage
- Jyothi & Venkatesh, Human Resource Management, Oxford
- Wilton, N., An Introduction to Human Resource Management, Sage
- Dessler & Varkkey, Human Resource Management, Pearson

CC 2.1Cg
COST AND MANAGEMENT ACCOUNTING – I

Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

COST AND MANAGEMENT ACCOUNTING-I

Unit	Topic	Content	Marks	Lecture
		MODULE - I		
1.	**Introduction**	• Definition of Costing, Objectives of Cost Accounting; Installing a Cost Accounting System, Essentials of a good Cost Accounting System. • **Cost concepts, terms and classification of costs**: Cost, Cost object, Cost units and Cost Centres, Types of costs, classification of costs- Direct-Indirect, Elementwise, Functionwise, Behaviourwise. **Costing Methods and Techniques** (introduction only).	**10**	**6**
2	**Material Costs**	• *Purchase of materials*: Organisation, purchase procedure, documentation. • *Storage of materials*: Need for storage, functions of a storekeeper, storage record, accounting for materials cost. • *Materials control*: Organisation; Tools: Just-in-Time Purchase; various stock levels, Economic Ordering Quantity; Periodic Inventory, Perpetual Inventory, Physical verification. • Methods of Pricing Material Issues: FIFO, LIFO, Weighted Average.	**10**	**10**
3	**Employee Cost and Incentive Systems**	• Introduction, Recording labour cost: Attendance and payroll procedures (Time-keeping, Time-Booking, Payroll procedure, Payment of wages-Piece rate, differential piece rate, time rate), Idle time (causes and treatment in Cost Accounting), Overtime (its effect and treatment in Cost Accounting). • Main Principles for sound system of wage incentive schemes-(Halsey, Halsey-weir, Rowan); System of Wage Payment and Incentives.	**10**	**12**
4	**Overhead And Presentation of Cost**	**Overhead** • *Introduction:* Definition, Classification of Overhead-Functional and Behavioural. • *Manufacturing Overheads:* Allocation and apportionment of Overhead; Absorption of Overhead: various methods and their application; Treatment of under absorption/over absorption of overheads; Basic concepts of different Capacities. Preparation of Cost Sheet (single product only)	**20**	**20**
	Cost Book-keeping	Non-Integrated System: Meaning & Features; Ledgers Maintained; Accounts prepared; General/Cost Ledger Adjustment Account; Meaning of Closing Balance in	**10**	**8**

		Various Accounts (Simple type) Reconciliation: Need for reconciliation; Items causing differences between Cost and Financial Profits and their reconciliation.		
	Costing Methods	• **Job Costing and Batch Costing** • **Contract Costing** - Progress payments, Retention money, Escalation clause, Contract accounts, Accounting for material, Accounting for plant used in a contract, Contract Profit. • **Service Costing -** Introduction; Motor Transport Costing only • **Process Costing:** Meaning, Features, Process vs Job Costing, Normal loss, Abnormal loss and gain and preparation of process accounts.	**20**	**24**
		Total	**80**	**80**

Suggested Readings

- Horngren, Datar & Rajan, Cost Accounting,- A Managerial Emphasis, Pearson
- B.Banerjee, Cost Accounting, PHI
- Jawahar Lal & Seema Srivastava, Cost Accounting, TMH
- M.Y.Khan & P.K.Jain, Management Accounting, TMH
- Atkinson, Management Accounting, Pearson
- Bhattacharyya, Ashish K., Cost Accounting for Business Manageres, Elsevier
- Ravi M Kishore, Cost and management Accounting, Taxmann
- Mitra, J.K., Cost & Management Accounting, Oxford
- Hanif, M., Cost & Management Accounting, McGraw Hill
- Drury, Colin., Management and Cost Accounting, Cengage
- Satish Inamdar, Cost & Management Accounting, Everest Publishing House

- Bhattacharyya, Ashish K., Cost Accounting for Business Manageres, Elsevier
- Ravi M Kishore, Cost and management Accounting, Taxmann

Year 2: Semester III

		Marks	**Credit Hours**	
SEC 3.1 Chg	Information Technology & Its Application in Business (Theory -50 + Practical- 50)	**100**	**4**	
GE 3.3 Chg	Business Mathematics & Statistics	**100**	**6**	
CC3.1 Ch	Financial Accounting II	**100**	**6**	
			16	

SEC 3.1 Chg

Information Technology & Its Application in Business
(Theory -50 + Practical- 50)

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
Information Technology and Its Application in Business (Theory)

(Marks: 50)

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit1: Information Technology and Business [8 Marks, Class: 8]

Concepts of data, information and computer based information system, impact of information technology on business [business data processing, intra-organizational and inter-organizational communication by using network technology, business process outsourcing and knowledge process outsourcing], types of Information System- Transaction Processing System (TPS), Management Information System (MIS), Decision Support System (DSS), Knowledge Management System (KMS) and their implementation at managerial levels [operational, tactical and strategic].

Unit 2: Data Organization and Data Base Management System [10 Marks, Class: 10]

(a) Data Organisation: Character, field, record, file and database, types of data processing systems [Serial, Batch, Real-time, Online, Centralized, Distributed], File Organizations [Sequential, Direct, Indexed-Sequential, Relative], Traditional file organisation vs. Database file organisation.

(b) Database Management System: Concept of database management system (DBMS), definition, importance of DBMS, important terms of database [Entity, Attribute, Keys- Primary, Foreign and Candidate, Referential Integrity, Table, Views, Data Dictionary], types of database [Hierarchical, Network and Relational], basic ideas of Data Warehouse and Data Mining (definition, importance, advantages and disadvantages), Big data analysis- Concept.

Unit 3: Internet and Its Applications [8 Marks, Class: 8]

Meaning of Internet, IPAddress [IPv4, IPv6], URL, Domain Name System, Internet Protocols - TCP/IP, UDP, FTP, TELNET[brief ideas only], HTML, DHTML AND XML [Concepts only], Ethical Hacking, Cloud Computing, Mobile Computing, Internet of Things, Ethical issues in Social Networking.

Unit 4: Security and Encryption [8 Marks, Class: 8]

Need and concepts, dimension, definition and scope of e-security, security threats- Malicious Codes (Virus, Trozan Horse, Worm, Spyware, Ransomware), Hacking, Spoofing, Sniffing, Phishing, Spamming, Denial of Service (DoS) attacks, Technology solutions [Confidentiality: (Data Encryption & Decryption, Symmetric and asymmetric encryption), Security Implementation: Firewall, DMZ (De Militarized Zone), SSL, HTTPs, Significance of Website Auditing].

Unit 5: IT Act. 2000 and Cyber Crimes [6 Marks, Class: 6]

IT Act 2000- Definitions of different terms, Digital signature, Electronic Governance, Attribution, Acknowledgement and Dispatch of Electronic Records, Regulation of Certifying Authorities, Digital Signatures Certificates, Duties of Subscribers, Penalties and Adjudication, Appellate Tribunal, Offences and Cyber-crimes.

Module II

Information Technology and Its Application in Business (Practical)

(Marks: 50)

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Word Processing [5 Marks, Class: 5]

Working with word document- Editing text, Find and Replace text, Formatting, Spell check, Autocorrect, Auto text; Bullets and numbering, Tabs, Paragraph Formatting, Indent, Page Formatting, Header and footer, Macros, Drop cap; Tables: Inserting, Filling and formatting a Table, Inserting Pictures and Video; Mail Merge- including linking with Database, Printing documents.

Creating Business Documents using the above facilities

Unit 2: Preparing Presentations [5 Marks, Class: 5]

Basics of presentations: Slides, Fonts, Drawing, Editing; Inserting: Tables, Images, texts, Symbols, Media; Design; Transition; Animation, Hyperlink and Slideshow.

Creating Business Presentations using above facilities.

Unit 3: Spreadsheet and its Business Applications [16Marks, Class: 16]

Managing worksheets- Formatting, Entering data, Editing, and Printing a worksheet; Handling operators in formula, Project involving multiple spreadsheets, Organizing Charts and graphs, Pivot Table.

Spreadsheet Functions: Mathematical [SUMIF, SQRT, SUBTOTAL, SUMPRODUCT etc.], Statistical [AVERAGE, STDEV, VAR, CORRELATION, REGRESSION etc.], Financial [PMT, RATE, PV, FV, NPER, IRR, NPV, Data Table Etc.] Logical [AND, OR, IF etc.], Date and Time, lookup and reference, Database and Text functions.

Creating Spreadsheet in the area of: Loan and Lease statement; Ratio Analysis; Payroll Statements; Capital Budgeting; Depreciation Accounting; Graphical Representation of Data; Frequency Distribution and its Statistical Parameters; Correlation and Regression

Unit 4: Database Management System [8 Marks, Class: 8]

Creation of Tables, Multiple Table Handling-Defining Relationship [Foreign Key], Simple and Conditional Queries, Types of Queries [Update, Delete, Append], Forms, Reports, Introduction to SQL through Basic Commands.

Applying DBMS in the areas of Accounting, Inventory, HRM and its accounting, Managing the data records of Employees, Suppliers and Customers.

Unit 5: Website Designing **[6 Marks, Class:6]**

Introduction to HTML; Tags and Attributes: Text Formatting, Fonts, Hypertext Links, Tables, Images, Lists, Forms, Frames, Cascading Style Sheets.

Suggested Readings

- Thareja, IT & Application, Oxford
- Aurora, Computer Fundamentals, Vikash
- Sinha & Sinha, Fundamentals of Computers, BPB Publications
- Dhar, P., Fundamental of IT and Its Application in Business, APH

GE 3.3 Chg
Business Mathematics & Statistics
Marks 100

Module I
Business Mathematics
Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

1 **Permutations and Combinations:** Definition, Factorial Notation, Theorems on Permutation, Permutations with repetitions, Restricted Permutations; Theorems on Combination, Basic identities, Restricted Combinations. **[8 L /8Marks]**

2 **Set Theory**: Definition of set, Presentation of sets, Different types of sets- Null set, Finite and infinite Sets, Universal set, Subset, Power set etc.; Set Operations, Law of algebra of Sets. **[8 L /8Marks]**

3 **Binomial Theorem:** Statement of the theorem for positive integral index, General term, Middle term, Simple properties of binomial coefficients. **[8 L /8Marks]**

4 **Logarithm:** Definition, Base and Index of Logarithm, General properties of Logarithm, Common Problems**.** **[8 L /8Marks]**

5 **Compound Interest and Annuities:**Simple AP and GP Series, Different types of interest rates, Net present value, Types of annuities, Continuous compounding, Valuation of simple loans and debentures, Problems relating to Sinking Funds. **[8 L /8Marks]**

Module II
Statistics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

6. **Correlation and Association:** Bivariate data, Scatter diagram, Pearson's correlationcoefficient, Spearman's rank correlation, Measures of association of attributes. [8 L /8Marks]
7. **Regression Analysis:** Least squares method, Simple regression lines, properties of regression, Identification of regression lines.[8 L /8Marks]
8. **Index Numbers:** Meaning and types of index numbers, Problems of constructing index numbers, Construction of price and quantity indices, Test of adequacy, errors in index numbers, Chain base index numbers; Base shifting, Splicing, Deflating, Consumer price index and its uses. [8 L /8Marks]
9. **Time Series Analysis:** Causes of variation in time series data, Components of time series, additive and multiplicative models, Determination of trend by semi-average, moving average and least squares(of linear, quadratic and exponential trend) methods; Computation of seasonal Indices by simple average, ratio-to-moving average, ratio-to-trend and link relative methods; Simple forecasting through time series data. [8 L /8Marks]
10. **Probability Theory:** Meaning of probability; Different definitions of probability; Conditional probability; Compound probability; Independent events, Simple problems. [8 L /8Marks]

Suggested Readings

- Business Mathematics and Statistics- N G Das & J K Das (Tata McGraw Hill)
- Statistics for Business Decisions – J. K .Das (Academic Publishers)
- Basic Mathematics and its Application in Economics – S. Baruah (Macmillan)
- Mathematics for Economics and Business – R. S. Bhardwaj (Excel Books)
- Mathematics and Statistics for Management – K B Akhilesh and S Balasubrahmanyam (Vikash Publishing House Pvt.Ltd.)
- Business Statistics – G. C. Beri (Tata McGraw Hill)
- Fundamentals of Statistics – S.C.Gupta (Himalaya Publishing House)
- Statistics for Business and Economics – D. R. Anderson, D. J. Sweeney and T. A.
- Williams (Thomson Asia Pvt Ltd)
- Text Book of Business Mathematics , Padmalochan Hazarika, S.Chand
- Business Mathematics, Jameeruddin, Khanna & Bhamdri, Vikash
- Business Mathematics & Statistics – J. Chakraborti (Dey Book Concern)
- Business Mathematics & Statistics – R K Ghosh & S Saha (New Central Book Agency(P) Ltd
- Rajaretnam, Statistics for Social Sciences, Sage
- Elementary Business Mathematics & Statistics – Dr. Priyotosh Khan (Elegant Publication)
- Business Mathematics & Statistics – Dr. S N De (Chhaya Prakashani)
- Business Mathematics & Statistics – N K Nag & S K Nag (Kalyani Publishers)
- Business Mathematics & Statistics – Dr. Ranjit Dhar (Dishari Prakashani)

CC3.1Cg
FINANCIAL ACCOUNTING – II
Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks
Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Details	Marks allotted	No. of lectures
1	Partnership accounts-I	Correction of appropriation items with retrospective effect. Change in constitution of firm – change in P/S ratio, admission, retirement and retirement cum admission – treatment of Goodwill, revaluation of assets & liabilities (with/without alteration of books), treatment of reserve and adjustment relating to capital; treatment of Joint Life Policy, Death of a partner	15	15
2	Partnership accounts-II	Accounting for dissolution of firm – insolvency of one or more partner, consideration of private estate and private liabilities. Piecemeal distribution – surplus capital basis; maximum possible loss basis.	15	15
3	Branch accounting	Concept of Branch; different types of Branches. Synthetic method – preparation of Branch account. Preparation of Branch Trading and P/L account. (at cost & at IP) – normal and abnormal losses. Analytical method – preparation of Branch Stock, Adjustment etc A/C (at cost & at IP) – normal & abnormal losses Independent branch – concept of wholesale profit	10	10
4	Hire purchase and Instalment payment system	Meaning; difference with Installment payment system; Recording of transaction in the books of buyer – allocation of interest – use of Interest Suspense a/c – partial and complete repossession Books of Seller – Stock and Debtors A/C (with repossession) Books of Seller – H.P. Trading A/C without HP Sales and HP Debtors and General Trading A/c (with repossession)	10	10

		Concept of operating and financial lease – basic concept only.		
5	Departmental accounts	Concept, objective of preparation of departmental accounts; apportionment of common cost; Preparation of Departmental Trading and P/L account, Consolidated Trading and P/L account; inter departmental transfer of goods at cost, cost plus and at selling price and elimination of unrealized profit.	10	10
6	Investment Accounts	Maintenance of Investment Ledger; Preparation of Investment Account (transaction with brokerage, STT, cum & ex-interest), Valuation of Investment under FIFO and Average method; Investment Account for Shares (with Right Shares, Bonus Shares and Sale of Right). Relevant Accounting Standard.	10	10
7	Business Acquisition and Conversion of partnership into limited company	• Profit/ loss prior to incorporation; Accounting for Acquisition of business. • Conversion of Partnership into Limited Company – with and without same set of books	10	10
			80	80

Relevant Accounting Standards issued by the Institute of Chartered Accountants of India are to be followed.

Suggested Reading

• Sukla, Grewal, Gupta: Advanced Accountancy Vol. I & II, S Chand
• R. L.Gupta & Radheswamy, Advanced Accountancy Vol. I & II, S. Chand
• Maheshwari & Maheshwari, Advanced Accountancy Vol. I & II, Vikash Publishing House Pvt. Ltd.
• Sehgal & Sehgal, Advanced Accountancy Vol. I & II, Taxman Publication
• L.S.Porwal, Accounting Theory, Tata Mcgraw Hill
• Gokul Sinha, Accounting Theory & Management Accounting,
• B. Banerjee, Regulation of Corporate Accounting & Reporting in India, World Press.
• Frank Wood, Business Accounting Vol 1&II, Pearson
• Tulsian, Financial Accounting, Pearson
• Hanif & Mukherjee, Financial Accounting, Vol II, McGraw Hill
• Accounting Standards issued by ICAI

GE 4.1 Chg

Microeconomics-II & Indian Economy (50+50)

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Microeconomics-II

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit: I Monopoly
Concept of Monopoly: Sources of monopoly power; Short-run and Long-run equilibrium of a monopoly firm; Price discrimination; Social Cost of Monopoly (concept only). **[L 10/ Marks:10]**

Unit: II Imperfect Competition
Concept of Imperfectly Competitive market; Monopolistic Competition: Features and examples; Oligopoly: Non-Collusive Oligopoly: Sweezy's Kinked demand Curve Model, Collusive Oligopoly: Cartel (concept with example) **[L 15/ Marks:15]**

Unit: III Factor Price Determination

Introduction; Marginal Productivity Theory of Distribution; Marginal Productivity Theory of Wage, Demand Curve of Labour, Supply Curve of Labour; Wage Determination in an Imperfectly Competitive Labour Market: Case of Collective Bargaining, Factors determining the power of trade unions to raise wages; Theory of Rent: Ricardian Theory of Rent, Modern Theory of Rent,Quasi-rent; Theory of Profit: Gross Profit and Net Profit, Accounting Profit and Normal Profit, Different Theories of Determination of Profit; Concept of Interest: Gross Interest and Net Interest, Classic Theory of Interest Rate Determination. **[L 15/ Marks 15]**

Suggested Readings

- Pindyke and Rubinfeld, Micro Economics, Pearson
- Gold & Ferguson, Micro Economic Theory
- Banerjee & Majumdar, Business Economics and Business Environment, ABS
- Banerjee & Majumdar, Banijjik Arthaniti –o- Banijjik Paribesh(Bengali),ABS
- Ratan Khasnabish & Ranesh Roy, Banijjik Arthaniti –o- Bharoter arthanaitik Paribesh(Bengali)
- Divedi, D.N., Managerial Economics, Vikash Publications
- Mankiw.N.G., Principles of Microeconomics, Cengage
- Das, P. & Sengupta A., Economics , Oxford
- Samuelson & Nordhaus, Macroeconomics, McGraw Hill

Module II
Indian Economy

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit:I Basic Issues in Economic Development
Concepts and measures of development and underdevelopment; Concept of national income: GDP,GNP,NDP,NNP,NI (concepts only). **[L 5/ Marks:5]**

Unit:II Basic Features of Indian Economy
Sectoral distribution of National Income and Occupational Structure; Structural Change in Indian Economy, issue of Service-led Growth. **[L 10/ Marks:10]**

Unit:III Sectoral Trends and Issues

(a) **Agricultural Sector**: Problem of low productivity; Green Revolution and its impact; Land Reforms; Problems of rural credit and marketing.
(b) **Industry and Service Sector**: An overview of industrial growth during pre-reform and post-reform period; Role of Public Sector: its performance and the issue of disinvestment; Role of MSME sector, problems faced by the MSME Sector; Role of the Service Sector: growth of banking and insurance sector during the post-reform period.
(c) **External Sector**: Problem of unfavourable balance of payments and policy measures.
[L 15/ Marks:15]

Unit:IV Social Issues in Indian Economy
Problem of Poverty, Poverty alleviation measures; Problem of Unemployment and the policy measures.
[L 10/ Marks:10]

Suggested Readings

•Dutt & Sundaram, Indian Economy, S.Chand
• Mishra &Puri, Indian Economy, Himalaya Publishing House
• Uma Kapila, Indian Economy
• Joydeb Sarkhel & Swapan Kr. Roy, Bharoter arthanaiti(Bengali)
• Banerjee & Majumdar, Business Economics and Business Environment,ABS
• Banerjee & Majumdar, Banijjik Arthaniti –o- Banijjik Paribesh(Bengali),ABS
• Ratan Khasnabish & Ranesh Roy, Banijjik Arthaniti –o- Bharoter arthanaitik Paribesh(Bengali)
- Prakash, B.A., Indian Economy, Pearson
- Fernando, Indian Economy, Pearson

CC 4.1 Chg

Entrepreneurship Development and Business Ethics

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I

Entrepreneurship Development

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit-1: Introduction:
No. of classes: 10 / Marks: 10
Meaning, elements, determinants and importance of entrepreneurship and creative behavior;
Entrepreneurship and Micro, Small and Medium Enterprises, Role of family business in India; The contemporary role models in Indian business: their values, business philosophy and behavioural orientations; Conflict in family business and its resolution.

Unit-2:
No. of classes: 10 / Marks: 10
Public and private system of stimulation, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, Role of industries/entrepreneur's associations and self-help groups, The concept, role and functions of business incubators, angel investors, venture capital and private equity fund.

Unit-3:
No. of classes: 10 / Marks: 10
Sources of business ideas and tests of feasibility. Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report

Unit-4:
No. of classes: 10 / Marks: 10
Mobilizing Resources (10 Lectures) Mobilizing resources for start-up. Accommodation and utilities; Preliminary contracts with the vendors, suppliers, bankers, principal customers; Basic start-up problems;

Module II
Business Ethics

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1: Business Ethics
No. of classes: 8 / Marks: 8
Introduction – Meaning - Scope – Types of Ethics – features – Factors influencing Business Ethics – significance of Business Ethics - Arguments for and against business ethics- Basics of business ethics - Corporate Social Responsibility and Business Ethics

Unit 2: Principles of Business Ethics
No. of classes: 8 / Marks: 8

Introduction – Meaning – Element – Ethics, Morale, Business ethics, Ethical dilemma [basic idea, features and significance of each of element]

Unit 3: Ethics in Management
No. of classes: 8 / Marks: 8
Introduction – Ethics in HRM – Ethics in Marketing — Ethics in Accounting and finance - Work place Ethics - Value and Ethics.

Unit 4: Corporate Culture
No. of classes: 8 / Marks: 8
Meaning – Role – Functions – Impact of Corporate Culture – Globalization and cross culture issues in ethics, Corporate Code of ethics

Unit 4: Ethics & Corporate Governance
No. of classes: 8 / Marks: 8
Concept of Corporate Governance, Scope, Reports on Corporate Governance and its benefits and limitations-- Corporate Governance and Business Ethics [Brief Concept]

Suggested Readings:

- Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
- Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
- Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai,
- Himalaya Publishing House.
- Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
- Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
- Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi:
- Prentice-Hall of India. ISBN-81-203-1690-8.
- Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi:

ASEED.
- SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
- Hifrich, Manimala, Peters & Shepherd, *Entrepreneurship,* McGraw-Hill
- Kumar Arya, Entrepreneurship, Pearson
- Bamford and Bruton, Entrepreneurship, McGraw Hill
- SIDBI Reports on Small Scale Industries Sector.
- Roy, Entrepreneurship, Oxford
- Albuquerque, Business Ethics, Oxford
- Ferrell, Fraedrich, Farrell, Business Ethics, Cengage

Note: Latest edition of text books may be used.

CC 4.1 Cg

TAXATION-I

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1 :

a) Basic Concepts and Definitions under IT Act
Assessee, Previous year, Assessment year, Person, Income, Sources of income, Heads of income, Gross total income, Total income, Maximum marginal rate of tax, Tax Evasion, Tax avoidance, Tax planning.

b) Residential Status and Incidence of Tax
Residential status of all persons except company

c) Incomes which do not form part of Total Income
Except section 10AA.

d) Agricultural Income
Definition, determination of agricultural and non-agricultural Income.

(L-10 / M-10)

Unit 2 : Heads of Income and Provisions governing Heads of Income

a) *Salaries*
b) *Income from House property* **(L-30 / M-30)**

Unit 3 : Heads of Income and Provisions governing Heads of Income

a) *Profits and Gains of Business or Profession*
Special emphasis on sec. 32, 32AC, 32AD, 35, 35D, 36(1)(2), (iii), (vii), 37, 37(2B), 40A(2), 40A(3), 43B, (Excluding presumptive taxation)

b) *Capital Gains*
Meaning and types of capital assets, basic concept of transfer, cost of acquisition, cost of improvement and indexation, computation of STCG and LTCG, exemptions u/s 54, 54EC and 54F, capital gain on transfer of bonus shares, right entitlement and right shares, taxability of STCG and LTCG.

c) *Income from Other Sources*

Basis of charge excluding deemed dividend **(L-25 / M-25)**

Unit 4 : a) Income of other Persons included in Assessee's Total Income
Remuneration of spouse, income from assets transferred to spouse and Son's wife, income of minor.

b) Set off and Carry Forward of Losses
Mode of set off and carry forward, inter source and inter head set off, carry forward and set off of losses u/s 71B, 72, 73, 74, 74A.

c) Deductions from Gross Total Income
Basic concepts, deductions u/s 80C, 80CCC, 80CCD, 80CCE, 80D, 80DD, 80DDB, 80E, 80G, 80GG, 80GGC, 80TTA, 80U

d) Rebate u/s 87A (L-15 / M-15)

If any new legislations/provisions are enacted in place of the existing legislations/provisions, the syllabus will accordingly include such new legislations/provisions in place of existing legislations/provisions with effect from such date as prescribed by CALCUTTA UNIVERSITY. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus.

Suggested Readings

- Singhnia V.K., and Singhania K, Direct Tax Law and Practice, Taxmann
- Lal and Vashist, Direct Taxes, Pearson
- Ahuja and Gupta, Direct Taxes Law And Practice, Bharat
- Manoharan & Hari, Direct Tax Laws, Snow White
- Roy, S. K., Principles and Practice of Direct & Indirect Taxes, ABS
- Sengupta, C.H., Direct & Indirect Taxes, Dey Book Concern

Latest edition of the books may be read.

CC 4.2 Cg
Cost and Management Accounting -II
Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Content	Marks	Lecture
1	Joint Product and By products	Concept of Joint products and by-products; Apportionment of common costs to joint products, and costing of By Products.	20	18
	ABC	Problems of traditional costing; meaning of Activity Based Costing; cost analysis under ABC; advantages and disadvantages.		
2	Budget and Budgetary Control	Budget and Budgetary Control; principal budget factor, preparation and monitoring procedures, Fixed and Flexible budget, preparation of cash budget, flexible budget.	10	12

3	**Standard Costing**	Standard Costs and Standard Costing; Uses, & Importance. Differences with Budgetary Control, Preliminary Steps. Classification of Standards. Analysis and computation of Materials, Labour and Overhead Cost (concepts only) variance.	**20**	**20**
4	**CVP Analysis, Marginal Costing**	**CVP Analysis** Introduction; CVP Assumptions and Uses; Break-Even Analysis: BE Point and Margin of Safety; Graphical presentation of CVP Relationship; Profit Graph **Marginal Costing and Management Decisions –** Marginal Costing vis-à-vis Absorption Costing; Cost statement under marginal costing and absorption costing; Marginal Costing Techniques. **Problems relating above areas**	**20**	**15**
5	**Short term Decision**	Marginal costing Techniques; Marginal Cost and product Pricing; Product Mix and Make or Buy Decisions (simple Type).	**10**	**15**
			80	**80**

Suggested Readings

- Horngren, Foster & Rajan, Cost Accounting,- A Managerial Emphasis, Pearson

• B.Banerjee, Cost Accounting, PHI
• Jawahar Lal & Seema Srivastava, Cost Accounting, TMH
• M.Y.Khan & P.K.Jain, Management Accounting, TMH
• Atkinson, Management Accounting, Pearson
• Bhattacharyya, Ashish K., Cost Accounting for Business Manageres, Elsevier
• Ravi M Kishore, Cost and management Accounting, Taxmann
• Hanif, M., Cost and Managment Accounting, TMH
• Mitra, J.K., Cost and Management Accounting, Oxford
• Drury, C., Management and Cost Accounting, Cengage

Year 3: Semester V

		Marks	Credit Hours	
CC 5.1 Cg	Auditing & Assurance	**100**	**6**	
DSE 5.1 A*	Taxation II	**100**	**6**	
DSE 5.2 A*	Corporate Accounting	**100**	**6**	
			18	

CC 5.1Cg

Auditing & Assurance

Full Marks – 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

UNIT – I CONCEPT, NEED AND PURPOSE OF AUDIT (10M 10L)

- Definition-Nature-Scope and Objectives of Independent Financial Audit
- Basic Principles Governing an Audit- Concept of Auditor's Independence
- Errors and Fraud-Concepts, Means of Doing Fraud, Auditor's Responsibility towards Detection and Prevention of Fraud.
- Classification of Audit- Organization Structure wise (Statutory, Non-statutory); Objective wise (Internal and Independent Financial Audit); Periodicity wise (Periodical, Continuous, Interim, Final)
- Standards on Auditing (SA)- Concept and Purpose

(This unit should be studied with SA 200 and SA 240)

UNIT – II AUDIT PROCEDURES AND TECHNIQUES (15M 15L)

- Auditing Engagement-Audit Planning- Audit Programme (Definitions)
- Documentation: Audit Working Paper, Ownership and Custody of Working Papers-Audit File (Permanent and Current) – Audit Note Book- Audit Memorandum.
- Audit Evidence – Concept, Procedures to Obtain Audit Evidence
- Routine Checking, Test Checking and Auditing in Depth
- Audit of Educational Institutions and Hospitals

(This unit should be studied with SA 210, SA 230, SA 300, SA 500, SA 520 and SA 530)

UNIT – III INTERNAL CONTROL SYSTEM (10M 10L)

- Internal Control- Definition, Objectives
- Internal check-Definition, Objectives
- Internal Audit- Definition, Objectives, Reliance by Statutory Auditor on Internal Auditor's Work

(This unit should be studied with SA 610)

UNIT – IV VOUCHING, VERIFICATION AND VALUATION (10M 10L)

- **Vouching** - Meaning, Objectives – Factors to be Considered during Vouching - Vouching of Following Items: i) **Receipts:** Cash Sale, Collection from Debtors, Interest and Dividend from Investment, Sale of Fixed Assets. Ii**) Payments:** Cash Purchase, Payment to Creditors, Payment of Wages and Salaries, Advertisement Expenses, Travelling Expenses
- **Verification and Valuation** – Concept, Objectives, Importance, Difference with Vouching, Difference between Verification and Valuation, Verification of Following Items: **i) Non-Current Assets:** Goodwill, Patent and Copy Right, Plant and Machinery, **ii) Investments** iii**) Current Assets:** Inventory, Loan and Advance, Cash and Bank Balances iv**) Non-current Liability**: Secured Loan v) **Current Liability**: Trade Payables (Sundry Creditors).

UNIT - V COMPANY AUDIT (15M 15L)

- Qualification, Disqualification, Appointment and Rotation, Removal and Resignation,
- Branch Audit and Joint Audit
- Depreciation – Concept and Provisions of the Companies Act
- Divisible Profit and Dividend (Final, Interim and Unclaimed/Unpaid): Provisions of the Act, Legal Decisions and Auditor's Responsibility.

UNIT - VI AUDIT REPORT AND CERTIFICATE (10M 10L)

- Definition – Distinction between Report and Certificate- Different types of Report
- Contents of Audit Report (As per Companies Act and Standards on Auditing)
- True and Fair View – Concept
- Materiality – Concept

(***This unit should be studied with SA 700)***

UNIT – VII OTHER THRUST AREAS (10M 10L)

- Cost Audit – Concepts, Objectives Relevant Provisions of Companies Act
- Management Audit - Concepts, Objectives, Advantages
- Tax Audit - Social Audit – Propriety Audit – Performance Audit – Environment Audit (Concepts only)

Notes and Appendices

Notes:

1) **The provisions of the Companies Act, 1956 which are still in force would form part of the syllabus till the time their corresponding or new provisions of the Companies Act, 2013 are enforced.**
2) **If new Laws or Rules are enacted in place of the existing laws and rules, the syllabus would include the corresponding provisions of such new laws and rules with immediately following Academic Year.**
3) **Students are expected to develop analytical mind for answering problem based questions along with the theoretical questions.**

Suggested Readings:

- Gupta & Arora, Fundamentals of Auditing, TMH
- Tandon et al, Practical Auditing, S.Chand
- Jha, A., Auditing, Taxmann
- Basu, S. K., Auditing and Assurance, Pearson
- Ghosh, J., Contemporary Auditing and Assurance, Elegant Publishing
- **Standards on Audit (SA) issued by the Institute of Chartered Accountants of India**

DSE 5.1A
TAXATION-II
Full Marks – 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
Direct Tax

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Computation of Total Income and Tax Payable

a) Rate of tax applicable to different assesses (except corporate assessee)
b) Computation of tax liability of an individual, Firm (excluding application of AMT) **(L-15 / M-15)**

Unit 2 : TAX MANAGEMENT

a) Provision for Filing of Return
Date of filing of return, relevant forms of return, different types of returns, return by whom to be signed, PAN, TAN

b) Assessment of Return
Self assessment u/s140A, Summary assessment u/s 143(1), Scrutiny assessment u/s 143(3) and Best judgement assessment u/s 144.

c) Advance Tax
Who is liable to pay, due dates and computation of advance tax (excluding corporate assessees)

d) Interest & Fees
Section 234A, 234B, 234C, 234F (simple problems on interest and fees)

e) TDS
Provisions regarding TDS from salary, interest on securities, horse racing, lottery. **(L-25 / M-25)**

Module II
INDIRECT TAXES

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 3 : Central Sales Tax
Definitions, incidence and levy of tax, exemptions and exclusions, forms under CST, determination of turnover and tax payable, registration of dealers.
(L-10 / M-10)

Unit 4 : West Bengal Value Added Tax
Concepts and general principles, features, advantages and disadvantages, definitions, incidence and levy of tax, Rates of VAT, Calculation of VAT

liability, Input tax credit (including on Capital goods), small dealers and composition scheme, registration of dealers, cancellation of registration certificate.

(L-10 / M-10)

Unit 5 : Central Excise

Basic concepts, conditions and taxable event for levy of excise duty, Goods and excisable goods, Manufacture and deemed manufacture, Definitions of factory, broker or commission agent, wholesale dealer, sale or purchase, valuation – MRP, transaction value. **(L-10 / M-10)**

Unit 6 : Customs

Basic concepts, Taxable event, Territorial water, Indian customs water, Goods, Types of Customs duties – Basic, Additional, Protective, Safeguard, Counter-veiling duty on subsidised goods, Anti Dumping, Valuation of Custom Duty. **(L-10 / M-10)**

The indirect tax portion of this paper will be replaced by the Goods & Service Tax Law whenever the law is enforced and accordingly revised syllabus will be announced. If any new legislations/provisions are enacted in place of the existing legislations/provisions, the syllabus will accordingly include such new legislations/provisions in place of existing legislations/provisions with effect from such date as prescribed by CALCUTTA UNIVERSITY. Similarly if any existing provision becomes redundant due to changes, it will be left out of the syllabus.

Suggested Readings

- Datey V.S., Indirect Taxes Law And Practice, Taxmann
- Sanjeev Kumar, Systematic Approach to Indirect Taxes, Bharat
- Bangar and Bangar, Students' Gide to Indirect Taxes, Aadhya Prakashan.
- Sengupta, C.H., Direct & Indirect Taxes, Dey Book Concern
- Roy, S. K., Principles and Practice of Direct & Indirect Taxes, ABS

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Latest edition of the books may be read.

DSE 5.2 A

CORPORATE ACCOUNTING

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Details	Marks allotted	No. of lectures
1	Company – Introduction And Accounting for Shares & debentures	• Meaning of Company; Maintenance of Books of Accounts; Statutory Books; Annual Return • Issue of Shares – issue, forfeiture, reissue, issue other than in cash consideration and issue to the promoters; Pro-rata issue of shares. Issue of debentures. Sweat equity. • Right and Bonus Share – Rules, Accounting • Underwriting of shares and debentures: Rules; Determination of Underwriters Liability – with marked, unmarked & firm underwriting; Accounting. • Employee Stock Option Plan – meaning; rules; Vesting Period; Exercise Period. Accounting for ESOP. Meaning and Accounting of ESPS.	20	20
2	Buy back and Redemption of preference shares	• Buy Back of Securities – meaning, rules and Accounting. • Redemption of Preference Shares – Rules and Accounting (with and without Bonus Shares)	10	10
3	Company Final Accounts	Introduction to Schedule III; Treatment of Tax; transfer to reserve, Dividend and applicable tax (out of current profit, out of past reserve); Preparation of Statement of Profit & Loss and Balance Sheet. (tax on net profit without recognizing deferred tax)	15	15
4	Redemption of debenture	Redemption of Debenture – Important Provisions, Accounting for Redemption: by conversion, by lot, by purchase in the open market (cum and ex-interest), held as Investment and Use of Sinking Fund	10	10
5	Valuation	Goodwill – valuation using different methods,i.e., Average Profit, Super Profit, Capitalisation and Annuity. Shares – Valuation using different methods: Asset approach, Earnings approach, Dividend Yield, Earnings-Price, Cum-div and Ex-div, Majority and Minority view and	10	10

		Fair Value		
6	Company Merger And Reconstruction	• Amalgamation, Absorption and Reconstruction– Meaning; relevant standard and meaning of different terms, Accounting in the books of Transferor Company. Accounting in the books of Transferee (based on relevant accounting standard); inter-company transactions (excluding inter-company share holding). • Internal reconstruction – meaning, provisions and Accounting, Surrender of Shares for redistribution; preparation of Balance Sheet after reconstruction	15	15
		Total	80	80

Relevant Accounting Standards issued by the Institute of Chartered Accountants of India are to be followed.

Suggested Reading

• Sukla, Grewal, Gupta: Advanced Accountancy Vol. II, S Chand
• R. L.Gupta & Radheswamy, Advanced Accountancy Vol. II, S. Chand
• Maheshwari & Maheshwari, Advanced Accountancy Vol. II, Vikash Publishing
• Sehgal & Sehgal, Advanced Accountancy Vol. I II, Taxman Publication
• Hanif & Mukherjee, Financial Accounting, Vol III , TMH
• • Frank Wood, Business Accounting Vol II, Pearson
• V.K.Goyal, Corprate Accounting, Excel Books
• Rajasekaran, Corporate Accounting, Pearson
• Accounting Standards issued by ICAI

DSE Papers

SEMESTER V

DSE 5.1 M : Consumer Behaviour & Sales Management (50+50)

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Consumer Behaviour

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Consumer Behaviour
No. of Classes 8 / Marks 8

• Concept : Application of Consumer Behaviour Knowledge
• Consumer Behaviour Model
• Market Segmentation
• Marketing Ethics

Unit 2 : Determinants of Consumer Behaviour
No. of Classes 8 / Marks 8

• Consumer as an Individual, Need, Motivation
• Personality, Perception, Learning Attitude
• Communication persuasion
• Consumers in their Social & Cultural Setting, the family, Social class, cross cultural consumer behaviour

Unit 3 : Consumer Decision-making Process
No. of Classes 8 / Marks 8

• Personal Influence & Opinion
• Leadership Process
• Diffusion of innovations
• Consumer decision making process

Unit 4 : Consumer Behaviour & Society
No. of Classes 8 / Marks 8

• Health - care Marketing
• Political marketing
• Social Marketing
• Environmental Marketing
• Public Policy & Consumer Protection

Unit 5 : Consumer Behaviour and Market Research
No. of Classes 8 / Marks 8

• Relevance of Marketing Information System
• Market Research in assessing Consumer Behaviour

Suggested Readings:

- Suhiffman & Kanuk, Consumer Behaviour, PHI
- Loudon & Bitta, Consumer Behaviour, TMH
- Bennet & Kassarjian, Consumer Behaviour, PHI
- Batra & Kazmi, Consumer Behaviour, Text & cases, Excel Books
- Beri, Marketing Research, TMH
- Bradley, marketing Research. Oxford University Press
- Schiffman and Kannak, Consumer Behaviour, Pearson Education

Module II : Sales Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Sales Organization
No. of Classes 8 / Marks 8

• Purpose and General principles of organization
• Every-growing complexity of Sales Organisation
• Different Models of Sales Organisation
• Factors determining Sales Organisation Structure
• Decentralised Structure
• Common problems associated with Structuring the Sales Organisation
• Modification of Sales Organisation
• Tasks of Chief Sales Executive

Unit 2 : Designing the Sales Force
No. of Classes 8 / Marks 8

• Objectives
• Strategies
• Structure size
• Sales force Compensation

Unit 3 : Managing the Sales Force
No. of Classes 8 / Marks 8

• Recruitment
• Selection
• Placement
• Transfer
• Training and Development
• Grievances handling of Sales Force
• Motivating Leading and Communicating with the Sales Force
• Performance Evaluation of Sale Force

Unit 4 : Personal Selling and Salesmanship
No. of Classes 8 / Marks 8

• Buyer-Seller Dyads
• Theories of selling
• Personal Selling as a Career
• Steps in Personal Selling – Methods of Approaching a Customer
• Handing Customer Objections
• Negotiations – Barganing and Negotiation Approaches, Bargaining Strategies and Tactics during Negotation

Unit 5 : Marketing Channels and Selection
No. of Classes 8 / Marks 8

• Need
• Functions
• Levels
• Identifying and Analyzing Customers' needs for Products Services
• Developing channel Objective, Selection of Appropriate Channel
• Selection of Appropriate channels
• Motivating, Leading, Communicating with the Channel Members
• Performance Evaluation of the Channel Members
• Modifying Channel Arrangements

Suggested Readings:

- Cundiff, Still and Govoni, Sales management, PHI
- Smith, Sales Management, PHI
- Kotler, Marketing Management, PHI
- Zieglar, et al Sales Promotion and Modern Merchandising
- Stem, Ansary and Coughlan Marketing Channels, PHI
- Warmer, Marketing and Distribution, Macmillan, New York
- Pyle, Marketing Principles, Macmillan, New York
- Doughlas, et al Fundamentals of Logistics and Distributions, TMH
- Gupta, Sales and Distribution Management, Excel Books
- Havaldar & Cavale, Sales and Distribution Management, McGraw Hill
- Hawkins, Motherbaugh & Mookerjee, Consumer Behaviour, McGraw Hill
- Schiffman, Wisenblit & Kumar, Consumer Behaviour, Pearson

DSE 5.2 M : Product & Pricing Management (50) & Marketing Communication (50)

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Product & Pricing Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction to Product Management
No. of Classes 8 / Marks 8

• Product: Basic concept of product, levels, Importance in Marketing Mix, Product Mix Decisions
• Product-Life-Cycle: Concept, strategies related to different stages of PLC.
• Product Portfolio: Concept, Importance, BCG Model

Unit 2 : Marketing Environment and Market segmentation
No. of Classes 8 / Marks 8

• Marketing Environment: concept, Importance, Micro-environmental factors and Macro-environmental factors (Demographic, Economic, Natural, Technological, Socio-Cultural & Political-Legal)
• Market segmentation: Concept, Importance and bases

Unit 3 : New Product Development
No. of Classes 8 / Marks 8

Concept
Importance
Stages
Reasons for failure of a new product
Adoption process.

Unit 4 : Packaging and Branding:
No. of Classes 8 / Marks 8

Packaging:
• Concept
• Importance
• Packaging Strategies
• Legal and Ethical aspects of packaging
Branding:
• Concept
• Importance
• Positioning and repositioning strategies
• Basic concepts of Brand equity

Unit 4 : Pricing Management:
No. of Classes 8 / Marks 8

• Concept
• Important features of pricing as an element of Marketing Mix
• Importance of pricing in consumer buying process
• Determining factors of effective pricing

• Pricing methods
• Pricing in the Indian context
• Regulatory Price Environment

Suggested Reading:

- Kotler and Kellar, Marketing Management, Pearson
- William and Ferrell, Marketing, Houghton Miffin McGraw-Hill
- Neelamegham, Marketing in India: Cases and Readings, Vikas Publishing
- Majumder, Product Management in India, PHI
- McCarthy and Perreault, Basic Marketing Managerial Approach, Irwin, Homewood, Illinois
- Srivastava, R. K., product Management & New product Development, Excel Book
- Ramaswamy and namakumari, Marketing Management, Macmillan India
- Srinivasan Case Studies in marketing: The India Context, PHI
- Baker & Hart, Product Strategy and Management, Pearson

Module II: Marketing Communication

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Communication Process
No. of Classes 8 / Marks 8

• Importance of communication
• Steps involved in the process of Communication
• Barriers to Marketing Communication
• Social Media, Digital Marketing- Concepts

Unit 2 : Communication Mix
No. of Classes 8 / Marks 8

• Advertising : Definition & Importance
• Different Adverting Function
• Types of Advertising
• Advertising Process
• Setting Advertising Objective
• Budget
• Economic aspects of Advertising

Unit 3 : Advertising Process
No. of Classes 8 / Marks 8

• Advertising Appeal
• Copy Writing
• Headline

• Illustration
• Message
• Copy Type
• Campaign Planning
• Different Types of Media
• Media Planning
• Scheduling

Unit 4 : Impact of Advertising
No. of Classes 8 / Marks 8

• Advertising Agency Roles
• Relationships with Clients
• Role of Advertising Department
• Measuring Advertising Effectiveness
• Legal and Ethical Aspects of Advertising

Unit 5 : Sales Promotion
No. of Classes 8 / Marks 8

• Meaning
• Nature and Function
• Types
• Sales Promotion Techniques (Sample Distribution, Coupon, Price off premium plan, Consumer contests, Displays Demonstration, Trade Fairs and Exhibitions
• Role of Sales force
• Limitation of Sales Promotion

Suggested Readings:

- Batra and Myers, Advertising Management, Prentice Hall
- Sengupta, Brand Positioning Strategies for Competitive Advantage, TMH
- Cundiff, Still and Govoni, Sales Management, Prentice Hall
- Rossiter and Percy, Advertising and Promotion Management, MacGraw-Hill Sundage,
- Fryburger and Rotzoll, Advertising Theory and Practice, AITBS
- Belch and Belch, Advertising and Promotion, McGraw Hill

DSE 5.1T
PUBLIC FINANCE AND TAXATION

Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1: **Origin and Development of Public Finance (L 8/8 Marks)**

- *Meaning, The rationale for State intervention – market failure, externalities, public goods*
- *Public finance and private finance, principle of maximum social advantage*

Unit 2: **Taxation and Government Revenue (L 8/12 Marks)**

- *Benefit approach, Ability to pay approach*
- *Impact and incidence of taxation, Direct and indirect taxes, Excess burden of taxes*
- *Sources and classification of public revenues*

Unit 3: **Government Expenditure (L 8/4Marks)**

- Provision of public goods and merit goods, redistribution objective of public expenditure

Unit 4: **Impact of Taxation and Public Expenditure (L 8/8Marks)**

- *Effect on production, investment, distribution and stability*

Unit 5: **Public Debt – Meaning, Impact and Management (L 8/8Marks)**

Unit 6: **Development of Federal Finance in India (L 8/8 Marks)**

- *The constitutional arrangements, Finance Commissions*

Unit 7: **Central Finances in India (L 8/8 Marks)**

- *Sources and uses of funds, effects of Fiscal Policy*
- *Different concepts of Deficit- Impact of deficit*

Unit 8: **State Finances (L 8/8 Marks)**

- *Sources and uses of funds, issues of federalism*

Unit 9: **Fiscal Reforms in India (L 8/8 Marks)**

- *Changing scenario of Indian tax Structure, FRBM Act*

Unit 10: **Issue of Public Debt in India –Internal and External (L 8/8 marks)**

Suggested Readings:

- Musgrave, R., The Theory of Public Finance, McGraw Hill
- Musgrave & Musgrave, Public Finance in Theory and Practice, McGraw Hill
- Bhargava B.M., The Theory and Working of Union Public of India
- Vaish & Agarwal, Public Finance, Willy Eastern
- Rosen, S.H. & Gayer, T., Public Finance, McGraw Hill

DSE 5.2 T
Paper DSE 5.2T

DIRECT TAX LAW AND PRACTICE
Full Marks – 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1 : **a) Residential Status and Incidence of Tax**
Residential status of a company & tax incidence. Income deemed to accrue or arise in India u/s 9.

b) Incomes which do not form part of Total Income
Sec 10(11A), 10(12A), 10(30), 10(31), 10(34) read with sec. 115BBDA, 10(35), 10(43) and 10AA. **(L-10/M-10)**

Unit 2 : **Heads of Income and Provisions Governing Heads of Income**

a) *Profits and gains of business or profession*
Advance level discussion with special emphasis on presumptive taxation

b) *Capital Gains*
Advance level discussion with special emphasis on transfer, treatment u/s 45(1A), 45(2), 45(3), 45(4), 45(5), Transfer of assets between holding and subsidiary company, and exemptions.

c) *Income from other sources*
Advance level discussion with special emphasis on gift and deemed dividend. **(L-25 / M-25)**

Unit 3 : **a) Income of other Persons included in Assessee's Total Income**
Revocable transfer of assets, Income from assets transferred to the benefit of spouse and son's wife, conversion of self acquired property into joint family property.

b) Deductions from Gross Total Income
Deductions u/s 80IAB, 80IAC, 80IBA, 80IE, 80JJ, 80JJAA
(L-10 / M-10)

Unit 4 : a) *Relief U/S 89*

b) *Double Taxation Relief*

c) *Business Restructuring – Amalgamation, Demerger, Stump Sale with special reference to treatment of depreciation and capital gains.*
(L-10 / M-10)

Unit 5 : **Computation of Total Income and Tax Payable**
Advance level problems on computation of total income and tax liability of an individual, HUF, Firm, LLP and AOP (including application of AMT)
(L-25 / M-25)

Suggested Readings

- *Singhnia V.K., and Singhania K, Direct Tax Law and Practice, Taxmann*
- *Lal and Vashist, Direct Taxes, Pearson*
- *Ahuja and Gupta, Direct Taxes Law And Practice, Bharat*
- *Manoharan and Hari, Direct Tax Laws, Snowwhite*

Latest edition of the books may be read.

DSE 5.1eB
FUNDAMENTALS OF COMPUTER

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit 1. Computer Basics: Characteristics of computer. Generations of computer. Type of computer – Mainframe, Mini, Micro (desktop, laptop and handheld), Super Computer. Inside a Computer – Power supply (SMPS), Motherboard, Ports and interfaces, Expansion Cards, memory Chips, Ribbon Cables, Storage devices, Processor. [12 lectures / 12 Marks]

Unit 2. **CPU organistion and architecture**: Arithmetic/Logic Unit (ALU), control Unit (CU), Registers, System Bus, Processor to Memory Communication Processor to I/O devices Communication. [12 lectures / 12 Marks]

Unit 3. Memory organization: Memory representation, Cache memory, Primary memory – RAM and ROM. Functions of RAM and ROM. Different types of RAM and ROM.

Secondary memory – Magnetic and optical storage devices (brief description of different types). Storage organization of a Magnetic disk. Mass storage devices – RAID, Automated Tape Library. [10 lectures / 10 Marks]

Unit 4. **Input and Output devices**: Major types and their functions. [6 lectures / 6 Marks]

Unit 5. Operating System: Concept, types, functions. [6 lectures / 6 Marks]

Unit 6. Problem Solving Tools: Algorithm. Flowcharts- Concepts, advantages and disadvantages of flowcharts, Problem solving using flowcharts.

Decision Tables - Concepts, advantages and disadvantages of decision tables, Problem solving using decision tables. [12 lectures / 12 Marks]

Unit 7. Data communication and Computer networks: Transmission Modes - Simplex, Half-Duplex, Full Duplex. Analog and digital transmission. Synchronous and Asynchronous transmission. Multiplexing. Network Concept, Types - LAN, WAN, MAN, VAN, SAN.
Various Topologies - Bus, Star, Ring, Mesh, Tree**.** Protocol Models - OSI, TCP/IP
[16 lectures/ 16 Marks]

Unit 8. Multimedia essentials: Definition, building blocks of multimedia**,** multimedia system, multimedia application. [6 lectures / 6 Marks]

Suggested Readings:

- ITLESL, Introduction to Computer Science, Pearson Education
- ITLESL, Introduction to Information Technology, Pearson Education
- .Sinha & Sinha, Fundamentals of Computers, BPB Publication.
- .Rajaraman, Fundamentals of Computers, PHI

DSE 5.2 eB

DATABASE MANAGEMENT SYSTEM & SYSTEM ANALYSIS AND DESIGN

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: DATABASE MANAGEMENT SYSTEM

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1. Introduction to DBMS: Concepts of database and database management system(DBMS). Data abstraction. Architecture – three schema architecture. Administration roles. (L8 /M8)

Unit 2. Data models: hierarchical model, network model and relational model. (L6 /M6)

Unit 3. Database languages: Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language(DCL). (L6 /M6)

Unit 4. SQL – An Overview: SQL constructs, embedded SQL , Query & Query Optimization Techniques. (L6 /M6)

Unit 5. Database design: Design phases - conceptual, logical and physical . ER diagram and model. (L6 /M6)

Unit 6. Database Normalisation: Concept. Normal forms - 1NF, 2NF, 3NF, BCNF. (L4 /M4)

Unit 7. Indexing; Single level indexing - Primary, Clustering, Secondary. Multilevel indexing. (L4 /M4)

Suggested Readings:

- Korth, Data Base System Concepts, TMH
- Leon,Data Base Management System, VIKAS
- Ivan Bayross, PL/SQL Programming

Module II:SYSTEM ANALYSIS AND DESIGN

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1. Overview of System analysis and design: system concepts. System Development models – Waterfall model, Spiral model. System development methods – major steps. (L8 /M8)
Unit 2. Phases in System Development: Problem definition. Analysis. Design. Implementation. Evaluation. (L6 /M6)
Unit 3. Information requirement analysis: Process modelling with physical and logical data flow diagrams. (L10 /M10)
Unit 4. System design: Process descriptions, Input/output controls, object modeling, Database design, User Interface design, Documentation, Data Dictionary, Development methodologies: Top down, bottom up, structured chart, decision table, decision tree. (L10 /M10)
Unit 5. Testing – Unit, integration, system, Acceptance, regression, Test Case generation. (L6 /M6)

Suggested Reading:

- Parthasarathi, System Analysis & Design, EPH
- Raja Raman, Analysis & Design of Information Systems, PHI

Year 3: Semester VI

		Marks	Credit Hours	
AECC 6.1Chg	Environmental Studies	**100**	**2**	
SEC 6.1Chg	Computerised Accounting and e-Filing of Tax Returns (70+30)	**100**	**4**	
DSE 6.1 A**	Financial Reporting and Financial Statement Analysis	**100**	**6**	
DSE 6.2 A**	Financial Management	**100**	**6**	
			24	

SEC 6.1Chg

COMPUTERISED ACCOUNTING SYSTEM and E-FILING OF TAX RETURN

(Practical)

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit-1: Computerized Accounting Package: Using Generic Software [40 Marks, Class: 40]

(a) Company creation, ledger creation, order processing, accounting voucher, inventory voucher, memorandum voucher, invoicing, multiple godown handling, Transfer of materials across godowns, Bank Reconciliation,
(b) Cost Centre, Cost Category, Bill of Material (BoM), Budget and Controls
(c) Payroll Accounting
(d) TDS, GST
(e) Back up & Restore, Export and Import data

Unit 2: Designing Computerized Accounting System [15 Marks, Class:15]

(a) Introduction to DBMS Package – Table, Query, Form and Report
(b) Designing Computerized Accounting System using DBMS Package
Creating a voucher entry Form, Preparing ledgers, trial balance, profit & loss a/c, and balance sheet with Form wizard and Report
(c) Designing Payroll System for Accounting using Form, Query, and Report

Unit-3: E-filing of Tax return [25 Marks, Class: 25]

(a) Preparation and submission of the Income Tax Return (ITR) offline/online for individual taxpayer [e-filing without using DSC and with using DSC, EVC]
(b) View form 26AS,Upload return, View e-file returns, e-verification
(c) Use of e-tax calculator (including interest calculation u/s 234A, 234B, 234C)
(d) E-Pay tax (Challan No./ITNS 280, ITNS 281)
(e) Prepare and submit online form 10E [Relief u/s 89(1)]

Project Work: **Assignment based for each and every topic should be prepared**

- Software: Singhania, V.K., E-Filing of Income Tax Returns and Computations of Tax, Taxmann
- Software: "Excel Utility", incometaxindiaefiling.gov.in

DSE 6.1 A

FINANCIAL REPORTING AND FINANCIAL STATEMENT ANALYSIS

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

FINANCIAL REPORTING AND FINANCIAL STATEMENT ANALYSIS

Unit	Topic	Details	Marks allotted	No. of lectures
1	Holding Company	Meaning of Holding Company & Subsidiary Company; relevant standard; Consolidation of Balance Sheets of Parent & Subsidiary (only one); Minority Interest – Basic principles and preparation of CBS; CBS with loss balance	15	15

		of Subsidiary Treatment for: Revaluation of Assets of Subsidiary, Intra-group Transactions, Holding of different securities. Consideration of dividend paid or proposed by Subsidiary in CBS; Bonus Shares issued or proposed to be issued by Subsidiary (excluding shares acquired on different dates by the Parent company, chain and cross holding)		
2	Accounting Standards	Conceptual Framework, Presentation of Financial Statements (Ind AS 1), Property, Plant and Equipment (Ind AS 16), Earnings per share (Ind AS 33), [Basic Definitions & Theoretical Concepts, Scope]	15	15
3	Fund Flow Statement	Concept of fund, meaning, nature, various sources And applications, advantages & limitations of Fund Flow Statement.	20	5
4	Cash Flow Statement	Meaning, objectives, difference with Fund Flow Statement; activity classification and preparation and presentation as per relevant Accounting Standard.		15
5	Introduction to Financial Statements Analysis	Nature and Component of Financial Statement; Meaning and Need for FSA, Traditional & Modern approaches to FSA, Parties interested in FSA. • Comparative Statement – meaning, preparation, uses, merits and demerits • Common -size Statement – meaning, preparation, uses, merits and demerits • Trend Analysis – meaning, determination, uses, merits and demerits	10	12
6	Accounting Ratios for FSA	Meaning, objective, Classification of Accounting Ratios, Advantages & Limitations Preparation of Classified Financial Statements and Statement of Proprietor's Fund from the given Ratios. Computation, Analysis and Interpretation of important ratios for measuring –Liquidity, Solvency, Capital Structure, Profitability and Managerial Effectiveness.	20	18
			80	80

Suggested Readings:

- L.S.Porwal, Accounting Theory, Tata Mcgraw Hill
- Gokul Sinha, Accounting Theory & Management Accounting,
- B. Banerjee, Regulation of Corporate Accounting & Reporting in India, World Press.
- Lev, Financial Statement Analysis-a new approach, Prentice Hall

- Foster G, Financial Statement Analysis, Prentice Hall
- White, Sondhi& Fred, Analysis and Use of Financial Statement, John Wiley
- Bernstein & Wild, Financial Statement Analysis; theory, application & interpretation, Mcgraw Hill
- Ormiston, Understanding Financial Statement, Pearson
- Bhattacharyya, Asish K., Introduction to Financial Statement Analysis, Elsevier
- Hanif & Mukherjee, Financial Accounting, Vol III, McGraw Hill
- Subramanyam, K.R. and Wild, Financial Statement Analysis, McGraw Hill

DSE 6.2 A

FINANCIAL MANAGEMENT

Full Marks 100
Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Unit	Topic	Content	Marks	Hours
1	**Introduction**	▪ Important functions of Financial Management ▪ Objectives of the firm: Profit maximisation vs. Value maximisation ▪ Role of Chief Financial Officer. ▪ Financial environment in which a firm has to operate	**10**	**10**
	Basic Concepts	• Time Value of Money: concept and reasons • Compounding and Discounting techniques • Concepts of Annuity and Perpetuity. • Risk-return relationship (concepts only)		
2	**Sources of Finance and Cost of Capital**	• Different sources of finance; long term and short term sources • Cost of capital: concept, relevance of cost of capital, Implicit and Explicit cost, specific costs (its computation) and weighted average cost (its computation) , rationale of after tax weighted average cost of capital, marginal cost of capital (its computation).	**10**	**10**
3	**Leverage and Capital Structure Theories**	• EBIT-EPS analysis and its limitations. Financial break even, point of indifference • Leverage- Business Risk and Financial Risk - Operating and financial leverage, Trading on Equity • Capital Structure decisions - Capital structure patterns, designing optimum capital structure, Constraints, Features of sound capital structure, Various capital structure theories (excluding M-M model).	**10**	**10**
4	**Working Capital Management (1)**	• Introduction; Meaning and various concepts of Working Capital • Management of Working Capital and Issues in Working Capital • Estimating Working Capital Needs; Operating or Working Capital Cycle.	**10**	**10**
5	**Working**	▪ Policies relating Current Assets – Conservative, Aggressive	**10**	**10**

	Capital Management (2)	and Balanced ▪ Various sources of finance to meet working capital requirements; Financing current assets: Strategies of financing (Matching, Conservative, and Aggressive policies) ▪ Management of components of working capital (debtors management only–credit period -simple type)		
6	**Capital Expenditure Decisions (1)**	• Purpose, Distinguishing features, Objectives & Process, Understanding different types of projects • Concept of Cash flow; Cash flow vis-à-vis Profit and determination of Cash flow • Techniques of Decision making: Non-discounted and Discounted Cash flow Approaches • Payback Period method, Accounting Rate of Return and their relative merits and demerits	**10**	**10**
7	**Capital Expenditure Decisions (2)**	• Discounted Payback Period, Net Present Value, Profitability Index and Benefit Cost ratio, Internal Rate of Return, relative merits and demerits of the methods.(excluding replacement decision) • Ranking of competing projects, Ranking of projects with unequal lives. Capital Rationing.	**10**	**10**
8	**Dividend Decisions**	▪ Meaning, Nature and Types of Dividend, Dividend and Retention; concept of pay-out ratio, retention ratio and growth. ▪ Dividend policies and formulating a dividend policy ▪ Dividend Theories: Walter's Model, Gordon's Model,	**10**	**10**
		Total	**80**	**80**

Suggested Readings

- M.Y.Khan & P.K.Jain, Financial Management, TMH
- Van Horne, Financial Management & Policy, Pearson
- Van Horne, Fundamentals of Financial Management, PHI
- Banerjee, B., Financial Policy & Management Accounting, PHI
- Chandra,P., Financial Management, TMH
- Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.
- Pandey, I.M. *Financial Management.* Vikas Publications.
- Majumdar, Ali and Nesha, Financial Management, ABS
- Kothari, R, Financial Management, Sage

DSE 6.1 M
Retail Management and Marketing of Services (50+50)

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Retail Management

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction to Retailing
No. of Classes 8 / Marks 8

• Relevant Concept
• Importance
• Function

Unit 2 : Retailing in India
No. of Classes 8 / Marks 8

• Factors determining Growth of Retailing in India
• Impact of Retail in Nation's Economy
• Key Drivers of the Indian Retails Industry

Unit 3 : Retail Formats
No. of Classes 8 / Marks 8

• Concept
• Types of Retailing – Multi Channel Retailing, Single Channel Retailing
• Product factors of Retail format
• Location factors of Retail format
• Current Indian Scenario

Unit 4 : Pricing in Retail
No. of Classes 8 / Marks 8

• Price factors of Retail format
• Importance of Retail Pricing
• Factors affecting Retail Pricing
• Approaches to Product Pricing

Unit 5 : Promotion in Retail
No. of Classes 8 / Marks 8

• Need and Objective of Promotional Mix in Retailing
• Promotional Mix and Strategy development
• Customer Relationship Management

Suggested Reading

- Madaan, Fundamentals of Retailing, Tata McGraw-Hill
- Pradhan, S., Retailing Management, McGraw Hill
- Seshanna & Prasad, Retail Management, McGraw Hill
- Berman, Evans & Mathur, Retail Management, Pearson

Module II: Marketing of Services

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction to Services Marketing & Services and economy of a country
No. of Classes 8 / Marks 8

• Concept of services
• Types
• Function
• Nature
• Characteristics
• Understanding Services Customers
• Impact of service marketing in the economy of a country

Unit 2 : Issues in Marketing of Services
No. of Classes 8 / Marks 8

• Service- Product or Packages
• Pricing in Services
• Place in Services
• Promotion of Service
• People in Services
• Physical Evidence
• Process Management

Unit 3 : Service Marketing Management
No. of Classes 8 / Marks 8

• Managing Services Quality
• Relationship marketing - Concept
• Service Communication Mix
• Communication Strategy

Unit 4 : Consumer Behaviour and Service
No. of Classes 8 / Marks 8

• Consumer Behaviour consideration
• Guidelines for Developing Service Communications
• Consumer Decision making process & ethical issues (concepts, factors influence decision making process, ethical decision making methods)

Unit 5 : Service Marketing in Non-profit and profit Organisations
No. of Classes 8 / Marks 8

Travel and Tourism
Financial Services
Information Technology Services

Media Services
Health Care Services
Educational Services

Suggested Reading

- Verma, H. V., Services Marketing, Pearson

- Venugopal and Raghu, Services Marketing, Himalaya Publishing Ltd.
- Ravi Shankar, Services Marketing : The Indian Perspective, Excel Books
- Rampal & Gupta, Services Marketing, Concepts, Applications & Cases, Galgotia
- Apte, Services Marketing, Oxford University Press

DSE 6.2 M
Rural Marketing and International Marketing (50+50)

Full Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: Rural Marketing

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Rural Marketing and Environment
No. of Classes 8 / Marks 8

• Concept
• Importance
• Rural vs. Urban Marketing
• Geographic
• Economic
• Socio-Cultural
• Infrastructural factors
• Their influence on Rural Marketing Operation

Unit 2 : Rural Consumer
No. of Classes 8 / Marks 8

• Characteristics
• Attitudes
• Behaviour
• Buying Patterns and Influences

Unit 3 : Rural Marketing Strategies
No. of Classes 8 / Marks 8

• Segmenting Rural markets
• Product Planning for Rural markets
• Market Size
• Packaging and Branding Decisions
• Pricing Decisions

Unit 4 : Promotion and Distribution in Rural Markets
No. of Classes 8 / Marks 8

• Promotion in Rural Markets
• Distribution Channels and Logistics in Rural Markets

Unit 5 : Marketing of Agricultural Products
No. of Classes 8 / Marks 8

• Pricing
• Distribution of Agricultural Products
• Role of Government
• Other organization in Marketing Agricultural products
• Co-operative Marketing
• Problems in Agricultural Marketing

Suggested Readings:

- Rajagopal, Management of Rural Business, Wheeler
- Neelamegham, Marketing in India : Cases and Redings, Vikas Publishing
- Mathur, U. C., Rural Marketing, Wheeler
- Nyyar and Ramaswamy, Globallization and Agricutural Marketings, Rawat Publishers
- Mamoria, Agricultural marketing, Himalaya Publisheing House
- Kashyap, P., Rural Marketing, Pearson

Module II: International Marketing

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : Introduction
No. of Classes 8 / Marks 8

• Definition
• Nature and Scope of International Marketing
• International Marketing Environment (Basic Concepts) PESTL-SOWC
• Market Entry (When-Why-How)
• Entry Strategy (Concept - Features - Advantages and Disadvantages)

Unit 2 : Product/ Service Planning for International Market
No. of Classes 8 / Marks 8

Categorization (Standardisation / Adaptation) of Product/ Service Planning
• Packaging and Labelling
• Quality
• After Sales services

Unit 3 : International Pricing
No. of Classes 8 / Marks 8

• Factors influencing International Price
• Pricing Strategy
• Export Price
• Price Quotation and Payment Terms

Unit 4 : Promotion and Distribution of Product/Service Abroad
No. of Classes 8 / Marks 8

Promotional Tools:
• Sales literature
• Direct Mail
• Personal Selling
• Advertising
• Trade Fairs and Exhibitions
• Distribution Channels (Categorization – Features - advantages and disadvantages)
• Logistics (Meaning – Categorization - advantages and disadvantages)
• Selection and management of Foreign Sales Agents

Unit 5 : Import and Export Policies and Practices in India
No. of Classes 8 / Marks 8

• EXIM Policy - An Overview
• Trends in India's Foreign Trade
• Steps in Starting an Export Business
• Documentation and Procedure
• Legal Aspects
• Export Finance
• Export Risk Insurance
• Export Assistance and Incentives
• Export Oriented Unit
• Export Processing Zone

Suggested Readings

- Bhattacharyya and Varsney, International Marketing Management, Sultan Chand
- Bhattacharyya, Export Marketing Strategies for Success, Global Press
- Keegan, Multinational Marketing Management, Prentice Hall
- Kriplani, International Marketing, Prentice Hall
- Taggart and Mott, The Essence of International Business, Prentice Hall

- Kotler, Principles of Marketing, Prentice Hall
- Caterora and Keavenay, Marketing : an International Perspective, Irwin, Homewood, Illinois
- Paliwala, The Essence of International Marketing, Prentice Hall
- Vasudeva, International Marketing, Excel Books
- Pateora, Graham and Salwan, International Marketing, McGraw Hill

DSE 6.1 T Indirect Tax: Laws and Practices

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Full Marks – 100

Unit 1 : a) Basic Concepts

Concepts of Indirect Tax, Difference between Direct and Indirect Tax, Indirect tax structure in India, Proposed changes in indirect tax structure in India.

b) **Central Excise** (L-25 / M-25)

Unit 2 : WB VAT (L 15 / M 15)

Unit 3 : Customs (L 20 / M 20)

Unit 4 : Central Sales Tax (L 10 / M 10)

Unit 5 : Service Tax (L 10 / M 10)

Suggested Readings

- Datey V.S., Indirect Taxes Law And Practice, Taxmann
- Sanjeev Kumar, Systematic Approach to Indirect Taxes, Bharat
- Bangar and Bangar, Students' Gide to Indirect Taxes, Aadhya Prakashan.

This Paper will be replaced by Goods & Service Tax Law whenever the law is enforced and accordingly revised syllabus will be announced.

Latest edition of the books may be read.

Paper DSE 6.2T

TAX PROCEDURE AND PLANNING

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: TAX PROCEDURE

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1 : **Return of Income and Assessment**

a) Forms for all types of assesses
b) Assessments and Reassessments (basic concepts)

(L 15 / M 15)

Unit 2 :
a) Advance Tax (all types of assessees)
b) Interest & Fees
c) Advance Ruling for Non-resident (L 10 / M 10)

Unit 3 :
a) TDS
b) Refund of Excess Payment (L 5 / M 5)

Unit 4 :
a) Penalties and Prosecutions
b) Appeals and Revisions
c) Income Tax Authorities (L 10 / M 10)

Module II: TAX PLANNING

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1 : **Basic Concepts**

a) Concept and difference between tax planning, tax avoidance, tax evasion and tax management.
b) Objectives, requisites, factors and types of tax planning
c) Tax on distributed Profit and on units of mutual fund.

(L 5 / M 5)

Unit 2 : **Tax Planning-I**

a) Tax Planning under different Heads of Income
b) Tax Planning on Deductions under Chapter VIA (L 10/M 10)

Unit 3 : **Tax Planning-II**

a) Setting up a New Business : Location, nature and form of business.
b) Financial Management Decisions : Capital structure, dividend policy, deemed dividend and bonus shares.
c) Tax Planning related to sale of scientific research assets.
d) Tax Planning related to Amalgamation, Demerger and conversion of company into LLP.
e) Transfer of assets between Holding & Subsidiary company
f) Tax planning with reference to receipt of insurance premium.
g) Own fund versus borrowed fund for financing of assets.
h) Sale in domestic market or export

(L15 / M 15)

Unit 4 :
a) Tax planning in relation to Employees Compensation
b) Basic Concepts of transfer pricing, APA.
c) Relief for Double Taxation (covering more than one foreign country) (L10 / M 10)

Suggested Readings

- Singhania V.K., and Singhania K, Direct Tax Law and Practice, Taxmann
- Lal and Vashist, Direct Taxes, Pearson
- Ahuja & Gupta, Corporate Tax Planning Management, Bharat Law House.
- Singhania V.K., and Singhania M, Corporate Tax Planning and Business Tax Procedure, Taxmann.

Latest edition of the books may be read.

DSE 6.1 e-B
Internet & WWW and Functional e-Business System (50+50)

Full Marks 100

Internal Assessment: 20 marks
Semester-end Examinations: 80 marks
Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I: INTERNET AND WORLD WIDE WEB

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1. Working of the internet with TCP/IP: Origin of TCP/IP. TCP/IP communication architecture, Internet Architecture, Working of TCP/IP,TCP/IP Applications - FTP, Telnet, Simple Mail Transfer Protocol, Network File System. (L10 /M10)
Unit 2. Internet Concepts: WWW, Internet and E-Commerce, Linking to the Internet, Internet Address, Internet Tools- Information Retrieval tools (ftp, Gopher),Communication Tools(Email, FTP, Telnet, Usenet), Multimedia Information Tools(Home page),Information Search Tools(Archie, Veronica, WAIS). Domain Name System. (L12 /M12)
Unit 3. Intranet and Extranet: Intranet, Intranet vs. Groupware, Intranet Hardware, Intranet Software, Intranet Services (Web (HTTP) Publishing, HTML,), Communication Systems (Email, Fax), Software used in Electronic mail, Electronic Meeting Systems(Audio conferencing, Video Conferencing, Groupware), Extranet. (L6 /M6)
Unit 4. Internet Security: Security on the internet, Network and Website Security Risks, Site Hacking, Security Incidents on the internet security and email, network and website security, Firewall(Concept, Components and Constituents, Benefits), Enterprise wide security Framework, secure physical infrastructure). (L 12/M12)

Module II: FUNCTIONAL E-BUSINESS SYSTEM

Internal Assessment: 10 marks
Semester-end Examinations: 40 marks
Total 50 marks

Unit 1. Applications of E-Business: Direct Marketing and Selling, Value Chain Integration, Supply Chain Management, Corporate Purchasing, Financial and Information Services, Obstacles in adopting E-Business Applications. (L6 /M6)
Unit 2. E-Strategy: Information and Strategy, The virtual value chain planning E-Business project, E-Business strategy and knowledge management. (L 4 /M 4)
Unit 3. Customer –effective Web design: Requirements of Intelligent Websites, Website Goals and Objectives, planning the budget, analyzing website structure, fixed versus flexible webpage design, choosing a page size, website development tools, design alternatives, outsourcing web design, testing

and maintaining websites. (L6 /M6)

Unit 4. Electronic Payment Systems-Overview of Electronic Payment Systems, Customer to Merchant Payments, Peer to Peer Payments. Electronic Banking, Electronic Fund Transfers. (L6 /M6)

Unit 5. E-Business Marketing Concepts: Basic marketing concepts for internet marketing, EBusiness marketing and branding strategies, Strengthening the customer relationship. (L4 /M4)

Unit 6. E-Commerce and Online service industries: Online financial services. Online travel services. Online career services. (L4 /M4)

Unit 7. Mobile Commerce- Wireless Spectrum, WAP - Origins of WAP, WAP Architecture. Wireless Datagram Protocol(WDP), Short Message Services, General Packet Radio Service(GPRS),Wireless Technology (CDMA, GSM), Different generations in Wireless Communication, Mobile commerce and its future in India. (L10 /M10)

Suggested Readings:

• S. Jaiswal, Doing Business on the Internet E-COMMERCE (Electronic Commerce for Business), Galgotia Publications.

• P.T.Joseph, E-Commerce An Indian Perspective, S.J., PHI.

• Kenneth C. Laudon, Carol Guerico Traver, 3.E-Commerce Business.Technology, Society, Pearson Education.

• Schneider, E-Commerce, Thomson Publication

DSE 6.2 e-B
COMPUTER APPLICATION (Practical) & E-BUSINESS APPLICATION (Practical)

Full Marks 100

Internal Assessment: 20 marks

Semester-end Examinations: 80 marks

Total 100 marks

Marks shown against the units indicate marks for Semester–end Examinations

Module I
COMPUTER APPLICATION (Practical)

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1: C++ [20 classes / 20 marks]

Unit 2: Use of Accounting software package – ACE, TALLY [20 classes / 20 marks]

Module II :E-BUSINESS APPLICATION (Practical)

Internal Assessment: 10 marks

Semester-end Examinations: 40 marks

Total 50 marks

Unit 1: HTML & DHTML [20 classes / 20 marks]

Unit 2: JAVA [20 classes / 20 marks]

1. Oops Concept and Introduction to JAVA. 2. An overview of Java. 3. Data Types - variables and arrays. 4. Operators, Control statements. 5. Classes and objects. 6. Inheritance. 7. String and string buffer. 8. Exception handling. 9. Applets.

M: Marks allotted to the Unit**; L:** No. of Lectures /Classes for the Unit

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

UNIVERSITY OF CALCUTTA

B.A./B.Sc. ECONOMICS
(HONOURS AND GENERAL)
SYLLABUS UNDER CHOICE BASED CREDIT SYSTEM

To be effective from the academic session 2018-19

BA/BSc ECONOMICS (HONOURS) SYLLABUS,
UNIVERSITY OF CALCUTTA, UNDER
CHOICE BASED CREDIT SYSTEM
To be effective from the academic session 2018-19

Table 1: Marks and Paper distributions with credit

		Credits	
Course Type	**Total Papers**	**Credit**	**Marks**
Core Courses (CC)	14	14*6=84	14*100=1400
Discipline Specific Electives (DSE)	4	4*6 =24	4*100 = 400
Generic Electives (GE) [Covering Two Disciplines with two courses each. Any discipline in any semester]	4	4*6=24	4*100= 400
Ability Enhancement Compulsory Courses-AECC [Consisting of two Ability Enhancement Compulsory Courses – AECC-1 and AECC-2]	2 [AECC-1 is Communicating English/ Modern Indian Languages(MIL) and AECC-2 is Environmental Studies (ENVS)]	2*2=4	100*2= 200
Skill Enhancement Courses (SEC)	2	2*2=4	100*2=200
Totals	26	140	2600

- **Continuous Internal Assessment and Students" Attendance: For each paper 10% will be reserved for continuous internal assessment (CIA) and 10% will be reserved for attendance of the students.** ***CIA may take the form of written examination/s, take-home assignments, viva-voce; presentation etc depending on the course instructor. As per definition CIA will be assessed fully internally by the course instructor.***

Types of tutorials: Tutorial classes are introduced per course (except for AEC and SEC) to give the students an idea of detailed understanding of the course and also to build their confidence on the subject in terms of (i) solving problems, (ii) presenting a paper in terms of board work or power point,(iii) preparation of term paper etc. A tutorial class also helps a teacher to clarify any topic in detail to the students. A tutorial contact hour has been meant to promote teacher-student academic interaction. The norm of examination for this part of the course will be decided later. ***Unlike all other Science subjects Economics should not be treated as a laboratory–based subject.*** After all it is a subject under Social Science and so there is limited scope for introducing practical part for each course. **Only under Discipline Specific Elective-A,**

5th Semester/6th Semester, for the Courses "Applied Econometrics" and "Issues in Indian Economy" (under DSE A) there will be a *practical part* of 30 marks (2 credits) instead of tutorial part of 15 marks (1 credit). Practical classes in case of ―Applied Econometrics‖ will be conducted on the basis of laboratory-based specified softwares (STATA or R). Practical classes for the course ―Issues in Indian economy‖

Method followed for coding the Courses

Economics Honours Core Course 1, 1st semester (Theory): ECO-A-CC-1-1-TH

Economics Honours Core Course 1, 1st semester (Tutorial): ECO-A-CC-1-1TU

Table 2 :Course structure semester-wise: Economics (Honours)

Table 2A :Semester –I (July to December)

Type of Course	Name of the Course	Credit	Marks
Economics Core Course –I (ECO-A-CC-1-1-TH-TU)	Introductory Microeconomics[Theory plus Tutorial]	5+1=6	100
Economics Core Course –II (ECO-A-CC-1-2-TH-TU)	Mathematical Methods for Economics-I [Theory plus Tutorial]	5+1=6	100

Table 2B :Semester –II (January to June)

Type of Course	Name of the Course	Credit	Marks
Economics Core Course –III (ECO-A-CC-2-3-TH-TU)	Introductory Macroeconomics [Theory plus Tutorial]	5+1=6	100
Economics Core Course –IV (ECO-A-CC-2-4.TH-TU)	Mathematical Methods for Economics-II [Theory plus Tutorial]	5+1=6	100

Table 2C :**Semester –III (July to December)**

Type of Course	Name of the Course	Credit	Marks
Economics Core Course –V (ECO-A-CC-3-5-TH-TU)	Intermediate Microeconomics-I [Theory plus Tutorial]	5+1=6	100
Economics Core Course –VI (ECO-A-CC-3-6-TH-TU)	Intermediate Macroeconomics-I [Theory plus Tutorial]	5+1=6	100
Economics Core Course –VII (ECO-A-CC-3-7-TH-TU)	Statistics for Economics [Theory plus Tutorial]	5+1=6	100
Skill Enhancement Course-I (A Group) (ECO-A-SEC-3-1A-TH)	Data Analysis [Theory]/ Rural Development [Theory] [A-Group of SEC consists of two courses. Students will have to select *any one* of the two]	2	100

Table 2D : Semester-IV (January to June)

Type of Course	Name of the Course	Credit	Marks
Economics Core Course –VIII (ECO-A-CC-4-8-TH-TU)	Intermediate Microeconomics-II[Theory plus Tutorial]	5+1=6	100
Economics Core Course –IX (ECO-A-CC-4-9-TH-TU)	Intermediate Macroeconomics-II [Theory plus Tutorial]	5+1=6	100
Economics Core Course –X (ECO-A-CC-4-10-TH-TU)	Introductory Econometrics[Theory plus Tutorial]	5+1=6	100
Skill Enhancement Course-II (B Group) (ECO-A-SEC-4-2B-TH)	Research Methodology [Theory]/ Managerial Economics [Theory] [B-Group of SEC consists of two courses. Students will have to select *any one* of the two]	2	100

Table 2E: Semester –V (July to December)

Type of Course	Name of the Course	Credit	Marks
Economics Core Course –XI (ECO-A-CC-5-11-TH-TU)	International Economics [Theory plus Tutorial]	5+1=6	100
Economics Core Course –XII (ECO-A-CC-5-12-TH-TU)	Indian Economy [Theory plus Tutorial based Term Paper]	5+1=6	100
Two Discipline Specific Elective (DSE) Courses: DSE-A and DSE- B In Semester V these two courses are denoted as DSE-A(1) and DSE-B(1) One out of two courses from : DSE-A(1) One out of two courses from: DSE-B(1) (ECO-A-DSE-5-A(1)-TH-TU/P) and (ECO-A-DSE-5-B(1)-TH-TU)	DSE-A(1) consists of two courses out of which students will have to select *any one* and DSE-B(1) consists of two courses out of which students have to select *any one.* <u>The two courses under DSE-A(1) are</u> Applied Econometrics (AE) : 4(Th) +2 (P)= 6 Economic History of India (1857-1947) (EHI) : 5(Th) +1(Tu) = 6 [Students will have to select any one] <u>The two courses under DSE-B(1) are</u> Comparative Economic Development (1850-1950) (CED): 5(Th) +1(Tu) = 6 Financial Economics (FE) : 5 (Th) + 1 (Tu) =6 [Students will have to select any one]	(5+1)= 6 (5+1)= 6 [Or one (4+2)= 6 and one (5+1)= 6]	100+ 100

Table 2F: Semester –VI (January to June)

Type of Course	Name of the Course	Credit	Marks
Economics Core Course –XIII (ECO-A-CC-6-13-TH-TU)	Public Economics [Theory plus Tutorial]	5+1=6	100
Economics Core Course –XIV (ECO-A-CC-6-14-TH-TU)	Development Economics [Theory plus Tutorial]	5+1=6	100
Two Discipline Specific Elective (DSE) Courses: DSE-A and DSE- B In Semester VI these two courses are denoted as DSE-A(2) and DSE-B(2) One out of two courses from : DSE-A(2) One out of two courses from: DSE-B(2) (ECO-A-DSE-6-A(2)-TH-TU/P) and (ECO-A-DSE-6-B(2)-TH-TU)	DSE-A(2) consists of two courses out of which students will have to select *any one* and DSE-B(2) consists of two courses out of which students have to select *any one.* <u>The two courses under DSE-A(2) are</u> Money and Financial Markets (MFM) : 5(Th) + 1(Tu) =6 Issues in Indian Economy (IIE) : 4(Th) +2 (P)= 6 [Students will have to select any one] <u>The two courses under DSE-B(2) are</u> Environmental Economics (EE) : 5 (Th) +1 (Tu) =6 Issues in Development Economics (IDE) : 5 (Th) +1 (Tu) =6 [Students will have to select any one]	(5+1)= 6 (5+1)=6 [Or one (4+2)=6 and one (5+1)= 6]	100 + 100
Total		**24**	**400**

- **In framing this syllabus the centralized structure of Calcutta University is followed.**
- **<u>Special Note</u>**

(i) *The four Generic Elective papers (courses) for Economics (Honours) students* ***will be from any two subjects other than Economics with the condition that Mathematics is to be one of the Generic Elective Subjects for Economics(Honours) students.*** *Thus students having Economics Honours will select two other disciplines of 200 marks each under Generic Elective and one of the two disciplines should be Mathematics .* ***Students will have to select two courses on Mathematics <u>in any two of the four semesters</u> 1,2, 3 and 4 (where we find Generic Elective Courses). <u>Thus two courses on Mathematics is compulsory for Economics (Honours).</u>*** *The other Discipline can be any other subject. For example, an Economics (Honours) student may opt for Mathematics as Generic Elective in 1st and 3rd semesters and Political Science (or Statistics) in 2nd and 4th Semesters.*

(ii) *Similarly Economics as Generic Elective will be offered to students having Honours in any subject other than Economics.* ***<u>The Generic Elective papers in Economics for Honours students (for students having Honours in any subject other than Economics) will be treated as Core Papers in Economics for General students (for BA/BSc General students having Economics as a Core paper under the General stream).</u> [This has been explained clearly in the context of the syllabus for BA/BSc Economics (General)].<u>Students having Honours in any subject other than Economics will select any two Disciplines or Subjects for the four Generic Elective papers offered.</u>***

Economics Core Course-I: ECO-A-CC-1-1-TH-TU

Introductory Microeconomics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours:15

[For Semester-I]

ECO-A-CC-1-1-TH

Unit 1: Exploring the subject matter of Economics **10 lecture hours**

1.1 Scope and Method of Economics: Wants, Scarcity, Competing Ends and Choice - Defining Economics, Thinking like an economist: Basic Economics Questions, Microeconomics and Macroeconomics, Normative Economics and Positive Economics

1.2Principles of Microeconomics – principles of individual decision making and principles of economic interactions – Introduce trade off, opportunity cost, efficiency, marginal changes and cost-benefit, trade, market economy, property rights, market failure, externality and market power.

1.3 Interdependence and the Gains from Trade- production possibilities frontier and increasing costs, absolute and comparative advantage, comparative advantage and gains from trade.

1.4 Reading and working with graphs

Unit 2: Demand and Supply: How Markets Work **10 lecture hours**

2.1Elementary theory of Demand: Determinants of household demand and market demand, movement along and shift of the demand curve

2.2 Elementary theory of Supply: factors influencing supply, the supply curve, movement along and shift of the supply curve

2.3 The Elementary theory of market price: Determination of equilibrium price in a competitive market.

2.4 Market Adjustment without Government (with illustrations):the effect of shifts in demand and supply, the excess demand function, existence, uniqueness and stability of equilibrium

Unit 3: Market and Adjustments **10 lecture hours**

3.1 The Evolution of Market Economies, Price System and the Invisible Hand

3.2 The Decision-takers - households, firms and central authorities

3.3 The Concepts of Markets- individual market, separation of individual markets, interlinking of individual markets. Difference among markets- competitiveness, goods and factor markets, free and controlled markets. Market and non-market sectors, public and private sectors, economies- free market, command and mixed.

3.4 Different goods: Public goods, Private goods, Common resources and Natural Monopolies.

Unit 4: Market Sensitivity and Elasticity **12 lecture hours**

4.1 Importance of Elasticity in Choice-Decisions

4.2 Method of Calculation- Arc Elasticity, Point Elasticity-definition

4.3 Demand and supply Elasticities-types of elasticity and factors affecting elasticity, Demand Elasticity and Revenue, Long run and Short run elasticities of Demand and Supply

4.4 Income and Cross Price Elasticity

4.5 Applications: Case studies – OPEC and Oil Price, Illegal Drugs

Unit 5: Government Intervention **8 lecture hours**

5.1 The Economic Role of Government with respect to Market: (i) Price Ceiling, Price Floor and Market Adjustment (with short case studies of agricultural administered price, minimum wage and rent control); (ii) Black Market; (iii) Tax and market adjustment ; (iv) Elasticity and Tax incidence

5.2 Comparison of markets with and without government

Unit 6: Utilitarian Approach **25 lecture hours**

(Focus on intuitive explanation and diagrams. Learning to analyze without using calculus a must)

6.1 The History of Utility Theory – From Cardinal to Ordinal Approach.

6.2 Utility in Cardinal Approach- Utility and choice, Total Utility and Marginal Utility, Utility and choice-maximization, marginal utility, theory of demand

6.3 Ordinal utility: Assumptions on preference ordering, indifference curve, marginal rate of substitution and convexity of IC, budget constraint, consumers' equilibrium-interior and corner, Derivation of Demand Curves from ICs, composite good convention. Application: Cash subsidy versus subsidy in kind

6.4 Price consumption curve, Income consumption curveand Engel curve. Price effect - Income and Substitution effect (Hicks and Slutsky),inferior goods and Giffen goods, Marshallian and compensated demand curves

ECO-A-CC-1-1-TU

Tutorial Contact Hours: 15

Texts

1. G.Mankiw. 2007, Economics: Principles and Applications, India edition by South Western, Cengage Learning
2. R.G. Lipsey. An Introduction to Positive Economics, ELBS (6^{th} edition)
3. Lipsey, R. and Chrystal, A. 2007 Economics, OUP
4. Pindyck, Rubinfeld and Mehta, Microeconomics, Pearson
5. G.S.Maddala and E. Miller, 1989, Microeconomics, Prentice Hall, McGraw Hill International Editions

References

1. Karl e Case and Ray C Fair, Principles of Economics, Pearson Education, 8th Edition, 2007
2. P Samuelson and W.Nordhaus, Economics, McGraw hill International Edition (14th edition or later edition)
3. J.E.Stiglitz and C.E.Walsh, Principles of Economics, WW Norton and Company, NY, (3rd edition or later edition)
4. Hal. R Varian , Intermediate Microeconomics, A modern Approach, WW Norton and Company, 8th edition, 2010 (T)
5. Gravelle, H. and Rees,R. , Microeconomics, Prentice Hall
6. Ryan, W.J.L. and Pearce : Price Theory and Applications , Macmillan Education, UK
7. Ferguson, C.E. and Gould, J.P. : Microeconomic Theory, Aitbs Publishers and Distributors, New Delhi.
8. Satya Chakrabarty, Microeconomics, Allied Publishers

Economics Core Course II: ECO-A-CC-1-2-TH-TU

Mathematical Methods in Economics-I

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester-I]

ECO-A-CC-1-2-TH

1. Preliminaries 10 lectures hours

- Sets and set operations; functions and their properties; number systems.
- Convex sets; geometric properties of functions: convex functions, their characterizations, properties and applications; further geometric properties of functions: quasi-convex functions, quasi-concave functions, their characterizations, properties and applications.
- Limit and continuity-Different Limit Theorems with proof-concept of first principle.
- Uses of the concept of continuity.

2. Functions of one real variable 10 lecture hours

- Continuous functions of different types and their graphs- quadratic, polynomial, power, exponential, and logarithmic.
- Concept of derivatives. Limits and derivatives. L' Hospital's rule .Graphical meaning of derivatives. Derivatives of first and second order and their properties; convex, concave and linear function.
- Application in economics- concept of marginal. Concept of elasticity. Concept of average function

3. Single variable optimization **10 lecture hours**

- Local and global optima; Geometric characterizations; characterizations using calculus. Significance of first and second order conditions.
- Interpretation of necessary and sufficient conditions with examples.
- Applications in Economics- profit maximization and cost minimization.

4. Integration of functions **10 lecture hours**

- Integration of different types of functions;
- Methods of Substitution and integration by parts.
- Applications in economics- obtaining total from the marginal.

5. **Matrix Algebra** **20 lecture hours**

- Matrix: its elementary operations; different types of matrix.
- Rank of a matrix.
- Determinants and inverse of a square matrix.
- Solution of system of linear equations-Cramer‘s rule; Eigen values and Eigen vectors.
- System of nonlinear equations- Jacobian determinant and existence of solution.
- The concept of comparative statics
- Applications of Matrix Algebra in input-output analysis-the Leontief Static Open Model (LSOM) - the Hawkins-Simon conditions.

6. Game Theory **15 lecture hours**

- Concept of a game, strategies and payoffs
- Zero-sum games- maxmin and minmax solutions
- Dominant Strategy Equilibrium
- Nash equilibrium
- Nash equilibrium in the context of some common games – Prisoners‘ Dilemma, Battle of Sexes, Matching Pennies

ECO-A-CC-1-2-TU

Tutorial contact hours :15

Texts :

- Alpha C. Chiang and Kavin Wainwright : Fundamental Methods of Mathematical Economics, Mc Graw Hill, 2005.

References

1. K. Sydsaeter and P. Hammond, Mathematics for Economic Analysis, Pearson Educational Asia: Delhi, 2002.

2. Gibbons R. Game Theory for Applied Economists.
3. Mukherji and S. Guha: Mathematical Methods and Economic Theory, Oxford University Press, 2011.
4. Hands, D. W.: Introductory Mathematical Economics, Second Edition, 2004.
5. Silberberg ,E. and Suen, W.: The Structure of Economics : A Mathematical Analysis, Third edition, Mc-Graw Hill, 2001.
6. Apostol T.M. : Calculus, Volume 1, One-variable calculus, with an introduction to linear algebra, (1967) Wiley, ISBN 0-536-00005-0, ISBN 978-0-471-00005-1.
7. K. G. Binmore, Mathematical analysis, Cambridge University Press, 1991.
8. Archibald, G.C. and Lipsey, R.G. , An Introduction to Mathematical Treatment of Economics, 1967, Weidenfeld and Nicolson
9. Henderson, J.M. and Quandt, R.E., Microeconomic Theory : A Mathematical Approach, McGrawHill,1980
10. Dorfman, R., Samuelson, P.A. and Solow, R.M. , Linear Programming and Economic Analysis, McGraw-Hill, 1958.
11. Hadley, G. , Linear Algebra, Addison-Wesley Publishing Company, 1977

Economics Core Course III: ECO-A-CC-2-3-TH-TU

Introductory Macroeconomics

Total Marks: 100 [Theory (Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester-II]

ECO-A-CC-2-3-TH

1. National Income Accounting 20 lecture hours

Macroeconomic data- Basic concepts of National Income accounting. The circular flow. Concepts of GNP, GDP, NNP, and NDP at market price and at factor cost. The measurement of National Income-Value Added Method and Expenditure Method. The problem of double counting. The role of Government. Concepts of Corporate Income, Corporate Savings, Personal Income, Personal Disposable Income and Personal Savings. Saving-Investment gap and its relation with budget deficit and trade surplus. National Income accounting and cost of living. Basic idea of India‘s national income.

2. Income Determination in the Short Run (Part-I) :The Simple Keynesian Model in a Closed Economy 18 lecture hours

The Simple Keynesian Model (SKM) in a Closed Economy without Government- the Keynesian

Consumption Function; the Keynesian Saving Function; income determination in SKM; stability of equilibrium; the concept of effective demand- the concept of demand-determined output ; the Simple Keynesian Multiplier; the paradox of thrift; the SKM in a Closed Economy with Government; government expenditure and tax; the government expenditure multiplier and the tax rate multiplier; the balanced budget multiplier; the budget surplus; effects of tax changes and government purchases on budget surplus; the full employment budget surplus.

3. The Classical system 18 lecture hours

Basic ideas of Classical Macroeconomics; Say's Law and Quantity Theory of Money, Loanable fund theory; the Classical Theory of Income and Employment determination; full Employment and wage-price flexibility; Classical Dichotomy and Neutrality of Money.

4. Macroeconomic Foundations -I 19 lecture hours

- The bond market as the mirror image of the money market-the Walras' Law. Relationship between bond price and rate of interest- the concept of Keynesian liquidity preference schedule-speculative demand for money and liquidity trap.
- Investment function: Concepts of Marginal productivity of capital, marginal efficiency of capital (MEC) and marginal efficiency of investment (MEI)- Jorgenson's neo-classical theory- Acceleration principle- fixed and variable. Multiplier-accelerator interaction.

ECO-A-CC-2-3-TU

Tutorial Contact hours: 15

Textbooks:

1. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
2. N. Gregory Mankiw. Principles of Macroeconomics, Indian Imprint of South Western by Cengage India, 6th edition, 2015.
3. N. Gregory Mankiw. Macroeconomics, Worth Publishers, 2010.
4. Ghosh Chandana and Ghosh Ambar, Macroeconomics, PHI Learning Pvt Ltd, 2014.

References

1. Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005.
2. Andrew B. Abel and Ben S. Bernanke, Macroeconomics, Pearson Education, Inc., 7th edition, 2011.
3. Venieris, Y.P. and Sebold F.D., Macroeconomics: Models and Policy, John Wiley and Sons, 1977.
4. Ackley Gardner (old), Macroeconomic Theory, Macmillan, 1961
5. Ackley Gardner(new), Macroeconomics : Theory and Policy : Macmillan,1978

6. Ghosh Chandana and Ghosh Ambar, Indian Economy : A Macro-theoretic Analysis, PHI Learning Pvt Ltd, 2016.
7. J.R.Hicks. The Social Framework: An Introduction to Economics, Clarendon Press, 3rd edition, 1960.
8. Sikdar Soumyen, Principles of Macroeconomics, Oxford University Press.
9. Economic Survey , Government of India, various issues.

Economics Core Course IV: ECO-A-CC-2-4-TH-TU

Mathematical Methods in Economics-II

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours:15

[For Semester-II]

ECO-A-CC-2-4-TH

1. Function of several variables **14 lecture hours**

- Continuous and differentiable functions: partial derivatives and Hessian matrix. Homogeneous and homothetic functions.
- Euler's theorem, implicit function theorem (without proof) and its application to comparative statics problems.
- Economic applications- the idea of level curves, theories of consumer behaviour and theory of production.

2. Multi-variable optimization **35 lecture hours**

- Optimization of nonlinear functions: Convex, concave, and quasi-concave functions; Unconstrained optimization.
- Constrained optimization with equality constraints- Lagrangian multiplier method; role of Hessian determinant.
- Inequality constraints and Kuhn-Tucker Conditions.
- Value function and Envelope theorem; Economic applications – consumer behaviour and theory of production.
- Optimization of linear function: Linear programming; concept of slack and surplus variables (graphical solution only). Concept of convex set. The Duality Theorem
- Economic Applications of Linear programming

3. Difference Equations **12 lecture hours**

- Finite difference; Equations of first and 2nd orders and their solutions
- Application in Economics- Cobweb model, Multiplier-Accelerator model.

4. Differential Equations **14 lecture hours**

- Solution of Differential equations of first order and second order of linear differential equations.
- Economic application-price dynamics in a single market- multimarket supply demand model with two independent markets.
- Qualitative graphic solution to 2x2 linear simultaneous non-linear differential equation system- phase diagram, fixed point and stability. Economic applications in microeconomics and macroeconomics

ECO-A-CC-2-4-TU

Tutorial Contact hours: 15

Text:

- Alpha C. Chiang and Kavin Wainwright: Fundamental Methods of Mathematical Economics, Mc Graw Hill, 2005.

References:

1. K. Sydsaeter and P. Hammond, Mathematics for Economic Analysis, Pearson Educational Asia: Delhi, 2002.
2. Carl Simon and Lawrence Blume. Mathematics for Economists, W. W. Norton and Company, 1994
3. A. Mukherji and S. Guha: Mathematical Methods and Economic Theory, Oxford University Press, 2011.
4. Hands, D. W.: Introductory Mathematical Economics, Second Edition,2004.
5. Silberberg, E. and Suen, W.: The Structure of Economics : A Mathematical Analysis, Third edition, Mc-Graw Hill, 2001.
6. K. G. Binmore, Mathematical analysis, Cambridge University Press, 1991.
7. Archibald, G.C. and Lipsey, R.G. , An Introduction to Mathematical Treatment of Economics, 1967, Weidenfeld and Nicolson
8. Henderson, J.M. and Quandt, R.E., Microeconomic Theory : A Mathematical Approach, McGrawHill,1980.
9. Intrilligator, M.D., Mathematical Optimization and Economic Theory, Society for Industrial and Applied Mathematics, Philadelphia, 1971.
10. Allen, R.G.D., Mathematical Analysis for Economists, McMillan, London, 1967

11. Dorfman, R., Samuelson, P.A. and Solow, R.M. , Linear Programming and Economic Analysis, McGraw-Hill, 1958.
12. Dixit, A.K., Optimization in Economic Theory, Oxford University Press, 1976.

Economics Core Course V: ECO-A-CC-3-5-TH-TU

Intermediate Microeconomics –I

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours:15

[For Semester- III]

ECO-A-CC-3-5-TH

Unit 1: Theories of Consumer Behaviour and Applications 17 lecture hours

1.1 Inter-temporal choice (saving and borrowing)

1.2Revealed preference

1.3. Choice under uncertainty – utility function and expected utility, risk aversion and risk preference

1.4 Applications of Consumer Behaviour in Construction of Price Indices – Laspeyers and Paasche‘s indices

2. Unit 2: Production and Costs 20 lecture hours

2.1 Technology – general concept of Production Function, production with one and two variable inputs,total average and marginal products, short run and long run, returns to factor and returns to scale, Isoquants, marginal rate of technical substitution, isocost line and firm‘s equilibrium, elasticity of substitution

2.2 Types of production functions- Cobb-Douglas, fixed-coefficient and CES functions

2.3 Cost structure- implicit cost, explicit cost, accounting cost, sunk cost, economic cost, fixed cost, variable cost, total, average and marginal cost. Determinants of short run cost, cost curves, cost minimization and expansion path, short versus long run cost curves, economies of scale.

3. Unit 3: The Firm and Perfect Market Structure 20 lecture hours

3.1 Organization, Firms and Profit Maximization

3.2 Marginal Revenue, Marginal Cost and Profit Maximization

3.3 Perfect competition- short run competitive equilibrium of the firm, short run supply curve of firm and industry, Output choice and competitive equilibrium in long run, Economic rent and profit, long-run industry supply- constant, increasing and decreasing cost.

3.4 Consumer and Producer surplus, welfare and efficiency of competitive equilibrium. Government intervention and dead weight loss, Application- Minimum prices and price supports (price ceiling and price floors)

4. Unit 4: Input Market in Perfect Competition 18 lecture hours

4.1 Basic concepts- derived demand, productivity of an input, marginal product of an input, marginal revenue product

4.2 Marginal productivity theory of distribution

4.3 Labor market-supply of labor, competitive labor markets

4.4 Land markets and rent

ECO-A-CC-3-5-TU

Tutorial Contact hours: 15

Text

1. Pindyck, Rubinfeld and Mehta, Microeconomics, Pearson

2. G.S.Maddala and E. Miller, 1989, Microeconomics, Prentice Hall, McGraw Hill International Editions

3. Goon, A.M., Gupta, M.K. and Dasgupta, B.: Fundamentals of Statistics Vol.2,The World Press Pvt. Ltd., Kolkata. (For index number only)

References

1. Hal. R Varian , Intermediate Microeconomics, A modern Approach, WW Norton and Company, 8th edition, 2010 (T)

2. Gravelle, H. and Rees ,R., Microeconomics, Prentice Hall

3. Anindya Sen, Microeconomics, OUP

4. Satya Chakrabarty, Microeconomics, Allied Publishers

5. Ferguson, C. E. and Gould, J.P., Microeconomic Theory, Aitbs Publishers and Distributors, New Delhi.

6. Lipsey, R. and Chrystal, A., 2007, Economics, OUP

Economics Core Course VI: ECO-A-CC-3-6-TH-TU

Intermediate Macroeconomics-I

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester- III]

ECO-A-CC-3-6-TH

1. Income Determination in the Short-run (Part-II) : The IS-LM Model

14 lecture hours

- IS-LM Model - equilibrium, stability and comparative statics. Crowding out .Effects of fiscal and monetary policies.

2. Aggregate Demand and Aggregate Supply- the Complete Keynesian Model

14 lecture hours

- Derivation of aggregate demand curve.
- Derivation of aggregate supply curves both in the presence and absence of wage rigidity.
- Equilibrium, stability, and comparative statics-effects of monetary and fiscal policies. Effects of wage cut.
- Unemployment equilibrium and its causes- possible solutions including real balance effect.

3. Keynes vs. Classics **10 lecture hours**

- Keynesian vs classical system.
- Hybrid models under Classical/Keynesian framework.
- Friedman‘s restatement of classical ideas

4. Money Supply, Monetary Policy and Government Budgetary Operations

17 lecture hours

- Measures of money supply with special reference to India (M_1,M_2, M_3 and M_4)
- Balance sheet view of money supplied by the banking sector as a whole
- High powered money –definition
- Balance sheet of Reserve Bank of India and High powered money
- Balance sheet of Commercial banks and basic ideas of money multiplier theory.
- Deposit multiplier, currency multiplier, reserve multiplier, credit multiplier and money multiplier in the context of the theory of money supply
- Interest sensitivity of money supply and the slope of the LM curve.

- Monetary policy – Open Market Operations, Statutory Liquidity Ratio, Bank rate, variable reserve ratio, repo rate.
- Government Budget Deficit and Deficit Financing-Indian illustration. Deficit financing and monetary policy.

5. Inflation, Unemployment and Expectations **20 lecture hours**

- The concept of Inflationary Gap.
- Demand pull vs. Cost push inflation
- Mark-up inflation
- The concept of stagflation
- Central Bank's role in controlling inflation: Monetary policy.
- Inflation and unemployment trade-off.
- Four models of aggregate supply: The Sticky-Wage Model, The Worker-Misperception Model, The Imperfect Information Model and The Sticky-Price Model.
- Deriving the Phillips Curve from Aggregate Supply Curve.
- Short run and long- run Phillips curve – role of adaptive expectations and rational expectations.
- Disinflation, Sacrifice Ratio and policy ineffectiveness.

ECO-A-CC-3-6-TU

Tutorial Contact hours: 15

Textbooks:

- Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
- N. Gregory Mankiw. Macroeconomics, Worth Publishers, 2010

References

- Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005.
- Ackley Gardner (old), Macroeconomic Theory, Macmillan, 1961
- Ackley Gardner(new), Macroeconomics : Theory and Policy : Macmillan,1978
- Ghosh Chandana and Ghosh Ambar, Macroeconomics, PHI Learning Pvt Ltd, 2014
- Andrew B. Abel and Ben S. Bernanke, Macroeconomics, Pearson Education, Inc., 7th edition, 2011.
- Venieris, Y.P. and Sebold F.D. , Macroeconomics: Models and Policy, John Wiley and Sons, 1977
- Richard T. Froyen, Macroeconomics, Pearson Education Asia, 10th edition, 2016.
- William Branson. Macroeconomic Theory and Policy, Indian reprint, East West Press, 3rd edition, 2014.
- Levacic Rosalind and Rebmann Alexander, Macroeconomics: An Introduction to Keynesian and Neo-Keynesian Controversies, Palgrave Macmillan, 1982.

- Sikdar Soumyen, Principles of Macroeconomics, Oxford University Press
- Blaug Mark , Economic Theory in Retrospect, 5th Edition, Cambridge University Press, 1997
- Mueller, M. (edited), Readings in Macroeconomics, London: Holt, Rinehart and Winston, 1973.

Economics Core Course VII: ECO-A-CC-3-7-TH-TU

Statistical Methods for Economics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester III]

ECO-A-CC-3-7-TH

1. Introduction and Overview **6 lecture hours**

- Subject-matter - the distinction between population and sample *[1 lecture hour]*
- Representation of data- graphical (line diagram, bar diagram, pie chart) and tabular method *[2 lecture hours]*
- Frequency Distribution *[3 lecture hours]*

2. Descriptive Statistics **13 lecture hours**

- Measures of central tendency(arithmetic mean, geometric mean, harmonic mean, median and mode, and their properties, Quartiles,Deciles and Percentiles) *[3 lecture hours]*
- Dispersion(range, quartile deviation, mean deviation, standard deviation, coefficient of variation, coefficient of mean deviation, coefficient of quartile deviation, Lorenz curve and Gini coefficient) *[4 lecture hours]*
- Moments, Skewness and Kurtosis (definition, computation) *[2 lecture hours]*
- Correlation and Regression (definition, computation, properties) *[4 lecture hours]*

3. Elementary Probability Theory **10 lecture hours**

- Sample spaces and events (concepts and definitions using set theory) *[2 lecture hours]*
- Axiomatic definition of probability and properties, theorem of total probability *[3 lecture hours]*
- Conditional probability, theorem of compound probability *[3 lecture hours]*
- Bayes' theorem and its applications. *[2 lecture hours]*

4. Probability Distributions **18 lecture hours**

- Random variable(discrete and continuous) *[1 lecture hour]*
- Probability distributions (pmf, pdf. Distribution functions) *[2 lecture hours]*

- Expected values of random variables (mean,variance, raw moment, central moment, moment generating functions) *[3 lecture hours]*
- Properties of commonly used discrete and continuous distributions:

  Binomial -(derivation of pmf, mean,variance, moments, moment generating functions, problems) *[3 lecture hours]*

  Poisson - (derivation of pmf, mean, variance, moments, moment generating functions, problems) *[3 lecture hours]*

  Normal - (derivation of pdf, mean, variance, moments, moment generating functions, problems) *[3 lecture hours]*
- Joint distribution functions of random variables (discrete and continuous) - joint pdf (pmf), marginal pdf (pmf)., conditional pdf (pmf) *[3 lecture hours]*

5. Sampling **14 lecture hours**

- Principal steps in a sample survey (concepts of population, sample, parameter, statistic) *[2 lecture hours]*
- Methods of sampling-

  SRSWR, SRSWOR(use of random sampling numbers) *[2 lecture hours]*

  Stratified sampling (basic concepts only) *[1 lecture hour]*

  Multi-staged sampling (basic concepts only) *[1 lecture hour]*
- Sampling distribution of sample mean and sample proportion

  Mean and standard error both inSRSWR and SRSWOR *[4 lecture hours]*

  Standard normal, chi-square, Student‘s t and F distributions – definitions, important properties (mean and variance) *[4 lecture hours]*

6. Statistical inference **14 lecture hours**

- Point estimation-Properties of a good estimator; *[4 lecture hours]*
- Basic principles of

  Ordinary Least Square, *[2 lecture hours]*

  Maximum Likelihood Method *[1 lecture hour]*

  Method of Moments; *[1 lecture hour]*
- Interval estimation.*[2 lecture hours]*
- Testing of hypothesis (basic conceptsof null hypothesis, alternative hypothesis, type I and Type II errors, power of a test, p-value) *[4 lecture hours]*

ECO-A-CC-3-7-TU

Tutorial contact hours: 15 [for revision, doubt clearing, solving problems]

Text books

- Goon, A. M, Gupta, M. K, and Dasgupta, B. Fundamentals of Statistics (Volume One, Volume two), The World Press Private Ltd
- William G. Cochran, Sampling Techniques, John Wiley, 2007

Reference books

- John E. Freund, Mathematical Statistics, Prentice Hall, 1992.
- Mood, A.M., F. A. Graybill and D.C. Boes, Introduction to the theory of statistics, McGraw Hill, 1974.

Skill Enhancement Course I: ECO-A-SEC-3-A(1)-TH

Data Analysis [DA]

Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: 2,

No. of Lecture hours: 30

[For Semester III]

Unit 1: Collection and representation of data **12 lecture hours**

1.1 Collection of data (some methodological issues) *[4 lecture hours]*

1.1.1 Census

1.1.2 Sample survey

1.2 Representation of data *[2 lecture hours]*

1.3 The basics of data management in Stata / R / Eviews / SPSS / MS Excel *[6 lecture hours]*

Unit 2: Indian Official Statistics (Basic concepts) **18 lecture hours**

1. Central Statistical Office (CSO) – National Accounts Statistics (NAS), Industrial Statistics (ASI, IIP) *[6 lecture hours]*
2. National Sample Survey Office (NSSO) – Household Consumer Expenditure Survey Rounds, Employment and Unemployment Survey Rounds *[6 lecture hours]*
3. Census of India – Population Census 2011 *[4 lecture hours]*
4. Reserve Bank of India (RBI) – Handbook of Statistics on Indian Economy (Selected parts) *[2 lecture hours]*

Suggested Readings:

1. Goon, A. M, Gupta, M. K, and Dasgupta, B. *Fundamentals of Statistics (Volume One)*, The World Press Private Ltd
2. GOI, *Note on Sample Design and Estimation Procedure of NSS 68th Round*, National Sample Survey Office, Ministry of Statistics and Programme Implementation.
3. GOI, *SRS Statistical Report 2016*, Office of the Registrar General & Census Commissioner, India

Suggested Websites

www.mospi.nic.in

www.censusindia.gov.in

www.rbi.org.in

Skill Enhancement Course I: ECO-A-SEC-3-A(1)-TH

Rural Development [RD]

Total Marks: 100 [Theory(Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: 2,

No. of Lecture hours: 30

[For Semester III]

1. **Aspects of Rural Development** **6 lecture hours**

- Concept of Rural Development
- Rural Development vs. Agricultural Development
- Role of NGOs in Rural Development
- Rural Non Farm Sector and Rural Development

2. **Panchayats and Rural Development** **5 lecture hours**

- Decentralized Planning and Participatory Development
- Role of Panchayats in Decentralized Rural Development
- Participatory Rural Appraisal
- Panchayats and Rural Development in West Bengal

3. **Rural Credit and Self Help Groups(SHGs)** **11 lecture hours**

- Role National Bank for Agriculture and Rural Development (NABARD) for promoting Rural Development
- Constraints of micro-enterprises in rural areas
- Credit needs for rural non farm sector.
- The concept of Micro credit
- Micro credit and the role of Grameen Bank
- Need for SHG for formation and features of SHG
- SHGs in India

4. **Critical Evaluation of Selected Government Programmes and Rural Development** **8 lecture hours**

- Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and Rural Development
- Child labour and school drop-out in rural areas. Mid-day Meal and Rural Development
- National Rural Health Mission (NRHM) and Rural Development

- Pradhan Mantri Gram Sadak Yojana (PMGSY) and Rural Development

References

1. Katar Singh , Rural Development : Principles, Policies and Management, Sage Publications, New Delhi
2. K.G. Karmakar, Rural Credit and Self-Help Groups, Sage Publications, New Delhi
3. S.Sau, Rural Industrialization –Development Trajectory in India, Farma K.L.M., Kolkata
4. Misra D. and Puri K. Indian Economy, Himalaya Publishing House
5. Datt and Sundharam (Revised by G.Datt and A. Mahajan) , Indian Economy, 70th edition, S. Chand

13. N. Narayanasami, Participatory Rural Appraisal: Principle, Methods and Applications, Sage Publications, New Delhi, 2009.
14. Vasant Desai, A Study of Rural Economics, Himalaya Publishing House, New Delhi.
15. Mahi Pal, ―Panchayati Raj and Rural governance‖, Economic and Political Weekly, Jan. 10-16, vol. XXXIX, 2004,No.2, p.13
16. Raghava, D. V. Rao, Panchayats and Rural Development, Ashish Publishing House, New Delhi, 1980.
17. Ram Reddy, Pattern of Panchayati Raj in India, Heritage Publishers, New Delhi, 2005.
18. Latest Reports on Panchayati Raj Development in West Bengal

Economics Core Course VIII: ECO-A-CC-4-8-TH-TU

Intermediate Microeconomics II

Total Marks: 100 [Theory (Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester IV]

ECO-A-CC-4-8-TH

Unit 1: Imperfect Market Structure **40 lecture hours**

1.1 Monopoly and barriers to entry- output determination and price rule, measure and sources of monopoly power, social costs of monopoly power-deadweight loss

1.2 Pricing with market power- first, second and third degree price discrimination, multiplant monopoly

1.3 Monopolistic competition- short run and long run equilibrium, excess capacity

1.4 Oligopoly- Oligopoly equilibrium as Nash equilibrium, Cournot, Bertrand and Stackelberg Model- use of isoprofit curves and simple game theoretic interpretation. Sweezy‘s kinked demand

curve model and non-collusive equilibrium. Competition versus collusion- the Prisoners' Dilemma. Collusive Oligopoly –Cartels and Price Leadership

Unit 2: Input market under Imperfect Competition 5 lecture hours

2.1 Monopsony, bilateral monopoly in labour market

Unit 3: General Equilibrium, Efficiency and Welfare 30 lecture hours

3.1 General Equilibrium and Economic Efficiency- Exchange, production and welfare, Pareto Optimality, Edgeworth box and contract curve, Pareto efficiency and perfect competition

3.2 Reasons for Market failure, Pareto efficiency and market failure (externalities and public goods), property right and Coase Theorem

3.3 Markets with asymmetric information-adverse selection, moral hazards, agency problems (concepts only) **ECO-A-**

CC-4-8-TU Tutorial

Contact Hours: 15

Text

- Pindyck, Rubinfeld and Mehta, Microeconomics, Pearson

References

1. Hal. R Varian , Microeconomic Analysis, WW Norton and Company, 3rd edition, 2013
2. J Tirole, Theory of Industrial Organisation, MIT Press, 1988
3. K Binmore, Fun and Games: A text on Game Theory, OUP,1991
4. Anindya Sen, Microeconomics, OUP
5. C. Snyder and W. Nicholson, Fundamentals of Microeconomics, Cengage Learning, 2010
6. Satya Chakrabarty, Microeconomics, Allied Publishers
7. Ferguson, C. E. and Gould, J.P., Microeconomic Theory, Aitbs Publishers and Distributors, New Delhi.
8. Cohen, K.J. and Cyert, R.M. , ―Theory of the Firms: Resource Allocation in a Market Economy‖ , Prentice Hall India,1981
9. Chauhan, S.P.S. , – Microeconomics- An Advanced Treatise‖, Prentice Hall India, 2009.

Economics Core Course IX: ECO-A-CC-4-9-TH-TU

Intermediate Macroeconomics II

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester IV]

ECO-A-CC-4-9-TH

1. Basic Tenets of New Classical and New Keynesian Theories 20 lecture hours

- New Classical Theory-The concept of rational expectations and the theory of real business cycle-introductory ideas
- New Keynesian Theory- nominal rigidities and real rigidities, rigidities in interest rates and credit rationing-introductory ideas

2. Macroeconomic Foundations -II 20 lecture hours

- Consumption: Keynesian consumption function; Fisher‘s theory of optimal intertemporal choice; life-cycle and permanent income hypotheses; Dusenberry‘s relative income hypothesis; rational expectations and random-walk of consumption expenditure.
- Demand for money: Regressive Expectations and Tobin‘s portfolio choice models; Baumol‘s inventory theoretic money demand.

3. Economic Growth 35 lecture hours

- Harrod and Domar models of economic growth.
- Solow one sector growth model-golden rule- -dynamic efficiency.
- Technological progress ,
- Elements of endogenous growth theory-basic ideas-the AK model

ECO-A-CC-4-9-TU

Tutorial Contact hours: 15

Textbooks:

- N. Gregory Mankiw. Macroeconomics, Worth Publishers, 2010
- Ghosh Chandana and Ghosh Ambar, Macroeconomics, PHI Learning Pvt Ltd, 2014

References

- Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005.
- Romer David , Advanced Macroeconomics, McGraw Hill Education, 4th edition, 2011.
- Ghosh Chandana and Ghosh Ambar, Economics of the Public Sector, PHI Learning Pvt Ltd, 2008

- Andrew B. Abel and Ben S. Bernanke, Macroeconomics, Pearson Education, Inc., 7th edition, 2011.
- Richard T. Froyen, Macroeconomics, Pearson Education Asia, 10th edition, 2016.
- Steven M. Sheffrin, Rational Expectations, Cambridge University Press, 2nd edition, 1996.
- William Branson. Macroeconomics , Harper and Row, 3rd edition, 1989
- Snowdon and Vane (ed), A Macroeconomics Reader, Routledge, Taylor and Francis Group.
- R. Barro. Macroeconomics, 5th edition, The MIT Press, 1989
- A.K.Sen (ed). Growth Economics, Penguin, 1970
- Barro, R.J. and Xavier Sala-i-Martin , Economic Growth,
- Errol D'Souza. Macroeconomics, Pearson Education (New Delhi), 2009.
- Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
- Laidler, E.W. ,The Demand for Money : Theories and Evidence, Dun-Donnelley Publishing Corporation, New York, 1978.

Economics Core Course X: ECO-A-CC-4-10-TH-TU

Introductory Econometrics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[For Semester IV]

ECO-A-CC-4-10-TH

1. Nature and Scope of Econometrics 4 lecture hours

1.1 Distinction between Economic Model and Econometric model *[1 lecture hour]*

1.2 Concept of stochastic relation, Role of random disturbance in econometric model *[1 lecture hour]*

1.3 Types of data *[1 lecture hour]*

1.4 Application of Econometrics in different branches of social science *[1 lecture hour]*

2. Classical Linear Regression Model (Simple linear regression and multiple linear regression): part 1 15 lecture hours

2.1 The classical assumptions (basic interpretation) *[1 lecture hour]*

2.2 Concepts of population regression function and sample regression function *[3 lecture hours]*

2.3 Estimation of model by method of ordinary least squares (Derivation in simple linear model (SLRM) and multiple linear model (MLRM) with two regressors only) *[6 lecture hours]*

2.4. Simple correlation, partial correlation and multiple correlation (Definition, and interpretation in the context of SLRM and MLRM) *[2 lecture hours]*

2.5 Limitations of SLRM and additional complications in MLRM *[2 lecture hours]*

2.6 Economic interpretations of the estimated model *[1 lecture hour]*

3. Classical Linear Regression Model (Simple linear regression and multiple linear regression): part 2 10 lecture hours

3.1 Properties of the Least Squares Estimators (BLUE) in SLRM- Gauss-Markov theorem *[4 lecture hours]*

3.2 Qualitative (dummy) independent variables – intercept dummy and slope dummy (only interpretation of the model) *[3 lecture hours]*

3.3 Forecasting - Ex-post forecast and Ex-ante forecast, forecast error (only for two variable model) *[3 lecture hours]*

4. Statistical inference in linear regression model 26 lecture hours

4.1 Use of standard normal, chi2, t, and F statistics in linear regression model *[9 lecture hours]*

4.2 Testing hypothesis *[12 lecture hours]*

Single test (t test and chi2 test)

Joint test (F test)

4.3 Goodness of fit (in terms of R^2, adjusted R^2 and F statistic), Analysis of Variance (ANOVA) *[3 lecture hours]*

4.4 Statistical significance and economic importance *[2 lecture hours]*

5. Violations of Classical Assumptions 12 lecture hours

5.1 Multicollinearity - Consequences, Detection (Variance Inflationary Factor (VIF)) and Remedies *[4 lecture hours]*

5.2 Heteroscedasticity - Consequences, Detection (Lagrange Multiplier test) and Remedies *[4 lecture hours]*

5.3 Autocorrelation - Consequences, Detection (Durbin-Watsontest) and Remedies *[4 lecture hours]*

6. Specification Analysis 8 lecture hours

6.1 Omission of a relevant variable *[2 lecture hours]*

6.2 Inclusion of irrelevant variable *[2 lecture hours]*

6.3 Tests of specification errors *[2 lecture hours]*

6.4 Testing for linearity and normality assumptions *[2 lecture hours]*

ECO-A-CC-4-10-TU

Tutorial Contact hours: 15

Text Books

1. Gujarati, Damodar (2004), *Basic Econometrics*, McGraw-Hill

2. Wooldridge, Jeffrey M. (2013), *Introductory Econometrics* – A Modern Approach, CENGAGE learning

Reference Books

1. Maddala, G. S. (2002), *Introduction to Econometrics*, Macmillan Publishing Company
2. Goon, A. M, Gupta, M. K, and Dasgupta, B., *Fundamentals of Statistics* (Volume One), The World Press Private Ltd

Skill Enhancement Course II: ECO-A-SEC-4-B(2)-TH

Research Methodology

Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: =2,

No. of Lecture hours: 30,

[For Semester IV]

Unit 1 : Methodological Issues 1 **10 lecture hours**

- Locating the basic issues- theme based literature survey and motivation behind any study-objectives of the study-development of writing skills
- Designing the sampling frame in case of field survey- the role of pilot survey
- The role of random numbers in drawing random sample
- Methods behind preparation of questionnaire in case of field survey
- Data entry after field survey
- Tabular representation of data and graphs for data interpretation

Unit 2: Methodological Issues 2 **20 lecture hours**

- Theoretical and Empirical Research in Economics.
- Common sections of an ideal research paper in Economics.
- Illustrations of empirical research work. Reporting the regression results and interpretation of the results: the role of statistical inference.[The course instructor should focus on framing the testable hypothesis and the role of statistical inference in empirical research]
- Illustrations of theoretical research: specification of the model, closing the model, checking stability of the model for meaningful comparative static results. [The course instructor should focus on the role of stability analysis in theoretical models by showing the method of linearizing non-linear differential equations. Illustrations can be made from IS-LM model by using trace and determinant conditions of the Jacobian matrix-the role of phase diagrams]
- Role of footnotes or end notes in a research paper
- Bibliography, reference and citation

- Writing the abstract of a research paper
- Key words and JEL Classification
- Presentation of a research paper through power point. Basic rules to be followed for a good presentation. Role of diagrams, graphs, pictures and charts.

Suggested Readings

1. Goon, A. M, Gupta, M. K, and Dasgupta, B. Fundamentals of Statistics (Volumes One and Two),The World Press Private Ltd
2. C.R. Kothari : Research Methodology : Methods and Techniques (second revised edition), New Age India (P) Ltd Publishers.
3. Alpha C. Chiang and Kavin WainWright : Fundamental Methods of Mathematical Economics, McGraw Hill, 2005.[For stability analysis]

Skill Enhancement Course II: ECO-A-SEC-4-B(2)-TH

Managerial Economics

Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: =2,

No. of Lecture hours: 30,

[For Semester IV]

1. Demand, Cost and Profit Analysis 6 lecture hours

- Demand for durable and non durable products, demand forecasting techniques
- Cost estimation
- Cost-volume-profit analysis (break even analysis)- objectives and assumptions; determination of breakeven point, limitations of c-v-p analysis

2. Pricing Policies and practices 3 lecture hours

- Factors governing prices, price discounts and differentials, price forecasting

3. Capital Budgeting 8 lecture hours

- What is capital budgeting, need for capital budgeting, different steps in capital budgeting, Capital budgeting appraisal methods – payback method, accounting rate of return method, net present value method, interest rate of return method, benefit cost ratio method. Capital rationing, alternative methods of financing investments

4. Cost of capital 5 lecture hours

- Cost of debt capital, cost of share capital, cost of equity capital, cost of retained earnings

5. Inventory Management **8 lecture hours**

- Inventory costs, concepts of average inventory, various inventory models- economic order quantity, optimum number of orders per year, optimum number of days supply per order.

References

- Varshney R.L., and Maheshwari K.L. – Managerial Economics, Sulatn Chand, N Delhi
- Keat P. G. and Young P.K.Y – Manegerial Economics, Pearson Education, N Delhi]
- Mehta P.L - – Managerial Economics, Sulatn Chand, N Delhi
- Samuelson W.F and Marks S,G - – Managerial Economics, Wiley Student Education
- Clarke T. International Corporate Governance, Routledge.

Economics Core Course XI: ECO-A-CC-5-11-TH-TU

International Economics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours:15

[Semester V]

ECO-A-CC-5-11-TH

1. Absolute and Comparative Advantages of Trade **9 lecture hours**

- Adam Smith's theory of absolute advantage.
- David Ricardo's theory of comparative advantage.
- Arbitrage as the basis and direction of trade; fundamental sources of cross-country price differences and arbitrage-concept of comparative advantage; externalities, regulation and perverse comparative advantage
- One factor economy, production possibility frontier, relative demand and relative supply, terms of trade, trade in the Ricardian world, determination of intermediate TOT, complete vs incomplete specialization, complete specialization and gains from trade.

2. The Building Blocks of Trade Theory **14 lecture hours**

- The concept of community indifference curve-Justification and properties.
- The need for trade indifference curves, derivation of trade indifference curves, properties of trade indifference map, Offer curves and its properties. Three important elasticities- the elasticity of offer curves, the elasticity of demand for imports, the elasticity of supply of exports. International equilibrium and offer curves, terms of trade (TOT) and stability, the Marshall-Lerner condition,
- Gains from Trade (GFT) theorem, illustration of GFT, decomposition of GFT, substitution possibilities and magnitude of GFT.

- Production structure for neo-classical trade models, role of constant returns to scale, the concept of unit isoquants, duality in the production structure, significance of the envelope condition in trade models

3. Factor Endowment and Trade (Heckscher-Ohlin-Samuelson Model) 15 lecture hours

- Heckscher-Ohlin (HO)theorem and price vs physical definitions of relative factor abundance.
- Role of homotheticity of tastes in the context of physical definition
- Factor Intensity Reversal in the context of price and physical definitions and invalidity of HO Theorem.
- Factor intensity ranking, one-to-one correspondence between commodity price ratio & factor price ratio (Stolper-Samuelson theorem), One to one correspondence between endowment ratio and production proportion (Rybczyski theorem) .
- The Factor Price Equalization Theorem. Factor price equalization and complete specialization.
- Incomplete Specialization, Factor price equalization and Factor Intensity Reversal
- Empirical studies- Leontief Paradox.

4. Applications of Neo-classical Trade Models for developing countries 10 lecture hours

- Jones (1965) Heckscher-Ohlin type 2x2(two factors-two commodities) full employment model for small open developing economies. Basic structure –significance of the assumption of constant returns to scale- the decomposability property-the capital intensity condition in physical and value terms- Implications of Stolper-Samuelson and Rybczynski theorems-the price and output magnification effects.
- Jones (1971) 3x2(three factors-two commodities) specific-factor model. Basic structure-significance of the assumption of constant returns to scale-the indecomposability property. Implications of price magnification effects in specific factor model.

5. Trade Policy 12 lecture hours

- Partial Equilibrium Analysis of Tariff - cost–benefit, Quota, Quota- Tariff equivalence & non-equivalence, monopoly effects of quota, subsidy and voluntary export restraint.
- General Equilibrium Analysis- distinction between large and small economy, welfare effects of a tariff on small country and large country. Tariff ridden offer curve, Tariff war, Optimum tariff for large economy, Metzler‘s Paradox.

6. Open Economy Macroeconomics and Balance of Payments 15 lecture hours

- Determination of equilibrium income in open economy. Foreign Trade Multiplier with & without repercussion effects.

- Balance of Payment accounts in an open economy. Autonomous and accommodating transactions.
- Fixed &Flexible Exchange Rates: adjustment of demand and supply of Foreign Exchange, Effect of devaluation, The Mundel-Fleming Model (IS LM BP model)

ECO-A-CC-5-11-TU

Tutorial Contact hours: 15

Texts

1. P. Krugman and M. Obstfeld- International Economics (8th Edition) ; Pearson Education
2. R. Caves, J. Frankel and R.W. Jones – World Trades & Payments (9th Ed); Pearson Education.
3. Rajat Acharyya- International Economics; Oxford University Press

References

- J.R. Markusen, J.R. Melvin, W.H. Kaempfer, K.E. Maskus – International Trade – Theory and Evidence, McGraw Hill
- B. Sodersten, and G. Reed (1994) : International Economics , Macmillan, London, 3rd edition.
- M. Chacoliades (1978) : International Trade: Theory and Policy, New York, McGraw- Hill
- R. Dornbusch : Open Economy Macroeconomics, Basic Books, Inc. Publishers, New York**.**
- Jones, R.W. : ‒ The Structure of Simple General Equilibrium Models‖, Journal of Political Economy, Vol 73, 1965, pp 551-572
- Jones, R.W. : ‒ A Three Factor Model in Theory, Trade and History‖, in Bhagwati. J. et al (eds) Trade, Balance of Payments and Growth, 1971, North Holland, Amsterdam.
- Chaudhuri, S. and Mukhopadhyay, U.: Foreign Direct Investment in Developing Countries: A Theoretical Evaluation, Springer, Chapter 2 only, 2014.

Economics Core Course XII: ECO-A-CC-5-12-TH-TU

Indian Economy

Total Marks: 100

[Theory (Th) 65 + Tutorial Based Term Paper (Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial Based Term Paper contact hours: 15

[Semester V]

ECO-A-CC-5-12-TH

1. Economic Development since Independence 20 lecture hours

- Growth and development under different policy regimes (from planning to market based development)
  - Objectives, achievements and failures of Planning *[4 lecture hours]*
  - Economic crisis during the late 1980s *[3 lecture hours]*

- Economic Reforms –Critical Analysis *[3 lecture hours]*

- Structural changes in the post-reforms period *[5 lecture hours]*
- Regional variation of growth and development *[5 lecture hours]*

2. Population and Human Development **15 lecture hours**

- Demographic trends and issues *[6 lecture hours]*
- Education and health:Basic problems and Government measures, Right to Education (RTE) Act 2009 *[9 lecture hours]*

3. Growth and Distribution **20 lecture hours**

- Trends in GDP and per capita GDP *[5 lecture hours]*
- Growth, poverty and inequality *[5 lecture hours]*
- Youth unemployment (School Transition to Work) *[5 lecture hours]*
- Policy perspectives in growth and distribution *[5 lecture hours]*

4. **Economic Reforms in India** **20 lecture hours**

- Banking sector reforms *[5 lecture hours]*
- Reforms in tax policy *[5 lecture hours]*
- Reforms in the external sector *[5 lecture hours]*
- Reforms in Labour market *[5 lecture hours]*

ECO-A-CC-5-12-TU

Tutorial Based Term Paper Contact Hours: 15 (for review classes, presentation by the students)

A term paper is to be prepared by the student under Tutorial Based Term Paper on any topic under the four broad themes covering the syllabus for the tutorial. Term paper should cover a literature survey of the topic along with a critical evaluation of the policy measures undertaken in the Indian context to tackle the specified problem. It should be prepared under a full time teacher of the subject belonging to the institution. All total 15 hours are allotted for a term paper. It is to be evaluated (all total 15 marks) jointly by an internal and an external examiner(if it is permitted under University rules) on the basis of the content of the term paper along with viva-voce on the term paper.

References

- Jean Dreze and AmartyaSen, 2013. An Uncertain Glory: India and its Contradictions, Princeton University Press.
- Jean Dreze and Amartya Sen: Economic Development and social opportunity, OUP

- Mihir Rakshit, 2011, Macroeconomics of Post-Reform India, OUP
- Sukhomoy Chakraborty: Development Planning: The Indian Experience, OUP
- Uma Kapila: Indian Economy since independence, Academic Foundation
- Ahluwalia and Little (ed): India‘s Economic Reforms and Development, OUP
- Joshi and Little: India‘s Economic Reforms, OUP
- Pulapre Balakrishnan, 2007, the Recovery of India: Economic Growth in the Nehru Era, Economic and Political Weekly, November.
- Panchanan Das. (2012), Wage Inequality in India - Decomposition by Sector, Gender and Activity Status, Economic and Political Weekly, 47(50), pp. 58-64
- Rakesh Mohan, 2008, ―Growth Record of Indian Economy: 1950-2008. A Story of Sustained Savings and Investment, Economic and Political Weekly, May.
- S.L. Shetty, 2007, ―India‗s Savings Performance since the Advent of Planning, in K.L. Krishna and A. Vaidyanathan, editors, Institutions and Markets in India‘s Development.
- Himanshu, 2010, Towards New Poverty Lines for India, Economic and Political Weekly, January.
- Jean Dreze and Angus Deaton, 2009, Food and Nutrition in India: Facts and Intepretations, Economic and Political Weekly, February.
- Himanshu. 2011, ―Employment Trends in India: A Re-examination, Economic and Political Weekly, September.
- Rama Baru et al, 2010, ―Inequities in Access to Health Services in India: Caste, Class and Region, Economic and Political Weekly, September.
- Geeta G. Kingdon, 2007, ―The Progress of School Education in India, Oxford Review of Economic Policy
- J.B.G. Tilak, 2007, ―Post Elementary Education, Poverty and Development in India, International Journal of Educational Development.
- T. Dyson, 2008, ―India‗s Demographic Transition and its Consequences for Development‖ in Uma Kapila, editor, Indian Economy Since Independence, 19th edition, Academic Foundation.
- Kaushik Basu, 2009, ―China and India: Idiosyncratic Paths to High Growth, Economic and Political Weekly, September.
- K. James, 2008, ―Glorifying Malthus: Current Debate on Demographic Dividend in India Economic and Political Weekly, June.
- Reetika Khera, 2011, ―India‗s Public Distribution System: Utilisation and Impact Journal of Development Studies.
- Aniruddha Krishna and DevendraBajpai, 2011, ―Lineal Spread and Radial Dissipation: Experiencing Growth in Rural India, 1992-2005, Economic and Political Weekly, September.
- Kaushik Basu and A. Maertens, Eds, 2013, The New Oxford Companion to Economics, Oxford University Press.

Discipline Specific Elective – A(1):

ECO-A-DSE-5-A(1)-TH-P Applied

Econometrics [AE] *Total Marks: 100*

[Theory (Th) 50+ Practical (P) 30 + Internal Assessment 10 + Attendance: 10]

Total Credits: [4(Th)+2(P)]=6 ,

No. of Lecture hours: 60, No. of Practical hours: 60/No. Of Practical classes: 30

[Semester –V]

ECO-A-DSE-5- A(1) –TH

1. Steps in empirical research **10 lecture hours**

1.1 Use of econometric models in empirical research – some basic concepts *[5 lecture hours]*

1.2 The basic commands in Stata / R *[5 lecture hours]*

2. Regression Diagnostics and Specification **20 lecture hours**

2.1 Misspecification *[4 lecture hours]*

2.2 Functional forms *[4 lecture hours]*

2.3 Model selection *[4 lecture hours]*

2.4 Application with Stata / R *[8 lecture hours]*

3. Application of Regression Analysis **30 lecture hours**

3.1 Cross section analysis – Linear regression model with two regressors (by using survey data like NSSO with Stata / R) *[6 lecture hours]*

3.2 Time series analysis (very preliminary level) – Basic concepts of time series, Estimating linear trend (by using NAS with Stata / R) *[12 lecture hours]*

3.3 Panel data analysis – basic concepts of fixed effects model; random effects model – (Application with Indian Official Statistics using Stata / R) *[12 lecture hours]*

ECO-A-DSE-5-A(1)-P

Total Practical Hours: 60, No of Practical Classes: 30

Applications of use of softwares STATA or R will be demonstrated in the computer laboratory in practical classes and the practical examination will be conducted in the usual manner as mentioned in CSR.

Text Books

1. Christopher F. Baum, (2006), An Introduction to Modern Econometrics Using Stata, Stata Press

2. Maddala, G. S. (2002), Introduction to Econometrics, Macmillan Publishing Company

3. Wooldridge, Jeffrey M. (2013), Introductory Econometrics – A Modern Approach, CENGAGE learning

4. Hamilton L. Statistics with Stata

References

STATA USER'S GUIDE RELEASE 13, https://www.stata.com/manuals13/u.pdf

Discipline Specific Elective – A(1):

ECO-A-DSE-5-A(1)-TH-TU

Economic History of India (1857-1947) [EHI]

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester- V]

ECO-A-DSE-5-A(1) –TH

1. Impact of British rule on India **30 lecture hours**

- Deindustrialization
- Commercialization of agriculture
- Economic Drain

2. Aspects of Economic Policies in British India **45 lecture hours**

- Land policy
- Policy of Discriminating Protection
- Early Industrial Development and Managing Agency System
- Currency and monetary policy
- Development of Infrastructure – Railways

ECO-A-DSE-5-A(1)-TU

Tutorial contact hours: 15

References

1. Lakshmi Subramanian, ―History of India 1707-1857‖, Orient Blackswan, 2010, Chapter 4.
2. SumitGuha, 1991, Mortality decline in early 20th century India‟, Indian Economic and Social History Review (IESHR), pp 371-74 and 385-87.
3. Tirthankar Roy, The Economic History of India 1857-1947, Oxford University Press, 3rd edition, 2011.
4. B. Chandra B. (2010): Rise and Growth of Economic Nationalism in India, HarAnand Publications,
5. J. Krishnamurty, Occupational Structure, Dharma Kumar (editor), The Cambridge Economic History of India, Vol. II, (henceforth referred to as CEHI), 2005, Chapter 6.
6. IrfanHabib, Indian Economy 1858-1914, A People‟s History of India, Vol.28, Tulika, 2006.

7. Ira Klein, 1984, ―When Rains Fail: Famine relief and mortality in British India‖, IESHR 21.
8. Jean Dreze, Famine Prevention in India in Dreze and Sen (eds.) Political Economy of Hunger, WIDER Studies in Development Economics, 1990, pp.13- 35.
9. John Hurd, Railways, CEHI, Chapter 8, pp.737-761.
10. Rajat Ray (ed.), Entrepreneurship and Industry in India, 1994.
11. AK Bagchi, ―Deindustrialization in India in the nineteenth century: Some theoretical implications Journal of Development Studies, 1976.
12. MD Morris, Emergence of an Industrial Labour Force in India, OUP 1965, Chapter 11, Summary and Conclusions.
13. K.N. Chaudhuri, Foreign Trade and Balance of Payments, CEHI, Chapter 10.
14. B.R. Tomlison, 1975, India and the British Empire 1880-1935, IESHR, Vol.XII.
15. Dharma Kumar, The Fiscal System, CEHI, Chapter 12.
16. Basudev Chatterjee, Trade, Tariffs and Empire, OUP 1992, Epilogue.
17. Daniel Thorner, Agrarian Prospect in India, 1977.
18. Visaria and P. Visaria, Population. CEHI, Chapter

Discipline Specific Elective-B(1):
ECO-A-DSE-5-B(1)-TH-TU
Comparative Economic Development (1850-1950) [CED]

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester-V]

ECO-A-DSE-5-B(1)-TH

1. Strategies and Policies for Economic Development 30 lecture hours

- Laissez-faire and free trade
- Strategy of industrialization in Soviet Union.

- Ha-Joon Chang. 2002. *Kicking Away the Ladder—Development Strategy in Historical Perspective*. London: Anthem Press. Chapter 2 (excluding NICs).
- Alec Nove. 1992. *An Economic History of the USSR 1917-1991*, London: Penguin 1992, chapter 8.

2. Regions of contemporary development 45 lecture hours

- Success stories of Asia : Japan, South East Asia and China
- Crisis and failures of Latin America and Africa

- Ha-Joon Chang. 2002. *Kicking Away the Ladder—Development Strategy in Historical Perspective*. London: Anthem Press. Chapter 2, 46-51.

- Ha-Joon Chang. 2004. ―The East Asian Development Experience‖, in *Rethinking Development Economics*, edited by Ha-Joon Chang, pp. 107-124. London: Anthem Press.
- PranabBardhan, ―What Makes a Miracle: Some Myths About the Rise of China and India‖, *Boston Review*, January/February 2008; and ―Introduction: The Myths Floating Around the Giants‖, in *Awakening Giants, Feet of Clay: Assessing the Economic Rise of China and India* (Princeton: Princeton University Press, 2010.
- Gabriel Palma. 2004. ―Latin America During the Second Half of the Twentieth Century – From the ‗Age of Extremes' to the Age of ‗End-of-History' Uniformity‖, in *Rethinking Development Economics*, edited by Ha-Joon Chang, pp. 125-151. London: Anthem Press.
- Kwan Kim. 2005. ―Development Crisis in Sub-Saharan Africa: Globalization, Adjustment and the Roles of International Institutions‖, in *Global Development and Poverty Reduction*, edited by John-ren Chen and David Sapsford, pp. 294-320. Cheltenham and Northampton: Edward Elgar, 2005.

ECO-A-DSE-5-B(1)-TU

Tutorial Contact hours: 15

General References

- Ha-Joon Chang. 2003. "Kicking Away the Ladder: The "Real" History of Free Trade", *Foreign Policy*, 30 December
- Alice Amsden. Ch. 6 of *Escape from Empire: The Developing Worlds Journey through Heaven and Hell*, MIT Press.
- World Bank, ―Overview‖, in *World Development Report 2001: Attacking Poverty*, pp. 1-12.
- World Bank, ―Overview‖, in *World Development Report 2002: Building Institutions for Markets*, pp. 1-12.
- Barry Naughton. 2006. *The Chinese Economy: Transitions and Growth*. MIT Press.
- Kay, Cristobal. 2002. Why East Asia overtook Latin America: Agrarian Reform, Industrialisation and Development, *Third World Quarterly*, Vol 23.
- Mark Weisbrot, *Latin America: The End of an Era*, Center for Economic and Policy Research, December 2006
- Keith Griffin. 1999. *Alternative Strategies for Economic Development*, chapter 2, Palgrave Macmillan.
- T. Nakamura, Economic Growth in Pre-War Japan, Tr. by Robert A Feldman, Yale University Press, 1983.
- Okochi, Karsh and Levine, Workers and Employees in Japan, The Japanese Employment Relations System, University of Tokyo, 1965.
- Y. Hayami, A Century of Agricultural Growth in Pre-War Japan: Its Relevance to Asian Development, University of Minnesota Press, 1975.

- Chalmers Johnson, MITI and the Japanese Miracle: The Growth of Industrial Policy 1925-1975, Stanford University Press, 1982.
- W.W. Lockwood, Economic Development of Japan, Expanded edition, Princeton University Press, 1966.
- Dobb M., Soviet Economic Development since 1917, Universal Book Stall, New Delhi, 1995.
- Paul R. Gregory and Robert C. Stuart, Soviet Economic Structure and Performance, Harper & Row, 3rd edition, 1986.
- Rodrik D. 2007. Industrial Policy for the 21st Century, in *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*, Princeton University Press.

Discipline Specific Elective-B(1):

ECO-A-DSE-5-B(1)-TH-TU

Financial Economics [FE]

Total Marks: 100 [Theory(Th) 65+ Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester-V]

ECO-A-DSE-5-B(1)-TH

1. Investment Theory and Portfolio Analysis 35 lecture hours

- Deterministic cash-flow streams: Basic theory of interest; discounting and present value; internal rate of return; evaluation criteria; fixed-income securities; bond prices and yields; interest rate sensitivity and duration; immunisation; the term structure of interest rates; yield curves; spot rates and forward rates.
- Single-period random cash flows: Random asset returns; portfolios of assets; portfolio mean and variance; feasible combinations of mean and variance; mean-variance portfolio analysis: the Markowitz model and the two-fund theorem; risk-free assets and the one-fund theorem.
- CAPM: The capital market line; the capital asset pricing model; the beta of an asset and of a portfolio; security market line; use of the CAPM model in investment analysis and as a pricing formula.

2. Options and Derivatives 20 lecture hours

- Introduction to derivatives and options; forward and futures contracts; options; other derivatives; forward and future prices; stock index futures; interest rate futures; the use of futures for hedging; duration-based hedging strategies; option markets; call and put options; factors affecting option

prices; put-call parity; option trading strategies: spreads; straddles; strips and straps; strangles; the principle of arbitrage; discrete processes and the binomial tree model; risk-neutral valuation.

3. Corporate Finance **20 lecture hours**

- Patterns of corporate financing: common stock; debt; preferences; convertibles; Capital structure and the cost of capital; corporate debt and dividend policy; the Modigliani- Miller theorem.

ECO-A-DSE-5-B(1)-TU

Tutorial Contact hours: 15

Text

Hull, John C., Options, Futures and Other Derivatives, Pearson Education, 6th edition, 2005.

References

- David G. Luenberger, Investment Science, Oxford University Press, USA, 1997.
- Thomas E. Copeland, J. Fred Weston and KuldeepShastri, Financial Theory and Corporate Policy, Prentice Hall, 4th edition, 2003.
- Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance, McGraw-Hill, 7th edition, 2002.
- Stephen A. Ross, Randolph W. Westerfield and Bradford D. Jordan, Fundamentals of Corporate Finance. McGraw-Hill, 7th edition, 2005.
- Burton G. Malkiel, A Random Walk Down Wall Street, W.W. Norton & Company, 2003.
- William Sharpe, Gordon Alexander and Jeffery Bailey, Investments, Prentice Hall of India, 6th edition, 2003.

Economics Core Course XIII: ECO-A-CC-6-13-TH-TU

Public Economics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester VI]

ECO-A-CC-6-13-TH

Unit 1. Government in a Market Economy **15 lecture hours**

- Market failure and externalities; public and merit goods;
- Government intervention;
- Public Expenditure for financing development

Unit 2. Choice and Public Economics **20 lecture hours**

- Characteristics of Pure Public Good; Distinction between Pure Public Good and Private Good;

- Market Failure in case of Pure Public Good Optimal provision of Public Goods - Private Provision and Public Provision of Public Goods,
- Lindahl Equilibrium,
- Voting Equilibrium.

Unit 3. The Revenue and Expenditure of the Government **20 lecture hours**

- Classification of Taxes; Canons of Taxation;
- Principles of Taxation - Benefit Principle, Equal Sacrifice Principle, Ability to Pay Principle;
- Incidence and Burden of Taxes;
- Effects of taxation on income distribution, work efforts, and on savings,
- The Laffer curve;
- Comparison between direct and indirect taxes – income and substitution effects;
- Optimal Taxation

Unit 4. Public Finance **20 lecture hours**

- Meaning and Classification of Public Expenditure - government budget and its types, government expenditure and tax multipliers, balanced budget multiplier;
- Meaning of Public Debt; Sources of Public Borrowings: internal and external borrowing; Effects of Public Debt.
- Indian Public Finance – Fiscal Federalism in India

ECO-A-CC-6-13-TU

Tutorial contact hours: 15

References:

- J. F. Due and A. F. Friedlander. Government Finance-Economics of Public Sector, AITBS Publishers and Distributors, 1994
- J. Hindriks and G. D. Myles. Intermediate Public Economics, The MIT Press; Annotated Edition, 2006.
- R.A. Musgrave and P.B. Musgrave, Public Finance in Theory & Practice, McGraw Hill Publications, 5th edition, 1989.
- Amaresh Bagchi (ed), Readings in Public Finance, OUP
- 5. J. E. Stiglitz. Economics of Public Sector,W. W Norton and Company, 3rd Edition, 2000.
- A Ghosh and C. Ghosh, Economics of the Public Sector, Prentice Hall India Learning Private Limited; 2nd Revised edition (2014)

Economics Core Course XIV: ECO-A-CC-6-14-TH-TU

Development Economics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester VI]

ECO-A-CC-6-14-TH

1. Meaning of Economic Development **10 lecture hours**

- Income Approach and Capability Approach,
- Construction and interpretation of HDI; international variations in development measures; comparing development trajectories across nations and within them.
- Dependency school of development.

2. Poverty and Inequality **15 lecture hours**

- Inequality axioms; a comparison of commonly used inequality measures.
- Gender Inequality, connections between inequality and development.
- Poverty measurement, HPI; poverty traps and path dependence of growth processes.
- Vicious Circle of Poverty Hypothesis

3. Dual Economy Models **20 lecture hours**

- The concept of surplus labour and disguised unemployment
- Peasants and Dualism with and without surplus labour
- Interdependence of agriculture and Industry (Lewis model, Ranis-Fei model)
- Rural-Urban Migration (Harris- Todaro model)

4. Population Growth and Economic Development **10 lecture hours**

- Basic concepts (Birth and Death Rates, mortality, fertility)
- Demographic transition theory
- Cost of children, externalities
- Low Level Equilibrium Trap models and their criticism-critical minimum effort theory (Nelson and Leibenstein).

5. Development Strategies **10 lecture hours**

- Balanced vs. Unbalanced Growth Theories
- Choice of Techniques

6. Political Institutions and the State **10 lecture hours**

- Definition of institutions, Evolution of Political and Economic Institutions.
- The determinants of democracy.
- Alternative institutional trajectories and their relationship with economic performance.
- Within-country differences in the functioning of state institutions. State ownership and regulation. Government failures and corruption.

ECO-A-CC-6-14-TU

Tutorial Contact hours: 15

Texts

1. Todaro and Smith: Economic Development, Pearson Education, 2009
2. Debraj Ray, Development Economics, Oxford University Press, 2009.
3. Kaushik Basu, Analytical Development Economics, OUP

References

- ParthaDasgupta, Economics, a Very Short Introduction, Oxford University Press, 2007.
- Abhijit Banerjee, Roland Benabou and Dilip Mookerjee, Understanding Poverty, Oxford University Press, 2006.
- KaushikBasu, The Oxford Companion to Economics in India, OUP, 2007.
- AmartyaSen, Development as Freedom, OUP, 2000.
- Daron Acemoglu and James Robinson, Economic Origins of Dictatorship and Democracy, Cambridge University Press, 2006.
- Robert Putnam, Making Democracy Work: Civic Traditions in Modern Italy, Princeton University Press, 1994
- Meier and Rauch (ed)- Leading Issues in Development Economics, OUP
- Hayami and Godo, Development Economics, OUP
- Thirlwall; Growth and Development. 5th Edition

Discipline Specific Elective –A(2):

ECO-A-DSE-6-A(2)-TH-TU

Money and Financial Markets [MFM]

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester-VI]

ECO-A-DSE-6-A(2)-TH

1. Introduction to money and Money and Banking **5 lecture hours**

- Concept, functions, measurement; theories of money supply determination**.**

2. Financial Institutions, Markets, Instruments and Financial Innovations 17 lecture hours

- Role of financial markets and institutions; problem of asymmetric information – adverse selection and moral hazard; financial crises.
- Money and capital markets: organization, structure and reforms in India; role of financial derivatives and other innovations.
- Why banks are special Institutions? How banks act as a leveraging mechanism?

3. Financial Markets and Interest Rates Behaviour 18 lecture hours

- Determination; sources of interest rate differentials;
- Theories of term structure of interest rates; interest rates in India.

4. Banking System 20 lecture hours

- Balance sheet and portfolio management;
- Multiple Deposit Creation,
- Determinants of the Money Supply.
- Indian banking system- Changing role and structure- banking sector reforms

5. Central Banking and Monetary Policy 15 lecture hours

- Functions, balance sheet; goals, targets, indicators and instruments of monetary control;
- Monetary management in an open economy; current monetary policy of India**.**

ECO-A-DSE-6-A(2)- TU

Tutorial Contact hours: 15

Text

- F. S. Mishkin and S. G. Eakins, Financial Markets and Institutions, Pearson Education, 6th edition, 2009.

References

- F. J. Fabozzi, F. Modigliani, F. J. Jones, M. G. Ferri, Foundations of Financial Markets and Institutions, Pearson Education, 3rd edition, 2009.
- M. R. Baye and D. W. Jansen, Money, Banking and Financial Markets, AITBS, 1996.
- Rakesh Mohan, Growth with Financial Stability- Central Banking in an Emerging Market, Oxford University Press, 2011.
- L. M. Bhole and J. Mahukud, Financial Institutions and Markets, Tata McGraw Hill, 5th edition, 2011.
- M. Y. Khan, Indian Financial System, Tata McGraw Hill, 7th edition, 2011.
- N. Jadhav, Monetary Policy, Financial Stability and Central Banking in India, Macmillan, 2006.

- R.B.I. – Report of the Working Group: Money Supply Analytics and Methodology of Compilation, 1998.
- R.B.I. Bulletin, Annual Report and Report on Currency and Finance (latest).

Discipline Specific Elective-A(2):

ECO-A-DSE-6-A(2)-TH-P

Issues in Indian Economy [IIE]

Total Marks: 100

[Theory (Th) 50 + Practical (P) 30 + Internal Assessment 10+Attendance: 10]

Total Credits: [4(Th)+2(P)]=6 ,

No. of Lecture hours: 60, No. of Practical hours: 30/No. of Practical classes: 30

[Semester-VI]

ECO-A-DSE-6-A(2)-TH

1. Growth and structural changes **4 lecture hours**

- Trends in national income and per capita income- Analysis with official statistics *[2 lecture hours]*
- Structural Composition of national income and employment with NAS and NSSO data *[2 lecture hours]*

2. Macroeconomic Policies and Their Impact **15 lecture hours**

- Fiscal Policy *[3 lecture hours]*
- Trade and investment policy *[3 lecture hours]*
- Financial and monetary policies *[3 lecture hours]*
- Inflation and measures to control inflation *[3 lecture hours]*
- Labour laws and regulation *[3 lecture hours]*

3. Policies and Performance in Agriculture **15 lecture hours**

- Growth; productivity; agrarian structure and technology, capital formation *[3 lecture hours]*
- Agricultural marketing *[3 lecture hours]*
- Food security and food policy *[3 lecture hours]*
- Pricing and procurement *[3 lecture hours]*
- WTO and Indian agriculture *[3 lecture hours]*

4. Policies and Performance in Industry **12 lecture hours**

- Output, employment and productivity growth *[2 lecture hours]*
- Regional variation of industrial growth *[2 lecture hours]*
- Small scale industries- problems and prospects *[2 lecture hours]*

- Public sector; competition policy *[2 lecture hours]*
- Foreign direct investment in industry *[2 lecture hours]*
- Economic reforms and industry *[2 lecture hours]*

5. Trends and Performance in Services **14 lecture hours**

- Formal and informal sectors *[5 lecture hours]*
- Banking and insurance *[5 lecture hours]*
- Trade in services *[4 lecture hours]*

ECO-A-DSE-6-A(2)-P

Total Practical Hours: 60, Number of Practical classes: 30

Students will have to take help of primary or secondary data and will have to make statistical/econometric analysis of any problem on Indian economy as mentioned in this course (i.e. the topic will not be outside the course) on the basis of the use of statistical softwares like SPSS/STATA/R/E-VIEWS .A project report is to be prepared by the candidate analysing the results obtained from the use of any one of the above-mentioned statistical softwares. Though there is a project report, basically it is a computer laboratory based practical on the basis of which the project report will be constructed. Use of computer laboratory is essential for running the above-mentioned statistical softwares and also for handling the data. In this sense the project work is to be interpreted as a Practical (it is not a separate project paper).The project should be supervised by a full time teacher of the subject belonging to the institution. All total 60 hours (30 Practical classes) have been allotted for the practical part of the course. The norm of the examination will be similar to that of a practical examination. To be more specific, the practical examination of the project is to be conducted jointly by the supervisor and an external examiner on the basis of the content of the project report, use of the above-mentioned statistical softwares in the computer laboratory (in the form of running the regressions used in the project or by determining the various measures of descriptive statistics used in the project in front of the examiners just like that of a practical examination) and also on the basis of a viva-voce based on the candidate"s knowledge about the data set (especially data sources in case of secondary data) along with economic interpretation of the regression results. In case the student uses primary data it should be related to one of the topics covered in the course and *why primary data is used instead of secondary data* is to be justified by the student. In case of use of primary data students should have good knowledge about the sampling procedure used in collecting data. *On the day of the practical examination students should carry with them soft copy of the data set used in the project.*

References

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- India Development Reports, IGIDR

Discipline Specific Elective- B(2) :

ECO-A-DSE-6-B(2)-TH-TU

Environmental Economics [EE]

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester- VI]

ECO-A-DSE-6-B(2)-TH

Unit 1. Introduction **7 lecture hours**

1.1 What is environmental economics;

1.2 Review of microeconomics and welfare economics.

1.3 Interlinkages between the economy and environment

Reference for unit 1:

Hanley N, Shogren J.F. & White B. *Environmental Economics in Theory and Practice*, Macmillan

Unit 2. Efficiency and Market Failure **18 lecture hours**

2.1 Pareto optimality and market failure in the presence of externalities

2.2 Property rights and the Coase theorem

2.3 Public goods/ bads and market failure

Reference for unit 2:

Kolstad C, *Environmental Economics*, OUP

Unit 3. The Design and Implementation of Environmental Policy **20 lecture hours**

3.1 Pigouvian Fees – Single Polluter, Multiple Polluters, Fees vs Subsidies

3.2 Regulating Pollution : Command and Control, Economic Incentives

3.3 The Basic Theory of Tradeable Pollution Permits

Reference for unit 3:

Kolstad C, *Environmental Economics*, OUP

Hanley N, Shogren J.F. & White B. *Environmental Economics in Theory and Practice*, Macmillan

Unit 4. International Environmental Problems **13 lecture hours**

4.1 Transboundary Pollution – Transboundary Pollution as a problem of international externalities

4.2 International Trade and Environment – Pollution Havens

4.3 International Environmental Agreements – Basic idea about Montereal and Kyoto Protocol and Talks on Climate Change

Reference for unit 4:

Hanley N, Shogren J.F. & White B. *Environmental Economics in Theory and Practice*, Macmillan

Kolstad C, *Environmental Economics*, OUP

Internet on Recent Environmental Agreements

Unit 5. Measuring the values of Environmental Costs and Benefits 17 lecture hours

5.1 Concepts of Willingness to pay (WTP) and Willingness to accept compensation (WTAC), Difference between the two concepts

5.2 Direct and Indirect Methods of Valuation – Contingent valuation, Travel Cost, hedonic Pricing – basic concepts only (no econometric techniques) – when they should be used, what are the advantages and disadvantages of these methods.

Reference for unit 5:

Hanley N, Shogren J.F. & White B. *Environmental Economics in Theory and Practice*, Macmillan

ECO-A-DSE-6-B(2)-TU

Tutorial Contact hours: 15

Discipline Specific Elective –B(2):

ECO-A-DSE-6-B(2)-TH-TU

Issues in Development Economics [IDE]

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours: 75, No. of Tutorial contact hours: 15

[Semester- VI]

ECO-A-DSE-6-B(2)-TH

1. Demography and Development 10 lecture hours

- Demographic concepts; birth and death rates, age structure, fertility and mortality
- Demographic transitions during the process of development; gender bias in preferences and outcomes and evidence on unequal treatment within households
- Connections between income, mortality, fertility choices and human capital accumulation
- Migration.

2. Land, Labor and Credit Markets 20 lecture hours

- The distribution of land ownership; land reform and its effects on productivity
- Contractual relationships between tenants and landlords
- Land acquisition; nutrition and labor productivity
- Iinformational problems and credit contracts

- Microfinance
- Inter- linkages between rural factor markets.

3. Individuals, Communities and Collective Outcomes **15 lecture hours**

- Individual behavior in social environments
- Multiple social equilibria;
- Governance in organizations and in communities;
- Individual responses to organizational inefficiency.

4. Environment and Sustainable Development **15 lecture hours**

- Defining sustainability for renewable resources
- A brief history of environmental change;
- Common-pool resources;
- Environmental externalities and state regulation of the environment;
- Market based instruments, economic activity and climate change.

5. Globalization **15 lecture hours**

- Globalization in historical perspective
- the economics and politics of multilateral agreements;
- Trade, production patterns and world inequality
- Financial instability in a globalized world.
- India in the context of global economy

ECO-A-DSE-6-B(2)-TU

Tutorial contact hours: 15

Text

- Debraj Ray, Development Economics, Oxford University Press, 2009.

References

- ParthaDasgupta, Economics, a Very Short Introduction, Oxford University Press, 2007.
- Abhijit Banerjee, Roland Benabou and Dilip Mookerjee, Understanding Poverty, Oxford University Press, 2006.
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- Raghuram Rajan, Fault Lines: How Hidden Fractures Still Threaten the World Economy, 2010.

- Elinor Ostrom, Governing the Commons: The Evolution of Institutions for Collective Action, CambridgeUniversity Press, 1990.
- DaniRodrik, The Globalization Paradox: Why Global Markets, States and Democracy Can‘t Coexist, Oxford University Press, 2011.
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BA/BSc ECONOMICS (GENERAL) SYLLABUS,

UNIVERSITY OF CALCUTTA, UNDER CHOICE BASED CREDIT SYSTEM

[AS ON 24-05-2018]

To be effective from the academic session 2018-19

Preamble

- As the subject Economics falls under both BA and BSc two types of structures are proposed for BA/BSc Economics (General). One for BA Economics (General) and the other for BSc Economics (General).
- For any student with Honours in a subject other than Economics (say Sociology (Honours) or Political Science (Honours) or Statistics (Honours)) may opt for Economics as a Generic Elective subject. So provisions are to be kept for Economics Generic Elective for four courses (papers).
- For any BA (General) student with Core subjects other than Economics [say Political Science as Core paper (under General) and History as Core paper (under General)] may opt for Economics as a Generic Elective Course [two Generic Elective courses are to be chosen from any discipline other than the Core. Thus provision should be kept for two courses of any subject other than the Core, say Economics]. This should be treated as Generic Elective Course for BA (General) student.
- Regarding skill-enhancement course there are two groups. Group A for odd semesters like semester III and semester V and Group B for even semesters like semester IV and semester VI. As part of skill-enhancement Course under BA/BSc Economics (General) provision should be kept for two skill-enhancement courses under each of the two groups (so all total provision is to be kept for 4 courses).
- The conversion of credit to lecture hours is same as that of the Honours course. **For *five credits* of lecture hours (theory) per course there will be *five hours of teaching per week* so that for fifteen weeks all total there will be 75 lecture hours for theory classes per semester. For 1 credit tutorial classes (each of one hour) there will be all total 15 hours of tutorial classes for 15 weeks (one can refer to it a 15 tutorial contact hours). We can club „lecture hours" and „tutorial contact hours" and can refer to it as „teaching hours " . Thus for a 5 credit (Theory)+1 credit(Tutorial)= 6 credit course for 15 weeks we have 75+15=90 teaching hours.** Similarly for a 2 credit course (only theory) the teaching hours or lecture hours all total is 30. Within each course the total marks of 100 has been subdivided in the following manner. For 90 hours of teaching (Theory plus tutorial) we have

  80 marks. The remaining part (20 marks) has been divided into two equal parts: 10 marks is reserved for ***continuous internal assessment (CIA)*** and the remaining 10 marks for

attendance. Out of 80 for written examination 65 marks has been allotted and the remaining 15 marks has been allotted for tutorial examination.

- We first focus on BSc Economics (General). To illustrate the structure we start from a hypothetical example. Suppose the three general subjects opted by a student for BSc (General) are Economics, Mathematics and Statistics. Then the syllabus for Economics should be treated as the syllabus for BSc Economics (General) and it would be based on the following structure.

Table 3: Structure for BSc (General) Course covering three subjects

. Type of Course	Total Number of Courses	Number of Courses for Economics out of total number of Courses	Credit for each course	Total Credit	Total Marks
Core Course (CC)	12	4	5(Th) +1 (Tu)=6 for each course or 4(Th) +2(P) =6 for each course	Total credit for12 courses = 72	2. 12x100 =1200
Discipline Specific Elective (DSE)	6	2	5(Th) +1 (Tu)=6 for each course or 4(Th) +2(P) =6 for each course	Total credit for 6 courses =36	6x100 =600
Ability Enhancement Compulsory course (AECC)	2	Nil	2 (Th) for each course	Total credit for 2 courses =4	2x100 =200
Skill Enhancement Elective Course (SEC)	4	2	2 (Th) for each course	Total credit for 4 courses =8	4x100 =400
Total	**24**	**8**		**120**	**2400**

- In case of BSc (General) for each CC we have 100 marks, for each DSE we have 100 marks, for each AECC we have 100 marks, for each SEC we have 100 marks so that all total we have 2400 marks for BSc (General) stream (as shown in Table 3). For each semester we have 400 marks as shown in table 3.In the above table Th stands for Theory, Tu stands for tutorial and P stands for Practical.
- We next focus on BA Economics (General). To illustrate the structure we start from a hypothetical example. Suppose the two general subjects opted by a student for BA (General) are Political Science and Economics. Then the syllabus for Economics should be treated as the syllabus for BA Economics (General) and it would be based on the structure shown in table 4
- In Language Core Course (LCC) as per decision of the University there will 2 English Courses and 2 MIL Courses.
- Ability Enhancement Courses can be conducted along with the Honours students in 1st and 2nd semesters.

Table 4: Structure for BA (General) Course covering two subjects (with two different subjects under Generic Elective)

. Type of Course	Total Number of Courses	Number of Courses for Economics out of total number of Courses	Credit for each course	Total Credit	Total Marks
Core Course (CC)	8	4	5(Th) +1 (Tu)=6 for each course	. Total credit for 8 courses = 48	8x100 =800
ϑ. Language Core Course (LCC)	4	Nil	5(Th) +1 (Tu)=6 for each course	. Total credit for 4 courses = 24	4x100 =400
. Generic Elective (GE) [From any other subject other than Core]	2	. 2 GE Economics (provided none of the two Core general subjects is Economics)	5(Th) +1 (Tu)=6 for each course	. Total credit for 2 courses = 12	2x100 =200
Discipline Specific Elective (DSE)	4	. 2 can be offered from Economics from each of the two groups A and B. Candidate will have to select one from each of the two groups	5(Th) +1 (Tu)=6 for each course	. Total credit for 4 courses =24	4x100 =400
Ability Enhancement Compulsory course (AECC)	2	Nil	2 (Th) for each course	. Total credit for 2 courses =4	2x100 =200
Skill Enhancement Elective Course (SEC)	4	. 2 can be offered from Economics from each of the two groups A and B	2 (Th) for each course	. Total credit for 4 courses =8	4x100 =400
Total	**24**	**8 (without considering GE courses) + 2 GE Courses (if the general Core subjects are other than Economics)**		**120**	**2400**

- We now consider semester-wise break-up of BSc (General) and BA (General) Courses:

Table 5 : Semester-wise Break-up of BSc (General) Course covering three subjects

Semester	Types of Courses [Course codes are in bold within brackets]	Economics Course	Total Credit for all Courses for each semester	Total Marks
I	3 CC**(CC-1)**, 1AECC**(AECC-1)**	1 CC	20	400
II	3CC**(CC-2)**, 1AECC**(AECC-2)**	1CC	20	400
III	3CC**(CC-3)**, 1 SEC**(SEC-A(1))**	1CC plus 1 SEC (if any candidate considers SEC-A(1) as Economics)	20	400
IV	3CC**(CC-4)**, 1 SEC**(SEC-B(1))**	1CC plus 1 SEC (if any candidate considers SEC-B(1) as Economics)	20	400
V	3DSE**[DSE-A (1A+2A+3A)]** , 1SEC **(SEC-A(2))**	1DSE plus 1SEC(if any candidate considers SEC-A(2) as Economics)	20	400
VI	3DSE**[DSE-B (1B+2B+3B)]**, 1 SEC **(SEC-B(2))**	1DSE plus 1SEC (if any candidate considers SEC-B(2) as Economics)	20	400
Total	**24Courses**	**4 CC +2 DSE under DSE A (candidate will select one) + 2 DSE under DSE B (candidate will select one) + 2 SEC under SEC A (candidate will select one) + 2 SEC under SEC B (candidate will select one)**	**120**	**2400**

Table 6 : Semester-wise Break-up of BA (General) Course covering two subjects

Semester	Types of Courses . [Course codes are in bold within brackets]	Economics Course	Total Credit for all Courses for each semester	. Total Marks
I	2 CC **(CC-1)** , 1 GE **(GE-1)** and 1AECC **(AECC-1)**	1 CC plus 1GE(if the core is other than Economics)	20	400
II	. 2CC **(CC-2)** ,1 GE **(GE-2)**, 1AECC **(AECC-2)**	1CC plus 1GE(if the core is other than Economics)	20	400
III	2CC **(CC-3)**, 1 LCC **(L1(1))** ,1 SEC **(SEC-A(1))**	1CC plus 1 SEC (if any candidate considers SEC-A(1) as Economics)	20	400
IV	2CC **(CC-4)** , 1LCC **(L2(1))**, 1 SEC **(SEC-B(1))**	1CC plus 1 SEC (if any candidate considers SEC-B(1) as Economics	20	400
V	1 LCC **(L1(2))**, 2DSE **[DSE-A (1A+2A)],** 1SEC **(SEC-A(2))**	1DSE plus 1SEC (if any candidate considers SEC-A(2) as Economics)	20	400
VI	1 LCC**(L1(2))** , 2DSE**[DSE-B (1B+2B)]** , 1 SEC **(SEC-B(2))**	1DSE plus 1SEC (if any candidate considers SEC-B(2) as Economics)	20	400
Total	**24Courses**	**4 CC +2 DSE under DSE A (candidate will select one) + 2 DSE under DSE B (candidate will select one) + 2 SEC under SEC A (candidate will select one) + 2 SEC under SEC B (candidate will select one) + 2 GE (in case if the Core Course is other than Economics– the candidate will select one)**	**120**	**2400**

- AECC-1 refers to Communicative English/MIL. AECC-2 refers to Environmental Studies
- LCC: L1 –English Courses; L2- MIL courses. Two courses each
- SEC - Two courses from two subjects
- DSE- Two courses from two subjects in case of BA (General) .Two Courses from three subjects in case of BSc (General).[One course from each subject under each semester].
- In case of BA (General) for each CC we have 100 marks, for each LCC we have 100 marks, for each GE we have 100 marks, for each DSE we have 100 marks, for each AECC we have 100 marks and for each SEC we have 100 marks (as shown in table 4) so that all total we

have 2400 marks for BA (General) stream. For each semester we have 400 marks as shown in table 6.

- If a candidate selects one Economics paper under group-A in case of SEC then the candidate can opt for 3rd or 5th semester. If a candidate selects one Economics paper under group-B in case of SEC then the candidate can opt for 4th or 6th semester. These are shown in terms of tables 5 and 6. [See the explanations regarding DSE and SEC after table 10]
- Economics as Generic Elective can be offered for students having Honours in any subject other than Economics. The semester break-up of the course is as follows

Table 7: Semester-wise break-up of Generic Elective for students having Honours in subject other than Economics

Semester	Course
I	Generic Elective Course I (GE-I)
II	Generic Elective Course II(GE-II)
III	Generic Elective Course III(GE-III)
IV	Generic Elective Course IV (GE-IV)

- The four GE courses for students having Honours in any subject other than Economics can be treated as Core courses (CC) in first four semesters for students under BA/BSc General Courses.
- We have thus the following classification of GE and CC:

Table 8 : Semester-wise distribution of CC and GE

Semester	Name of the Course	Core Course (CC) for BA/BSc General students	GE Course for students who have Honours in sny subject other than Economics	GE (Economics) Course for BA (General) students who have Core papers other than Economics
I	Introductory Microeconomics	Core Course 1(Econ)-CC-1 (ECO-G-CC-1-1-TH-TU)	Generic Elective Course I (ECO-GE- 1-1-TH-TU)	Generic Elective Course I (ECO-G-GE-1-1-TH-TU)
II	Introductory Macroeconomics	Core Course 2(Econ)-CC-2 (ECO-G-CC-2-2-TH-TU)	Generic Elective Course II (ECO-GE-2-2-TH-TU)	Generic Elective Course II (ECO-G-GE-2-2-TH-TU)
III	Issues in Economic Development and India	Core Course 3(Econ)-CC-3 (ECO-G-CC-3-3-TH-TU)	Generic Elective Course III (ECO-GE-3-3-TH-TU)	Not Applicable
IV	. Indian Economic Policies	Core Course 4(Econ)-CC-4 (ECO-G-CC-4-4-TH-TU)	Generic Elective Course IV (ECO-GE-4-4-TH-TU)	Not Applicable

- In table 8 the last column implies the two Generic Elective Courses for BA (General) students that will be offered to students who have Core Courses other than Economics. In such case the student may opt for the two Courses in Economics in the First Semester and in the Second Semester (it matches with the two Core Courses in Economics for the first two semesters). The student may take two such courses from Economics in the first and second semesters

provided his/her Core papers in BA (General) are other than Economics. No separate option has been provided for the students in choosing the courses. They will have to select from the Core papers of Economics (General) Courses provided in the First and Second Semesters.

- For the two Discipline Specific Elective (DSE) courses we suggest the following :

Table 9 : Options for two DSE (Economics) Courses –Group A and Group-B
BA (General) and BSc (General)

Name of Courses under DSE-A [Candidate will have to select only one] [Relevant for 5th Semester]	**Name of the Courses under DSE-B [Candidate will have to select only one] [Relevant for 6th Semester]**
Money and Banking (MB) ECO-G-DSE-5-1A/2A-TH-TU	Public Finance (PF) ECO-G-DSE-6-1B/2B-TH-TU
Sustainable Development (SD) ECO-G-DSE-5-1A/2A-TH-TU	Economic History of India (1857-1947) (EHI) ECO-G-DSE-6-1B/2B-TH-TU

Table 10 : Options for two SEC (Economics) Courses –Group A and Group-B:
BA (General) and BSc (General)

Name of the Course under SEC-A [Candidate will have to select only one] [Relevant for 3rd or 5th Semesters]	**Name of the Course for SEC-B [Candidate will have to select only one] [Relevant for 4th or 6th Semesters]**
Introductory Methods of Field Survey (IMFS) ECO-G-SEC-3-1A-TH/ECO-G-SEC-5-2A-TH	. Economic Data Analysis and Report Writing (EDARW) ECO-G-SEC-4-1B-TH/ECO-G-SEC-6-2B-TH
Elementary Rural Development (ERD) ECO-G-SEC-3-1A-TH/ECO-G-SEC-5-2A-TH	Entrepreneurship and Development (ED) ECO-G-SEC-4-1B-TH/ECO-G-SEC-6-2B-TH

- In case of semester 5 for DSE A at least two options from each discipline are to be given. Similarly in case of semester 6 for DSE-B at least two options from each discipline are to be given. In case of Economics we have given exactly two options for each group A and B. In case of BSc (General) a candidate will have to select one option from three different disciplines from each group (i.e. DSE-A ad DSE-B). These are referred to as courses DSE-A: 1A, 2A and 3A and DSE-B: 1B, 2B and 3B. [Here 1 ,2 and 3 are disciplines like Economics, Mathematics, Statistics whereas A and B are the groups]

- The structure is similar in case of BA (General) except that here a candidate will have to select one option from two different disciplines (instead of three different disciplines). These are referred to as courses DSE-A: 1A and 2A (for semester 5) and DSE-B : 1B and 2B (for semester 6) . [Here again 1 and 2 are disciplines like Economics and History whereas A and B are the groups]

- In Table 10 we have specified the options under Group A and Group B. As an example we can say that in case of BA (General) suppose the disciplines as Core Courses are History and Economics. In this case two options are given for Economics under Skill Enhancement

Course (SEC) in the form of SEC-A and SEC-B. In case of SEC-A, suppose two options from Economics and two from History are offered. Similarly, two options from Economics and two options from History are also offered under SEC-B. If a candidate opts for History from SEC- A in semester 3 then he /she must opt for Economics (any one of the two Economics options) from SEC-A in case of semester-5. Similarly if a candidate opts for Economics from SEC-B (any one of the two Economics options) in semester 4 then he/she must opt for History from SEC-B in semester 6.

- ***The SEC-A courses will be offered twice .The same courses will be taught twice: once in the 3rd Semester and again in the 5th Semester. Similarly SEC-B courses will be offered twice. The same courses will be taught twice: once in the 4th Semester and again in the 6th Semester. Examinations will be conducted both for 3rd and 5th semester students for the same Economics courses under SEC-A. Similarly, examinations will be conducted both for 4th and 6th semester students for the same Economics courses under SEC-B.***

- Based on the above-mentioned structure we have framed the syllabus in the following manner.

Core Course 1 (CC 1) BA/BSc (General) / Generic Elective Course I (GE -1) for BA/BSc Honours students [other than students having Economics (Honours)]/BA (General) Generic Elective Course I (GE-I) for students not having Economics as Core Course

Name of the Course: Introductory Microeconomics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-I]

ECO-G-CC-1-1-TH-TU/ ECO--GE-1-1-TH-TU/ECO-G-GE-1-1-TH-TU

ECO-G-CC-1-1-TH/ ECO--GE-1-1-TH /ECO-G-GE-1-1-TH

1. **Exploring the subject matter of Economics** **5 lecture hours**

Why study economics? Scope and method of economics; the economic problem: scarcity and choice; the question of what to produce, how to produce and how to distribute output; science of economics; the basic competitive model; prices, property rights and profits; incentives and information; rationing; opportunity sets; economic systems; reading and working with graphs.

2. **Supply and Demand: How Markets Work, Markets and Welfare**

16 lecture hours

Markets and competition; determinants of individual demand/supply; demand/supply schedule and demand/supply curve; law of demand and law of supply; market versus individual

demand/supply; shifts in the demand/supply curve, demand and supply together; how prices allocate resources; elasticity of demand - own price, cross price and income elasticity of demand- total revenue, average revenue, marginal revenue and price elasticity of demand; elasticity and its application; controls on prices; taxes and the costs of taxation; consumer surplus; producer surplus and the efficiency of the markets.

3. The Households 18 lecture hours

- Utility maximization-the cardinal approach. Total utility and marginal utility-law of diminishing marginal utility-relation between law of demand and law of diminishing marginal utility
- Utility maximization-the ordinal approach. Consumption decision and the budget constraint, consumption and income/price changes, description of preferences (representing preferences with indifference curves); properties of indifference curves; consumer s optimum choice; the price consumption curve and the income consumption curve; derivation of the demand curve from price consumption curve; income and substitution effects.

4. The Firm and Perfect Market Structure 18 lecture hours

- Production function of a firm; total product, average product and marginal product; concept of isoquant ; returns to scale; behaviour of profit maximizing firms and the production process; the cost function, short run costs and output decisions; costs and output in the long run.
- Features of a perfectly competitive market. Short run equilibrium under perfect competition. Supply curve of a firm. Long run equilibrium under perfect competition.

5. Imperfect Market Structure 8 lecture hours

Monopoly equilibrium- differences with perfect competition. Basic ideas of price-discriminating monopolist .

6. Input Markets 10 lecture hours

The labour market - basic concepts - derived demand, productivity of an input; marginal productivity of labour, marginal revenue product); the land market- concepts of rent and quasi rent.

ECO-G-CC-1-1-TU/ ECO--GE-1-1-TU /ECO-G-GE-1-1-TU

Tutorial Contact Hours: 15

Text

- R.G. Lipsey. An Introduction to Positive Economics, ELBS (6^{th} edition)

Reference Books

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- Samuelson, P.A. and Nordhaus, W.D. :Economics, 19^{th} edition, McGraw Hill
- Stonier, A.W. and Hague, D.C. : A Textbook of Economic Theory, Longman Group, London.

Core Course 2 (CC 2) BA/BSc (General) / Generic Elective Course II (GE -II) for BA/BSc Honours students [other than students having Economics (Honours)]/ BA (General) Generic Elective Course II (GE-II) for students not having Economics as Core Course

Name of the Course: Introductory Macroeconomics

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-II]

ECO-G-CC-2-2-TH-TU/ ECO--GE-2-2-TH-TU/ECO-G-GE-2-2-TH-TU

ECO-G-CC-2-2-TH / ECO--GE-2-2-TH /ECO-G-GE-2-2-TH

1. Introduction to Macroeconomics and National Income Accounting 14 lecture hours

Basic issues of macroeconomics; measurement of gross domestic product; distinction of gross domestic product with gross national product; net domestic product and net national product; net domestic product at market price and at factor cost-the concept of national income. Measurement of national income- income method and the expenditure method- circular flow of income; the concept of value added and the value added method of measuring national income; real versus nominal GDP.

2. The Simple Keynesian Model in a Closed Economy 14 lecture hours

The Keynesian consumption function and the Keynesian saving function. The Simple Keynesian Model of Income determination- the concept of effective demand-the Simple Keynesian Multiplier-the role of the government in Simple Keynesian Model

3. The Classical System 11 lecture hours

Basic ideas of classical system-Say‘s Law and Quantity Theory of Money- classical theory of income and employment determination.

4. Money Supply and Money Demand 11 lecture hours

- Supply of money; measures of money supply; high powered money, credit creation by commercial banks, tools of monetary policy.
- Demand for money-demand for money in the classical system and in the Keynesian system-the liquidity preference schedule.

5. Inflation 13 lecture hours

Demand pull and cost push inflation; inflation and its social costs; hyperinflation; trade off between inflation and unemployment –basic ideas of the Phillips Curve; anti-inflationary

monetary and fiscal policies.

6. The External Sector **12 lecture hours**

- Basis of trade: concepts of absolute advantage and comparative advantage; arguments for free trade; arguments for protection
- Balance of Payments-accounting and equilibrium; disequilibrium in balance of payments and devaluation-the role of the Marshall-Lerner condition

ECO-G-CC-2-2-TU / ECO--GE-2-2-TU /ECO-G-GE-2-2-TU

Tutorial Contact Hours: 15

Text

Sikdar Soumyen, Principles of Macroeconomics, Oxford University Press

Reference Books

- Stonier, A.W. and Hague, D.C. : A Textbook of Economic Theory, Longman Group, London
- Mankiw, N.G.: Elementary Macroeconomics, Worth Publishers, 7th edition, 2010.
- Errol D_Souza, Macroeconomics, Pearson Education, 2009.

Core Course 3 (CC 3) BA/BSc (General) / Generic Elective Course III (GE-III) for BA/BSc Honours students [other than students having Economics (Honours)]:

Name of the Course: Issues in Economic Development and India

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-III]

ECO-G-CC-3-3-TH-TU/ ECO--GE-3-3-TH-TU

ECO-G-CC-3-3-TH / ECO--GE-3-3-TH

1. Meaning of Economic Development **25 lecture hours**

Meaning of economic development; growth vs. development; concept of human development and its measurement, population and human development; education and health sectors in India; features and causes of underdevelopment of the Indian economy; growth and development of Indian economy under different policy regimes.

2. Poverty , Inequality and Development **20 lecture hours**

Basic issues of poverty and inequality; basic ideas about measurement of poverty and inequality- the poverty line; trends and policies to eradicate poverty and income inequality in India

3. Development of the Dual Economy and Development Strategies 15 lecture hours

- Surplus labour and disguised unemployment-basic concepts; the Lewis model of economic development with unlimited supply of labour.
- Balanced and unbalanced growth as development strategies

4. International Organizations and Economic Development 15 lecture hours

- Functions of IMF and World Bank and their roles in economic development
- The World Trade Organization (WTO) and its functions. India and the WTO

ECO-G-CC-3-3-TU / ECO--GE-3-3-TU

Tutorial Contact Hours: 15

Text

- Todaro and Smith: Economic Development, Pearson Education, 2009
- Misra D. and Puri K. Indian Economy, Himalaya Publishing House

References

- Thirlwall, Growth and Development, 5th Edition
- Rakesh Mohan, 2008, ―Growth Record of Indian Economy: 1950-2008. A Story of Sustained Savings and Investment, Economic and Political Weekly, May.
- Datt and Sundharam (Revised by G. Datt and A. Mahajan) , Indian Economy, 70th edition, S. Chand
- T. Dyson, 2008, ―India‗s Demographic Transition and its Consequences for Development in Uma Kapila, editor, Indian Economy Since Independence, 19th edition, Academic Foundation.
- Agarwala, A.N. and Singh, S.P. : Economics of Underdevelopment (eds), Oxford University Press, London.
- Mukherjee, Debes : Development Policies, Problems and Institutions, New Central Book Agency, Kolkata.

Core Course 4 (CC 4) BA/BSc (General) / Generic Elective Course IV (GE-IV) for BA/BSc Honours students [other than students having Economics (Honours)]:

Name of the Course: Indian Economic Policies

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-IV]

ECO-G-CC-4-4-TH-TU/ ECO--GE-4-4-TH-TU

ECO-G-CC-4-4-TH / ECO--GE-4-4-TH

1. **Macroeconomic Policies and their Impact** **15 lecture hours**

   Fiscal Policy; trade and investment policy; financial and monetary policies; labour regulation.

2. **Policies and Performance in Agriculture** **21 lecture hours**

   Growth; productivity; agrarian structure and technology; capital formation; trade; pricing and procurement.

3. **Policies and Performance in Industry** **21 lecture hours**

   Growth; productivity; diversification; small scale industries; public sector; competition policy; foreign investment

4. **Policies and Performance of Indian Foreign Trade** **18 lecture hours**

   India‘s foreign trade: change in volume and direction of India‘s foreign trade in the post-liberalization period; Balance of Payments position of India in recent years; India‘s export and import policies.

ECO-G-CC-4-4-TU / ECO--GE-4-4-TU

Tutorial Contact Hours: 15

Text

- Misra D. and Puri K. Indian Economy, Himalaya Publishing House
- Datt and Sundharam (Revised by G.Datt and A. Mahajan) , Indian Economy, 70th edition, S. Chand

References

- Shankar Acharya, 2010, ―Macroeconomic Performance and Policies 2000-8,‖ in Shankar Acharya and Rakesh Mohan, editors, India‘s Economy: Performances and Challenges: Development and Participation, Oxford University Press.
- Rakesh Mohan, 2010, ―India_s Financial Sector and Monetary Policy Reforms, ‖ in Shankar Acharya and Rakesh Mohan, editors, India‘s Economy: Performances and Challenges: Development and Participation, Oxford University Press.

Discipline Specific Elective Course [Economics] (DSE -A) BA/BSc (General)

Name of the Course: Money and Banking (MB)

Total Marks: 100 [Theory(Th) 65+ Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-V]

ECO-G-DSE-5-1A/2A-TH-TU

ECO-G-DSE-5-1A/2A-TH

25 lecture hours

1. Money Supply and Banking System with reference to India

efinition of money supply in the Indian context (M_1, M_2, M_3 and M_4) , Balance sheet of the banking sector and accounting of money supply; balance sheet of the Reserve Bank of India and the accounting interpretation of High powered money; definition of high powered money; the money multiplier theory and balance sheet of commercial banks, sterilization by Central Banks. Indian banking system-changing role and structure; Indian banking sector reforms.

2. Financial Institutions and Financial Markets 22 lecture hours

- Role of financial markets and institutions in economic development- Indian examples
- Money and capital markets: organization, structure and reforms in India; role of financial derivatives and other innovations.

3. Interest Rates 12 lecture hours

Determination; sources of interest rate differentials; theories of term structure of interest rates; interest rates in India.

4. Central Banking and Monetary Policy 16 lecture hours

Instruments of monetary control with special reference to India; concepts of statutory liquidity ratio(SLR), cash reserve ratio(CRR) and repo rate as instruments of monetary control; monetary management in an open economy; current monetary policy of India, demonetization and its impact on the Indian economy.

ECO-G-DSE-5-1A/2A-TU

Tutorial Contact Hours: 15

Texts

- F. S. Mishkin and S. G. Eakins, Financial Markets and Institutions, Pearson Education, 6th edition, 2009.
- F. J. Fabozzi, F. Modigliani, F. J. Jones, M. G. Ferri, Foundations of Financial Markets and Institutions, Pearson Education, 3rd edition, 2009.
- M. R. Baye and D. W. Jansen, Money, Banking and Financial Markets, AITBS, 1996.
- Gupta, S.B.: Monetary Planning in India, Oxford University Press, Delhi.

References

- Rakesh Mohan, Growth with Financial Stability- Central Banking in an Emerging Market,

Oxford University Press, 2011.

- L. M. Bhole and J. Mahukud, Financial Institutions and Markets, Tata McGraw Hill, 5th edition, 2011.
- M. Y. Khan, Indian Financial System, Tata McGraw Hill, 7th edition, 2011.
- N. Jadhav, Monetary Policy, Financial Stability and Central Banking in India, Macmillan, 2006.
- R.B.I. – Report of the Working Group: Money Supply Analytics and Methodology of Compilation, 1998.
- R.B.I. Bulletin, Annual Report and Report on Currency and Finance (latest).
- Economic Survey 2016-17, Government of India.

Discipline Specific Elective Course [Economics] (DSE -A) BA/BSc (General)

Name of the Course: Sustainable Development (SD)

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-V]

ECO-G-DSE-5-1A/2A-TH-TU

ECO-G-DSE-5-1A/2A-TH

1. The Approach Towards Sustainability-Introductory ideas 15 lecture hours

Key environmental issues and problems, economic way of thinking about these problems, circular flow of environmental pollutants and waste recycling-laws of thermodynamics, renewable and non-renewable resources-the issue of sustainability

2. The meaning of Sustainable Development 25 lecture hours

Different definitions of sustainable development, rules of sustainable development, measures of sustainable development, sustainable management of resources-the role of property rights, stakeholders associated with sustainble management of different types of renewable resources-fishery, forestry and water, the concept of sustainable livelihood in the context of sustainable resource management.

3. Trans-boundary pollution, climate change and sustainable development

15 lecture hours

Implementation of environmental policies in developing countries and international experience; transboundary environmental problems-international meetings, protocols and treaties; economics

of climate change-basic ideas of the carbon credit market-clean development mechanism and international emission trading.

4. Sustainable Resource Management Policies in India **20 lecture hours**

Water policy, forestry policy and fishery policy of India. Basic objectives of the policies along with goals and visions.

ECO-G-DSE-5-1A/2A-TU

Tutorial Contact Hours: 15

Texts

Rabindranath Bhattacharya : ―Environmental Economics : An Indian Perspective‖, Oxford University Press.

Pearce and Turner : ‗Environmental and Natural Resource Economics', John Hopkins University Press,1991

References

- Roger Perman, Yue Ma, Michael Common, David Maddison and James McGilvray, ―Natural Resource and Environmental Economics‖, Pearson Education/Addison Wesley, 4th edition, 2011.
- Charles Kolstad, ―Intermediate Environmental Economics‖, Oxford University Press, 2nd edition, 2010.
- IPCC (Intergovernmental Panel on Climate Change), Fifth Assessment Report , 2014.
- National Water Policy 2012, Ministry of Water Resources, Government of India.
- National Forest Policy 2016 : Ministry of Environment and Forests, Government of India
- National Policy on Marine Fisheries, 2017: Ministry of Animal Husbandry, Dairying and Fisheries, Government of India.

Discipline Specific Elective Course [Economics] (DSE-B) BA/BSc (General)

Name of the Course: Public Finance (PF)

Total Marks: 100 [Theory(Th) 65 + Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-VI]

ECO-G-DSE-6-1B/2B-TH-TU

ECO-G-DSE-6-1B/2B-TH

1. Theory of Public Finance **40 lecture hours**

- Overview of Fiscal Functions, Tools of Normative Analysis, Pareto Efficiency, Equity and

the Social Welfare.

- Market Failure, Public Good and Externalities.
- Elementary Theories of Product and Factor Taxation (Excess Burden and Incidence).

2. Issues from Indian Public Finance **35 lecture hours**

- Current Issues of India‘s Tax System.
- Working of Monetary and Fiscal Policies.
- Analysis of Budget and Deficits
- Fiscal Federalism in India
- State and Local Finances

ECO-G-DSE-6-1B/2B-TU

Tutorial Contact Hours: 15

Text

- Ganguly Subrata , Public Finance : A Normative Approach, Nababharat Publishers

References

- Musgrave, R.A. and P.B. Musgrave, Public Finance in Theory and Practice, Mc- Graw Hill, 1989.
- M.M Sury, Government Budgeting in India, Commonwealth Publishers, 1990.
- Shankar Acharya, ―Thirty years of tax reform‖ in India, Economic and Political Weekly, May 2005.
- Government of India, Report of the 13th Finance Commission.
- Economic Survey, Government of India (latest).
- State Finances: A Study of Budgets, Reserve Bank of India (latest).

Discipline Specific Elective Course [Economics] (DSE-B) BA/BSc (General)

Name of the Course: Economic History of India (1857-1947) (EHI)

Total Marks: 100 [Theory(Th) 65+ Tutorial(Tu) 15 + Internal Assessment 10+Attendance: 10]

Total Credits: [5(Th)+1(Tu)]=6 ,

No. of Lecture hours (Theory): 75, No. of Tutorial contact hours: 15

[For Semester-VI]

ECO-G-DSE-6-1B/2B-TH-TU

ECO-G-DSE-6-1B/2B-TH

- **Colonial India: Background and Introduction** **10 lecture hours**

  Overview of the colonial economy

- **Macro Trends** **13 lecture hours**

National Income; population; occupational structure.

- **Agriculture** **17 lecture hours**

Agrarian structure and land relations; agricultural markets and institutions – credit, commerce and technology; trends in performance and productivity; famines.

- **Railways and Industry** **20 lecture hours**

Railways; the de-industrialisation debate; evolution of entrepreneurial and industrial structure; nature of industrialisation in the interwar period; constraints to industrial breakthrough; labor relations.

- **Economy and State in the Imperial Context** **15 lecture hours** The imperial priorities and the Indian economy; drain of wealth; international trade, capital flows and the colonial economy – changes and continuities; government and fiscal policy.

ECO-G-DSE-6-1B/2B-TU

Tutorial Contact Hours: 15

Text

- Bhattacharya, Dhiresh, A Concise History of Indian Economy, Progressive Publishers, 1972

References

- Irfan Habib, Indian Economy 1858-1914, A People_s History of India, Vol.28, Tulika, 2006.
- B.R. Tomlison, 1975, India and the British Empire 1880-1935, IESHR, Vol.XII.
- Dharma Kumar, the Fiscal System, CEHI, Chapter 12.
- Basudev Chatterjee, Trade, Tariffs and Empire, OUP 1992, Epilogue.
- Daniel Thorner, Agrarian Prospect in India, 1977
- Amiya Kumar Bagchi , Private Investment in India 1900-1939, Taylor and Francis, 2000.

Skill Enhancement Course [Economics] -A Group (SEC-A) BA/BSc (General)

Name of the Course: Introductory Methods of Field Survey (IMFS)

Total Marks: 100 [Theory(Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: 2,

No. of Lecture hours: 30

ECO-G-SEC-3-1A-TH/ECO-G-SEC-5-2A-TH

[For Semester III or Semester V]

1. **Basic ideas of economic data** **8 lecture hours**
    - Types of data-cross section, time series , pooled data, panel data etc.
    - Nature of field survey data – types of cross section data
    - Advantages and disadvantages of field survey data

- Importance of field survey data for economic analysis
- Role of pilot survey

2. Methodologies of collection of data 15 lecture hours

- Complete enumeration vs. sample survey
- Sampling techniques : basic ideas of simple random sampling (with and without replacement), stratified random sampling, circular sampling, sampling proportional to size (mathematical proof/mathematical demonstration not required for any type of sampling)
- Practical methods of drawing random sample using random number tables.
- Prerequisites for field survey –preparation of blank tables
- Preparation of questionnaire depending on nature of survey- illustrations on the basis of preparation of hypothetical questionnaire

3. Recording of data 7 lecture hours

- How to record data after completion of survey : use of manual methods and recording through the use of computers
- Tabular representation of data collected
- Cross checking of data after tabular representation
- Role of units of measurement

References

- Goon, A. M, Gupta, M. K, and Dasgupta, B. Fundamentals of Statistics (Volumes One and Two),The World Press Private Ltd
- Kapur J.N. and Saxena H.C. , Mathematical Statistics, Sultan Chand Publishing

Skill Enhancement Course [Economics] -A Group (SEC-A) BA/BSc (General)

Name of the Course: Elementary Rural Development (ERD)

Total Marks: 100 [Theory(Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: 2,

No. of Lecture hours: 30

ECO-G-SEC-3-1A-TH/ECO-G-SEC-5-2A-TH

[For Semester III or Semester V]

1. Basic Issues in Rural Development 12 lecture hours

- Rural Development vs. Agricultural Development
- Decentralized Planning and Participatory Development-the role of Panchayats
- Panchayat and Rural Development in West Bengal
- Role of NGOs in Rural Development

2. Rural Credit and Self Help Groups (SHGs) 12 lecture hours

- Constraints of micro-enterprises in rural areas
- The rural non farm sector –credit needs for rural non farm sector.
  - Concept of micro credit and the role of Grameen Bank
  - Need for SHG for formation-features of SHG
  - SHGs in India

3. Selected Government Programmes and Rural Development 6 lecture hours

- Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
- Mid-day Meal
- Pradhan Mantri Gram Sadak Yojana (PMGSY)

References

1. Katar Singh , Rural Development : Principles, Policies and Management, Sage Publications, New Delhi.
2. K.G. Karmakar, Rural Credit and Self-Help Groups, Sage Publications, New Delhi
3. S.Sau, Rural Industrialization –Development Trajectory in India, Farma K.L.M., Kolkata
4. Misra D. and Puri K. Indian Economy, Himalaya Publishing House
5. Datt and Sundharam (Revised by G.Datt and A. Mahajan) , Indian Economy, 70th edition, S. Chand

Skill Enhancement Course [Economics] -B -Group (SEC-B) BA/BSc (General)

Name of the Course: Economic Data Analysis and Report Writing (EDARW)

Total Marks: 100 [Theory(Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: 2,

No. of Lecture hours: 30

ECO-G-SEC-4-1B-TH/ECO-G-SEC-6-2B-TH

[For Semester IV or Semester VI]

1. Tabular and Graphical representation of Statistical Data 6 lecture hours

- Tabular representation of data for analysis
- Graphical representation of data-use of line diagram, bar chart, divided bar chart, pie chart etc.
- Frequency distribution table: uses and implications
- Pictorial descriptions of frequency table: frequency polygon, histogram, ogive etc.

2. Basic Descriptive Statistics and its role in Data Analysis 16 lecture hours

- Measures of Central Tendency-Concept of arithmetic mean, geometric mean and harmonic mean-their uses (explicit mathematical proof of the properties of different types mean are not required).The concept of median and mode-their uses in analyzing economic data. Comparison of mean, median and mode as measures of central tendency
- Measures of dispersion: range, mean deviation, standard deviation and quartile deviation. Properties of various measures and their implications (explicit proof of properties is not required). Comparison of various measures of dispersion. Significance of the concept of coefficient of variation. Use of range, standard deviation and coefficient of variation in measuring income inequality. Basic concept of Gini coefficient and Lorenz curve.
- Introductory ideas of correlation and regression analysis.

3. Elements of Report writing 8 lecture hours

- Locating the basic issues- theme based literature survey and motivation behind any study- objectives of the study-development of writing skills
- Methodological issues: Use of tables and graphs. Use of various measures of central tendency and dispersion in analyzing the results.
- Insertion of footnotes or end notes.
- Preparation of Bibliography

References

- Goon, A. M, Gupta, M. K, and Dasgupta, B. Fundamentals of Statistics (Volume One), The World Press Private Ltd.
- A.L. Nagar and R.K. Das : Basic Statistics, 2nd edition, Oxford University Press.
- C.R. Kothari: Research Methodology: Methods and Techniques (second revised edition), New Age India (P) Ltd Publishers.

Skill Enhancement Course [Economics] -B -Group (SEC-B) BA/BSc (General)

Name of the Course: Entrepreneurship and Development (ED)

Total Marks: 100 [Theory(Th) 80 + Internal Assessment 10+Attendance: 10]

Total Credits: 2,

No. of Lecture hours: 30

ECO-G-SEC-4-1B-TH/ECO-G-SEC-6-2B-TH

[For Semester IV or Semester VI]

1. Basic issues of Entrepreneurship and Economic Development 10 lecture hours

- Basic features of Entrepreneurship
- Entrepreneurship and its linkages with economic development

- Growth of entrepreneurship in India—Role of Entrepreneurship in Economic Development.

- Planning Commission's guidelines for formulating a project report by an entrepreneur
- Problem of Rural entrepreneurship in India

2. Financial resources for new ventures of an entrepreneur 7 lecture hours

- Sources of finance---capital structure.
- Institutional support to enterprises—national small industries board – state small industries development corporation--- district industries center--- industrial estates-Indian experience

3. Growth strategies in small business 7 lecture hours

- Stages of growth,
- Types of growth strategies-Expansion, Diversification, Joint Venture, Merger and Subcontracting

4. Sickness in Small Business 6 lecture hours

- Concept of industrial sickness
- Symptoms of sickness in small business
- Causes and consequences of sickness in small business

References

- S.S Khanka--- Entrepreneurial Development, S.Chand & Company Ltd
- Bill Bolton and John Thompson ---- Entrepreneurs: Talent, Temperament and Technique, Butterworth and Heinemann.
- .David .H Holt---Entrepreneurship New Venture Creation
- Poornima M. Charantimath: Entrepreneurship Development and Small Business Enterprises (2nd Edition) Pearson.
- Misra D. and Puri K. Indian Economy, Himalaya Publishing House
- Datt and Sundharam (Revised by G.Datt and A. Mahajan) , Indian Economy, 70th edition, S. Chand

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

UNIVERSITY OF CALCUTTA
CBCS SYLLABUS FOR UG ENGLISH (HONS)

CORE COURSES (CC) – 14 COURSES, 6 CREDITS PER COURSE
DISCIPLINE SPECIFIC ELECTIVE (DSE) –4 COURSES (out of 8), 6 CREDITS PER COURSE
ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) – 2 COURSES, 2 CREDITS PER COURSE
SKILL ENHANCEMENT COURSE (SEC) – 2 COURSES (out of 4), 2 CREDITS PER COURSE

COURSE NAMES:

CC1 – HISTORY OF LITERATURE AND PHILOLOGY
CC2 –EUROPEAN CLASSICAL LITERATURE
CC3 –INDIAN WRITING IN ENGLISH
CC4 –BRITISH POETRY AND DRAMA (14TH – 17TH CENTURY)
CC5 –AMERICAN LITERATURE
CC6 –POPULAR LITERATURE
CC7 –BRITISH POETRY AND DRAMA (17TH – 18TH CENTURY)
CC8 –BRITISH LITERATURE (18TH CENTURY)
CC9 –BRITISH ROMANTIC LITERATURE
CC10 –19TH CENTURY BRITISH LITERATURE
CC11 – WOMEN'S WRITING
CC12 – EARLY 20TH CENTURY BRITISH LITERATURE
CC13 –MODERN EUROPEAN DRAMA
CC14 –POSTCOLONIAL LITERATURE

DSE (ANY TWO FROM DSE-A AND ANY TWO FROM DSE-B)
DSE-A1 –MODERN INDIAN WRITING IN ENGLISH TRANSLATION
DSE-A2 –LITERARY THEORY AND LITERARY CRITICISM
DSE-A3–PARTITION LITERATURE
DSE-A4 –MEDIA AND COMMUNICATION STUDIES
DSE-B1– LITERARY TYPES, RHETORIC AND PROSODY
DSE-B2–CONTEMPORARY INDIA: WOMEN AND EMPOWERMENT
DSE-B3–AUTOBIOGRAPHY
DSE-B4 – TEXT AND PERFORMANCES

AECC1 – COMMUNICATIVE ENGLISH OR MIL
AECC2 – ENVIRONMENT STUDY

SEC (ANY ONE FROM SEC-A AND ANY ONE FROM SEC-B)
SEC-A1 – TRANSLATION STUDIES
SEC-A2 –BUSINESS COMMUNICATION
SEC-B1 – CREATIVE WRITING
SEC-B2 - ACADEMIC WRITING AND COMPOSITION

COURSE STRUCTURE

SEMESTER 1: CC1, CC2, AECC1 (Communicative English/MIL), GE1 (FROM OTHER SUBJECT)

SEMESTER 2: CC3, CC4, AECC2 (ENVS), GE2 (FROM OTHER SUBJECT)

SEMESTER 3: CC5, CC6, CC7, SEC-A, GE3 (FROM OTHER SUBJECT)

SEMESTER 4: CC8, CC9, CC10,SEC-B, GE4 (FROM OTHER SUBJECT)

SEMESTER 5: CC11, CC12, DSE-A(1 or 2), DSE-B(1 or 2)

SEMESTER 6: CC13, CC14, DSE-A(3 or 4), DSE-B(3 or 4)

COURSE DETAILS

FOR ALL 14 CORE COURSES, THE MARKS DIVISION IS AS FOLLOWS:

End Semester – 65
Tutorial – 15
Internal – 10
Attendance – 10

CC1 (SEMESTER 1, CODE –ENG-A-CC-1-1-TH/TU)
HISTORY OF LITERATURE AND PHILOLOGY - 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Group A: History of Literature

Section 1:

Unit A –Old English Heroic Poetry, Old English Prose and Chaucer
Unit B – Elizabethan Sonnets, University Wits and Ben Jonson
Unit C–Restoration Comedy of Manners and Eighteenth Century Novels

Section 2:

Unit D – Pre-Romantic Poetry and Romantic Non-fiction Prose
Unit E–Victorian Novel and the Pre-Raphaelites
Unit F–Modern Novel: Joseph Conrad, Virginia Woolf, James Joyce
Modern Poetry: T.S. Eliot, W.B. Yeats, Dylan Thomas
Modern Drama: Samuel Beckett, Harold Pinter, John Osborne

End Semester Question Pattern:

Objective 5 marks from Section 1
One question of 10 marks from Section 1 (out of 3, 1 from each unit)
One question of 5 marks from Section 1 (out of 3, 1 from each unit)
Objective 5 marks from Section 2
One question of 10 marks from Section 2 (out of 3, 1 from each unit)
One question of 5 marks from Section 2 (out of 3, 1 from each unit)

Suggested Readings:

1. Andrew Sanders: *The Short Oxford History of English Literature*
2. Edward Albert: *History of English Literature*
3. Michael Alexander: *A History of English Literature*
4. G.M. Trevelyan: *English Social History*
5. Bibhash Choudhury: *English Social and Cultural History*

Group B: Philology

Section 1: Latin Influence, Scandinavian Influence, French Influence, Americanism
Section 2: Consonant Shift and Word Formation Processes (Shortening, Back-formation, Derivations), Short Notes (Hybridism, Monosyllabism, Free & Fixed Compounds, Malapropism, ing-formation, Johnsonese)

End Semester Question Pattern:

One question of 10 marks from Section 1 (out of three)
One question of 10 marks out of two, and one question of 5 marks out of two from Section 2

Suggested Readings:

1. Otto Jespersen: *Growth and Structure of the English Language* (Chapters 4, 5, 6, 8, 10)
2. C.L. Wren: *The English Language* (Chapters 6 & 7)
3. A.C. Baugh: *A History of English Language*
4. C.L. Barber: *The Story of Language*

CC2 (SEMESTER 1, CODE – ENG-A-CC-1-2-TH/TU)
EUROPEAN CLASSICAL LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Group A: Social and intellectual background

Group B:

Homer, *The Iliad* (Books I and II) translated byE.V. Rieu
Sophocles, *Oedipus the King*, in *The Three Theban Plays*, translated by Robert Fagles

Group C:

Ovid, Selections from *Metamorphosis*, 'Bacchus' (Book III)
Plautus, *Pot of Gold*, translated byE.F. Watling OR
Horace, *Satires*, I: IV in Horace: Satires and Epistles and Persius, translated Niall Rudd, Penguin, 2005.

End Semester Question Pattern:

Objective – 5 marks (from Group B and Group C)
Two questions of 15 marks (one from each text) from Group B (out of four, two from each text)
Two questions of 15 marks (one from each text) from Group B (out of four, two from each text)

Suggested Readings:

1. S.H. Butcher, *Aristotle's Theory of Poetry and Fine Art*, New Delhi: Kalyani Publishers
2. *Aristotle/Horace/Longinus: Classical Literary Criticism*, Translated with an Introduction by T.S. Dorsch, London: Penguin Books

CC3 (SEMESTER 2, CODE – ENG-A-CC-2-3-TH/TU)
INDIAN WRITING IN ENGLISH: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Poetry

Henry Louis Vivian Derozio, 'To India, My Native Land'
Toru Dutt, 'Our Casuarina Tree'
Kamala Das, 'Introduction'
A.K. Ramanujan, 'River'
Nissim Ezekiel, 'Enterprise'
JayantaMahapatra, 'Dawn at Puri'

Novel

Bankimchandra Chattopadhyay: *Rajmohan's Wife*

Drama

Mahesh Dattani, *Bravely Fought the Queen*

End Semester Question Pattern:

Objective – 5 marks
Two questions of 15 marks each from poetry (out of four)

One question of 15 marks from novel (out of two)
One question of 15 marks from drama (out of two)

Suggested Readings:

1. Raja Rao, Foreword to *Kanthapura* (New Delhi: OUP, 1989) pp. v–vi.
2. Salman Rushdie, 'Commonwealth Literature does not exist', in *Imaginary Homelands* (London: Granta Books, 1991) pp. 61–70.
3. Meenakshi Mukherjee, 'Divided by a Common Language', in *The Perishable Empire* (New Delhi: OUP, 2000) pp.187–203.
4. Bruce King, 'Introduction', in Modern Indian Poetry in English (New Delhi: OUP, 2nd edn, 2005) pp. 1–10
5. Arvind Krishna Mehrotra, *A Concise History of Indian Writing in English*, Ranikhet: Permanent Black

CC4 (SEMESTER 2, CODE – ENG-A-CC-2-4-TH/TU)
BRITISH POETRY AND DRAMA (14TH – 17TH CENTURY): 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social and Intellectual Background

Poetry

Geoffrey Chaucer, 'Wife of Bath's Prologue'
Edmund Spenser, 'One Day I Wrote Her Name'
William Shakespeare, Sonnets 18 & 130
John Donne, 'The Good Morrow'
Andrew Marvell, 'To His Coy Mistress'

Drama

Christopher Marlowe, *Edward II* OR William Shakespeare, *Macbeth*
William Shakespeare, *Twelfth Night* OR *As You Like It*

End Semester Question Pattern:

Objective – 5 marks
Two questions of 15 marks each from poetry (out of three)
Two questions of 15 marks each (one from each) from drama (out of four, two from each)

Suggested Readings:

1. Pico Della Mirandola, excerpts from the Oration on the Dignity of Man, in *The Portable Renaissance Reader*, ed. James Bruce Ross and Mary Martin McLaughlin (New York: Penguin Books, 1953) pp. 476–9.
2. John Calvin, 'Predestination and Free Will', in *The Portable Renaissance Reader*, ed. James Bruce Ross and Mary Martin McLaughlin (New York: Penguin Books, 1953) pp. 704–11.
3. Baldassare Castiglione, 'Longing for Beauty' and 'Invocation of Love', in Book 4 of *The Courtier*, 'Love and Beauty', tr. George Bull (Harmondsworth: Penguin, rpt. 1983) pp. 324–8, 330–5.

4. Philip Sidney, *An Apology for Poetry*, in D.J. Enright and Ernst D. Chickera eds. *English Critical Texts*, Delhi: OUP

CC5 (SEMESTER 3, CODE – ENG-A-CC-3-5-TH/TU)
AMERICAN LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Poetry

Robert Frost, 'After Apple Picking'
Walt Whitman, 'O Captain, My Captain'
Sylvia Plath, 'Daddy'
Langston Hughes, 'Harlem to be Answered'
Edgar Allan Poe, 'To Helen'

Novel

Ernest Hemingway, *The Old Man and the Sea*

Stories

Edgar Allan Poe, 'The Purloined Letter'
F. Scott Fitzgerald, 'The Crack-up'
William Faulkner, 'Dry September'

Drama

Arthur Miller, *Death of A Salesman*

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from poetry (out of three)
One question of 15 marks from novel (out of two)
One question of 15 marks from stories (out of two)
One question of 15 marks from drama (out of two)

Suggested Readings:

1. Hector St John Crevecouer, 'What is an American', (Letter III) in *Letters from an American Farmer* (Harmondsworth: Penguin, 1982) pp. 66–105.
2. Frederick Douglass, *A Narrative of the life of Frederick Douglass* (Harmondsworth: Penguin, 1982) chaps. 1–7, pp. 47–87.
3. Henry David Thoreau, 'Battle of the Ants' excerpt from 'Brute Neighbours', in Walden (Oxford: OUP, 1997) chap. 12.
4. Ralph Waldo Emerson,'Self Reliance', in *The Selected Writings of Ralph Waldo Emerson*, ed. with a biographical introduction by Brooks Atkinson (New York: The Modern Library, 1964).
5. Toni Morrison, 'Romancing the Shadow', in *Playing in the Dark: Whiteness and Literary Imagination* (London: Picador, 1993) pp. 29–39.

CC6 (SEMESTER 3, CODE – ENG-A-CC-3-6-TH/TU)
POPULAR LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Lewis Carroll, *Through the Looking Glass*
Agatha Christie, *The Murder of Roger Ackroyd*
Sukumar Ray, *Abol Tabol* ('Nonsense Rhymes', translated Satyajit Ray), Kolkata: Writers' Workshop
Herge, *Tintin in Tibet*

End Semester Question Pattern:
Objective – 5 marks
One question of 15 marks from each of the four texts (out of two from each text)

Suggested Readings:

1. Chelva Kanaganayakam, 'Dancing in the Rarefied Air: Reading Contemporary Sri Lankan Literature' (ARIEL, Jan. 1998) rpt, Malashri Lal, Alamgir Hashmi, and Victor J. Ramraj, eds., *Post Independence Voices in South Asian Writings* (Delhi: Doaba Publications, 2001) pp. 51–65.
2. Sumathi Ramaswamy, 'Introduction', in *Beyond Appearances?: Visual Practices and Ideologies in Modern India* (Sage: Delhi, 2003) pp. xiii–xxix.
3. Leslie Fiedler, 'Towards a Definition of Popular Literature', in *Super Culture: American Popular Culture and Europe*, ed. C.W.E. Bigsby (Ohio: Bowling Green University Press, 1975) pp. 29–38.
4. Felicity Hughes, 'Children's Literature: Theory and Practice', *English Literary History*, vol. 45, 1978, pp. 542–61.

CC7 (SEMESTER 3, CODE – ENG-A-CC-3-7-TH/TU)
BRITISH POETRY AND DRAMA (17TH – 18TH CENTURY): 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social and Intellectual Background

Poetry

John Milton, *Paradise Lost*, Book I
Alexander Pope, *The Rape of the Lock*, Cantos I-III

Drama

John Webster, *The Duchess of Malfi*
Aphra Behn, *The Rover*

End Semester Question Pattern:
Objective – 5 marks
Two questions of 15 marks each (one from each) from poetry (out of four, two from each)

Two questions of 15 marks each (one from each) from poetry (out of four, two from each)

Suggested Readings:

1. The Holy Bible, Genesis, chaps. 1–4, The Gospel according to St. Luke, chaps. 1–7 and 22–4.
2. Niccolo Machiavelli, *The Prince*, ed. and tr. Robert M. Adams (New York: Norton, 1992) chaps. 15, 16, 18, and 25.
3. Thomas Hobbes, selections from *The Leviathan*, pt. I (New York: Norton, 2006) chaps. 8, 11, and 13.
4. John Dryden, 'A Discourse Concerning the Origin and Progress of Satire', in *The Norton Anthology of English Literature*, vol. 1, 9th edn, ed. Stephen Greenblatt (New York: Norton 2012) pp. 1767–8.

CC8 (SEMESTER 4, CODE – ENG-A-CC-4-8-TH/TU)
18TH CENTURY BRITISH LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social and Intellectual Background

Poetry

Samuel Johnson, 'London'
Thomas Gray, *Elegy Written in a Country Churchyard*

Drama

William Congreve, *The Way of the World*

Prose (Fiction & Non-Fiction)

Daniel Defoe, *Robinson Crusoe*
Joseph Addison, 'Sir Roger at Home' and 'Sir Roger at Church'

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from poetry (out of two)
One question of 15 marks from drama (out of two)
Two questions of 15 marks each (one from each) from prose (out of four, two from each)

Suggested Readings:

1. Jeremy Collier, *A Short View of the Immorality and Profaneness of the English Stage* (London: Routledge, 1996).
2. Daniel Defoe, 'The Complete English Tradesman' (Letter XXII), 'The Great Law of Subordination Considered' (Letter IV), and 'The Complete English Gentleman', in *Literature and Social Order in Eighteenth-Century England*, ed. Stephen Copley (London: Croom Helm, 1984).

3. Samuel Johnson, 'Essay 156', in *The Rambler*, in *Selected Writings: Samuel Johnson*, ed. Peter Martin (Cambridge, Mass.: Harvard University Press, 2009) pp. 194–7; *Rasselas* Chapter 10; 'Pope's Intellectual Character: Pope and Dryden Compared', from *The Life of Pope*, in *The Norton Anthology of English Literature*, vol. 1, ed. Stephen Greenblatt, 8th edn (New York: Norton, 2006) pp. 2693–4, 2774–7.

CC9 (SEMESTER 4, CODE – ENG-A-CC-4-9-TH/TU)
BRITISH ROMANTIC LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social and Intellectual Background

Poetry

William Blake, 'The Lamb' and 'The Tyger'
William Wordsworth, 'Tintern Abbey'
Samuel Taylor Coleridge, 'Kubla Khan'
Percy Bysshe Shelley, 'Ode to the West Wind' and 'To a Skylark'
John Keats, 'Ode to a Nightingale' and 'Ode to Autumn'

Prose (Fiction & Non-Fiction)

Charles Lamb, 'Dream Children', 'The Superannuated Man'
Mary Shelley, *Frankenstein*

End Semester Question Pattern:

Objective – 5 marks
2 questions of 15 marks each from poetry (out of four)
2 questions of 15 marks each (one from each) from prose (out of four, two from each)

Suggested Readings:

1. William Wordsworth, 'Preface to Lyrical Ballads', in D.J. Enright and Ernst D. Chickera eds. *English Critical Texts*, Delhi: OUP
2. John Keats, 'From the Letters', in D.J. Enright and Ernst D. Chickera eds. *English Critical Texts*, Delhi: OUP
3. Jean-Jacques Rousseau, 'Preface' to *Emile or Education*, tr. Allan Bloom (Harmondsworth: Penguin, 1991).
4. Samuel Taylor Coleridge, *BiographiaLiteraria*, Chapters XIV and XVII, in D.J. Enright and Ernst D. Chickera eds. *English Critical Texts*, Delhi: OUP

CC10 (SEMESTER 4, CODE – ENG-A-CC-4-10-TH/TU)
19TH CENTURY BRITISH LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social and Intellectual Background

Poetry

Lord Tennyson, 'Ulysses'
Robert Browning, 'My Last Duchess'
Christina Rossetti, 'The Goblin Market'
Matthew Arnold, 'Dover Beach'

Novel

Jane Austen, *Pride and Prejudice* OR Charlotte Bronte, *Jane Eyre*
Charles Dickens, *Oliver Twist* OR Thomas Hardy, *The Mayor of Casterbridge*

End Semester Question Pattern:

Objective – 5 marks
Two questions of 15marks each from poetry (out of three)
Two questions of 15 marks each (one from each) from novels (out of four, two from each)

Suggested Readings:

1. Karl Marx and Friedrich Engels, 'Mode of Production: The Basis of Social Life', 'The Social Nature of Consciousness', and 'Classes and Ideology', in *A Reader in Marxist Philosophy*, ed. Howard Selsam and Harry Martel (New York: International Publishers,1963) pp. 186–8, 190–1, 199–201.
2. Charles Darwin, 'Natural Selection and Sexual Selection', in *The Descent of Man* in The Norton Anthology of English Literature, 8th edn, vol. 2, ed. Stephen Greenblatt (New York: Northon, 2006) pp. 1545–9.
3. John Stuart Mill, 'The Subjection of Women' in *Norton Anthology of English Literature*, 8th edn, vol. 2, ed. Stephen Greenblatt (New York: Norton, 2006) chap. 1, pp. 1061–9.

CC11 (SEMESTER 5, CODE – ENG-A-CC-5-11-TH/TU)
WOMEN'S WRITINGS: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Poetry

Emily Dickinson, 'I cannot live with you'
Elizabeth Barrett Browning, 'How do I love thee'
Eunice De Souza, 'Advice to Women'

Fiction

Alice Walker, *Color Purple* OR Emily Bronte, *Wuthering Heights*
Mahasweta Devi, 'Draupadi', translated Gayatri Chakravorty Spivak
Katherine Mansfield, 'Bliss'

Non-Fiction

Mary Wollstonecraft, *A Vindication of the Rights of Woman*, Chapters I & II (New York: Norton, 1988)

Rassundari Devi, *Amar Jiban*, translated Enakshi Chatterjee, Writers' Workshop.

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from poetry (out of two)
Two questions of 15 marks each from fiction (out of three, one from each)
One question of 15 marks from non-fiction (out of two, one from each)

Suggested Readings:

1. Virginia Woolf, *A Room of One's Own* (New York: Harcourt, 1957) chaps. 1 and 6.
2. Simone de Beauvoir, 'Introduction', in *The Second Sex*, tr. Constance Borde and Shiela Malovany-Chevallier (London: Vintage, 2010) pp. 3–18.
3. Kumkum Sangari and Sudesh Vaid, eds., 'Introduction', in *Recasting Women: Essays in Colonial History* (New Delhi: Kali for Women, 1989) pp. 1–25.
4. Chandra Talapade Mohanty,'Under Western Eyes: Feminist Scholarship and Colonial Discourses', in *Contemporary Postcolonial Theory: A Reader*, ed. Padmini Mongia (New York: Arnold, 1996) pp. 172–97
5. 'Feminist Criticism' in Peter Barry, *Beginning Theory*, Chennai: T.R. Publications

CC12 (SEMESTER 5, CODE – ENG-A-CC-5-12-TH/TU)
EARLY 20TH CENTURY BRITISH LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social and Intellectual Background

Poetry

T.S. Eliot, 'The Love Song of J. Alfred Prufrock' and 'Preludes'
W.B. Yeats, 'The Second Coming' and 'No Second Troy'
Wilfred Owen, 'Spring Offensive'

Fiction

Joseph Conrad, *Heart of Darkness*
D.H. Lawrence, *Sons and Lovers*

Drama

George Bernard Shaw, *Pygmalion*

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from poetry (out of two)
Two questions of 15 marks each (one from each) from fiction (out of four, two from each)

One question of 15 marks from drama (out of two)

Suggested Readings:

1. Sigmund Freud, 'Theory of Dreams', 'Oedipus Complex', and 'The Structure of the Unconscious', in *The Modern Tradition*, ed. Richard Ellman et. al. (Oxford: OUP, 1965) pp. 571, 578–80, 559–63.
2. T.S. Eliot, 'Tradition and the Individual Talent', in D.J. Enright and Ernst D. Chickera eds. *English Critical Texts*, Delhi: OUP
3. Raymond Williams, 'Introduction', in *The English Novel from Dickens to Lawrence* (London: Hogarth Press, 1984) pp. 9–27.
4. Raymond Williams, 'Introduction', in *Drama from Ibsen to Brecht*, Penguin, 1973

CC13 (SEMESTER 6, CODE – ENG-A-CC-6-13-TH/TU)
MODERN EUROPEAN DRAMA: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Henrik Ibsen, *Ghosts* OR *A Doll's House*
Bertolt Brecht, *The Good Woman of Szechuan*
Samuel Beckett, *Waiting for Godot*

End Semester Question Pattern:
Objective – 5 marks
One question of 20 marks out of two from each of the three plays

Suggested Readings:

1. Constantin Stanislavski, *An Actor Prepares*, chap. 8, 'Faith and the Sense of Truth', tr. Elizabeth Reynolds Hapgood (Harmondsworth: Penguin, 1967) sections 1, 2, 7, 8, 9, pp. 121–5, 137–46.
2. Bertolt Brecht, 'The Street Scene', 'Theatre for Pleasure or Theatre for Instruction', and 'Dramatic Theatre vs Epic Theatre', in *Brecht on Theatre: The Development of an Aesthetic*, ed. and tr. John Willet (London: Methuen, 1992) pp. 68–76, 121–8.
3. George Steiner, 'On Modern Tragedy', in *The Death of Tragedy* (London: Faber, 1995) pp. 303–24.

CC14 (SEMESTER 6, CODE – ENG-A-CC-6-14-TH/TU)
POSTCOLONIAL LITERATURES: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

<u>Poetry</u>

Pablo Neruda, 'Tonight I Can Write'
Derek Walcott, 'A Far Cry from Africa'
David Malouf, 'Revolving Days'

Mamang Dai, 'The Voice of the Mountain'

Novel

Chinua Achebe, *Things Fall Apart*
Gabriel Garcia Marquez, *Chronicle of a Death Foretold*

End Semester Question Pattern:

Objective – 5 marks
Two questions of 15 marks each from poetry (out of three)
Two questions of 15 marks each (one from each) from novel (out of four, two from each)

Suggested Readings:

1. Frantz Fanon, 'The Negro and Language', in *Black Skin, White Masks*, tr. Charles Lam Markmann (London: Pluto Press, 2008) pp. 8–27.
2. Ngugiwa Thiong'o, 'The Language of African Literature', in *Decolonising the Mind* (London: James Curry, 1986) chap. 1, sections 4–6.
3. Gabriel Garcia Marquez, the Nobel Prize Acceptance Speech, in *Gabriel Garcia Marquez: New Readings*, ed. Bernard McGuirk and Richard Cardwell (Cambridge: Cambridge University Press, 1987)
4. 'Postcolonial Criticism' in Peter Barry, *Beginning Theory*, Chennai: T.R. Publications
5. Ania Loomba, *Colonialism/Postcolonialism*, London and New York: Routledge

FOR ALL DSECOURSES, THE MARKS DIVISION IS AS FOLLOWS:

End Semester – 65
Tutorial – 15
Internal – 10
Attendance – 10

Semester 5 – DSE-A1 OR DSE-A2 and DSE-B1 OR DSE-B2

Semester 6 – DSE-A3 OR DSE-A4 and DSE-B3 OR DSE-B4

DSE-A1 (SEMESTER 5, CODE –ENG-A-DSE-A-5-1-TH/TU)
MODERN INDIAN WRITING IN ENGLISH TRANSLATION: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Stories

Munshi Prem Chand, 'The Shroud'
Ismat Chugtai, 'The Quilt'
Fakir Mohan Senapati, 'Rebati'

Poetry

Rabindranath Tagore, 'Light, oh where is the light?' (*Gitanjali* XXVII) and 'When my play was with thee' (*Gitanjali* XCVII)
G.M. Muktibodh, 'The Void'
Amrita Pritam, 'I say unto Waris Shah'

Novel

Rabindranath Tagore, *The Home and the World*

Drama

Vijay Tendulkar, *Silence! The Court is in Session*

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from story (out of two)
One question of 15 marks from poetry (out of two)
One question of 15 marks from novel (out of two)
One question of 15 marks from drama (out of two)

Suggested Readings:

1. Namwar Singh, 'Decolonising the Indian Mind', tr. Harish Trivedi, *Indian Literature*, no. 151 (Sept./Oct. 1992).
2. B.R. Ambedkar, 'Annihilation of Caste' in *Dr. Babasaheb Ambedkar: Writings and Speeches*, vol. 1 (Maharashtra: Education Department, Government of Maharashtra, 1979) chaps. 4, 6, and 14.
3. Sujit Mukherjee, 'A Link Literature for India', in *Translation as Discovery* (Hyderabad: Orient Longman, 1994) pp. 34–45.
4. G.N. Devy, 'Introduction', from *After Amnesia* in The G.N. Devy Reader (New Delhi: Orient BlackSwan,2009) pp. 1–5.

DSE-A2 (SEMESTER 5, CODE – ENG-A-DSE-A-5-2-TH/TU)
LITERARY THEORY AND CRITICISM: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Literary Theory

Antonio Gramsci, 'The Formation of the Intellectuals' from *The Prison Notebooks*
Virginia Woolf: 'A Room of One's Own'
Rabindranath Tagore, 'Nationalism in India', in *Nationalism*, with an Introduction by Ramachandra Guha, New Delhi: Penguin Books

Literary Criticism

William Wordsworth, 'Preface' to the *Lyrical Ballads*
S.T. Coleridge, *Biographia Literaria*, Chapters XIII and XIV
T.S. Eliot, 'Tradition and the Individual Talent'

End Semester Question Pattern:

Objective – 5 marks

Two questions of 15 marks from Literary Theory (out of three, one from each text)
Two questions of 15 marks from Literary Criticism (out of three, one from each text)

Suggested Readings:

1. Terry Eagleton, *Literary Theory: An Introduction* (Oxford: Blackwell, 2008).
2. Peter Barry, Beginning Theory, Chennai: T.R. Publications, 1999.
3. Peter Barry (ed), *Issues in Contemporary Critical Theory: A Selection of Critical Essays, A Casebook*, Macmillan, 1987
4. Raman Selden and Peter Widdowson, *A Reader's Guide to Contemporary Literary Theory*, Pearson India, 2006
5. C.S. Lewis: *Introduction in An Experiment in Criticism*, Cambridge University Press 1992
6. M.H. Abrams: *The Mirror and the Lamp*, Oxford University Press,1971
7. Rene Wellek, Stephen G. Nicholas: *Concepts of Criticism*, Connecticut, Yale University 1963
8. Taylor and Francis Eds. *An Introduction to Literature*, Criticism and Theory, Routledge, 1996

DSE-B1 (SEMESTER 5, CODE – ENG-A-DSE-B-5-1-TH/TU)
LITERARY TYPES, RHETORIC AND PROSODY: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Group – A: Literary Types

Tragedy (Tragic Hero, Catharsis, Heroic Tragedy, Chorus)
Comedy (Romantic Comedy, Comedy of Humours, Comedy of Manners, Sentimental Comedy)
Short Story

Group – B: Rhetoric

Group – C: Prosody

End Semester Question Pattern:
Objective – 5 marks
Two questions of 20 marks from Group A (out of three)
One question of 10 marks from Group B (out of two)
One question of 10 marks from Group C (out of two)

Suggested Readings:

1. K.R.S. Iyengar and Prema Nandakumar, *Introduction to the Study of English Literature*
2. S.H. Butcher, *Aristotle's Theory of Poetry and Fine Art*, New Delhi: Kalyani Publishers
3. Allerdyce Nicoll, *The Theory of Drama*

4. Bose and Sterling, *Elements of English Rhetoric and Prosody*

DSE-B2 (SEMESTER 5, CODE – ENG-A-DSE-B-5-2-TH/TU)
CONTEMPORARY INDIA: WOMEN AND EMPOWERMENT: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Social Construction of Gender
History of Women's Movement in India (pre-independence and post-independence)
Women and Law: Domestic Violence, Female Foeticide, Sexual Harassment
Dalit Women and Double Marginalisation

End Semester Question Pattern:
Objective – 5 marks
Society, Sex and Gender – 20 marks
History of Women's Movement in India – 15 marks
Women and Law – 15 marks
Dalit Women – 10 marks

Recommended Readings:

1. Rinita Mazumdar, *A Short Introduction to Feminist Theory*, Kolkata: Anustup, 2010.
2. 'Feminist Criticism' in Peter Barry, *Beginning Theory*, Chennai: T.R. Publications, 1999.
3. V. Geetha, *Gender*, Calcutta: Stree, 2002.
4. Kate Millet, *Sexual Politics*, New York: Doubleday, 1970.
5. Ann Oakley, *Sex, Gender and Society*, London: Temple Smith, 1972.
6. Ray Raka, *Fields of Protest: Women's Movements in India*, New Delhi: Kali for Women, 2000.
7. *The Sexual Harassment of Women at Workplace*, *(Prevention, Prohibition and Redressal)* Bare Act, New Delhi: Universal, 2014.
8. Sharmila Rege, *Against the Madness of Manu, B.R. Ambedkar's Writings on Brahmanical Patriarchy*, New Delhi: Navayana, 2013.
9. Sandra Gilbert and Susan Gubar, *The Madwoman in the Attic: The Woman Writer and the Nineteenth Century Literary Imagination*

DSE-A3 (SEMESTER 6, CODE – ENG-A-DSE-A-6-3-TH/TU)
PARTITION LITERATURE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Novel

Amitav Ghosh, *The Shadow Lines*

Short Stories

Protiva Basu, 'The Marooned', translated Subhasree Tagore, in *The Other Voice*, eds. Tapati Gupta and Anil Acharya, Kolkata: Anustup
Manik Bandyopadhyay, 'The Final Solution', translated Rani Ray, in Debjani Sengupta ed. *Mapmaking: Partition Stories from Two Bengals*, New Delhi: Srishti
Sadat Hasan Manto, 'Toba Tek Singh', in *Black Margins:Manto*, New Delhi: Manohar

Poetry

Sahir Ludhianvi, 'Twentysixth January',
Birendra Chattopadhyay, 'After Death: Twenty Years'
Sankha Ghosh, 'Rehabilitation', in RakhshandaJalil, Tarun Saint and Debjani Sengupta eds. *Looking Back: The 1947 Partition of India 70 Years On*, New Delhi: Orient Blackswan, 2017

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from novel (out of two)
Two questions of 15 marks each from short stories (out of three, one from each)
One question of 15 marks from poetry (out of two)

Suggested Readings:

1. Ritu Menon and Kamla Bhasin, 'Introduction', in *Borders and Boundaries* (New Delhi: Kali for Women, 1998).
2. Sukrita P. Kumar, *Narrating Partition* (Delhi: Indialog, 2004).
3. Urvashi Butalia, *The Other Side of Silence: Voices from the Partition of India* (Delhi: Kali for Women, 2000).
4. Sigmund Freud, 'Mourning and Melancholia', in *The Complete Psychological Works of Sigmund Freud*, tr. James Strachey (London: Hogarth Press, 1953) pp. 3041–53.

DSE-A4 (SEMESTER 6, CODE – ENG-A-DSE-A-6-4-TH/TU)
MEDIA AND COMMUNICATION STUDIES: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Introduction to Mass Communication
Mass Communication and Globalisation
Writing Pamphlets, Posters etc
Advertisements and Creating Advertisements

End Semester Question Pattern:

Questions on Mass Communication (Theory) – 20 marks
Report /Pamphlet Writing – 20 marks
Advertisement / Poster Writing – 15 marks

Pamphlet Writing – 10 marks

Recommended Readings:

1. M.V. Kamath, *Professional Journalism*, New Delhi: Vikas Publishing House, 1980.
2. Ambrish Saxena, *Fundamentals of Reporting and Editing*, New Delhi: Kanishka Publishers, 2007.
3. Uma Narula, *Handbook of Communication Models*, *Perspectives, Strategies*, New Delhi: Atlantic Publishers, 2006.
4. Stephen Cushion, *Television Journalism*, New Delhi: Sage Publications, 2012.
5. Tony Feldman, *An Introduction to Digital Media*, Taylor and Francis, 2004.

DSE-B3 (SEMESTER 6, CODE – ENG-A-DSE-B-6-3-TH/TU)
AUTOBIOGRAPHY - 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Rabindranath Tagore, *My Reminiscences,* Chapters 1-15, New Delhi: Rupa & Co.
Mahatma Gandhi, *Autobiography or the Story of My Experiments with Truth*, Part I, Chapters 1 to 8
Binodini Dasi, *My Story and Life as an Actress*, pp 61-83, New Delhi: Kali for Women
Nirad C. Chaudhuri, *Autobiography of an Unknown Indian*, Book I, Mumbai: Jaico Publishing House

End Semester Question Pattern:
Objective – 5 marks
One question of 15 marks out of two from each of the texts

Suggested Readings:

1. James Olney, 'A Theory of Autobiography' in *Metaphors of Self: The Meaning of Autobiography* (Princeton: Princeton University Press, 1972) pp. 3-50.
2. Laura Marcus, 'The Law of Genre' in *Auto/biographical Discourses* (Manchester: Manchester University Press, 1994) pp. 229-72.
3. Linda Anderson, 'Introduction' in *Autobiography* (London: Routledge, 2001) pp.1-17.
4. Mary G. Mason, 'The Other Voice: Autobiographies of women Writers' in *Life/Lines: Theorizing Women's Autobiography*, Edited by Bella Brodzki and Celeste Schenck (Ithaca: Cornell University Press, 1988) pp. 19-44.

DSE-B4 (SEMESTER 6, CODE – ENG-A-DSE-B-6-4-TH/TU)
TEXT AND PERFORMANCE: 6 CREDITS

(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Historical Overview of Indian and Western Theatre
Classical, Modern and Contemporary Theatres
Historical Developments of Theatrical Forms
Folk Traditions

End Semester Question Pattern:

History of Theatre and Traditions of Theatre (in India and the West) – 20 marks
Contribution of Eminent Individuals – 10 marks
Folk Traditions – 20 marks
Tagore as Theatrician – 15 marks

Recommended Readings:

Kamalesh Datta Tripathi, 'Rasa' in *Theatres of India: A Concise Companion*, New Delhi: OUP, 2009.
Kamalesh Datta Tripathi, 'Natyasastra' in *Theatres of India: A Concise Companion*, New Delhi: OUP, 2009.
Ananda Lal, 'Tagore as Theatrician' in Rabindranath Tagore, *Three Plays*, Translated and with an introduction by Ananda Lal, New Delhi: OUP, 2001.
Prasanna, *Indian Method in Acting*, New Delhi: National School of Drama, 2013.
Walter Benjamin, 'What is Epic Theatre', *Understanding Brecht*, London and New York, Verso, 1973.
Robert Leach: *Theatre Studies: The Basics*, Routledge, 2015.
Sonia Moore, *The Stanislavsky System: The Professional Training of an Actor*, Penguin, 1984.

AECC1 – COMMUNICATIVE ENGLISH: 2 CREDITS (SEMESTER 1)

- Correction of sentences
- Transformation (Simple, Complex and Compound Sentences; Degrees of Comparison; Affirmative and Negative Sentences; Interrogative and Assertive Sentences; Exclamatory and Assertive Sentences)
- Identifying True/False Statements from Given Passages

Internal – 10 marks
Attendance – 10 marks
End Semester Questions – MCQ 80 marks

End Semester Question Patterns:
Correction of Sentences: 20 (2 x 10)
Transformation of Sentences: 20 (2 x 10)
True/False Statements from Given Passage One: 20 (4 x 5)
True/False Statements from Given Passage Two: 20 (4 x 5)

SEC-A1 (SEMESTER 3, CODE –ENG-A-SEC-A-3-1-TH)
TRANSLATION STUDIES: 2 CREDITS

Unit 1 – Importance of translation in a multi-linguistic and multi-cultural society
Unit 2 – Literal translation
Unit 3 – Free translation
Unit 4 – Transcreation

Internal – 10 marks
Attendance – 10 marks
End Semester Question Pattern (80 marks, no tutorial):

Questions may include (1) translation from one language to another (2) critical comments on a translated passage (3) differences between literal translation and free translation (4) why translation is necessary into other Indian languages and also to foreign languages

Recommended Readings

1. Jyoti Bhattacharya, *Transcreations: Some Experiments on Tagore Songs*, Kolkata: Gangchil
2. Mona Baker, *In Other Words: A Coursebook on Translation*, Routledge, 2001.
3. I.C. Catford, *A Linguistic Theory of Translation*, London: OUP, 1965.
4. Ravinder Gargesh and Krishna Kumar Goswami eds. *Translation and Interpreting: Reader and Workbook*, New Delhi: Orient Longman, 2007.
5. Sukanta Chaudhuri, *Translation and Understanding*, New Delhi: OUP
6. Lawrence Venuti (ed), *The Translation Studies Reader*, London and New York: Routledge, 2012

SEC-A2 (SEMESTER 3, CODE – ENG-A-SEC-A-3-2-TH)
BUSINESS COMMUNICATION: 2 CREDITS

What is business communication
Writing reports, letters, curriculum vitae
Writing meeting minutes
E-correspondence

Internal – 10 marks
Attendance – 10 marks
End Semester Question Pattern (80 marks, no tutorial):

Writing Business Letters – 15 marks
Writing CV – 15 marks
Writing e-mail – 15 marks
Writing Report – 15 marks
Writing Meeting Minutes – 20 marks

Recommended Readings:

1. O. Scot, *Contemporary Business Communication*, New Delhi: Biztantra
2. R. Ludlow and F. Panton, *The Essence of Effective Communications*, New Delhi: Prentice Hall of India Pvt Ltd

3. R.C. Bhatia, *Business Communication*, New Delhi: Ane Books Private Limited

SEC-B1 (SEMESTER 4, CODE – ENG-A-SEC-B-4-1-TH)
CREATIVE WRITING: 2 CREDITS

What is creative writing
Modes of creative writing
Writing Short Story / Poetry
Preparing for publication

Internal – 10 marks
Attendance – 10 marks
End Semester Question Pattern (80 marks, no tutorial):

Questions may include (1) the importance of creative writing in development of personality and creativity (2) actual creative writing – poem or short story (3) different modes of publishing – viz. books, articles in newspapers, articles in magazines and periodicals, social media – and differences of impact

Recommended Readings:

1. Anjana Neira Dev *et al*, *Creative Writing: A Beginner's Manual*, New Delhi: Pearson, 2009.
2. David Morley and Philip Neilsen eds., *The Cambridge Companion to Creative Writing*

SEC-B2 (SEMESTER 4, CODE – ENG-A-SEC-B-4-2-TH)
ACADEMIC WRITING AND COMPOSITION: 2 CREDITS

Introduction to the writing process
Introduction to academic writing
Summarising and paraphrasing
Citing Sources

Internal – 10 marks
Attendance – 10 marks
End Semester Question Pattern (80 marks, no tutorial):

Citing Sources – 10 marks
Writing Critical Appreciation – 20 marks
Writing Summary/Substance with a Critical Note – 12 + 8 marks
Writing Essay – 30 marks

Recommended Readings:

1. Liz Hamp-Lyons and Ben Heasley, *Study writing: A Course in Writing Skills for Academic Purposes* (Cambridge: CUP, 2006).
2. Renu Gupta, *A Course in Academic Writing* (New Delhi: Orient Blackswan, 2010).

3. Ilona Leki, *Academic Writing: Exploring Processes and Strategies* (New York: CUP, 2nd edn, 1998).
4. Gerald Graff and Cathy Birkenstein, *They Say/I Say: The Moves That Matter in Academic Writing* (New York: Norton, 2009).
5. Hacker, D. & Sommers, N. (2011). *A writer's reference* (7th ed.). Boston, MA: Bedford/St, Martin's. PE1408.H2778 2011

University of Calcutta

CBCS Syllabus for BA General Programme in English

COURSE STRUCTURE

SEMESTER	COURSE TYPE
SEMESTER I	CC1/GE1 AECC1
SEMESTER II	CC2/GE2
SEMESTER III	CC3/GE3 L1-1 SECA
SEMESTER IV	CC4/GE4 SECB L2-1
SEMESTER V	L1-2 DSEA SECA
SEMESTER VI	DSEB SECB L2-2

CORECOURSE(CC)

CC1/GE1:Poetry&ShortStory
CC2/GE2:Essay,Drama&Novel
CC3/GE3:Women's Writing
CC4/GE4:AcademicWritingandComposition

LCC COURSE

LCC-1 (L1-1): Language, Variety and Stylistics
LCC-1 (L1-2): Language, Imagination & Creativity
LCC-2 (Alternative English) (L2-1): Language, Society and Personality
LCC-2 (Alternative English) (L2-2): Language, Creativity and Analysis

DISCIPLINE SPECIFIC ELECTIVE(DSE)

ONE TO BE CHOSEN FROM DSEA AND ONE TO BE CHOSEN FROM DSEB

DSEA1:British Literature
DSEA2:Modern Indian Writing in English Translation
DSEB1: Partition Literature
DSEB2: Translation Studies

ABILITY ENANCEMENT COMPULSORY COURSE (AECC)

AECC-1**:** Communicative English/MIL
AECC-2: Environmental Studies

SKILL ENHANCEMENT COURSE (SEC]

ONE TO BE CHOSEN FROM SECA AND ONE TO BE CHOSEN FROM SECB

SECA1: English Language Teaching
SECA2: Business Communication
SECB1: Spoken English
SECB2: Creative Writing

COURSE DETAILS

FOR ALL CC/GECOURSES, THE MARKS DIVISION IS AS FOLLOWS:

End Semester – 65
Tutorial – 15
Internal – 10
Attendance – 10

CC1/GE1 (SEMESTER 1, CODE –ENG-G-CC-1-1-TH/TU) – 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

POETRY AND SHORT STORY

Poetry

William Shakespeare: Sonnet 18
William Wordsworth: 'Strange fits of passion'
P.B. Shelley: 'To a Skylark'
John Keats: 'To Autumn'

Short Story

James Joyce: 'Araby'
Katherine Mansfield: 'The Fly'
Joseph Conrad: 'The Lagoon'

End Semester Question Pattern:

Objective – 5 marks
Two question of 15 marks out of four from poetry (one from each poem)
Two questions of 15 marks out of three from short story (one from each)

CC2/GE2 (SEMESTER 2, CODE – ENG-G-CC-2-2-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

ESSAY, DRAMA AND NOVEL

Essay

Charles Lamb: 'Dream Children: A Reverie'
George Orwell: 'Shooting an Elephant'

Drama

William Shakespeare: *As You Like It*
George Bernard Shaw: *Arms and the Man*

Novel

Thomas Hardy: *The Mayor of Casterbridge*

End Semester Question Pattern:
Objective – 5 marks
One question of 15 marks out of two from essay (one from each)
Two questions of 15 marks (one from each) out of four from drama (two from each)
One question of 15 marks out of two from novel

CC3/GE3 (SEMESTER 3, CODE – ENG-G-CC-3-3-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

WOMEN'S WRITING AND WOMEN'S EMPOWERMENT

Poetry

Elizabeth Barret Browning: 'How Do I Love Thee'
Christina Rossetti: 'Uphill'
Emily Dickinson: 'I cannot live with you'
Sarojini Naidu: 'Palanquin Bearers'

Prose

Rassundari Devi: *Amar Jiban*, translated Enakshi Chatterjee, Writers' Workshop.
Rokeya Sakhawat Hussain: *Sultana's Dream*

End Semester Question Pattern:
Objective – 5 marks
Two questions of 15 marks out of three from poetry
Two questions of 15 marks (one from each) out of four from prose (two from each)

CC4/GE4 (SEMESTER 4, CODE – ENG-G-CC-4-4-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

ACADEMIC WRITING

Introduction to the writing process
Introduction to academic writing
Summarising and paraphrasing
Writing Essay
Citing Sources

End Semester Question Pattern:
Citing Sources – 5 marks
Writing Critical Appreciation – 15 marks
Writing Summary/Substance with a Critical Note – 12 + 8 marks
Writing Essay – 25 marks

Suggested Readings:

1. Liz Hamp-Lyons and Ben Heasley, *Study writing: A Course in Writing Skills for Academic Purposes* (Cambridge: CUP, 2006).
2. Renu Gupta, *A Course in Academic Writing* (New Delhi: Orient Blackswan, 2010).
3. Ilona Leki, *Academic Writing: Exploring Processes and Strategies* (New York: CUP, 2nd edn, 1998).
4. Gerald Graff and Cathy Birkenstein, *They Say/I Say: The Moves That Matter in Academic Writing* (New York: Norton, 2009).
5. Hacker, D. & Sommers, N. (2011). *A writer's reference* (7th ed.). Boston, MA: Bedford/St, Martin's. PE1408.H2778 2011

FOR ALL LCC COURSES, THE MARKS DIVISION IS AS FOLLOWS:

End Semester – 65
Tutorial – 15
Internal – 10
Attendance – 10

LCC (L1)-1 (SEMESTER 3, CODE – ENG-G-LCC-1-3-1-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

LANGUAGE, VARIETY AND STYLISTICS

Language and Communication: Official and Personal
Language Varieties: Formal & Informal, Correct and Incorrect
Differences between British English and American English

End Semester Question Pattern:

Writing Letter (Personal or Business) – 15 marks
Writing Report – 15 marks
Writing e-mail – 15 marks
Correction – 10 marks
British English to American English and vice versa (objective) – 10 marks

Suggested Readings:

Rajend Mesthrie and Rakesh M. Bhatt, *World Englishes: The Study of New Linguistic Varieties*, Cambridge: CUP, 2008
George Bernard Shaw, 'Spoken English and Broken English'
H.G. Widdowson, *Stylistics and the Teaching of Literature*

LCC (L1)-2 (SEMESTER 5, CODE – ENG-G-LCC-1-5-2-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

LANGUAGE, IMAGINATION AND CREATIVITY

Plain Language and Figurative Language (Use of Figures of Speech)

Language of Poetry with reference to select poems:
William Wordsworth: 'Three Years She Grew',
Lord Tennyson: 'Break Break Break',
Henry Louis Vivian Derozio: 'To India, My Native Land',
Rabindranath Tagore: 'Gitanjali 50',

Creative use of Language: Writing Story, Travelogues and Advertisement Matters

End Semester Question Pattern:

Identifying Figures of Speech – 10 marks
Two questions of 15 marks from poetry (out of three)
Writing Story – 10 marks
Writing Travelogue – 10 marks
Writing Advertisement Matters – 5 marks

Suggested Reading:

Geoffrey N. Leech, *A Linguistic Guide to English Poetry*
Bose and Sterling, *Rhetoric and Prosody*

LCC (L2) – 1 (Alternative English)

LANGUAGE, SOCIETY AND PERSONALITY
(SEMESTER 4, CODE – ENG-G-LCC-2-4-1-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

1. Language and Society:

a. Shashi Tharoor, 'The Idea of India: India's Mosaic of Multiplicities'
b. Ismat Chugtai, 'Roots'
c. Ramachandra Guha, 'A Gandhian in Garhwal'

[from B. Keralavarma (ed), *Understanding India: Reflections on Indian Polity, Secularism and Sustainable Environment*, Kottayam, Kerala: Macmillan Publishers India Ltd and Mahatma Gandhi University, Kerala, 2010]

2 . Language and Personality

a. Louis Fischer, 'Gandhi and the Western World', from B. Keralavarma (ed), *Understanding India: Reflections on Indian Polity, Secularism and Sustainable Environment*, Kottayam, Kerala: Macmillan Publishers India Ltd and Mahatma Gandhi University, Kerala, 2010.
b. Sisirkumar Ghosh, *Makers of Indian Literature: Rabindranath Tagore*, New Delhi: Sahitya Akademi, 2012 (first chapter, viz. 'Life')
c. Subal Chandra Mitra, *Isvar Chandra Vidyasagar: A Story of His Life and Work*, New Delhi: Rupa and Co., 2008 (the first two chapters, viz. 'Birth and Ancestry' and 'Childhood and Early Instruction')

End Semester Question Pattern:

Objective – 5 marks
Two questions of 15 marks each out of three from Section 1.
Two questions of 15 marks each out of three from Section 2.

LCC (L2)-2(Alternative English)
LANGUAGE, CREATIVITY AND ANALYSIS

(SEMESTER 6, CODE – ENG-G-LCC-2-6-2-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

Prose

R.K. Narayan, 'Out of Business'
Bhisham Sahni, 'The Boss Came to Dinner'
Ruskin Bond, 'The Thief's Story'
Prem Chand, 'The Child'

Poetry

Rabindranath Tagore, 'Gitanjali: XVIII'
Purushottam Lal, 'Life'
Nissim Ezekeil, 'In a Country Cottage'
Gauri Deshpande, 'The Female of the Species'

[from UG Board of Studies in English, University of Calcutta (ed), *Golden Leaves: A Textbook for College Students*, New Delhi: Macmillan Publishers India Ltd and University of Calcutta, 2011]

End Semester Question Pattern:

Objective – 5 marks
Two question of 15 marks out of three from Prose
Two questions of 15 marks each out of three from Poetry

FOR ALL DSE COURSES, THE MARKS DIVISION IS AS FOLLOWS:

End Semester – 65
Tutorial – 15
Internal – 10
Attendance – 10

DSEA1 (SEMESTER 5, CODE – ENG-G-DSEA-5-1-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

BRITISH LITERATURE

Poetry

Group – A

William Wordsworth, 'Tintern Abbey'
Percy Bysshe Shelley, 'Ode to the West Wind'
John Keats, 'Ode to a Nightingale'

Group – B

Lord Tennyson, 'Ulysses'
Matthew Arnold, 'Dover Beach'
W.B. Yeats, 'The Second Coming'

Drama

William Shakespeare, *Macbeth*

Fiction

Robert Louis Stevenson, *The Strange Case of Dr Jekyll and Mr Hyde*

End Semester Question Pattern:

Objective – 5 marks
Two questions of 15 marks from poetry (one from each group)out of four, two from each group
One question of 15 marks out of two from drama
One question of 15 marks out of two from fiction

DSEA2 (SEMESTER 5, CODE – ENG-G-DSEA-5-2-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

MODERN INDIAN WRITING IN ENGLISH TRANSLATION

Novel

Rabindranath Tagore, *The Home and the World*

Poetry

Rabindranath Tagore, 'Light, oh where is the light?' (*Gitanjali* XXVII) and 'When my play was with thee' (*Gitanjali* XCVII)
G.M. Muktibodh, 'The Void'
Amrita Pritam, 'I say unto Waris Shah'

Drama

Vijay Tendulkar, *Silence! The Court is in Session*
Habib Tanveer, *Charandas Chor*

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks out of two from novel
One question of 15 marks out of three from poetry
Two questions of 15 marks each (one from each)out of four from drama (two from each drama)

DSEB1 (SEMESTER 6, CODE – ENG-G-DSEB-6-1-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

PARTITION LITERATURE

Novel

Amitav Ghosh, *The Shadow Lines*

Short Stories

Protiva Basu, 'The Marooned', translated Subhasree Tagore, in *The Other Voice*, eds. Tapati Gupta and Anil Acharya, Kolkata: Anustup
Manik Bandyopadhyay, 'The Final Solution', translated Rani Ray, in Debjani Sengupta ed. *Mapmaking: Partition Stories from Two Bengals*, New Delhi: Srishti
Sadat Hasan Manto, 'Toba Tek Singh', in *Black Margins:Manto*, New Delhi: Manohar

Poetry

Sahir Ludhianvi, 'Twentysixth January'
Birendra Chattopadhyay, 'After Death: Twenty Years' and
Sankha Ghosh, 'Rehabilitation', in Rakhshanda Jalil, Tarun Saint and Debjani Sengupta (eds) *Looking Back: The 1947 Partition of India 70 Years On*, New Delhi: Orient Blackswan, 2017

End Semester Question Pattern:

Objective – 5 marks
One question of 15 marks from novel (out of two)
Two questions of 15 marks each from short stories (out of three)
One question of 15 marks from poetry (out of two)

DSEB2 (SEMESTER 6, CODE – ENG-G-DSEB-6-2-TH/TU) - 6 CREDITS
(5 CREDITS THEORY AND 1 CREDIT TUTORIAL)

TRANSLATION STUDIES

Unit 1 – Importance of translation in a multi-linguistic and multi-cultural society
Unit 2 – Literal translation

Unit 3 – Free translation
Unit 4 – Transcreation

End Semester Question Pattern:

Questions may include (1) translation from one language to another (2) critical comments on a translated passage/poem (3) differences between literal translation and free translation (4) why translation is necessary into other Indian languages and also to foreign languages

Suggested Readings

1. Jyoti Bhattacharya, *Transcreations: Some Experiments on Tagore Songs*, Kolkata: Gangchil
2. Mona Baker, *In Other Words: A Coursebook on Translation*, Routledge, 2001.
3. I.C. Catford, *A Linguistic Theory of Translation*, London: OUP, 1965.
4. Ravinder Gargesh and Krishna Kumar Goswami eds. *Translation and Interpreting: Reader and Workbook*, New Delhi: Orient Longman, 2007.
5. Sukanta Chaudhuri, *Translation and Understanding*, New Delhi: OUP
6. Lawrence Venuti (ed), *The Translation Studies Reader*, London and New York: Routledge, 2012

AECC1 – COMMUNICATIVE ENGLISH (SEMESTER 1) – 2 CREDITS

- Correction of sentences
- Transformation (Simple, Complex and Compound Sentences; Degrees of Comparison; Affirmative and Negative Sentences; Interrogative and Assertive Sentences; Exclamatory and Assertive Sentences)
- Identifying True/False Statements from Given Passages

Internal – 10 marks
Attendance – 10 marks
End Semester Questions – MCQ 80 marks

End Semester Question Patterns:
Correction of Sentences: 20 (2 x 10)
Transformation of Sentences: 20 (2 x 10)
True/False Statements from Given Passage One: 20 (4 x 5)
True/False Statements from Given Passage Two: 20 (4 x 5)

SECA1 – ENGLISH LANGUAGE TEACHING (SEMESTER 3/5, CODE –ENG-G-SEC-A-3/5-1-TH) – 2 CREDITS

Language Perspectives: First Language Second Language and Foreign Language – Acquisition and Learning
Knowing the Learner: Features of a good language learner
Structure of the English Language
Methods of Teaching English Language
Assessing Language Skills

Materials for Language Teaching

End Semester Question Pattern: To be finalised later

Suggested Readings:

1. Penny Ur, *A Course in Language Teaching: Practice and Theory*, Cambridge: CUP, 1996
2. Marianne Celce-Murcia, Donna M. Brinton and Marguerite Ann Snow, *Teaching English as a Second or Foreign Language*, Delhi: Cengage Learning, 2014.
3. Mohammad Aslam, *Teaching of English*, New Delhi: CUP, 2013.
4. Daine Larsen-Freeman, *Techniques and Principles in Language Teaching*: Oxford: OUP, 1986
5. Geetha Nagaraj, *English Language Teaching*, New Delhi: Orient BlackSwan, 2010
6. J.C. Richards and T.S. Rodgers, *Approaches and Methods in Language Teaching*, Cambridge: CUP, 2001

SECA2– BUSINESS COMMUNICATION
(SEMESTER 3/5, CODE – ENG-G-SEC-A-3/5-1-TH) - 2 CREDITS

What is business communication
Writing reports, letters, curriculum vitae
Writing meeting minutes
E-correspondence

End Semester Question Pattern:

Writing Business Letters – 15 marks
Writing CV – 15 marks
Writing e-mail – 15 marks
Writing Report – 15 marks
Writing Meeting Minutes – 20

Suggested Readings:

1. O. Scot, *Contemporary Business Communication*, New Delhi: Biztantra
2. R. Ludlow and F. Panton, *The Essence of Effective Communications*, New Delhi: Prentice Hall of India Pvt Ltd
3. R.C. Bhatia, *Business Communication*, New Delhi: Ane Books Private Limited

SECB1– SPOKEN ENGLISH
(SEMESTER 4/6, CODE – ENG-G-SEC-B-4/6-1-TH) – 2 CREDITS

Differences between Speech and Writing
Features of Oral Communication
Essentials of Good Communication
Stress, Intonation, Voice Modulation, Rules of Interruption in Civil Discourses

Greeting, Leave-taking, Making and Granting/Refusing Requests, Queries and Giving Information, Narrating Events
Complaints and Apologies, Alerting and Warning
Interview, Debate, Anchoring, Public Address

End Semester Question Pattern: To be finalised later

Suggested Readings:

1. W.S. Allen, *Lining English Speech*, London: Orient Longman, 1968
2. R.K. Bansal and J.B. Harrison, *Spoken English for India*, Madras: Orient Longman, 1972
3. Leena Sen, *Communication Skills*, New Delhi: Prentice Hall of India

SECB2– CREATIVE WRITING
(SEMESTER 4/6, CODE – ENG-G-SEC-B-4/6-1-TH) – 2 CREDITS

What is creative writing
Modes of creative writing
Writing Short Story / Poetry
Preparing for publication

End Semester Question Pattern:

Questions may include (1) the importance of creative writing in development of personality and creativity (2) actual creative writing – poem or short story (3) different modes of publishing – viz. books, articles in newspapers, articles in magazines and periodicals, social media – and differences of impact

Suggested Readings:

1. Anjana Neira Dev *et al*, *Creative Writing: A Beginner's Manual*, New Delhi: Pearson, 2009.
2. David Morley and Philip Neilsen eds., *The Cambridge Companion to Creative Writing*

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

CBCS Syllabus
for
Undergraduate Courses in Geography

TO BE EFFECTIVE FROM THE ACADEMIC SESSION 2018-19

University of Calcutta
May, 2018

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Choice Based Credit System (CBCS): Syllabus of Geography

INTRODUCTION: In compliance with recent directives from the University Grants Commission, the undergraduate syllabus for Geography is reframed into Choice Based Credit System largely following the model syllabus prepared by the West Bengal State Council of Higher Education.

The main objective of this new curriculum is to give the students a holistic understanding of the subject, putting equal weightage to the core content and techniques used in Geography. The syllabus tries to give equal importance to the two main branches of Geography: Physical and Human.

The principal goal of the syllabus is to enable the students to secure a job at the end of the undergraduate programme. Keeping this in mind and in tune with the changing nature of Geography, adequate emphasis is rendered on applied aspects of the subject such as emerging techniques of mapping and field-based data generation, especially in the honours course. The syllabus emphasises on development of basic skills of the subject, so that everyone need not go for higher studies in search of professional engagement or employment.

LEARNING OUTCOMES: This syllabus is designed to impart basic knowledge on geography as a spatial science and train the undergraduates to secure employment in the sectors of geospatial analysis, development and planning, mapping, and surveying.

Contents

1. Scheme for the CBCS Curriculum

1.1 Credit Distribution across Courses: Honours Course

Course Type	Total Papers	Credits	
		THEORY + PRACTICAL	THEORY + TUTORIAL*
S-CC Core Courses: Geography Honours	14	14 × 4 = 56 14 × 2 = 28	— —
S-DSE Discipline (Geography) Specific Electives	4	4 × 4 = 16 4 × 2 = 08	— —
S-GE Generic Electives: Two disciplines other than Geography	4	4 × 4 = 16 4 × 2 = 08	⇔ 4 × 5 = 20 4 × 1 = 04*
AECC Ability Enhancement Courses	2	2 × 2 = 04	—
S-SEC Skill Enhancement Courses: from geography and/or other disciplines	2	2 × 2 = 04	—
Total	26	140	—

*Tutorials of 1 Credit will be conducted in case there is no practical component (Generic Electives from BA courses)

1.2 Credit Distribution across Courses: General Course

Course Type	Total Papers	Credits	
		THEORY + PRACTICAL	THEORY + TUTORIAL*
G-CC Core Course: Geography and two other disciplines	12	12 × 4 = 48 12 × 2 = 24	12 × 5 = 60 12 × 1 = 12*
G-DSE Discipline Specific Electives: Geography and two other disciplines	6	6 × 4 = 24 6 × 2 = 12	6 × 5 = 30 6 × 1 = 06*
AECC Ability Enhancement Course	2	2 × 2 = 04	2 × 2 = 04
G-SEC Skill Enhancement Course: from geography and/or other disciplines	4	4 × 2 = 08	4 × 2 = 08
Total	24	120	120

*Tutorials of 1 Credit will be conducted in case there is no practical component

1.3 Suggested Mark-wise Class Distribution (apart from SECs)

Type of Course	Marks	Number of Periods	Duration of Periods
Theory (TH)	60	60	40~45 minutes
Practical (P)	30	60	40~45 minutes

1.4 Honours Course: Core Subjects

GEO-A-CC-1-**01**-TH/P – Geotectonics and Geomorphology

GEO-A-CC-1-**02**-TH/P – Cartographic Techniques

GEO-A-CC-2-**03**-TH/P – Human Geography

GEO-A-CC-2-**04**-TH/P – Cartograms, Thematic Mapping and Surveying

GEO-A-CC-3-**05**-TH/P – Climatology

GEO-A-CC-3-**06**-TH/P – Hydrology and Oceanography

GEO-A-CC-3-**07**-TH/P – Statistical Methods in Geography

GEO-A-CC-4-**08**-TH/P – Economic Geography

GEO-A-CC-4-**09**-TH/P – Regional Planning and Development

GEO-A-CC-4-**10**-TH/P – Soil and Biogeography

GEO-A-CC-5-**11**-TH/P – Research Methodology and Fieldwork

GEO-A-CC-5-**12**-TH/P – Remote Sensing, GIS and GNSS

GEO-A-CC-6-**13**-TH/P – Evolution of Geographical Thought

GEO-A-CC-6-**14**-TH/P – Disaster Management

1.5 Honours Course: Choices for Four Discipline Specific Electives [1]

GEO-A-DSE-A-5-**01**-TH/P – Fluvial Geomorphology

GEO-A-DSE-A-5-**02**-TH/P – Climate Change: Vulnerability and Adaptations

GEO-A-DSE-B-5-**05**-TH/P – Cultural and Settlement Geography

GEO-A-DSE-B-5-**06**-TH/P – Social Geography

GEO-A-DSE-A-6-**03**-TH/P – Environmental Issues in Geography

GEO-A-DSE-A-6-**04**-TH/P – Resource Geography

GEO-A-DSE-B-6-**07**-TH/P – Urban Geography

GEO-B-DSE-B-6-**08**-TH/P – Geography of India

1.6 Honours Course: Choices for Two Skill Enhancement Courses

GEO-A-SEC-A-3-**01**-TH – Coastal Management

GEO-A-SEC-A-3-**02**-TH – Tourism Management

GEO-A-SEC-B-4-**03**-TH – Rural Development

GEO-A-SEC-B-4-**04**-TH – Sustainable Development

1.7 General Course: Core Subjects

GEO-G-CC-1-**01**-TH/P – Physical Geography

GEO-G-CC-2-**02**-TH/P – Environmental Geography

GEO-G-CC-3-**03**-TH/P – Human Geography

GEO-G-CC-4-**04**-TH/P – Cartography

[1] Any two electives, one each from DSE-A and DSE-B, are to be chosen in each of Semesters-V and VI

1.8 General Course: Choices for Two Discipline Specific Electives

GEO-G-DSE-A-5-**01**-TH/P – Regional Development

GEO-G-DSE-A-5-**02**-TH/P – Geography of Tourism

GEO-G-DSE-B-6-**03**-TH/P – Agricultural Geography

GEO-G-DSE-B-6-**04**-TH/P – Population Geography

1.9 General Course: Choices for Two Skill Enhancement Courses

GEO-G-SEC-A-3/5-**01**-TH – Coastal Management

GEO-G-SEC-A-3/5-**02**-TH – Forest and Wildlife Management

GEO-G-SEC-B-4/6-**03**-TH – Rural Development

GEO-G-SEC-B-4/6-**03**-TH – Sustainable Development

1.10 Credits and Marks Distribution Scheme for CBCS Curriculum: Honours Course

Semester	Course Type	Paper Code and Name	Credits	Marks Distribution *						Marks per Qn Type	
				Full Marks	Attendance	Internal Assessment	Theoretical Exam	Practical Exam		MCQ	Long-Answer Type
								Written	Project/Viva		
I Marks: 400 Credits: 20	Ability Enhancement Compulsory Course - I	AECC-1 – Communicative Bengali / English / Hindi / Urdu	2	100	10	10	80	—	—	80	—
	Core Course - I	GEO-A-CC-1-**01**-TH – Geotectonics and Geomorphology	4	70	10	10	50	—	—	20	30
		GEO-A-CC-1-**01**-P – Geotectonics and Geomorphology Lab	2	30	—	—	—	25	5	—	20
	Core Course - II	GEO-A-CC-1-**02**-TH – Cartographic Techniques	4	70	10	10	50	—	—	20	30
		GEO-A-CC-1-**02**-P – Cartographic Techniques Lab	2	30	—	—	—	25	5	—	25
	Generic Elective - I	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
II Marks: 400 Credits: 20	Ability Enhancement Compulsory Course - II	AECC-2 – Environmental Studies	2	100	10	10	80	—	—	80	—
	Core Course - III	GEO-A-CC-2-**03**-TH – Human Geography	4	70	10	10	50	—	—	20	30
		GEO-A-CC-2-**03**-P – Human Geography Lab	2	30	—	—	—	25	5	—	20
	Core Course - IV	GEO-A-CC-2-**04**-TH – Cartograms, Thematic Mapping and Surveying	4	70	10	10	50	—	—	20	30
		GEO-A-CC-2-**04**-P – Cartograms, Thematic Mapping and Surveying Lab	2	30	—	—	—	25	5	—	25
	Generic Elective - II	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
III Marks: 500 Credits: 26	Core Course - V	GEO-A-CC-3-**05**-TH – Climatology	4	70	10	10	50	—	—	20	30
		GEO-A-CC-3-**05**-P – Climatology Lab	2	30	—	—	—	25	5	—	25
	Core Course - VI	GEO-A-CC-3-**06**-TH – Hydrology and Oceanography	4	70	10	10	50	—	—	20	30
		GEO-A-CC-3-**06**-P – Hydrology and Oceanography Lab	2	30	—	—	—	25	5	—	25
	Core Course - VII	GEO-A-CC-3-**07**-TH – Statistical Methods in Geography	4	70	10	10	50	—	—	20	30
		GEO-A-CC-3-**07**-P – Statistical Methods in Geography Lab	2	30	—	—	—	25	5	—	25
	Skill Enhancement Course - I	GEO-A-SEC-A-3-**01**-TH – Coastal Management / GEO-A-SEC-A-3-**02**-TH – Tourism Management	2	100	10	10	80	—	—		
	Generic Elective - III	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							

Semester	Course Type	Paper ID and Name	Credits	Marks Distribution *						Marks per Qn Type	
				Full Marks	Attendance	Internal Assessment	Theoretical Exam	Practical Exam		MCQ	Long-Answer Type
								Written	Project/Viva		
IV Marks: 500 Credits: 26	Core Course - VIII	GEO-A-CC-4-**08**-TH – Economic Geography	4	70	10	10	50	—	—	20	30
		GEO-A-CC-4-**08**-P – Economic Geography Lab	2	30	—	—	—	25	5	—	25
	Core Course - IX	GEO-A-CC-4-**09**-TH – Regional Planning and Development	4	70	10	10	50	—	—	20	30
		GEO-A-CC-4-**09**-P – Regional Planning and Development Lab	2	30	—	—	—	25	5	—	25
	Core Course - X	GEO-A-CC-4-**10**-TH – Soil and Biogeography	4	70	10	10	50	—	—	20	30
		GEO-A-CC-4-**10**-P – Soil and Biogeography Lab	2	30	—	—	—	25	5	—	25
	Skill Enhancement Course - II	GEO-A-SEC-B-4-**03**-TH – Rural Development / GEO-A-SEC-B-4-**04**-TH – Sustainable Development	2	100	10	10	80	—	—		
	Generic Elective - IV	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
V Marks: 400 Credits: 24	Core Course - XI	GEO-A-CC-5-**11**-TH – Research Methodology and Fieldwork	4	70	10	10	50	—	—	20	30
		GEO-A-CC-5-**11**-P – Research Methodology and Fieldwork Lab	2	30	—	—	—	—	20+10	—	—
	Core Course - XII	GEO-A-CC-5-**12**-TH – Remote Sensing, GIS and GNSS	4	70	10	10	50	—	—	20	30
		GEO-A-CC-5-**12**-P – Remote Sensing, GIS and GNSS Lab	2	30	—	—	—	25	5	—	25
	Discipline Specific Elective - I	GEO-A-DSE-A-5-**01/02**-TH	4	70	10	10	50	—	—	20	30
		GEO-A-DSE-A-5-**01/02**-P	2	30	—	—	—	25	5	—	25
	Discipline Specific Elective - II	GEO-A-DSE-B-5-**05/06**-TH	4	70	10	10	50	—	—	20	30
		GEO-A-DSE-B-5-**05/06**-P	2	30	—	—	—	25	5	—	25
VI Marks: 400 Credits: 24	Core Course - XIII	GEO-A-CC-6-**13**-TH – Evolution of Geographical Thought	4	70	10	10	50	—	—	20	30
		GEO-A-CC-6-**13**-P – Evolution of Geographical Thought Lab	2	30	—	—	—	—	20+10	—	15
	Core Course - XIV	GEO-A-CC-6-**14**-TH – Disaster Management	4	70	10	10	50	—	—	20	30
		GEO-A-CC-6-**14**-P – Disaster Management Lab	2	30	—	—	—	—	20+10	—	—
	Discipline Specific Elective - III	GEO-A-DSE-A-6-**03/04**-TH	4	70	10	10	50	—	—	20	30
		GEO-A-DSE-A-6-**03/04**-P	2	30	—	—	—	25	5	—	25
	Discipline Specific Elective - IV	GEO-A-DSE-B-6-**07/08**-TH	4	70	10	10	50	—	—	20	30
		GEO-A-DSE-B-6-**07/08**-P	2	30	—	—	—	25	5	—	25

*Tutorials of 1 Credit will be conducted in case there is no practical component

1.11 Credits and Marks Distribution Scheme for CBCS Curriculum: General Course

Semester	Course Type	Paper Code and Name	Credits	Marks Distribution *						Marks per Qn Type	
				Full Marks	Attendance	Internal Assessment	Theoretical Exam	Practical Exam		MCQ	Long-Answer Type
								Written	Viva Voce		
I Marks: 400 Credits: 20	Ability Enhancement Compulsory Course - I	AECC-1 – Communicative Bengali / English / Hindi / Urdu	2	100	10	10	80	—	—	80	—
	Core Course - I	GEO-G-CC-1-**01**-TH – Physical Geography	4	70	10	10	50	—	—	20	30
		GEO-G-CC-1-**01**-P – Physical Geography Lab	2	30	—	—	—	25	5	—	25
	Core Course - A1	TBD-TH	4/5								
		TBD-P/TU	2/1								
	Core Course - B1	TBD-TH	4/5								
		TBD-P/TU	2/1								
II Marks: 400 Credits: 20	Ability Enhancement Compulsory Course -II	AECC-2 – Environmental Studies	2	100	10	10	80	—	—	80	—
	Core Course - II	GEO-G-CC-2-**02**-TH – Environmental Geography	4	70	10	10	50	—	—	20	30
		GEO-G-CC-2-**02**-P – Environmental Geography Lab	2	30	—	—	—	25	5	—	25
	Core Course - A2	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
	Core Course - B2	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
III Marks: 400 Credits: 20	Core Course - III	GEO-G-CC-3-**03**-TH – Human Geography	4	70	10	10	50	—	—	20	30
		GEO-G-CC-3-**03**-P – Human Geography Lab	2	30	—	—	—	25	5	—	25
	Core Course - A3	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
	Core Course - B3	TBD-TH	4/5	70/85							
		TBD-P/TU	2/1	30/15							
	Skill Enhancement Course - I	GEO-G-SEC-A-3/5-**01**-TH – Coastal Management / GEO-G-SEC-A-3/5-**02**-TH – Forest and Wildlife Management	2	100	10	10	80	—	—		

Semester	Course Type	Paper ID and Name	Credits	Marks Distribution *						Marks per Qn Type	
				Full Marks	Attendance	Internal Assessment	Theoretical Exam	Practical Exam		MCQ	Long-Answer Type
								Written	Viva Voce		
IV Marks: 400 Credits: 20	Core Course - IV	GEO-G-CC-4-**04**-TH – Cartography	4	70	10	10	50	—	—	20	30
		GEO-G-CC-4-**04**-P – Cartography Lab	2	30	—	—	—	25	5	—	25
	Core Course - A4	TBD-TH	4/5	70/85							
		TBD-P/T	2/1	30/15							
	Core Course - B4	TBD-TH	4/5	70/85							
		TBD-P/T	2/1	30/15							
	Skill Enhancement Course - II	GEO-G-SEC-B-4/6-**03**-TH – Rural Development / GEO-G-SEC-B-4/6-**04**-TH – Sustainable Development	2	100	10	10	80	—	—		
V Marks: 400 Credits: 20	Discipline Specific Elective - I	GEO-G-DSE-A-5-**01/02**-TH	4	70	10	10	50	—	—	20	30
		GEO-G-DSE-A-5-**01/02**-P	2	30	—	—	—	25	5	—	25
	Discipline Specific Elective - A1	TBD-TH	4/5	70/85							
		TBD-P/T	2/1	30/15							
	Discipline Specific Elective - B1	TBD-TH	4/5	70/85							
		TBD-P/T	2/1	30/15							
	Skill Enhancement Course - III	GEO-G-SEC-A-3/5-**01**-TH – Coastal Management / GEO-G-SEC-A-3/5-**02**-TH – Forest and Wildlife Management	2	100	10	10	80	—	—		
VI Marks: 400 Credits: 20	Discipline Specific Elective - II	GEO-G-DSE-B-6-**03/04**-TH	4	70	10	10	50	—	—	20	30
		GEO-G-DSE-B-6-**03/04**-P	2	30	—	—	—	25	5	—	25
	Discipline Specific Elective - A2	TBD-TH	4/5	70/85							
		TBD-P/T	2/1	30/15							
	Discipline Specific Elective - B2	TBD-TH	4/5	70/85							
		TBD-P/T	2/1	30/15							
	Skill Enhancement Course - IV	GEO-G-SEC-B-4/6-**03**-TH – Rural Development / GEO-G-SEC-B-4/6-**04**-TH – Sustainable Development	2	100							

*Tutorials of 1 Credit will be conducted in case there is no practical component

2. Honours Course: Core Subjects

2.1 GEO-A-CC-1-01-TH – Geotectonics and Geomorphology ✧ 60 Marks♣ / 4 Credits

Unit I: Geotectonics

1. Earth's tectonic and structural evolution with reference to geological time scale [3]
2. Earth's interior with special reference to seismology. Isostasy: Models of Airy, Pratt, and their applicability [3]
3. Plate Tectonics as a unified theory of global tectonics: Processes and landforms at plate margins and hotspots [10]
4. Folds and Faults—origin and types. [4]

Unit II: Geomorphology

5. Degradational processes: Weathering, mass wasting, and resultant landforms [5]
6. Processes of entrainment, transportation, and deposition by different geomorphic agents. Role of humans in landform development [4]
7. Development of river network and landforms on uniclinal and folded structures. Surface expression of faults [7]
8. Development of river network and landforms on granites, basalts and limestones [4]
9. Coastal processes and landforms [4]
10. Glacial and glacio-fluvial processes and landforms [4]
11. Aeolian and fluvio-aeolian processes and landforms [4]
12. Role of time in geomorphology: Schumm and Lichty's model. Models on landscape evolution: Views of Davis, Penck, King, and Hack. Significance of systems approach [8]

References

Books:

Billings, M.P. 1971. Structural Geology, Pearson.

Frisch, W., Meschede, M., Blakey, R.C. 2011. Plate Tectonics: Continental Drift and Mountain Building, Springer.

Goudie, A.S. (Ed) 2004. Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.

Gregory, K.J., Lewin, J. 2014. The Basics of Geomorphology: Key Concepts, Sage.

Harvey, A. 2012. Introducing Geomorphology: A Guide to Landforms and Processes, Dunedin Academic Press.

Kale, V.S., Gupta, A. 2001. Introduction to Geomorphology, Orient Longman.

Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India.

Knighton, A.D. 1984. Fluvial Forms and Processes, Edward Arnold.

McCullagh, P. 1978. Modern Concepts in Geomorphology, Oxford University Press.

Selby, M.J. 1986. Earth's Changing Surface, Oxford University Press.

♣ Excluding 10 marks for attendance

Strahler, A. 2016. Introducing Physical Geography, 6th ed, Wiley.

Summerfield, M.J. 2003. Global Geomorphology: An Introduction to the Study of landforms, Longman.

Thornbury, W.D. 1969. Principles of Geomorphology, 2nd ed, Wiley-India / CBS.

WEBSITES:

British Society for Geomorphology: geomorphology.org.uk

Geological Survey of India: www.gsi.gov.in

Indian Institute of Geomorphologists: www.indiageomorph.org

International Association of Geomorphologists: www.geomorph.org

Plaleomap Project: www.scotese.com & www.youtube.com/user/cscotese

'This Dynamic Earth' (USGS): pubs.usgs.gov/gip/dynamic/dynamic.html

2.2 GEO-A-CC-1-01-P – Geotectonics and Geomorphology Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Measurement of dip and strike using clinometer [6]
2. Megascopic identification of (a) *mineral samples*: Bauxite, calcite, chalcopyrite, feldspar, galena, gypsum, hematite, magnetite, mica, quartz, talc, tourmaline; and (b) *rock samples*: Granite, basalt, dolerite, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite, marble [14]
3. Extraction and interpretation of geomorphic information from Survey of India 1:50k topographical maps of plateau region: Construction of relief profiles (superimposed, projected, and composite). Delineation of drainage basins. Construction of relative relief map, slope map (Wentworth's method), drainage density map, stream ordering (Strahler), and bifurcation ratio on a drainage basin (c. 5' x 5') [35]
4. Construction of hypsometric curve and derivation of hypsometric integer of a drainage basin (c. 5' x 5') from Survey of India 1:50k topographical maps of plateau region [5]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Farndon, J. 2012. The Illustrated Guide to Rocks & Minerals, Southwater.

McCullagh, P. 1978. Modern Concept in Geomorphology, Oxford University Press.

Pillent, C. 2002. Smithsonian Handbooks: Rocks & Minerals, Dorling Kindersley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Sen, P.K. 1989. Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.

Sorrell, C.A. Rocks and Minerals: A Guide to Field Identification, St. Martin's Press.

2.3 GEO-A-CC-1-02-TH – Cartographic Techniques ✧ 60 Marks / 4 Credits

1. Maps: Components and classification [4]
2. Concept and application of scales: Plain, comparative, diagonal and Vernier [8]
3. Coordinate systems: Polar and rectangular [6]
4. Concept of generating globe [2]
5. Grids: Angular and linear systems of measurement [5]
6. Bearing: Magnetic and true, whole-circle and reduced [5]
7. Concept of geoid and spheroid with special reference to Everest and WGS-84 [4]
8. Map projections: Classification, properties and uses [8]
9. Concept and significance of UTM projection [2]
10. Representation of data using dots, spheres and divided proportional circles [5]
11. Representation of data using isopleth, choropleth, and chorochromatic maps [5]
12. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps [6]

References

BOOKS

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

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Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Vaidyanadhan, R., Subbarao, K.V. 2014. Landforms of India from Topomaps and Images, Geological Society of India.

WEBSITES

Geological Survey of India: www.gsi.gov.in

Indian National Cartographic Association: www.incaindia.org

Indian Naval Hydrographic Department: www.hydrobharat.nic.in

Land & Land Reforms and Refugee Relief and Rehabilitation Department, Gov. of West Bengal: www.banglarbhumi.gov.in

National Bureau of Soil Survey and Land Use planning: www.nbsslup.in

Survey of India: www.surveyofindia.gov.in

2.4 GEO-A-CC-1-02-P – Cartographic Techniques Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Graphical construction of scales: Plain, comparative, diagonal and Vernier [16]
2. Construction of projections: Polar Zenithal Stereographic, Simple Conic with one standard parallel, Bonne's, Cylindrical Equal Area, and Mercator's [20]
3. Thematic maps: Proportional squares, pie diagrams with proportional circles, dots and spheres [12]
4. Thematic maps: Choropleth, isopleth, and chorochromatic maps [12]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

2.5 GEO-A-CC-2-03-TH – Human Geography ✧ 60 Marks / 4 Credits

Unit I: Nature and Principles

1. Nature, scope and recent trends. Elements of human geography [4]
2. Approaches to Human Geography: Resource, locational, landscape, environment [6]
3. Concept and classification of race. Ethnicity [5]
4. Space, society, and cultural regions (language and religion) [5]

Unit II: Society, Demography and Ekistics

5. Evolution of human societies: Hunting and food gathering, pastoral nomadism, subsistence farming, and industrial society [6]
6. Human adaptation to environment: Case studies of Eskimo, Masai and Maori [4]
7. Population growth and distribution, composition; demographic transition [5]
8. Population–resource regions (Ackerman) [5]
9. Development–environment conflict [5]
10. Types and patterns of rural settlements [5]
11. Rural house types in India [5]
12. Morphology and hierarchy of urban settlements [5]

References

Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.

Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley.

Ghosh, S. 1998. Introduction to Settlement Geography, Sangam Books Ltd.

Gould, W.T.S. 2015. Population and Development, Routledge.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Knox, P.L., Marston, S.A. 2014. Human Geography: Places and Regions in Global Context, 6th ed, Pearson Education Limited.

Knox, P.L., McCarthy, L.M. 2011. Urbanization: An Introduction to Urban Geography, 3rd ed, Pearson Educztuion Ltd.

Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

Moseley, W.G., Perramond, E., Hapke, H.M., Laris, P. 2013. An Introduction to Human-Environment Geography: Local Dynamics and Global Processes, Wiley-Blackwell.

Norton, W. 2014. Human Geography, 8th ed, Oxford University Press.

Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.

Rubenstein, J.M. 2016. The Cultural Landscape: An Introduction to Human Geography, 12th ed, Pearson Education Limited.

Singh, R.Y. 2000. Geography of Settlements, Rawat Publication

Short, R.J. 2017. Human Geography: A Short Introduction, 2nd ed, Oxford University Press.

2.6 GEO-A-CC-2-03-P – Human Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Spatial variation in continent- or country-level religious composition by divided proportional circles [12]
2. Measuring arithmetic growth rate of population comparing two decadal datasets [15]
3. Types of age-sex pyramids (progressive, regressive, intermediate, and stationary): Graphical representation and analysis [20]
4. Nearest neighbour analysis from Survey of India 1:50k topographical maps of plain region (c. 5' x 5') [13]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Hassan, M.I. 2005. Population Geography, Rawat publications.

Knowles, R., Wareing, J. 1990. Economic and Social Geography, Made Simple Books.

Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publication.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

2.7 GEO-A-CC-2-04-TH – Thematic Mapping and Surveying ✧60 Marks / 4 Credits

1. Concepts of rounding, scientific notation. Logarithm and anti-logarithm. Natural and log scales [4]
2. Concept of diagrammatic representation of data [2]
3. Preparation and interpretation of geological maps [5]
4. Preparation and interpretation of weather maps [5]
5. Preparation and interpretation land use land cover maps [5]
6. Preparation and interpretation of socio-economic maps [5]
7. Principal national agencies producing thematic maps in India: NATMO, GSI, NBSSLUP, NHO, and NRSC / Bhuvan [5]
8. Basic concepts of surveying and survey equipment: Prismatic compass [5]
9. Basic concepts of surveying and survey equipment: Dumpy level [7]
10. Basic concepts of surveying and survey equipment: Theodolite [7]
11. Basic concepts of surveying and survey equipment: Abney level [5]
12. Basic concepts of surveying and survey equipment: Laser distance measurer [5]

References

BOOKS:

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Bolton. T. 2009 (reprint). Geological Maps: Their Solution and Interpretation, Cambridge Univ. Press.

Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press

WEBSITES:

Geological Survey of India: www.gsi.gov.in

Indian Naval Hydrographic Department: www.hydrobharat.nic.in

National Bureau of Soil Survey and Land Use planning: www.nbsslup.in

Survey of India: www.surveyofindia.gov.in

ISRO Bhuvan 2D Platform: bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php

National Remote Sensing Centre: www.nrsc.gov.in

2.8 GEO-A-CC-2-04-P – Thematic Mapping and Surveying Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Traverse survey using prismatic compass [10]
2. Profile survey using dumpy Level [12]
3. Height determination of base accessible and inaccessible (same vertical plane method) objects by theodolite [18]
4. Interpretation of geological maps with uniclinal structure, folds, unconformity, and intrusions [20]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Bolton. T. 2009 (reprint). Geological Maps: Their Solution and Interpretation, Cambridge University Press.

Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press

2.9 GEO-A-CC-3-05-TH – Climatology ✧ 60 Marks / 4 Credits

Unit I: Elements of the Atmosphere

1. Nature, composition and layering of the atmosphere [4]
2. Insolation: Controlling factors. Heat budget of the atmosphere [6]
3. Temperature: horizontal and vertical distribution. Inversion of temperature: types, causes and consequences [6]
4. Overview of climate change: Greenhouse effect. Formation, depletion, and significance of the ozone layer [4]

Unit II: Atmospheric Phenomena and Climatic Classification

5. Condensation: Process and forms. Mechanism of precipitation: Bergeron-Findeisen theory, collision and coalescence. Forms of precipitation [6]
6. Air mass: Typology, origin, characteristics and modification [4]
7. Fronts: Warm and cold, frontogenesis, and frontolysis [5]
8. Weather: Stability and instability, barotropic and baroclinic conditions [5]
9. Circulation in the atmosphere: Planetary winds, jet streams, index cycle [5]
10. Atmospheric disturbances: Tropical and mid-latitude cyclones, thunderstorms [5]
11. Monsoon circulation and mechanism with reference to India [5]
12. Climatic classification after Thornthwaite (1955) and Oliver [5]

References

BOOKS:

Ahrens, C.D. 2012. Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning.

Barry, R.G, Chorley R.J. 2009. Atmosphere Weather and Climate. 9th ed, Routledge.

Critchfield, H. J. 1983. General Climatology. Prentice Hall India Ltd (2010 Reprint).

Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan.

Lutgens, F.K., Tarbuck, E.J. 1998. The Atmosphere: An Introduction to Meteorology, 9th ed, Prentice-Hall Inc.

Oliver, J.E., Hidore J.J. 2002. Climatology: An Atmospheric Science, Pearson Education India

WEBSITES:

India Meteorological Department: www.imd.gov.in

Intergovernmental Panel on Climate Change: www.ipcc.ch

World Bank Climate Change Knowledge Portal: sdwebx.worldbank.org/climateportal/index.cfm

World Meteorological Organization: public.wmo.int/en

2.10 GEO-A-CC-3-05-P – Climatology Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Measurement of weather elements using analogue instruments: Mean daily temperature, air pressure, relative humidity, and rainfall [15]
2. Interpretation of a daily weather map of India (any two): Pre-Monsoon, Monsoon, and Post-Monsoon [20]
3. Construction and interpretation of hythergraph and climograph (G. Taylor) [15]
4. Construction and interpretation of wind rose [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

WEBSITE:

India Meteorological Department: www.imd.gov.in

2.11 GEO-A-CC-3-06-TH – Hydrology and Oceanography ✧ 60 Marks / 4 Credits

Unit-I: Hydrology

1. Systems approach in hydrology. Global hydrological cycle: Its physical and biological role [5]
2. Run off: controlling factors. Infiltration and evapotranspiration. Run off cycle [5]
3. Drainage basin as a hydrological unit. Principles of water harvesting and watershed management [5]
4. Groundwater: Occurrence and storage. Factors controlling recharge, discharge and movement [5]

Unit-II: Oceanography

5. Major relief features of the ocean floor: Characteristics and origin according to plate tectonics [6]
6. Physical and chemical properties of ocean water [4]
7. Water mass, T–S diagram [4]
8. Air-Sea interactions, ocean circulation, wave and tide [8]
9. Ocean temperature and salinity: Distribution and determinants [4]
10. Coral reefs: Formation, classification and threats [5]
11. Marine resources: Classification and sustainable utilisation [4]
12. Sea level change: Types and causes [5]

References

Dingman, S.L. 2015. Physical Hydrology, 3rd ed, Macmillan Publishing Co.

Fitts, C.R. 2002. Groundwater Science, Elsevier.

Garrison, T. 2016. Oceanography: An Invitation to Marine Science, 9th ed, Cengage Learning.

Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India.

Karanth, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata- McGraw Hill.

Pinet, P.R. 2014. Invitation to Oceanography. 7th ed, Jones and Barlett Publishers.

Pinneker, E.V. 2010. General Hydrogeology, Cambridge University Press.

Pugh, D., Woodworth, P. 2014. Sea-Level Science: Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes, 2nd ed, Cambridge University press.

Raghunath, H.M. 2006. Hydrology: Principles, Analysis, Design, 3rd ed, New Age International Publishers.

Reddy, P.J.R. 2014. A Textbook of Hydrology, University of Science Press.

Subramanya, K. 2013. Engineering Hydrology, McGraw Hill Education.

Sverdrup, K.A., Armrest, E.V. 2010. An Introduction to the World Oceans, 10th ed, McGraw Hill.

Todd, D.K., Larry, W.M. 2004. Groundwater Hydrology, John Wiley & Sons.

Ward, A.D., Trimble, S.W., Burckhard, S.R., Lyon, J.G. 2016. Environmental Hydrology, 3rd ed, CRC Press.

2.12 GEO-A-CC-3-06-P – Hydrology and Oceanography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Construction and interpretation of rating curves [10]
2. Construction and interpretation of hydrographs and unit hydrographs [15]
3. Construction and interpretation of monthly rainfall dispersion diagram (Quartile method), Climatic water budget and Ergograph [25]
4. Construction of Theissen polygon from precipitation data [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Sen, P.K. 1989. Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Raghunath, H.M. 2006. Hydrology: Principles, Analysis, Design, 3rd ed, New Age International Publishers.

WEBSITES:

India Meteorological Department: www.imd.gov.in

Central Water Commission: cwc.gov.in

2.13 GEO-A-CC-3-07-TH – Statistical Methods in Geography ✧ 60 Marks / 4 Credits

Unit I: Frequency Distribution and Sampling

1. Importance and significance of statistics in Geography [4]
2. Discrete and continuous data, population and samples, scales of measurement (nominal, ordinal, interval and ratio) [5]
3. Sources of geographical data for statistical analysis [4]
4. Collection of data and preparation of statistical tables [5]
5. Sampling: Need, types, significance, and methods of random sampling [4]
6. Theoretical distribution: Frequency, cumulative frequency, normal, and probability [6]

Unit II: Numerical Data Analysis

7. Central tendency: Mean, median, mode, and partition values [6]
8. Measures of dispersion range, mean deviation, standard deviation, and coefficient of variation [6]
9. Association and correlation: Product moment correlation and rank correlation, [5]
10. Regression: Linear and non-linear [5]
11. Time series analysis: Moving average [5]
12. Hypothesis testing: Chi-square test and T-test [5]

References

Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.

Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.

McGrew Jr., J.C., Lembo Jr., A.J.,Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.

Pal S. K., 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

2.14 GEO-A-CC-3-07-P – Statistical Methods in Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Construction of data matrix with each row representing an areal unit (districts / blocks / *mouzas* / towns) and corresponding columns of relevant attributes [15]
2. Based on the above, a frequency table, measures of central tendency, and dispersion would be computed and interpreted using histogram and frequency curve [15]
3. From the data matrix, a sample set (20%) would be drawn using random, systematic, and stratified methods of sampling and the samples would be located on a map with an explanation of the methods used [15]
4. Based on the sample set and using two relevant attributes, a scatter diagram and linear regression line would be plotted and residual from regression would be mapped with a short interpretation [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.

Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.

McGrew Jr., J.C., Lembo Jr., A.J.,Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.

Pal, S. K., 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

2.15 GEO-A-CC-4-08-TH – Economic Geography ✧ 60 Marks / 4 Credits

Unit I: Concepts

1. Meaning and approaches to economic geography [4]
2. Concepts in economic geography: Goods and services, production, exchange, and consumption [6]
3. Concept of economic man. Theories of choices [6]
4. Economic distance and transport costs [4]

Unit II: Economic Activities

5. Concept and classification of economic activities [4]
6. Factors affecting location of economic activity with special reference to agriculture (von Thünen), and industry (Weber) [6]
7. Primary activities: Agriculture, forestry, fishing, and mining [6]
8. Secondary activities: Classification of manufacturing, concept of manufacturing regions, special economic zones and technology parks [6]
9. Tertiary activities: Transport, trade and services [6]
10. Transnational sea-routes, railways and highways with reference to India [4]
11. International trade and economic blocs [4]
12. WTO and BRICS: Evolution, structure and functions [4]

References

BOOKS:

Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.

Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.

Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.

Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. Economic Geography, 3rd ed, Wiley.

Willington D. E., 2008: Economic Geography, Husband Press.

Wood, A., Roberts, A. 2010. Economic Geography: Places, Networks and Flows, Routledge.

WEBSITES:

BRICS: www.brics2017.org/English & www.brics2016.gov.in

World Trade Organisation: www.wto.org

2.16 GEO-A-CC-4-08-P – Economic Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Choropleth mapping of state-wise variation in GDP [10]
2. State-wise variation in occupational structure by proportional divided circles [15]
3. Time series analysis of industrial production (India and West Bengal) [20]
4. Transport network analysis by detour index and shortest path analysis [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata

Sharma, T.C. 2012. Economic Geography of India, Rawat Publications.

Saxena, H.M. 2005. Transport Geography, Rawat Publications.

WEBSITES:

Open Government of India Data Platform: data.gov.in

Planning Commission (West Bengal Development Report 2010): planningcommission.nic.in/plans/stateplan/sdr/sdr_wb1909.pdf

Trending Economics (India's industrial production): tradingeconomics.com/india/industrial-production

Wikipedia (Hierarchy of states): en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_GDP_per_capita

2.17 GEO-A-CC-4-09-TH – Regional Planning and Development ✧ 60 Marks / 4 Credits

Unit I: Regional Planning

1. Regions: Concept, types, and delineation [4]
2. Regional Planning: Types, principles, objectives, tools and techniques [6]
3. Regional planning and multi-level planning in India [6]
4. Concept of metropolitan area and urban agglomeration [4]

Unit I: Regional Development

5. Concept of growth and development, growth versus development [6]
6. Indicators of development: Economic, demographic, and environmental [6]
7. Human development: Concept and measurement [4]
8. Theories and models for regional development: Cumulative causation (Myrdal) [4]
9. Models and theories in regional development: Stages of development (Rostow), growth pole model (Perroux) [6]
10. Underdevelopment: Concept and causes [4]
11. Regional development in India: Disparity and diversity [5]
12. Need and measures for balanced development in India [5]

References

Bhargava, G. 2001. Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.

Chand, M., Puri, V.K. 2000. Regional Planning In India, Allied Publishers Ltd.

Chandana, R.C. 2016. Regional Planning and Development, 6th ed, Kalyani Publishers.

Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

Gore, C. 2011. Regions in Question: Space, Development Theory, and Regional Policy, Routledge.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Hall, P., Tewdwr-Jones, M. 2010. Urban and Regional Planning, Routledge.

Higgins, B., Savoie, D.J. 2017. Regional Development: Theories and Their Application, Routledge.

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Kumar, A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.

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Misra, R.P. 1992. Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Publishing.

Ray, J. 2001. Introduction to Development & Regional Planning, Orient Blackswan.

Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.

Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.

Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.

Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. Economic Geography, 3rd ed, Wiley.

Willington D. E., 2008: Economic Geography, Husband Press.

Wood, A., Roberts, A. 2010. Economic Geography: Places, Networks and Flows, Routledge.

2.18 GEO-A-CC-4-09-P – Regional Planning and Development Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Delineation of formal regions by weighted index method [15]
2. Delineation of functional regions by breaking point analysis [15]
3. Measurement of inequality by location quotient [15]
4. Measuring regional disparity by Sopher index [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

Knowles, R, Wareing, J. 1990. Economic and Social Geography, Made Simple Books, Rupa.

Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publication.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

2.19 GEO-A-CC-4-10-TH – Soil and Biogeography ✧ 60 Marks / 4 Credits

Unit I: Soil Geography

1. Factors of soil formation [3]
2. Definition and significance of soil properties: Texture, structure, and moisture [5]
3. Definition and significance of soil properties: pH, organic matter, and NPK [5]
4. Soil profile. Origin and profile characteristics of lateritic, podsol and chernozem soils [6]
5. Soil erosion and degradation: Factors, processes and management measures. Humans as active agents of soil transformation [5]
6. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification [6]

Unit II: Biogeography

7. Concepts of biosphere, ecosystem, biome, ecotone, community and ecology [5]
8. Concepts of trophic structure, food chain and food web. Energy flow in ecosystems [5]
9. Classification of world biomes (Whittaker). Geographical extent and characteristics of tropical rain forest, savanna, hot desert, taiga and coral reef biomes [8]
10. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen [4]
11. Deforestation: Causes, consequences and management [4]
12. Biodiversity: Definition, types, threats and conservation measures [4]

References

Chapman J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.

Chiras, D.D., Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future, 10th ed, Pearson.

Cox, B., Moore, P.D., Ladle, R. 2016. Biogeography: An Ecological and Evolutionary Approach, 9th ed, Wiley-Blackwell.

Daji, J.A., Kadam, J.R., Patil, N.D. 1996. A Textbook of Soil Science, Media Promoters and Publishers.

Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGrawHill, New Delhi

Dey, N. K., Ghosh. P. 1993. India: A Study in Soil Geography, Sribhumi Publishing Company.

Franzmeier, D.P., McFee, W.W., Graveel, J.G., Kohnke, H. 2016. Soil Science Simplified, 5th ed, Waveland Press.

Huggett, R. 1998. Fundamentals of Biogeography, Routledge, London:

Lomolino, M.V., Riddle, B.R., Whittaker, R.J. 2016. Biogeography, 5th ed, Oxford University Press.

MacDonald, G.2001. Biogeography: Introduction to Space, Time, and Life, Wiley

Morgan, R.P.C. 1995. Soil Erosion and Conservation, 2nd edition, Longman.

Santra. A. 2006. Handbook on Wild and Zoo Animals, International Book Distributing Co.

Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.

Singer, M., Munns, D.N. 2005. Soils: An Introduction, 6th ed, Pearson.

Weil, R.R. and Brady, N.C. 2016. The Nature and Properties of Soil, 15th edition, Pearson.

White, R. 2006. Principles and Practice of Soil Science: The Soil as a Natural Resource, Blackwell.

Whittaker, R.H. 1975. Communities and Ecosystems, MacMillan.

2.20 GEO-A-CC-4-10-P – Soil and Biogeography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Determination of soil reaction (pH) and salinity using field kit [15]
2. Determination of soil type by ternary diagram textural plotting [15]
3. Plant species diversity determination by matrix method [10]
4. Time series analysis of biogeography data [20]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Stohlgren, T.J. 2007. Measuring Plant Diversity: Lessons from the Field. Oxford University Press.

USDA: United States Department of Agriculture. 2014. Soil Survey and Laboratory Methods Manual, Soil Survey Investigations Report No. 51.

Walters,M., Scholes, R.J. (Eds.) 2017. The GEO Handbook on Biodiversity Observation Networks, Springer International Publishing.

Xiao, M. 2009. Soil Testing Laboratory Manual, Bent Tree Press.

2.21 GEO-A-CC-5-11-TH – Research Methodology and Fieldwork ✧ 60 Marks / 4 Credits

Unit I: Research Methodology

1. Research in Geography: Meaning, types and significance [5]
2. Literature review and formulation of research design [5]
3. Defining research problem, objectives and hypothesis [6]
4. Research materials and methods [4]
5. Techniques of writing scientific reports: Preparing notes, references, bibliography, abstract, and keywords [6]
6. Plagiarism: Classification and prevention [4]

Unit II: Fieldwork

7. Fieldwork in Geographical studies: Role and significance. Selection of study area and objectives. Pre-field academic preparations. Ethics of fieldwork [6]
8. Field techniques and tools: Observation (participant, non-participant), questionnaires (open, closed, structured, non-structured). Interview [5]
9. Field techniques and tools: Landscape survey using transects and quadrants, constructing a sketch, photo and video recording [5]
10. Positioning and collection of samples. Preparation of inventory from field data [4]
11. Post-field tabulation, processing and analysis of quantitative and qualitative data [5]
12. Fieldwork: Logistics and handling of emergencies [5]

References

Clifford, N., Cope, M., Gillespie, T.W., French, S. (Eds) 2016. Key Methods in Geography, 3rd ed, Sage.

Gomes, B., Jones III, J.P. (Eds) 2010. Research Methods in Geography: A Critical Introduction, Wiley-Blackwell.

Lenon, B., Cleves, P. 2015. Geography Fieldwork and Skills, Harper-Collins.

Montello , D.R, Sutton, P. 2012. An Introduction to Scientific Research Methods in Geography and Environmental Studies, 2nd ed, Sage.

Murthy , K.L.N. 2004. Research Methodology in Geography: A Text Book, Concept Publishing Co.

Northey, N., Draper, D., Knight, D.B. 2015. Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing, 6th ed, Oxford University Press.

Parsons, T., Knight, P.G. 2015. How To Do Your Dissertation in Geography and Related Disciplines, 3rd ed, Routledge.

Riordan, D. 2013. Technical Report Writing Today, 10th ed, Wadsworth Publishing.

Phillips, R., Johns, J. 2012. Fieldwork for Human Geography, Sage.

Thornbush, M.J., Allen, C.D., Fitzpatrick, F.A. (Eds) 2014. Geomorphological Fieldwork, Elsevier.

2.22 GEO-A-CC-5-11-P – Research Methodology and Fieldwork Lab ✧ 30 Marks / 2 Credits

Every student needs to participate in fieldwork and prepare a field report according to the following guideline, failing which he/she will not be evaluated for GEO-A-CC-5-11-P.

1. Each student will prepare a report based on primary data collected from field survey and secondary data collected from different sources.
2. Students will select either one rural area (*mouza*) or an urban area (municipal ward) for the study, with the primary objective of evaluating the relation between physical and cultural landscape.
3. A specific problem or a special feature should be identified based on which, the study area will be selected.
4. The report should be handwritten in English on A4 size paper in candidate's own words within 5,000 words (Introductory Chapter: 1000 words; Physical Aspects: 1500 words; Socio-economic Aspects: 1500 words; Concluding Chapter: 500 words, approximately) excluding tables, photographs, maps, diagrams, references and appendices.
5. Photographs, maps and diagrams should not exceed 15 pages.
6. A copy of the bound report, duly signed by the concerned teacher, will be submitted during examination.
7. The field work and post-field work will include:
    a. Collection of primary data on physical aspects (relief and soil) of the study area. Students should use survey instruments like prismatic compass, dumpy level, Abney level or clinometer wherever necessary.
    b. Collection of soil samples from different land cover land use regions of the study area for determining pH and NPK values with help of a soil kit.
    c. Collection of socio economic data, at the household level (with the help of a questionnaire) in the selected study area.
    d. Plot to plot land use survey for preparation of a land use map, covering whole or part of the selected area.
    e. Visit to different organisations and departments for collection of secondary data.
    f. Any other survey relevant to the objective of the study.
8. The Field Report should contain the following sections (a–e).
    a. Introduction: Study area extent and space relations, reasons for selection of the study area on the basis of a specific problem or special feature, objectives, methods of data collection, analyses and presentation, sources of information, etc.
    b. Physical aspects: Lithology and geological structure, relief, slope, drainage, climate, soil, vegetation, environmental issues, proneness to natural hazards, etc.
    c. Socio-economic aspects:
        i. Population attributes: Number, sex ratio, literacy, occupational structure, ethnic and religious composition, language, per capita income, etc.
        ii. Settlement characteristics: Number of houses, building materials, number and size of rooms, amenities, etc.
        iii. Agriculture: General land use, crop-combination, use of fertiliser and irrigational facilities, production and marketing etc.
        iv. Other economic activities: Fishing, horticulture, brick-making, household and other industries, etc.

d. Conclusions: Relation between physical and cultural landscape. Evaluation of problems and prospects. General recommendations.

e. Bibliography.

9. The students will prepare (i) a chorochromatic land use land cover map on the basis of plot to plot survey; (ii) a profile of suitable length, surveyed and plotted, with different land use land cover superimposed on it.

10. All sections of the report should contain relevant maps, diagrams and photographs using primary and secondary data, clearly citing sources.

11. All surveys should pertain to the objective of the study. Surveys not relevant for establishing the relation between physical and cultural landscape should be avoided.

12. Marks division: 20 on report + 10 on viva-voce = 30

2.23 GEO-A-CC-5-12-TH – Remote Sensing, GIS and GNSS ✧ 30 Marks / 2 Credits

Unit I: Remote Sensing

1. Principles of Remote Sensing (RS): Types of RS satellites and sensors [5]
2. Sensor resolutions and their applications with reference to IRS and Landsat missions [5]
3. Image referencing schemes and acquisition procedure of free geospatial data from NRSC / Bhuvan and USGS [5]
4. Preparation of False Colour Composites from IRS LISS-3 and Landsat TM / OLI data. [5]
5. Principles of image interpretation. Preparation of inventories of landuse land cover (LULC) features from satellite images [5]
6. Acquisition and utilisation of free Digital Elevation Model data: CartoDEM, SRTM and ALOS [5]

Unit II: Geographical Information Systems and Global Navigation Satellite System

7. GIS data structures types: Spatial and non-spatial, raster and vector [5]
8. Principles of preparing attribute tables, data manipulation, and overlay analysis [6]
9. Principles and significance of buffer preparation [4]
10. Principles and significance of overlay analysis [5]

Unit III: Global Navigation Satellite System (GNSS)

11. Principles of GNSS positioning and waypoint collection [5]
12. Principles of transferring of GNSS waypoints to GIS. Area and length calculations from GNSS data [5]

References

BOOKS:

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.

Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEdu Publishing.

Brewer, C.A. 2015. Designing Better Maps: A Guide for GIS Users, 2nd ed, Esri Press.

Harvey, F. 2015. A Primer of GIS: Fundamental Geographic and Cartographic Concepts, 2nd ed, The Guilford Press.

Jensen, J.R., 2013. Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education India.

Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W. 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Indian Space Research Organisation. 2017. Effective Use of Space Technology.

Sarkar, A. 2015. Practical Geography: A Systematic Approach. 2nd ed, Orient Black Swan Private Ltd.

WEBSITES:

ALOS Global Digital Surface Model: www.eorc.jaxa.jp/ALOS/en/aw3d30/index.htm

International Society for Photogrammetry and Remote Sensing: www.isprs.org

ISRO Bhuvan 2D and 3D Platforms: bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php
bhuvan.nrsc.gov.in/globe/3d.php#

NASA Landsat Science: www.landsat.gsfc.nasa.gov

National Remote Sensing Centre: www.nrsc.gov.in

USGS Global Visualization Viewer: www.glovis.usgs.gov

2.24 GEO-A-CC-5-12-P – Remote Sensing, GIS and GNSS Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be represented as computer prints from Q-GIS / Garmin Basecamp / MS Excel software as applicable. Methods and interpretations are to be handwritten.

1. Image georeferencing and enhancement. Preparation of reflectance libraries of LULC features across different image bands of IRS L3 or Landsat OLI data [15]
2. Supervised image classification, class editing, and post-classification analysis [15]
3. Digitisation of features and administrative boundaries. Data attachment, overlay, and preparation of annotated thematic maps [20]
4. Waypoint collection from GNSS receivers and exporting to GIS database [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.

Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEdu Publishing.

Brewer, C.A. 2015. Designing Better Maps: A Guide for GIS Users, 2nd ed, Esri Press.

Chang, K-t. 2015. Introduction to Geographical Information System, McGraw-Hill Education.

Harvey, F. 2015. A Primer of GIS: Fundamental Geographic and Cartographic Concepts, 2nd ed, The Guilford Press.

Jensen, J.R., 2013. Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education India.

Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach. 2nd ed, Orient Black Swan Private Ltd.

WEBSITES:

Garmin: support.garmin.com/en-US/?productID=52801&tab=manuals

International Society for Photogrammetry and Remote Sensing: www.isprs.org

ISRO Bhuvan 2D and 3D Platforms: bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php
bhuvan.nrsc.gov.in/globe/3d.php#

NASA Landsat Science: www.landsat.gsfc.nasa.gov

National Remote Sensing Centre: www.nrsc.gov.in

Q-GIS: qgis.org/en/site/forusers/index.html

USGS Global Visualization Viewer: www.glovis.usgs.gov

2.25 GEO-A-CC-6-13-TH – Evolution of Geographical Thought ✧ 60 Marks / 4 Credits

Unit I: Nature of Pre Modern Geography

1. Development of pre-modern Geography: Contributions of Greek, Chinese, and Indian geographers [5]
2. Impact of 'Dark Age' in Geography and Arab contributions [5]
3. Geography during the age of 'Discovery' and 'Exploration' (contributions of Portuguese voyages, Columbus, Vasco da Gama, Magellan, Thomas Cook) [5]
4. Transition from cosmography to scientific Geography (contributions of Bernard Varenius and Immanuel Kant). Dualism and Dichotomies (General vs. Particular, Physical vs. Human, Regional vs. Systematic, Determinism vs. Possibilism, Ideographic vs. Nomothetic) [7]

Unit II: Foundations of Modern Geography and Recent Trends

5. Evolution of Geographical thoughts in Germany, France, Britain, and United States of America [5]
6. Contributions of Humboldt and Ritter [3]
7. Contributions of Richthofen, Hartshorne–Schaeffer, Ratzel, La Blaché [6]
8. Trends of geography in the post World War-II period: Quantitative revolution, systems approach [7]
9. Structuralism and historical materialism [3]
10. Changing concept of space with special reference to Harvey [5]
11. Evolution of Critical Geography: Behavioural, humanistic, and radical [5]
12. Towards post modernism: Geography in the 21st Century [5]

References

Adhikari, S. 2015. Fundamentals of Geographical Thought, Orient Blackswan.

Clifford, N. Holloway S.L., Rice, S.P., Valentine, G. 2009. Key Concepts in Geography, 2nd ed, Sage.

Couper, P. 2015. A Student's Introduction to Geographical Thought: Theories, Philosophies, Methodologies, Sage.

Cresswell, T. 2013. Geographic Thought: A Critical Introduction, Wiley-Blackwell.

Dikshit, R.D. 2004. Geographical Thought: A Contextual History of Ideas, Prentice Hall India.

Holt-Jensen, A. 2011. Geography: History and Concepts: A Student's Guide, Sage.

Husain, M. 2015. Evolution of Geographical Thought, 6th ed, Rawat Publications.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Pete, P. 1998. Modern Geographical Thought, Wiley-Blackwell.

2.26 GEO-A-CC-6-13-P – Evolution of Geographical Thought Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of topics 1 and 2, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Changing perception of maps of the world (Ptolemy, Ibn Batuta, Mercator)
2. Mapping voyages; Columbus, Vasco da Gama, Magellan, Thomas Cook
3. Group Presentation of five to ten students on any selected school of geographical thought (20 marks)
4. Viva-voce based on laboratory notebook on topics 1 and 2 (10 Marks)

References

Black, J. 2003. Visions of the World: A History of Maps, Mitchell Beazley.

Couper, P. 2015. A Student's Introduction to Geographical Thought: Theories, Philosophies, Methodologies, Sage.

Holt-Jensen, A. 2011. Geography: History and Concepts: A Student's Guide, Sage.

Whitfield, P. 2017. Charting the Oceans, British Library.

2.27 GEO-A-CC-6-14-TH – Hazard Management ✧ 60 Marks / 4 Credits

Unit I: Concepts

1. Classification of hazards and disasters. Hazard continuum [4]
2. Approaches to hazard study: Risk perception and vulnerability assessment. Hazard paradigms [6]
3. Responses to hazards: Preparedness, trauma, and aftermath. Resilience, capacity building [5]
4. Hazards mapping: Data and geospatial techniques (for hazards enlisted in Unit II and GEO-A-CC-6-14-P) [5]

Unit II: Hazard-specific Study with Focus on West Bengal and India

5. Earthquake: Factors, vulnerability, consequences, and management [5]
6. Landslide: Factors, vulnerability, consequences, and management [5]
7. Land subsidence: Factors, vulnerability, consequences, and management [5]
8. Tropical cyclone: Factors, vulnerability, consequences, and management [5]
9. Flood: Factors, vulnerability, consequences, and management [5]
10. Riverbank erosion: Factors, vulnerability, consequences, and management [5]
11. Fire: Factors, vulnerability, consequences, and management [5]
12. Biohazard: Classification, vulnerability, consequences, and management [5]

References

BOOKS:

Coenraads, R. (Ed.) 2006. Natural Disasters and How We Cope, Millennium House.

Coch, N.K. 1994. Geohazards: Natural and Human, Pearson College.

Cutter, S.L. 2006. Hazards Vulnerability and Environmental Justice, Routledge

Government of India. 1997. Vulnerability Atlas of India, Revised ed, Building Materials & Technology Promotion Council, Ministry of Urban Development.

Gupta, H.K. 2013. Disaster Management, University Press.

Hyndman,D., Hyndman, D. 2016. Natural Hazards and Disasters, 5th ed, Brooks Cole.

Kapur, A. 2010. Vulnerable India: A Geographical Study of Disasters, Sage.

Keller. E.A., DeVecchio, D.E. 2014. Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, 4th ed, Routledge.

Pine, J.C. 2014. Hazards Analysis: Reducing the Impact of Disasters, 2nd ed, CRC Press.

Robbins, P., Hintz, J., Moore, S.A. 2014. Environment and Society: A Critical Introduction 2nd ed, Wiley.

Smith, K. 2013. Environmental Hazards: Assessing Risk and Reducing Disaster, 6th ed, Routledge.

WEBSITES:

AGU landslide Blog: blogs.agu.org/landslideblog

Dartmouth Flood Observatory: floodobservatory.colorado.edu

Disaster News Network: secure.disasternews.net

India Meteorological Department Cyclone Page: www.rsmcnewdelhi.imd.gov.in/index.php?lang=en

USGS Earthquake Hazards Programme: www.earthquake.usgs.gov

2.28 GEO-A-CC-6-14-P – Hazard Management Lab ✧ 30 Marks / 2 Credits

A Group Project Report is to be prepared and submitted based on any one case study among the following hazards from West Bengal, incorporating a preparedness plan, preferably in the vicinity of the candidates' institution / district:

1. Earthquake
2. Landslide
3. Land subsidence
4. Thunderstorm
5. Flood
6. Riverbank / Coastal erosion
7. Fire
8. Industrial accident
9. Road / Railway accident
10. Structural collapse
11. Environmental pollution
12. Biohazard

One case study will be done by a group of five to ten students. Different groups may choose different case studies from any one or different types of disasters. The report should be prepared on secondary data and handwritten on A4 page in candidates' own words not exceeding 2,000 words excluding references. The report should contain a proper title. The report should incorporate relevant tables, maps, diagrams, and references, not exceeding ten pages. Photographs are optional and should not exceed three. A copy of the stapled / spiral-bound report in a transparent cover, duly signed by the concerned teacher, is to be submitted during examination. Without the report the candidates will not be evaluated for GEO-A-CC-6-14-P.

Marks division: 20 on report + 10 on viva-voce = 30

3. Honours Course: Discipline Specific Electives

3.1 GEO-A-DSE-A-5-01-TH – Fluvial Geomorphology ✧ 60 Marks / 4 Credits

1. Scope and components of Fluvial Geomorphology. Rivers as hydro-systems. Geographers' approach to study of rivers [3]
2. Processes and significance of sediment entrainment. The Hjulström curve [5]
3. Models of channel initiation and network development [5]
4. Linear, areal and altitudinal properties of drainage basin. Horton's stream laws. [5]
5. Fundamentals of Rosgen stream classification system [5]
6. Fluvial morphodynamics: Adjustment of channel forms to tectonic, climatic, sea level and land use changes [6]
7. Large rivers of the tropics: Characteristics and significance [5]
8. Fluvial landforms: Terraces, alluvial fans, badlands and accretion topography [5]
9. Riverbank erosion and river degeneration: Processes, management, and impact on land use [5]
10. Human intervention on fluvial systems : Types and consequences [8]
11. Concept and significance of ecological flow [3]
12. Integrated watershed management: Principles and significance [5]

References

Bridges, E. M., 1990. World Geomorphology, Cambridge University Press.

Charlton, R. 2016. Fundamentals of Fluvial Geomorphology, 2nd ed, Routledge.

Chorley, R., Schumm, S. and Sugden, D.E. 1994. Geomorphology, Methuen.

Chorley, R.J. and Kennedy, B.A. 1971. Physical Geography: A Systems Approach, Prentice Hall.

Goudie, A.S. (Ed) 2004. Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.

Gupta, A. (Ed) 2008. Large Rivers, Wiley.

Gupta, A. 2011. Tropical Geomorphology, Cambridge University Press.

Huggett, R.J. 2011. Fundamentals of Geomorphology, Routledge.

Kale V.S., Gupta A. 2001. Introduction to Geomorphology, Orient Longman.

Knighton, D. 1998. Fluvial Forms and Processes: A New Perspective, Arnold.

Morisawa, M. 1985. Rivers, Longman.

Petts, G.E., Amoros, C (Eds). 1996. Fluvial Hydrosystems, Chapman and Hall.

Rosgen, D.L. 1994. A classification of natural rivers, Catena, 22:169-199.

Selby, M.J. 1985. Earth's Changing Surface, Oxford University Press.

Sen, P.K. 1989. Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.

Summerfield, M.J., 2003. Global Geomorphology: An Introduction to the Study of landforms, Longman.

3.2 GEO-A-DSE-A-5-01-P – Fluvial Geomorphology Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Identification of drainage patterns and construction of channel profiles from Survey of India 1:50k topographical maps. Computation of sinuosity indices from river planforms [20]
2. Riverbank erosion: Quantification of eroded area and vulnerability zonation using multi-dated maps and images [20]
3. Flood frequency analysis from hydrographs [5]
4. Analyses of pebbles: Sphericity and roundness indices [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Publishers.

Gardiner, V., Dacombe, R.V. 1982. Geomorphological Field Manual, George Allen & Unwin

Lindholm, R. 1987. A Practical Approach to Sedimentology, Allen & Unwin.

Morisawa, M. 1985. Rivers, Longman.

Mukolwe, M.M. 2016. Flood Hazard Mapping: Uncertainty and its Value in the Decision-making Process, CRC Press.

Sen, P.K. 1989. Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.

WEBSITES:

Central Water Commission: cwc.gov.in

Dartmouth Flood Observatory: floodobservatory.colorado.edu

3.3 GEO-A-DSE-A-5-02-TH – Climate Change: Vulnerability and Adaptations ✧ 60 Marks

1. The science of climate change: Origin, scope and trends [5]
2. Climate change with reference to the geological time scale [6]
3. Evidences and factors of climate change: The nature–man dichotomy [4]
4. Greenhouse gases and global warming [5]
5. Electromagnetic spectrum, atmospheric window, heat balance of the earth [5]
6. Global climatic assessment: IPCC reports [5]
7. Climate change and vulnerability: Physical; economic and social [5]
8. Impact of climate change: Agriculture and water; flora and fauna; human health and morbidity [5]
9. Global initiatives to climate change mitigation: Kyoto Protocol, carbon trading, clean development mechanism, COP, climate fund [5]
10. Climate change vulnerability assessment and adaptive strategies with particular reference to South Asia [5]
11. National Action Plan on climate change [5]
12. Role of urban local bodies, panchayats, and educational institutions on climate change mitigation: Awareness and action programmes [5]

References

BOOKS:

Parry, M., Canziani, O., Palutikof, J., Linden, P., Hanson, C. (Eds) 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability-Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press.

Field, C.B., Barros V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, D.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R., White, L.L. (Eds) 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects-Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press.

Field, C.B., Barros V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, D.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R., White, L.L. (Eds) 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects-Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press.

Organisation for Economic Co-operation and Development (OECD) 2008. Climate Change Mitigation: What Do we do? Organisation and Economic Co-operation and Development.

United Nations Environmental Programme (UNEP) 2007. Global Environment Outlook: GEO4: Environment for Development, United Nations.

Singh, M., Singh, R.B., Hassan, M.I. (Eds) 2014. Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Vol-1, Springer.

Sen Roy, S., Singh, R.B. 2002. Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH.

WEBSITES:

Intergovernmental Panel on Climate Change: www.ipcc.ch

Ministry of Environment, Forest and Climate Change: envfor.nic.in

World Bank Climate Change Knowledge Portal: sdwebx.worldbank.org/climateportal/index.cfm

3.4 GEO-A-DSE-A-5-02-P – Climate Change: Vulnerability and Adaptations Lab ✧ 30 Marks

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Analysis of trends of temperatures (maximum and minimum of about three decades) of any India Meteorological Department (IMD) station [10]
2. Comparative analysis of seasonal variability of rainfall on the basis of monthly data of any two IMD stations [15]
3. Annual rainfall variability of about three decades for any two representative climatic regions of India [15]
4. Preparation of an inventory of extreme climatic events and mitigation measure of any climatic region / country of South Asia for a period of one decade on the basis of secondary information [20]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Attri, S.D., Tyagi, A. 2010. Climate Profile of India. Met Monograph No. Environment Meteorology 01/ 2010, India Meteorological Department, Govt. of India. Available at: www.indiaenvironmentportal.org.in/files/climate_profile.pdf

Rathore, L.S., Attri, S.D., Jaswal, A. K. 2013. State Level Climate Change Trends In India. Meteorological Monograph No. ESSO/IMD/EMRC/02/2013. India Meteorological Department, Govt. of India. Available at: http://www.imd.gov.in/section/climate/StateLevelClimateChangeMonoFinal.pdf

Overseas Development Institute and Climate & Development Knowledge Network. 2014. The IPCC's Fifth Assessment Report: What's in it for South Asia? Available at: https://cdkn.org/wp-content/uploads/2014/04/IPCC_AR5_CDKN_Whats_in_it_for_South_Asia_FULL.pdf

WEBSITES:

India Meteorological Department: www.imd.gov.in/Welcome%20To%20IMD/Welcome.php

World Bank Climate Change Knowledge Portal: sdwebx.worldbank.org/climateportal/index.cfm

3.5 GEO-A-DSE-A-6-03-TH – Environmental Issues in Geography ✧ 60 Marks / 4 Credits

1. Geographers' approach to environmental studies [5]
2. Concept of holistic environment and systems approach [5]
3. Ecosystems and their relation with habitats. Habitat loss in West Bengal [5]
4. Wetland ecosystem with special reference to East Kolkata Wetlands [5]
5. Rural environmental issues: Special reference to sanitation and public health [6]
6. Urban environmental issues with special reference to waste management [4]
7. Environmental policies – Club of Rome, earth summits (special reference to Stockholm, Rio, Johannesburg) [5]
8. Global initiatives for environmental management (special reference to Montreal, Kyoto, Paris) [5]
9. Environmental Impact Assessment and Environmental Management Planning [5]
10. Overview of principal environment-related regulations of India. Review of their achievements [5]
11. Principles of wasteland management with examples from West Bengal [5]
12. Principles of forest management with examples from West Bengal [5]

References

BOOKS:

Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Publishers.

Chandna, R.C. 2002. Environmental Geography, Kalyani Press.

Chapman, J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.

Cunninghum, W.P., Cunninghum, M.A. 2004. Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill.

Goudie, A. 2001. 2013. The Human Impact on the Natural Environment: Past, Present, and Future, 7th ed, Wiley-Blackwell.

Gilpin, A., 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press.

Miller, G.T. 2004. Environmental Science: Working with the Earth, Thomson Brooks.

Odum, E.P., Barrett, G.W. 2005. Fundamentals of Ecology, Ceneage Learning.

Raven, P.H., Hassenzahl, D.M., Hager, M.C., Gift, N.Y., Berg, L.R. 2015. Environment, 9th ed, Wiley.

Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.

Singh, S. 2013. Environmental Geography, Prayag Pustak Bhawan.

Withgott, J.H., Laposata, M. 2017. Environment: The Science behind the Stories, 6th ed, Pearson.

WEBSITES:

BBC – Science & Environment: www.bbc.com/news/science_and_environment

Central Pollution Control Board: www.wbpcb.gov.in

Centre for Science and Environment: www.cseindia.org

Ministry of Environment, Forest and Climate Change: www.envfor.nic.in

The Energy and Resources Institute: www.teriin.org

The World Bank – Environment: www.worldbank.org/en/topic/environment

United Nations Environment Programme: www.unenvironment.org

West Bengal Pollution Control Board: www. cpcb.nic.in

3.6 GEO-A-DSE-A-6-03-P – Environmental Issues in Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Preparation of questionnaire for perception survey on environmental problems [15]
2. Preparation of check-list for Environmental Impact Assessment for urban / industrial development projects [15]
3. Quality assessment of soil using field kit: Organic matter and NPK [15]
4. Interpretation of changes in air quality using multi-seasonal and multi-city or multi locational (within a single city) CPCB / WBPCB data [15]
5. Laboratory notebook and viva voce (10 marks)

References

BOOKS:

Clifford, N., Cope, M., Gillespie, T.W., French, S. (Eds) 2016. Key Methods in Geography, 3rd ed, Sage.

Gilpin, A., 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press.

Northey, N., Draper, D., Knight, D.B. 2015. Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing, 6th ed, Oxford University Press.

WEBSITES:

Central Pollution Control Board: www.wbpcb.gov.in

West Bengal Pollution Control Board: www. cpcb.nic.in

3.7 GEO-A-DSE-A-6-04-TH – Resource Geography ✧ 60 Marks / 4 Credits

Unit I: Resource and Development

1. Natural resources: Concept and classification [4]
2. Approaches to resource utilization: Utilitarian, conservational, community based adaptive [6]
3. Significance of resources: Backbone of economic growth and development [5]
4. Pressure on resources. Appraisal and conservation of natural resources [5]
5. Problems of resource depletion: global scenario (forest, water, fossil fuels) [7]
6. Sustainable resource development [3]

Unit II: Resource Conflict and Management

7. Distribution, utilisation, problems and management of metallic mineral resources: Iron ore, bauxite, copper [6]
8. Distribution, utilisation, problems and management of non-metallic mineral resources: Limestone, mica, gypsum [6]
9. Distribution, utilisation, problems and management of energy resources: Conventional and non-conventional [6]
10. Contemporary energy crisis and future scenario [4]
11. Politics of power resources [3]
12. Limits to growth and sustainable use of resources. Concept of resource sharing [5]

References

Chiras, D.D., Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future, 10th ed, Pearson.

Cutter, S.N., Renwich, H.L., Renwick, W. 1991. Exploitation, Conservation, and Preservation: A Geographical Perspective on Natural Resources Use, John Wiley and Sons.

Gadgil, M., Guha, R. 2005. The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity, Oxford University Press.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Holechek, J.L.C., Richard, A., Fisher, J.T., Valdez, R. 2003. Natural Resources: Ecology, Economics and Policy, Prentice Hall.

Jones, G., Hollier, G. 1997. Resources, Society and Environmental Management, Paul Chapman.

Klee, G. 1991. Conservation of Natural Resources, Prentice Hall.

Mather, A.S., Chapman, K. 1995. Environmental Resources, John Wiley and Sons.

Mitchell, B. 1997. Resource and Environmental Management, Longman Harlow.

Owen, S., Owen, P.L. 1991. Environment, Resources and Conservation, Cambridge University Press.

Rees, J. 1990. Natural Resources: Allocation, Economics and Policy, Routledge.

3.8 GEO-A-DSE-A-6-04-P – Resource Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Mapping and area estimate of changes in forest or vegetation cover from maps and/or satellite images [15]
2. Mapping and number estimate of changes in water bodies from maps and/or satellite images [15]
3. Decadal changes in state-wise production of coal and iron ore [15]
4. Computing Human Development Index: Comparative decadal change of top five Indian states [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Books:

Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.

Datta, R., Sundharam, K.P.M. 2015. Indian Economy, Chand.

Fukuda-Parr, S., Kumar, S.A.K. 2005. Readings in Human Development, Oxford University Press.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Websites:

Open Government of India Data Platform: data.gov.in

Wikipedia (hierarchy of states):
en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_GDP_per_capita

3.9 GEO-A-DSE-B-5-05-TH – Cultural and Settlement Geography ✧ 60 Marks / 4 Credits

Unit I: Cultural Geography

1. Definition, scope and content of cultural geography [5]
2. Development of cultural geography in relation to allied disciplines [5]
3. Cultural hearth and realm, cultural diffusion, diffusion of major world religions and languages [6]
4. Cultural segregation and cultural diversity, culture, technology and development. [5]
5. Races and racial groups of the world [5]
6. Cultural regions of India [4]

Unit II: Settlement Geography

7. Rural settlement: Definition, nature and characteristics [3]
8. Rural settlement: Site, situation, and morphology [5]
9. Rural house types with reference to India, social segregation in rural areas. Census of India categories of rural settlements [7]
10. Urban settlement: Census of India definition and categories [3]
11. Urban morphology: Models of Burgess, Hoyt, Harris, and Ullman. [7]
12. City-region and conurbation. Functional classification of cities: Schemes of Harris, Nelson, and McKenzie [5]

References

Banerjee Guha, S. (Ed.) 2004. Space, Society and Geography, Rawat Publication.

Bjelland, M.D., Montello, D.R., Fellmann, J.D., Getis, A., Getis, J. 2000. Human Geography: Landscape of Human Activity, McGraw Hill.

Carter, H. 1995. The Study of Urban Geography, 4th ed, Arnold.

Dhanagare, D.N. 2004. Themes and Perspectives in Indian Sociology, Rawat Publication.

Fern, R.L. 2002. Nature, God and Humanity, Cambridge University Press.

Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley

Ghosh, S. 1998. Introduction to Settlement Geography, Sangam Books Ltd.

Gottdiener, M., Budd, M. Lehtovuori, P. 2016. Key Concepts in Urban Studies, 2nd ed, Sage.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Hudson, F.S. 1970. Geography of Settlements, Macdonald and Evans Ltd.

Hussain, M. 2007. Models in Geography, Rawat Publication.

Jordan,T., Rowntree, L. 1990. Human Mosaic, Harper Collins Publishers.

Knox, P., Pinch, S. 2000. Urban Social Geography, Pearson Education.

Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company.

Mitchell, D. 2000. Cultural Geography: A Critical Introduction, Blackwell.

Singh, R.Y. 2000. Geography of Settlements, Rawat Publication.

3.10 GEO-A-DSE-B-5-05-P – Cultural and Settlement Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Mapping language distribution of India [10]
2. CD block-wise housing distribution in any district of West Bengal using proportional square [20]
3. Identification of rural settlement types from Survey of India 1:50k topographical maps [15]
4. Social area analysis of a city (Shevky & Bell) [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

Pacione, M. 2012. Population Geography: Progress and Prospect, Routledge.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

3.11 GEO-A-DSE-B-5-06-TH– Social Geography ✧ 60 Marks / 4 Credits

Unit I: Society, Identity and Crisis

1. Social Geography: Concept, origin, nature, and scope [4]
2. Concept of space, Social differentiation, and stratification. Social processes [5]
3. Social categories: Caste, class, religion, race, gender, and their spatial distribution [6]
4. Basis of social region formation; Evolution of social-cultural regions of India [4]
5. Peopling process of India: Technology and occupational change. Migration [6]
6. Social groups, social behaviour and contemporary social environmental issues with special reference to India [5]

Unit II: Social Wellbeing and Planning

7. Concepts of social well-being, quality of life. Gender and social well-being [6]
8. Measures of social well-being: Healthcare, education, housing, gender disparity [7]
9. Social geographies of inclusion and exclusion, slums, gated communities, communal conflicts, and crime [6]
10. Social planning during the five-year plans in India [3]
11. Social policies in India: Education and health [4]
12. Social Impact Assessment: Concept and importance [4]

References

Ahmed A., 1999. Social Geography, Rawat Publications.

Casino, V. J. D., Jr., 2009. Social Geography: A Critical Introduction, Wiley Blackwell.

Cater, J., Jones T., 2000: Social Geography: An Introduction to Contemporary Issues, Hodder Arnold.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Holt, L., 2011. Geographies of Children, Youth and Families: An International Perspective, Taylor & Francis.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

Mukherji, S. 2013. Migration in India: Links to Urbanization, Regional Disparities and Development Policies, Rawat Publications

Panelli, R., 2004. Social Geographies: From Difference to Action, Sage.

Rachel, P., Burke, M., Fuller, D., Gough, J., Macfarlane, R., Mowl, G. 2001. Introducing Social Geographies, Oxford University Press.

Smith, D. M., 1994. Geography and Social Justice, Blackwell, Oxford.

Smith, S.J., Pain, R., Marston, S. A., Jones, J. P., 2009. The SAGE Handbook of Social Geographies, Sage Publications.

Valentine, G. 2014. Social Geographies: Space and Society, Routledge.

3.12 GEO-A-DSE-B-5-06-P – Social Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Preparation of spatial distribution maps of India: Gender, caste, and religion [15]
2. Preparation of spatial distribution map of West Bengal: Healthcare indices and institutions [15]
3. Analysis of migration data: (a) rural to urban and (b) urban to urban migration. [15]
4. Preparation for Social Impact Assessment (checklist of indices only) [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

Mishra, D.K. (eds). 2016., Internal Migration in Contemporary India, Sage Publication, New Delhi

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

WEBSITE:

West Bengal Directorate of Health Services (Data on Health): https://www.wbhealth.gov.in/other_files/Health%20on%20the%20March,%202015-2016.pdf

3.13 GEO-A-DSE-B-6-07-TH – Urban Geography ✧ 60 Marks / 4 Credits

Unit I: Urban Settlements – Origin and Evolution

1. Urban Geography: Nature and scope, different approaches and recent trends in urban geography [5]
2. Origin of urban places in ancient, medieval, modern and post-modern periods: Factors, stages, and characteristics [7]
3. Theories of urban evolution and growth: Hydraulic theory and economic theory [3]
4. Aspects of urban places: Location, site, and situation. Size and spacing of cities: Rank size rule, law of primate city [5]
5. Urban hierarchies: Central place theory. August Lösch's theory of market centres [5]
6. Patterns of urbanisation in developed and developing countries [5]

Unit II: Urban Places – Changing Scenario

7. Ecological processes of urban growth, Urban fringe. City-region [5]
8. Models on urban structure: Political economy, bid-rent curve, social area analysis [5]
9. Urban issues: Problems of housing, slums, civic amenities (water and transport) [7]
10. Patterns and trends of urbanisation in India [3]
11. Policies on urbanisation. Urban change in post-liberalised period in India [5]
12. Case studies of Delhi, Kolkata, and Chandigarh with reference to land use [5]

References

Carter, H. 1995. The Study of Urban Geography, 4th ed, Arnold.

Giuliano, G., Hanson, S. (Eds) 2017. The Geography of Urban Transportation, 4th ed, Guilford Press.

Gottdiener, M., Budd, M. Lehtovuori, P. 2016. Key Concepts in Urban Studies, 2nd ed, Sage.

Jonas, A.E.G., McCann, E., Thomas, M. 2015. Urban Geography: A Critical Introduction, Wiley-Blackwell.

Kaplan, D., Holloway,S. 2014. Urban Geography, 3rd ed, Wiley.

Knox, P.L., McCarthy, L.M. 2011. Urbanization: An Introduction to Urban Geography, 3rd ed, Pearson.

Latham, A., McCormack, D., McNamara, K. McNeill, D. 2009.Key Concepts in Urban Geography, Sage.

LeGates, R.T., Stout, F. (Eds) 2015 The City Reader, 6th ed, Routledge.

Levy, J.M. 2016. Contemporary Urban Planning, 11th ed, Routledge.

Macionis, J.J.,Parrillo, V.N. 2016. Cities and Urban Life, 7th ed, Pearson.

Mandal, R.B. 2008. Urban Geography: A Text Book, Concept Publishing Company.

Pacione, M. 2009. Urban Geography: A Global Perspective, Routledge.

Potter, R.B., Lloyd-Evans, S. 2014. The City in the Developing World, Routledge.

Ramachandran, R. 1989. Urbanisation and Urban Systems in India, Oxford University Press.

Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press

Singh, R.B. (Ed.) (2015) Urban development, challenges, risks and resilience in Asian megacities. Advances in Geographical and Environmental Studies, Springer

3.14 GEO-A-DSE-B-6-07-P – Urban Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Hierarchy of urban settlements: Rank-size rule [15]
2. State-wise variation and trends of urbanisation [15]
3. Temporal analysis of urban growth using Census of India data [15]
4. Preparation of urban land use land cover map from satellite images [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Books:

Kaplan, D., Holloway,S. 2014. Urban Geography, 3rd ed, Wiley.

Latham, A., McCormack, D., McNamara, K. McNeill, D. 2009.Key Concepts in Urban Geography, Sage.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publication

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

WEBSITES:

Census of India: censusindia.gov.in

censusindia.gov.in/2011census/dchb/WBA.html

Planning Commission (West Bengal Development Report 2010):

planningcommission.nic.in/plans/stateplan/sdr/sdr_wb1909.pdf

3.15 GEO-A-DSE-B-6-08-TH – Geography of India ✧ 60 Marks / 4 Credits

Unit I: Geography of India

1. Physiographic divisions with reference to tectonic provinces [5]
2. Climate, soil and vegetation: Classification and interrelation [6]
3. Population: Distribution, growth, structure, and policy [4]
4. Tribes of India with special reference to Gaddi, Toda, Santal, and Jarwa [5]
5. Agricultural regions. Green revolution and its consequences [4]
6. Mineral and power resources: Distribution and utilisation of iron ore, coal, petroleum, and natural gas [6]
7. Industrial development: Automobile and information technology [3]
8. Regionalisation of India: Physiographic (R.L. Singh) and economic (P. Sengupta) [7]

Unit II: Geography of West Bengal

9. Physical perspectives: Physiographic divisions, forest and water resources [6]
10. Resources: Agriculture, mining,, and industry [6]
11. Population: Growth, distribution, and human development [4]
12. Regional issues: Darjeeling Hills and Sundarban [4]

References

BOOKS

Bandyopadhyay, S., Kar, N.S., Das, S., Sen, J. 2014. River system and water resources of West Bengal: A Review. In: Vaidyanadhan, R. (Ed) Rejuvenation of Surface Water Resources of India: Potential, Problems and Prospects, Geological Society of India Special Publication.

Dhara, M.K., Basu, S.K., Bandyopadhyay, R.K., Roy, B., Pal, A.K. (Eds.) 1999. Geology and Mineral Resources of the States of India, Part-1: West Bengal. Geological Survey of India Miscellaneous Publication.

Ghurey, G.S. 1963. The Scheduled Tribes of India, 1980 reprint, Transaction Books.

Johnson, B.L.C. (Ed) 2001. Geographical Dictionary of India, Vision Books.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers

Mandal, H., Mukherjee, S., Datta, A. 2002. India: An Illustrated Atlas of Tribal World, Anthropological Survey of India.

Pathak, C.R. 2003. Spatial Structure and Processes of Development in India, Regional Science Association-Kolkata.

Sharma, T.C. 2012. Economic Geography of India, Rawat Publications.

Singh, J. 2003. India-A Comprehensive & Systematic Geography, Gyanodaya Prakashan.

Singh, R.L. 1971. India: A Regional Geography, National Geographical Society of India.

Spate, O.H.K., Learmonth, A.T.A. 1967. India and Pakistan: A General and Regional Geography, Methuen.

Tiwari, R.C. 2007. Geography of India, Prayag Pustak Bhawan.

Valdiya, K.S. 2010. The Making of India: Geodynamic Evolution, Macmillan Pubishers India Ltd.

WEBSITES

Geological Survey of India: gsi.gov.in

National Bureau of Soil Survey and Land Use Planning: nbsslup.in

Indian Council of Agricultural Research: icar.org.in

Census of India: censusindia.gov.in

censusindia.gov.in/2011census/dchb/WBA.html

3.16 GEO-A-DSE-B-6-08-P –Geography of India Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Monthly temperature and rainfall graphs of five select stations from different physiographic regions of India [15]
2. Crop combination: Comparison of any two contrasting districts from West Bengal [15]
3. Annual trends of production: Mineral resources and manufacturing goods over two decades [20]
4. Composite Index: Comparison of developed and backward states of India [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Datt, R. and Sundharam, K.P.M. 2015. Indian Economy, 50th ed, S. Chand.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers.

Government of West Bengal: District Statistical Handbooks (e.g. bardhaman.nic.in/dshb05.pdf)

WEBSITES:

India Meteorological Department: www.imd.gov.in

ISRO Bhuvan 2D Platforms: bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php

Open Government of India Data Platform: data.gov.in

Planning Commission (West Bengal Development Report 2010):
planningcommission.nic.in/plans/stateplan/sdr/sdr_wb1909.pdf

Trending Economics (India's industrial production):
tradingeconomics.com/india/industrial-production

UNDP Human Development Report on India (2016):
hdr.undp.org/en/countries/profiles/IND
hdr.undp.org/sites/all/themes/hdr_theme/country-notes/IND.pdf

Wikipedia (hierarchy of states):
en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_GDP_per_capita

4. Honours Course: Skill Enhancement Electives

4.1 GEO-A-SEC-A-3-01-TH – Coastal Management ✧ 90 Marks / 2 Credits

1. Components of a coastal zone. Coastal morphodynamic variables and their role in evolution of coastal forms [7]
2. Environmental impacts and management of mining, oil exploration, salt manufacturing, land reclamation and tourism [8]
3. Coastal hazards and their management using structural and non-structural measures: Erosion, flood, sand encroachment, dune degeneration, estuarine sedimentation and pollution [8]
4. Principles of Coastal Zone Management. Exclusive Economic Zone and Coastal Regulation Zones with reference to India. [7]

References

Books:

Beatley, T., Brower, D., Schwab, A.K. 2002. An Introduction to Coastal Zone Management, 2nd ed, Island Press.

Berkes, F. 2015. Coasts for People: Interdisciplinary Approaches to Coastal and Marine Resource Management, Routledge.

Carter, R.W.G. 1988. Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press.

Clark, J.R. 1996. Coastal Zone Management Handbook, CRC Press / Lewes Publishers.

Clark, J.R. 1998. Coastal Seas: The Conservation Challenge, Blackwell Science.

French, P. 1997. Coastal and Estuarine Management, Routledge.

Kay, R. and Alder, J. 1999. Coastal Planning and Management, E & FN Spon / Routledge.

Pethick, J. 1984. An Introduction to Coastal Geomorphology, Arnold.

Woodrofe, C.D. 2002. Coasts : Form, Process and Evolution. Cambridge University Press.

Website:

Govt. of India CRZ notification:

www.moef.nic.in/downloads/public-information/CRZ-Notification-2011.pdf

4.2 GEO-A-SEC-A-3-02-TH – Tourism Management ✧ 90 Marks / 2 Credits

1. Scope and Nature: Concepts and issues, tourism, recreation and leisure inter-relations; Factors influencing tourism, Types of Tourism: Ecotourism, cultural tourism, adventure tourism, medical tourism, pilgrimage, international, national [10]
2. Use of information on factors (historical, natural, socio-cultural and economic; motivating factors for pilgrimages) to plan destination marketing; tourism products. Niche tourism planning [5]
3. Tourism impact assessment, Sustainable tourism, Information Technology and Tourism, Tour operations planning and guiding [8]
4. Increasing Global tourism; Tourism in India: Tourism infrastructure, access, planning for different budgets for case study sites of Western Himalayas, Goa, Chilka/Vembanad, Jaipur [7]

References

Boniface, B., Cooper, R., Cooper, C. 2016. Worldwide Destinations: The Geography of Travel and Tourism, vol. 1, 7th ed, Routledge.

Edgell, D.L., Swanson, J. 2013. Tourism Policy, and Planning: Yesterday, Today, and Tomorrow, Routledge.

Fennell, D.A.2014. Ecotourism, 4th ed, Routledge.

Hall, C.M., Lew, A.A. 2009. Understanding and Managing Tourism Impacts: An Integrated Approach, Routledge.

Hall, C.M., Page, S.J. 2014.The Geography of Tourism and Recreation: Environment, Place and Space 4th ed, Routledge.

Honey, M. 2008. Ecotourism and Sustainable Development, Second Edition: Who Owns Paradise? 2nd ed, Island Press.

Kale, V.S. (Ed) 2017. Geomorphosites of India, Indian Institute of Geomorphologists.

Lew, A., Hall, C.M., Timothy, D.J. 2008. World Geography of Travel and Tourism: A Regional Approach, Butterworth-Heinemann.

Mason, P. 2017. Geography of Tourism: Image, Impacts and Issues, Goodfellow Publishers.

Mowforth, M., Munt, I. 2015. Tourism and Sustainability: Development, globalisation and new tourism in the Third World, 4th ed, Routledge.

Var, T., Gunn, C. Tourism Planning: Basics, Concepts, Cases, 4th ed, Routledge.

Velvet, N. 2017. An Introduction to the Geography of Tourism, 2nd ed, Rowman & Littlefield Publishers.

Williams, S., Lew, A.A. 2014. Tourism Geography: Critical Understandings of Place, Space and Experience, 3rd ed, Routledge.

Wilson, J. 2017. The Routledge Handbook of Tourism Geographies, Routledge.

4.3 GEO-A-SEC-B-4-03-TH – Rural Development ✧ 90 Marks / 2 Credits

1. Rural Development: Concept, basic elements, measures of level of rural development [5]
2. Paradigms of rural development: Gandhian approach to rural development Lewis model of economic development, 'big push' theory of development, Myrdal's model of 'spread and backwash effects' [10]
3. Area based approach to rural development: Drought prone area programmes, PMGSY, SJSY, MNREGA, Jan Dhan Yojana [10]
4. Rural Governance: Panchayati Raj System and rural development policies and Programmes in India [5]

References

Gilg, A.W. 1985. An Introduction to Rural Geography, Edwin Arnold.

Krishnamurthy, J. 2000. Rural Development: Problems and Prospects, Rawat Publications.

Lee, D.A., Chaudhri, D.P. (Eds) 1983. Rural Development and State, Methuen Publishing.

Misra, R.P., Sundaram, K.V. (Eds) 1979. Rural Area Development: Perspectives and Approaches, Sterling Publishers.

Misra, R.P. (Ed.) 1985. Rural Development: Capitalist and Socialist Paths, Vol-1, Concept Publishing.

Ramachandran, H., Guimaraes, J.P.C. 1991. Integrated Rural Development in Asia: Leaning from Recent Experience, Concept Publishing.

Robb, P. (Ed.) 1983. Rural South Asia: Linkages, Change and Development, Curzon Press.

Singh, K., Shishodia, A. 2016. Rural Development: Principles, Policies, and Management, 4th ed, Sage.

Wanmali, S. 1992. Rural Infrastructure, the Settlement System and Development of the Regional Economy in Southern India, International Food Policy Research Institute.

Yugandhar, B.N., Mukherjee, N.(Eds) 1991. Studies in Village India: Issues in Rural Development, Concept Publishing.

4.4 GEO-A-SEC-B-4-04-TH – Sustainable Development ✧ 90 Marks / 2 Credits

1. Sustainable development: Concept, historical background, components, and limitations [5]
2. Challenges of sustainable development: Determinants, linkage among sustainable development, environment and poverty [10]
3. Determinants of global environmental issues: Population, income distribution, urbanisation, deforestation, and depletion / contamination water resources [9]
4. Global goals for sustainable development: Domain, conflict, crisis and compromise [6]

References

BOOKS:

Agyeman, J., Bullard, R.D., Evans, B. (Eds) 2003. Just Sustainabilities: Development in an Unequal World, the MIT Press.

Baker, S. 2006. Sustainable Development, Routledge.

Blewitt, J. 2017. Understanding Sustainable Development 3rd ed, Routledge.

Browne, S. 2017. Sustainable Development Goals and UN Goal-Setting, Routledge.

Elliott, J. 2012. An Introduction to Sustainable Development, 4th ed, Routledge.

Robbins, P. 2004. Political Ecology: A Critical Introduction, Blackwell Publishing.

Rogers, P., Jalal, K.F., Boyd, J.A. 2007. An Introduction to Sustainable Development, Routledge.

Sachs, J.D. 2015. The Age of Sustainable Development, Columbia University Press.

Williams, O.F. 2014. Sustainable Development, University of Notre Dame Press.

WEBSITE:

UNO Sustainable Development Knowledge Platform: sustainabledevelopment.un.org

5. General Course: Core Subjects

5.1 GEO-G-CC-1-01-TH – Physical Geography ✧ 60 Marks* / 4 Credits

Unit I: Geotectonics

1. Earth's interior with special reference to seismology [3]
2. Plate Tectonics as a unified theory of global tectonics. Formation of major relief features of the ocean floor and continents according to Plate Tectonics [7]
3. Folds and faults: Classification and surface expressions [6]

Unit II: Geomorphology

4. Degradational processes: Weathering, mass wasting, and resultant landforms [4]
5. Principal geomorphic agents. Classification and evolution of fluvial, coastal, aeolian, and glacial landforms [12]
6. Basic models of slope evolution: Decline, replacement, and retreat. Systems approach and its significance in geomorphology [6].

Unit III: Hydrology

7. Global hydrological cycle: Its physical and biological role [2]
8. Run off: Controlling factors. Concept of ecological flow [3]
9. Drainage basin as a hydrological unit. Principles of watershed management [3]

Unit IV: Oceanography

10. Physical and chemical properties of ocean water. Distribution and determinants of temperature and salinity [4]
11. Ocean circulation, wave, and tide [7]
12. Marine resources: Classification and sustainable utilisation [3]

References

Books:

Billings, M.P. 1971. Structural Geology, Pearson.

Goudie, A.S. (Ed) 2004. Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.

Gregory, K.J., Lewin, J. 2014. The Basics of Geomorphology: Key Concepts, Sage.

Harvey, A. 2012. Introducing Geomorphology: A Guide to Landforms and Processes, Dunedin Academic Press.

Kale, V.S., Gupta, A. 2001. Introduction to Geomorphology, Orient Longman.

Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India.

Monkhouse, F.J. 1974. Principles of Physical Geography (2009-reprint), Platinum Publishers.

Selby, M.J. 1986. Earth's Changing Surface, Oxford University Press.

* Excluding 10 marks for attendance

Strahler, A. 2016. Introducing Physical Geography, 6th ed, Wiley.

Summerfield, M.J. 2003. Global Geomorphology: An Introduction to the Study of landforms, Longman.

WEBSITES:

British Society for Geomorphology: geomorphology.org.uk

Geological Survey of India: www.gsi.gov.in

Indian Institute of Geomorphologists: www.indiageomorph.org

International Association of Geomorphologists: www.geomorph.org

Plaleomap Project: www.scotese.com & www.youtube.com/user/cscotese

'This Dynamic Earth' (USGS): pubs.usgs.gov/gip/dynamic/dynamic.html

5.2 GEO-G-CC-1-01-P – Physical Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Megascopic identification of *mineral samples*: Bauxite, calcite, chalcopyrite, feldspar, galena, hematite, mica, quartz, talc, tourmaline [8]
2. Megascopic identification of *rock samples*: Granite, basalt, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite [12]
3. Extraction of physiographic information from Survey of India 1:50k topographical maps of plateau region: Construction and interpretation of relief profiles (superimposed, projected and composite), Construction and interpretation of relative relief map (c. 5'×5') [20]
4. Extraction of drainage information from Survey of India topographical maps of plateau region: Extraction and interpretation of channel features and drainage patterns, Construction of channel profiles [20]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Farndon, J. 2012. The Illustrated Guide to Rocks & Minerals, Southwater.

Pillent, C. 2002. Smithsonian Handbooks: Rocks & Minerals, Dorling Kindersley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Sen, P.K. 1989. Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.

Sorrell, C.A. Rocks and Minerals: A Guide to Field Identification, St. Martin's Press.

5.3 GEO-G-CC-2-02-TH – Environmental Geography ✧ 60 Marks / 4 Credits

Unit I: Climatology

1. Insolation and Heat Budget. Horizontal and vertical distribution of atmospheric temperature and pressure [5]
2. Overview of planetary wind systems. Indian Monsoons: Mechanisms and controls [6]
3. Atmospheric disturbances: Tropical and temperate cyclones. Thunderstorms [7]
4. Overview of global climatic change: Greenhouse effect. Ozone depletion [5]
5. Scheme of world climatic classification by Köppen [2]

Unit II: Soil Geography

6. Factors of soil formation [4]
7. Soil profile development under different climatic conditions: Laterite, Podsol, and Chernozem [6]
8. Physical and chemical properties of soils: Texture, structure, pH, salinity, and NPK status [6]
9. USDA classification of soils. Soil erosion and its management [4]

Unit III: Biogeography

10. Ecosystem and Biomes. Distribution and characteristics of tropical rainforest; Savannah, and hot desert biomes [6]
11. Plant types, occurrence and ecological adaptations: Halophytes, xerophytes, hydrophytes, and mesophytes [5]
12. Biodiversity: Types, threats and management with special reference to India [4]

References

BOOKS:

Ahrens, C.D. 2012. Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning.

Barry, R.G, Chorley R.J. 2009. Atmosphere Weather and Climate. 9th Ed, Routledge.

Chapman J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.

Cox, B., Moore, P.D., Ladle, R. 2016. Biogeography: An Ecological and Evolutionary Approach, 9th ed, Wiley-Blackwell.

Daji, J.A., Kadam, J.R., Patil, N.D. 1996. A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.

Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGraw-Hill, New Delhi

Dey, N. K., Ghosh. P. 1993. India: A Study in Soil Geography, Sribhumi Publishing Company.

Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan.

Lutgens, F.K., Tarbuck, E.J., Tasa, D.G. 2015. The Atmosphere: An Introduction to Meteorology, 13th Ed, Pearson

MacDonald, G.2001. Biogeography: Introduction to Space, Time, and Life, Wiley

Morgan, R.P.C. 1995. Soil Erosion and Conservation, 2nd edition, Longman.

Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.

Singer, M., Munns, D.N. 2005. Soils: An Introduction, 6th ed, Pearson.

Weil, R.R. and Brady, N.C. 2016. The Nature and Properties of Soil, 15th edition, Pearson.

WEBSITES:

India Meteorological Department: www.imd.gov.in

Intergovernmental Panel on Climate Change: www.ipcc.ch

World Bank Climate Change Knowledge Portal: sdwebx.worldbank.org/climateportal/index.cfm

World Meteorological Organization: public.wmo.int/en

United Nations Environment Programmes: www.unep.org

5.4 GEO-G-CC-2-02-P – Environmental Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Interpretation of daily weather map of India (any one): Pre-Monsoon or Monsoon or Post-Monsoon [20]
2. Construction and interpretation of hythergraph, climograph (G. Taylor) and wind rose (seasonal) [20]
3. Determination of soil type by ternary diagram textural plotting [10]
4. Preparation of peoples' biodiversity register [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

USDA: United States Department of Agriculture. 2014. Soil Survey and Laboratory Methods Manual, Soil Survey Investigations Report No. 51.

5.5 GEO-G-CC-3-03-TH – Human Geography ✧ 60 Marks / 4 Credits

Unit I: Economic Geography

1. Sectors of the economy: Primary, Secondary, Tertiary and Quaternary. Factors affecting location of economic activities [5]
2. Location of economic activities: Theories of von Thünen, Lösch, and Weber [5]
3. Location of industries with special reference to India: Cotton, Iron and Steel [5]
4. Globalisation and integration of world economies [5]

Unit II: Social Geography

5. Human Society: Structure, functions, social systems. Population and migration: overview, causes and effects [5]
6. Types and characteristics of social organisations: Primitive, hunting–gathering, agrarian, industrial [5]
7. Race, Language and Religion: Origin, characteristics and spatial variations [6]
8. Social Issues: Diversity, conflict and transformation [5]

Unit III: Cultural Geography

1. Carl Sauer: cultural landscape and its elements [6]
2. Rural and urban settlements: Differentiation in cultural landscapes [5]
3. Cultural regions and cultural realms [5]
4. Diffusion of culture and innovations [4]

References:

Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.

Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.

Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.

Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley.

Ghosh, S. 1998. Introduction to Settlement Geography, Sangam Books Ltd.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Knox, P.L., Marston, S.A. 2014. Human Geography: Places and Regions in Global Context, 6th ed, Pearson Education Limited.

Knox, P.L., McCarthy, L.M. 2011. Urbanization: An Introduction to Urban Geography, 3rd ed, Pearson Educztuion Ltd.

Moseley, W.G., Perramond, E., Hapke, H.M., Laris, P. 2013. An Introduction to Human-Environment Geography: Local Dynamics and Global Processes, Wiley-Blackwell.

Norton, W. 2014. Human Geography, 8th ed, Oxford University Press.

Rubenstein, J.M. 2016. The Cultural Landscape: An Introduction to Human Geography, 12th ed, Pearson Education Limited.

Short, R.J. 2017. Human Geography: A Short Introduction, 2nd ed, Oxford University Press.

Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. Economic Geography, 3rd ed, Wiley.

Willington D. E., 2008: Economic Geography, Husband Press.

Wood, A., Roberts, A. 2010. Economic Geography: Places, Networks and Flows, Routledge.

5.6 GEO-G-CC-3-03-P– Human Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. State-wise variation in occupational structure by proportional divided circles [15]
2. Time series analysis of industrial production using any two manufactured goods from India [20]
3. Measuring arithmetic growth rate of population comparing two datasets [15]
4. Nearest neighbour analysis: Rural example from Survey of India 1:50k topographical maps [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Hassan, M.I. 2005. Population Geography, Rawat publications.

Knowles, R. and Wareing, J. 1990. Economic and Social Geography, Made Simple Books.

Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publication.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

WEBSITES:

Census of India: censusindia.gov.in

Open Government of India Data Platform: data.gov.in

Trending Economics (India's industrial production): tradingeconomics.com/india/industrial-production

5.7 GEO-G-CC-4-04-TH – Cartography ✧ 60 Marks / 4 Credits

Unit I: Scale and Projections

1. Maps: Classification and types. Scales: Types, significance, and applications [3]
2. Coordinate systems: Polar and rectangular. Bearing: Magnetic and true, whole-circle and reduced [3]
3. Map projections: Classification, properties and uses. Concept and significance of UTM projection [8]

Unit II: Topographic and Thematic Maps

4. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps [4]
5. Representation of data by dots and proportional circles [4]
6. Representation of data by isopleth and choropleth [4]
7. Principal national agencies producing thematic maps in India: GSI, NATMO, NBSSLUP, NHO, and NRSC. Acquaintance with Bhuvan platform [5]

Unit III: Remote Sensing and Geographical Information System

8. Basics of Remote Sensing: Types of satellites, sensors, bands, and resolutions with special reference to the ISRO missions [10]
9. Principles of preparing standard FCCs and classified raster images [5]
10. Principles of Geographical Information System: Concepts of vector types, attribute tables, buffers, and overlay analysis [6]

Unit IV: Surveying

11. Basic concepts of surveying and survey equipment: Prismatic compass [6]
12. Basic concepts of surveying and survey equipment: Dumpy level [6]

References

BOOKS:

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.

Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.

Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.

Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Vaidyanadhan, R., Subbarao, K.V. 2014. Landforms of India from Topomaps and Images, Geological Society of India.

WEBSITES:

Geological Survey of India: www.gsi.gov.in

Indian Naval Hydrographic Department: www.hydrobharat.nic.in

National Bureau of Soil Survey and Land Use planning: www.nbsslup.in

Survey of India: www.surveyofindia.gov.in

International Society for Photogrammetry and Remote Sensing: www.isprs.org

ISRO Bhuvan 2D Platform: bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php

NASA Landsat Science: www.landsat.gsfc.nasa.gov

National Remote Sensing Centre: www.nrsc.gov.in

USGS Global Visualization Viewer: www.glovis.usgs.gov

5.8 GEO-G-CC-4-04-P – Cartography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Graphical construction of scales: Plain and comparative [10]
2. Construction of projections: Simple Conic with one standard parallel, Cylindrical Equal Area,, and Polar Zenithal Stereographic [20]
3. Construction of thematic maps: Proportional squares, proportional circles, choropleths, and isopleths [20]
4. Preparation of annotated thematic overlays from satellite standard FCCs of 1:50k [10]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune Vidyarthi Griha Prakashan.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press

6. General Course: Discipline Specific Electives

6.1 GEO-G-DSE-A-5-01-TH – Regional Development ✧ 60 Marks / 4 Credits

1. Definition of region. Types and need of regional planning [3]
2. Choice of a region for planning; characteristics of an ideal planning region; delineation of planning region [7]
3. Regionalization of India for planning (agro-ecological zones) [5]
4. Strategies/models for regional planning: growth pole model of Perroux [6]
5. Growth centre model in Indian context. Concept of village cluster [4]
6. Problem regions and regional planning. Backward regions and regional plans: special area development plans in India. Damodar4 Valley Corporation: Success and failure [5]
7. Changing concept of development and underdevelopment; Efficiency-equity debate [5]
8. Indicators of development: Economic, demographic, and environmental. Concept of human development [5]
9. Regional development in India, regional inequality, disparity and diversity [5]
10. Development and regional disparities in India since Independence: Disparities in agricultural development [5]
11. Development and regional disparities in India since Independence: Disparities in industrial development [5]
12. Development and regional disparities in India since independence : Disparities in human resource development in terms of education and health [5]

References

Bhargava, G. 2001. Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.

Chand,M., Puri, V.K. 2000. Regional Planning In India, Allied Publishers Ltd.

Chandana, R.C. 2016. Regional Planning and Development, 6th ed, Kalyani Publishers.

Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

Gore, C. 2011. Regions in Question: Space, Development Theory, and Regional Policy, Routledge.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Hall, P., Tewdwr-Jones, M. 2010. Urban and Regional Planning, Routledge.

Higgins, B., Savoie, D.J. 2017. Regional Development: Theories and Their Application, Routledge.

Kulshetra, S.K. 2012. Urban and Regional Planning in India: A Handbook for Professional Practioners, Sage Publication.

Kumar, A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.

Misra, R.P. 1992. Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Publishing.

Rapley, J. 2007. Understanding Development: Theory and Practice in the Third World, Lynne Rienner.

Ray, J. 2001. Introduction to Development & Regional Planning, Orient Blackswan.

Raza, M. (Ed.) 1988. Regional Development: Contributions to Indian Geography, Heritage Publishers.

Sen, A. 2000. Development as Freedom, Random House.

6.2 GEO-G-DSE-A-5-01-P – Regional Development Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Delineation of regions according to given criteria using Weaver's method [15]
2. Determination of sphere of influence by gravity model [15]
3. Measurement of inequality by Lorenz curve and location quotient [15]
4. Preparation of Z-score and composite index from suitable data [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publication.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Pal S. K., 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

6.3 GEO-G-DSE-A-5-02-TH – Geography of Tourism ✧ 60 Marks / 4 Credits

1. Scope and Nature: Concepts and issues, tourism, recreation and leisure inter-relations; geographical parameters of tourism by Robinson [6]
2. Types of Tourism: Ecotourism, cultural tourism, adventure tourism, medical tourism, pilgrimage, international, national [6]
3. Factors influencing tourism: Historical, natural, socio-cultural and economic; motivating factors for pilgrimages [5]
4. Spatial pattern of tourism: Spatial affinity; areal and locational dimensions comprising physical, cultural, historical and economic; International travel destinations- cultural and historical [4]
5. Impact of tourism: Physical, economic, social, and perceptive positive and negative impacts [4]
6. Environmental laws and tourism – current trends, spatial patterns and recent changes [5]
7. Role of foreign capital and impact of globalisation on tourism [4]
8. Recent trends of tourism: International and domestic (India) and local, sustainable tourism, Meeting Incentives Conventions and Exhibitions (MICE) [6]
9. Tourism in India: Tourism infrastructure; regional dimensions of tourist attraction; case studies of Dal lake, Goa, Garhwal Himalaya, desert and coastal areas [5]
10. Promotion of tourism: National tourism policy. Role of Internet [5]
11. Infrastructure and support system: Accommodation and supplementary accommodation, other facilities and amenities [5]
12. Tourism circuits-short and longer detraction: Agencies and intermediaries, Indian hotel industry [5]

References

Boniface, B., Cooper, R., Cooper, C. 2016. Worldwide Destinations: The Geography of Travel and Tourism, vol. 1, 7th ed, Routledge.

Edgell, D.L., Swanson, J. 2013. Tourism Policy and Planning: Yesterday, Today, and Tomorrow, Routledge.

Fennell, D.A.2014. Ecotourism, 4th ed, Routledge.

Hall, C.M., Lew, A.A. 2009. Understanding and Managing Tourism Impacts: An Integrated Approach, Routledge.

Hall, C.M., Page, S.J. 2014.The Geography of Tourism and Recreation: Environment, Place and Space 4th ed, Routledge.

Honey, M. 2008. Ecotourism and Sustainable Development, Second Edition: Who Owns Paradise? 2nd ed, Island Press.

Kale, V.S. (Ed) 2017. Geomorphosites of India, Indian Institute of Geomorphologists.

Lew, A., Hall, C.M., Timothy, D.J. 2008. World Geography of Travel and Tourism: A Regional Approach, Butterworth-Heinemann.

Mason, P. 2017. Geography of Tourism: Image, Impacts and Issues, Goodfellow Publishers.

Mowforth, M., Munt, I. 2015. Tourism and Sustainability: Development, Globalisation and New Tourism in the Third World, 4th ed, Routledge.

Var, T., Gunn, C. Tourism Planning: Basics, Concepts, Cases, 4th ed, Routledge.

Velvet, N. 2017. An Introduction to the Geography of Tourism, 2nd ed, Rowman & Littlefield Publishers.

Williams, S., Lew, A.A. 2014. Tourism Geography: Critical Understandings of Place, Space and Experience, 3rd ed, Routledge.

Wilson, J. 2017. The Routledge Handbook of Tourism Geographies, Routledge.

6.4 GEO-G-DSE-A-5-02-P – Geography of Tourism Lab ✧ 30 Marks / 3 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Tourist flow analysis [15]
2. Tourist flow projection from time-series data [15]
3. Isochronic map showing tourist resource and travel time [15]
4. Environmental Impact Assessment of tourism development: Preparation of questionnaire [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Hall, C.M., Lew, A.A. 2009. Understanding and Managing Tourism Impacts: An Integrated Approach, Routledge.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Velvet, N. 2017. An Introduction to the Geography of Tourism, 2nd ed, Rowman & Littlefield Publishers.

Wilson, J. 2017. The Routledge Handbook of Tourism Geographies, Routledge.

WEBSITE:

Open Government of India Data Platform: data.gov.in

6.5 GEO-G-DSE-B-6-03-TH – Agricultural Geography ✧ 60 Marks / 4 Credits

Unit I: Agriculture System

1. Progress of Agricultural Geography with reference to allied disciplines. Approaches to Agricultural Geography [5]
2. Origin and dispersal of agriculture; Role of agriculture on human society [5]
3. Factors affecting agriculture. Classification of world agricultural systems [4]
4. Location and characteristics of major agricultural types: Intensive subsistence, extensive commercial and plantation agriculture [6]

Unit II: Regionalisation of Agricultural Patterns

5. Concept of cropping pattern, crop combination, gross and net cropped area, crop rotation [7]
6. A critical review and contemporary perspective of von Thünen model [3]
7. Definition and factors affecting yield. Measures of agricultural productivity [5]
8. Role of irrigation in Indian agriculture [5]
9. Problems of agriculture with special reference to South Asian countries [5]
10. World patterns of agricultural production and food security [5]
11. Land use survey and land classification (USDA) [5]
12. Globalization and agriculture with special reference to India [5]

References

Basu, D.N., Guha, G.S. 1996. Agro-Climatic Regional Planning in India, Concept Publication.

De, N.K., Jana, N.C. 1997. The Land: Multifaceted Appraisal and Management, Sribhumi Publishing.

Grigg, D. 1995. An Introduction to Agricultural Geography, 2nd ed, Routledge.

Hussain, M. 1978. Agricultural Geography, Rawat Publication.

Ilbery, B.W. 1985. Agricultural Geography: A Social and Economic Analysis, Oxford University Press.

Mohammad, N. 1992. New Dimension in Agriculture Geography, Concept Pub.

Roling, N.G., Wageruters, M.A.E. (Eds.) 1998. Facilitating Sustainable Agriculture, Cambridge University Press.

Shafi, M. 2005. Agricultural Geography, Pearson.

Singh, J., Dhillon, S.S. 1994. Agricultural Geography, Tata McGraw Hill.

Vaidya, B.C. 1997. Agricultural Land Use in India, Manak Publications.

6.6 GEO-G-DSE-B-6-03-P – Agricultural Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Preparation and interpretation of crop calendar using Ergograph [15]
2. Preparation of crop-combination regions by Weaver [15]
3. Determination and mapping of cropping intensity [15]
4. Determination and mapping of crop diversity [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

Hussain, M. 1978. Agricultural Geography, Rawat Publication, Jaipur

Knowles, R and Wareing, J.1990. Economic and Social Geography, Made Simple Books, Rupa

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Shafi, M. 2005. Agricultural Geography, Pearson

Singh, J., Dhillon, S.S. 1994. Agricultural Geography, Tata McGraw Hill, New Delhi

6.7 GEO-G-DSE-B-6-04-TH – Population Geography ✧ 60 Marks / 4 Credits

Unit I: Population Dynamics

1. Development of Population Geography as a field of specialization. Relation between population geography and demography. Sources of population data, their level of reliability and problems of mapping [6]
2. Population distribution: Density and growth. Classical and modern theories on population growth, Demographic transition model [6]
3. World patterns and determinants of population distribution and growth. Concept of optimum population [4]
4. Population distribution, density, and growth in India [4]

Unit II: Population and Development

5. Types of population composition: Age–sex. rural–urban, literacy and education [5]
6. Measurements of fertility and mortality. Concept of cohort and life table [5]
7. Population composition of India: Urbanisation and occupational structure [7]
8. Migration: Causes and types [3]
9. National and international patterns of migration with reference to India [5]
10. Population and development: Population–resource regions (Sekerman). Concept of human Development Index and its components [5]
11. Population policies in developed and less development countries. India's population policies. Population and environment, implication for the future [5]
12. Contemporary issues: Ageing of population, declining sex ratio, population and environment dichotomy, impact of HIV/AIDS [5]

References

Books:

Barrett, H.R. 1995. Population Geography, Oliver and Boyd.

Bartram, D. Poros, M. Monforte, P. 2014. Key Concepts in Migration, Sage.

Binde, N., Kanitkar, H. 2000. The Principle of Population Studies, Himalaya Publications.

Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.

Dyson,T. 2011. Population and Development: The Demographic Transition, Rawat Publications.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Hassan, M.I. 2005. Population Geography, Rawat publications.

Hussain, M. 1994. Human Geography, Rawat publications.

Jhingan, M.L., Bhatt, B.K., Desai, J.N. 2014. Demography, Vrinda Publications.

Jones, H. R. 2000. Population Geography, 3rd ed, Chapman.

Lutz, W., Warren, C.S., Scherbov, S. 2004. The End of the World Population Growth in the 21st Century, Earthscan.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

Mukherji, S. 2013. Migration in India: Links to Urbanization, Regional Disparities and Development Policies, Rawat Publications

Newbold, K.B. 2017. Population Geography: Tools & Issues, 3rd ed, Rowman & Littlefield Publishers.

Pacione, M. 2012. Population Geography: Progress and Prospect, Routledge.

WEBSITES:

Census of India: censusindia.gov.in

World Population History: worldpopulationhistory.org

World Population Review: worldpopulationreview.com/continents/world-population

6.8 GEO-G-DSE-B-6-04-P – Population Geography Lab ✧ 30 Marks / 2 Credits

A laboratory notebook, comprising class assignments of the following, is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.

1. Population projection by arithmetic method [15]
2. Population density mapping: State-wise for India [15]
3. Analysis of work participation rate: Total and gender-wise for India [15]
4. Analysis occupation structure by dominant and distinctive functions: Districts of West Bengal [15]
5. Viva-voce based on laboratory notebook (5 Marks)

References

BOOKS:

Hassan, M.I. 2005. Population Geography, Rawat publications.

Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers.

Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publication, New Delhi.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

WEBSITE:

Census of India: censusindia.gov.in
censusindia.gov.in/2011census/dchb/WBA.html

7. General Course: Skill Enhancement Electives

7.1 GEO-G-SEC-A-3/5-01-TH – Coastal Management ✧ 90 Marks / 2 Credits

5. Components of a coastal zone. Coastal morphodynamic variables and their role in evolution of coastal forms [7]
6. Environmental impacts and management of mining, oil exploration, salt manufacturing, land reclamation and tourism [8]
7. Coastal hazards and their management using structural and non-structural measures: Erosion, flood, sand encroachment, dune degeneration, estuarine sedimentation and pollution [8]
8. Principles of Coastal Zone Management. Exclusive Economic Zone and Coastal Regulation Zones with reference to India. [7]

References

Beatley, T., Brower, D., Schwab, A.K. 2002. An Introduction to Coastal Zone Management, 2nd ed, Island Press.

Berkes, F. 2015. Coasts for People: Interdisciplinary Approaches to Coastal and Marine Resource Management, Routledge.

Carter, R.W.G. 1988. Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press.

Clark, J.R. 1996. Coastal Zone Management Handbook, CRC Press / Lewes Publishers.

Clark, J.R. 1998. Coastal Seas: The Conservation Challenge, Blackwell Science.

French, P. 1997. Coastal and Estuarine Management, Routledge.

Kay, R. and Alder, J. 1999. Coastal Planning and Management, E & FN Spon / Routledge.

Pethick, J. 1984. An Introduction to Coastal Geomorphology, Arnold.

Woodrofe, C.D. 2002. Coasts: Form, Process and Evolution. Cambridge University Press.

7.2 GEO-G-SEC-A-3/5-02-TH – Forest and Wildlife Management ✧ 90 Marks / 2 Credits

1. Forest and wildlife management: Importance and strategies. Role and significance of stakeholders. Tangible and intangible benefits of forest and wildlife management [7]
2. Legal framework of forest and wildlife protection in India: The Indian Forest Act 1927, Forest Conservation Act 1980, Wild Life Protection Act 1972, Biodiversity Act 2002 [5]
3. Forests as common property resources. Forest rights: Tribals and forests. Gender dimension of forest management. Management of poaching and illegal logging. [8]
4. Principles of community participation and joint forest management. Causes and management of human–wildlife conflicts with special reference to Jangal Mahal, Sundarban and Duars [10]

References

BOOKS:

Bailey, J.A. 1984. Principles of Wildlife Management, John Wiley & Sons.

Das, C., Bandyopadhyay, S. 2012. Sharing Space: Human–Animal Conflicts in Indian Sundarban, Progressive Publishers.

Fisher, M. 2016. Forest Conservation, Planning and Management, Callisto Reference.

Fryxell, J.M., Sinclair, A.R.E., Caughley, G. 2014. Wildlife Ecology, Conservation and Management, 3rd ed., Wiley-Blackwell.

Gopal, G. 2011. Fundamentals of Wildlife Management, Natraj Publishers.

Hosetti, B.B. 2008. Concepts in Wildlife Management, 3rd ed., Daya Publishing House.

Jacob, L. 2018. Principles of Forest Management, Syrawood Publishing House.

Negi, S. 2011. Forest Management in India, Bishen Singh Mahendra.

Panda, P.K., Das, C.R. (Eds) 2013. Forest Resources and its Management in India, Abhijeet Publications.

WEBSITES:

Department of Forest, Govt. of West Bengal: www.westbengalforest.gov.in

Forest Research Institute, Dehradun: www.fri.res.in

Ministry of Environment, Forest and Climate Change, Govt. of India: envfor.nic.in

7.3 GEO-G-SEC-B-4/6-03-TH – Rural Development ✧ 90 Marks / 2 Credits

1. Rural Development: Concept, basic elements, measuring the level of rural development [5]
2. Paradigms of rural development: Cumulative causation model, core-periphery model, Gandhian approach to rural development [10]
3. Area based approach to rural development: Drought prone area programmes, PMGSY, SJSY, MGNREGA, Jan Dhan Yojana [10]
4. Rural Governance: Panchayati Raj system, rural development policies and programmes in India – an overview [5]

References

Gilg, A.W. 1985. An Introduction to Rural Geography, Edwin Arnold.

Krishnamurthy, J. 2000. Rural Development: Problems and Prospects, Rawat Publications.

Lee, D.A., Chaudhri, D.P. (Eds) 1983. Rural Development and State, Methuen Publishing.

Misra, R.P., Sundaram, K.V. (Eds) 1979. Rural Area Development: Perspectives and Approaches, Sterling Publishers.

Misra, R.P. (Ed.) 1985. Rural Development: Capitalist and Socialist Paths, Vol-1, Concept Publishing.

Ramachandran, H., Guimaraes, J.P.C. 1991. Integrated Rural Development in Asia: Leaning from Recent Experience, Concept Publishing.

Robb, P. (Ed.) 1983. Rural South Asia: Linkages, Change and Development, Curzon Press.

Singh, K., Shishodia, A. 2016. Rural Development: Principles, Policies, and Management, 4th ed, Sage.

Wanmali, S. 1992. Rural Infrastructure, the Settlement System and Development of the Regional Economy in Southern India, International Food Policy Research Institute.

Yugandhar, B.N., Mukherjee, N.(Eds) 1991. Studies in Village India: Issues in Rural Development, Concept Publishing.

7.4 GEO-G-SEC-B-4/6-04-TH – Sustainable Development ✧ 90 Marks / 2 Credits

1. Sustainable development: Concept, Historical background, components, limitations [5]
2. Challenges of sustainable development: Determinants, linkage among sustainable development, environment and poverty [10]
3. Global environmental issues: Population, income and urbanization, health care, forest and water resources [8]
4. Global goals for sustainable development: Domain, conflict, crisis and compromise [7]

References

BOOKS:

Agyeman, J., Bullard, R.D., Evans, B. (Eds) 2003. Just Sustainabilities: Development in an Unequal World, the MIT Press.

Baker, S. 2006. Sustainable Development, Routledge.

Blewitt, J. 2017. Understanding Sustainable Development 3rd ed, Routledge.

Browne, S. 2017. Sustainable Development Goals and UN Goal-Setting, Routledge.

Elliott, J. 2012. An Introduction to Sustainable Development, 4th ed, Routledge.

Robbins, P. 2004. Political Ecology: A Critical Introduction, Blackwell Publishing.

Rogers, P., Jalal, K.F., Boyd, J.A. 2007. An Introduction to Sustainable Development, Routledge.

Sachs, J.D. 2015. The Age of Sustainable Development, Columbia University Press.

Williams, O.F. 2014. Sustainable Development, University of Notre Dame Press.

WEBSITE:

UNO Sustainable Development Knowledge Platform: sustainabledevelopment.un.org

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Spaul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

CBCS SYLLABUS

IN

HISTORY (HONOURS)

CALCUTTA UNIVERSITY

2018

University of Calcutta

HIS – A

The Three - year B.A. Honours in History will comprise 6 Semesters. The curriculum will consist of 14 Core Courses (CC), 4 Discipline Specific Elective (DSE) courses, 2 Ability Enhancement Compulsory Courses (AECC), 2 Skill Enhancement Courses (SEC) Each course will be of 100 Marks. Attendance: 10 marks per Paper, Internal Assessment: 10 marks per paper.

➢ Core Courses CC

[Fourteen courses. Each course: 6 credits (5 theoretical segments TH+ 1 for tutorial related segment TU). Total: 84 credits.

- Each course carries 80 marks. Teaching time: 6x14 = 84 hrs Minimum 60 classes
- 65 marks for theoretical segment.
- Question Pattern for subjective/descriptive segment of 65 marks: 3 questions out of 6 (within 500 words) (10 x3 = 30) + 4 questions out of 8 within 250 words; 5x4 =20) + 15 objective type questions carrying 1 mark each (15 x 1 = 15).
- 15 marks for tutorial - related segments as suggested below (any one from each mode):
- Any one of the following modes: upto 1000 words for one Term Paper/upto 500 words for each of the two Term Papers/ equivalent Book Review/ --based on syllabus -related and/or current topics .[The modes and themes and/or topics are be decided by the concerned faculty of respective colleges.]
- Core courses: 2 each in Semesters 1 and 2; three each in Semesters 3 and 4; 2 each in Semesters 5 and 6.

- IMPORTANT NOTES:

  The Readings provided below include many of those of the UGC Model CBCS Syllabus in History. For further details of Course Objectives and additional references it is advised that the UGC model CBCS syllabus concerning relevant courses and topics should be given due importance and primarily consulted.
- Cited advanced texts in Bengali are not necessarily substitutes, but supplementary to the English books.

- The format is subject to the common structural CBCS format of the University.

➢ Discipline- specific Elective Courses DSE

Each course: 6 credits 5 for theoretical segment + 1 for tutorial-related segment. **(TH -5 TU-1)**

DSE-A for Semester -5/6, DSE-B for Semester 5/6

- Each course carries 80 marks. Minimum 60 classes.
- 65 marks for theoretical segment.
- Question Pattern for subjective/descriptive segment of 65 marks: 3 questions out of 6 (within 500 words; (10 x3 = 30) + 4 questions out of 8 (within 250 words; 5x4=20) and 15 objective type questions carrying 1 mark each (15 x 1 = 15).
- 15 marks for tutorial-related segments as suggested below (any one from each mode): Any one of the following modes: upto 1000 words for one Term Paper/upto 500 words for each of the two Term Papers/ equivalent Book Review/ based on syllabus related and/or current topics [The modes and themes and/or topics of a. and b. to be decided by the concerned faculty of respective colleges.]

- **HIS-A: Skill Enhancement/Skill-based Courses SEC** Each Course: 2 credits . (**Only theoretical**.)

  SEC –A in Semester 3, SEC –B in Semester 4.
  - Each course carries 80 marks. Teaching time: 2 hrs per week or 2x14 =28 hrs
  - 80 marks for theoretical segment.
  - Question Pattern for subjective/descriptive segment of 80 marks: 4 questions out of 8 (within 500 words; (10 x4 = 40) + 5 questions out of 10(within 250 words; 5x5=25) and 15 objective type questions carrying 1 mark each (15 x 1 = 15).
- **HIS-A: Ability Enhancement Compulsory Courses (** AECC) Each Course 2 credits

  AECC -1 : Communicative English/ MIL

  AECC-2 **:** Environmental Studies

  AECC -1 in Semester 1, AECC -2 in Semester 2

IMPORTANT NOTES:

LIST OF COURSES FOR HISTORY HONOURS PROGRAMME

- The Readings provided below include many of those of the UGC Model CBCS Syllabus in History. For Course Objectives and references it is advised that the UGC model CBCS syllabus concerning relevant courses and topics should be given due importance and primarily consulted.

*Website: BA History (Honours):

- Cited advanced texts in Bengali are not necessarily substitutes, but supplementary to the English books.
- The format is subject to the common structural CBCS format of the University.

HIS-A COURSES SEMESTER WISE

	SEM-1	**SEM-2**	**SEM-3**	**SEM-4**	**SEM-5**	**SEM-6**
CC	CC- 2TH/ 2TU **1& 2**	CC- 2TH/2TU **3&4**	CC- 3TH/3TU **5,6&7**	CC- 3TH/3TU **8,9&10**	CC-2TH/2TU **11,&12**	CC- 2TH/2TU **13&14**
DSE					DSE-A* DSE-B 2TH/2TU	DSE-A* DSE-B 2TH/2TU
****GE**	GE-1 1TH/ 1TU	GE-2 1TH/ 1TU	GE-3 1TH/ 1TU	GE-4 1TH/ 1TU		
AECC	AECC-1 1TH/0 TU	AECC-2 1TH/ 0TU				
SEC			SEC-A 1TH/0 TU	SEC-B 1TH/0 TU		
Total No. of Courses and Marks	4x100= 400	4x100= 400	5x100= 500	5x100= 500	4x100= 400	4x100= 400
Total Credits	20	20	26	26	24	24

***HIS-A- DSE** – Candidates can choose any one paper in Semester -5 and another in Semester 6 taking one from Group –A and the other from Group –B

****HIS-A Generic Elective (GE):** The four Generic Elective papers (courses) for History (Honours) students will be from any subject other than History. Similarly History as Generic Elective will be offered to students having Honours in any subject other than History. The Generic Elective papers in History, for Honours students (for students having Honours in any subject other than History.) will be treated as Core Papers in History, for General students (for BA General Students having History. as a General paper)

COURSE CODE	(6 Credits per Core Course)
Subject-Hon-Core-Semester-Paper-TH&TU	**CORE COURSES**
HIS-A-CC -1-1-TH&TU	
HIS-A-CC -1-2-TH&TU	
HIS-A-CC -2-3-TH&TU	
HIS-A-CC -2-4-TH&TU	
HIS-A-CC -3-5-TH&TU	
HIS-A-CC -3-6-TH&TU	
HIS-A-CC -3-7-TH&TU	
HIS-A-CC -4-8-TH&TU	
HIS-A-CC -4-9-TH&TU	
HIS-A-CC -4-10-TH&TU	
HIS-A-CC -5-11-TH&TU	
HIS-A-CC -5-12-TH&TU	
HIS-A-CC -6-13-TH&TU	
HIS-A-CC -6-14-TH&TU	
Skill Enhancement Course (2 Credits per Course)	
GROUP-A	**HIS-G-SEC-3-A(1) or A(2)-TH**
SEC-A-(1)	
SEC-A-(2)	
GROUP-B	**HIS-G-SEC-4-B(1) or B(2)-TH**
SEC-B-(1)	
SEC-B-(2)	
DISCIPLINE SPECIFIC ELECTIVE (6 Credits per Course)	
GROUP-A	**Semester 5: DSE A-1/ A-2 & Semester-6: DSE A-3/A4TH&TU**
DSE-A-(1)	HIS-A-DSE-A-1-5 TH&TU
DSE-A-(2)	HIS-A-DSE-A-2 -5TH&TU
	HIS-A-DSE-A-3-6 TH&TU
DSE-A-(3)	HIS-A-DSE-A-4 -6 TH&TU
DSE-A-(4)	
GROUP-B	**Semester 5: DSE B-1/ B-2 & Semester-6: DSE A3/A4 TH&TU**
DSE-B-(1)	HIS-A-DSE-B--1 -5TH&TU
DSE-B-(2)	HIS-A-DSE-B-2 -5TH&TU
DSE-B-(3)	HIS-A-DSE-B-3-6 TH&TU
DSE-B-(4)	HIS-A-DSE-B-4-6 TH&TU
➢ **DISCIPLINE SPECIFIC ELECTIVE**	
➢ Note: Choose any one paper in Semester -5 and another in Semester 6 taking one from Group –A and the other from Group –B	
GENERIC ELECTIVE (6 Credits per Course)	
➢ Note: Core Courses Designed for General Programme will be offered as Generic Elective courses for students of other Disciplines.	

Structure of B.A (Hons.) History Course under CBCS
HIS-A-CC-1-14- TH &TU

Paper 1 **SEM -1**: History of India (From the Earliest times to C 300 BCE)

Paper 2 **SEM-1**: Social Formations and Cultural Patterns of the Ancient World other than India

Paper 3 **SEM-2**: History of India (c 300 BCE to c.750 CE)

Paper 4 **SEM-2**: Social Formations and Cultural Patterns of the Medieval World other than India

Paper 5 **SEM-3**: History of India (c.750 – 1206)

Paper 6 **SEM-3**: Rise of the Modern West –I

Paper 7 **SEM-3**: History of India (c.1206 – 1526)

Paper 8 **SEM-4**: Rise of the Modern West – 11

Paper 9 **SEM-4**: History of India (c.1526-1605)

Paper 10 **SEM-4** History of India (c.1605 – 1750s)

Paper 11 **SEM-5:** History of Modern Europe (c.1780-1939)

Paper 12 **SEM-5**: History of India (c.1750s– 1857)

Paper 13 **SEM-6**: History of India (c. 1857 – 1964)

Paper 14 **SEM-6** : History of World Politics: (1945-1994)

HIS-A- DSE TH &TU

Discipline Specific Elective DSE (Any Four) Choosing any one paper in Semester -5 and another in Semester 6 taking one from Group –A and the other from Group –B

Paper 1 **DSE-A-1 SEM -5**: History of Bengal (c.1757-1905)

Paper 2 **DSE-A-3 SEM -6**: History of Bengal (c.1905-1947)

Paper 3 **DSE-B-2 SEM -5**: History of Southeast Asia – The 19th Century

Paper 4 **DSE-B-4 SEM -6**: History of Southeast Asia – The 20th Century

Paper 5 **DSE-B-1 SEM -5**: History of Modern East Asia – I China (c.1840 – 1949)

Paper 6 **DSE-B-3 SEM -6**: History of Modern East Asia – II Japan (c.1868 – 1945)

Paper 7 **DSE-A-2** SEM **-5**: History of United States of America – I (c.1776 – 1945)

Paper 8 **DSE-A-4 SEM -6**: History of United States of America – II (c.1776-1945)

Skill Enhancement Courses SEC –A & B (Any Two) Choosing one from group-A and one from group-B) in Semester 3 and 4

SEC -A 1: **SEM-3** Archives and museums
SEC -B 1: **SEM-4** Understanding Popular Culture
SEC-A 2: **SEM-3** Understanding Heritage
SEC-B 2: **SEM-4** Art Appreciation: an Introduction to Indian Art

*Generic Elective Courses (GE) - Same as Core courses (CC) offered in the BA General Syllabus.

Detailed Syllabus History Honours
HIS-A CC –1- 14 TH&TU
CC 1 : History of India From the earliest times to C 300 BCE

I. Reconstructing Ancient Indian History:
a) Early Indian notions of History
b) Sources and tools of historical reconstruction.
c) Historical interpretations (with special reference to gender, environment, technology and regions)

II. Hunter-gatherers and the advent of food products
a)Paleolithic cultures- sequence and distribution; stone industries and other technological developments.
b) Mesolithic cultures – regional and chronological distribution; new developments in technology and economy; rock art.
c) Neolithic and Chalcolithic cultures: distribution and subsistence pattern

III. The Harappan civilization:
Origins; settlement patterns and town planning; agrarian base; craft productions and trade; social and political organization; religious beliefs and practices; art; the problem of urban decline and the late/post-Harappan traditions.

IV. Cultures in transition
Settlement patterns, technological and economic developments; social stratification; political relations; religion and philosophy; the Aryan problem.
a) North India (circa 1500 BCE – 300 BCE)
b) Central India and the Deccan (circa 1000 BCE – circa 300 BCE)

Essential Readings
Agarwal D.P, The Archaeology of India, London, 1982.
Basham A.L, The Wonder That Was India, London, 1954.
Chakrabarti Dilip Kumar, An Oxford Companion to Indian Archaeology, New Delhi, 2006.
Chakrabarti Dilip Kumar, India, An Archaeological History, Delhi, 1999
Sharma R.S, Looking for the Aryans, 1995.
Sharma R.S, Material Cultures and Social Formations in Ancient India, New Delhi, 1983.
Thapar Romila, Early India: From the Origins to AD 1300, London, 2002

Suggested Readings
Basham A.L ed. A Cultural History of India, New Delhi, 1975.
Ghosh Amalananda, The City in Early Historic India, Shimla, 1973.
Altekar A.S, The Position of Women in Hindu Civilization from Pre-historic times to the Present Day, New Delhi, 1962.
Chattopadhyaya B.D, Studying Early India: Archaeology, Texts and Historical Issues. New Delhi, 2003.
Sircar D.C, Indian Epigraphy, New Delhi, 1965.
Kosambi D.D, An Introduction to the Study of Indian History, Bombay, 1956
Kosambi D.D, Combined Methods in Indology and Other Writings, Edited and Introduced By B.D Chattopadhyaya
Jha D.N, Ancient India: An Introduction, New Delhi, 1998
Chattopadhyay D.P, Science and Society in Ancient India, Calcutta, 1977.
Erdosy George, Urbanization in Early Historic India, Oxford, 1988.

Allchin F.R. (ed). The Archaeology of Early Historic South Asia: The Emergence of Cities and States, Cambridge, 1995.
Staal Frits, Discovering the Vedas : Origins, Mantras, Rituals Insights, New Delhi, 2008.
Possehl G.L, ed. Harappan Civilization- A Recent Perspective, Delhi, 1993 (second edition).
Michell George, The Penguin Guide to the Monuments of India. London, 1989.
Raychaudhuri H.C, Political History of Ancient India with a commentary by B.N.Mukherjee, New Delhi, 1996 (8th edition)
Habib Irfan (General Editor), A People's History of India (Volume 1,2,3), New Delhi.
Shastri K.A Nilakantha, A History of South India, Madras, 1974 (4th Edition)
Lahiri Nayanjyot, The Decline and Fall of the Indus Civilization, New Delhi, 2000.
Ray Nihar Ranjan, Brajadulal Chattopadhyaya, V.R. Mani and Ranabii Chakravarti eds. A Source Book of Indian Civilization, Kolkata, 2000.
Sahu Bhairabi Prasad (ed.). Iron and Social Change in Early India. New Delhi: Oxford University Press, 2006.
Chakraborty Ranabir, Exploring early India, upto circa AD 1300
Kochar R., The Vedic People, New Delhi. 2000.
Majumdar R.C (General Editor), The History & Culture of the Indian People, Volumes I – III, Bombay, 1951,1968, 1970
Sharma R.S, Advent of the Aryans, Manohar, 1999.
Sharma R.S, Aspects of Political Ideas and Institutions in Ancient India. New Delhi, 2005 (reprint).
Sharma R.S, India's Ancient Past, New Delhi, 2005.
Sharma R.S, Perspectives in the Social and Economic History of Early India, New Delhi, 1983.
Sharma R.S, Sudras in Ancient India.
Salomon Richard, Indian Epigraphy: A Guide to the Study of Inscriptions in Sanskrit, Prakrit, and Other Indo-Aryan Languages. New York, 1998.
Thapar Romila (et al). India: Historical Beginnings and the Concept of the Aryan, New Delhi, 2006
Thapar Romila, From Lineage to State, Delhi, 1996 (2nd Edition)
Ratnagar Shireen, (ed), Women in Early Indian Societies. New Delhi, 1999.
Ratnagar Shireen, The End of the Great Harappan Tradition, Delhi, 2000
Roy Kumkum, The Emergence of Monarchy in North India: eighth to fourth centuries BC, NewDelhi, 1994
Ratnagar Shireen, Understanding Harappa, Delhi 2001
Saraswati S.K, A Survey of Indian Sculpture, New Delhi, 1975 (second edition)
Bhattacharji Sukumar, Women and Society in Ancient India. Calcutta, 1994.
Singh Upinder, A History of Ancient and Early Medieval India. Delhi, 2008.
বাশাম এ এল, অতীতের উজ্জ্বল ভারত, (The Wonder That Was India), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৫
চক্রবর্তী রণবীর, ভারত ইতিহাসের আদি পর্ব, কলকাতা, ২০০৭
হাবিব ইরফান, ভারতবর্ষের সাধারণ মানুষের ইতিহাস
প্রথম খন্ড – প্রাক–ইতিহাস, (Pre-history) এন বি এ, কলকাতা, ২০০২
দ্বিতীয় খন্ড: সিন্ধু সভ্যতা, (The Indus Civilisation) এন বি এ, কলকাতা, ২০০২
তৃতীয় খন্ড – বৈদিক সভ্যতা, (The Vedic Age) এন বি এ, কলকাতা, ২০০২
ঝা ডি এন, আদি ভারত – একটি সংক্ষিপ্ত ইতিহাস, (Ancient India: An Introduction), প্রগ্রেসিভ পাবলিশার্স, কলকাতা
কোশাম্বী ডি ডি, ভারত ইতিহাস চর্চার ভূমিকা (An Introduction to the Study of Indian History) বাগচি কে পি এন্ড কোং, কলকাতা, ২০০২

রত্নাগর শিরিণ, হরপ্পা সভ্যতার সন্ধানে (Understanding Harappa) এন বি এ, কলকাতা, ২০০৩
রায়চৌধুরী হেমচন্দ্র, প্রাচীন ভারতের রাজনৈতিক ইতিহাস, (Political History of Ancient India), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
থাপার রোমিলা, ভারতবর্ষের ইতিহাস, ওরিয়েন্ট লংম্যান, কলকাতা
ভট্টাচার্য নরেন্দ্রনাথ, প্রাচীন ভারতে ধর্ম, কলকাতা, ১৯৮৮
ভট্টাচার্য নরেন্দ্রনাথ, প্রাচীন ভারতীয় সমাজ, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
ভট্টাচার্য সুকুমারী, ইতিহাসের আলোকে বৈদিক সাহিত্য, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
ভট্টাচার্য সুকুমারী, প্রাচীন ভারত- সমাজ ও সাহিত্য, আনন্দ পাবলিশার্স, কলকাতা
চক্রবর্তী দিলীপ কুমার - ভারতবর্ষের প্রাক্ ইতিহাস আনন্দ পাবলিশার্স, কলকাতা, ১৯৯৯
গঙ্গোপাধ্যায় দিলীপ কুমার - ভারত ইতিহাসের সন্ধানে, (২ খন্ডে), ২০০৭
চক্রবর্তী রণবীর, প্রাচীন ভারতের অর্থনৈতিক ইতিহাসের সন্ধানে, আনন্দ পাবলিশার্স, কলকাতা ২০০২ (সংশোধিত সংস্করণ)
চানানা দেবরাজ, প্রাচীন ভারতে দাস প্রথা, (Slavery in Ancient India as depicted in Pali and Sanskrit Texts), কে পি বাগচি এন্ড কোং, কলকাতা ১৯৯৫
রায় নীহাররঞ্জন, বাঙালির ইতিহাস, কলকাতা, ১৯৮০ (দ্বিতীয় সংস্করণ)
শর্মা রামশরণ, প্রাচীন ভারতে বস্তুগত সংস্কৃতি ও সমাজ সংগঠন, (Material Cultures and Social Formations in Ancient India), ওরিয়েন্ট লংম্যান, ১৯৯৮
শর্মা রামশরণ, আদি মধ্যযুগের ভারতীয় সমাজ : সমস্ত-প্রক্রিয়া বিষয়ে এক সমীক্ষা (Early Medieval Indian Society : A Study in Feudalism) ওরিয়েন্ট লংম্যান, ২০০৩
শর্মা রামশরণ, ভারতের সমাজতন্ত্র, (Indian Feudalism), কে পি বাগচি এন্ড কোং, কলকাতা
শর্মা রামশরণ, আর্যদের অনুসন্ধান, (Looking for the Aryans), প্রগ্রেসিভ পাবলিশার্স, কলকাতা
শর্মা রামশরণ, আর্যদের ভারতে আগমন, (Advent of the Aryans), ওরিয়েন্ট লংম্যান, ২০০১
শর্মা রামশরণ, প্রাচীন ভারতে শূদ্র, (Sudras in Ancient India), কে পি বাগচি এন্ড কোং, কলকাতা
থাপার রোমিলা, অশোক ও মৌর্যদের পতন, (Asoka and the Decline of the Mauryas), কে পি বাগচি এন্ড কোং, কলকাতা
চট্টোপাধ্যায় সুনীল, প্রাচীন ভারতের ইতিহাস (১ম খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, একাদশ মুদ্রণ, এপ্রিল ২০০৪
চট্টোপাধ্যায় সুনীল, প্রাচীন ভারতের ইতিহাস (২য় খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৮ম মুদ্রণ, ফেব্রুয়ারি ২০০৪
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস (১ম খন্ড) (প্রাচীন ও মধ্যযুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, প্রথম মুদ্রণ নভেম্বর ১৯৯৭

CC-2 : Social Formations and Cultural Patterns of the ancient world other than India

I. Evolution of human kind: Paleolithic and Mesolithic cultures – Role of kinship social institutions in the development of early societies.

II. Food production : beginnings of agriculture and animal husbandry.

III. Bronze Age civilizations, with reference to any one of the following : i)Egypt (Old Kingdom); ii)China(Shang), economy, social stratification, state structure, religion.

IV. Nomadic groups in Central and West Asia; Debate on the advent of iron and its implications.

V. Slave society in ancient Greece & Rome: agrarian economy, urbanization, trade.

VI. Polis in ancient Greece: Athens and Sparta; Greek culture.

Essential Readings

Farooqui Amar, Early Social Formations. Manak Publications Pvt. Ltd. 2002

B.Fagan, People of the Earth. : an introduction to world prehistory

New York, NY HarperCollins College Publishers 1977

B.Trigger, Ancient Egypt : A Social History. Cambridge University Press, 1983

Bai Shaoyi, An Outline History of China. Beijing : Foreign Languages Press, 1982.

Burns and Ralph, World Civilisations.

Cambridge History of Africa, Vol.I. Cambridge University Press ,1982

G.Clark, World Prehistory: A New Perspective Cambridge University Press, 1977.

Jacquetta Hawkes, First Civilisations**.** life in Mesopotamia, the Indus Valley and Egypt. The history of human society. New York: Knopf, 1973.

M.I.Finley, The Ancient Economy. University of California Press 1999.

R.J.Wenke, Patterns in Prehistory Oxford University Press, USA; 5th edition 2006

UNESCO Series: History of Mankind, Vols. I –III/ or New ed. History of Humanity.1963

V.Gordon Childe, What happened in History. Peregrine Books 1985

Suggested Readings

A.Hauser, A Social History of Art, Vol I. Routledge, 1999.

Glyn Daniel, First Civilisations. New. York: Thomas Y. Crowell (Apollo. Editions), 1968

J.D. Bernal, Science in History, Vol.I. Cambridge: The MIT Press, Massachusetts Institute of Technology, 1971

Salia Ikram, Death & Burial in Ancient Egypt (American University in Cairo Press, 2015)

V.Gordon Childe, Social Evolution.

Martin Bernal, Black Athena; the Afro Asiatic Roots of Classical Civilization Brunswick: Rutgers University Press, 1991.

গর্ডন চাইল্ড, সোশ্যাল ইভলিউশন, অসিত চৌধুরী (ভাষান্তর), দীপায়ন, কলকাতা, ১৪০৫ বঙ্গাব্দ।

গর্ডন চাইল্ড, ম্যান মেক্‌স হিমসেলফ, মগন দাস (ভাষান্তর), দীপায়ন, কলকাতা, ১৯৯৯।

গর্ডন চাইল্ড,হোয়াট হ্যাপেনড ইন হিস্ট্রি, দীপায়ন, কলকাতা।

জন ডেসমন্ড বার্নাল, ইতিহাসে বিজ্ঞান, আনন্দ, কলকাতা।

কুণাল চট্টোপাধ্যায় ও সুজাত ভদ্র, প্রাচীন গ্রীসের সমাজ ও সভ্যতা, প্রগ্রেসিভ, কলকাতা ।

সুপ্রতিম দাস, গ্রীস অনুসন্ধান, প্রগ্রেসিভ, কলকাতা ।

CC-3 : History of India C 300 BCE to C 750 CE

I. Economy and Society (circa 300 BCE to circa CE 300)
a)Expansion of agrarian economy : production relations
b)Urban growth: north India, central India and the Deccan; craft Production: trade and trade routes; coinage
c)Social stratification: class, Varna, Jati, untouchability; gender; marriage and property relations.

II. Changing political formations (circa 300 BCE to circa CE 300) :
a)The Mauryan Empire
b)Post-Mauryan Poliities with special reference to the Kushanas and the Satavahanas; Gana-Sanghas

III. Towards early medieval India (circa CE fourth century to CE 750):
a) Agrarian expansion: land grants, changing production relations; graded land rights and peasantry.
b)The problem of urban decline: patterns of trade, currency, and urban settlements.
c)Varna, proliferation of Jatis: changing norms of marriage and property
d) The nature of polities: the Gupta empire and its contemporaries: post-Gupta polities- Pallavas, Chalukyas, and Vardhanas.

IV. Religion, philosophy and society (circa 300 BCE – CE 750)
a)Consolidation of the Brahmanical tradition : dharma, Varnashram, Purushastras, Samskaras.
b)Theistic cults (from circa second century BC): Mahayana; the Puranic tradition.
c) The beginnings of Tantricism.

V. Cultural developments (circa 300 BCE to circa CE 750):
a)A brief survey of Sanskrit, Pali, Prakrit and Tamil literature. Scientific and technical treatises.
b)Art and architecture and forms and patronage; Mauryan , Post-Mauryan, Gupta , Post-Gupta

Essential Readings
Chattopadhyaya B.D, The making of early Medieval India, 1994.
Chattopadhyaya B.D, Bharatvarsha and other Essays, Permanent Black, Delhi, 2017.
Chattopadhyaya D.P, History of Science and Technology in Ancient India, 1986.
Chakravarti Ranabir, Exploring Early India upto AD 1300, Primus, Delhi, 2016.
Huntington Susan, The Art of Ancient India: Buddhist, Hindu, and Jain, New York, 1985.
Kosambi D.D, An Introduction to the Study of Indian History, 1975.
Maity S.K, Economic Life in Northern India in the Gupta Period, 1970.
Sahu B.P (ed.), Land System and Rural Society in Early India, 1997.
Sastri K.A.N, A History of South India.
Sharma R.S, Indian Feudalism, 1980.
Sharma R.S, Urban Decay in India, c.300- c1000, Delhi, Munshiram Manohar Lal, 1987
Singh Upinder, A history of Ancient and early Medieval India, 2008.
Thapar Romila, Asoka and the Decline of the Mauryas, 1997

Suggested Readings
Agarwal Asvini, The Rise and Fall of the Imperial Guptas, New Delhi,1988.
Bhattacharya N.N, Ancient Indian Rituals ad Their Social Contents, 2nd ed., 1996.
Bhattacharya N.N, History of Tantric Religion, 1982

Chakravarti Uma, The Social Dimensions of Buddhism. New Delhi: Oxford University Press, 1987.
Chakravarti Uma, Trade and Traders in Early Indian Society, New Delhi, 2007 (revised edition)
Champakalakshmi R, Trade, Ideology and Urbanization: South India: 300BC to AD 1300, Delhi, 1996.
Chanana D., Slavery in Ancient India as Depicted in Pali and Sanskrit Texts, Delhi, 1960.
Gupta P.L, Coins, 4th ed., 1996.
Harle J.C, The Art and Architecture of the Indian Subcontinent, 1987.
Lahiri Nayanjot, Ashoka in Ancient India, 2015
Majumdar R.C and Altekar A.S eds. The Vakataka Gupta Age, Varanasi, 1955.
Mukherjee B.N, Kushana Studies, New Perspectives, Kolkata, 2004
Mukherjee B.N, The Character of the Maurya Empire, Kolkata, 2000
Mukherjee B.N, The Rise and Fall of the Kushana Empire, Calcutta, 1989.
Pollock Sheldon, The Language of the Gods in the World of Men. Sanskrit, Culture and Power in Pre-modern India. New Delhi, 2006.
Ray H.P, Winds of Change, 1994.
Ray Nihar Ranjan, Maurya and Post Maurya Art, New Delhi, 1975.
Sharma R.S, Perspectives in the Social and Economic History of Early India, New Delhi, 1983.
Shastri A.M ed. The Age of the Vakatakas, Delhi, 1992.
Singh Upinder, A History of Ancient and Early Medieval India. Delhi, 2008.
Smith Bardwell ed., Essays in Gupta Culture, New Delhi, 1983.
Thapar Romila, Asoka and the Decline of the Mauryas, New Delhi, 2000
Thapar Romila, Early India: From the origins to 1300, London, 2002
Thapar Romila, The Mauryas Revisited, Calcutta,1987.
Veluthat Kesavan, The Early Medieval in South India, New Delhi, 2009

রোমিলা থাপার, অশোক ও মৌর্যদের পতন, (Asoka and the Decline of the Mauryas), কে পি বাগচি এন্ড কোং, কলকাতা
সুনীল চট্টোপাধ্যায়, প্রাচীন ভারতের ইতিহাস (১ম খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, একাদশ মুদ্রণ, এপ্রিল ২০০৪
সুনীল চট্টোপাধ্যায়, প্রাচীন ভারতের ইতিহাস (২য় খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৮ম মুদ্রণ, ফেব্রুয়ারি ২০০৪
হীরেন্দ্রনাথ মুখোপাধ্যায়, ভারতবর্ষের ইতিহাস (১ম খন্ড) (প্রাচীন ও মধ্যযুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, প্রথম মুদ্রণ নভেম্বর ১৯৯৭

CC-4 : Social Formations and Cultural patters of the Medieval World other than India

- **CANDIDATES CAN CHOOSE EITHER GROUP- A OR B, GROUP –C IS COMPULSORY**

GROUP- A

I. Arabia: Bedouin Society:

a) Tribal Organization (families and clans)
b) System of Alliances
c) Economic Structure
d) Language and poetry

II. The Steppes:

a) A brief outline of Central Asia (Geography and History)
b) Mongols :
(i) The strategic location of Mongolia;
(ii) Mongol Society: Tribal organization, different tribal formations, unification of the tribes under Chenghiz Khan
(iii) Brief outlines of the Mongol Empire: Case Study: The Golden Horde, Tatar rule in Russia
c) The Turks:
(i) Conversion of the Turks to Islam from Buddhism
(ii) Brief history of the Seljuks and the Ottomans
(iii) The rise of the Ottoman Empire
(iv) Ottoman Society and Administration.

GROUP- B

III. Crisis of the Roman Empire and its principal causes: Historiography

IV. Religion and Culture in Medieval Europe: Society, Religious organizations (Church and Monastery), Carolingian renaissance 12th century renaissance, Position of Women in Medieval Europe, Witchcraft and Magic, Urbanization, Rise of University, Medieval art and architecture.

V. The feudal society its origins and its crisis: Historiography

GROUP- C

VI. Judaism and Christianity under Islam

Essential Reading:

Ali, Syed Ameer, A Short History of the Saracens, Macmillan, 1900.
Allsen, Thomas T., Culture and Conquest in Mongol Eurasia (Cambridge), Cambridge University Press, March 2004.
Baker, Simon, Ancient Rome The Rise and Fall of an Empire, Ebury Publishing, 2006.
Barthold, V., A Secret History of the Mongols, Cheng & Tsui Co, June 1999.
Biran Michael, The Empire of the Qara Khitai in Eurasian History Between China and the Islamic World, Cambridge University Press, June 2008.
Bloch, Marc, Feudal Society (2 Vols), Aakar Books, Revised Edition, July, 2017.
Brundage (ed.), The Crusades, Marquette University Press, 1962.
Burke, Edmund, III & Ira M. Lapidus, Islam, Politics and Social Movements, University of California Press, 1988.
Burke, Peter, Popular Culture, Ashgate Publishing Ltd, 2009.

Cohen, Mark, Under Crescent and Cross The Jews in the Middle Ages, Princeton University Press, 2008.
Deansley, Margaret, A History of Early Medieval Europe, 476 to 911, Methuen, 1956.
Dobb, Maurice Dobb, Studies in the Development of Capitalism, Routledge, First Edition, March, 1965.
Goff, Le, Medieval Civilizations (400-1500), Blackwell Publishing, August 1991.
Hitti, Philip K., History of the Arabs, Macmillan Education Ltd., First Edition, 1937.
Inalcik, Halil, The Ottoman Empire, Phoenix, December 2001.
Lewis, Bernard, The Arabs in History, Oxford University Press, 6th Edition, May 2002.
Lewis, Bernard, The Jews of Islam, 1984.
Man, John, The Mongol Empire, Penguin Random House, May 2015.
Pirenne, Heim, Medieval Cities, Princeton University Press, 1969.
Smith, Leslie and Leyser, Conrad; Motherhood, Women and Society in Medieval Europe (400-1400), Ashgate Publishing Ltd, 2011.
Stuard, Susan Mosher (Ed.), Women in Medieval History and Historiography, University of Pennsylvania Press; New edition, December, 1988.

CC-5 : History of India (CE 750 – 1206)

I. Studying Early Medieval India:
Historical geography sources: texts, epigraphic and numismatic data. Debates on Indian Feudalism, rise of the Rajputs and the nature of the state.

II. Political Structures:
a) Evolution of political structures: Rashtrakutas, Palas, Pratiharas, Rajputs and Cholas.
b) Legitimization of kingship; Brahmanas and temples; royal genealogies and rituals
c)Arab conquest of Sindh : nature and impact of the new set-up; Ismaili Dawah
d) Cause and consequences of early Turkish invasions : Mamud of Ghazna; Shahab-ud-Din of Ghur.

III. Agrarian structure and social change:
a) Agricultural expansion; crops
b)Landlords and peasants
c)Proliferation of castes: status of untouchables
d) Tribes as peasants and their place in the Varna order

IV. Trade and Commerce
a) Inter-regional trade
b) Maritime trade
c) Forms of exchange
d)Process of urbanization
e)Merchant guilds of South India

V. Religious and Cultural developments:
a)Bhakti, Tantrism, Puranic traditions; Buddhism and Jainism; Popular religious cults.
b) Islamic intellectual traditions: Al-Biruni; Al-Hujwiri
c)Regional languages and literature

d)Art and architecture: Evolution of regional styles.

Essential Readings

Chattopadhyaya, B.D, The Making of Early Medieval India, 1994.
Karashima, N., South Indian History and Society (Studies from Inscriptions, AD 850 – 1800)
Kulke, Hermann, ed., The State in India (AD 1000 – AD 1700)
Sharma, R.S and Shrimali, K.M eds., Comprehensive History of India, Vol. IV (A & B)
Sharma, R.S. Indian Feudalism (circa 300 – 1200)
Singh,Vipul Interpreting Medieval India, Volume-I, Early Medieval, Delhi Sultanate and Regions (circa 750 – 1550), 2009.

Suggested Readings :

Basham, A.L., (ed.), A Cultural History of India
Basham, A.L., The Wonder that was India
Bose Mandakranta (ed.), Faces of Feminine in Ancient Medieval and Modern India, New York, 2000
Chakravarti Ranabir, Exploring Early India upto Circa AD 1300
Chakravarti, R(ed.), Trade in Early India, Delhi
Champalakshmi, R, Trade, Ideology and Urbanisation :South India 300 BC – AD 1300, Delhi, 1966
Chandra, S, History of Medieval India (800 -1700)
Chattopadhyay, B.D, Aspects of Rural settlements and Rural Society in Early Medieval India
Chattopadhyay, B.D, Science and Society in Ancient India, Calcutta, 1977
Chattopadhyay, B.D, Studying Early India: Arcchaeology, Texts and Historical Issues , New Delhi, 2003
Chaudhuri, K.N, Trade and Civilisation in the Indian Ocean : An Economic History from the Rise of Islam to 1750
Gopal Lalanji, The Economic Life of Northern India ,Varanasi, 1965
Habib, Irfan, Economic History of Medieval India: A Survey, New Delhi, 2001
Habib, Irfan, Medieval India: The Study of a Civilisation ,New Delhi, 2008
Habib, Md. And Nizami KA (eds), A Comprehensive History of India Vol. V
Habibullah, A.B.M, The Foundation of Muslim Rule in India
Jackson, Peter, The Delhi Sultanate: A Political & Military History, Cambridge, 1999
Jha D.N (ed), The Feudal Order, New Delhi, 2000
Kulke, H., The State in India (1000- 1700)
Majumdar R.C and Dasgupta K.K.(eds), A Comprehensive History of India Vol.Ill
Majumdar R.C. et al (eds), History and Culture of the Indian People Vol. IV and Vol. V
Meister M.M & Dhaky MA, Indian Temple Architecture, Delhi, 1983
Mukherjee B.N, Post-Gupta Coinages of Bengal, Calcutta, 1989
Mukhia, H., The Feudalism Debate
Rakaswami Vijaya, Walking Naked: Women,Society, Spirituality in South India (Simla, 1997)
Ray H.C, Dynastic History of Northern India (New Delhi, 1973)
Ray Nihar Ranjan et al ed., A Source Book of Indian Civilisation (Kolkata, 2000)
Rizvi, S.A.A, The Wonder that was India, Vol. II
Roy Kumkum (ed), Women in Early Indian Societies (New Delhi, 1999)
Sastri , K.A. Nilkanta, A History of South India from Prehistoric Times to the Fall of Vijaynagar,
Sastri K.A. Nilkantha, The Cholas (Madras, 1975 [reprint])
Sastri, K.A. Nilkanta (ed), A Comprehensive History of India Vol. II
Sharma R.S, Early Medieval Indian Society: A Study in Feudalisation, Delhi, 2001.
Sharma R.S, Indian Feudalism, University of Calcutta, 1965.

Sharma R.S, Perspectives in the Social and Economic History of Early India, New Delhi, 1983.
Sharma, R.S, Early Medieval Indian Society: A Study in Feudalisation (Delhi, 2001)
Sharma, R.S, Indian Feudalism
Singh Upinder ed., Rethinking Early Medieval India : A Reader, 2011
Singh Upinder, A History of Ancient and Early Medieval India. Delhi, 2008.
Thapar Romila, Early India: From the Origins to AD 1300, London, 2002
Thapar, R; Early India
Veluthat, K; The Political Structure of Early Medieval South India
India and the Expansion of Islam 7-11 century, 1990
Yadava, B.N.S, Society & Culture in North India in the 12th century
Yazdani, G., (ed), The Early History of the Deccan

বাশাম এ এল, অতীতের উজ্জ্বল ভারত, (The Wonder That Was India), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৫
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস (১ম খন্ড) (প্রাচীন ও মধ্যযুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, প্রথম মুদ্রণ নভেম্বর ১৯৯৭
ভট্টাচার্য, নরেন্দ্রনাথ, ধর্ম ও সংস্কৃতিক: প্রাচীন ভারতীয় প্রেক্ষাপট
চক্রবর্তী রণবীর, প্রাচীন ভারতের অর্থনৈতিক ইতিহাসের সন্ধানে, আনন্দ পাবলিশার্স, কলকাতা ২০০২
চক্রবর্তী রণবীর, ভারত ইতিহাসের আদি পর্ব, ওরিয়েন্ট লংম্যান,কলকাতা, ২০০৭
সেন সমরেন্দ্রনাথ, বিজ্ঞানের ইতিহাস, শৈব্যা প্রকাশন, ১৯৯৬
শর্মা রামশরণ, ভারতের সামন্ততন্ত্র, (Indian Feudalism), কে পি বাগচি এন্ড কোং, কলকাতা
শর্মা রামশরণ, আদি মধ্যযুগের ভারতীয় সমাজ: সামন্ত-প্রক্রিয়া বিষয়ে এক সমীক্ষা(Early Medieval Indian Society: A Study in Feudalisation), ওরিয়েন্ট লংম্যান, ২০০৩

CC-6 : Rise of the Modern West - I

I. Transition Debate on transition from feudalism to capitalism: problems and theories.

II a) The exploration of the new world: motives.
b.) Portugese and Spanish voyages.

III. a) Renaissance : its social roots
b.) Renaissance humanism
c.) Rediscovery of classics
d.) Italian renaissance and its impact on art, culture, education and political thought.
e.) Its spread in Europe

IV. a) Reformation movements: Origins & courses
b.) Martin Luther & Lutheranism
c.) John Calvin & Calvinism
d.) Radical reformation: Anabapists and Huguenots
e.) English reformation and the role of the state
f.) Counter Reformation

V. a) Economic developments
b.) Shift of economic balance from the Mediterranean to the Atlantic
c.) Commercial Revolution
d.) Price Revolution
e.) Agricultural Revolution and the Enclosure Movement

VI. a) Development of national monarchy
b.) Emergence of European state system

Essential Readings

Butterfield H., The Origins of Modern Science. The Macmillan Company. 1959
Cipolla Carlo M., Fontana Economic History of Europe, Vols. II and III Collins/ Fontana Books; 1978
Cipolla Carlo M., Before the Industrial Revolution, European Society and Economy, 1000-1700, W. W. Norton & Company; 3rd edition 1994
Coleman D.C (ed.), Revisions in Mercantilism Methuen & Co, 1969.
Davis Ralph, The Rise of the Atlantic Economics. Cornell University Press, 1973
Dobb Maurice, Studies in the Development of Capitalism, International Publishers, 1947
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Phukan Meenaxi, Rise of the Modern West: Social and Economic History of Early Modern Europe. Laxmi Publications 2013
Poliensky.V, war and Society in Europe, 1618-48 Cambridge University Press, 2008
Rabb Theodore K., The Struggle for Stability in Early Modern Europe. Oxford University Press, 1975
Scammell V., The First Imperial Age: European Overseas expansion, 1400-1715. Routledge, 2003

Vries Jan de, Economy of Europe in an Age of Crisis 1600-1750. New York: Cambridge University Press, 1976

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Anderson M.S, Europe in the Eighteenth Century Holt, Rinehart and Winston, 1961
Anderson, Perry, The lineages of the Absolutist States. Verso, 1979
Aston, T.H and Philipin C.H.E (eds.), The Brenner Debate: Agrarian Class Structure and Economic Development in Pre-Industrial Europe, Cambridge University Press, 2005.
Bernal J.D, Science in History Cambridge: The MIT Press, 1954
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Camerson, Euan (ed.), Early Modern Europe: An Oxford History, Oxford University Press 2001.
Dunn Rechard S., The Age of Religious Wars, 1559-1715, W.W.Norton & Company, 2004
Elton, G.R., Reformation Europe, 1517-1559 Wiley, 1999
Gilmore, M.P., The World of Humanism, 1453-1517 New York, Harper 1952
Hall, R., From Galileo to Newton Courier Corporation, 1981
Hill, Christopher, A century of Revolutions. Psychology Press, 2002
Hilton, Rodney, Transition from feudalism to Capitalism, Aakar Books, 2006
Koenigsberger, H.G and Mosse, G.L., Europe in the Sixteenth Century. Longmans, 1961

Lee, Stephen J., Aspects of European History, 1494-1789 Routledge, 1982
Parker, G. and Smith, L.M., General Crisis of the Seventeenth Century. Boston : Routledge & Kegan Paul, 1978.
Pennington, D.H., Seventeenth Century Europe. Longman, 1972
Rabb, Theodore K., The Struggle for Stability in Early Modern Europe. Oxford University Press, 1975
Rice, Eugene F. and Grafton, Anthony, The Foundations of Early Modern Europe, 1460-1559, W.W.Norton & Company, 2004.
The Cambridge Economic History of Europe, Vol.I, IV Cambridge University Press 1944
The New Cambridge Economic History of Europe, Vol.I, VII.

ত্রিপাঠী অমলেশ, ইতালির রেনেসাঁস বাঙালির সংস্কৃতি, আনন্দ পাবলিশার্স, কলকাতা ১৯৯৪
দাশগুপ্ত অশীন, ভারত মহাসাগরে বাণিজ্য ও রাজনীতি ১৫০০–১৮০০, আনন্দ পাবলিশার্স, কলকাতা, ১৯৯৯
বার্নাল জে ডি, ইতিহাসে বিজ্ঞান, (Science in History**)**, আনন্দ পাবলিশার্স, কলকাতা, ২০০৫
সেন সমরেন্দ্র, বিজ্ঞানের ইতিহাস, শৈব্যা প্রকাশন, কলকাতা, ১৯৯৬
ভট্টাচার্য স্নেহাদ্রি, ইংলন্ডের ইতিহাস (টিউডর যুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা, ১৯৯৫
চক্রবর্তী ভাস্কর, চক্রবর্তী সুভাষ রঞ্জন এবং চট্টোপাধ্যায় কিংশুক, ইউরোপে যুগান্তর, নবভারতী প্রকাশনী, কলকাতা, ২০০৫
মুখার্জী রীলা, রূপান্তরিত ইউরোপ(৯০০ - ১৮০০), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৪

CC-7 : HISTORY OF INDIA (c.1206-1526)

I. Interpreting the Delhi Sultanate:
Survey of sources: Persian tarikh tradition; vernacular histories; epigraphy

II. Sultanate Political Structures:
a. Foundation, expansion and consolidation of the Sultanate of Delhi; the Khaljis and the Tughluqs; Mongol threat and Timur's invasion; Rise and fall of Syed dynasty; The Lodis; Conquest of Bahlul and Sikandar; Ibrahim Lodi and the battle of Panipat;
b. Theories of Kingship; Ruling elites; Sufis, Ulama and the political authority; imperial monuments and coinage
c. Emergence of provincial dynasties: Bahamanis, Vijayanagar, Gujarat, Malwa, Jaunpur and Bengal
d. Consolidation of regional identities: regional art, architecture and literature

III. Society and Economy:
a. Iqta and the revenue-free grants
b. Agriculture production; technology
c. Changes in rural society; revenue systems
d. Monetization; market regulations; growth of urban centres; trade and commerce; Indian Ocean trade

IV. Religion and Culture:
a. Sufi silsilas: Chishtis and Suhrawardis; doctrines and practices; social roles.
b. Bhakti movements and monotheistic traditions in South and North India; Women Bhaktas;
Nathpanthis; Kabir, Nanak and the Sant tradition
c. Sufi literature; Malfuzat; Premakhayans
d. Architecture of the Delhi Sultanate

ESSENTIAL READINGS:
Asher, Catherine and Talbot Cynthia, India before Europe, Cambridge University Press, March 2006.
Chandra Satish, Medieval India I, Har Anand Publication, New Delhi, July 2007.
Habib Mohammad and Nizami K.A., eds, Comprehensive History of India, Vol. V, The Delhi Sultanate, People's Publishing House, 2nd Edition, 1992.
Hasan Mohibul, Historians of Medieval India, Meenakshi Prakashan, 1968.
Jackson Peter, The Delhi Sultanate, Cambridge University Press, Revised Edition, 2003.
Schomer, Karine, and McLeod W.H., (Eds), The Sants Studies in A Devotional Tradition of India, Motilal Banarsidas, Delhi, 1987.
Nizami K.A., Some Aspects of Religion and Politics in India During the 13th Century, Aligarh, 1961.
Raychaudhuri Tapan and Habib Irfan, (Eds), Cambridge Economic History of India, Vol. I: c. 1200 – c. 1750, Cambridge University Press, Cambridge, 1982, 1987 (reprint).
Rizvi S.A.A., A History of Sufism in India, Vol. I, Munshiram Manoharlal, New Delhi, 1978.

Suggested Readings
Ashraf K.M, Life and Conditions of the People of Hindusthan (1250 – 1550), Gyan Publishing House, 2000.

Eaton, R.M, The Rise of Islam and the Bengal Frontier (1204- 1760), University of California Press, July 1996.
Habib, Irfan, Medieval India: The Study of a Civilization, National Book Trust, July 2008.
Karashima, Noboru, South Indian History and Society: studies from inscriptions, A.D. 850 - 1800, Oxford, 1984.
Karashima, Noboru, Towards a New Formation: South Indian Society under Vijayanagara, Oxford University Press, 1992.
Kumar Sunil, The Emergence of the Sultanate of Delhi, Permanent Black, Delhi, First edition, 2010.
Stein, Burton, Peasant State and Society in Medieval South India, Oxford University Press, Oxford, February 1995.
Sherwani, H.K., Joshi, P.M. (eds), The History of Medieval Deccan (1295 - 1724), Government of Andhra Pradesh, Hyderabad, 1973-74.
Singh,Vipul, Interpreting Medieval India, Volume-I, Early Medieval, Delhi Sultanate and Regions (circa 750 – 1550), Macmillan Publishers India Ltd, 2009.
Tripathi, R.P; Some Aspects of Muslim Administration, The Indian Press Ltd., 1936.
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রায় মিহিরকুমার, ভারতের ইতিহাস (তুরক-আফগান যুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, দ্বিতীয় মুদ্রণ, ফেব্রুয়ারী ১৯৯২
হাবিব ইরফান, মধ্যযুগের ভারতের অর্থনৈতিক ইতিহাস, (Economic History of Medieval India: A Survey), প্রগ্রেসিভ পাবলিশার্স
হাবিব ইরফান, মধ্যকালীন ভারত ১-৪ খন্ড (Medieval India)কে পি বাগচি এন্ড কোং, কলকাতা
হাবিবুল্লাহ এ বি এম, ভারতে মুসলিম শাসনের প্রতিষ্ঠা ১২০৬-১২৯০, (The Foundation of Muslim Rule in India), প্রগ্রেসিভ পাবলিশার্স, কলকাতা
রায় অনিরুদ্ধ ও চট্টোপাধ্যায় রত্নাবলী, মধ্যযুগে বাংলার সমাজ ও সংস্কৃতি, কে পি বাগচি এন্ড কোং, কলকাতা ১৯৯২
রায় অনিরুদ্ধ, মধ্যযুগের ভারতের ইতিহাস : সুলতানি আমল, ওরিয়েন্ট লংম্যান, কলকাতা
করিম আব্দুল, বাংলার ইতিহাস : সুলতানি আমল, ঢাকা

CC-8 : Rise of the Modern West - II

I. **a)** Printing Revolution.
b) Revolution in war techniques

II . a.) Crisis in Europe in the 17th century
b.) Its economic, social and political dimensions

III. a.) The English Revolution : major issues
b.) Political and intellectual issues

IV. **a**.) Scientific Revolution
b.) Emergence of scientific academies
c.) Origins of Enlightenment

Va.) Mercantilism and European economics
b.) Preludes to the Industrial Revolution

VI. a). European Politics in the 17th & 18th Century
b.) Parliamentary monarchy
c.) patterns of Absolutism in Europe

Essential Readings

Butterfield H., The Origins of Modern Science. The Macmillan Company. 1959
Cipolla Carlo M., Fontana Economic History of Europe, Vols. II and III Collins/ Fontana Books; 1978
Cipolla Carlo M., Before the Industrial Revolution, European Society and Economy, 1000-1700, W. W. Norton & Company; 3rd edition 1994
Coleman D.C (ed.), Revisions in Mercantilism Methuen & Co, 1969.
Davis Ralph, The Rise of the Atlantic Economics. Cornell University Press, 1973
Dobb Maurice, Studies in the Development of Capitalism, International Publishers, 1947
Parker G., Europe in Crisis, 1598-1648 Ithaca, N.Y. : Cornell University Press. 1980
Parry, J.H., The Age of Reconnaissance University of California Press, 1981
Phukan Meenaxi, Rise of the Modern West: Social and Economic History of Early Modern Europe. Laxmi Publications 2013
Poliensky.V, war and Society in Europe, 1618-48 Cambridge University Press, 2008
Rabb Theodore K., The Struggle for Stability in Early Modern Europe. Oxford University Press, 1975
Scammell V., The First Imperial Age: European Overseas expansion, 1400-1715. Routledge, 2003
Vries Jan de, Economy of Europe in an Age of Crisis 1600-1750. New York: Cambridge University Press, 1976

Suggested Readings :

Anderson M.S, Europe in the Eighteenth Century Holt, Rinehart and Winston, 1961
Anderson, Perry, The lineages of the Absolutist States. Verso, 1979
Aston, T.H and Philipin C.H.E (eds.), The Brenner Debate: Agrarian Class Structure and Economic Development in Pre-Industrial Europe, Cambridge University Press, 2005.

Bernal J.D, Science in History Cambridge: The MIT Press, 1954
Burke, Peter, The Renaissance . Humanities Press International, 1987
Camerson, Euan (ed.), Early Modern Europe: An Oxford History, Oxford University Press 2001.
Dunn Rechard S., The Age of Religious Wars, 1559-1715, W.W.Norton & Company, 2004
Elton, G.R., Reformation Europe, 1517-1559 Wiley, 1999
Gilmore, M.P., The World of Humanism, 1453-1517 New York, Harper 1952
Hall, R., From Galileo to Newton Courier Corporation, 1981
Hill, Christopher, A century of Revolutions. Psychology Press, 2002
Hilton, Rodney, Transition from feudalism to Capitalism, Aakar Books, 2006
Koenigsberger, H.G and Mosse, G.L., Europe in the Sixteenth Century. Longmans, 1961

Lee, Stephen J., Aspects of European History, 1494-1789 Routledge, 1982
Parker, G. and Smith, L.M., General Crisis of the Seventeenth Century. Boston : Routledge & Kegan Paul, 1978.
Pennington, D.H., Seventeenth Century Europe. Longman, 1972
Rabb, Theodore K., The Struggle for Stability in Early Modern Europe. Oxford University Press, 1975
Rice, Eugene F. and Grafton, Anthony, The Foundations of Early Modern Europe, 1460-1559, W.W.Norton & Company, 2004.
The Cambridge Economic History of Europe, Vol.I, IV Cambridge University Press 1944
The New Cambridge Economic History of Europe, Vol.I, VII.

ত্রিপাঠী অমলেশ, ইতালির রেনেসাঁস বাঙালির সংস্কৃতি, আনন্দ পাবলিশার্স, কলকাতা ১৯৯৪
দাশগুপ্ত অশীন, ভারত মহাসাগরে বাণিজ্য ও রাজনীতি ১৫০০–১৮০০, আনন্দ পাবলিশার্স, কলকাতা, ১৯৯৯
বার্নাল জে ডি, ইতিহাসে বিজ্ঞান, (Science in History**)**, আনন্দ পাবলিশার্স, কলকাতা, ২০০৫
সেন সমরেন্দ্র, বিজ্ঞানের ইতিহাস, শৈব্যা প্রকাশন, কলকাতা, ১৯৯৬
ভট্টাচার্য স্নেহাদ্রি, ইংলন্ডের ইতিহাস (টিউডর যুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা, ১৯৯৫
চক্রবর্তী ভাস্কর, চক্রবর্তী সুভাষ রঞ্জন এবং চট্টোপাধ্যায় কিংশুক, ইউরোপে যুগান্তর, নবভারতী প্রকাশনী, কলকাতা, ২০০৫
মুখার্জী রীলা, রূপান্তরিত ইউরোপ(৯০০ - ১৮০০), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৪

CC-9 : History of India (c 1526 – 1605)

I. Sources and Historiography:
a) Persian literary culture; translations; Vernacular literary traditions.
b)Modern Interpretations

II. Establishment of Mughal rule:
a) India on the eve of Babur's Invasion
b) Fire arms, military technology and warfare
c) Humayun's struggle for empire
d) Sher Shah and his administrative and revenue reforms

III. Consolidation of Mughal rule under Akbar:
a) Campaigns and conquests: tactics and technology
b) Evolution of administrative institutions : Zabt, Masnab, Jagir, Madad-I-Maash
c) Revolts and resistance

IV. Expansion and Integration:
a)Incorporation of Rajputs and other indigenous groups in Mughal nobility.
b)North-West frontier, Gujarat and the Deccan
c) Conquest of Bengal

V. Rural Society and Economy:
a)Land rights and revenue system; Zamindars and Peasants; rural tensions
b)Extension of agriculture; agricultural production; crop patterns
c) Trade routes and patterns of internal commerce; overseas trade; rise of Surat

VI. Political and religious ideals:
a)Inclusive political ideas: theory and practice
b) Religious tolerance and Sulh-i-kul; Sufi mystical and intellectual interventions
c)Pressure from the Ulama

Readings

For readings – see the listing given in Paper -10

CC-10: History of India (c 1605 – 1750s)

I. Sources: Persian and vernacular literary cultures, histories, memoirs and travelogues
II. Political Culture under Jahangir and Shah Jahan
a) Extension of Mughal rule; changes in Mansab and Jagir systems; imperial culture
b) Orthodoxy and syncretism – Naqshbandi Sufis, Miyan Mir, Dara Shukoh, Samrad

III. Mughal Empire under Aurangzeb
a) State and religion under Aurangzeb; issues in the war of succession; policies regarding religious groups and institutions
b) Conquests and limits of expansion
c) Beginning of the crisis: contemporary perceptions; agrarian and Jagir crises; revolts.

IV. Visual Culture: Paintings and Architecture
V. Patterns of Regional Politics:
a) Rajput political culture and state formation
b) Deccan kingdoms; emergence of the Marathas; Shiva; expansion under the Peshwas
c) Mughal decline; emergence of successor states
d) Interpreting eighteenth century India: recent debates

V. Trade and Commerce
a)Crafts and technologies; Monetary system
b) Markets, transportation, urban centres
c) Indian Ocean trade network

Essential Readings

Alam Muzaffar and Subramaniam Sanjay , eds., The Mughal state, 1526-1750
Ali Athar M., The Mughal Nobility under Aurangzeb
Chandra Satish, Essays on Medieval Indian History
Dasgupta Ashin, Indian Merchants and the Decline of Surat, 1700 – 1750
Gordon Stewart, The Marathas 1600 – 1818
Habib Irfan, Agrarian System of Mughal India, 1526 – 1701
Koch Ebba, Mughal Art and Imperial Ideology
Qanungo, K.R, Dara Shukoh
Richards, J.F, The Mughal Empire
Rizvi, S.A.A, Muslim Revivalist Movements in Northern India.

Suggested Readings

Alam, Muzaffar-The Crisis of Empire in Mughal North India: Awadh and Punjab-1707-1748.
Alavi,Seema (ed.),The Eighteenth Century in India
Ali, M. Athar, Mughal India: Studies in Polity, Ideas, society and Culture.
Arasaratnam S., Maritime India in the Seventeenth Century
Asher Catherine, Architecture of Mughal India
Bandyopadhya S, From Plassey to Partition
Barnett,R.B, North India between Empires: Awadh, the Mughals and the British.
Bashir, Ahmed, Akbar, the Mughal Emperor.
Bayly, Susan, Caste, Society and Politics in India from the 18th century to the modern age.
Bayly,C.A., Indian Society and the Making of the British Empire;
Beach Milo, Mughal and Rajpur Paintings

Bernier, F, Travels in Mughal India.
Chandra Satish, Parties and Politics at the Mughal Court
Chandra, Satish, A History of Medieval India (Part II)
Chandra, Satish, Historiography, Religion and State in Medieval India
Chandra, Satish, Mughal Religious Policies, the Rajputs and the Deccan.
Chandra, Satish, The 18th century in India: Its economy and the Role of the Marathas, the jats and the Sikhs and the Afghans and Supplement (K.P.Bagchi)
Chaudhuri, K.N.,Trade & Civilization: An Economic History from the Rise of Islam to 1750.
Eaton, R.M., The Rise of Islam and the Bengal Frontier 1204-1760;
Eaton, R.M., The Sufis of Bijapur
Fukuzawa,H., The Medieval Deccan: Peasants, Social systems and States 16th to 18th centuries.
Gordon S.,The Marathas 16oo-1818
Grewal J.S.,The Sikhs of the Punjab
Habib Irfan(ed.), Medieval India
Habib Irfan (ed), Resistance and Modernization under Haider Ali and Tipu Sultan
Hasan S., Nurul,Thoughts on Agrarian Relations in Mughal India
Hasan S.Nurul, Reliogn, State, and Society in Medieval India
Husain Iqbal, Ruhela Chieftancies in 18th Century India
Kulke, H.(ed.),The State in India 1000-1700.
Malik, Z.U, The Reign of Muhammad Shah
Marshall P J., (Edited) , The Eighteenth century in Indian history: Evolution or revolution
Marshall P J.,East Indian Fortunes: the British in Bengal in the 18th Cent,
Mukhia Harbans, The Mughals of India
Nizami K.A., (ed.) Politics and society during the early Medieval Period : The collected Works of Prof. Md. Habib (2 vols.)
Raychoudhuri T.K. & Habib I. (eds.)-The Cambridge Economic History of India Vol.l
Richards J.F.,The Mughal Empire
Richards, J.F, Mughal Administration in Golconda
Rizvi S.A.A., A History of Sufism in India
Rizvi S.A.A., The Wonder that was India (vol.2);
Sarkar, Sir J.N., History of Aurangzeb 5 vols.
Sarkar, Sir J.N.,The Fall of the Mughal Empire, 4 vols.
Siddiqi. N.A., Land Revenue Administration Under the Mughals (1700- 1750)
Stein, Burton, Eighteenth Century in India: Another view (Studies in History, No.I, 1989)
Stein, Burton, Peasant, State and Society in Medieval South India (Oxford University Press)
Streusand D.F., The Formation of the Mughal Empire
Tripathi R.P., Some Aspects of Muslim Administration
Tripathi R.P.,The Rise & Fall of the Mughal Empire
Wink, Andre, Land and Sovereignty in India: Agrarian society and politics under the eighteenth century Maratha Swarajya.

আলি এম আথার, আওরঙ্গজেবের সময়ে মুঘল অভিজাত শ্রেণী(The Mughal Nobility under Aurangzeb) কে পি বাগচি এন্ড কোং, কলকাতা
বন্দ্যোপাধ্যায় শেখর, অষ্টাদশ শতকের মুঘল সংকট ও আধুনিক ইতিহাস চিন্তা, কলকাতা,১৯৮৩
ভদ্র গৌতম, মুঘল যুগে কৃষি অর্থনীতি ও কৃষক বিদ্রোহ, সুবর্ণরেখা, কলকাতা, ১৯৮৩
চন্দ্র সতীশ, মুঘল দরবারে দল ও রাজনীতি, (Parties and politics at the Mughal Court 1707-1740) কে পি বাগচি এন্ড কোং, কলকাতা

চৌধুরী বিনয় ভূষণ ও অন্যান্যরা, বাংলার কৃষি সমাজের গঠন, কে পি বাগচি এন্ড কোং, কলকাতা
হাবিব ইরফান, মধ্যকালীন ভারত, খন্ড ১-৪, কে পি বাগচি এন্ড কোং, কলকাতা
হাবিব ইরফান, মুঘল সাম্রাজ্য ও তার পতন- একটি সমীক্ষা, পশ্চিমবঙ্গ ইতিহাস সংসদ,২০০০
হাবিব ইরফান, মুঘল ভারতের কৃষি ব্যবস্থা, (The Agrarian System of Mughal India (1556-1707)), কে পি বাগচি এন্ড কোং, কলকাতা
হাবিব ইরফান, মধ্যযুগের ভারতের অর্থনৈতিক ইতিহাস, (Economic History of Medieval India: A Survey), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৯
হাবিব ইরফান, ভারতের ইতিহাস প্রসঙ্গঃ মার্কসীয় চেতনার আলোকে (Essays in Indian History: Towards a Marxist Perception), ন্যাশনাল বুক এজেন্সি, কলকাতা, ১৯৯৯
রায় অনিরুদ্ধ, মধ্যযুগের ভারতের অর্থনৈতিক ইতিহাস, ১২০০-১৭৫৭, প্রগ্রেসিভ পাবলিশার্স, কলকাতা
রায় অনিরুদ্ধ, মুঘল যুগের অর্থনৈতিক ইতিহাস, কে পি বাগচি এন্ড কোং, কলকাতা
সরকার জগদীশ নারায়ণ, মুঘল অর্থনীতিঃ সংগঠন এবং কার্যক্রম, (Mughal Economy : Organisation and Working) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা ১৯৯১
সিদ্দিকী নোমান আহমেদ, মোঘল রাজত্বে ভুমিরাজস্ব পরিচালন ব্যবস্থা (১৭০০ – ১৭৫০) (Land Administration Under the Mughals (1700 -1750) পার্ল পাবলিশার্স, কলকাতা, ১৯৮০
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস (২য় খন্ড)
(মুঘল ও ব্রিটিশ ভারত,পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ,কলকাতা ১৯৯৮
চট্টোপাধ্যায় রত্নাবলী, মুঘল যুগের দরবারি চিত্রকলা, থীমা, কলকাতা

CC-11: History of Modern Europe (c.1780 – 1939)

I. The French Revolution and its European repercussions:
a) Crisis of *ancien regime*
b) Intellectual currents
c) Social classes and emerging gender relations.
d) Phases of the French Revolution
e)Art and Culture of French Revolution
f)Napoleonic consolidation – reform and empire.

II. Restoration and Revolution: c.1815 - 1848
a) Forces of conservatism and restoration of old hierarchies.
b) Social, Political and intellectual currents.
c) Revolutionary and Radical movements, 1830 -1848

III. Capitalist Industrialization and Social and Economic Transformation (Late 18th century to AD 1914)
a) Process of capitalist development in industry and agriculture: case studies of Britain, France, the German States and Russia.
b) Evolution and Differentiation of social classes : Bourgeoisie, proletariat, Land Owning classes and peasantry.
c) Changing trends in demography and urban patterns
d)Family, gender and process of industrialization.

IV. Varieties of Nationalism and the Remaking of States in the 19th and 20th centuries.
a)Intellectual currents, popular movements and the formation of National identities in Germany, Italy, Ireland and the Balkans.
b) Specifications of economic development, political and administrative Reorganization – Italy; Germany.
c) Revolutions of 1905; the Bolshevik Revolution of 1917
d) Programme of Socialist Construction and the Soviet Union during the inter-war period 1918-39.

V. Imperialism, War and Crisis: c.1880 - 1918
a) Theories and mechanisms of imperialism;
b) Growth of Militarism;
c) Power blocks and alliances;
d) Expansion of European empires
e) War of 1914 - 1918

VI. Europe between Two World Wars:
a) Post War Europe: A Diplomatic History
b) The Great Depression
c) Rise of Fascism in Italy and Nazism in Germany
d) The Spanish Civil War
e) Policy of Appeasement and Russo German Non-Aggression Pact
f) Origins and Course of the Second World War

Essential Readings

Brennan Gerald, The Spanish Labyrinth: An Account of the Social and Political Background of the Civil War.
Cipolla C.M, Fontana Economic History of Europe, Volume III: The Industrial Revolution
Davies Norman, Europe
Evans J., The Foundations of a Modern State in 19th Century Europe
Hamerow T.S, Restoration, Revolution and Reaction : Economics and Politics in Germany [1815 – 1871]
Hobsbawn, E.J, The Age of Revolution
Hunt Lynn, Politics, Culture and Class in the French Revolution
Joll James, Europe Since 1870
Landes David; Prometheus Unbound
Lefebvre George, Coming of the French Revolution
Lichteim, A Short History of Socialism
Mathias Peter, First Industrial Revolution
Nove, Alec; An Economic History of the USSR
Porter Andrew, European Imperialism, 1876 – 1914
Wood Anthony, History of Europe, 1815 – 1960
Woolf Stuart, History of Italy, 1700 to 1860

Suggested Readings

Barraclough G., An Introduction to Contemporary History
Blanning, T.C.W, The French Revolution: Class War or Culture Clash
Braudel Fernand, History and the Social Science in M. Aymard and Mukhia H. ed., French Studies in History, Vol.I (1989)
Briggs Asa and Clavin Patricia, Modern Europe: 1789 – Present
Calleo D, German Problem Reconsidered
Carr E.H, International Relations between the Two World Wars
Carr E.H, The Bolshevik Revolution (Vol. I, II, III)
Cobban, Alfred, History of Modern France, Volume I – III
Dobb Maurice, Soviet Economic Development since 1917
Doyle, William, Origins of the French Revolution
Droz. Jacques, Europe Between Revolutions
Ellis G., The Napoleonic Empire
Evans, J., The Foundations of a Modern State in 19th Century Europe
Hamerow, T.S, Restoration, Revolution and Reaction : Economics and Politics in Germany (1815 – 1871)
Hanham H.J, Nineteenth Century Constitution, 1815-1914
Hobsbawm, E.J, Age of Capital
Hobsbawm, E.J, Age of Empire
Hobsbawm, E.J, Age of Revolution
Hobsbawm, E.J, Nation and Nationalism
Hufton, Olwen, Europe: Privilege and Protest
Jelavich Charles and Jelavich Barbara, Establishment of the Balkan National States, 1840 – 1920
Joll James, Europe Since 1870
Joll James, Origins of the First World War, 1989
Landes Jaon B., Women and the Public Sphere in the Age of the French Revolution
Lee Stephen J., Aspects of European History 1789 – 1980
Licas Colin, The French Revolution and the Making of Modern Political Culture

Lowenthal David, The Past is a Foreign Country
Lyon Martin, Napoleon Bonaparte & the Legacy of the French Revolution
Mansergh Nicholas, The Irish Question, 1840 – 1921
Morgan K.O, Oxford Illustrated History of Britain, Volume 3 (1789-1983)
Morgan R.P, German Social Democracy and the First International
Perrot M. and Duby G. [eds.], A History of Women in the West, Volumes 4 and 5
Renton Dave, Fascism: Theory and Practice
Riasanovsky N.V, A History of Russia
Robert J.M, Europe 1880 to 1985
Roth J.J (ed), World War I: A Turning Point in Modern History
Rude, George, Revolutionary Europe
Schamma Simon , Citizens: A chronicle of the French Revolution
Soboul Albert, History of the French Revolution (in two Volumes)
Stone Lawrence, History and the Social Sciences in the twentieth Century, The Past and the Present, 1981
Taylor A.J.P, Europe: Grandeur and Decline
Taylor A.J.P, The Course of German History
Taylor A.J.P, The Origin of the Second World War
Taylor, A.J.P, The Struggle for Mastery in Europe
Thompson Dorothy; Chartists: Popular Politics in the Industrial Revolution
Thompson, E.P, Making of the English Working Class
Thomson, David, Europe Since Napoleon
Vovelle Michael, Fall of the French Monarchy, 1984.
Watson H. Seton, The Russian Empire
Watson, Seton, The Russian Empire
Williams Raymond, Culture and Society

গৌতম চট্টোপাধ্যায় সম্পাদিত: দু'শো বছরের আলোকে, পশ্চিমবঙ্গ ইতিহাস সংসদ, ১৯৮৯
চক্রবর্তী সুভাষ রঞ্জন, ফরাসী বিপ্লব, পশ্চিমবঙ্গ পুস্তক পর্ষদ, কলকাতা
চক্রবর্তী সুভাষ রঞ্জন, ইউরোপের ইতিহাস, পশ্চিমবঙ্গ পুস্তক পর্ষদ, কলকাতা, ১৯৮৬
জ্যাকসন টি এ, ফরাসী বিপ্লব - দশ দিগন্ত, কে পি বাগচি এন্ড কোং, কলকাতা ২০০৪
টমসসন ডেভিড, বিশ্ব ইতিহাসের প্রেক্ষাপটে ইউরোপ, ১ম খন্ড (১৭৮৯-১৮৫০), ২য় খন্ড (১৮৫১-১৯১৪) প্রগ্রেসিভ পাবলিশার্স, কলকাতা ২০০২ ও ২০০৩
রায় সিদ্ধার্থ গুহ, আধুনিক ইউরোপঃ ফরাসী বিপ্লব থেকে দ্বিতীয় বিশ্বযুদ্ধ, প্রগতিশীল প্রকাশক, কলকাতা, ২০১৩

CC-12: History of India (c 1750s – 1857)

I. India in the mid 18th Century; Society, Economy, Polity

II. Expansion and Consolidation of Colonial Power :

a) Mercantilism, foreign trade and early forms of exactions from Bengal

b) Dynamics of expansion, with special reference to Bengal, Mysore, Western India, Awadh, Punjab and Sindh.

III. Colonial State and Ideology:

a) Arms of the colonial state : army, police, law

b) Ideologies of the Raj and racial attitudes.

c) Education : indigenous and modern.

IV. Rural Economy and Society:

a) Land revenue systems and forest policy

b) Commercialization and indebtedness

c) Rural society : change and continuity.

d) Famines

e)Pastoral economy and shifting cultivation.

V. Trade and Industry

a)De industrialization

b)Trade and fiscal policy

c) Drain of Wealth

d) Growth of modern industry

VI. Popular Resistance:

a) Santhal uprising (1857); Indigo rebellion (1860); Pabna Agrarian Leagues(1873); Deccan riots (1875)

b) Uprising of 1857

Essential Readings

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Ray, Rajat K., ed., Entrepreneurship and Industry in India, 1800-1947, Oxford In India Readings.
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Stokes, Eric, English Utilitarians and India
Stokes, Eric, The Peasant Armed: The Indian Rebellion of 1857, ed. Bayly, C.A, New Delhi, Oxford University Press, 1986

Suggested Readings

Arnold David and Guha Ramchandra , eds., Nature, Culture and Imperialism
Bagchi, Amiya, Private Investment in India
Chandra Bipan, Panikkar, K.K, Mukherjee Mridula, Mahajan Sucheta and Mukherjee Aditya, India's Struggles for Independence.
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Desai, A.R, Peasant Struggles in India
Dutt, R.P, India today
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Krishnamurti, J., Women in Colonial India.

বন্দ্যোপাধ্যায় শেখর, অষ্টাদশ শতকের মুঘল সংকট ও আধুনিক ইতিহাস চিন্তা, কলকাতা,১৯৮৩
বন্দ্যোপাধ্যায় শেখর, পলাশী থেকে পার্টিশন: আধুনিক ভারতের ইতিহাস, ওরিয়েন্ট লংম্যান, ২০০৪
ভট্টাচার্য সব্যসাচী, ঔপনিবেশিক ভারতের অর্থনীতি, কলকাতা, ২০০০
সুনীল সেন, ভারতে কৃষিকার্য ১৭৯৩-১৯৪৭, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৫
চৌধুরী বিনয় ভূষণ, ঔপনিবেশিক আমলে বাংলার কৃষি ইতিহাস, কে পি বাগচি এন্ড কোং, কলকাতা
ইসলাম, সিরাজুল, বাংলার ইতিহাস ঔপনিবেশিক শাসনকাঠামো, চয়নিকা, ঢাকা, ২০০২
চক্রবর্তী মৃণাল, সিরাজ-উদ্-দৌলা, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ,কলকাতা, ১৯৮১
রায় রজতকান্ত, পলাশীর ষড়যন্ত্র ও সেকালের সমাজ, আনন্দ পাবলিশার্স, কলকাতা
চৌধুরী সুশীল, পলাশীর অজানা কাহিনী, আনন্দ পাবলিসার্স,কলকাতা

CC-13 : History of India (c. 1857 – 1964)

I. Cultural changes and Social and Religious Reform Movements:
a) Growth of a new intelligentsia – the Press and Public Opinion
b) Reform and Revival : Brahmo Samaj, Prarthna Samaj, and Ramakrishna and Vivekananda, Arya Samaj, Wahabi, Deoband, Aligarh and Singh Sabha Movements.
c)Debates around gender
d)Making of religious and linguistic identities
e)Caste : Sanskritising and anti Brahminical trends

II. Nationalism : Trends up to 1919
a)Formation of early political organizations
b) Moderates and extremists
c)Swadeshi movement
d)Revolutionaries

III. Gandhian nationalism after 1919 : Ideas and Movements:
a)Mahatma Gandhi : his Perspectives and Methods
b)i) Impact of the First World War
ii) Rowlatt Satyagraha and Jalianwala Bagh
iii)Non-Cooperative and Civil Disobedience
iv)Provincial Autonomy, Quit India and INA
c)Left wing movements
d)Princely India : States people movements

IV. Nationalism and Social Groups : Interfaces:
a) Landlords, Professionals and Middle Classes
b)Peasants
c)Tribals
d)labours
e)Dalits
f)Women
g)Business groups

V.Communalism : Ideologies and practices, RSS , Hindu Maha Sabha, Muslim League

VI. Independence and Partition
a)Negotiations for independence and partition
b)Popular movements
c)Partition riots

VII. Emergence of a New State:
a)Making of the Constitution
b)Integration of princely states
c) Land reform and beginnings of planning
d) The Nehru years.

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Bandyopadhyay Sekhar, From Plassey to Partition and After
Brass Paul, The Politics of India since Independence, OUP, 1990
Brown Judith, Gandhi's rise to power, 1915-22
Brown Judith, Gandhi and Civil Disobedience
Brown Judith,Nehru : A political Life. New Delhi: Oxford University Press 2003
Chandra Bipan, et Al., India's Struggle for Independence
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Chandra Bipan, Communalism in Modern India (2nd Ed., 1987)
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Chatterjee Joya, Bengal Divided : Hindu Communalism and Partition 1932 – 1947, O.U.P, 1994
Desai, A.R, Social Background to Indian Nationalism
Desai, A.R Peasant Struggles in India
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Gallagher J., Johnson, G. Seal, A Locality, Province and Nation
Hardy Peter, Muslims of British India
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Hassan Mushirul ed., India's Partition, Oxford in India Readings
Hutchins F., Illusion of Permanence
Kumar Ravinder, Social History of Modern India
Krishnamurty J., Women in Colonial India
Low D.A (ed.) Congress and the Raj
McLane J.R, Indian Nationalism and Early Congress
Pandey Gyanendra, The Construction of Communalism in Colonial North India
Sarkar Sumit , Swadeshi Movement in Bengal
Sarkar Sumit, Modern India, 1885-1947
Sarkar Susobhan, Notes on Bengal Renaissance
Seal Anil, Emergence of Indian Nationalism
Sen S.N, An Advanced History of Modern India, Kolkata, 2010
Stokes Eric, Peasants and the Raj : Studies in Agrarian Society and Peasant Rebellion in Colonial India
Tripathi Amales, The Extremist Challenge
Zelliot Elleanor, From Untouchables to Dalit : Essays on the Ambedkar Movement

বন্দ্যোপাধ্যায় শেখর, পলাশি থেকে পার্টিশান ও তারপর (From Plassey to Partition and after), ওরিয়েন্ট লংম্যান
চন্দ্র বিপান এবং অন্যান্য, ভারতের স্বাধীনতা সংগ্রাম, (India's Struggle for Independence) কে পি বাগচি এন্ড কোং, কলকাতা
চন্দ্র বিপান এবং অন্যান্য, ভারতবর্ষ - স্বাধীনতার পরে, (India after Independence), আনন্দ পাবলিশার্স, কলকাতা
দেশাই এ আর, ভারতীয় জাতীয়তাবাদের সামাজিক পটভূমি, (Social Background to Indian Nationalism) কে পি বাগচি এন্ড কোং, কলকাতা
জয়া চ্যাটার্জী, বাংলা ভাগ হলঃ হিন্দু সাম্প্রদায়িকতা ও দেশ-বিভাগ, ১৯৩২-১৯৪৭ (Bengal Divided : Hindu Communalism and Partition 1932 – 1947) এল আলমা পাবলিকেশনস, কলকাতা, ২০০৩

দত্ত রজনী পাম, আজিকার ভারত (India Today)
সরকার সুশোভন, বাংলার রেনেসাঁস, (Notes on Bengal Renaissance), দীপায়ন, কলকাতা
ত্রিপাঠী অমলেশ, ভারতের মুক্তিসংগ্রামে চরমপন্থী পর্ব, (The Extremist Challenge) আনন্দ পাবলিশার্স, কলকাতা
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস(২য় খন্ড) (মুঘল ও ব্রিটিশ ভারত) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৪র্থ মুদ্রণ, ১৯৯৮
সুর নিখিল, ভারতীয় জাতীয়তাবাদী আন্দোলনের পটভূমি, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৯
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৮৫৮-১৯২০) (১ম খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৮
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৯২০-১৯৪৭) (২য় খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৯
সেন সুনীল, ভারতে কৃষিসম্পর্ক(১৭৯৩-১৯৪৭)(Agrarian Relations in India (1793-1847) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৫
ত্রিপাঠী অমলেশ, স্বাধীনতা সংগ্রামে ভারতের জাতীয় কংগ্রেস, আনন্দ পাবলিশার্স, কলকাতা
চন্দ্র বিপান, আধুনিক ভারতঃ ঔপনিবেশিকতাবাদ ও জাতীয়তাবাদ (Nationalism and Colonialism), কে পি বাগচি এন্ড কোং, কলকাতা

CC-14 : History of World Politics: 1945-1994

I. The Cold War: Weakening of European balance of power: Origins of The Cold War: Yalta and Potsdam Conferences; End of wartime alliance.

II. The USA in World Politics: Truman Doctrine, Marshall Plan, NATO.

III. The USSR in World Politics: Molotov Plan, COMECON and Cominform; Sovietisation of Eastern Europe; Berlin Blockade; Warsaw Pact.

IV. Manifestation of Cold War: The Korean Crisis- End of French Colonial rule in Indo-China and the Vietnam War – Cuban Crisis.

V. De-Stalinisation; Thaw in Cold War; Détente and road to the ending of Cold War.

VI. Disintegration and Decline of the Soviet Union – Glasnost and Perestroika – Crisis of Socialist regimes in other East European Countries: Poland, Germany, Czechoslovakia, Hungary – Response of the USA; Rise of a Unipolar World system, Globalization.

VII. Emergence of the People's Republic of China – China and the USA – Sino-Soviet rift.

VIII. West Asian Crisis – Palestine and Western Powers – Birth of Israel – Arab-Israel Conflict –The Suez Crisis (1956); Origin and Formation of PLO; Yom Kippur War(1973) ; Camp David Accord(1979); Oslo Peace Accord(1993).

IX. Decolonization: The African Case Study: Ghana, Algeria, Congo, Kenya.

X. Protest Politics: Civil Rights Movement, Anti-Apartheid Movement and the end of Apartheid (1994), Second Wave Feminist Movement.

Selected Readings

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P. Eric Louw , The Rise, Fall, and Legacy of Apartheid, Praeger, 2004

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Mark Newman , The Civil Rights Movement , Edinburgh University Press, 2004

চক্রবর্তী রাধারমণ ও চক্রবর্তী সুকল্পা, সমসাময়িক আন্তর্জাতিক সম্পর্ক , প্রগ্রেসিভ পাবলিশার্স, কলিকাতা।

চট্টোপাধ্যায় প্রণবকুমার, আন্তর্জাতিক সম্পর্কের ইতিহাস, কলিকাতা ১৯৯৪।

Discipline Specific Elective: DSE TH&TU

Paper 1 DSE-A-1 SEM -5: History of Bengal (c.1757-1905)

I. Political history of Bengal under the Nawabs: Rise of British power in Bengal from the battle of Plassey to Buxar.
II. .Administrative history: 1765--1833
III. Colonial economy: - Agriculture, trade and industry.
IV. Cultural changes and Social and Religious Reform Movements:
Christian missionaries- The advent of printing and its implications, education: Indigenous and western - Hindu and Muslim religious revivalist movements.
V. Social Reforms and the women's question.
VI. Protest movements and insurgencies against the Raj: The Fakir and Sannyasi revolts, Indigo Revolt (1859-1860), Pabna Peasant Uprisings (1873-76)
VII. Partition of Bengal 1905: Curzon and the administrative blueprint.

Select Readings:

Bandyopadhyay, Sekhar. From Plassey to Partition: A History of Modern India. New Delhi: Orient Blackswan , 2004

Banerjee Dube, Ishita. A History of Modern India. Cambridge University Press, 2015

Bayly C.A., Indian Society and the Making of the British Empire Cambridge University Press, 1995

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Marshall P.J, Bengal the British Bridgehead Bengal: The British Bridgehead: Eastern India 1740-1828. Cambridge University Press. 1987

Metcalfe, Thomas, Ideologies of the Raj. Cambridge: Cambridge University Press, 1995.
Sinha , N.K. ed. The history of Bengal 1757- 1905 Calcutta: Calcutta University Press, 1967

বন্দ্যোপাধ্যায় শেখর, পলাশি থেকে পার্টিশান, ওরিয়েন্ট লংম্যান
চন্দ্র বিপান এবং অন্যান্য, ভারতের স্বাধীনতা সংগ্রাম, কে পি বাগচি এন্ড কোং, কলকাতা
চন্দ্র বিপান এবং অন্যান্য, ভারতবর্ষ – স্বাধীনতার পরে, , আনন্দ পাবলিশার্স, কলকাতা
চন্দ্র বিপান, আধুনিক ভারতঃ ঔপনিবেশিকতাবাদ ও জাতীয়তাবাদ, কে পি বাগচি এন্ড কোং, কলকাতা
চ্যাটার্জী জয়া, বাংলা ভাগ হোলঃ হিন্দু সাম্প্রদায়িকতা ও দেশ-বিভাগ, ১৯৩২-১৯৪৭। এল আলমা পাবলিকেশনস, কলকাতা, ২০০৩

দেশাই এ আর, ভারতীয় জাতীয়তাবাদের সামাজিক পটভূমি, কে পি বাগচি এন্ড কোং, কলকাতা

দত্ত রজনী পাম, আজিকার ভারত সরকার সুশোভন, বাংলার রেনেসাঁস, দীপায়ন, কলকাতা
ত্রিপাঠী অমলেশ, স্বাধীনতা সংগ্রামে ভারতের জাতীয় কংগ্রেস ১৮৮৫-১৯৪৭। কলকাতা আনন্দ পাবলিশার্স, ২০১২।
ত্রিপাঠী অমলেশ, ভারতের মুক্তিসংরামে চরমপন্থী পর্ব, আনন্দ পাবলিশার্স, কলকাতা
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস(২য় খন্ড) (মুঘল ও ব্রিটিশ ভারত) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৪র্থ মুদ্রণ, ১৯৯৮
সুর নিখিল, ভারতীয় জাতীয়তাবাদী আন্দোলনের পটভূমি, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৯
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৮৫৮-১৯২০) (১ম খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৮
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৯২০-১৯৪৭) (২য় খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৯
সেন সুনীল, ভারতে কৃষিসম্পর্ক(১৭৯৩-১৯৪৭) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৫
ত্রিপাঠী অমলেশ, স্বাধীনতা সংগ্রামে ভারতের জাতীয় কংগ্রেস, আনন্দ পাবলিশার্স, কলকাতা

Paper 2 DSE-A-3 SEM -6: History of Bengal (c.1905-1947)

I. Partition of Bengal and Swadeshi Movement (1905-08) Political ideology and organizations, rise of Extremism in Bengal, Swadeshi movement, Revolutionary terrorism.

II. Communal Politics: 1906- 30 Birth of Muslim League, and the Hindu response.

III. Gandhian nationalism after 1919, Non- Cooperation and Khilafat movement, Swaraj party, Civil Disobedience movement, Revolutionary Nationalists and the beginnings of Left politics in the 1920s, Rise of Krishak Praja Party, Muslim League in Bengal politics.

IV. Government of India Act 1935 and its aftermath:

V. Peasant Movements in Bengal 1920-1946, Labour Movement in Bengal 1920-1946, Caste Movement in Bengal 1920-1946, Women's Movements in Bengal 1920-1946.

VI. Subhash Chandra Bose and the Congress, Quit India Movement in Bengal, Post war upsurges in Bengal- Left wing movements.

VIII. Independence and Partition: Communal Riots, the great Calcutta killing and Noakhali riots, Hindu Mahasabha, Muslim League, freedom and Partition, Birth of West Bengal and East Pakistan.

Select Readings:

Bhattacharya Sabyasachi , The Defining Moments in Bengal 1920–1947 New Delhi: Oxford University Press, 2014.

Brown Judith, Gandhi's rise to Power, 1915-22. Cambridge University Press, 1974

Brown Judith, Gandhi: A Prisoner of Hope. Yale University Press, 1991

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Hiren Chakrabarty, Political Protest In Bengal : Boycott and Terrorism 1905-1918 Papyrus,Calcutta

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Sarkar Sumit, Modern India, 1885-1947. Macmillan Publishers India Publication, 2000.

Sarkar Sumit , The Swadeshi Movement in Bengal 1903-1908 New Delhi: People's Publishing House, 1973

Tripathi Amalesh, The Extremist Challenge: India between 1890 and 1910 Orient Longmans, 1967.

বন্দ্যোপাধ্যায় শেখর, পলাশি থেকে পার্টিশান, ওরিয়েন্ট লংম্যান

চন্দ্র বিপান এবং অন্যান্য, ভারতের স্বাধীনতা সংগ্রাম, কে পি বাগচি এন্ড কোং, কলকাতা

চন্দ্র বিপান এবং অন্যান্য, ভারতবর্ষ – স্বাধীনতার পরে, , আনন্দ পাবলিশার্স, কলকাতা

চন্দ্র বিপান, আধুনিক ভারতঃ ঔপনিবেশিকতাবাদ ও জাতীয়তাবাদ, কে পি বাগচি এন্ড কোং, কলকাতা

চ্যাটার্জী জয়া, বাংলা ভাগ হোলঃ হিন্দু সাম্প্রদায়িকতা ও দেশ-বিভাগ, ১৯৩২-১৯৪৭। এল আলমা পাবলিকেশনস, কলকাতা, ২০০৩

দেশাই এ আর, ভারতীয় জাতীয়তাবাদের সামাজিক পটভূমি, কে পি বাগচি এন্ড কোং, কলকাত

দত্ত রজনী পাম, আজিকার ভারত সরকার সুশোভন, বাংলার রেনেসাঁস, দীপায়ন, কলকাতা
ত্রিপাঠী অমলেশ, স্বাধীনতা সংগ্রামে ভারতের জাতীয় কংগ্রেস ১৮৮৫-১৯৪৭। কলকাতা আনন্দ পাবলিশার্স, ২০১২।
ত্রিপাঠী অমলেশ, ভারতের মুক্তিসংরামে চরমপন্থী পর্ব, আনন্দ পাবলিশার্স, কলকাতা
ভট্টাচার্য সব্যসাচী, বাংলায় সন্ধিক্ষণঃ ইতিহাসের ধারা ১৯২০-৪৭। অক্সফোর্ড ইউনিভার্সিটি প্রেসঃ ২০১৮।
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস(২য় খন্ড) (মুঘল ও ব্রিটিশ ভারত) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৪র্থ মুদ্রণ, ১৯৯৮
সুর নিখিল, ভারতীয় জাতীয়তাবাদী আন্দোলনের পটভূমি, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৯
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৮৫৮-১৯২০) (১ম খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৮
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৯২০-১৯৪৭) (২য় খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ,১৯৯৯
সেন সুনীল, ভারতে কৃষিসম্পর্ক(১৭৯৩-১৯৪৭) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৫
ত্রিপাঠী অমলেশ, স্বাধীনতা সংগ্রামে ভারতের জাতীয় কংগ্রেস, আনন্দ পাবলিশার্স, কলকাতা

Paper 3 DSE-B-2 SEM -5: History of Southeast Asia – The 19th Century

I. Pre-Colonial Structures of Power and Authority c.1800

II. Economy and Society in early 19th c.

a)Patterns of production in agriculture and the crafts

b) Organisation of trade and banking
c) Cultural expressions : Folk and Classical
d)Islam and popular culture

III. Colonisation and Colonial Transformations:
a)Processes of colonial controls and the Informal Empire in Thailand
b) Peasant society and agrarian transformations, plantations, forests, mining.
c) Urbanisation : Colonial cities in Plural Societies
d) Culture : i) Colonial Discourses and the Creation of National Culture
ii)Oral traditions, literacy and the case of Malay Hikayats.
iii) Creation of Perfect Natives
iv) Education

Essential Readings
Anderson B., Imagined Communities: Reflections on the Origin and Spread of Nationalism Verso 1983
Benda H., The Crescent and the Rising Sun. The Hague, W. van Hoeve , 1958.
Furnivall, Colonisation and the Plural Society Oxford University. Press, 1980
Hart G., ed., Agrarian Transformations: Local Processes and the state in South-East Asia. Berkeley : University of California Press,1989

Kemp J., ed., Peasants and Cities, Cities and Peasants : Rethinking Southeast Asian Models.
Osborne Milton, South East Asia : An Introductory History Allen & Unwin, 2016.
Tarling Nicholas, ed., Cambridge History of South-East Asia, 2 vols. Cambridge University Press . 1993
দাসগুপ্ত অরুণ, দক্ষিণ পূর্ব এশিয়ার ইতিহাস
সেন জহর, দক্ষিণ পূর্ব এশিয়ার ইতিহাস

Suggested Readings
Anderson B., Mythology and the Tolerance of the Javanese Southeast Asia Program Cornell University monograph series, Modern Indonesia Project (1985)
Dijk Van C., Trousers, Sarongs and Jubbahs
Dobblin C., Islamic Revivalism in a Changed Peasant Economy (1784 – 1847) London: Curzon Press, 1983
Keys, Charles F., The Golden Peninsula Honolulu : University of Hawaii Press, 1995.
Lev Daniel S., and McVey T., eds, Making Indonesia – Essays on Modern Indonesia. Ithaca: Cornell Southeast Asia Program, 1996
Purcell Victor, The Chinese in South-East Asia London and New York: Oxford University Press, 1951
Winichakul Tongchai, Siam Mapped : A History of the Geo-Body of a Nation University of Hawaii Press, 1994
Wyatt, David K, Thailand: Studies in Thai History, 1999

Paper 4 DSE-B-4 SEM -6: History of Southeast Asia – The 20th Century

I. Migration : Indian and Chinese Labour and Capital

II. Movements of Resistance and the making of new identities
a) Peasant resistance
b) Radicalism and the Origins of the Vietnamese Revolution, 1920-1946
c) Indonesian Revolution, 1945-1949

III. Emergence of Modern Nations and States
a) The Union of Burma (Mynamar), 1948-1962
b) Indonesia, the Sukarno Era, 1949-1965
c) Two Vietnams : 1946 - 1976

Essential Readings

Amin Mohammad and Malcolm Coldwell, ed, Malay: The Making of a Neo Colony, 1977
Anderson B., Imagined Communities Reflections on the Origin and Spread of Nationalism Verso 1983
Bandyopadhyay Sekhar, Burma Today, 1987
Benda H., The Crescent and the Rising Sun The Hague, W. van Hoeve, 1958.

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Hart G., ed., Agrarian Transformations: Local Processes and the state in South-East Asia Berkeley : University of California Press,1989
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Legge John D, Indonesia (1964)
Osborne Milton, South East Asia: An Introductory History Osborne Milton, Allen & Unwin, 2016.
Ryan N. J, A History of Malaysia and Singapore, 1976
Sardesai D.R, Vietnam : Trials and tribulations of a Nation (1988)
Tarling Nicholas, ed., Cambridge History of South-East Asia, 2 vols. Cambridge University Press . 1993

সেন জহর, দক্ষিণ পূর্ব এশিয়ার ইতিহাস, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ,
মুখোপাধ্যায় সুবোধ, দক্ষিণ পূর্ব এশিয়া ,

Suggested Readings

Anderson B., Mythology and the Tolerance of the Javanese Southeast Asia Program Cornell University monograph series, Modern Indonesia Project (1985)
Dijk Van C., Trousers, Sarongs and Jubbahs
Dobblin C., Islamic Revivalism in a Changed Peasant Economy (1784 – 1847)) London: Curzon Press, 1983
Keys, Charles F., The Golden Peninsula Honolulu :University of Hawaii Press, 1995.
Lev Daniel S., and McVey T., eds, Making Indonesia – Essays on Modern Indonesia. Ithaca: Cornell Southeast Asia Program, 1996
Purcell Victor, The Chinese in South-East Asia London and New York: Oxford University Press, 1951

Winichakul Tongchai, Siam Mapped : A History of the Geo-Body of a Nation University of Hawaii Press, 1994

Wyatt, David K, Thailand: Studies in Thai History, 1999

Paper 5 DSE-B-1 SEM -5: History of Modern East Asia – I China (c.1840 – 1949)

I. Imperialism and China during the 19th and early 20th century

a) Chinese feudalism : Gentry, Bureaucracy and peasantry; the Confucian value system; Sinocentrism; the canton commercial system
b)The transformation of China into an informal colony; the Opium Wars; the Unequal Treaties; the scramble for concessions; Finance Imperialism; the Open Door policy.
c)Agrarian and Popular Movements : Taiping and Yi Ho Tuan
d)Attempts at Self-Strengthening (Tzu-Chiang): Reforms of 1860-95; 1898; and 1901-08.
ii) The Emergence of Nationalism in China
a)The Revolution of 1911: Causes , nature and significance; the social composition of the Revolution; Sun Yat-sen and his contribution; the formation of the Republic; Yuan Shih Kai; War Lordism.
b)May Fourth Movement of 1919: Nature and Significance

II. History of China (cc.1919 – 1949)

i) Nationalism and Communism in China (1921 – 1937)
a) Formation of CCP; and the
b) The First United Front
i)The Communist Movement (1938-1949)
ii)The Jiangxi Period and the rise of Mao Tse Tung

Essential Readings

Beckamann George M., Modernization of China and Japan Harper & Row, 1962
Bianco Lucien, Origins of the Chinese Revolution, 1915 -1949 Stanford University Press, 1973
Chesneaux Jean, et al, China from Opium War to 1911 Revolution to Liberation. Hassocks, Sussex : The Harvester Press, cop.1976
Chesneaux Jean, Peasant Revolts in China, 1840 – 1949 W. W. Norton ,1973
Chung Tan, China and the Brave New World : A Study of the Origins of the Opium War, 1840 - 42
Chung Tan, Triton and Dragon : Studies on the Nineteenth Century China and Imperialisms Gian Publishing House, 1986
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Jansen M.B., Japan and China: From War to Peace, 1894 – 1972 Chicago : Rand McNally College Pub. Co., [1975
Johnson Chalmers A, Peasant Nationalism and Communist Power: The Emergence of Red China, 1937 -1945 Stanford, 1962

Michael Franz, The Taiping Rebellion Seattle and London: University of Washington Press, 1971

Peffer Nathaniel, The Far East: A Modern History. University of Michigan Press, 1958
Purcell Victor, The Boxer Uprising: A Background Study. Cambridge University Press, 2010
Schifrin Harold Z, Sun Yat-Sen and the Origin of the Chinese Revolution. University of California Press, 1968

Schuramann Franz and Schell Orville (eds.), China Readings, 2 Volumes, (Imperial China, and Republican China) Penguin; First edition 1967
Schwartz Benjamin I., Mao and the Rise of Chinese Communism. Stanford, Stanford University Press,. 1951.
Sheng Hu, Imperialism and Chinese Politics. Foreign Languages Press, 1981
The Yi Ho Tuan Movement, The Revolution of 1911, Foreign Language Press, Beijing.
Tse Tung Chow, The May Fourth Movement: Intellectual Revolution in Modern China. Stanford University Press: Stanford, 1967
Wright Mary C., China in Revolution : The First Phase, 1900 – 1913. New Haven: Yale University Press, 1968
Yu-teng Ssu and K. Fairbank John , China's Response to the West. Cambridge: Harvard University Press, 1954

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ভট্টাচার্য অমিত– চীনের রূপান্তরের ইতিহাস, ১৮৪০–১৯৮৯, কলকাতা, ২০০৪
চট্টোপাধ্যায় হরপ্রসাদ, চীনের ইতিহাস, কলকাতা, ১৯৮৮
সেন জহর, এ যুগের চীনকথা, কলকাতা, ২০০৭

Paper 6 DSE-B-3 SEM -6: History of Modern East Asia – II Japan (c.1868 – 1945)

I) Transition from feudalism to capitalism:
a) Crisis of Tokugawa Bakuhan system
b) Meiji Restoration : Its nature and Significance
c) Political Reorganization
d) Military Reforms

e) Social, cultural and educational reforms (Bunmeikaika)
f) Financial reforms and educational development in the 'Meiji' era
g) Meiji Constitution

II) Japanese Imperialism
a) China
b) Manchuria
c) Korea
3) Democracy and Militarism / Fascism
a) Popular/ People's Rights Movement
b) Nature of political parties
c) Rise of Militarism-Nature and significance
d) Second World War; American occupation
e) Post-War Changes

Essential Readings

Allen George, A Short Economic History of Modern Japan. Psychology Press, 2003
Beasley G., The Modern History of Japan. Weidenfeld & Nicolson, 1963
Beckman George M, Modernization of China and Japan. Joanna Cotler Books , 1962
Beckman George M, The Making of the Meiji Constitution . Praeger; New edition 1975
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Livingstone Jon, et al., The Japan Reader (Imperial Japan **:** 1800 **–** 1945)**,** Vol.I Pantheon, 1974
Mikiso Hane, Modern Japan: A Historical Survey. Westview Press, 4th edition 2008
Norman E.H, Japan's Emergence as a Modern State. Greenwood Press, 1973
Peffer Nathaniel, The Far East: A Modern History. University of Michigan Press, 1968 -
Pyle Kenneth B., The Making of Modern Japan. D.C. Heath, 1996
Storry Richard, A History of Modern Japan Penguin Books, 1991
Vinacke H, A History of the Far East in Modern Times 1928

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ভট্টাচার্য অমিত– জাপানের রূপান্তরের ইতিহাস, ১৬০০–১৯৪৫, কলকাতা, ২০০৫
চট্টোপাধ্যায় হরপ্রসাদ, জাপানের ইতিহাস, কলকাতা, ১৯৮৬
গুহরায় সিদ্ধার্থ, – আধুনিক পূর্ব এশিয়ার ইতিহাস **:** চীন ও জাপানের ইতিহাস, কলকাতা, ১৯৯৬

Paper 7 DSE-A-2 SEM -5: History of United States of America – I (c.1776 – 1945)

I. The Background:
The land and indigenous people: settlement and colonization by Europeans; early colonial society and politics; indentured labour- White and Black.

II. Making of the Republic:
a)Revolution : Sources of conflict : Revolutionary groups, Ideology: The War of Independence and its historical interpretations

b) Processes and Features of Construction making : Debates, Historical interpretations.

III. Evolution of American Democracy:
a)Federalists: Jeffersonianism: Jacksonianism, Rise of political parties- 1840 – 1960; judiciary-role of the Supreme Court
b) Expansion of Frontier: Turner's Thesis; Marginalization, displacement and decimation of native Americans; Case histories of Tecumseh , Shawnee Prophet.
c)Limits of Democracy: Blacks and Women

IV. Early Capitalism
a) Beginnings of Industrialization
b) Immigrants and changing composition of Labour; Early Labour Movements.

V. The Agrarian South :
a)Plantation economy
b)Slave Society and Culture: Slave resistance.

VI. Ante Bellum Foreign Policy:
War of 1812: Monroe Doctrine: Manifest Destiny

VII. Civil War:
a)Abolitionism and Sectionalism
b)Issues and interpretations
c)Rise of Republicanism, Emancipation and Lincoln

Essential Readings

Bailyn Bernard, The Great Republic 1985.
Bailyn Bernard, The Ideological Origins of the American Revolution. Harvard University Press 1967
Beard Charles, An Economic Interpretation of the American Constitution. Macmillan, 1921
Brown Dee, Bury My Heart at Wounded Knee, An Indian History of the American West. Grover Gardner 1970
Carroll Peter and Noble David, Free and Unfree: A New History of the United States. Penguin Books, 1977.
Davis David B., The Problem of Slavery in the Age of Revolution *1770-1823*. New York: Oxford University Press, 1999.
Faulkner U., American Economic History . New York, Harper, 1960
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Hofstadter Richard, The Age of Reform, From Bryan to FDR. Vintage Books, 1955
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Stampp Kenneth, The Peculiar Institution, Slavery in the Antebellum South. (New York: Alfred A. Knopf, 1956
Jackson Frederick Turner, The Frontier in American History. Henry Holt, 1921
Wiebe Robert, The Search for Order. Farrar, Straus and Giroux, 1967

Suggested Readings

Benson Lee, The Concept of Jackson Democracy: New York as a Test Case Princeton Legacy Library 1961
Billington Ray A., Westward Expansion. UNM Press, 2001
Boyer Paul, Sitkoff Harvard, Woloch Nancy, The Enduring Vision : A History of the American People, Vols. 1 and 2. Houghton Mifflin; 5th Revised edition 2003
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Degler Carl N., At Odds: Women and Family in America from the Revolution to the Present. Oxford University Press, 1980
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Kennedy, David M., Bailey Thomas and Piehl Mel, The Brief American Pageant. Cengage Learning, 1999.
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Washington : American Enterprise Institute for Public Policy Research, 1975]
Leopard Richard W., The Growth of American Foreign Policy. Alfred A. Knopf 1967
Miller Perry, From Colony to Province. Harvard University Press, 1953
Nash Gary (ed.), Retracing the Past. Longman, 2000
Pelling Henry, American Labor. University of Chicago 1960
Pessen Edward, Jacksonian Panorama. Bobbs-Merrill, 1976
Sellers Charles, May Henry and McMillen Neil, A Synopsis of American History; 2 volumes. Rand McNally College Pub. Co., 1976
Tripathi Dwijendra and Tiwari S.C., Themes and Perspectives in American History American Studies Research Centre, 1978.
Weinstein James, The Corporate Ideal in the Liberal state. 1900-1918 Beacon Press, 1985

Paper 8 DSE-A-4 SEM -6: History of United States of America – II (c.1776-1945)

I. Reconstructions: Political changes and agrarian transformation:

a) Conservative and Radical phases.

b) The New South : Participants and Reactions, Carpetbaggers; Scalawags, Blacks, Ku Klux Klan.

II. Industrial America:

a)Growth of Capitalism and Big Business.
b) Business cycles; Depression..

III. Resistance and Reform:
a)Labour movements and Unionization.
b) Agrarian crisis and populism. Urban corruption and progressivism.
c) New Deal.

IV. U.S Imperialism
a) Spanish-American War
b) Expansion in the Far east and Latin America
c) World War I and Fourteen Points
d) Isolation
e) Americans in World War II: Bombing of Hiroshima and Nagasaki

V. Afro-American Movements:
Black Movements: Booker T. Washington, W.E.B Dubois, NAACP and Marcus Garvey.

VI. Women's Movements:
a) Rise of the Lowell Factory System
b) Abolitionists and Women's rights movement
c) Suffrage
d) Afro-American Women

VII. Religious, Cultural and Intellectual Trends:
a)Religious movements; Early Revivalism; Puritans, Quakers; Mormons; Temperance
b) Mass Culture (circa 1900 – 1945)
c) Major Literary trends (circa 1900 – 1945)

Essential Readings
Bailyn Bernard, The Great Republic 1985.
Bailyn Bernard, The Ideological Origins of the American Revolution. Harvard University Press 1967
Beard Charles, An Economic Interpretation of the American Constitution. Macmillan, 1921
Brown Dee, Bury My Heart at Wounded Knee, An Indian History of the American West. Grover Gardner 1970
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Fogel Robert, Railroads and American Economic Growth Baltimore: Johns Hopkins Press, 1964.
Foner Eric, America's Black Past. Harper collins, 1970
Franklin, John Hope, From Slavery to Freedom. New York: Alfred A Knopf, 1947
Grobb Gerald N., and Billias George A., Interpretations of American History: Patterns and Perspectives, 2 Vols. New York, Free Press 1972.
Hofstadter Richard, The Age of Reform, From Bryan to FDR. Vintage Books, 1955
Kerber Linda, Women's America: Refocussing the Past. Oxford University Press, 1991
Potter David M., The Impending Crisis HarperCollins, 1977
Pratt W., A History of the United States Foreign Policy. Prentice-Hall, 1965

Randail James, The Civil War and Reconstruction. W. W. Norton & Company ,1937
Randall J.G and Donald David, The Civil War and Reconstruction. Pickle Partners Publishing, 2016
Stampp Kenneth, The Peculiar Institution, Slavery in the Antebellum South. (New York: Alfred A. Knopf, 1956
Jackson Frederick Turner, The Frontier in American History. Henry Holt, 1921
Wiebe Robert, The Search for Order. Farrar, Straus and Giroux, 1967

Suggested Readings

Benson Lee, The Concept of Jackson Democracy**:** New York as a Test Case Princeton Legacy Library 1961

Billington Ray A., Westward Expansion. UNM Press, 2001
Boyer Paul, Sitkoff Harvard, Woloch Nancy, The Enduring Vision : A History of the American People, Vols. 1 and 2. Houghton Mifflin; 5th Revised edition 2003
Cochran Thomas, The Inner Revolution Harper Torchbooks, The Academy Library), 1964.
Craven A.O., The Growth of Southern Nationalism, 1848 – 1861. Louisiana State University Press, 1953
Davis lance E.,(ed.), American Economic Growth. Harper & Row; First edition 1972
Degler Carl N., At Odds: Women and Family in America from the Revolution to the Present. Oxford University Press, 1980
Fogel and Engerman, Time on the Cross. Brown and Company, 1974.
Gould Lewis L., (ed.), The Progressive Era. Longman, 2001
Hicks, John D., The Federal Union : A History of USA since 1865. Houghton Mifflin, 1964
Kaushik R.P., Significant Themes in American History. Ajanta Publications, 1983
Kennedy, David M., Bailey Thomas and Piehl Mel, The Brief American Pageant. Cengage Learning, 1999.
Kristol Irving, Wood Gordon and others, America's Continuing Revolution.
Washington : American Enterprise Institute for Public Policy Research, 1975]
Leopard Richard W., The Growth of American Foreign Policy. Alfred A. Knopf 1967
Miller Perry, From Colony to Province. Harvard University Press, 1953
Nash Gary (ed.), Retracing the Past. Longman, 2000
Pelling Henry, American Labor. University of Chicago 1960
Pessen Edward, Jacksonian Panorama. Bobbs-Merrill, 1976
Sellers Charles, May Henry and McMillen Neil, A Synopsis of American History; 2 volumes. Rand McNally College Pub. Co., 1976
Tripathi Dwijendra and Tiwari S.C., Themes and Perspectives in American History American Studies Research Centre, 1978.
Weinstein James, The Corporate Ideal in the Liberal state. 1900-1918 Beacon Press, 1985

Skill Enhancement Courses (SEC –A & B) Credits,-2 each

SEC –A (1): Archives and museums

This course introduces students to the institutions that house and maintain documentary, visual and material remains of the past. Museums and archives are among the most important such repositories and this course explains their significance and how they work. Students will be encouraged to undertake collection, documentation and exhibition of such materials in their localities and colleges. Visit to National Archives and National Museum are an integral part of the course.

I. Definition and history of development (with special reference to India)

II. **Types of archives and museums**: Understanding the traditions of preservation in India Collection policies, ethics and procedures Collection: field exploration, excavation, purchase, gift and bequests, loans and deposits, exchanges, treasure trove confiscation and others. Documentation: accessioning, indexing, cataloguing, digital documentation and de-accessioning Preservation: curatorial care, preventive conservation, chemical preservation and restoration

III. Museum Presentation and Exhibition:

IV. **IV. Museums, Archives and Society:** (Education and communication Outreach activities

Essential Readings:

Agrawal, O.P., Essentials of Conservation and Museology,Sundeep Prakashan, New *Delhi*, India, 2007.

Choudhary, R.D. Museums of India and their maladies. Calcutta: Agam Kala Prakashan, New Delhi, 1998(In Bengali).

Guha, Thakurta, Tapati, Monuments, Objects, Histories: Institution of Art in Colonial Post Colonial India, New York, 2004

Kathpalia, Y. P. Conservation and Restoration of Archive Materials. UNESCO, 1973

Mathur Saloni, India by Design: Colonial History and Cultural Display, University of California, 2007

Nair, S.M. Bio-Deterioration of Museum Materials.2011

Roychowdhury, Madhuparna. Displaying India's Heritage : Archaelogy and the Museum Movement in Colonial India. Delhi: Orient Blackswan 2015

Sengupta, S. Experiencing History Through Archives. Delhi: Munshiram Manoharlal.2004.

SEC –B (1) Understanding Popular Culture

The paper examines some popular cultures expressed in different mediums like visual, oral and cultural. In the process of theirevolution, these cultures eclectically draw from traditions, articulate anxieties, and even give rise to new traditions. The paper endeavours to equip students with understanding such phenomena historically, with special reference to India. It is imperative that the students use electronic devices to view, record, and document the subject matter.

I Introduction: Defining popular culture and understanding it historically

II Visual expressions Folk art, calendar art, photography
III. Performance: Theatre; music; folk tales/songs/swang and Nautanki:Identifying themes,functionality, anxieties
IV. The audio-visual: cinema and television:
Indian cinema: Mapping the influence of the national struggle for independence (1930s and 40s); Idealized nationalism (1950s), disillusionment and the anti-establishment mood (1970s and 80s); documentary films Expressions of popular culture in television
V. Fairs, Festivals and Rituals:
Disentangling mythological stories, patronage, regional variations
VI. Popular culture in a globalized world:
The impact of the Internet and audio-visual media
Essential Readings:
Dissanayake, W. and K. M. Gokul Singh, Indian Popular Cinema, Trentham Book, London, 2004
John Storey, Cultural Theory and Popular Culture, London, 2001
Oberoi, Patricia, Freedom and Destiny: Gender, Family and Popular Culture in India, Delhi, 2009
Christopher Princy, Camera Indica: The Social Life of Indian Photographs, Chicago, 1998
Suggested Readings:
Ramanujan, A.K. Folktales from India A Selection of Oral Tales from Twenty-two Languages (Only Introduction). New York : Pantheon Books, ©1991.
Ramaswamy, V. 'Women and the 'Domestic' in Tamil Folk Songs' in Kumkum Sangari and Uma Chakravarti, eds., From Myths to Markets: Essays on Gender, Shimla, 1999
Singh, Lata (ed.), Theatre in Colonial India: Playhouse of Power, New Delhi, 2009

SEC –A (2) Understanding Heritage

This course will enable students to understand the different facets of heritage and their significance. It highlights the legal and institutional frameworks for heritage protection in India as also the challenges facing it. The implications of the rapidly changing interface between heritage and history will also be examined. The course will be strongly project-based and will require visits to sites and monuments. At least two Projects will be based on visits to Museums/Heritage Sites.

I. Defining Heritage
Meaning of 'antiquity', 'archaeological site', 'tangible heritage', 'Intangible heritage' and 'art treasure'
II. Evolution of Heritage Legislation and the Institutional Framework:
Conventions and Acts— national and international Heritage-related government departments, museums, regulatory bodies etc.
Conservation Initiatives
III. Challenges facing Tangible and Intangible Heritage
Development, antiquity smuggling, conflict (to be examined through Specific case studies)
IV. Evolution of Heritage Legislation and the Institutional Framework:
Conventions and Acts— national and international Heritage-related government departments, museums, regulatory bodies etc.
Conservation Initiatives
V. Challenges facing Tangible and Intangible Heritage:
Development, antiquity smuggling, conflict (to be examined through specific case studies)
VI. Heritage and Travel:
Viewing Heritage Sites - The relationship between cultural heritage, Landscape and travel recent trends

Essential Readings
David Lowenthal, Possessed By The Past: The Heritage Crusade and The Spoils of History, Cambridge, 2010

Layton, R. P. Stone and J. Thomas. Destruction and Conservation of Cultural Property, London: Rutledge, 2001

Lahiri, N., Marshaling the Past - Ancient India and its Modern Histories. Ranikhet: Permanent Black. 2012. Chapters 4 and 5.

S.S. Biswas, Protecting the Cultural Heritage (National Legislations and International Conventions). New Delhi: INTACH, 1999.

Suggested Readings
Acts, Charters and Conventions are available on the UNESCO and ASI websites (www.unesco.org; www.asi.nic.in)

Agrawal, O.P., Essentials of Conservation and Museology, Delhi, 2006

Chainani, S. 2007. Heritage and Environment. Mumbai: Urban Design Research Institute, 2007

SEC –B (2): Art Appreciation: an Introduction to Indian Art

The purpose of this course is to introduce students to Indian art, from ancient to contemporary times, in order to understand and appreciate its diversity and its aesthetic richness. The course will equip students with the abilities to understand art as a medium of cultural expression. It will give students direct exposure to Indian art through visuals, and visits to sites and museums.

I. Prehistoric and protohistoric art: _Rock art; Harappan arts and crafts

II. Indian art (c. 600 BCE – 600 CE):

World Heritage Site Managers, UNESCO World Heritage Manuals
[Can be downloaded/ accessed at www.unesco.org]

Notions of art and craft Canons of Indian paintings Major developments in stupa, cave, and temple art and architecture Early Indian sculpture: style and iconography Numismatic art

III. Indian Art (c. 600 CE – 1200 CE) : Temple forms and their architectural features Early illustrated manuscripts and mural painting traditions Early medieval sculpture: style and iconography Indian bronzes or metal icons

IV. Indian art and architecture (c. 1200 CE – 1800 CE) :
Sultanate and Mughal architecture Miniature painting traditions: Mughal, Rajasthani, Pahari Introduction to fort, palace and haveli architecture

V. Modern and Contemporary Indian art and Architecture:
The Colonial Period Art movements: Bengal School of Art, Progressive Artists Group, etc. Major artists and their artworks Popular art forms (folk art traditions)

Essential Readings

Neumayer, Erwin, Lines of Stone: The pre-historic rock-art of India,
South Asia Books, 1993
Goswamy, B.N., Essence of Indian Art, Asian Art Museum of San
Francisco, 1986
Huntington, Susan, The Art of Ancient India: Hindu, Buddhist, Jain, Weatherhill, 1985
Guha-Thakurta, Tapati, The making of a new modern Indian art: Aesthetics and nationalism in Bengal, 1850-1920, Cambridge University Press, 1992

Suggested Readings:

Mitter, Partha, Indian Art, Oxford History of Art series, Oxford University Press, 2001
Dhar, Parul Pandya, ed., 2011, Indian Art History Changing Perspectives, New Delhi: D.K. Printworld and National Museum Institute (Introduction).
Beach, M.C., The New Cambridge History of India I: 3, Mughal and Rajput Painting, Cambridge University Press, 1992.
Ray, Niharranjan, An Approach to Indian Art, Calcutta, 1970

CBCS SYLLABUS

IN

HISTORY (GENERAL)

CALCUTTA UNIVERSITY

2018

University of Calcutta

HIS-G (General)-CBCS Syllabus in History, 2018

4 Core Courses. (CC.) 2 Discipline-specific Elective; (DSE-A & DSE-B) 2 Generic Elective (GE) 2 Skill Enhancement/Skill based Courses (SEC- A & SEC-B)

- Each course carries 80 marks. Minimum 60 classes.
- Each course: 6 credits (5 Theoretical + 1 Tutorial-related). Teaching time: 6 hrs per week or 6x14 =84 hrs
- Exception: Skill Enhancement/Skill-based Courses: 2 credits (no Tutorial).
- 65 marks for theoretical segment:
- Question Pattern for subjective/descriptive segment of 50 marks: 3 questions out of 6(within 500 words; 10 x3 = 30) + 4 questions out of 8 (within 250 words; one from each module 5x4=20) and 15 objective type questions carrying 1 mark each (15 x 1 = 15).
- 15 marks for tutorial-related segments as suggested below (any one from each mode):
- Any one of the following modes: upto 1000 words for one Term Paper/upto 500 words for each of the two Term Papers/ equivalent Book Review --- based on syllabus related and/or current topics [The modes and themes and/or topics are be decided by the concerned faculty of respective colleges.]
- Core Courses (CC) in Semesters 1- 4 ; Generic Elective (GE) courses in Semesters 1-4; Skill Enhancement courses (SEC-A) in Semesters 3/5 & (SEC- B) in Semesters 4/6 Discipline-specific Elective(DSE –A) in Semester 5 (DSE –B) in Semester 6
- **Skill Enhancement/Skill-based Courses: 2 credits (no Tutorial).**
- Each course carries 80 marks. Teaching time: 2hrs per week or 2x14=28hrs
- 80 marks for theoretical segment.
- Question Pattern for subjective/descriptive segment of 80 marks: 4 questions out of 8 (within 500 words; (10 x4 = 40) + 5 questions out of 10 (within 250 words; 5x5=25) and 15 objective type questions carrying 1 mark each (15 x 1 = 15).

IMPORTANT NOTES:

- The Readings provided below (except Bengali books) include those of the UGC Model CBCS Syllabus in History. For Course Objectives and references it is advised that the UGC model CBCS syllabus concerning relevant courses and topics should be given due importance and primarily consulted.
- Bengali are not necessarily substitutes, but supplementary to the English books.
- The format is subject to the CBCS Common Structural Format of the University.

LIST OF COURSES FOR GENERAL PROGRAMME	
COURSE CODE	**(6 Credits per Core Course)**
Subject-Hon-Core-Semester-Paper-Th &TU	**CORE COURSES FOR GENERAL & GENERIC ELECTIVE FOR HONOURS**
HIS-G-CC/GE-1-1-TH&TU	
HIS-G-CC/GE-2-2-TH&TU	
HIS-G-CC/GE-3-3-TH&TU	
HIS-G-CC/GE-4-4-TH&TU	
Skill Enhancement Course (2 Credits per Course)	
GROUP-A	**HIS-G-SEC- 3/5-A(1) or A (2)-TH**
SEC-A-(1)	
SEC-A-(2)	
GROUP-B	**HIS-G-SEC- 4/6-B(1) or B(2)-TH**
SEC-B-(1)	
SEC-B-(2)	
DISCIPLINE SPECIFIC ELECTIVE (6 Credits per Course)	
GROUP-A	**HIS-G-DSE- 5-A(1) or A(2)-TH&TU**
DSE-A-(1)	
DSE-A-(2)	
GROUP-B	**HIS-G-DSE-6-B(1) or B (2)-TH&TU**
DSE-B-(1)	
DSE-B-(2)	

Structure of B.A General (Programme)

HIS-G - CC -1- 4 /GE -1-4 TH&TU

1History of India from the Earliest Times upto 300 CE
2.History of India from C.300 to 1206.
3.History of India from C. 1206to1707
4.History of India from 1707to1950

Discipline Specific Elective (DSE -A &DSE- B) TH&TU Any One from DSE-A in Semester 5 & Any One from DSE-B in Semester 6

1. National liberation Movements in 20th Century World.
2. Some Aspects of European History: C.1780-1945.
3. Patterns of Capitalism in Europe: C.16TH Century to early 20th Century
4. Some Aspects of Society &Economy of Modern Europe: 15 – 18 Century

Skill Enhancement Courses SEC –A & B: Any One from SEC-A1/ SEC-A2 in Semester 3/5. Any One from SEC-B1/ SEC-B2 in Semester 4/6

SEC -A 1: Historical Tourism: Theory &Practice
SEC -B 1: Museums &Archives in India
SEC –A 2: Indian History &Culture
SEC-B 2: Orality and Oral Culture in India

Semester wise Courses for HIS-G

	SEM-1	SEM-2	SEM-3	SEM-4	SEM-5	SEM-6
CC	CC-1 2TH +2TU	CC -2 2TH +2TU	CC-3 2TH +2TU	CC-4 2TH +2TU		
GE	GE-1 TH +TU	GE-2 TH +TU				
AECC	AECC-1 TH	AECC-2 TH				
DSE			DSE-A TH +TU	DSE-B TH +TU	DSE-A TH +TU	DSE-B TH +TU
SEC			SEC-A -1 TH	SEC-B -1 TH	SEC-A 2 TH	SEC-B 2 TH

CC: 4 courses each from 2 disciplines. (One course from each subject under each semester) Each course is of 6 credits.
GE: Two courses from one subject different from the core subject. Each course is of 6 credits.

AECC:-1 Communicative English AECC-2- Environmental studies (Each course has 2 credits)
DSE: 2 courses each from 2 disciplines. Each course is of 6 credits.
SEC: 2 courses each from 2 disciplines ((Each course has 2 credits)
DSE/ SEC : Choice must be group specific to each semester

CC -1/GE-1 : History of India from Earliest Times up to 300 CE

I. Sources & Interpretation

II. A broad survey of Palaeolithic, Mesolithic and Neolithic Cultures.

III. Harappan Civilization : Origin, Extent, dominant features &decline, Chalcolithic age.

IV. The Vedic Period: Polity, Society, Economy and Religion, Iron Age with reference to PGW &Megaliths.

V. Territorial States and the rise of Magadha,
Conditions for the rise of Mahajanpadas and the Causes of Magadha's success
VI. Iranian and Macedonian Invasions, Alexander's Invasion and impact
VII. Jainism and Buddhism: Causes, Doctrines, Spread, Decline and Contributions
VIII. The Satavahanas Phase: Aspects of Political History, Material Culture, Administration, Religion

VIII. Emergence and Growth of Mauryan Empire; State Administration, Economy, Ashoka's Dhamma, Art &Architecture

IX. The Satvahana Phase: Aspects of Political History, Administration, Material Culture, & Religion

X. The Sangam Age: Sangam Literature, The three Early Kingdoms, Society & the Tamil language

XI. The age of the Indo-Greeks, Shakas: Parthians & Kushanas: Aspects of Polity, Society, Religion, Arts &Crafts, Coins, Commerce and Towns.

References:

Agrawal, D.P. The Archaeology of India. Curzon Press, 1982

Basham, A.L. The Wonder that was India: A Survey of the Culture of the Indian Sub-Continent before the Coming of the Muslims. Picador, 2004

Chakrabarti, D.K. Archaeology of Ancient Indian Cities OUP India; 1998

Jaiswal, Suvira, Caste: Origin, Function and Dimensions of Change. Manohar Publishers 1998

Subramanian, N. Sangam Polity

Thapar, Romila The Penguin History of Early India: From the Origins to AD 1300 University of California Press; 1st edition 2004

Allchin, F.R. and B Origins of a Civilization: The Prehistory and Early Archaeology of South Asia New Delhi : Viking, 1997.

Jha, D.N. Ancient India in Historical Outline .Manohar, New Delhi (1998 edn.)
Kosambi, D.D. Culture and Civilization of Ancient India World Publishing Company, 1969

Ray, H.P. Monastery and guild : commerce under the Sātavāhanas
Delhi ; New York : Oxford University Press, 1986.

Sastri, K.A.N. A History of South India **:**From Prehistoric Times to the Fall of Vijayanagar OUP India 1976

R.S Sharma, India's Ancient Past Delhi: Oxford University Press 2005

Ray, Niharranjan , Maurya and Post Maurya Art: A Study in Social and Formal Contrasts . Indian Council of Historical Research, 1975

Sharma, R.S., Aspects of Political Ideas and Institutions in Ancient India (1991 edn.)
Thapar, Romila Ashoka and the Decline of the Mauryas Oxford University Press (1997 edn)
Yazdani, G. Early History of Deccan Aspects of Political Ideas and Institutions in Ancient India (1991 edn.)

বাশাম এ এল, অতীতের উজ্জ্বল ভারত, (The Wonder That Was India), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৫
চক্রবর্তী রণবীর, ভারত ইতিহাসের আদি পর্ব, কলকাতা, ২০০৭
হাবিব ইরফান, ভারতবর্ষের সাধারণ মানুষের ইতিহাস
প্রথম খন্ড – প্রাক-ইতিহাস, (Pre-history) এন বি এ, কলকাতা, ২০০২
দ্বিতীয় খন্ড: সিন্ধু সভ্যতা, (The Indus Civilisation) এন বি এ, কলকাতা, ২০০২
তৃতীয় খন্ড – বৈদিক সভ্যতা, (The Vedic Age) এন বি এ, কলকাতা, ২০০২
ঝা ডি এন, আদি ভারত – একটি সংক্ষিপ্ত ইতিহাস, (Ancient India: An Introduction,) প্রগ্রেসিভ পাবলিশার্স, কলকাতা
কোশাম্বী ডি ডি, ভারত ইতিহাস চর্চার ভূমিকা (An Introduction to the Study of Indian History) বাগচি কে পি এন্ড কোং, কলকাতা, ২০০২
রত্নাগর শিরিণ, হরপ্পা সভ্যতার সন্ধানে (Understanding Harappa) এন বি এ, কলকাতা, ২০০৩
রায়চৌধুরী হেমচন্দ্র, প্রাচীন ভারতের রাজনৈতিক ইতিহাস, (Political History of Ancient India), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ**,** কলকাতা
থাপার রোমিলা, ভারতবর্ষের ইতিহাস, ওরিয়েন্ট লংম্যান, কলকাতা
ভট্টাচার্য নরেন্দ্রনাথ, প্রাচীন ভারতে ধর্ম, কলকাতা, ১৯৮৮

ভট্টাচার্য নরেন্দ্রনাথ, প্রাচীন ভারতীয় সমাজ, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
ভট্টাচার্য সুকুমারী, ইতিহাসের আলোকে বৈদিক সাহিত্য, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
ভট্টাচার্য সুকুমারী, প্রাচীন ভারত- সমাজ ও সাহিত্য, আনন্দ পাবলিশার্স, কলকাতা
চক্রবর্তী দিলীপ কুমার - ভারতবর্ষের প্রাক্ ইতিহাস আনন্দ পাবলিশার্স, কলকাতা, ১৯৯৯
গঙ্গোপাধ্যায় দিলীপ কুমার - ভারত ইতিহাসের সন্ধানে, (২ খন্ডে), ২০০৭
চক্রবর্তী রণবীর, প্রাচীন ভারতের অর্থনৈতিক ইতিহাসের সন্ধানে, আনন্দ পাবলিশার্স, কলকাতা ২০০২ (সংশোধিত সংস্করণ)
চানানা দেবরাজ, প্রাচীন ভারতে দাস প্রথা, (Slavery in Ancient India as depicted in Pali and Sanskrit Texts), কে পি বাগচি এন্ড কোং, কলকাতা ১৯৯৫
রায় নীহাররঞ্জন, বাঙালির ইতিহাস, কলকাতা, ১৯৮০(দ্বিতীয় সংস্করণ)
শর্মা রামশরণ, প্রাচীন ভারতে বস্তুগত সংস্কৃতি ও সমাজ সংগঠন, (Material Cultures and Social Formations in Ancient India), ওরিয়েন্ট লংম্যান, ১৯৯৮
শর্মা রামশরণ, আদি মধ্যযুগের ভারতীয় সমাজ : সমন্ত-প্রক্রিয়া বিষয়ে এক সমীক্ষা(Early Medieval Indian Society : A Study in Feudalism) ওরিয়েন্ট লংম্যান, ২০০৩
শর্মা রামশরণ, ভারতের সমাজতন্ত্র, (Indian Feudalism), কে পি বাগচি এন্ড কোং, কলকাতা
শর্মা রামশরণ, আর্যদের অনুসন্ধান, (Looking for the Aryans), প্রগ্রেসিভ পাবলিশার্স, কলকাতা
শর্মা রামশরণ, আর্যদের ভারতে আগমন, (Advent of the Aryans), ওরিয়েন্ট লংম্যান, ২০০১
শর্মা রামশরণ, প্রাচীন ভারতে শূদ্র, (Sudras in Ancient India), কে পি বাগচি এন্ড কোং, কলকাতা
থাপার রোমিলা, অশোক ও মৌর্যদের পতন, (Asoka and the Decline of the Mauryas), কে পি বাগচি এন্ড কোং, কলকাতা
চট্টোপাধ্যায় সুনীল, প্রাচীন ভারতের ইতিহাস (১ম খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, একাদশ মুদ্রণ, এপ্রিল ২০০৪
চট্টোপাধ্যায় সুনীল, প্রাচীন ভারতের ইতিহাস (২য় খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৮ম মুদ্রণ, ফেব্রুয়ারি ২০০৪
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস (১ম খন্ড) (প্রাচীন ও মধ্যযুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, প্রথম মুদ্রণ নভেম্বর ১৯৯৭

CC-2/GE- 2: History of India from. C.300 to1206

I. The Rise & Growth of the Guptas: Administration, Society, Economy, Religion, Art, Literature, and Science &Technology.

II. Harsha & His Times: Harsha's Kingdom, Administration,Buddhism & Nalanda

III. South India: Polity, Society, Economy & Culture

IV. Towards the Early Medieval: Changes in Society, Polity Economy and Culture with reference to the Pallavas, Chalukayas and Vardhanas.

V. Evolution of Political structures of Rashtakutas, Pala &Pratiharas.

VI. Emergence of Rajput States in Northern India: Polity,Economy &Society.

VII. Arabs in Sindh: Polity, Religion &Society.

VIII. Struggle for power in Northern India &establishment of Sultanate.

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রোমিলা থাপার, অশোক ও মৌর্যদের পতন, (Asoka and the Decline of the Mauryas), কে পি বাগচি এন্ড কোং, কলকাতা
সুনীল চট্টোপাধ্যায়, প্রাচীন ভারতের ইতিহাস (১ম খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, একাদশ মুদ্রণ, এপ্রিল ২০০৪
সুনীল চট্টোপাধ্যায়, প্রাচীন ভারতের ইতিহাস (২য় খন্ড), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৮ম মুদ্রণ, ফেব্রুয়ারি ২০০৪
হীরেন্দ্রনাথ মুখোপাধ্যায়, ভারতবর্ষের ইতিহাস (১ম খন্ড) (প্রাচীন ও মধ্যযুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, প্রথম মুদ্রণ নভেম্বর ১৯৯৭
বাশাম এ এল, অতীতের উজ্জ্বল ভারত, (The Wonder That Was India), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৫

মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস (১ম খন্ড) (প্রাচীন ও মধ্যযুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, প্রথম মুদ্রণ নভেম্বর ১৯৯৭
ভট্টাচার্য, নরেন্দ্রনাথ, ধর্ম ও সংস্কৃতিক: প্রাচীন ভারতীয় প্রেক্ষাপট
চক্রবর্তী রণবীর, প্রাচীন ভারতের অর্থনৈতিক ইতিহাসের সন্ধানে, আনন্দ পাবলিশার্স, কলকাতা ২০০২
চক্রবর্তী রণবীর, ভারত ইতিহাসের আদি পর্ব, ওরিয়েন্ট লংম্যান,কলকাতা, ২০০৭
সেন সমরেন্দ্রনাথ, বিজ্ঞানের ইতিহাস, শৈব্যা প্রকাশন, ১৯৯৬
শর্মা রামশরণ, ভারতের সামন্ততন্ত্র, (Indian Feudalism), কে পি বাগচি এন্ড কোং, কলকাতা
শর্মা রামশরণ, আদি মধ্যযুগের ভারতীয় সমাজ: সামন্ত-প্রক্রিয়া বিষয়ে এক সমীক্ষা(Early Medieval Indian Society: A Study in Feudalisation), ওরিয়েন্ট লংম্যান, ২০০৩

CC-3/GE-3 : History of India from 1206 to1707

I. Foundation, Expansion &consolidation of the Delhi Sultanate; Nobility &Iqta system.

II.Miltary, administrative &economic reforms under the Khiljis &the Tughlaqs.

III. Bhakti &Sufi Movements.

IV.Provincialkingdoms: Mewar, Bengal, Vijaynagara &Bahamanis.

V. Second Afghan State.

VI. Emergence and consolidation of Mughal State, C.16th century to mid 17th century.

VII. Akbar to Aurangzeb: administrative structure-Mansab & Jagirs, State &Religion, Socio-Religious Movements.

VIII. Economy, Society &Culture under the Mughals.

IX. Emergence of Maratha Power.

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রায় মিহিরকুমার, ভারতের ইতিহাস (তুরক-আফগান যুগ), পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, দ্বিতীয় মুদ্রণ, ফেব্রুয়ারী ১৯৯২
হাবিব ইরফান, মধ্যযুগের ভারতের অর্থনৈতিক ইতিহাস, (Economic History of Medieval India: A Survey), প্রগ্রেসিভ পাবলিশার্স
হাবিব ইরফান, মধ্যকালীন ভারত ১-৪ খন্ড (Medieval India)কে পি বাগচি এন্ড কোং, কলকাতা
হাবিবুল্লাহ এ বি এম, ভারতে মুসলিম শাসনের প্রতিষ্ঠা ১২০৬-১২৯০, (The Foundation of Muslim Rule in India), প্রগ্রেসিভ পাবলিশার্স, কলকাতা
রায় অনিরুদ্ধ ও চট্টোপাধ্যায় রত্নাবলী, মধ্যযুগে বাংলার সমাজ ও সংস্কৃতি, কে পি বাগচি এন্ড কোং, কলকাতা ১৯৯২
রায় অনিরুদ্ধ, মধ্যযুগের ভারতের ইতিহাস : সুলতানি আমল, ওরিয়েন্ট লংম্যান, কলকাতা
করিম আব্দুল, বাংলার ইতিহাস : সুলতানি আমল, ঢাকা

CC-4/GE-4 History of India; 1707-1950.

I. Interpreting the 18th Century.

II. Emergence of Independent States &establishment of Colonial power.

III. Expansion &consolidation of Colonial Power upto 1857.

IV.Uprising of 1857: Causes, Nature &Aftermath.

V. Colonial economy: Agriculture, Trade & Industry.

VI.Socio-Religious Movements in the 19th century.

VII. Emergence &Growth of Nationalism with focus on Gandhian nationalism.

VIII. Communalism: Genesis, Growth and partition of India.

IX. Advent of Freedom: Constituent Assembly, establishment of Republic.

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বন্দ্যোপাধ্যায় শেখর, অষ্টাদশ শতকের মুঘল সংকট ও আধুনিক ইতিহাস চিন্তা, কলকাতা,১৯৮৩
বন্দ্যোপাধ্যায় শেখর, পলাশী থেকে পার্টিশন: আধুনিক ভারতের ইতিহাস, ওরিয়েন্ট লংম্যান, ২০০৪
ভট্টাচার্য সব্যসাচী, ঔপনিবেশিক ভারতের অর্থনীতি, কলকাতা, ২০০০
সুনীল সেন, ভারতে কৃষিকার্য ১৭৯৩-১৯৪৭, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৫
চৌধুরী বিনয় ভূষণ, ঔপনিবেশিক আমলে বাংলার কৃষি ইতিহাস, কে পি বাগচি এন্ড কোং, কলকাতা
ইসলাম, সিরাজুল, বাংলার ইতিহাস ঔপনিবেশিক শাসনকাঠামো, চয়নিকা, ঢাকা, ২০০২
চক্রবর্তী মৃণাল, সিরাজ-উদ্-দৌলা, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ,কলকাতা, ১৯৮১
রায় রজতকান্ত, পলাশীর ষড়যন্ত্র ও সেকালের সমাজ, আনন্দ পাবলিশার্স, কলকাতা
চৌধুরী সুশীল, পলাশীর অজানা কাহিনী, আনন্দ পাবলিসার্স,কলকাতা

আলি এম আখার, আওরঙ্গজেবের সময়ে মুঘল অভিজাত শ্রেণী(The Mughal Nobility under Aurangzeb) কে পি বাগচি এন্ড কোং, কলকাতা
বন্দ্যোপাধ্যায় শেখর, অষ্টাদশ শতকের মুঘল সংকট ও আধুনিক ইতিহাস চিন্তা, কলকাতা,১৯৮৩
ভদ্র গৌতম, মুঘল যুগে কৃষি অর্থনীতি ও কৃষক বিদ্রোহ, সুবর্ণরেখা, কলকাতা, ১৯৮৩
চন্দ্র সতীশ, মুঘল দরবারে দল ও রাজনীতি, (Parties and politics at the Mughal Court 1707-1740) কে পি বাগচি এন্ড কোং, কলকাতা
চৌধুরী বিনয় ভূষণ ও অন্যান্যরা, বাংলার কৃষি সমাজের গঠন, কে পি বাগচি এন্ড কোং, কলকাতা
হাবিব ইরফান, মধ্যকালীন ভারত, খন্ড ১-৪, কে পি বাগচি এন্ড কোং, কলকাতা
হাবিব ইরফান, মুঘল সাম্রাজ্য ও তার পতন- একটি সমীক্ষা, পশ্চিমবঙ্গ ইতিহাস সংসদ,২০০০
হাবিব ইরফান, মুঘল ভারতের কৃষি ব্যবস্থা, (The Agrarian System of Mughal India(1556-1707)), কে পি বাগচি এন্ড কোং, কলকাতা
হাবিব ইরফান, মধ্যযুগের ভারতের অর্থনৈতিক ইতিহাস, (Economic History of Medieval India: A Survey), প্রগ্রেসিভ পাবলিশার্স, কলকাতা, ২০০৯
হাবিব ইরফান, ভারতের ইতিহাস প্রসঙ্গঃ মার্কসীয় চেতনার আলোকে(Essays in Indian History: Towards a Marxist Perception), ন্যাশনাল বুক এজেন্সি, কলকাতা, ১৯৯৯
রায় অনিরুদ্ধ, মধ্যযুগের ভারতের অর্থনৈতিক ইতিহাস, ১২০০-১৭৫৭, প্রগ্রেসিভ পাবলিশার্স, কলকাতা
রায় অনিরুদ্ধ, মুঘল যুগের অর্থনৈতিক ইতিহাস, কে পি বাগচি এন্ড কোং, কলকাতা
সরকার জগদীশ নারায়ণ, মুঘল অর্থনীতিঃ সংগঠন এবং কার্যক্রম, (Mughal Economy : Organisation and Working) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা ১৯৯১
সিদ্দিকী নোমান আহমেদ, মোঘল রাজত্বে ভুমিরাজস্ব পরিচালন ব্যবস্থা (১৭০০ – ১৭৫০)(Land Administration Under the Mughals (1700 -1750)) পার্ল পাবলিশার্স, কলকাতা, ১৯৮০
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস (২য় খন্ড)
(মুঘল ও ব্রিটিশ ভারত,পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ,কলকাতা ১৯৯৮
চট্টোপাধ্যায় রত্নাবলী, মুঘল যুগের দরবারি চিত্রকলা, খীমা, কলকাত
বন্দ্যোপাধ্যায় শেখর, পলাশি থেকে পার্টিশান (From Plassey to Partition), ওরিয়েন্ট লংম্যান
দেশাই এ আর, ভারতীয় জাতীয়তাবাদের সামাজিক পটভূমি, (Social Background to Indian Nationalism) কে পি বাগচি এন্ড কোং, কলকাতা
জয়া চ্যাটার্জী, বাংলা ভাগ হলঃ হিন্দু সাম্প্রদায়িকতা ও দেশ-বিভাগ, ১৯৩২-১৯৪৭
(Bengal Divided : Hindu Communalism and Partition 1932 – 1947) এল আলমা পাবলিকেশনস, কলকাতা, ২০০৩
দত্ত রজনী পাম, আজিকার ভারত (India Today)
সরকার সুশোভন, বাংলার রেনেসাঁস, (Notes on Bengal Renaissance), দীপায়ন, কলকাতা
ত্রিপাঠী অমলেশ, ভারতের মুক্তিসংরামে চরমপন্থী পর্ব, (The Extremist Challenge) আনন্দ পাবলিশার্স, কলকাতা
মুখোপাধ্যায় হীরেন্দ্রনাথ, ভারতবর্ষের ইতিহাস(২য় খন্ড) (মুঘল ও ব্রিটিশ ভারত) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ৪র্থ মুদ্রণ, ১৯৯৮
সুর নিখিল, ভারতীয় জাতীয়তাবাদী আন্দোলনের পটভূমি, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৯
চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৮৫৮-১৯২০) (১ম খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৮

চট্টোপাধ্যায় প্রণবকুমার, আধুনিক ভারত (১৯২০-১৯৪৭) (২য় খন্ড) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৯৯
সেন সুনীল, ভারতে কৃষিসম্পর্ক(১৭৯৩-১৯৪৭)(Agrarian Relations in India (1793-1847)) পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮৫

DSE Discipline Specific Elective (Any Two):

DSE –A -1: National Liberation Movements in 20th century World

I.Nationalism: Theory and Practice.

II. Nature of Imperialism and colonialism

III. National Movements in Nigeria, Kenya, Congo, Angola &South Africa.

IV.China between 1911-1949:Revolution of 1911,May Fourth Movement and Cultural Revolution under Mao Tse Tung. Indonesian Revolution 1945-1949.
V. National Movement in India.

References:

Lucian Bianco, Origins of the Chinese Revolution, 1915-1946. Stanford University Press, 1971.
A.J.Temu & Roger Owen eds , Studies in the theory of Imperialism,1970.
E.F.Penrose, ed., European Imperialism the partition of Africa,1980.
Milton Osborne, Southeast Asia: An Introductory History. 1995
Sumit Sarkar, Modern India, Macmillan, 1984.

ত্রিপাঠী অমলেশ, স্বাধীনতা সংগ্রামে ভারতের জাতীয় কংগ্রেস, আনন্দ পাবলিশার্স, কলকাতা
চন্দ্র বিপান, আধুনিক ভারতঃ ঔপনিবেশিকতাবাদ ও জাতীয়তাবাদ(Nationalism and Colonialism), কে পি বাগচি এন্ড কোং, কলকাতা
চন্দ্র বিপান এবং অন্যান্য, ভারতের স্বাধীনতা সংগ্রাম, (India's Struggle for Independence) কে পি বাগচি এন্ড কোং, কলকাতা

চন্দ্র বিপান এবং অন্যান্য, ভারতবর্ষ – স্বাধীনতার পরে, (India after Independence), আনন্দ পাবলিশার্স, কলকাতা

DSE- A -2: Some Aspects of European History: C.1780-1945

I.The French Revolution: Genesis Nature & Consequences

II.Napoleonic Era and aftermath.

III.Revolutions of 1830 & 1848.

IV.Unification of Italy & Germany.

V.Social and economic Changes.

VI. Imperialist Conflicts: World War I

VII.Rise of Fascism and Nazism.

VIII. Origins of World War II

References:

E.J. Hobsbawn: The Age of Revolution. London : Weidenfeld & Nicolson, 1962.
Lynn Hunt: Politics, Culture and Class in the French Revolution. Berkeley: University of California Press, 1984.
Andrew Porter, European Imperialism, 18760 -1914 (1994).
E.J. Hobsbawm, The Age of Extremes, 1914 - 1991, New York: Vintage, 1996
Carter V. Findley and John Rothey, Twentieth-Century World,Boston: Houghton-Mifflin, 5th ed. 2003

DSE- B-1: Patterns of Capitalism in Europe: C.16TH Century to early 20th Century

I.Definitions & Concepts

II.Commercial Capitalism: 1500-1700

III.Industrial Revolution in England: Causes &Nature

IV.Industrial Capitalism in France: Genesis & Nature

V. Growth of Industries in Germany

VI.Impact of Industrial Revolution on European Society, Polity & Economy.

References:

Jerry Müller, The Mind &the Market, Knopf Doubleday Publishing Group, 2007
Karl Polanyi, The Great Transformation : *The Political and Economic Origins of Our Time*. Boston: Beacon Press 1944.
Joseph Schumpeter, Capitalism, Socialism &Democracy New York: Harper & Row, 1942.
Wallerstein, World System Analysis: An Introduction, 2004
Cipolla Carlo, M, Fontana Economic History of Europe, VOL I&II Collins, 1973.
Christopher Hill, From Reformation to Industrial Revolution, Weidenfeld and Nicolson, 1967
Jan De Vries, The Industrial Revolution &the Industrious Revolution, 1994

DSE-B-2: Some aspects of Society & Economy of Modern Europe: 15Tth – 18 th Century

1: Historiographical Trends

II. Feudal Crisis: Main strands

III. Renaissance: Origin, Spread &Dominant Features

IV. European Reformation: Genesis, nature & Impact

V. Beginning of the era of colonization: motives; mining and plantation; the African slaves

VI. Economic developments of the sixteenth century; Shift of economic balance from the Mediterranean to the Atlantic

VII. Transition from Feudalism to Capitalism: Industrial Revolution in England

References:

J H Plumb, The Pelican Book of the Renaissance, Penguin, 1982
G. R. Elton, Reformation Europe 1517,1559, Wiley, 1999
Ralph Davis, The Rise of the Atlantic Economies, New York, 1973
Arvind Sinha, Europe in Transition, Delhi, 2010
Rodney Hilton, The Transition from Feudalism to Capitalism, Delhi,2006.
Fernand Braudel, Civilization and Capitalism, Vols. I, II, III, California, 1992
Butterfield, Herbert. The origins of modern science. Vol. 90507. Free Press, 1997

গৌতম চট্টোপাধ্যায় সম্পাদিত: দুশো বছরের আলোকে, পশ্চিমবঙ্গ ইতিহাস সংসদ, ১৯৮৯
চক্রবর্তী, ফরাসী বিপ্লব, পশ্চিমবঙ্গ পুস্তক পর্ষদ, কলকাতা
চক্রবর্তী সুভাষ রঞ্জন, ইউরোপের ইতিহাস, পশ্চিমবঙ্গ পুস্তক পর্ষদ, কলকাতা, ১৯৮৬
জ্যাকসন টি এ, ফরাসী বিপ্লব – দশ দিগন্ত, কে পি বাগচি এন্ড কোং, কলকাতা ২০০৪
টমসসন ডেভিড, বিশ্ব ইতিহাসের প্রেক্ষাপটে ইউরোপ, ১ম খন্ড (১৭৮৯-১৮৫০), ২য় খন্ড (১৮৫১-১৯১৪)
প্রগ্রেসিভ পাবলিশার্স, কলকাতা ২০০২ ও ২০০৩
রায় সিদ্ধার্থ গুহ, আধুনিক ইউরোপঃ ফরাসী বিপ্লব থেকে দ্বিতীয় বিশ্বযুদ্ধ, প্রগতিশীল প্রকাশক, কলকাতা, ২০১৩

Skill Enhancement Elective Course (SEC) Credits,-2

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SEC-A- 1: Historical Tourism: Theory &Practice

I. Defining Heritage
Art &Architecture in India: An overview:
Field Work: Visit to historical sites &Museums
II. Understanding Built Heritage:
Stupa Architecture
Temple Architecture
Indo Persian Architecture, Forts, Palaces, Mosques
Colonial Architecture
Present day structures
III. Field Work: Visit to site &Conducting of research
IV. Modalities of conducting tourism

References:
Sunil Kumar, The Present in Delhi's Past, Delhi, Gyan Publishing House, 2002
Peter Howard, Heritage: Management, Interpretation, Identity, and London, 2003
V.S Agarwal, Indian Art, Varanasi, Prithvi Prakasahan, 1972
Percy Brown, Indian Architecture, Bombay, D.B.Taraporevala Sons &Co, 1940
James Harle, The Art & Architecture of the Indian Subcontinent, Hormonds worth, Penguin, 1988
S.K.Bhowmik, Heritage Management: Care, Understanding & Appreciation of Cultural Heritage, Jaipur, 2004.

SEC-B -1: Museums &Archives in India

I. Definitions

II. History of setting up of Museums and Archives: Some case
Studies

III. Field Work; Studying of structures & Functions

IV. Training & Employment

References:

G. Edson & Dean David, Handbook for Museum, London, Routledge,1986
John Ridener, From Folders to Post Modernism: A Concise History of Archival Theory, 2009
Roychowdhury, Madhuparna. Displaying India's Heritage : Archaelogy and the Museum Movement in Colonial India. Delhi: Orient Blackswan 2015
Sengupta, S. Experiencing History Through Archives. Delhi: Munshiram Manoharlal.2004.

SEC-A -2: Indian History &Culture

I. Environment; Culture, Tradition &Practices:
-Historical overview
-Oral &codified information on medicinal Plants
-Water & Water Bodies
-Fieldwork
II. Urbanization &Urbanism:
-Issues of settlements & Landscapes
-Social differentiations
-Communication networks
III. Social inequality &Gender:
-Status within Households: An overview
-Present context
-Issues of Violence
-Employment, distribution of resources
IV.Cultural Heritage:
-Main components
-Built Heritage
-Historical Tourism
V. Cultural Forms &Cultural Expressions:
- Performing Arts
-Fairs &Festivals
-Fieldwork
References:

Indu Banga, ed. The City in Indian History: Urban Demography, Society & Polity, Delhi, Manohar,,1991
Koch, E. Mughal Art & Imperial Ideology, New Delhi ; New York : Oxford University Press, 2001.
Radha Kumar, History of Doing: An Illustrated Account of Movements for Women's Rights &Feminism in India 1880-1990, Zubaan, 2007
V.Vasudev, Fairs &Festivals, Incredible India Series, 2007
V.Singh, The Human Footprint on Environment: Issues in India,New Delhi, and Macmillan, 2012

B. Parikh, Composite Culture in a multicultural Society, Delhi, NBT,2007
N. Mehta, Introduction: Satellite Television, Identity &Globalization in Contemporary India in N.Mehta, ED, Television in India, New York, Routledge, 2008

SEC-B- 2: Orality and Oral Culture in India

I. Defining orality

II. History &Historiography of Orality

III. Life Histories: Sociological Aspects

IV. Research Methodologies

V. Documentation: Written &Visual

References:

H. Roberts. Ed. Doing Feminist Research, London: Routledge &Kegan Paul, 1981
John Miles Foley, Oral Formulaic-Theory: An Introduction &Annotated Bibliography, New York & London: Garland, 1985
M.F.D. Knowledge & Control, London,1971

Prasad M. Mahadeva, Ideology of the Hindi Film: A Historical Construction. Delhi: OUP, 1998
Srirupa Roy,' The Post Colonial State &Visual Representations of India" Contributions to Indian Sociology, 2006, 36,1&2:233-263

Stephen Humphries: The Handbook of Oral History: recording life stories. University of Michigan : Inter-Action Inprint, 1984.

Veena Das, ed, Mirrors of Violence: Communities, Riots & Survivors in South Asia, Delhi,OUP,1990

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

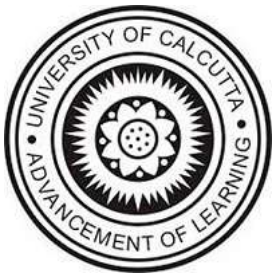
List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Spaul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar



University of Calcutta

Syllabus for three-year B.Sc. in Mathematics

(Honours)

under

CBCS System

2018

1. Credit Distribution across Courses

Course Type	Total Papers	Credits		
		Theory + Tutorial	Theory + Practical	Total
Core Courses	14	$13 \times 5 = 65$ $13 \times 1 = 13$	$1 \times 4 = 4$ $1 \times 2 = 2$	84
Discipline Specific Electives	4	$4 \times 5 = 20$ $4 \times 1 = 4$	—	24
Generic Electives	4	$4 \times 6 = 24$	—	24
Ability Enhancement Language Courses	2	$2 \times 2 = 4$	—	4
Skill Enhancement Courses	2	$2 \times 2 = 4$	—	4
Totals	26	134	6	140

2. Course Structure : Semester-wise distribution of Courses

Semester	Course Name	Course Detail	Credits	Page No.
1	Ability Enhancement Compulsory Course-1	AECC(1)	2	
	Core Course-1	Calculus, Geometry & Vector Analysis	6	4
	Core Course-2	Algebra	6	6
	Generic Elective-1	GE(1)/CC(1) *	6	
		Total	**20**	
2	Ability Enhancement Compulsory Course-2	AECC(2)	2	
	Core Course-3	Real Analysis	6	8
	Core Course-4	Group Theory-I	6	10
	Generic Elective-2	GE(2)/CC(2) *	6	
		Total	**20**	
3	Core Course-5	Theory of Real Functions	6	11
	Core Course-6	Ring Theory & Linear Algebra-I	6	13
	Core Course-7	ODE & Multivariate Calculus-I	6	14
	Skill Enhancement Course-A	See SEC A	2	3
	Generic Elective-3	GE(3)/CC(3) *	6	
		Total	**26**	
4	Core Course-8	Riemann Integration & Series of Functions	6	16
	Core Course-9	PDE & Multivariate Calculus-II	6	18
	Core Course-10	Mechanics	6	20
	Skill Enhancement Course-B	See SEC B	2	3
	Generic Elective-4	GE(4)/CC(4) *	6	
		Total	**26**	
5	Core Course-11	Probability & Statistics	6	22
	Core Course-12	Group Theory-II & Linear Algebra-II	6	24
	Discipline Specific Elective- A	See DSE A(1)	6	3
	Discipline Specific Elective-B	See DSE B (1)	6	3
		Total	**24**	
6	Core Course-13	Metric Space & Complex Analysis	6	26
	Core Course-14	Numerical Methods	4	28
	Core Course-14 Practical	Numerical Methods Lab	2	30
	Discipline Specific Elective- A	See DSE A(2)	6	3
	Discipline Specific Elective-B	See DSE B(2)	6	3
		Total	**24**	
		Grand Total	**140**	

*These courses are to be taken by the students of **other discipline.** These are the 4 **Core Courses** of **General Courses** of other disciplines.

Course Structure | Credit Distribution | DSE | SEC | GE

3. Choices for Discipline Specific Electives (DSE)

DSE-A(1)	DSE-B(1)	DSE-A(2)	DSE-B(2)
For Semester -5	**For Semester-5**	**For Semester-6**	**For Semester-6**
Advanced Algebra [31]	Discrete Mathematics [35]	Differential Geometry [41]	Point Set Topology [46]
Bio Mathematics [32]	Linear Programming & Game Theory [37]	Mathematical Modelling [43]	Astronomy & Space Science [47]
Industrial Mathematics [34]	Boolean Algebra & Automata Theory [39]	Fluid Statics [44] & Elementary Fluid Dynamics	Advanced Mechanics [49]

The number within the bracket [ ] refers to page number. A student has to opt for any one of the subjects in DSE-A(1) and any one in DSE-B(1) in Semester 5. The student has to opt for any one of the subjects in DSE-A(2) and any one in DSE-B(2) in Semester 6.

Course Structure | Credit Distribution | SEC

4. Choices for Skill Enhancement Courses (SEC)

SEC-A (for Semester 3)	SEC-B (for Semester 4)
C Programming Language [51]	Mathematical Logic [53]
Object Oriented Programming in C++ [52]	Scientific computing with SageMath & R [54]

The number within the bracket [ ] refers to page number. A student has to opt for any one of the subjects available under each category.

Course Structure | Credit Distribution | DSE

Calculus, Geometry & Vector Analysis

Semester : 1 Core Course-1 Paper Code(Theory): MTM-A-CC-1-1-TH Paper Code (Tutorial):MTM-A-CC-1-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Calculus [25 classes]

- Hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to problems of type $e^{ax+b}\sin x$, $e^{ax+b}\cos x$, $(ax+b)^n\sin x$, $(ax+b)^n\cos x$, curvature, concavity and points of inflection, envelopes, rectilinear asymptotes (Cartesian & parametric form only), curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves, L'Hospital's rule, applications in business, economics and life sciences.
- Reduction formulae, derivations and illustrations of reduction formulae of the type $\int \sin^n x dx$, $\int \cos^n x dx$, $\int \tan^n x dx$, $\int \sec^n x dx$, $\int (\log x)^n dx$, $\int \sin^n x \sin mx dx$, $\int \sin^n x \cos^m x dx$. Parametric equations, parametrizing a curve, arc length of a curve, arc length of parametric curves, area under a curve, area and volume of surface of revolution.

Unit-2 : Geometry [30 classes]

- Rotation of axes and second degree equations, classification of conics using the discriminant, tangent and normal, polar equations of conics.
- Equation of Plane : General form, Intercept and Normal forms. The sides of a plane. Signed distance of a point from a plane. Equation of a plane passing through the intersection of two planes. Angle between two intersecting planes. Parallelism and perpendicularity of two planes.
- Straight lines in 3D: Equation (Symmetric & Parametric form). Direction ratio and direction cosines. Canonical equation of the line of intersection of two intersecting planes. Angle between two lines. Distance of a point from a line. Condition of coplanarity of two lines. Equation of skew lines. Shortest distance between two skew lines.
- Spheres. Cylindrical surfaces. Central conicoids, paraboloids, plane sections of conicoids, generating lines, classification of quadrics, illustrations of graphing standard quadric surfaces like cone, ellipsoid. Tangent and normals of conicoids.

Unit-3 : Vector Analysis [15 classes]

- Triple product, vector equations, applications to geometry and mechanics — concurrent forces in a plane, theory of couples, system of parallel forces. Introduction to vector functions, operations with vector-valued functions, limits and continuity of vector functions, differentiation and integration of vector functions of one variable.

Graphical Demonstration (Teaching Aid**) [5 classes]

- Plotting of graphs of function e^{ax+b}, $\log(ax+b)$, $1/(ax+b)$, $\sin(ax+b)$, $\cos(ax+b)$, $|ax+b|$ and to illustrate the effect of a and b on the graph.

- Plotting the graphs of polynomial of degree 4 and 5, the derivative graph, the second derivative graph and comparing them.
- Sketching parametric curves (Eg. trochoid, cycloid, epicycloids, hypocycloid).
- Obtaining surface of revolution of curves.
- Tracing of conics in cartesian coordinates/ polar coordinates.
- Sketching ellipsoid, hyperboloid of one and two sheets, elliptic cone, elliptic, paraboloid, and hyperbolic paraboloid using cartesian coordinates.

** **Preferably by free softwares but can be taught through drawing on black board/white board etc. in case of unavailability.**

References

[1] G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005.

[2] M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.

[3] H. Anton, I. Bivens and S. Davis, Calculus, 7th Ed., John Wiley and Sons (Asia) P. Ltd., Singapore, 2002.

[4] R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989.

[5] T. Apostol, Calculus, Volumes I and II.

[6] S. Goldberg, Calculus and mathematical analysis.

[7] Marsden, J., and Tromba, Vector Calculus, McGraw Hill.

[8] M.R. Speigel, SchaumÃââs outline of Vector Analysis.

[9] S. L. Loney, Co-ordinate Geometry.

[10] Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions.

Course Structure | DSE | SEC | Credit Distribution

Algebra

Semester : 1 Core Course-2 Paper Code(Theory): MTM-A-CC-1-2-TH Paper Code (Tutorial):MTM-A-CC-1-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[30 classes]

- Polar representation of complex numbers, n-th roots of unity, De Moivre's theorem for rational indices and its applications. Exponential, logarithmic, trigonometric and hyperbolic functions of complex variable.
- Theory of equations : Relation between roots and coefficients, transformation of equation, Descartes rule of signs, Sturm's theorem, cubic equation (solution by Cardan's method) and biquadratic equation (solution by Ferrari's method).
- Inequality : The inequality involving $AM \geq GM \geq HM$, Cauchy-Schwartz inequality.
- Linear difference equations with constant coefficients (up to 2nd order).

Unit-2

[30 classes]

- Relation : equivalence relation, equivalence classes & partition, partial order relation, poset, linear order relation.
- Mapping : injective, surjective, one to one correspondence, invertible mapping, composition of mappings, relation between composition of mappings and various set theoretic operations. Meaning and properties of $f^{-1}(B)$, for any mapping $f : X \to Y$ and $B \subseteq Y$.
- Well-ordering property of positive integers, Principles of Mathematical induction, division algorithm, divisibility and Euclidean algorithm. Prime numbers and their properties, Euclid's theorem. Congruence relation between integers. Fundamental Theorem of Arithmetic. Chinese remainder theorem. Arithmetic functions, some arithmetic functions such as ϕ, τ, σ and their properties.

Unit-3

[15 classes]

- Rank of a matrix, inverse of a matrix, characterizations of invertible matrices.
- Systems of linear equations, row reduction and echelon forms, vector equations, the matrix equation $AX = B$, solution sets of linear systems, applications of linear systems.

References

[1] Titu Andreescu and Dorin Andrica, Complex Numbers from A to Z, Birkhauser, 2006.

[2] Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics with Graph Theory, 3rd Ed., Pearson Education (Singapore) P. Ltd., Indian Reprint, 2005.

[3] David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007.

[4] K. Hoffman, R. Kunze, Linear algebra.

[5] W.S. Burnstine and A.W. Panton, Theory of equations.

Course Structure | DSE | SEC | Credit Distribution

Real Analysis

Semester : 2 Core Course-3 Paper Code(Theory): MTM-A-CC-2-3-TH Paper Code (Tutorial):MTM-A-CC-2-3-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[30 classes]

- Intuitive idea of real numbers. Mathematical operations and usual order of real numbers revisited with their properties (closure, commutative, associative, identity, inverse, distributive). Idea of countable sets, uncountable sets and uncountability of $\mathbb{R}$. Concept of bounded and unbounded sets in $\mathbb{R}$. L.U.B. (supremum), G.L.B. (infimum) of a set and their properties. L.U.B. axiom or order completeness axiom. Archimedean property of $\mathbb{R}$. Density of rational (and Irrational) numbers in $\mathbb{R}$.
- Intervals. Neighbourhood of a point. Interior point. Open set. Union, intersection of open sets. Limit point and isolated point of a set. Bolzano-Weirstrass theorem for sets. Existence of limit point of every uncountable set as a consequence of Bolzano-Weirstrass theorem. Derived set. Closed set. Complement of open set and closed set. Union and intersection of closed sets as a consequence. No nonempty proper subset of $\mathbb{R}$ is both open and closed. Dense set in $\mathbb{R}$ as a set having non-empty intersection with every open intervals. $\mathbb{Q}$ and $\mathbb{R} \setminus \mathbb{Q}$ are dense in $\mathbb{R}$.

Unit-2

[30 classes]

- Real sequence. Bounded sequence. Convergence and non-convergence. Examples. Boundedness of convergent sequence. Uniqueness of limit. Algebra of limits.
- Relation between the limit point of a set and the limit of a convergent sequence of distinct elements. Monotone sequences and their convergence. Sandwich rule. Nested interval theorem. Limit of some important sequences : $\left\{n^{\frac{1}{n}}\right\}_n$, $\{x^n\}_n$, $\left\{x^{\frac{1}{n}}\right\}_n$, $\{x_n\}_n$ with $\frac{x_{n+1}}{x_n} \to l$ and $|l| < 1$, $\left\{\left(1+\frac{1}{n}\right)^n\right\}_n$, $\left\{1+\frac{1}{1!}+\frac{1}{2!}+\cdots+\frac{1}{n!}\right\}_n$, $\{a^{x_n}\}_n\,(a>0)$. Cauchy's first and second limit theorems.
- Subsequence. Subsequential limits, $\limsup$ as the L.U.B. and $\liminf$ as the G.L.B of a set containing all the subsequential limits. Alternative definition of limsup and liminf of a sequence using inequality or as $\limsup x_n = \inf_n \sup\{x_n, x_{n+1}, \ldots,\}$ and $\liminf x_n = \sup_n \inf\{x_n, x_{n+1}, \ldots,\}$ [Equivalence between these definitions is assumed]. A bounded sequence $\{x_n\}$ is convergent if and only if $\limsup x_n = \liminf x_n$. Every sequence has a monotone subsequence. Bolzano-Weirstrass theorem for sequence. Cauchy's convergence criterion. Cauchy sequence.

Unit-3

[10 classes]

- Infinite series, convergence and non-convergence of infinite series, Cauchy criterion, tests for convergence : comparison test, limit comparison test, ratio test, Cauchy's n-th root test, Kummer's test and Gauss test (statements only). Alternating series, Leibniz test. Absolute and conditional convergence.

Graphical Demonstration (Teaching aid**)

[5 classes]

- Plotting of recursive sequences.

- Study the convergence of sequences through plotting.
- Verify Bolzano-Weierstrass theorem through plotting of sequences and hence identify convergent subsequences from the plot.
- Study the convergence/divergence of infinite series by plotting their sequences of partial sum.
- Cauchy's root test by plotting n-th roots.
- Ratio test by plotting the ratio of n-th and $(n+1)$-th term.

** **Preferably by computer softwares but can be taught through drawing on black board/white board etc. in case of unavailability.**

References

[1] R.G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 3rd Ed., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.

[2] Gerald G. Bilodeau , Paul R. Thie, G.E. Keough, An Introduction to Analysis, 2nd Ed., Jones & Bartlett, 2010.

[3] Brian S. Thomson, Andrew. M. Bruckner and Judith B. Bruckner, Elementary Real Analysis,Prentice Hall, 2001.

[4] S.K. Berberian, a First Course in Real Analysis, Springer Verlag, New York, 1994.

[5] T. Apostol, Mathematical Analysis, Narosa Publishing House

[6] Courant and John, Introduction to Calculus and Analysis, Vol I, Springer

[7] W. Rudin, Principles of Mathematical Analysis, Tata McGraw-Hill

[8] C. C. Pugh, Real Mathematical Analysis, Springer, 2002.

[9] Terence Tao, Analysis I, Hindustan Book Agency, 2006.

[10] S. Goldberg, Calculus and mathematical analysis.

[11] Horst R. Beyer, Calculus and Analysis, Wiley, 2010.

Course Structure | DSE | SEC | Credit Distribution

Group Theory-I

Semester : 2 Core Course-4 Paper Code(Theory): MTM-A-CC-2-4-TH Paper Code (Tutorial):MTM-A-CC-2-4-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Mark are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[30 classes]

- Symmetries of a square, definition of group, examples of groups including permutation groups, dihedral groups and quaternion groups (through matrices), elementary properties of groups, examples of commutative and non-commutative groups. Subgroups and examples of subgroups, necessary and sufficient condition for a nonempty subset of a group to be a subgroup. Normalizer, centralizer, center of a group, product of two subgroups.

Unit-2

[25 classes]

- Properties of cyclic groups, classification of subgroups of cyclic groups. Cycle notation for permutations, properties of permutations, even and odd permutations, alternating group, properties of cosets, order of an element, order of a group. Lagrange's theorem and consequences including Fermat's Little theorem.

Unit-3

[20 classes]

- Normal subgroup and its properties. Quotient group. Group homomorphisms, properties of homomorphisms, correspondence theorem and one one correspondence between the set of all normal subgroups of a group and the set of all congruences on that group, Cayley's theorem, properties of isomorphisms. First, Second and Third isomorphism theorems.

References

[1] John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.

[2] M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.

[3] Joseph A. Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa Publishing House, New Delhi, 1999.

[4] Joseph J. Rotman, An Introduction to the Theory of Groups, 4th Ed., Springer Verlag, 1995.

[5] I.N. Herstein, Topics in Algebra, Wiley Eastern Limited, India, 1975.

[6] D.S. Malik, John M. Mordeson and M.K. Sen, Fundamentals of abstract algebra.

Course Structure | DSE | SEC | Credit Distribution

Theory of Real Functions

Semester : 3 Core Course-5 Paper Code(Theory): MTM-A-CC-3-5-TH Paper Code (Tutorial):MTM-A-CC-3-5-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Limit & Continuity of functions [40 classes]

- Limits of functions ($\epsilon - \delta$ approach), sequential criterion for limits. Algebra of limits for functions, effect of limit on inequality involving functions, one sided limits. Infinite limits and limits at infinity. Important limits like $\frac{\sin x}{x}$, $\frac{\log(1+x)}{x}$, $\frac{a^x-1}{x}$ $(a > 0)$ as $x \longrightarrow 0$.
- Continuity of a function on an interval and at an isolated point. Sequential criteria for continuity. Concept of oscillation of a function at a point. A function is continuous at x if and only if its oscillation at x is zero. Familiarity with the figures of some well known functions : $y = x^a$ $(a = 2, 3, \frac{1}{2}, -1)$, $|x|$, $\sin x$, $\cos x$, $\tan x$, $\log x$, e^x. Algebra of continuous functions as a consequence of algebra of limits. Continuity of composite functions. Examples of continuous functions. Continuity of a function at a point does not necessarily imply the continuity in some neighbourhood of that point.
- Bounded functions. Neighbourhood properties of continuous functions regarding boundedness and maintenance of same sign. Continuous function on $[a, b]$ is bounded and attains its bounds. Intermediate value theorem.
- Discontinuity of functions, type of discontinuity. Step functions. Piecewise continuity. Monotone functions. Monotone functions can have only jump discontinuity. Monotone functions can have atmost countably many points of discontinuity. Monotone bijective function from an interval to an interval is continuous and its inverse is also continuous.
- Uniform continuity. Functions continuous on a closed and bounded interval is uniformly continuous. A necessary and sufficient condition under which a continuous function on a bounded open interval I will be uniformly continuous on I. A sufficient condition under which a continuous function on an unbounded open interval I will be uniformly continuous on I(statement only). Lipschitz condition and uniform continuity.

Unit-2 : Differentiability of functions [35 classes]

- Differentiability of a function at a point and in an interval, algebra of differentiable functions. Meaning of sign of derivative. Chain rule.
- Darboux theorem, Rolle's theorem, Mean value theorems of Lagrange and Cauchy — as an application of Rolle's theorem. Taylor's theorem on closed and bounded interval with Lagrange's and Cauchy's form of remainder deduced from Lagrange's and Cauchy's mean value theorem respectively. Expansion of e^x, $\log(1 + x)$, $(1 + x)^m$, $\sin x$, $\cos x$ with their range of validity (assuming relevant theorems). Application of Taylor's theorem to inequalities.
- Statement of L' Hospital's rule and its consequences. Point of local extremum (maximum, minimum) of a function in an interval. Sufficient condition for the existence of a local maximum/minimum of a function at a point (statement only). Determination of local extremum using first order derivative. Application of the principle of maximum/minimum in geometrical problems.

References

[1] R.G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 3rd Ed., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.

[2] Gerald G. Bilodeau , Paul R. Thie, G.E. Keough, An Introduction to Analysis, 2nd Ed., Jones & Bartlett, 2010.

[3] Brian S. Thomson, Andrew. M. Bruckner and Judith B. Bruckner, Elementary Real Analysis,Prentice Hall, 2001.

[4] S.K. Berberian, a First Course in Real Analysis, Springer Verlag, New York, 1994.

[5] T. Apostol, Mathematical Analysis, Narosa Publishing House

[6] Courant and John, Introduction to Calculus and Analysis, Vol I, Springer

[7] W. Rudin, Principles of Mathematical Analysis, Tata McGraw-Hill

[8] C. C. Pugh, Real Mathematical Analysis, Springer, 2002.

[9] Terence Tao, Analysis I, Hindustan Book Agency, 2006.

[10] S. Goldberg, Calculus and mathematical analysis.

[11] Horst R. Beyer, Calculus and Analysis, Wiley, 2010.

Course Structure | DSE | SEC | Credit Distribution

Ring Theory & Linear Algebra-I

Semester : 3 Core Course-6 Paper Code(Theory): MTM-A-CC-3-6-TH Paper Code (Tutorial):MTM-A-CC-3-6-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Ring theory [35 classes]

- Definition and examples of rings, properties of rings, subrings, necessary and sufficient condition for a nonempty subset of a ring to be a subring, integral domains and fields, subfield, necessary and sufficient condition for a nonempty subset of a field to be a subfield, characteristic of a ring. Ideal, ideal generated by a subset of a ring, factor rings, operations on ideals, prime and maximal ideals. Ring homomorphisms, properties of ring homomorphisms. First isomorphism theorem, second isomorphism theorem, third isomorphism theorem, Correspondence theorem, congruence on rings, one-one correspondence between the set of ideals and the set of all congruences on a ring.

Unit-2 : Linear algebra [40 classes]

- Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces. Subspaces of $\mathbb{R}^n$, dimension of subspaces of $\mathbb{R}^n$. Geometric significance of subspace.
- Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, change of coordinate matrix. Algebra of linear transformations. Isomorphisms. Isomorphism theorems, invertibility and isomorphisms. Eigen values, eigen vectors and characteristic equation of a matrix. Cayley-Hamilton theorem and its use in finding the inverse of a matrix,

References

[1] John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.

[2] M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.

[3] Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, 4th Ed., Prentice- Hall of India Pvt. Ltd., New Delhi, 2004.

[4] Joseph A. Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa Publishing House, New Delhi, 1999.

[5] S. Lang, Introduction to Linear Algebra, 2nd Ed., Springer, 2005.

[6] Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007.

[7] S. Kumaresan, Linear Algebra- A Geometric Approach, Prentice Hall of India, 1999.

[8] Kenneth Hoffman, Ray Alden Kunze, Linear Algebra, 2nd Ed., Prentice-Hall of India Pvt. Ltd., 1971.

[9] D.A.R. Wallace, Groups, Rings and Fields, Springer Verlag London Ltd., 1998.

[10] D.S. Malik, John M. Mordeson and M.K. Sen, Fundamentals of abstract algebra.

Course Structure | DSE | SEC | Credit Distribution

Ordinary Differential Equation & Multivariate Calculus-I

Semester : 3 Core Course-7 Paper Code(Theory): MTM-A-CC-3-7-TH Paper Code (Tutorial):MTM-A-CC-3-7-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Ordinary differential equation [40 classes]

- First order differential equations : Exact differential equations and integrating factors, special integrating factors and transformations, linear equations and Bernoulli equations, the existence and uniqueness theorem of Picard (Statement only).
- Linear equations and equations reducible to linear form. First order higher degree equations solvable for x, y and p. Clairaut's equations and singular solution.
- Basic Theory of linear systems in normal form, homogeneous linear systems with constant coefficients: Two Equations in two unknown functions.
- Linear differential equations of second order, Wronskian : its properties and applications, Euler equation, method of undetermined coefficients, method of variation of parameters.
- System of linear differential equations, types of linear systems, differential operators, an operator method for linear systems with constant coefficients.
- Planar linear autonomous systems : Equilibrium (critical) points, Interpretation of the phase plane and phase portraits.
- Power series solution of a differential equation about an ordinary point, solution about a regular singular point (up to second order).

Unit-2 : Multivariate Calculus-I [35 classes]

- Concept of neighbourhood of a point in R^n (n $>$ 1), interior point, limit point, open set and closed set in R^n (n $>$ 1).
- Functions from R^n($n > 1$) to R^m($m \geq 1$), limit and continuity of functions of two or more variables. Partial derivatives, total derivative and differentiability, sufficient condition for differentiability. Chain rule for one and two independent parameters, directional derivatives, the gradient, maximal and normal property of the gradient, tangent planes. Extrema of functions of two variables, method of Lagrange multipliers, constrained optimization problems.

References

[1] D.A. Murray, Introductory course in Differential Equations, Orient and Longman

[2] H.T. H.Piaggio, Elementary Treaties on Differential Equations and their applications, C.B.S Publisher & Distributors, Delhi,1985.

[3] G.F.Simmons, Differential Equations, Tata Mc Graw Hill

[4] S.L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, India, 2004.

[5] M.R. Speigel, Schaum's outline of Laplace Transform

[6] Horst R. Beyer, Calculus and Analysis, Wiley, 2010.

Course Structure | DSE | SEC | Credit Distribution

Riemann Integration & Series of Functions

Semester : 4 Core Course-8 Paper Code(Theory): MTM-A-CC-4-8-TH Paper Code (Tutorial):MTM-A-CC-4-8-TU	Credits : 5+1*=6 Full Marks 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Riemann integration [35 classes]

- Partition and refinement of partition of a closed and bounded interval. Upper Darboux sum $U(P, f)$ and lower Darboux sum $L(P, f)$ and associated results. Upper integral and lower integral. Darboux's theorem. Darboux's definition of integration over a closed and bounded interval. Riemann's definition of integrability. Equivalence with Darboux definition of integrability (statement only). Necessary and sufficient condition for Riemann integrability.
- Concept of negligible set (or zero set) defined as a set covered by countable number of open intervals sum of whose lengths is arbitrary small. Examples of negligible sets : any subset of a negligible set, finite set, countable union of negligible sets. A bounded function on closed and bounded interval is Riemann integrable if and only if the set of points of discontinuity is negligible. Example of Riemann integrable functions.
- Integrability of sum, scalar multiple, product, quotient, modulus of Riemann integrable functions. Properties of Riemann integrable functions arising from the above results.
- Function defined by definite integral $\int_a^x f(t)dt$ and its properties. Antiderivative (primitive or indefinite integral). Properties of Logarithmic function defined as the definite integral $\int_1^x \frac{dt}{t},\ x > 0$.
- Fundamental theorem of Integral Calculus. First Mean Value theorem of integral calculus.

Unit-2 : Improper integral [10 classes]

- Range of integration, finite or infinite. Necessary and sufficient condition for convergence of improper integral in both cases.
- Tests of convergence : Comparison and M-test. Absolute and non-absolute convergence and inter-relations. Statement of Abel's and Dirichlet's test for convergence on the integral of a product.
- Convergence and working knowledge of Beta and Gamma function and their interrelation $\Big[\Gamma(n)\Gamma(1-n) = \frac{\pi}{\sin n\pi}, 0 < n < 1$, to be assumed$\Big]$. Computation of the integrals $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$, $\int_0^{\pi/2} \tan^n x dx$ when they exist (using Beta and Gamma function).

Unit-3 : Series of functions [30 classes]

- Sequence of functions defined on a set, Pointwise and uniform convergence. Cauchy criterion of uniform convergence. Weirstrass' M-test. Boundedness, continuity, integrability and differentiability of the limit function of a sequence of functions in case of uniform convergence.

- Series of functions defined on a set, Pointwise and uniform convergence. Cauchy criterion of uniform convergence. Weierstrass' M-test. Passage to the limit term by term. Boundedness, continuity, integrability, differentiability of a series of functions in case of uniform convergence.
- Power series : Fundamental theorem of power series. Cauchy-Hadamard theorem. Determination of radius of convergence. Uniform and absolute convergence of power series. Properties of sum function. Differentiation and integration of power series. Abel's limit theorems. Uniqueness of power series having sum function.
- Fourier series : Trigonometric series. Statement of sufficient condition for a trigonometric series to be a Fourier series. Fourier coefficients for periodic functions defined on $[-\pi, \pi]$. Statement of Dirichlet's condition of convergence. Statement of theorem of sum of Fourier series.

References

[1] R.G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 3rd Ed., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.

[2] Gerald G. Bilodeau , Paul R. Thie, G.E. Keough, An Introduction to Analysis, 2nd Ed., Jones & Bartlett, 2010.

[3] Brian S. Thomson, Andrew. M. Bruckner and Judith B. Bruckner, Elementary Real Analysis,Prentice Hall, 2001.

[4] S.K. Berberian, a First Course in Real Analysis, Springer Verlag, New York, 1994.

[5] T. Apostol, Mathematical Analysis, Narosa Publishing House

[6] Courant and John, Introduction to Calculus and Analysis, Vol I, Springer

[7] W. Rudin, Principles of Mathematical Analysis, Tata McGraw-Hill

[8] C. C. Pugh, Real Mathematical Analysis, Springer, 2002.

[9] Terence Tao, Analysis I, Hindustan Book Agency, 2006.

[10] S. Goldberg, Calculus and mathematical analysis.

[11] Horst R. Beyer, Calculus and Analysis, Wiley, 2010.

Course Structure | DSE | SEC | Credit Distribution

Partial differential equation & Multivariate Calculus-II

Semester : 4 Core Course-9 Paper Code(Theory): MTM-A-CC-4-9-TH Paper Code (Tutorial):MTM-A-CC-4-9-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Partial differential equation [40 classes]

- Partial differential equations of the first order, Lagrange's solution, non linear first order partial differential equations, Charpit's general method of solution, some special types of equations which can be solved easily by methods other than the general method.
- Derivation of heat equation, wave equation and Laplace equation. Classification of second order linear equations as hyperbolic, parabolic or elliptic. Reduction of second order linear equations to canonical forms.
- The Cauchy problem, Cauchy-Kowalewskaya theorem, Cauchy problem of finite and infinite string. Initial boundary value problems. Semi-infinite string with a fixed end, semi-infinite string with a free end. Equations with non-homogeneous boundary conditions. Non-homogeneous wave equation. Method of separation of variables, solving the vibrating string problem. Solving the heat conduction problem.

Unit-2 : Multivariate Calculus-II [35 classes]

- Multiple integral: Concept of upper sum, lower sum, upper integral, lower-integral and double integral (no rigorous treatment is needed). Statement of existence theorem for continuous functions. Iterated or repeated integral, change of order of integration. Triple integral. Cylindrical and spherical coordinates. Change of variables in double integrals and triple integrals. Transformation of double and triple integrals (problems only). Determination of volume and surface area by multiple integrals (problems only). Differentiation under the integral sign, Leibniz's rule (problems only).
- Definition of vector field, divergence and curl. Line integrals, applications of line integrals : mass and work. Fundamental theorem for line integrals, conservative vector fields, independence of path.
- Green's theorem, surface integrals, integrals over parametrically defined surfaces. Stoke's theorem, The Divergence theorem.

References

[1] G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005.

[2] M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2007.

[3] E. Marsden, A.J. Tromba and A. Weinstein, Basic Multivariable Calculus, Springer (SIE), 2005.

[4] James Stewart, Multivariable Calculus, Concepts and Contexts, 2nd Ed., Brooks /Cole, Thomson Learning, USA, 2001

[5] T. Apostol, Mathematical Analysis, Narosa Publishing House.

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[7] W. Rudin, Principles of Mathematical Analysis, Tata McGraw-Hill.

[8] Horst R. Beyer, Calculus and Analysis, Wiley, 2010.

[9] Ian Sneddon, Elements of Partial Differential equations, Mcgraw-Hill International Edition, 1957.

[10] M.D. Raisinghania, Ordinary and Partial Differential Equations, S. Chand Higher Academic, 19th Edition, 2017.

[11] K.Sankara Rao, Introduction to Partial Differential Equations, PHI, Third Edition, 2015.

Course Structure | DSE | SEC | Credit Distribution

Mechanics

Semester : 4 Core Course- 10 Paper Code(Theory): MTM-A-CC-4-10-TH Paper Code (Tutorial):MTM-A-CC-4-10-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial **20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[15 classes]

- **Coplanar forces in general :** Resultant force and resultant couple, Special cases, Varignon's theorem, Necessary and sufficient conditions of equilibrium. Equilibrium equations of the first, second and third kind.
- **An arbitrary force system in space :** Moment of a force about an axis, Varignon's theorem. Resultant force and resultant couple, necessary and sufficient conditions of equilibrium. Equilibrium equations, Reduction to a wrench, Poinsot's central axis, intensity and pitch of a wrench, Invariants of a system of forces. Statically determinate and indeterminate problems.
- **Equilibrium in the presence of sliding Friction force :** Contact force between bodies, Coulomb's laws of static Friction and dynamic friction. The angle and cone of friction, the equilibrium region.

Unit-2

[10 classes]

- **Virtual work :** Workless constraints - examples, virtual displacements and virtual work. The principle of virtual work, Deductions of the necessary and sufficient conditions of equilibrium of an arbitrary force system in plane and space, acting on a rigid body.
- **Stability of equilibrium :** Conservative force field, energy test of stability, condition of stability of a perfectly rough heavy body lying on a fixed body. Rocking stones.

Unit-3

[20 classes]

- **Kinematics of a particle :** velocity, acceleration, angular velocity, linear and angular momentum. Relative velocity and acceleration. Expressions for velocity and acceleration in case of rectilinear motion and planar motion - in Cartesian and polar co-ordinates, tangential and normal components. Uniform circular motion.
- **Newton laws of motion and law of gravitation :** Space, time, mass, force, inertial reference frame, principle of equivalence and g. Vector equation of motion.

  Work, power, kinetic energy, conservative forces - potential energy. Existence of potential energy function. Energy conservation in a conservative field. Stable equilibrium and small oscillations: Approximate equation of motion for small oscillation. Impulsive forces

Unit-4

[20 classes]

- **Problems in particle dynamics :** Rectilinear motion in a given force field - vertical motion under uniform gravity, inverse square field, constrained rectilinear motion, vertical motion under gravity in a resisting medium, simple harmonic motion, Damped and forced oscillations, resonance of an oscillating system, motion of elastic strings and springs.

- **Planar motion of a particle :** Motion of a projectile in a resisting medium under gravity, orbits in a central force field, Stability of nearly circular orbits. Motion under the attractive inverse square law, Kepler's laws on planetary motion. Slightly disturbed orbits, motion of artificial satellites. Constrained motion of a particle on smooth and rough curves. Equations of motion referred to a set of rotating axes.
- **Motion of a particle in three dimensions :** Motion on a smooth sphere, cone, and on any surface of revolution.

Unit-5

[10 classes]

- **Many particles system**

  The linear momentum principle : Linear momentum, linear momentum principle, motion of the centre of mass, conservation of linear momentum.
- **The angular momentum principle :** Moment of a force about a point, about an axis. Angular momentum about a point, about an axis. Angular momentum principle about centre of mass. Conservation of angular momentum (about a point and an axis). Impulsive forces.
- **The energy principle :** Configurations and degrees of freedom of a multi-particle system, energy principle, energy conservation.

  Rocket motion in free space and under gravity, collision of elastic bodies. The two-body problem.

References

[1] Gregory R.D., Classical mechanics, Cambridge UP

[2] K. R. Symon, Mechanics, Addison Wesley

[3] Mary Lunn; A First Course in Mechanics, OUP

[4] J. L. Synge, B. A. Griffith, Principles of Mechanics, Mcgraw Hill

[5] T. W. B. Kibble, F. H. Berkshire, Classical Mechanics, Imperial College Press

[6] D. T. Greenwood, Principle of Dynamics, PHI

[7] Chorlton, F., Textbook of Dynamics.

[8] D. Kleppner & R. Kolenkow, Introduction to Mechanics, Tata Mcgraw Hill

[9] A. P. French, Newtonian Mechanics, Viva Books

[10] Timoshenko and Young, Engineering Mechanics, Mcgraw Hill

[11] D. Chernilevski, E. Lavrova, V. Romanov, Mechanics for Engineers, MIR Publishers

[12] I.H. Shames and G. Krishna Mohan Rao, Engineering Mechanics: Statics and Dynamics, (4th Ed.), Dorling Kindersley(India) Pvt. Ltd. (Pearson Education), Delhi, 2009.

[13] R.C. Hibbeler and Ashok Gupta, Engineering Mechanics: Statics and Dynamics, 11th Ed., Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi.

[14] Loney, S. L., An Elementary Treatise on the Dynamics of particle and of Rigid Bodies, Loney Press .

[15] Loney, S. L., An Elementary Treatise on Statics

[16] Verma, R. S., A Textbook on Statics, Pothishala, 1962

[17] Ramsey, A. S., Dynamics (Part I & II).

Course Structure | DSE | SEC | Credit Distribution

Probability & Statistics

Semester : 5 Core Course-11 Paper Code(Theory): MTM-A-CC-5-11-TH Paper Code (Tutorial):MTM-A-CC-5-11-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[20 classes]

- Random experiment, σ-field, Sample space, probability as a set function, probability axioms, probability space. Finite sample spaces. Conditional probability, Bayes theorem, independence. Real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions, mathematical expectation, moments, moment generating function, characteristic function. Discrete distributions : uniform, binomial, Poisson, geometric, negative binomial, Continuous distributions : uniform, normal, exponential.

Unit-2

[15 classes]

- Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, moments, covariance, correlation coefficient, independent random variables, joint moment generating function (jmgf) and calculation of covariance from jmgf, characteristic function. Conditional expectations, linear regression for two variables, regression curves. Bivariate normal distribution.

Unit-3

[5 classes]

- Markov and Chebyshev's inequality, Convergence in Probability, statement and interpretation of weak law of large numbers and strong law of large numbers. Central limit theorem for independent and identically distributed random variables with finite variance.

Unit-4

[15 classes]

- Sampling and Sampling Distributions : Populations and Samples, Random Sample, distribution of the sample, Simple random sampling with and without replacement. Sample characteristics.
- Sampling Distributions : Statictic, Sample moments. Sample variance, Sampling from the normal distributions, Chi-square, t and F-distributions, sampling distribution of $\overline{X}$, s^2, $\frac{\sqrt{n}}{s}(\overline{X}-\mu)$
- Estimation of parameters : Point estimation. Interval Estimation- Confidence Intervals for mean and variance of Normal Population. Mean-squared error. Properties of good estimators - unbiasedness, consistency, sufficiency, Minimum-Variance Unbiased Estimator (MVUE).
- Method of Maximum likelihood : likelihood function, ML estimators for discrete and continuous models.

Unit-5

[15 classes]

- Statistical hypothesis : Simple and composite hypotheses, null hypotheses, alternative hypotheses, one-sided and two-sided hypotheses. The critical region and test statistic, type I error and type II error, level of significance. Power function of a test, most powerful test. The p-value (observed level of significance), Calculating p-values.

- Simple hypothesis versus simple alternative : Neyman-Pearson lemma (Statement only).
- Bivariate frequency Distribution : Bivariate data, Scatter diagram, Correlation, Linear Regression, principle of least squares and fitting of polynomials and exponential curves.

Graphical Demonstration (Teaching Aid**) [5 classes]

- Graphical representation of data - how to load data, plot a graph viz. histograms (equal class intervals and unequal class intervals), frequency polygon, pie chart, ogives with graphical summaries of data.
- Measures of central tendency and measures of dispersion ,moments, skewness and kurtosis.
- Karl Pearson correlation coefficient.
- Correlation coefficient for a bivariate frequency distribution.
- Lines of regression, angle between lines and estimated values of variables.
- Fitting of polynomials, exponential curves by method of least squares.
- Confidence interval for the parameters of a normal distribution (one sample and two sample problems).

** **Preferably by free softwares (e.g. R/ Python / SageMath etc.) but can be taught through black board/white board / square sheet etc. in case of unavailability.**

References

[1] William Feller, An introduction to Probability Theory and its Application, Volume 1, 3e.

[2] Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.

[3] Irwin Miller and Marylees Miller, John E. Freund, Mathematical Statistics with Applications, 7th Ed., Pearson Education, Asia, 2006.

[4] Sheldon Ross, Introduction to Probability Models, 9th Ed., Academic Press, Indian Reprint, 2007.

[5] Alexander M. Mood, Franklin A. Graybill and Duane C. Boes, Introduction to the Theory of Statistics, 3rd Ed., Tata McGraw- Hill, Reprint 2007

[6] A.M. Goon, M.K.Gupta and B.Dasgupta, Fundamental of Statistics, Vol 1 & Vol 2, World Press.

[7] A. Gupta, Ground work of Mathematical Probability and Statistics, Academic publishers .

Course Structure | DSE | SEC | Credit Distribution

Group Theory-II & Linear Algebra-II

Semester : 5 Core Course-12 Paper Code(Theory): MTM-A-CC-5-12-TH Paper Code (Tutorial):MTM-A-CC-5-12-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Group theory [35 classes]

- Automorphism, inner automorphism, automorphism groups, automorphism groups of finite and infinite cyclic groups, applications of factor groups to automorphism groups.
- External direct product and its properties, the group of units modulo n as an external direct product, internal direct product, converse of Lagrange's theorem for finite abelian group, Cauchy's theorem for finite abelian group, Fundamental theorem of finite abelian groups.

Unit-2 : Linear algebra [40 classes]

- Inner product spaces and norms, Gram-Schmidt orthonormalisation process, orthogonal complements, Bessel's inequality, the adjoint of a linear operator and its basic properties.
- Bilinear and quadratic forms, Diagonalisation of symmetric matrices, Second derivative test for critical point of a function of several variables, Hessian matrix, Sylvester's law of inertia. Index, signature.
- Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, annihilators. Eigenspaces of a linear operator, diagonalizability, invariant subspaces and Cayley-Hamilton theorem, the minimal polynomial for a linear operator, canonical forms (Jordan & rational).

References

[1] John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.

[2] M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.

[3] Joseph A. Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa Publishing House, New Delhi, 1999.

[4] Joseph J. Rotman, An Introduction to the Theory of Groups, 4th Ed., Springer Verlag, 1995.

[5] I.N. Herstein, Topics in Algebra, Wiley Eastern Limited, India, 1975.

[6] D.S. Malik, John M. Mordeson and M.K. Sen, Fundamentals of abstract algebra.

[7] Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, 4th Ed., Prentice- Hall of India Pvt. Ltd., New Delhi, 2004.

[8] S. Lang, Introduction to Linear Algebra, 2nd Ed., Springer, 2005.

[9] Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007.

[10] S. Kumaresan, Linear Algebra- A Geometric Approach, Prentice Hall of India, 1999.

[11] Kenneth Hoffman, Ray Alden Kunze, Linear Algebra, 2nd Ed., Prentice-Hall of India Pvt. Ltd., 1971.

[12] D.A.R. Wallace, Groups, Rings and Fields, Springer Verlag London Ltd., 1998.

Course Structure | DSE | SEC | Credit Distribution

Metric Space & Complex Analysis

Semester : 6 Core Course-13 Paper Code(Theory): MTM-A-CC-6-13-TH Paper Code (Tutorial):MTM-A-CC-6-13-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Metric space [40 classes]

- Definition and examples of metric spaces. Open ball. Open set. Closed set as complement of open set. Interior point and interior of a set. Limit point and closure of a set. Boundary point and boundary of a set. Properties of interior, closure and boundary. Bounded set and diameter of a set. Distance between two sets. Subspace of a metric space.
- Convergent sequence. Cauchy sequence. Every convergent sequence is Cauchy and bounded, but the converse is not true. Completeness. Cantor's intersection theorem. $\mathbb{R}$ is a complete metric space. $\mathbb{Q}$ is not complete.
- Continuous mappings, sequential criterion of continuity. Uniform continuity.
- Compactness, Sequential compactness, Heine-Borel theorem in $\mathbb{R}$. Finite intersection property, continuous functions on compact sets.
- Concept of connectedness and some examples of connected metric space, connected subsets of $\mathbb{R}, \mathbb{C}$.
- Contraction mappings, Banach Fixed point Theorem and its application to ordinary differential equations.

Unit-2 : Complex analysis [35 classes]

- Stereographic projection. Regions in the complex plane. Limits, limits involving the point at infinity. Continuity of functions of complex variable.
- Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability. Analytic functions, exponential function, logarithmic function, trigonometric functions, hyperbolic functions. Möbius transformation.
- Power series : Cauchy-Hadamard theorem. Determination of radius of convergence. Uniform and absolute convergence of power series. Analytic functions represented by power series. Uniqueness of power series.
- Contours, complex integration along a contour and its examples, upper bounds for moduli of contour integrals. Cauchy- Goursat theorem (statement only) and its consequences, Cauchy integral formula.

References

[1] Satish Shirali and Harikishan L. Vasudeva, Metric Spaces, Springer Verlag, London, 2006.

[2] S. Kumaresan, Topology of Metric Spaces, 2nd Ed., Narosa Publishing House, 2011.

[3] P. K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House.

[4] G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 2004.

[5] James Ward Brown and Ruel V. Churchill, Complex Variables and Applications, 8th Ed., McGraw Ãâåœ Hill International Edition, 2009.

[6] Joseph Bak and Donald J. Newman, Complex Analysis, 2nd Ed., Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., NewYork, 1997.

[7] S. Ponnusamy, Foundations of complex analysis.

[8] E. M. Stein and R. Shakrachi, Complex Analysis, Princeton University Press.

Course Structure | DSE | SEC | Credit Distribution

Numerical Methods

Semester : 6 Core Course-14 Paper Code(Theory): MTM-A-CC-6-14-TH	Credits : 4 Full Marks : 50+20**=70
Number of classes required : 55	
***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[5 classes]

- Representation of real numbers, Machine Numbers - floating point and fixed point. Sources of Errors, Rounding of numbers, significant digits and Error Propagation in machine arithmetic operations. Numerical Algorithms - stability and convergence.

Unit-2

[15 classes]

- Approximation : Classes of approximating functions, Types of approximations- polynomial approximation, The Weierstrass polynomial approximation theorem (statement only).
- Interpolation : Lagrange and Newton's methods. Error bounds. Finite difference operators. Newton (Gregory) forward and backward difference interpolation.
- Central Interpolation : Stirling's and Bessel's formulas. Different interpolation zones, Error estimation. Hermite interpolation.

Unit-3

[10 classes]

- Numerical differentiation : Methods based on interpolations, methods based on finite differences.
- Numerical Integration : Newton Cotes formula, Trapezoidal rule, Simpson's $\frac{1}{3}$-rd rule, Simpson's $\frac{3}{8}$-th rule, Weddle's rule, Boole's Rule, midpoint rule. Composite trapezoidal rule, composite Simpson's $\frac{1}{3}$-rd rule, composite Weddle's rule. Gaussian quadrature formula.

Unit-4

[10 classes]

- Transcendental and polynomial equations : Bisection method, Secant method, Regula-falsi method, fixed point iteration, Newton-Raphson method. Condition of convergence (if any), Order of convergence, Rate of convergence of these methods. Modified Newton-Raphson method for multiple roots, Complex roots of an algebraic equation by Newton-Raphson method.

  Numerical solution of system of nonlinear equations - Newton's method.

Unit-5

[10 classes]

- System of linear algebraic equations :
  Direct methods : Gaussian elimination and Gauss Jordan methods, Pivoting strategies.
- Iterative methods : Gauss Jacobi method, Gauss Seidel method and their convergence analysis. LU decomposition method (Crout's LU decomposition method).
- Matrix inversion : Gaussian elimination and LU decomposition method (Crout's LU decomposition method) (operational counts).
- The algebraic eigen value problem : Power method.

Unit-6

[5 classes]

- Ordinary differential equations : Single-step difference equation methods- error, convergence. The method of successive approximations (Picard), Euler's method, the modified Euler method, Runge-Kutta methods of orders two and four.

References

[1] Brian Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, India, 2007.

[2] M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering

[3] Computation, 6th Ed., New age International Publisher, India, 2007.

[4] C.F. Gerald and P.O. Wheatley, Applied Numerical Analysis, Pearson Education, India, 2008.

[5] Uri M. Ascher and Chen Greif, A First Course in Numerical Methods, 7th Ed., PHI Learning Private Limited, 2013.

[6] John H. Mathews and Kurtis D. Fink, Numerical Methods using Matlab, 4th Ed., PHI Learning Private Limited, 2012.

[7] Scarborough, James B., Numerical Mathematical Analysis, Oxford and IBH publishing co.

[8] Atkinson, K. E., An Introduction to Numerical Analysis, John Wiley and Sons, 1978.

[9] Yashavant Kanetkar, Let Us C, BPB Publications.

Course Structure | DSE | SEC | Credit Distribution

Numerical Methods Lab

Semester : 6 Core Course-14 Practical Paper Code(Practical): MTM-A-CC-6-14-P	Credits : 2 Full Marks : 30
Number of contact hours required : 50	

Course Structure | DSE | SEC | Credit Distribution

List of practicals (using C/ C++/ FORTRAN 90)

1. Calculate the sum $\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{N}$
2. Enter 100 integers into an array and sort them in an ascending order.
3. Solution of transcendental and algebraic equations by
   i) Bisection method
   ii) Newton Raphson method (Simple root, multiple roots, complex roots).
   iii) Secant method.
   iv) Regula Falsi method.
4. Solution of system of linear equations
   i) LU decomposition method
   ii) Gaussian elimination method
   iii) Gauss-Jacobi method
   iv) Gauss-Seidel method
5. Interpolation
   i) Lagrange Interpolation
   ii) Newton's forward, backward and divided difference interpolations
6. Numerical Integration
   i) Trapezoidal Rule
   ii) Simpson's one third rule
   iii) Weddle's Rule
   iv) Gauss Quadrature
7. Method of finding Eigenvalue by Power method (up to 4×4)
8. Fitting a Polynomial Function (up to third degree)
9. Solution of ordinary differential equations
   i) Euler method
   ii) Modified Euler method
   iii) Runge Kutta method (order 4)
   iv) The method of successive approximations (Picard)

Note : For any of the CAS (Computer aided software), Data types-simple data types, floating data types, character data types, arithmetic operators and operator precedence, variables and constant declarations, expressions, input/output, relational operators, logical operators and logical expressions, control statements and loop statements, Arrays should be introduced to the students.

Course Structure | DSE | SEC | Credit Distribution

Advanced Algebra

Semesters : 5 Discipline Specific Elective- DSE-A (1) Paper Code(Theory):MTM-A-DSE-A-5-1-TH Paper Code(Tutorial):MTM-A-DSE-A-5-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1: Group Theory [25 classes]

- Group actions, stabilizers, permutation representation associated with a given group action, Applications of group actions: Generalized Cayley's theorem, Index theorem.
- Groups acting on themselves by conjugation, class equation and consequences, conjugacy in S_n, p-groups, Sylow's theorems and consequences, Cauchy's theorem, Simplicity of A_n for $n \geq 5$, non-simplicity tests.

Unit-2: Ring Theory [50 classes]

- Principal ideal domain, principal ideal ring, prime element, irreducible element, greatest common divisor (gcd), least common multiple (lcm), expression of gcd, examples of a ring R and a pair of elements $a, b \in R$ such that $\gcd(a, b)$ does not exist, Euclidean domain, relation between Euclidean domain and principal ideal domain.
- Polynomial rings, division algorithm and consequences, factorization domain, unique factorization domain, irreducible and prime elements in a unique factorization domain, relation between principal ideal domain, unique factorization domain, factorization domain and integral domain, Eisenstein criterion and unique factorization in $\mathbb{Z}[x]$.
- Ring embedding and quotient field, regular rings and their examples, properties of regular ring, ideals in regular rings.

References

[1] John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.

[2] M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.

[3] Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, 4th Ed., Prentice- Hall of India Pvt. Ltd., New Delhi, 2004.

[4] Joseph A. Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa Publishing House, New Delhi, 1999.

[5] D.A.R. Wallace, Groups, Rings and Fields, Springer Verlag London Ltd., 1998.

[6] D.S. Malik, John M. Mordeson and M.K. Sen, Fundamentals of abstract algebra.

Course Structure | DSE | SEC | Credit Distribution

Bio Mathematics

Semesters : 5 Discipline Specific Elective- DSE-A(1) Paper Code(Theory):MTM-A-DSE-A-5-1-TH Paper Code(Tutorial):MTM-A-DSE-A-5-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[25 classes]

- Mathematical biology and the modeling process: an overview. Continuous models: Malthus model, logistic growth, Allee effect, Gompertz growth, Michaelis-Menten Kinetics, Holling type growth, bacterial growth in a chemostat, harvesting a single natural population, Prey predator systems and Lotka-Volterra equations, populations in competitions, epidemic models (SI, SIR, SIRS, SIC)

Unit-2

[30 classes]

- Activator-inhibitor system, insect outbreak model: Spruce Budworm. Numerical solution of the models and its graphical representation. Qualitative analysis of continuous models: Steady state solutions, stability and linearization, multiple species communities and Routh-Hurwitz Criteria. Phase plane methods and qualitative solutions, bifurcations and limit cycles with examples in the context of biological scenario. Spatial models: One species model with diffusion. Two species model with diffusion, conditions for diffusive instability, spreading colonies of microorganisms, Blood flow in circulatory system, travelling wave solutions, spread of genes in a population.

Unit-3

[15 classes]

- Discrete models : Overview of difference equations, steady state solution and linear stability analysis. Introduction to discrete models, linear models, growth models, decay models, drug delivery problem, discrete prey-predator models, density dependent growth models with harvesting, host-parasitoid systems (Nicholson- Bailey model), numerical solution of the models and its graphical representation. case studies. Optimal exploitation models, models in genetics, stage structure models, age structure models.

Graphical Demonstration (Teaching Aid)[using any software]

[5 classes]

- Growth model (exponential case only).
- Decay model (exponential case only).
- Lake pollution model (with constant/seasonal flow and pollution concentration).
- Case of single cold pill and a course of cold pills.
- Limited growth of population (with and without harvesting).
- Predatory-prey model (basic Volterra model, with density dependence, effect of DDT, two prey one predator).
- Epidemic model of influenza (basic epidemic model, contagious for life,disease with carriers).
- Battle model (basic battle model, jungle warfare, long range weapons).

References

[1] L.E. Keshet, Mathematical Models in Biology, SIAM, 1988.

[2] J. D. Murray, Mathematical Biology, Springer, 1993.

[3] Y.C. Fung, Biomechanics, Springer-Verlag, 1990.

[4] F. Brauer, P.V.D. Driessche and J. Wu, Mathematical Epidemiology, Springer, 2008.

[5] M. Kot, Elements of Mathematical Ecology, Cambridge University Press, 2001.

Course Structure | DSE | SEC | Credit Distribution

Industrial Mathematics

Semester : 5 Discipline Specific Elective-A(1) Paper Code(Theory):MTM-A-DSE-A-5-1-TH Paper Code(Tutorial):MTM-A-DSE-A-5-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[20 classes]

- Medical Imaging and Inverse Problems. The content is based on Mathematics of X-ray and CT scan based on the knowledge of calculus, elementary differential equations, complex numbers and matrices.

Unit-2

[20 classes]

- Introduction to Inverse problems: Why should we teach Inverse Problems? Illustration of Inverse problems through problems taught in Pre-Calculus, Calculus, Matrices and differential equations. Geological anomalies in Earth's interior from measurements at its surface (Inverse problems for Natural disaster) and Tomography.

Unit-3

[10 classes]

- X-ray: Introduction, X-ray behavior and Beers Law (The fundamental question of image construction) Lines in the place

Unit-4

[05 classes]

- Radon Transform: Definition and Examples, Linearity, Phantom (Shepp - Logan Phantom - Mathematical phantoms).

Unit-5

[05 classes]

- Back Projection: Definition, properties and examples.

Unit-6

[15 classes]

- CT Scan: Revision of properties of Fourier and inverse Fourier transforms and applications of their properties in image reconstruction. Algorithms of CT scan machine. Algebraic reconstruction techniques abbreviated as ART with application to CT scan.

References

[1] Timothy G. Feeman, The Mathematics of Medical Imaging, A Beginners Guide, Springer Under graduate Text in Mathematics and Technology, Springer, 2010.

[2] C.W. Groetsch, Inverse Problems, Activities for Undergraduates, The Mathematical Association of America, 1999.

[3] Andreas Kirsch, An Introduction to the Mathematical Theory of Inverse Problems, 2nd Ed., Springer, 2011

Course Structure | DSE | SEC | Credit Distribution

Discrete Mathematics

Semesters : 5 Discipline Specific Elective-DSE-B(1) Paper Code(Theory):MTM-A-DSE-B-5-1-TH Paper Code(Tutorial):MTM-A-DSE-B-5-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1 : Graph Theory [40 classes]

- Definition of undirected graphs, Using of graphs to solve different puzzles and problems. Multigraphs. Walks, Trails, Paths, Circuits and cycles, Eulerian circuits and paths. Eulerian graphs, example of Eulerian graphs. Hamiltonian cycles and Hamiltonian graphs.
- Weighted graphs and Travelling salespersons Problem. Dijkstra's algorithm to find shortest path.
- Definition of Trees and their elementary properties. Definition of Planar graphs, Kuratowski's graphs.
- Partial Order relations and lattices, Chains and antichains. Pigeon hole Principle.

Unit-2 : Number Theory [35 classes]

- Application of techniques of groups and rings to prove some theorems in number theory : Fermat's Theorem, Euler's Theorem, Willson's Theorem, Chinese Remainder Theorem.
- The Arithmetic of $\mathbb{Z}_p$, p a prime, pseudo prime and Carmichael Numbers, Fermat Numbers, Perfect Numbers, Mersenne Numbers.
- Primitive roots, the group of units $\mathcal{Z}_n^*$, the existence of primitive roots, applications of primitive roots, the algebraic structure of $\mathcal{Z}_n^*$.
- Quadratic residues and non quadratic residues, Legendre symbol, proof of the law of quadratic reciprocity, Jacobi symbols.
- Arithmetic functions, Multiplicative functions, definitions and examples.

References

[1] N. Deo; Graph Theory with Application to Engineering and Computer Science; Prentice Hall of India, New Delhi, 1990.

[2] John Clark and Derek Allan Holton; A First Look at Graph Theory; World Scientific, New Jersey, 1991.

[3] F. Harary; Graph Theory; Narosa Publishing House, New Delhi, 2001.

[4] J. A. Bondy and U. S. R. Murty; Graph theory and related topics; Academic Press, New York, 1979.

[5] Adhikari M R and Adhikari A: Basic Modern Algebra with Applications, Springer, 2014.

[6] Gareth A Jones and J Mary Jones : Elementary Number Theory, Springer International Edition.

[7] Neal Koblitz : A course in number theory and cryptography, Springer-Verlag, 2nd edition.

[8] D. M. Burton : Elementary Number Theory, Wm. C. Brown Publishers, Dulreque, Lowa, 1989.

[9] Kenneth. H. Rosen : Elementary Number Theory & Its Applications, AT&T Bell Laboratories, Addition-Wesley Publishing Company, 3rd Edition.

[10] Kenneth Ireland & Michael Rosen : A Classical Introduction to Modern Number Theory, 2nd edition, Springer-verlag.

[11] Richard A Mollin : Advanced Number Theory with Applications, CRC Press, A Chapman & Hall Book.

Course Structure | DSE | SEC | Credit Distribution

Linear Programming & Game Theory

Semesters : 5 Discipline Specific Elective- DSE-B(1) Paper Code(Theory):MTM-A-DSE-B-5-1-TH Paper Code(Tutorial):MTM-A-DSE-B-5-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[15 classes]

- Definition of Linear Programming Problem (L.P.P.). Formation of L.P.P. from daily life involving inequations. Graphical solution of L.P.P. Basic solutions and Basic Feasible Solution (B.F.S) with reference to L.P.P. Matrix formulation of L.P.P. Degenerate and Non-degenerate B.F.S.
- Hyperplane, Convex set, Cone, extreme points, convex hull and convex polyhedron. Supporting and Separating hyperplane. The collection of a feasible solutions of an L.P.P. constitutes a convex set. The extreme points of the convex set of feasible solutions correspond to its B.F.S. and conversely. The objective function has its optimal value at an extreme point of the convex polyhedron generated by the set of feasible solutions (the convex polyhedron may also be unbounded). In the absence of degeneracy, if the L.P.P. admits of an optimal solution then at least one B.F.S. must be optimal. Reduction of a F.S. to a B.F.S.

Unit-2

[20 classes]

- Slack and surplus variables. Standard form of L.P.P. theory of simplex method. Feasibility and optimality conditions.
- The algorithm. Two phase method. Degeneracy in L.P.P. and its resolution.

Unit-3

[10 classes]

- Duality theory: The dual of dual is the primal. Relation between the objective values of dual and the primal problems. Relation between their optimal values. Complementary slackness, Duality and simplex method and their applications.

Unit-4

[30 classes]

- Transportation and Assignment problems. Mathematical justification for optimality criterion. Hungarian method. Traveling Salesman problem.
- Concept of game problem. Rectangular games. Pure strategy and Mixed strategy. Saddle point and its existence. Optimal strategy and value of the game. Necessary and sufficient condition for a given strategy to be optimal in a game. Concept of Dominance. Fundamental Theorem of rectangular games. Algebraic method. Graphical method and Dominance method of solving Rectangular games. Inter-relation between theory of games and L.P.P.

References

[1] Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network Flows, 2nd Ed., John Wiley and Sons, India, 2004.

[2] F.S. Hillier and G.J. Lieberman, Introduction to Operations Research, 9th Ed., Tata McGraw Hill, Singapore, 2009.

[3] Hamdy A. Taha, Operations Research, An Introduction, 8th Ed., Prentice-Hall India, 2006.

[4] G. Hadley, Linear Programming, Narosa Publishing House, New Delhi, 2002.

Course Structure | DSE | SEC | Credit Distribution

Boolean Algebra & Automata Theory

Semester : 5 Discipline Specific Elective-B(1) Paper Code(Theory):MTM-A-DSE-B-5-1-TH Paper Code(Tutorial):MTM-A-DSE-B-5-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[10 classes]

- Definition, examples and basic properties of ordered sets, maps between ordered sets, duality principle, lattices as ordered sets, lattices as algebraic structures, sublattices, products and homomorphisms.

Unit-2

[15 classes]

- Definition, examples and properties of modular and distributive lattices, Boolean algebras, Boolean polynomials, minimal and maximal forms of Boolean polynomials, Quinn-McCluskey method, Karnaugh diagrams, Logic gates, switching circuits and applications of switching circuits.

Unit-3

[15 classes]

- Introduction : Alphabets, strings, and languages. Finite automata and regular languages: deterministic and non-deterministic finite automata, regular expressions, regular languages and their relationship with finite automata, pumping lemma and closure properties of regular languages.

Unit-4

[15 classes]

- Context free grammars and pushdown automata : Context free grammars (CFG), parse trees, ambiguities in grammars and languages, pushdown automaton (PDA) and the language accepted by PDA, deterministic PDA, Non-deterministic PDA, properties of context free languages; normal forms, pumping lemma, closure properties, decision properties.

Unit-5

[10 classes]

- Turing Machines : Turing machine as a model of computation, programming with a Turing machine, variants of Turing machine and their equivalence.

Unit-6

[10 classes]

- Undecidability : Recursively enumerable and recursive languages, undecidable problems about Turing machines: halting problem. Post correspondence problem, and undecidability problems about CFGs.

References

[1] B A. Davey and H. A. Priestley, Introduction to Lattices and Order, Cambridge University Press, Cambridge, 1990.

[2] Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics with Graph Theory, (2nd Ed.), Pearson Education (Singapore) P.Ltd., Indian Reprint 2003.

[3] Rudolf Lidl and G$\ddot{u}$nter Pilz, Applied Abstract Algebra, 2nd Ed., Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

[4] J. E. Hopcroft, R. Motwani and J. D. Ullman, Introduction to Automata Theory, Languages, and Computation, 2nd Ed., Addison-Wesley, 2001.

[5] H.R. Lewis, C.H. Papadimitriou, C. Papadimitriou, Elements of the Theory of Computation, 2nd Ed., Prentice-Hall, NJ, 1997.

[6] J.A. Anderson, Automata Theory with Modern Applications, Cambridge University Press, 2006

Course Structure | DSE | SEC | Credit Distribution

Differential Geometry

Semesters : 6 Discipline Specific Elective- DSE-A(2) Paper Code(Theory):MTM-A-DSE-A-6-2-TH Paper Code(Tutorial):MTM-A-DSE-A-6-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[10 classes]

- Tensor : Different transformation laws, Properties of tensors, Metric tensor, Riemannian space, Covariant Differentiation, Einstein space.

Unit-2

[35 classes]

- Theory of space curves : Space curves. Planer curves, curvature, torsion and Serret-Frenet formula. Osculating circles, osculating circles and spheres. Existence of space curves. Evolutes and involutes of curves.
- Theory of surfaces : Parametric curves on surfaces. Direction coefficients. First and second Fundamental forms. Principal and Gaussian curvatures. Lines of curvature, Euler's theorem. Rodrigue's formula. Conjugate and asymptotic lines.

Unit-3

[30 classes]

- Developables : Developable associated with space curves and curves on surfaces. Minimal surfaces. Geodesics: Canonical geodesic equations. Nature of geodesics on a surface of revolution. Clairaut's theorem. Normal property of geodesics. Torsion of a geodesic. Geodesic curvature. Gauss-Bonnet theorem.

References

[1] T.J. Willmore, An Introduction to Differential Geometry, Dover Publications, 2012.

[2] B. O'Neill, Elementary Differential Geometry, 2nd Ed., Academic Press, 2006.

[3] C.E. Weatherburn, Differential Geometry of Three Dimensions, Cambridge University Press 2003.

[4] D.J. Struik, Lectures on Classical Differential Geometry, Dover Publications, 1988.

[5] S. Lang, Fundamentals of Differential Geometry, Springer, 1999.

[6] B. Spain, Tensor Calculus: A Concise Course, Dover Publications, 2003.

[7] An Introduction to Differential Geometry (with the use of tensor Calculus), L. P. Eisenhart, Princeton University Press, 1940.

[8] Tensor Analysis, Theory and Applications to Geometry and Mechanics of Continua, 2nd Edition, I. S. Sokolnikoff, John Wiley and Sons., 1964.

Mathematical Modelling

Semesters : 6 Discipline Specific Elective-DSE-A(2) Paper Code(Theory):MTM-A-DSE-A-6-2-TH Paper Code(Tutorial):MTM-A-DSE-A-6-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[20 classes]

- Power series solution of Bessel's equation and Legendre's equation, Laplace transform and inverse transform, application to initial value problem up to second order.

Unit-2

[45 classes]

- Monte Carlo simulation modelling: simulating deterministic behavior (area under a curve, volume under a surface), generating random numbers: middle square method, linear congruence, queuing models: harbor system, morning rush hour, Overview of optimization modelling. Linear programming model: geometric solution algebraic solution, simplex method, sensitivity analysis

Graphical demonstration (Teaching aid **)

[10 classes]

- Plotting of Legendre polynomial for n = 1 to 5 in the interval [0,1]. Verifying graphically that all the roots of $P_n(x)$ lie in the interval [0,1].
- Automatic computation of coefficients in the series solution near ordinary points.
- Plotting of the Bessel's function of first kind of order 0 to 3.
- Automating the Frobenius Series Method.
- Random number generation and then use it for one of the following (a) Simulate area under a curve (b) Simulate volume under a surface.
- Programming of either one of the queuing model (a) Single server queue (e.g. Harbor system) (b) Multiple server queue (e.g. Rush hour).
- Programming of the Simplex method for 2/3 variables.

** **Preferably by free softwares e.g. R / SageMath / Python etc.**

References

[1] TynMyint-U and Lokenath Debnath, Linear Partial Differential Equation for Scientists and Engineers, Springer, Indian reprint, 2006.

[2] Frank R. Giordano, Maurice D. Weir and William P. Fox, A First Course in Mathematical Modeling, Thomson Learning, London and New York, 2003.

Course Structure | DSE | SEC | Credit Distribution

Fluid Statics & Elementary Fluid Dynamics

Semester : 6 Discipline Specific Elective-A(2) Paper Code(Theory):MTM-A-DSE-A-6-2-TH Paper Code(Tutorial):MTM-A-DSE-A-6-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[20 classes]

- **Introduction and Fundamental Concepts:**
  Definition of Fluid, Distinction Between Solid and Fluid, Concept of Continuum, Fluid Properties : Density, Specific Weight, Specific Volume, Specific Gravity. Stress field [(Normal stress: $\sigma_n = lim_{\delta A_n \to 0}(\delta F_n / \delta A_n)$ and Shear stress: $\tau_n = lim_{\delta A_n \to 0}(\delta F_t / \delta A_n)$], Viscosity, Vapor pressure,. Newtonian fluid, Non-Newtonian Fluids. Ideal Fluid, Compressibility, Distinction between an Incompressible and a Compressible Flow, Surface Tension of Liquids.

  Forces on Fluid Elements: Definition of Fluid Elements, Body Force, Surface Force, Normal Stress in a Stationary Fluid, Pascal's Law of Hydrostatics, Fundamental Equation of Fluid Statics: $\vec{\nabla} p = \rho \vec{F}$, Fundamental Fluid Static Equations in Scalar Form: $\frac{\partial p}{\partial z} = \rho g$, Constant Density Solution.

Unit-2

[25 classes]

- **Hydrostatics**
  Hydrostatic Thrusts on Submerged Plane Surface: Centre of pressure, determination of coordinates of centre of pressure. Hydrostatic Thrusts on Submerged Curved Surfaces. Buoyancy: Center of the buoyancy. Archimedes principle. Stability of Unconstrained Submerged Bodies in Fluid: Stable Equilibrium, Unstable Equilibrium, Neutral Equilibrium. Stability of Floating Bodies in Fluid: Metacentre, Metacentric height.
- **Gas**
  Pressure of gases, The Atmosphere, Relation between pressure, density and temperature, Pressure in an isothermal atmosphere, Atmosphere in convective equilibrium.

Unit-3

[15 classes]

- **Kinematics of Fluid:**
  Scalar and Vector Fields, flow field, Description of Fluid Motion: Lagrangian Method, Eulerian Method, Relation between Eulerian and Lagrangian Method, Variation of Flow Parameters in Time and Space: Steady and Unsteady Flow, Uniform and Non-uniform Flows. Material Derivative and Acceleration: temporal derivative, convective derivative

Unit-4

[15 classes]

- **Conservation Equations:**
  Control Mass System, Control Volume System, Isolated System. Conservation of Mass - The Continuity Equation: Differential Form and Vector Form, Integral form. Conservation of Momentum: Momentum Theorem, Reynolds Transport Theorem. Conservation of energy.

References

[1] Fox and McDonalds INTRODUCTION TO FLUID MECHANICS (8th edition) Philips J. Pritchard, JOHN WILEY AND SONS INC .

[2] Fluid Mechanics (7th edition) Frank M. White, McGraw Hill.

[3] An Elementary Text-Book on Hydrostatics: William Briggs and G.H. Bryan , London: W.B.Clive.

[4] Hydrostatics : A.S.Ramsey, Cambridge University Press, 2017.

[5] Hydrostatics : J.M.Kar, Krishna Prakashan, India.

[6] Elementary Fluid Dynamics : D.J.Acheson, Oxford Applied Mathematics and Computing Science Series.

[7] Introduction to Mathematical Fluid Dynamics : Richard E.Meyer, Dover Publication.

Course Structure | DSE | SEC | Credit Distribution

Point Set Topology

Semesters : 6 Discipline Specific Elective-DSE-B(2) Paper Code(Theory):MTM-A-DSE-B-6-2-TH Paper Code(Tutorial):MTM-A-DSE-B-6-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[35 classes]

- Topological spaces, basis and subbasis for a topology, neighbourhoods of a point, interior points, limit points, derived set, boundary of a set, closed sets, closure and interior of a set, dense subsets, subspace topology, finite Product topology, Continuous functions, open maps, closed maps, homeomorphisms, topological invariants, metric topology, isometry and metric invariants.

Unit-2

[15 classes]

- First countability, T_1 and T_2 separation axioms of topological spaces, convergence and cluster point of a sequence in topological spaces and some related concepts on first countable as well as on T_2 spaces. Heine's continuity criterion.

Unit-3

[25 classes]

- Connected spaces, connected sets in $\mathbb{R}$, components, Compact spaces, compactness and T_2, compact sets in $\mathbb{R}$, Heine-Borel Theorem for $\mathbb{R}^n$, real valued continuous function on connected and compact spaces, the concept of compactness in metric space, sequentially compactness of a metric space X and the Bolzano-Weiertrass property of X are equivalent.

References

[1] Munkres, J.R., Topology, A First Course, Prentice Hall of India Pvt.Ltd.,New Delhi, 2000.

[2] Dugundji, J., Topology, Allyn and Bacon, 1966.

[3] Simmons, G.F., Introduction to Topology and Modern Analysis, McGraw Hill, 1963.

[4] Kelley, J.L., General Topology, Van Nostrand Reinhold Co., New York,1995.

[5] Hocking, J., Young, G., Topology, Addison-Wesley Reading, 1961.

[6] Steen, L., Seebach, J., Counter Examples in Topology, Holt, Reinhart andWinston, New York, 1970.

Course Structure | DSE | SEC | Credit Distribution

Astronomy & Space Science

Semesters : 6 Discipline Specific Elective-DSE-B(2) Paper Code(Theory):MTM-A-DSE-B-6-2-TH Paper Code(Tutorial):MTM-A-DSE-B-6-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[25 classes]

- Celestial Sphere, various Coordinate Systems, transformation formulae among various coordinate systems, formulae of spherical triangle : cosine formula, sine formula, four parts formula , analogous cosine formula, hour angle, sidereal day, sidereal time, equation of time. Exercises.

Unit-2

[10 classes]

- Light and its properties, Optical , absorption, emission and continuous spectra, radio and Hubble Space Telescopes (HST), Photometry, Spectrometry, Spectrophotometry (definitions only), magnification, resolution, f/a ratio , refractors and reflectors. Exercises.

Unit-3

[10 classes]

- Various magnitudes of stars: apparent, absolute, photovisual, photographic, bolometric etc. Distance measurements of stars: Parallax method, Statistical Palallax Method, Moving Cluster Method. Radial and proper motion. Exercises.
- Morphological structure of Sun, solar cycles, sunspots, solar corona, solar wind, solar neutrino puzzle (Merely descriptive models). Solar system.

Unit-4

[5 classes]

- Interstellar matter, elastic collisions and kinetic equilibrium, Jeans Mass for gravitational collapse, radiative process (statement only).

Unit-5

[10 classes]

- Morphological classification of galaxies, rotation curves and mass modelling, missing mass and dark matter, distance determination by various methods. Our Galaxy. Exercises.

Unit-6

[15 classes]

- Space agencies around the world – The history of space agencies – Indian space exploration – First missions – Remarkable achievements.
- Rocket Propulsion; Rocket Equation and Staging, Optimal Rocket. Element of Aerodynamics; Aerodynamics Force and Moment, Fluid dynamics (Governing equations: Interpretations and Statements only), Flow regime, Continuum Flow, Continuum Viscous Flow and Boundary Layer, Rarefied Flow. Airbreathing Propulsion; Ideal Momentum Theory, Propeller Engine, Jet Engine.

References

[1] T. Padmanabhan, Theoretical Astrophysics, vols. 1-3, Cambridge University Press, 2002.

[2] S. Weinberg, Gravitation and Cosmology, Wiley, 2001.

[3] J.V. Narlikar, Introduction to Cosmology, Cambridge University Press, 2002.

[4] J.V. Narlikar, An Introduction to Relativity, Cambridge University Press, 2010.

[5] B.Basu, T.Chattopadhyay and S.N.Biswas, An Introduction to Astrophysics, Prentice Hall of India, 2010.

[6] Physical Processes in the Interstellar Medium, Lyman Spitzer, Jr. Wiley, 1998.

[7] Astrophysics for Physicists, Arnab Rai Choudhuri, Cambridge University Press, 2010.

[8] Extragalactic Astronomy and Cosmology: An Introduction, Peter Scineider, Springer, 2006.

[9] Textbook on Spherical Astronomy, W.M. Smart , Cambridge University Press.

[10] A Text Book on Astronomy, K.K. De, Books Syndicate (P) Ltd. 2013.

[11] Twentieth-century Space And Astronomy: A History of Notable Research And Discovery (Twentieth-Century Science): Marianne J. Dyson.

[12] International Space Olympiad: NASA.

[13] Rönnmark, Kjell Space Physics from the Sun to the Aurora.

[14] https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-522-space-propulsion-spring-2015/lecture-notes/
(Online tutorial, assignments and lecture notes).

[15] Tewari A (2007), Atmospheric and Space Flight Dynamics : Birkhäuser Basel.

[16] Schmidt L. V. (1998), Introduction to Aircraft Flight Dynamics, AIAA Education Series.

[17] Francis J, Hale (1994) Introduction to Spaceflight.

Course Structure | DSE | SEC | Credit Distribution

Advanced Mechanics

Semester : 6 Discipline Specific Elective-B(2) Paper Code(Theory):MTM-A-DSE-B-6-2-TH Paper Code(Tutorial):MTM-A-DSE-B-6-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Number of classes required : 75	
*1 Credit for Tutorial	
**15 Marks are reserved for Tutorial ***20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[20 classes]

- Degrees of freedom, reactions due to constraints. D' Alembert's principle; Lagranges first kind equations; Generalized coordinates; Generalized forces; Lagrangian; Second kind Lagrange's equations of motion; cyclic coordinates; velocity dependent potential; Principle of energy; Rayleigh's dissipation function.

Unit-2

[20 classes]

- Action Integral; Hamilton's principle; Lagrange's equations by variational methods; Hamilton's principle for non-holonomic system; Symmetry properties and conservation laws; Noether's theorem. Canonically conjugate coordinates and momenta; Legendre transformation; Routhian approach; Hamiltonian.

Unit-3

[15 classes]

- Hamilton's equations from variational principle; Poincare-Cartan integral invariant; Principle of stationary action; Fermat's principle;

Unit-4

[20 classes]

- Canonical transformation; Generating function; Poisson Bracket; Equations of motion; Action-angle variables; Hamilton-Jacobi's equation; Hamilton's principal function; Hamilton's characteristics function; Liouville's theorem.

References

[1] H. Goldstein, Classical Mechanics, Narosa Publ., New Delhi, 1998.

[2] N.C. Rana and P.S. Joag, Classical Mechanics, Tata McGraw Hill, New Delhi, 2002.

[3] E.T. Whittaker, A Treatise of Analytical Dynamics of Particles and Rigid Bodies, Cambridge Univ. Press, Cambridge, 1977.

[4] F. Gantmacher, Lectures in Analytical Mechanics, Mir Publ., 1975.

[5] T.W.B. Kibble and F.H. Berkshire, Classical Mechanics, 4th ed., Addison-Wesley Longman, 1996.

[6] V.I. Arnold, Mathematical Methods of Classical Mechanics, 2nd ed., Springer-Verlag, 1997.

[7] N.G. Chetaev, Theoretical Mechanics, Springer-Verlag, 1990.

[8] M. Calkin, Lagrangian and Hamiltonian Mechanics, World Sci. Publ., Singapore, 1996.

[9] J.L. Synge and B.A. Griffith, Principles of Mechanics, McGraw Hill, Singapore, 1970.

[10] E.C.G. Sudarshan and N. Mukunda, Classical Dynamics: A Modern Perspectives, John Wiley & Sons, 1974.

[11] J.R. Taylor, Classical Mechanics, University Science Books, California, 2005.

[12] L.D. Landau and E.M. Lifshitz, Mechanics, 3rd ed., Pergamon Press, 1982.

C Programming Language

Semester : 3 Skill Enhancement Course- SEC A Paper Code (Theory) : MTM-A-SEC-A-TH	Credits : 2 Full Marks : 100 (=80+20*)
Number of contact hours required : 50 *20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

[30 classes]

- An overview of theoretical computers, history of computers, overview of architecture of computer, compiler, assembler, machine language, high level language, object oriented language, programming language and importance of C programming.
- Constants, Variables and Data type of C-Program : Character set. Constants and variables data types, expression, assignment statements, declaration.
- Operation and Expressions : Arithmetic operators, relational operators, logical operators.
- Decision Making and Branching : decision making with if statement, if-else statement, Nesting if statement, switch statement, break and continue statement.
- Control Statements : While statement, do-while statement, for statement.
- Arrays : One-dimension, two-dimension and multidimensional arrays, declaration of arrays, initialization of one and multi-dimensional arrays.
- User-defined Functions : Definition of functions, Scope of variables, return values and their types, function declaration, function call by value, Nesting of functions, passing of arrays to functions, Recurrence of function.
- Introduction to Library functions: stdio.h, math.h, string.h stdlib.h, time.h etc.
- **Some hands on examples should be included.**

References

[1] B. W. Kernighan and D. M. Ritchi : The C-Programming Language, 2nd Edi.(ANSI Refresher), Prentice Hall, 1977.

[2] E. Balagurnsamy : Programming in ANSI C, Tata McGraw Hill, 2004.

[3] Y. Kanetkar : Let Us C ; BPB Publication, 1999.

[4] C. Xavier : C-Language and Numerical Methods, New Age International.

[5] V. Rajaraman : Computer Oriented Numerical Methods, Prentice Hall of India, 1980.

Course Structure | DSE | SEC | Credit Distribution

Object Oriented Programming in C++

Semester : 3 Skill Enhancement Course - SEC A Paper Code(Theory): MTM-A-SEC-A-TH	Credits : 2 Full Marks : 100(=80+20*)
Number of contact hours required : 50 *20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[10 classes]

- Programming paradigms, characteristics of object oriented programming languages, brief history of C++, structure of C++ program, differences between C and C++, basic C++ operators, Comments, working with variables, enumeration, arrays and pointer.

Unit-2

[10 classes]

- Objects, classes, constructor and destructors, friend function, inline function, encapsulation, data abstraction, inheritance, polymorphism, dynamic binding, operator overloading, method overloading, overloading arithmetic operator and comparison operators.

Unit-3

[10 classes]

- Template class in C++, copy constructor, subscript and function call operator, concept of namespace and exception handling.
- **List of hands on examples (using C++)**
  1. Calculate the sum $\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{N}$
  2. Enter 100 integers into an array and sort them in an ascending order.
  3. HCF and LCM of three positive integers.
  4. Separate even and odd numbers from first N natural numbers.
  5. Find all the prime numbers between 1 and N (N being a positive integer).
  6. Find the binary representation of a decimal number (up to 3 digits).
  7. Addition , subtraction, multiplication of two matrices (order up to 4×4).
  8. Compute the value of the determinant of a square matrix (order up to 4×4).

References

[1] Arnold Robbins, Linux Programming by Examples The Fundamentals, 2nd Ed., Pearson Education, 2008.

[2] Cox K, Red Hat Linux Administrator's Guide, PHI, 2009.

[3] R. Stevens, UNIX Network Programming, 3rd Ed., PHI, 2008.

[4] Sumitabha Das, UNIX Concepts and Applications, 4th Ed., TMH, 2009.

[5] Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, Linux in a Nutshell, 6th Ed.,O'Reilly Media, 2009.

[6] Neil Matthew, Richard Stones, Alan Cox, Beginning Linux Programming, 3rd Ed., 2004.

Course Structure | DSE | SEC | Credit Distribution

Mathematical Logic

Semester : 4 Skill Enhancement Course- SEC-B Paper Code (Theory): MTM-A-SEC-B-TH	Credits : 2 Full Marks : 100 (=80+20*)
Number of classes required : 50 *20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[5 classes]

- Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators.
- General Notions : Formal language, object and meta language, general definition of a Formal Theory/Formal Logic.

Unit-2

[15 classes]

- Propositional Logic : Formal theory for propositional calculus, derivation, proof, theorem, deduction theorem, conjunctive and disjunctive normal forms, semantics, truth tables, tautology, adequate set of connectives, applications to switching circuits, logical consequence, consistency, maximal consistency, Leindenbaum lemma, soundness and completeness theorems, algebraic semantics.

Unit-3

[10 classes]

- Predicate Logic : First order language, symbolizing ordinary sentences into first order formulae, free and bound variables, interpretation and satisfiability, models, logical validity, formal theory for predicate calculus, theorems and derivations, deduction theorem, equivalence theorem, replacement theorem, choice rule, Prenex normal form, soundness theorem, completeness theorem, compactness theorem, First Order Theory with equality, examples of First Order Theories (groups, rings, fields etc.).

References

[1] Elliott Mendelson; Introduction to mathematical logic; Chapman & Hall; London(1997)

[2] Angelo Margaris; First order mathematical logic; Dover publications, Inc, New York (1990).

[3] S.C.Kleene; Introduction to Metamathematics; Amsterdam; Elsevier (1952).

[4] J.H.Gallier; Logic for Computer Science; John.Wiley & Sons (1987).

[5] H.B.Enderton; A mathematical introduction to logic; Academic Press; New York (1972).

Course Structure | DSE | SEC | Credit Distribution

Scientific computing with SageMath & R

Semester : 4 Skill Enhancement Course- SEC B Paper Code (Theory): MTM-A-SEC-B-TH	Credits : 2 Full Marks : 100 (=80 + 20*)
Number of contact hours required : 50 *20 Marks are reserved for Internal Assessment & Attendance (10 marks for each)	

Course Structure | DSE | SEC | Credit Distribution

[30 classes]

- Introduction to SageMath and R , Installation Procedure, Use of SageMath & R as a Calculator, Numerical and symbolic computations using mathematical functions such as square root, trigonometric functions, logarithms, exponentiations etc.
- Graphical representations of few functions through plotting in a given interval, like plotting of polynomial functions, trigonometric functions, Plots of functions with asymptotes, superimposing multiple graphs in one plot like plotting a curve along with a tangent on that curve (if it exists), polar plotting of curves.
- SageMath & R commands for differentiation, higher order derivatives, plotting $f(x)$ and $f'(x)$ together, integrals, definite integrals etc.
- Introduction to Programming in SageMath & R , relational and logical operators, conditional statements, loops and nested loops, without using inbuilt functions write programs for average of integers, mean, median, mode, factorial, checking primes, checking next primes, finding all primes in an interval, finding gcd, lcm, finding convergence of a given sequence, etc.
- Use of inbuilt functions that deal with matrices, determinant, inverse of a given real square matrix (if it exists), solving a system of linear equations, finding roots of a given polynomial, solving differential equations.
- **Some hands on examples should be included.**

  Note : The goal of this course is to introduce students to the fundamental commands and structure of SageMath & R The course covers the basic syntax and semantics of SageMath & R , including basic data types, variables, control structures and functions or similar concepts, and visualization of results and processed data.

References

[1] An Introduction to R: W. N. Venables, D. M. Smith and the R Core Team (available online).

[2] https://www.datacamp.com/courses/free-introduction-to-r (Online tutorial on R)

[3] https://www.datacamp.com/community/open-courses/kaggle-r-tutorial-on-machine-learning (Online PDF tutorial)

[4] http://data.princeton.edu/R/introducingR.pdf (Online PDF: Princeton University)

[5] M. Crawley, Basic Statistics: An Introduction using R

[6] P. Dalgaard, Introductory Statistics with R

[7] B.S. Everitt T. Hothorn, A Handbook of Statistical Analyses Using R (2nd ed.) **

[8] J.J. Faraway, Linear Models with R

[9] J.J. Faraway, Extending the Linear Model with R: Generalized Linear, Mixed Effects and Nonparametric Regression Models

[10] J. Maindonald J. Braun, Data Analysis and Graphics Using R: An Example-based Approach

[11] An Introduction to SAGE Programming : With Applications to SAGE, Razvan A. Mezei, Wiley,

[12] http://doc.sagemath.org/pdf/en/tutorial/SageTutorial.pdf

Course Structure | DSE | SEC | Credit Distribution

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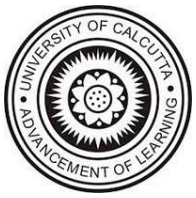
University of Calcutta

Syllabus for three-year B.Sc. in Mathematics

(General)

Under

CBCS System



2018

1. Credit Distribution across Courses

Course Type	Total Papers	Credits		
		Theory + Tutorial	Theory + Practical	Total
Core Courses	4 (Mathematics)	$4 \times 5 + 4 \times 1 = 24$	—	72
	8 (Other disciplines)	To be decided	To be decided	
Discipline Specific Electives	2 (Mathematics)	$2 \times 5 + 2 \times 1 = 12$	—	36
	4 (Other disciplines)	To be decided	To be decided	
Ability Enhancement Language Courses	2	$2 \times 2 = 4$	—	4
Skill Enhancement Courses	4 (at least one from each discipline)	$4 \times 2 = 8$	—	8
Totals	24			120

2. Course Structure : Semester-wise distribution of Courses

Semester	Course Name	Course Detail	Credits	Page No.
1	Ability Enhancement Compulsory Course-I	AECC(1)	2	
	Core Course-1A	Mathematics-CC1/GE1	6	4
	Core Course-2A	Other Discipline	6	
	Core Course-3A	Other Discipline	6	
		Total	**20**	
2	Ability Enhancement Compulsory Course-2	AECC(2)	2	
	Core Course-1B	Mathematics- CC2/GE2	6	7
	Core Course-2B	Other Discipline	6	
	Core Course-3B	Other Discipline	6	
		Total	**20**	
3	Core Course-1C	Mathematics- CC3/GE3	6	9
	Core Course-2C	Other Discipline	6	
	Core Course-3C	Other Discipline	6	
	Skill Enhancement Course-1	For Mathematics Course see SEC-A *	2	3
		Total	**20**	
4	Core Course-1D	Mathematics- CC4/GE4	6	11
	Core Course-2D	Other Discipline	6	
	Core Course-3D	Other Discipline	6	
	Skill Enhancement Course-2	For Mathematics Course see SEC-B *	2	3
		Total	**20**	
5	Skill Enhancement Course-3	For Mathematics Course see SEC-A *	2	3
	Discipline Specific Elective-1A	Mathematics-5 (See DSE-A)	6	3
	Discipline Specific Elective-2A	Other Discipline	6	
	Discipline Specific Elective-3A	Other Discipline	6	
		Total	**20**	
6	Skill Enhancement Course-4	For Mathematics Course see SEC-B *	2	3
	Discipline Specific Elective-1B	Mathematics-6 (See DSE-B)	6	??
	Discipline Specific Elective-2B	Other Discipline	6	
	Discipline Specific Elective-3B	Other Discipline	6	
		Total	**20**	
		Grand Total	**120**	

* A student has to opt for 4 Skill Enhancement Courses in four Semesters (3rd to 6th) taking **at least one Course from each discipline.**

Course Structure | Credit Distribution | DSE | SEC

3. Choices for Skill Enhancement Courses in Mathematics (SEC)

	Course Detail
Skill Enhancement Course (Semester 3)-SEC A	C Programming Language [13]
Skill Enhancement Course (Semester 4)-SEC B	Mathematical Logic [14]
Skill Enhancement Course (Semester 5) -SEC A	Object Oriented Programming in C++ [15]
Skill Enhancement Course (Semester 6)-SEC B	Boolean Algebra [16]

The number within the bracket [ ] refers to page number.

Course Structure | Credit Distribution | DSE

4. Choices for Discipline Specific Electives
. DSE-A & B (Mathematics)

DSE-A: (Semesters 5/6)	**DSE-B: (Semesters 5/6)**
Particle Dynamics [17]	Advanced Calculus [19]
Graph Theory [18]	Mathematical Finance [20]

The number within the bracket [ ] refers to page number. A student has to opt for at least one of the subjects available under each category.

Course Structure | Credit Distribution | SEC

Mathematics - CC1/GE1

Semester : 1 Core Course-CC1/GE1 Paper Code (Theoretical) : MTM-G-CC-1-1-TH / MTM-G-GE-1-1-TH Paper Code (Tutorial):MTM-G-CC-1-1-TU / MTM-G-GE-1-1-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | SEC | DSE | Credit Distribution

Unit-1 : Algebra-I (15 Marks) [10 classes]

- Complex Numbers : De Moivre's Theorem and its applications. Exponential, Sine, Cosine and Logarithm of a complex number. Definition of a^z $(a \neq 0)$. Inverse circular and Hyperbolic functions.
- Polynomials : Fundamental Theorem of Algebra (Statement only). Polynomials with real coefficients, the n-th degree polynomial equation has exactly n roots. Nature of roots of an equation (surd or complex roots occur in pairs). Statement of Descarte's rule of signs and its applications.
- Statements of : (i) If a polynomial $f(x)$ has opposite signs for two real values a and b of x, the equation $f(x) = 0$ has odd number of real roots between a and b. If $f(a)$ and $f(b)$ are of same sign, either no real root or an even number of roots lies between a and b.

  (ii) Rolle's Theorem and its direct applications. Relation between roots and coefficients, symmetric functions of roots, transformations of equations. Cardan's method of solution of a cubic equation.
- Rank of a matrix : Determination of rank either by considering minors or by sweep-out process. Consistency and solution of a system of linear equations with not more than 3 variables by matrix method.

Unit-2 : Differential Calculus-I (25 Marks) [20 classes]

- Rational numbers, Geometrical representations, Irrational number, Real number represented as point on a line — Linear Continuum. Acquaintance with basic properties of real number (No deduction or proof is included).
- Real-valued functions defined on an interval, limit of a function (Cauchy's definition). Algebra of limits. Continuity of a function at a point and in an interval. Acquaintance (on proof) with the important properties of continuous functions no closed intervals. Statement of existence of inverse function of a strictly monotone function and its continuity.
- Derivative - its geometrical and physical interpretation. Sign of derivative-Monotonic increasing and decreasing functions. Relation between continuity and derivability. Differential - application in finding approximation.
- Successive derivative - Leibnitz's theorem and its application.
- Functions of two and three variables : their geometrical representations. Limit and Continuity (definitions only) for function of two variables. Partial derivatives. Knowledge and use of chain Rule. Exact differentials (emphasis on solving problems only). Functions of two variables - Successive partial Derivatives : Statement of Schwarz's Theorem on Commutative property of mixed derivatives. Euler's Theorem on homogeneous function of two and three variables.

- Applications of Differential Calculus : Curvature of plane curves. Rectilinear Asymptotes (Cartesian only). Envelope of family of straight lines and of curves (problems only). Definitions and examples of singular points (Viz. Node. Cusp, Isolated point).

Unit-3 : Differential Equation-I (15 Marks) [10 classes]

- Order, degree and solution of an ordinary differential equation (ODE) in presence of arbitrary constants, Formation of ODE.
- First order equations : (i) Exact equations and those reducible to such equation. (ii) Euler's and Bernoulli's equations (Linear). (iii) Clairaut's Equations : General and Singular solutions.
- Second order linear equations : Second order linear differential equation with constant coefficients. Euler's Homogeneous equations.
- Second order differential equation : (i) Method of variation of parameters, (ii) Method of undetermined coefficients.

Unit-4 : Coordinate Geometry (25 Marks) [20 classes]

- Transformations of Rectangular axes : Translation, Rotation and their combinations. Invariants.
- General equation of second degree in x and y : Reduction to canonical forms. Classification of conic.
- Pair of straight lines : Condition that the general equation of 2nd degree in x and y may represent two straight lines. Point of intersection of two intersecting straight lines. Angle between two lines given by $ax^2 + 2hxy + by^2 = 0$. Equation of bisectors. Equation of two lines joining the origin to the points in which a line meets a conic.
- Equations of pair of tangents from an external point, chord of contact, poles and polars in case of General conic : Particular cases for Parabola, Ellipse, Circle, Hyperbola.
- Polar equation of straight lines and circles. Polar equation of a conic referred to a focus as pole. Equation of chord joining two points. Equations of tangent and normal.
- Sphere and its tangent plane. Right circular cone.

Course Structure | SEC | DSE | Credit Distribution

Mathematics - CC2/GE2

Semester : 2 Core Course-CC2/GE2 Paper Code (Theoretical) : MTM-G-CC-2-2-TH / MTM-G-GE-2-2-TH Paper Code (Tutorial):MTM-G-CC-2-2-TU / MTM-G-GE-2-2-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | SEC | DSE | Credit Distribution

Unit-1 : Differential Calculus-II (20 Marks) [15 classes]

- Sequence of real numbers : Definition of bounds of a sequence and monotone sequence. Limit of a sequence. Statements of limit theorems. Concept of convergence and divergence of monotone sequences-applications of the theorems, in particular, definition of e. Statement of Cauchy's general principle of convergence and its application.
- Infinite series of constant terms; Convergence and Divergence (definitions). Cauchy's principle as applied to infinite series (application only). Series of positive terms : Statements of comparison test. D.AIembert's Ratio test. Cauchy's nth root test and Raabe's test Applications. Alternating series. Statement of Leibnitz test and its applications.
- Real-Valued functions defined on an interval: Statement of Rolle's Theorem and its geometrical interpretation. Mean value theorems of Lagrange and Cauchy. Statements of Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's from of remainders. Taylor's and Maclaurin's Infinite series of functions like $e^x, \sin x, \cos x, (1+x)^n, \log(1+x)$ with restrictions wherever necessary.
- Indeterminate Forms : L'Hospital's Rule : Statement and Problems only.
- Application of the principle of Maxima and Minima for a function of single variable in geometrical, physical and to other problems.
- Maxima and minima of functions of not more than three variables Lagrange's Method of undetermined multiplier - Problems only.

Unit-2 : Differential Equation-II (15 Marks) [10 classes]

- Linear homogeneous equations with constant coefficients, Linear non-homogeneous equations, The method of variation of parameters, The Cauchy-Euler equation, Simultaneous differential equations, Simple eigenvalue problem.
- Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations, Formation of first order partial differential equations, Linear partial differential equation of first order, Lagrange's method, Charpit's method.

Unit-3 : Vector Algebra (15 Marks) [10 classes]

- Addition of Vectors, Multiplication of a Vector by a Scalar. Collinear and Coplanar Vectors. Scalar and Vector products of two and three vectors. Simple applications to problems of Geometry. Vector equation of plane and straight line. Volume of Tetrahedron. Applications to problems of Mechanics (Work done and Moment).

Unit-4 : Discrete Mathematics (30 Marks) [25 classes]

- Integers : Principle of Mathematical Induction. Division algorithm. Representation of integer in an arbitrary base. Prime Integers. Some properties of prime integers. Fundamental theorem of Arithmetic. Euclid's Theorem. Linear Diophantine equations. [Statement of Principle of Mathematical Induction, Strong form of Mathematical induction. Applications in different problems. Proofs of division algorithm. Representation of an integer uniquely in an arbitrary base, change of an integer from one base to another base. Computer operations with integers â“ Divisor of an integer, g.c.d. of two positive integers, prime integer, Proof of Fundamental theorem, Proof of Euclid's Theorem. To show how to find all prime numbers less than or equal to a given positive integer. Problems related to prime number. Linear Diophantine equation â“ when such an equation has solution, some applications.]
- Congruences : Congruence relation on integers, Basic properties of this relation. Linear congruences, Chinese Remainder Theorem. System of Linear congruences. [Definition of Congruence â“ to show it is an equivalence relation, to prove the following : $a \equiv b$ (mod m) implies
(i) $(a + c) \equiv (b + c)$ (mod m)
(ii) $ac \equiv bc$ (mod m)
(iii) $a^n \equiv b^n$ (mod m), for any polynomial $f(x)$ with integral coefficients $f(a) \equiv f(b)$ (mod m) etc. Linear Congruence, to show how to solve these congruences, Chinese remainder theorem â“ Statement and proof and some applications. System of linear congruences, when solution exists â“ some applications.]
- Application of Congruences : Divisibility tests. Check-digit and an ISBN, in Universal product Code, in major credit cards. Error detecting capability. [Using Congruence, develop divisibility tests for integers based on their expansions with respect to different bases, if d divides $(b - 1)$ then $n = (a_k a_{k-1} a_1 b)$ is divisible by d if and only if the sum of the digits is divisible by d etc. Show that congruence can be used to schedule Round-Robin tournaments. Check digits for different identification numbers â“ International standard book number, universal product code etc. Theorem regarding error detecting capability.]
- Congruence Classes : Congruence classes, addition and multiplication of congruence classes. Fermat's little theorem. Euler's theorem. Wilson's theorem. Some simple applications. [Definition of Congruence Classes, properties of Congruence classes, addition and multiplication, existence of inverse. Fermat's little theorem. Euler's theorem. Wilson's theorem - Statement, proof and some applications.]
- Boolean algebra : Boolean Algebra, Boolean functions, Logic gates, Minimization of circuits.

Course Structure | SEC | DSE | Credit Distribution

Mathematics - CC3/GE3

Semester : 3 Core Course-CC3/GE3 Paper Code (Theoretical) : MTM-G-CC-3-3-TH / MTM-G-GE-3-3-TH Paper Code (Tutorial):MTM-G-CC-3-3-TU / MTM-G-GE-3-3-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | SEC | DSE | Credit Distribution

Unit-1 : Integral Calculus (20 Marks) [10 classes]

- Evaluation of definite integrals.
- Integration as the limit of a sum (with equally spaced as well as unequal intervals).
- Reduction formulae of $\int \sin^n x \cos^m x dx$, $\int \frac{\sin^m x}{\cos^n x} dx$, $\int \tan^n x dx$ and associated problems (m and n are non-negative integers).
- Definition of Improper Integrals : Statements of (i) μ-test (ii) Comparison test (Limit from excluded) - Simple problems only. Use of Beta and Gamma functions (convergence and important relations being assumed).
- Working knowledge of double integral.
- Applications : Rectification, Quadrature, volume and surface areas of solids formed by revolution of plane curve and areas problems only.

Unit-2 : Numerical Methods (30 Marks) [25 classes]

- Approximate numbers, Significant figures, Rounding off numbers. Error : Absolute, Relative and percentage.
- Operators - Δ, ∇ and E (Definitions and some relations among them).
- Interpolation : The problem of interpolation Equispaced arguments Difference Tables, Deduction of Newton's Forward Interpolation Formula, remainder term (expression only). Newton's Backward interpolation Formula (Statement only) with remainder term. Unequally- spaced arguments Lagrange's Interpolation Formula (Statement only). Numerical problems on Interpolation with both equally and unequally spaced arguments.
- Numerical Integration : Trapezoidal and Simpson's $\frac{1}{3}$-rd formula (statement only). Problems on Numerical Integration.
- Solution of Numerical Equation : To find a real root of an algebraic or transcendental equation. Location of root (tabular method), Bisection method, Newton-Raphson method with geometrical significance, Numerical Problems. (Note : Emphasis should be given on problems)

Unit-3 : Linear Programming (30 Marks) [25 classes]

- Motivation of Linear Programming problem. Statement of L.P.P. Formulation of L.P.P. Slack and Surplus variables. L.P.P. is matrix form. Convex set, Hyperplane, Extreme points, convex Polyhedron, Basic solutions and Basic Feasible Solutions (B.F.S.). Degenerate and Non-degenerate B.F.S.
- The set of all feasible solutions of an L.P.P. is a convex set. The objective function of an L.P.P. assumes its optimal value at an extreme print of the convex set of feasible solutions, A.B.F.S. to an L.P.P. corresponds to an extreme point of the convex set of feasible solutions.
- Fundamental Theorem of L.P.P. (Statement only) Reduction of a feasible solution to a B.F.S. Standard form of an L.P.P. Solution by graphical method (for two variables), by simplex method and method of penalty. Concept of Duality. Duality Theory. The dual of the dual is the primal. Relation between the objective values of dual and the primal problems. Dual problems with at most one unrestricted variable, one constraint of equality. Transportation and Assignment problem and their optimal solutions.

Course Structure | SEC | DSE | Credit Distribution

Mathematics - CC4/GE4

Semester : 4 Core Course-CC4/GE4 Paper Code (Theoretical) : MTM-G-CC-4-4-TH / MTM-G-GE-4-4-TH Paper Code (Tutorial):MTM-G-CC-4-4-TU / MTM-G-GE-4-4-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | SEC | DSE | Credit Distribution

Unit-1 : Algebra-II (20 Marks) [10 classes]

- Introduction of Group Theory : Definition and examples taken from various branches (example from number system, roots of Unity, 2×2 real matrices, non singular real matrices of a fixed order). Elementary properties using definition of Group. Definition and examples of sub- group - Statement of necessary and sufficient condition and its applications.
- Definitions and examples of (i) Ring, (ii) Field, (iii) Sub-ring, (iv) Sub- field.
- Concept of Vector space over a Field : Examples, Concepts of Linear combinations, Linear dependence and independence of a finite number of vectors, Sub- space, Concepts of generators and basis of a finite-dimensional vector space. Problems on formation of basis of a vector space (No proof required).
- Real Quadratic Form involving not more than three variables (problems only).
- Characteristic equation of square matrix of order not more than three determination of Eigen Values and Eigen Vectors (problems only). Statement and illustration of Cayley-Hamilton Theorem.

Unit-2 : Computer Science & Programming (30 Marks) [25 classes]

- Computer Science and Programming : Historical Development, Computer Generation, Computer Anatomy Different Components of a computer system. Operating System, hardware and Software.
- Positional Number System. Binary to Decimal and Decimal to Binary. Other systems. Binary Arithmetic. Octal, Hexadecimal, etc. Storing of data in a Computer - BIT, BYTE, WORD etc. Coding of a data- ASCII, etc.
- Programming Language : Machine language, Assembly language and High level language, Compiler and interpreter. Object Programme and source Programme. Ideas about some HLL– e.g. BASIC, FORTRAN, C, C++, COBOL, PASCAL, etc.
- Algorithms and Flow Charts– their utilities and important features, Ideas about the complexities of an algorithm. Application in simple problems. FORTRAN 77/90: Introduction, Data Type– Keywords, Constants and Variables - Integer, Real, Complex, Logical, character, subscripted variables, Fortran Expressions.

Unit-3 : Probability & Statistics (30 Marks) [25 classes]

- Elements of probability Theory : Random experiment, Outcome, Event, Mutually Exclusive Events, Equally likely and Exhaustive. Classical definition of probability, Theorems of Total Probability, Conditional probability and Statistical Independence. Baye's Theorem. Problems, Shortcoming of the classical definition. Axiomatic approach problems, Random Variable and its Expectation, Theorems on mathematical expectation. Joint distribution of two random variables.

- Theoretical Probability Distribution Discrete and Continuous (p.m.f., p.d.f.) Binomial, Poisson and Normal distributions and their properties.
- Elements of Statistical Methods. Variables, Attributes. Primary data and secondary data, Population and sample. Census and Sample Survey. Tabulation Chart and Diagram, Graph, Bar diagram, Pie diagram etc. Frequency Distribution Un-grouped and grouped cumulative frequency distribution. Histogram, Frequency curve, Measures of Central tendencies. Averages : AM,; GM, HM, Mean, Median and Mode (their advantages and disadvantages). Measures of Dispersions - Range, Quartile Deviation, Mean Deviation, Variance / S.D., Moments, Skewness and Kurtosis.
- Sampling Theory : Meaning and objects of sampling. Some ideas about the methods of selecting samples, Statistic and parameter, Sampling Proportion. Four fundamental distributions, derived from the normal: (i) standard Normal Distribution, (ii) Chi-square distribution (iii) Student's distribution (iv) Snedecor's F-distribution. Estimation and Test of Significance. Statistical Inference. Theory of estimation Point estimation and Interval estimation. Confidence Interval / Confidence Limit. Statistical Hypothesis - Null Hypothesis and Alternative Hypothesis. Level of significance. Critical Region. Type I and II error. Problems.
- Bivariate Frequency Distribution. Scatter Diagram, Co-relation co-efficient Definition and properties. Regression lines.

Course Structure | SEC | DSE | Credit Distribution

C Programming Language

Semester : 3 Skill Enhancement Course- SEC A Paper Code (Theory) : MTM-G-SEC-A-TH	Credits : 2 Full Marks : 100 (= 80 + 20*)
Minimum number of classes required : 30 *20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[30 classes]

- An overview of theoretical computers, history of computers, overview of architecture of computer, compiler, assembler, machine language, high level language, object oriented language, programming language and importance of C programming.
- Constants, Variables and Data type of C-Program : Character set. Constants and variables data types, expression, assignment statements, declaration.
- Operation and Expressions : Arithmetic operators, relational operators, logical operators.
- Decision Making and Branching : decision making with if statement, if-else statement, Nesting if statement, switch statement, break and continue statement.
- Control Statements : While statement, do-while statement, for statement.
- Arrays : One-dimension, two-dimension and multidimensional arrays, declaration of arrays, initialization of one and multi-dimensional arrays.
- User-defined Functions : Definition of functions, Scope of variables, return values and their types, function declaration, function call by value, Nesting of functions, passing of arrays to functions, Recurrence of function.
- Introduction to Library functions: stdio.h, math.h, string.h stdlib.h, time.h etc.

References

[1] B. W. Kernighan and D. M. Ritchi : The C-Programming Language, 2nd Edi.(ANSI Refresher), Prentice Hall, 1977.

[2] E. Balagurnsamy : Programming in ANSI C, Tata McGraw Hill, 2004.

[3] Y. Kanetkar : Let Us C ; BPB Publication, 1999.

[4] C. Xavier : C-Language and Numerical Methods, New Age International.

[5] V. Rajaraman : Computer Oriented Numerical Methods, Prentice Hall of India, 1980.

Course Structure | DSE | SEC | Credit Distribution

Mathematical Logic

Semester : 4 Skill Enhancement Course-SEC B Paper Code (Theory) :MTM-G-SEC-B-TH	Credits : 2 Full Marks : 100 (=80+20*)
Minimum number of classes required : 30 *20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[5 classes]

- Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators.
- General Notions : Formal language, object and meta language, general definition of a Formal Theory/Formal Logic.

Unit-2

[15 classes]

- Propositional Logic : Formal theory for propositional calculus, derivation, proof, theorem, deduction theorem, conjunctive and disjunctive normal forms, semantics, truth tables, tautology, adequate set of connectives, applications to switching circuits, logical consequence, consistency, maximal consistency, Leindenbaum lemma, soundness and completeness theorems, algebraic semantics.

Unit-3

[10 classes]

- Predicate Logic : First order language, symbolizing ordinary sentences into first order formulae, free and bound variables, interpretation and satisfiability, models, logical validity, formal theory for predicate calculus, theorems and derivations, deduction theorem, equivalence theorem, replacement theorem, choice rule, Prenex normal form, soundness theorem, completeness theorem, compactness theorem, First Order Theory with equality, examples of First Order Theories (groups, rings, fields etc.).

References

[1] Elliott Mendelson; Introduction to mathematical logic; Chapman & Hall; London(1997)

[2] Angelo Margaris; First order mathematical logic; Dover publications, Inc, New York (1990).

[3] S.C.Kleene; Introduction to Metamathematics; Amsterdam; Elsevier (1952).

[4] J.H.Gallier; Logic for Computer Science; John.Wiley & Sons (1987).

[5] H.B.Enderton; A mathematical introduction to logic; Academic Press; New York (1972).

Course Structure | DSE | SEC | Credit Distribution

Object Oriented Programming in C++

Semester : 5 Skill Enhancement Course-SEC A Paper Code (Theory): MTM-G-SEC-A-TH	Credits : 2 Full Marks : 100 (=80 +20*)
Minimum number of classes required : 30 *20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[10 classes]

- Programming paradigms, characteristics of object oriented programming languages, brief history of C++, structure of C++ program, differences between C and C++, basic C++ operators, Comments, working with variables, enumeration, arrays and pointer.

Unit-2

[10 classes]

- Objects, classes, constructor and destructors, friend function, inline function, encapsulation, data abstraction, inheritance, polymorphism, dynamic binding, operator overloading, method overloading, overloading arithmetic operator and comparison operators.

Unit-3

[10 classes]

- Template class in C++, copy constructor, subscript and function call operator, concept of namespace and exception handling.

References

[1] Arnold Robbins, Linux Programming by Examples The Fundamentals, 2nd Ed., Pearson Education, 2008.

[2] Cox K, Red Hat Linux Administrator's Guide, PHI, 2009.

[3] R. Stevens, UNIX Network Programming, 3rd Ed., PHI, 2008.

[4] Sumitabha Das, UNIX Concepts and Applications, 4th Ed., TMH, 2009.

[5] Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, Linux in a Nutshell, 6th Ed.,O'Reilly Media, 2009.

[6] Neil Matthew, Richard Stones, Alan Cox, Beginning Linux Programming, 3rd Ed., 2004.

Course Structure | DSE | SEC | Credit Distribution

Boolean Algebra

Semester : 6 Skill Enhancement Course- SEC B Paper Code (Theory) : MTM-G-SEC-B-TH	Credits : 2 Full Marks : 100 (= 80+20*)
Minimum number of classes required : 30 *20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

[30 classes]

- Definition, examples and basic properties of ordered sets, maps between ordered sets, duality principle, maximal and minimal elements, lattices as ordered sets, complete lattices, lattices as algebraic structures, sublattices, products and homomorphisms. Definition, examples and properties of modular and distributive lattices, Boolean algebras.
- Boolean polynomials, minimal forms of Boolean polynomials, Quinn-McCluskey method, Karnaugh diagrams, switching circuits and minimization of switching circuits using Boolean algebra.

References

[1] B A. Davey and H. A. Priestley, Introduction to Lattices and Order, Cambridge University Press, Cambridge, 1990.

[2] Rudolf Lidl and Günter Pilz, Applied Abstract Algebra, 2nd Ed., Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

Course Structure | DSE | SEC | Credit Distribution

Particle Dynamics

Semesters : 5/6 Discipline Specific Elective-DSE-A Paper Code (Theory): MTM-G-DSE-A-TH Paper Code (Tutorial)MTM-G-DSE-A-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

[60 classes]

- Velocity and Acceleration of a particle. Expressions for velocity and acceleration in rectangular Cartesian and polar co-ordinates for a particle moving in a plane. Tangential and normal components of velocity and acceleration of a particle moving along a plane curve.
- Concept of Force : Statement and explanation of Newton's laws of motion. Work, power and energy. Principles of conservation of energy and momentum. Motion under impulsive forces. Equations of motion of a particle (i) moving in a straight line, (ii) moving in a plane.
- Study of motion of a particle in a straight line under (i) constant forces, (ii) variable forces (S.H.M., Inverse square law, Damped oscillation, Forced and Damped oscillation, Motion in an elastic string). Equation of Energy. Conservative forces.
- Motion in two dimensions : Projectiles in vacuum and in a medium with resistance varying linearly as velocity. Motion under forces varying as distance from a fixed point.
- Central orbit. Kepler's laws of motion. Motion under inverse square law.

References

[1] Loney, S. L., An Elementary Treatise on the Dynamics of particle and of Rigid Bodies, Loney Press.

[2] A.S. Ramsey; Dynamics, Part-II; ELBS.

Course Structure | DSE | SEC | Credit Distribution

Graph Theory

Semesters : 5/6 Discipline Specific Elective-DSE-A Paper Code (Theory): MTM-G-DSE-A-TH Paper Code (Tutorial):MTM-G-DSE-A-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[60 classes]

- Definition, examples and basic properties of graphs, pseudographs, complete graphs, bi-partite graphs, isomorphism of graphs
- Paths and circuits, Eulerian circuits, Hamiltonian cycles, the adjacency matrix, weighted graph, travelling salesman's problem, shortest path, Dijkstra's algorithm, Floyd-Warshall algorithm.
- Definition of Trees and their elementary properties. Definition of Planar graphs, Kuratowski's graphs.

References

[1] Robin J. Wilson; Introduction to Graph Theory; 4th edition, Pearson, 2007.

[2] Edgar G. Goodaire and Michael M. Parmenter; Discrete Mathematics with Graph Theory 2nd Ed.; Pearson Education (Singapore) P. Ltd., Indian Reprint, 2003.

[3] Rudolf Lidl and Günter Pilz; Applied Abstract Algebra, 2nd Ed.; Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

Course Structure | DSE | SEC | Credit Distribution

Advanced Calculus

Semesters : 5/6 Discipline Specific Elective: DSE-B Paper Code (Theory): MTM-G-DSE-B-TH Paper Code (Tutorial)MTM-G-DSE-B-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

[60 classes]

- Concept of Point-wise and Uniform convergence of sequence of functions and series of functions with special reference of Power Series. Statement of Weierstrass M-Test for Uniform convergence of sequence of functions and of series of functions. Simple applications. Statement of important properties like boundedness, continuity, differentiability and integrability of the limit function of uniformly convergent sequence of functions and of the sum function of uniformly convergent series of functions. Determination of Radius of convergence of Power Series. Statement of properties of continuity of sum function power series. Term by term integration and Term by term differentiation of Power Series. Statements of Abel's Theorems on Power Series. Convergence of Power Series. Expansions of elementary functions such as $e^x, \sin x, \log(1+x), (1+x)^n$. Simple problems.
- Periodic Fourier series on $(-\pi, \pi)$: Periodic function. Determination of Fourier coefficients. Statement of Dirichlet's conditions of convergence and statement of the theorem on convergence of Fourier Sine and Cosine series.
- Laplace Transform and its application to ordinary differential equation. Laplace Transform and Inverse Laplace Transform. Statement of Existence theorem. Elementary properties of Laplace Transform and its Inverse. Application to the solution of ordinary differential equation of second order with constant coefficients.

References

[1] David Widder; Advance Calculus; Prentice Hall.

[2] Angus E. Taylor and W. Robert Mann; Advanced Calculus (3rd Edition); John Wiley & Sons, Inc.

[3] Robert C. Wrede and Murray Spiegel; Advanced Calculus, (Schaum's outline series); McGraw - Hill.

Course Structure | DSE | SEC | Credit Distribution

Mathematical Finance

Semesters : 5/6 Discipline Specific Elective: DSE-B Paper Code (Theory): MTM-G-DSE-B-TH Paper Code (Tutorial)MTM-G-DSE-B-TU	Credits : 5+1*=6 Full Marks : 65+15**+20***=100
Minimum number of classes required : 60	
*1 Credit for Tutorial	
**15 Mark is reserved for Tutorial ***20 Mark is reserved for Internal Assessment & Attendance of 10 mark each	

Course Structure | DSE | SEC | Credit Distribution

Unit-1

[60 classes]

- Basic principles: Comparison, arbitrage and risk aversion, Interest (simple and compound, discrete and continuous), time value of money, inflation, net present value, internal rate of return (calculation by bisection and Newton-Raphson methods)
- Comparison of NPV and IRR. Bonds, bond prices and yields. Floating-rate bonds, immunization. Asset return, short selling, portfolio return, (brief introduction to expectation, variance, covariance and correlation), random returns, portfolio mean return and variance, diversification, portfolio diagram, feasible set, Markowitz model (review of Lagrange multipliers for 1 and 2 constraints).

References

[1] David G. Luenberger; Investment Science; Oxford University Press, Delhi, 1998.

[2] John C. Hull; Options, Futures and Other Derivatives, 6th Ed.; Prentice-Hall India, Indian reprint, 2006.

[3] Sheldon Ross; An Elementary Introduction to Mathematical Finance, 2nd Ed.; Cambridge University Press, USA, 2003.

Course Structure | DSE | SEC | Credit Distribution

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

UNIVERSITY OF CALCUTTA

SYLLABUS

Subject: Physical Education (General)

According to
CBCS
w.e.f. 2018-19 Session

Syllabus Structure

Course Nature	Subject Code	Subject	Marks	Credit	Evaluation
Core Course (CC)	PEDN-G-CC-1-1-TH	Foundation and History of Physical Education	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Project Evaluation- 30 Marks Internal Evaluation -10 Marks
	PEDN-G-CC-2-2-TH	Health Education, Physical Fitness and Wellness	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Project Evaluation- 30 Marks Internal Evaluation -10 Marks
	PEDN-G-CC-3-3-TH-P	Anatomy, Physiology and Exercise Physiology	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Lab Practical & Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-CC-4-4-TH-P	Psychology and Sociology in Physical Education & Sports	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Lab Practical & Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
Discipline Specific Elective (DSE)	PEDN-G-DSE-A-5-1-TH-P	Management in Physical Education and Sports	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Lab Practical & Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-DSE-A-5-2-TH-P	Modern Trends in Physical Education & Exercise Science	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Lab Practical & Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-DSE-B-6-1-TH-P	Sports Training	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Lab Practical & Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-DSE-B-6-2-TH-P	Test, Measurement and Evaluation in Physical Education	100	4+2 (6)	Term-end Theory Examination - 50 Marks Term-end Lab Practical & Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
Skill Enhancement Course (SEC)	PEDN-G-SEC-A-3-1-P	Track and Field	100	4+2 (6)	Term-end Practical Examination - 50 Marks Term-end Project & Practical Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-SEC-B-4-1-P	Gymnastics and Yoga	100	4+2 (6)	Term-end Practical Examination - 50 Marks Term-end Project & Practical Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-SEC-A-5-2-P	Ball Games (Any Two)	100	4+2 (6)	Term-end Practical Examination - 50 Marks Term-end Project & Practical Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks
	PEDN-G-SEC-B-6-2-P	Indian Games (Any One) and Racket Sports (Any One)	100	4+2 (6)	Term-end Practical Examination - 50 Marks Term-end Project & Practical Record Book - 30 Marks Internal Evaluation -10 Marks Attendance -10 Marks

N.B.: 1. Term-end Field, Lab Practical & Project Work examination to be evaluated as per CU Examination procedure.

2. A student is to take one DSE subject from Group-A in the fifth semester and one DSE subject from Group-B in the sixth semester.

3. A student is to take one SEC subject from Group-A in the third/fifth semester and one SEC subject from Group-B in the fourth/sixth semester.

Semester-1

Subject Code: PEDN-G-CC-1-1-TH

Subject: Foundation and History of Physical Education

Marks & Evaluation: 100 Marks - (50 Marks: Term-end Theory Examination & 30 Marks Term-end Project Work & Record Book at Term-end Evaluation jointly by Internal & External Examiner, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Meaning and Definition of Physical Education.
1.2. Aim and Objectives of Physical Education.
1.3. Misconceptions and Modern Concept of Physical Education.
1.4. Physical Education in Ancient and Modern Society.

Unit- II: Foundations of Physical Education **Lecture Hour-12**

2.1. Growth and Development: Meaning, Definition, Factors, Principles and Difference.
2.2. Age Characteristics: Chronological Age, Anatomical Age, Physiological Age and Mental Age.
2.3. Play, Game and Sports: Meaning, Definition and Characteristics; Play Theories; Play, Games and Sports for Human Development.
2.4. Society - Meaning and Definition; Social Groups, Sports as a Social Institution, Sports for National and International Harmony.

Unit- III: History of Physical Education **Lecture Hour-13**

3.1 History of Physical Education and Sports in India: Pre-Independence and Post-Independence Period.
3.2 Olympic Movement: Ancient and Modern Olympic Games.
3.3 Asian Games, Commonwealth Games and SAF Games.
3.4 National Sports Awards: Arjuna, Dhyanchand, Dronacharya, Rajiv Gandhi Khel Ratna

Unit- IV: Yoga Education **Lecture Hour-13**

4.1 Yoga: Meaning, Definition, Aim, Objectives and Importance of Yoga for Health.
4.2 History of Yoga: Ancient Period, Vedic Period, Pre-Classical Period, Classical Period, Post-Classical Period, Contemporary Period.
4.3 Astanga Yoga: Meaning, Steps, Methods and Objectives.
4.4 Yogic Concept of Personality and Diet, Yoga for Health and Wellness

Project Work **Lecture Hour-30**

1. One from Unit-I to be selected by internal teacher.
2. One from Unit-II to be selected by internal teacher.
3. One from Unit-III to be selected by internal teacher.
4. One from Unit-IV to be selected by internal teacher.

Reference Book

1. Bhattacharyya, A.K. & Bhowmick. S. Sarir Siksha. Paschimbanga Rajya Pustak Parsad
2. Graham, G. Teaching Children Physical Education: Becoming a Master Teacher. Human Kinetics, Champaign, Illinois.
3. Kamlesh, M.L. & Singh, M.K. Physical Education. Naveen Publication.
4. Lumpkin, A. (2007) Introduction to Physical Education, Exercise Science and Sports Studies, McGraw Hill, New York.
5. Siedentop, D. (2004) Introduction to Physical Education, Fitness and Sport, McGraw Hill Companies Inc., New York.
6. Shaffer, D.R. Developmental Psychology: Childhood and Adolescence, Thomson, Sydney
7. Singh, A. et al. Essentials of Physical Education, Kalyani Publishers, Ludhiana, Punjab.
8. Wuest, D.A. & Bucher, C.A. Foundation of Physical Education, Exercise Science and Sports, McGraw Hill Co. Inc., New York.

Semester- 2

Subject Code: PEDN-G-CC-2-2-TH

Subject: Health Education, Physical Fitness and Wellness

Marks & Evaluation: 100 Marks - (50 Marks: Term-end Theory Examination, 30 Marks Project Work & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-13**

1.1. Health: Meaning, Definition, Dimensions and Factors.
1.2. Health Education: Meaning, Definition, Aim, Objectives and Principles.
1.3. School Health Program: Health Service, Health Instruction, Health Supervision; Personal Hygiene and Health Record; Care of Eyes, Ear, Nose, Skin, Mouth and Teeth.
1.4. Aim, Objectives and Functions: National Institute of Health & Family Welfare (NIHFW), World Health Organization (WHO), United Nations Educational Scientific & Cultural Organization (UNESCO), United Nations International Children's Emergency Fund (UNICEF).

Unit- II: Health Problems in India - Prevention and Control **Lecture Hour-13**

2.1. Communicable Disease: Meaning, Definition and Types; Causes, Prevention and Control of Malaria, Dengue, Chicken Pox and Diarrhea.
2.2. Hypokinetic Disorders: Meaning, Definition and Causes; Management of Obesity, Diabetes, Asthma and Cardiovascular disorders.
2.3. Nutrition: Nutrients and their Functions and Daily Requirements. Balanced Diet. Balanced Diet principles for Growing ups, Adults, Elderly and Athletes of both Genders and Mothers. Health disorders for deficiency of Protein, Vitamins and Minerals.
2.4. Posture: Meaning and Definition. Types of Postural Deformities; Causes and Corrective Exercise for Kyphosis, Lordosis, Scoliosis, Bow-Legs, Knock Knees and Flat Foot. Importance of Good Posture.

Unit- III: Physical Fitness and Wellness **Lecture Hour-12**

3.1 Physical Fitness: Meaning and Definition, Need and Importance of Physical Fitness.
3.2 Physical Fitness Components: Meaning, Definition and Usefulness of Health-related and Sports Performance-related Physical Fitness.
3.3 Concept of Wellness. Meaning, Definition and Components of Wellness; Relationship between Physical Activities and Wellness.
3.4 Ageing: Meaning and Definition; Aging Phenomenon; Role of Exercise in Aging.

Unit- IV: Health and First-aid Management **Lecture Hour-12**

4.1 First-aid: Meaning, Definition, Need and Importance; Golden Rules of First-aid.
4.2 Sports Injuries: Meaning, Definition and Types; Management of Sprain, Strain, Wound, Facture and Dislocation.
4.3 Therapeutic Modalities: Therapy - Meaning and Definition; Principles and Sports Injury Management Procedure of Cryo-therapy and Thermo-therapy.
4.4 Sports Injury Management: Types of Massage. Principles and methods of Sports Injury Management through Exercise and Massage.

Project Work **Lecture Hour-30**

1. One from Unit-I to be selected by internal teacher.
2. One from Unit-II to be selected by internal teacher.
3. One from Unit-III to be selected by internal teacher.
4. One from Unit-IV to be selected by internal teacher.

Reference Book

1. Bucher, C. A. Administration of Health and Physical Education, C. V. Mosby Co. USA.
2. Ghosh, B.N. A Treaties of Hygiene and Public Health, Scientific Publishing Co., Kolkata.
3. Turner, C.E. et al. School Health and Health Education, National Library of Australia.
4. Nemir A. The School Health Education. Harber and Brothers, New York.
5. Bandopadhyay, K. and Dutta, B.K. Prakcharjar Abhimukh, Classic Publishers, Kolkata.
6. Thakur, S. Krira Chikitsha, Paschimbanga Rajya Pustak Parsad.

Semester- 3

Subject Code: PEDN-G-CC-3-3-TH-P

Subject: Anatomy, Physiology and Exercise Physiology

Marks & Evaluation: 100 Marks (50 Marks: Term-end Theory Examination, 30 Marks: Lab Practical & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Anatomy, Physiology and Exercise Physiology: Meaning, Definition, Scope and Importance.
1.2. Cell: Definition, Structure and Function of Human Cell.
1.3. Tissue: Definition, Types and Functions.
1.4. System: Definition, Types and Functions in Human Body.

Unit-II: Musculo-skeletal System **Lecture Hour-13**

2.1 Skeletal System: Structure of Skeletal System; Classification of Bones and Joints; Anatomical Differences between Male and Female.
2.2 Muscular System: Types, Location, Structure and Function of Skeletal Muscle.
2.3. Muscular Contraction: Meaning, Types, Definition and Characteristics.
2.4. Effect of Exercise and Training on Muscular System.

Unit- III: Circulatory System **Lecture Hour-13**

3.1 Blood: Definition, Composition and Functions.
3.2 Heart: Definition, Structure and Functions. Blood Circulation Mechanism within Heart.
3.3 Meaning and Definition of Term: Heart Rate, Pulse Rate, Stroke Volume, Cardiac Output Blood Pressure – Systolic and Diastolic, Athletic Heart and Bradycardia.
3.4 Effect of Exercise and Training on Circulatory System.

Unit- IV: Respiratory System **Lecture Hour-12**

4.1 Structure and Functions of Human Respiratory Organs.
4.2 Respiration Mechanism.
4.3 Meaning and Definition of Term: Respiratory Rate, Tidal Volume, Residual Volume, Vital Capacity, O_2 Debt and Second Wind.
4.4 Effect of Exercise and Training on Respiratory System.

Lab & Field Practical

Lecture Hour-60

1. Assessments of BMI and WHR (Waist-to-hip ratio).
2. Assessment of Resting Heart Rate and Exercise Heart Rate.
3. Assessment of Blood Pressure, Respiratory Rate and Pick Flow Rate.

Reference Book

1. Amrit Kumar, & Moses, R. Introduction to Exercise Physiology. Madras: Poompugar Pathipagam.
2. Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs.
3. Fox, E.L. & Mathews, D.K. The Physiological Basis of Physical Education & Athletics. Philadelphia: Sanders College Pub.
4. Shaver, L. G. Essentials of Exercise Physiology. New Delhi: Subject Publications.
5. William, D. McAradle. Exercise Physiology, Energy, Nutrition and Human Performance, Philadelphia: Lippincott Williams & Wilkins Co.

Subject Code: PEDN-G-SEC-A-3-1-P

Subject: Track and Field

Marks & Evaluation: 100 Marks (50 Marks: Term-end Practical Examination, 30 Marks: Practical Work Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

1. Track Events **Lecture Hour-50**

1.1. Starting Techniques: Standing start and Crouch start (its variations) use of Starting Block.

1.2. Acceleration with proper running techniques.

1.3. Finishing Technique: Run Through, Forward Lunging and Shoulder Shrug.

1.4. Relay Race: Starting, Baton Holding/Carrying, Baton Exchange in between zone, and Finishing.

2. Field Events (Any three; Students' choice) **Lecture Hour-50**

2.1. Long Jump: Approach Run, Take-off, Flight in the air (Hang Style/Hitch Kick) and Landing.

2.2. High jump: Approach Run, Take-off, Bar Clearance/Flight (Straddle Roll) and Landing.

2.3. Shot put: Holding the Shot, Placement, Initial Stance, Glide, Delivery Stance and Recovery (Perry O'Brien Technique).

2.4. Discus Throw: Holding the Discus, Initial Stance, Primary Swing, Turn, Release and Recovery (Rotation in the circle).

2.5. Javelin Throw: Grip, Carry, Release and Recovery (3/5 Impulse stride).

Project-cum-Practical Record Book

1. Introduction of the Sport, History of Development
2. Performance status of India and renowned personalities – Indian & International
3. Fundamental Skills
4. Rules & regulations with Field/Court diagram
5. Tournaments & Sports Federations (National & International).

Reference Book

1. Saha, A. K. Sarir Siksher Ritiniti, Rana Publishing House, Kalyani.
2. Bandopadhyay, K. Sarir Siksha Parichay, Classic Publishers, Kolkata.
3. Petipus, et al. Athlete's Guide to Career Planning, Human Kinetics.
4. Dharma, P.N. Fundamentals of Track and Field, Khel Sahitya Kendra, New Delhi.

Semester- 4

Subject Code: PEDN-G-CC-4-4-TH-P

Subject: Psychology and Sociology in Physical Education and Sports

Marks & Evaluation: 100 Marks (50 Marks: Term-end Theory Examination, 30 Marks: Lab Practical & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Psychology: Meaning, Definition and Scope of Psychology.
1.2. Nature of Psychology; Branches, Need and Importance of Psychology.
1.3. Sports Psychology: Meaning, Definition, Scope and Role of Sports Psychology.
1.4. Need for Psychology in Physical Education and Sports.

Unit- II: Learning **Lecture Hour-12**

2.1. Learning: Meaning, Definition and Characteristics.
2.2. Learning Phenomenon: Basic Theories and Laws of Learning. Learning Phenomena and Physical Education and Sports.
2.3. Learning Process: Learning Curve - Meaning, Stages and Features; Learning Motor Skills.
2.4. Transfer of Learning: Meaning, Definition and Types. Factors of Transfer of Learning/Training.

Unit- III: Psychological Factors **Lecture Hour-13**

3.1 Motivation: Meaning, Definition, Types and Role of Motivation in Life.
3.2 Instinct and Emotion: Meaning, Definition and Types; Physical Education and Sports for Emotional Development.
3.3 Stress: Meaning, Definition, Types and Causes; Physical Education and Sports for Students' Stress Relaxation.
3.4 Personality: Meaning, Definition, Types and Traits; Physical Education and Sports for Personality Development.

Unit- IV: Sociological Aspects **Lecture Hour-13**

4.1 Sociology: Meaning and Definition, Society and Social Group – Primary, Secondary and Remote Groups.
4.2 Culture: Features, Importance, Cultural Values of Games and Sports.
4.3 Leadership: Meaning, Definition and Types. Leadership and Sports Performance; Leadership and Physical Education and Sports.
4.4 Sports Related Social Issues: Empowerment, Gender Discrimination, Women and Sport, Socio-economic Status and Sports Participation, Sports in Modern Society.

Lab & Field Practical **Lecture Hour-60**

1. Assessment of Simple and Choice Reaction Time
2. Assessment of Group-cohesion and Social Development.
3. Assessment of Personality.

Reference Book

1. Authors Guide. National Library of Educational and Psychological Test Catalogue, New Delhi: NCERT Publication.
2. Jay Coakley, Sports in Society – Issues and Controversies, McGraw Hill.
3. Richard, J. Crisp, Essentials of Social Psychology, Sage Publications.
4. Robert N. Singer, Motor Learning and Human Performance, New York: The Macmillan Co.
5. Thelma Horn, Advances in Sports Psychology. Human Kinetic.
6. Whiting, H.T.A. et al. Personality and Performance in Physical Education and Sports. London: Henry Kimpton Publishers.

Subject Code: PEDN-G-SEC-B-4-1-P

Subject: Gymnastics and Yoga

Marks & Evaluation: 100 Marks (50 Marks: Term-end Practical Examination, 30 Marks: Practical Work Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

GYMNASTICS **Lecture Hour-50**

1. Compulsory

1.1. Forward Roll
1.2. T-Balance
1.3. Forward Roll with Split leg
1.4. Backward Roll
1.5. Cart-Wheel

[Note: Student perform any three of the above skills compulsorily in the same sequence]

2. Optional (any three)

2.1. Dive and Forward Roll
2.2. Hand Spring
2.3. Head Spring
2.4. Neck Spring
2.5. Hand Stand and Forward Roll
2.6. Summersault

YOGA

3. Asana

3.1. **Standing Posture**
- 3.1.1. Ardhachandrasana
- 3.1.2. Brikshasana
- 3.1.3. Padahastasana

3.2. **Sitting Posture**
- 3.2.1. Ardhakurmasana
- 3.2.2. Paschimottanasana
- 3.2.3. Gomukhasana

3.3. **Supine Posture**
- 3.3.1. Setubandhasana
- 3.3.2. Halasana
- 3.3.3. Matsyasana

3.4 Prone Posture
- 3.4.1 Bhujangasana
- 3.4.2 Salvasana
- 3.4.3 Dhanurasana

3.5 Inverted Posture
- 3.5.1 Sarbangasana
- 3.5.2 Shirsasana
- 3.5.3 Bhagrasana

[Note: One Asana from each Posture; Student's Choice] **Lecture Hour-30**

4. Suryanamaskara and Pranayama **Lecture Hour-20**

4.1. Suryanamaskara 4.2 Kapalbhati 4.3 Pranayama - Bhramari and Anulam Vilom.

Project-cum-Practical Record Book

1. Introduction of the Sport, History of Development
2. Performance status of India and renowned personalities – Indian & International
3. Fundamental Skills
4. Rules & regulations with Field/Court diagram
5. Tournaments & Sports Federations (National & International).

Reference Book

1. Bandopadhyay, K. Sarir Siksha Parichay, Classic Publishers, Kolkata.
2. Tyagi Arun Kumar, Gymnastics: Skills and Rules**,** Khel Sahitya Kendra, New Delhi.
3. Dubey, H.C. Gymnastics, Discovery Publishing House, New Delhi.
4. Swami Satyananda Saraswati, Asana Pranayama Mudra Bandha, Yoga Publications Trust, Munger.
5. Swami Satyananda Saraswati, Suryanamaskara, Yoga Publications Trust, Munger.
6. Yoga – The Science of Holistic Living, Vivekananda Kendra Prakashan Trust, Chennai.

Semester-5

Subject Code: PEDN-G-DSE-A-5-1-TH-P

Subject: Management in Physical Education and Sports

Marks & Evaluation: 100 Marks (50 Marks: Term-end Theory Examination, 30 Marks: Lab Practical & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Sports Management: Meaning, Definition Nature and Scope.
1.2. Emergence: History and Importance of Sports Management.
1.3. Basics: Principles and Practices of Sports Management.
1.4. Application: Qualities, Duties and Responsibilities of Sports Manager.

Unit- II: Tournaments **Lecture Hour-13**

2.1. Tournaments: Meaning, Definition and Types; Tournaments - Knock-out, League, Combination, Challenge.
2.2. Organisation: Fixture Drawing Procedure of Knock-out, League, Combination Tournaments.
2.3. Annual Program: Athletic Meet and Play Day Organisation and Management.
2.4. Year-round Programme: Intramural and Extramural Competition Organisation and Management.

Unit- III: Facilities and Equipment **Lecture Hour-12**

3.1 Lay-out: Characteristics, Principles and Lay-out of Standard Athletic Track and Football Field.
3.2 Care and Maintenance: Meaning, Methods, Need and Importance of Sports Equipment Playground and Gymnasium.
3.3 Documentation: Meaning, Methods, Need and Importance.
3.4 Time Table: Meaning, Definition, Importance and Factors.

Unit- IV: Financial Management **Lecture Hour-13**

4.1. Financial Management: Meaning, Definition, Need and Importance.
4.2. Budget: Meaning, Definition, Criteria, Principles; Steps for Preparing a Good Budget.
4.3. Sponsorship: Meaning, Trends, Process, Aim and Objectives.
4.4. Sports Promotion: Meaning, Means and Methods; Funding Agencies –Types, Procedure of Communication with the Agencies.

Lab & Field Practical **Lecture Hour-60**

1. Lay out of a Standard Track and any two sport field/court
2. Fixture of Different type Tournaments
3. Preparation of a Model Budget and ideal Time Table.

Reference Book

1. Broyles, F. J. & Robert, H. D. Administration of Sports, Athletic Programme: A Managerial Approach. New York: Prentice Hall Inc.
2. Bucher, C. A. Administration of Physical Education and Athletic Programme. St. Louis: The C.V. Mosby Co.
3. Thomas, J. P. Organization & Administration of Physical Education. Madras: Gyanodayal Press.
4. Nanda, S.M. Sports Management, Friend Publications, New Delhi.
5. Paul, A. Sarirsikshay Management, Classic Publishers, Kolkata.

Subject Code: PEDN-G-DSE-A-5-2-TH-P

Subject: Modern Trends in Physical Education and Exercise Science

Marks & Evaluation: 100 Marks (50 Marks: Term-end Theory Examination, 30 Marks: Lab Practical & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Orientation: Need and Importance of Physical Education and Sports in the Modern Era.

1.2. Function: Compatibility of Physical Education and Sports in Modern Lifestyle.

1.3. Scope: Types of Sports and their Usefulness in Health and Fitness.

1.4. The Concepts: Physical Fitness and Motor Fitness; Movement Literacy – Meaning Definition and Development; Physical Fitness Components.

Unit – II: Foundations **Lecture Hour-13**

2.1. Biological Foundation: Meaning, Definition and Factors of Growth and Development. Differences of growth and development. Principles of Growth and Development.

2.2. Psychological Foundation: Drives and Needs; Motivation; Attention, Interest and Emotion; Learning and Motor Learning; Heredity, Environment and Psychological Factors for Health and Sports.

2.3. Sociological Foundation- Meaning and definition of Sociology. Social values and their Importance. Socialization through Sports

2.4. Role of games and sports in National Integration and International Understanding.

Unit- III: History of Physical Education **Lecture Hour-13**

3.1 History of Physical Education and Sports Science in India: Pre-Independence Period and Post-Independence Period; Sports Science and Sports Performance.

3.2 Olympic: Olympic Movement; Para Olympics; Sports and Politics.

3.3 Rights about Physical Education: In India; UNESCO

3.4 Promotion of Physical Education and Sports: Role and Responsibilities of National and International Associations in Physical Education and Sports.

Unit- IV: Exercise Sciences **Lecture Hour-12**

4.1 Exercise and Exercise Physiology: Meaning, Definition, Scope and Importance.

4.2 Sports Bio-mechanics: Meaning, Definition, Scope and Importance.

4.3 Sports Psychology: Meaning, Definition, Scope and Importance.

4.4 Sports Sociology: Meaning, Definition, Scope and Importance.

Lab & Field Practical **Lecture Hour-60**

1. Health and Physical Fitness Dimensions with Functions.
2. Assessment of Movement Literacy Components with Development.
3. UNESCO Charter with interpretation.

Reference Book

1. Kamlesh, M.L. & Singh, M.K. Physical Education, Naveen Publication.
2. Siedentop, D. Introduction to Physical Education, Fitness and Sport, McGraw Hill Companies Inc., New York, USA.
3. Shukla, Mother on Education, National Council of Teacher Education, New Delhi.
4. Singh, A. et al. Essentials of Physical Education, Kalyani Publishers, Ludhiana, Punjab.
5. Wuest, D.A. & C.A. Bucher, Foundation of Physical Education, Exercise Science, and Sports. McGraw Hill Companies Inc.; New York, USA.
6. Kansal, D.K. A Practical Approach to Test Measurement and Evaluation, Sports and Spiritual Science Publication, New Delhi.
7. David, L Costill, Physiology of Sports and Exercise, Human Kinetics.

Subject Code: PEDN-G-SEC-A-5-2-P

Subject: Ball Games (Any Two)

Marks & Evaluation: 100 Marks (50 Marks: Term-end Practical Examination, 30 Marks: Practical Work Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Project-cum-Practical Record Book

1. Introduction of the Sport, History of Development
2. Performance status of India and renowned personalities – Indian & International
3. Fundamental Skills
4. Rules & regulations with Field/Court diagram
5. Tournaments & Sports Federations (National & International).

FOOTBALL

A. Fundamental Skills **Lecture Hour-44**

1. Kicking: Kicking the ball with inside of the foot, Kicking the ball with Full Instep of the foot, Kicking the ball with Inner Instep of the foot, Kicking the ball with Outer Instep of the foot and Lofted Kick.
2. Trapping: Trapping- the Rolling ball, and the Bouncing ball with Sole of the foot, Thigh and Chest Trapping.
3. Dribbling: Dribbling the ball with Instep of the foot, Dribbling the ball with Inner and Outer Instep of the foot.
4. Heading: In standing, running and jumping condition.
5. Throw-in: Standing throw-in and Running throw-in.
6. Feinting: With the lower limb and upper part of the body.
7. Tackling: Simple Tackling, Slide Tackling.
8. Goal Keeping: Collection of Ball, Ball clearance- kicking, throwing and deflecting.

B. Rules and their interpretation and duties of officials. **Lecture Hour-06**

Reference Book

1. Saha, A. K. Sarir Siksher Ritiniti, Rana Publishing House, Kalyani.
2. Bandopadhyay, K. Sarir Siksha Parichay, Classiq Publishers, Kolkata.
3. Dave Smith, Football Skills and Tactics, Chancellor Press.
4. Norman Barrett, Super Soccer Skills, Dragon Grand Publishers, Glasgow.

CRICKET **Lecture Hour-44**

A. Fundamental Skills

1. Batting - Forward Defence Stroke, Backward Defence Stroke, Off Drive, On Drive, Straight Drive, Cover Drive, Square Cut.

2. Bowling -Out-swing, In-swing, Off Break, Leg Break and Googly.
3. Fielding: Catching - The High Catch, The Skim Catch, The Close Catch and throwing at the stumps from different angles. Long Barrier and Throw, Short Throw, Long Throw, Throwing on the Turn.
4. Wicket Keeping

B. Rules and their interpretation and duties of officials. **Lecture Hour-06**

Reference Book

1. Jain, R. Play and Learn Cricket, Khel Sahitya Kendra, New Delhi.
2. Vivek Thani, Coaching Cricket, Khel Sahitya Kendra, New Delhi.
3. Saha, A. K. Sarir Siksher Ritiniti, Rana Publishing House, Kalyani.
4. Bandopadhyay, K. Sarir Siksha Parichay, Classic Publishers, Kolkata.

BASKETBALL

A. Fundamental Skills **Lecture Hour-44**

1. Passing: Two hand Chest Pass, Two-hand Bounce Pass, One hand Baseball Pass, Side arm Pass, Overhead Pass, Hook Pass.
2. Receiving: Two hand receiving, One hand receiving, Receiving in stationary position, Receiving while Jumping and Receiving while Running.
3. Dribbling: How to start dribble, drop dribble, High Dribble, Low Dribble, Reverse Dribble, Rolling Dribble.
4. Shooting: Lay-up shot and its variations, One hand set shot, Two hands jump shot, Hook shot, Free Throw.
5. Rebounding: Defensive rebound and Offensive rebound.
6. Individual Defence: Guarding the player with the ball and without the ball, Pivoting.
7. Game practice with application of Rules and Regulations.

B. Rules and their interpretation and duties of officials. **Lecture Hour-06**

Reference Book

1. Naveen Jain, Play and Learn Basketball, Khel Sahitya Kendra, New Delhi.
2. Dubey, H. C. Basketball, Discovery Publishing House, New Delhi.
3. Rachana Jain, Teach Yourself Basketball, Sports Publication.
4. Jack Nagle, Power Pattern Offences for Winning asketball, Parker Publishing Co., New York.

VOLLEYBALL

A. Fundamental skills **Lecture Hour-44**

1. Serve: Under hand serve and Side arm serve; Over-head serve, Floating service standing and jumping.
2. Passing: Fore arm passing, Over-head passing.
3. Setting: Front set, Back set and Long set.
4. Spiking: Short ball, Medium ball and High ball (approach, arm and foot movement, and landing).
5. Blocking: Offensive and Defensive with one or more than one blockers (approach, arm and foot movement, and landing).
6. Service reception and Court coverage.
7. Rotation and front court and back court players.

B. Rules and their interpretation and duties of officials. **Lecture Hour-06**

Reference Book

1. Renu Jain, Play and Learn Basketball, Khel Sahitya Kendra, New Delhi.
2. Sally Kus, Coaching Volleyball Successfully, Human Kinetics.
3. Saha, A. K. Sarir Siksher Ritiniti, Rana Publishing House, Kalyani.
4. Bandopadhyay, K. Sarir Siksha Parichay, Classic Publishers, Kolkata.

Semester-6

Subject Code: PEDN-G-DSE-B-6-1-TH-P

Subject: Sports Training

Marks & Evaluation: 100 Marks (50 Marks: Term-end Theory Examination, 30 Marks: Lab Practical & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Sports Training: Meaning, Definition and Scope.
1.2. Aim, Objectives and Characteristics of Sports Training.
1.3. Principles of Sports Training.
1.4. Need and Importance of Sports Training.

Unit- II: Methods of Training and Conditioning in Sports **Lecture Hour-13**

2.1. Warming-up and Cooling-down: Meaning, Definition and Methods.
2.2. Conditioning: Meaning, Definition and Principles.
2.3. Training Methods: Principles and Characteristics of Circuit Training, Interval Training and Weight Training.
2.4. Periodisation: Meaning, Definition, Types, Aim and Contents of Different Periods.

Unit- III: Training Load and Adaptation **Lecture Hour-13**

3.1 Training Load: Meaning, Definition, Types and Factors.
3.2 Training Load Components: Volume, Intensity, Repetition and Duration.
3.3 Over Load: Meaning, Causes, Symptoms and Overcoming Over-load.
3.4 Load Adaptation: Meaning and Conditions of Adaptation; Super-compensation.

Unit- IV: Training Techniques **Lecture Hour-12**

4.1 Strength: Means and Methods Development.
4.2 Speed: Means and Methods Development.
4.3 Endurance: Means and Methods Development.
4.4 Flexibility: Means and Methods Development.

Lab & Field Practical **Lecture Hour-60**

1. Weight Training – Practice with Principles.
2. Measurement of Speed, Strength, Endurance and Flexibility.
3. Circuit Training - Practice with Principles and Periodisation Chart.

Reference Book

1. Uppal, A.K. Principles of Sports Training, Friends Publications, New Delhi.
2. Singh, H. Science of Sports Training, New Delhi, DVS Publications.
3. Bunn, J.N. Scientific Principles of Coaching, New Jersey Engle Wood Cliffs, Prentice Hall Inc.
4. Cart, E. Klafs &Daniel, D. Arnheim (1999) Modern Principles of Athletic Training St. Louis C. V. Mosphy Company.
5. David R. Mottram, Drugs in Sport, School of Pharmacy, Liverpool: John Moore University.
6. Gary, T. Moran, Cross Training for Sports, Canada : Human Kinetics.
7. Jensen, C.R. & Fisher A.G. (2000) Scientific Basic of Athletic Conditioning, Philadelphia.

Subject Code: PEDN-G-DSE-B-6-2-TH-P

Subject: Tests, Measurement and Evaluation in Physical Education

Marks & Evaluation: 100 Marks (50 Marks: Term-end Theory Examination, 30 Marks: Lab Practical & Record Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Unit- I: Introduction **Lecture Hour-12**

1.1. Meaning and Definition Test, Measurement and Evaluation.
1.2. Criteria of a Good Test.
1.3. Principles of Evaluation.
1.4. Importance of Test, Measurement and Evaluation in Physical Education and Sports.

Unit – II: Body Composition and Somatotype **Lecture Hour-13**

2.1. Body Mass Index (BMI): Concept and Method of Measurement; Significance.
2.2. Body Fat: Meaning, Types Body Fat Percentage (BF%).
2.3. Lean Body Mass (LBM), Meaning, Importance and Prediction Process.
2.4. Somatotype: Meaning, History and Measuring Methods.

Unit- III: Fitness Test **Lecture Hour-13**

3.1 Kraus-Weber Muscular Strength Test
3.2 AAHPER Health Related Fitness Test
3.3 Queens College Step Test
3.4 J.C.R. Test

Unit- IV: Sports Skill Test **Lecture Hour-12**

4.1 Lockhart and McPherson Badminton Skill Test
4.2 Johnson Basketball Test Battery
4.3 McDonald Soccer Test
4.4 Brady Volleyball Test

Lab & Field Practical **Lecture Hour-60**

1. Assessment of Body Composition: LBM & % body fat.
2. Assessment of Fitness by AAHPER Health-Related Fitness Test.
3. Queens College Step Test and Brady Volleyball Test.

Reference Book

1. Authors Guide. ACSM's Health Related Physical Fitness Assessment Manual, USA: ACSM Publications.
2. Collins, R.D., & Hodges P.B. A Comprehensive Guide to Sports Skills Tests and Measurement, Lanham: Scarecrow Press.
3. Cureton T.K. (1947) Physical Fitness Appraisal and Guidance, St. Louis: The C. Mosby Company.
4. Kansal, D.K. (1996), Test and Measurement in Sports and Physical Education, New Delhi: DVS Publications.
5. Krishnamurthy, Evaluation in Physical Education and Sports, New Delhi; Ajay Verma Publication.
6. Yobu, A, Test, Measurement and Evaluation in Physical Education in Physical Education and Sports. New Delhi; Friends Publications.

Subject Code: PEDN-G-SEC-B-6-2-P

Subject: Indian Games (Any One) and Racket Sports (Any One)

Marks & Evaluation: 100 Marks (50 Marks: Term-end Practical Examination, 30 Marks: Practical Work Book at Term-end Evaluation, 10 Marks: Internal Evaluation & 10 Marks: Attendance)

Project-cum-Practical Record Book

1. Introduction of the Sport, History of Development
2. Performance status of India and renowned personalities – Indian & International
3. Fundamental Skills
4. Rules & regulations with Field/Court diagram
5. Tournaments & Sports Federations (National & International).

Indian Games (Any One)

KABADDI

A. Fundamental skills **Lecture Hour-44**

1. Raiding Skills: Cant, Touching with hands, Use of leg-toe touch, squat leg thrust, side kick, mule kick, arrow flying kick, roll back; crossing of baulk line; Crossing of Bonus line.
2. Holding skills: Ankle, Knee, Thigh, Wrist, Crocodile and Washer man hold.
3. Formation during holding: Various formations, catching from particular position.
4. Additional Raiding skills: Escaping from various holds, techniques of escaping from chain formation, offense and defence.
5. Game practice with application of Rules and Regulations.

B. Rules and their interpretations and duties of the officials. **Lecture Hour-06**

Reference Book

1. Biswas, Abhay, Kabaddi K Jante Holay, Sobha prokasani, Chakdah, Nadia.
2. Saha, A. K. Sarir Siksher Ritiniti, Rana Publishing House, Kalyani.
3. Bandopadhyay, K. Sarir Siksha Parichay, Classiq Publishers, Kolkata.

OR

KHO-KHO

A. Fundamental skills **Lecture Hour-44**

1. Chasing Skills: Sitting on the box - Parallel and Bullet toe method; Getting up from the box - Proximal and Distal foot method; Giving Kho - Simple, Early, Late and Judgment Kho; Pole Turn, Pole Diving, Tapping, Hammering, Rectification of foul.
2. Running Skills: Chain Play, Ring play and Chain, Ring mixed play, running zigzag, avoiding and dodging.
3. Game practice with application of Rules and Regulations.

B. Rules and their interpretations and duties of the officials. **Lecture Hour-06**

Reference Book

1. Roy Pranab, Bharatiyo Khela Kho-Kho, Classic Books, Kolkata.
2. Saha, A. K. Sarir Siksher Ritiniti, Rana Publishing House, Kalyani.
3. Bandopadhyay, K. Sarir Siksha Parichay, Classic Publishers, Kolkata.

Racket Sports (Any One)

BADMINTON

A. Fundamental skills **Lecture Hour-44**

1. Basic Knowledge: Various parts of the Racket and Grip – hand-shake grip, figure pointing grip.
2. Basic foot work and court coverage.
3. Basic Stance: Defensive, attacking, net stance.
4. Service: Short service, Long service, Long-high service.
5. Shots: fore hand, back hand, clearing, lobbing, over-head shot, defensive clear shot, attacking clear shot, drop shot, net shot, smash.
6. Game practice with application of Rules and Regulations.

B. Rules and their interpretations and duties of the officials. **Lecture Hour-06**

Reference Book

1. Ashok Kumar, Badminton, Discovery Publishing House, New Delhi.
2. Narang, P. Play and Learn Badminton, Khel Sahitya Kendra, New Delhi.
3. Bandopadhyay, K. Sarir Siksha Parichay, Classic Publishers, Kolkata.

OR

TABLE TENNIS

A. Fundamental skills **Lecture Hour-44**

1. Basic Knowledge: Various parts of the racket and grip (shake hand & pen hold grip), back hand and fore hand grip.
2. Stance: Alternate and Parallel.
3. Service: Backhand and Forehand high toss service, spin, top spin, back spin, side spin.
4. Chop: Backhand and Forehand.
5. Receive return and receiving: Push, Chop, drive loop and flick with both Backhand & Forehand.
6. Game practice with application of Rules and Regulations.

B. Rules and their interpretations and duties of the officials. **Lecture Hour-06**

Reference Book

1. Ashok Kumar, Table Tennis, Discovery Publishing House, New Delhi.
2. Narang, P. Play and Learn Table Tennis, Khel Sahitya Kendra, New Delhi.
3. David Fairholm, The Pocket Guide to Table Tennis Tactics, Bell & Heyman, London.

UNIVERSITY OF CALCUTTA

NotificationNo.CSR/47/19

It is notified for information of all concerned that the Syndicate at its meeting held on 08.08.2019 (vide Item No.19) subsequently confirmed by the Syndicate 27.08.2019 (Item No.01) approved the revised syllabus of B.Sc. Physics (Honours/General) under CBCS, under this University, as laid down in the accompanying pamphlet.

The above shall take effect from the academic session 2019 -2020 and the students who are at present attending semester-3 classes will continue with the old syllabus.

Prof.(Dr.) Debasis Das
Registrar

SENATE HOUSE
KOLKATA-700 073
The 11th November, 2019.

U.G. Syllabus

for

Physics (Honours and General)

(Revised)

University of Calcutta

2019

Choice Based Semester System (CBCS)

Basic Scheme of CBCS for Science in University of Calcutta

The details for CBCS scheme for Science and Arts (Humanities) are described in CSR Number CUS/268 (Cir)/18 dated 07.05.2018. The relevent portions for Physics (H) and Physics (G) termed as PHSA and PHSG are mentioned here.

The choice bases credit system is comprised of several type of courses. Some courses are compulsory. They are termed as Core Course (CC). There are again two type of core courses subject specific core courses (termed as CC only) and abitlity enhancement core courses (termed as AECC).

The choice is actually available for elective subjects. There are three kind of elective subjects,

- Generic Elective (GE): It can be chosen from other disciplines
- Skill Enhancement Course (SEC): It can be chosen from the subject which is opted for CC
- Discipline Specific Elective course (DSE): It can be chosen from the subject which is opted for CC

Each courses has definite credit. They are summarised in the table given below:

Basic Course Types and Credits under CBCS

Course Type	Description	Credit
Core Course (CC)	Compulsory Basic course *from Physics*	6
Generic Elective Course (GE)	Elective course *other than Phyiscs* [In first four semesters]	6
Skill Enhancement Course (SEC)	Skill based elective course *from Physics* [In 3rd and 4th Semesters for Hons] [In 3rd, 4th, 5th, 6th Semesters for Gen]	2
Discipline Specific Elective Course (DSE)	Specialised elective course *from Physics* [In 5th and 6th Semester]	6
Ability Enhancement Compulsory Course (AECC) AECC-1 [In 1st Semester] AECC-2 [In 2nd Semester]	*Not related to Physics* Language Environment Science	2

A. Teaching Methods
For any course, one of the following modes of teaching will be used

1. Theory + Practical
2. Theory + Tutorial
3. Theory + Project
4. Theory only

B. Class Assignments
The class assignment for different course segments (theory, practical, tutorial) are as follows:

- Theory: 1 credit = 1 hour / week
- Practical: 1 credit = 2 hours / week
- Tutorial: 1 credit = 1 hour /week
- Project: 1 credit = 1 hour/week

C. Duration of the Semesters: The semesters will comprise 15 weeks.

D. The total number of classes
The number of classes for each part is summarised below:

- Theoretical module (Credit 4) = 60 Classes
- Practical module (Credit 2) = 60 Classes
- Tutorial (Credit 1) = 15 Classes
- Theoretical module, SEC (Credit 2) = 30 Classes
- Theoretical module, (project type) SEC (credit 1) = 15 Classes
- Project module, (project type) SEC (credit 1) = 15 Classes
- Theoretical module, DSE (Credit 5) = 75 Classes

E. Marks Distribution

The total number for evaluation of each course is 100. Twenty (20) out of hundred (100) is reserved as internal marks where 10 marks come from attendance and 10 from internal assessment examination. The other 80 marks are distributed among different components in different ways for a particular courses. The number distributions are mentioned below.

- CC/GE
  - Attendance 10
  - Internal Assessment 10
  - Theory Examination 50
  - Practical 30
- DSE
  - Attendance 10
  - Internal Assessment 10
  - Theory Examination 65
  - Tutorial 15
- SEC type **1** (Knowledge skill - Theory based)
  - Attendance 10
  - Internal Assessment 10
  - Theory Examination 65
  - Tutorial 15
- SEC type **2** (Technical Skill - Theory & Project based)
  - Attendance 10
  - Internal Assessment 10
  - Theory Examination 20
  - Project 60

Contents

Part I

Physics Syllabus: Honours Course

Basic Course Structure for Honours Course

Students of B.Sc. Physics Honours Course have to take 14 (fourteen) Core Courses (CC) from Physics and these Core Courses are distributed over all the six semesters. Two subjects other than physics are to be chosen as Generic Elective (GE). The modules of the GE courses are confined to the first four semesters. e.g., a student of physics Honours had chosen Chemistry and Mathematics as his/her generic elective subjects. The corresponding subject codes will be CEMG-GE and MTMG-GE. We refer to them as subject 111G-GE and 222G-GE. i.e., 111≡CEM and 222≡MTM. Two modules from each subject will be taken in any two semester. The possible combinations of GE modules are described in the third table.

Skill Enhancement Course, SEC must be opted in 3rd, 4th Semester only. SEC A is meant for 3rd Semesters and SEC B is meant for 4th Semesters. Student of Physics Honours will take SEC course from Physics. In each semester there is one project type and one theory SEC is available.

Student should take two Discipline specific elective courses, DSEs in each 5th and 6th semester. These two courses are termed as DSE-A and DSE-B. In 5th semester the courses are DSE A1 and DSE B1. Similarly, DSE A2 and DSE B2 are the subjects for 6th Semester.

Detail plans with credits in parentheses are given in following table (XXX for GE will be cleared in the third table).

Honours Course: Credit Distribution

Courses	Semester 1	Semester 2	Semester 3	Semster 4	Semester 5	Semester 6
CC	PHSA-CC-1 (6)	PHSA-CC-3 (6)	PHSA-CC-5 (6)	PHSA-CC-8 (6)	PHSA-CC-11 (6)	PHSA-CC-13 (6)
	PHSA-CC-2 (6)	PHSA-CC-4 (6)	PHSA-CC-6 (6)	PHSA-CC-9 (6)	PHSA-CC-12 (6)	PHSA-CC-14 (6)
			PHSA-CC-7 (6)	PHSA-CC-10 (6)		
GE	XXXGE1 (6)	XXXGE2 (6)	XXXGE2 (6)	XXXGE4 (6)		
SEC			PHSA-SEC A (2)	PHSA-SEC B (2)		
DSE					PHSA-DSE-A1 (6)	PHSA-DSE-A2 (6)
					PHSA-DSE-B1 (6)	PHSA-DSE-B2 (6)
AECC	AECC -1 (2)	AECC-2 (2)				
Total Credit	20	20	26	26	24	24
Number	400	400	500	500	400	400

Thus a general stuents completes $20 \times 2+26 \times 2+24 \times 2 = 40 + 52 + 48 = 140$ Credits in his/her course. The total marks for which student will appear in examination are given below. All the core courses have practical module. Therefore, both theory and practical examination will be held for these courses. Some SEC and AECC2

have projects. All these projects must be completed and submitted for evaluation within the stipulated semester. However, the DSE courses do not have any practical module. In these courses the students will appear in tutorial instead of practical examination.

Distribution of Honours Courses

The fourteen (14) Core papers are compulsory. Students persuing Advanced (i.e., Honours) Course need to take two (2) Skill enhancement Courses one in each of 3rd and 4th Semesters and four Discipline Specific Elective two in each 5th and 6th Semester. The details of the course divisions along with the subjects are given below.

Table 1: The Course distribution of Honours Course

Semester	Core Courses			SEC	DSE A	DSE B
Semester	**CC-1**	**CC-2**				
1	Mathematical Methods 1	Mechanics				
Semester	**CC-3**	**CC-4**				
2	Electricity & Magnetism	Waves & Optics				
Semester	**CC-5**	**CC-6**	**CC-7**	**SEC A-1**		
3	Mathematical Methods II	Thermal Physics	Modern Physics	Scintific Writing		
				Or		
				SEC A-2		
				Renewable Energy		
Semester	**CC-8**	**CC-9**	**CC-10**	**SEC B-1**		
4	Mathematical Methods III	Analog Electronics	Quantum Mechanics	Arduino		
				Or		
				SEC B-2		
				Electrical Circuits Network Skill		
Semester	**CC-11**	**CC-12**			**DSE A1**	**DSE B1**
5	Electromagnetic Theory	Statistical Physics			Advanced Mathmatical Methods	Astronomy & Astrophysics
					Or	Or
					Laser & fiber optics	Nuclear Physics
Semester	**CC-13**	**CC-14**			**DSE A2**	**DSE B2**
6	Digital Electronics	Solid State Physics			Nanomaterials	Communication Electronics
					Or	Or
					Advanced Classical Dynamics	Advanced Statistical Mechanics

Distribution of Generic Elective

Student will take two generic elective coureses and need to cover only two module for each of them. Therefore, a student read a particluar subject in two semesters only. Four different modules are prescribed for four semesters in all subjects and they are named accordingly. i.e.,

- Semester 1 GE 1
- Semester 2 GE 2
- Semester 3 GE 3
- Semester 4 GE 4

Therefore, a student who will choose chemistry in second semester his/her module will be CEMG-GE2. Among the first four semesters student should take one subject in any two semesters and in the rest two semesters he/she need to take the other one as Generic Elective. Let us denote these two subjects as 111G & 222G. The possible combinations of generic electives are shown in the following table.

Combination	GE1	GE2	GE3	GE4
1	111G	222G	222G	111G
2	222G	111G	111G	222G
3	111G	111G	222G	222G
4	222G	222G	111G	111G
5	111G	222G	111G	222G
6	222G	111G	222G	111G

Honours: Semester 1

CC1 and CC2

CC1	Mathemtical Physics 1	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
CC2	Mechanics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60

1.1 Mathematical Physics I

1.1.1 Mathematical Physics I (Theory)

Paper: PHS-A-CC-1-1-TH	**Credits:4**

1. Calculus **20 Lectures**

(a) Recapitulation: Limits, continuity, average and instantaneous quantities, differentiation. Plotting functions. Intuitive ideas of continuous, differentiable, etc. functions and plotting of curves.

(b) Convergence of infinite series: Convergence of power series . Idea of interval of convergence . Different convergence tests of power series: D'alembert's ratio test, Cauchy's root test, Integral test. Alternating series test. Absolute and conditional convergence. Taylor series of one variable, Maclaurin series. Approximation errors.

(c) First Order and Second Order Differential equations: First Order Differential Equations and Integrating Factor. Homogeneous Equations with constant coefficients. Wronskian and general solution. Statement of existence and Uniqueness Theorem for Initial Value Problems. Particular Integral.

(d) Calculus of functions of more than one variable: Partial derivatives, exact and inexact differentials. Integrating factor with simple illustration. Taylor series of two variable functions, Maxima, minima, saddle point evaluation of two variable functions using Taylor series. Constrained Maximization using Lagrange Multipliers.

2. Vector Algebra and Vector Calculus **25 Lectures**

(a) Recapitulation of Vector Algebra. Idea of linear independence, completeness, basis and representation of vectors. Properties of vectors under rotations. Scalar product and its invariance under coordinate rotations. Vector product, Scalar triple product and their interpretation in terms of area and volume respectively.

(b) Vector Differentiation: Scalar and Vector fields. Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators. Vector identities.

(c) Vector Integration: Ordinary Integrals of Vectors. Multiple integrals, Jacobian. Notion of infinitesimal line, surface and volume elements. Line, surface and volume integrals of Vector fields. Flux of a vector field. Gauss' divergence theorem, Green's and Stokes Theorems and their applications (no rigorous proofs).

(d) Orthogonal Curvilinear Coordinates. Derivation of Gradient, Divergence, Curl and Laplacian in Spherical and Cylindrical Coordinate Systems.

3. Matrices **15 Lectures**

(a) Addition and Multiplication of Matrices. Null Matrices. Diagonal, Scalar and Unit Matrices. Transpose of a Matrix. Symmetric and Skew-Symmetric Matrices. Conjugate of a Matrix. Hermitian and Skew- Hermitian Matrices. Singular and Non-Singular matrices. Orthogonal and Unitary Matrices. Trace of a Matrix.

(b) Eigen-values and Eigenvectors (Degenerate and non-degenerate). Cayley-Hamiliton Theorem. Diagonalization of Matrices. Solutions of Coupled Linear Ordinary homogeneous Differential Equations. Functions of a Matrix.

Reference Books

1. Calculus and Analytic Geometry , Thomas and Finney, Pearson Education India
2. Mathematical methods in the Physical Sciences, M. L. Boas, 2005, Wiley
3. Mathematical Methods for Physicists, G.B. Arfken, H.J. Weber, F.E. Harris, 2013, 7th Edn., Elsevier
4. Essential Mathematical Methods, K.F.Riley and M.P.Hobson, 2011, Cambridge Univ. Press
5. Higher Enginering Mathematics, B. S. Grewal, Khanna Publisher
6. Differential Equations, George F. Simmons, 2007, McGraw Hill
7. Vector Analysis and an introduction to TENSOR ANALYSIS, S. Lipschutz, D. Spellman, M. R. Spiegel, Schaum's Outline Series, Tata Mc Graw Hill Education Private Limited, edition 2009
8. Matrix Methods: An Introduction , R. Bronson, 1991, Academic Press
9. A Students Guide to Vectors and Tensors, D. Fleisch, 2012, Cambridge University Press

Additional Reference Books

1. Calculus: Early Transcendentals, J. Stewart, Cengage India Private Limited
2. Calculus volume 1 and 2, T. Apostol, Wiley.
3. An introduction to ordinary differential equations, E.A. Coddington, 2009, PHI
4. Mathematical Tools for Physics, James Nearing, 2010, Dover Publications
5. Mathematical methods for Scientists and Engineers, D.A. McQuarrie, 2003, Viva Book
6. Advanced Engineering Mathematics, D.G. Zill and W.S. Wright, 5 Ed., 2012, Jones and Bartlett Learning
7. Mathematical Physics, Goswami, 1st edition, Cengage Learning

8. Engineering Mathematics, S.Pal and S.C. Bhunia, 2015, Oxford University Press
9. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India
10. Mathematics for Physics and Physicists, W.Appel, 2007, Princeton University Press
11. Piskunov, N., Differential and Integral Calculus, CBS
12. Play with Graphs, Amit M. Agarwal, Arihant Publisher

1.1.2 Mathematical Physics - I (Practical)

Paper: PHS-A-CC-1-1-P	**Credits: 2**

1. Introduction to plotting graphs with Gnuplot **3 Lectures + 6 Classes**

(a) **Plotting 2D graphs:** both functions and data files. Changing plot range, plot style: the options- with points (w p), with dots (w d), with lines (w l), with linespoints (w lp), linetype (lt), linewidth (lw). Using the set command for samples, xrange, yrange, xlabel , ylabel, title etc. The *using* and *every* options.

(b) User defined functions [Including the use of ternary operator (? :) for piece-wise defined functions.]

(c) Fitting data files using gnuplot.

(d) Polar and parametric plots.

[Graphs to be saved by using GUI - The "export" protocol is not needed.]

2. Introduction to programming in python:

(a) Introduction **3 Lectures + 5 Classes**

- Using the python interpreter as a calculator
- Variable and data types (int, float, complex, list, tuple, string, the type() function)
- Basic mathematical operations
- Compound statements in python
  - *Conditionals*
    if:
    elf:
    else:
  - *Loops* for: , while:
  - *User defined functions* def: [return statement, default values for arguments, keyword arguments]
- Importing modules with math and cmath as examples
- Using online help
- Basic idea of namespaces-local and global
- Python scripts, I/O operations (including opening and writing to files)

(b) The python iterables data type **5 Lectures + 10 Classes**

- **List:**defining lists,reading and changing elements from lists, slicing (with discussion on the difference between **ll=mm** and **ll=mm[:]**, concatenation, list comprehension.

- built in functions involving lists: range(), len(), sum(), min(), max()
- list methods: append(), extend(), count(), index(), sort(), insert(), pop(), remove(), reverse()

- **Tuples:** Contrast and compare with lists, packing/unpacking using tuples (including **a,b**=**b,a** to swap variables)
- **Strings:** defining strings, the use of single, double or triple quotes as string delimiters, len(),indexing, slicing, string concatanation, some string methods: strip(), split(), join(), find(), count(), replace(), string formatting in python (using the % operator

(c) Problems and applications **8 Lectures + 20 Classes**

Problem 0: Observe and interpret the result of the following two scripts

```
i=0
a=1
while a>0:
        i=i+1
        a=a/2
print i
```

```
i=0
a=1
b=1
while a+b > b:
        i=i+1
        a=a/2
print i
```

Problem 1. Root finding for a single variable (basic theory and algorithm)

- Bisection method
- Newton-Raphson Method

Problem 2. Sorting of lists (algorithm, flowchart and code)

- Bubble sort
- Selection sort

Problem 3. ODE in one and two dimensions using Euler algorithm (output to be saved in data files and gunuplot to be used to plot graphs)

- Capacitor charging/discharging
- Simulating a half-wave rectifier with a capacitor filter
- Particle dynamics in 1D

Problem 4. Matrix operations using list of lists

- Matrix Addition
- Matrix Multiplication
- Transpose of a Matrix

Reference Books

1. Gnuplot in Action understanding data and Graphs, Phillipp K. Janert
2. Scientific Computing in Python. Abhijit Kar Gupta, Techno World

3. Physics in Laboratory including python Programming (Semester I), Mandal, Chowdhury, Das, Das, Santra Publication

Additional Reference Books

1. Introduction to Numerical Analysis, S.S. Sastry, 5th Edn. , 2012, PHI Learning Pvt. Ltd
2. Numerical Methods, Arun Kr Jalan, Utpal Sarkar, Univerisity Press
3. Numerical Mathematical Analysis, J. B. Scarborough, OXFORD and IBH Co. Pvt. Ltd.
4. Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition
5. An Introduction to computational Physics, T.Pang, 2nd Edn., 2006,Cambridge Univ. Press
6. Learning with Python-how to think like a computer scientist, J. Elkner, C. Meyer, and A. Downey, 2015, Dreamtech Press
7. Gnuplot 5, Lee Phillips, Alogus Publishing, edition 2012.
8. Python Programming, Satyanarayana, Radhika Mani, Jagdesh, Univerisity Press
9. Python 2.1 Bible Dave Brueck, Stephen Tanner, Hungry Minds Inc, New York
10. Computatioal Physics problem solving with Computers, Landau, Paez, Bordeianu etextbook in Python 3rd Edition

1.2 Mechanics

1.2.1 Mechanics (Theory)

Paper: PHS-A-CC-1-2-TH	**Credits: 4**

1.Fundamentals of Dynamics **12 Lectures**

(a) Review of Newtons Laws: Mechanistic view of the Universe. Concepts of Inertial frames, force and mass.Galilean transformations and Gallilean invariance. Solution of the equations of motion (E.O.M.) in simple force fields in one, two and three dimensions using cartesian, cylindrical polar and spherical polar coordinate systems.

(b) Dynamics of systems of particles: Difficulty of solving the E.O.M. for systems of particles. Newton's third Law. External and Internal forces. Momentum and Angular Momentum of a system. Torque acting on a system. Conservation of Linear and Angular Momentum. Centre of mass and its properties. Two-body problem.

(c) Variable mass system: motion of rocket.

2. Work and Energy **8 Lectures**

(a) Work Kinetic Energy Theorem. Conservative Forces: Force as the gradient of a scalar field. concept of Potential Energy. Other equivalent definitions of a Conservative Force. Conservation of Energy.

(b) Qualitative study of one dimensional motion from potential energy curves. Stable and Unstable equilibrium.

(c) Energy of a system of particles.

3. Gravitation and Central Force Motion **10 Lectures**

(a) Central Force. Reduction of the two body central force problem to a one body problem. Setting up the E.O.M. in plane polar coordinates.

(b) Differential equation for the path. Motion under an Inverse square force. Newton's Law of Gravitation. Inertial and gravitational mass. Kepler's Laws. Satellite in circular orbit and applications. Weightlessness.

(c) Gravitational potential energy. Potential and field due to spherical shell and solid sphere.

4. Non-Inertial Systems **12 Lectures**

Non-inertial frames and idea of fictitious forces. E.O.M with respect to a uniformly accelerating frame. E.O.M with respect to a uniformly rotating frame - Centrifugal and Coriolis forces. Laws of Physics in a laboratory on the surface of the earth.

5. Rotational Dynamics **12 Lectures**

(a) The Rigid Body: Constraints defining the rigid body. Degrees of freedom for a rigid body;

(b) Relation between Angular momentum and Angular Velocity: Moment of Inertia Tensor. Calculation of moment of inertia for rectangular, cylindrical and spherical bodies.

(c) Equation of motion for rotation about a fixed axis. Principal Axes transformation. Transformation to a body fixed frame. E.O.M for the rigid body with one point fixed (Euler's equations of motion). Torque free motion.Kinetic energy of rotation.

6. Fluid Motion **6 Lectures**

Kinematics of Moving Fluids: Idea of compressible and incompressible fluids, Equation of continuity; streamline and turbulent flow, Reynold's number. Euler's Equation. The special case of fluid statics $\vec{F} = \vec{\nabla} p$. Simple applications (e.g: Pascal's law and Archimedes principle). Bernoulli's Theorem.

Reference Books

1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw- Hill
2. Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
3. Classical Mechanics and General Properties of Matter. S.N. Maiti and D.P. Raychaudhuri, New Age
4. Introduction to Classical Mechanics, R. G. Takwale and P.S.Puranik, Tata McGraw-Hill Publishing Company Ltd.
5. Theory and Problems of Theoretical Mechanics, M. R. Spiegel, Mc Grow Hill Education
6. Classical Mechanics , R.D. Gregory, 2006, Cambridge University Press
7. Introduction to Classical Mechanics With Problems and Solutions , D. Morin, Cambridge University Press

Additional Reference Books

1. Mechanics,Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill. Physics
2. Mechanics,Resnick, Halliday and Walker 8/e. 2008, Wiley
3. Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, Cengage Learning
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole

5. Classical Dynamics of Particles and Systems. S.T. Thornton and J. B. Marion, 2009, Brooks/Cole
6. Mechanics , K. Symon, 2016, Pearson Education India
7. Classical Mechanics , Kibble and Berkshire, Imperial College Press
8. Classical Mechanics , J.M. Finn, 2010, Laxmi Publications
9. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000
10. University Physics. F.W Sears, M.W Zemansky, H.D Young 13/e, 1986, Addison Wesley

1.2.2 Mechanics (Practical)

Paper PHS-A-CC-1-2-P	**Credits: 2**

General Topics

1. Measurements of length (or diameter) using vernier caliper, screw gauge and traveling microscope.
2. Idea of systematic and random errors introduced in different instruments.

List of Practicals

1. To determine the Moment of Inertia of a metallic cylinder / rectangular bar about an axis passing through the C.G. and to determine the Modulus of Rigidity of the suspension wire.
2. To determine the Moment of Inertia of a Flywheel.
3. To determine the Young modulus, modulus of rigidity and Poisson ratio of the material of a wire by Searle's dynamic method.
4. To determine the value of g using Bar Pendulum.
5. To determine the height of a building (or a suitable vertical height) using sextant.
6. Determination of Young's modulus of the material of a beam by the method of flexure.

Reference Books

1. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press
2. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited
3. Physics in Laboratory, Mandal, Chowdhury, Das, Das, Santra Publication
4. Advanced Practical Physics Vol 1, B. Ghosh, K. G. Majumder, Sreedhar Publisher

Additional Reference Books

1. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited
2. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited
3. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd

Honours: Semester 2

CC3 and CC4

CC3	Electricity and Magnetism	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
CC4	Waves and Optics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60

2.1 Electricity and Magnetism

2.1.1 Electricity and Magnetism (Theory)

Paper: PHS-A-CC-2-3-TH **Credits: 4**

1. Dirac delta function and it's properties **3 Lectures**

Dirac delta function: definition of dirac delta function. Delta function as limit of different representations. Properties of delta function. Three dimensional delta function. Proof of the relation $\nabla.(\frac{\hat{r}}{r^2}) = 4\pi\delta^3(\vec{r})$.

2. Electrostatics **12 Lectures**

(a) Coulombs law, principle of superposition, electrostatic field. Electric field and charge density, surface and volume charge density, charge density on the surface of a conductor. Force per unit area on the surface.

(b) Divergence of the Electrostatic field, flux, Gauss's theorem of electrostatics, applications of Gauss theorem to find Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor.

(c) Curl of the Electrostatic Field. Conservative nature of electrostatic field, Introduction to electriostatic potential, Calculation of potential for linear, surface and volume charge distributions, potential for a uniformly charged spherical shell and solid sphere. Calculation of electric field from potential.

3. Dielectric properties of matter **6 Lectures**

Electric dipole moment, electric potential and field due to an electric dipole, force and Torque on a dipole. Electric Fields inside matter, Electric Polarisation, bound charges, displacement density vector, relation between $\vec{E}$, $\vec{P}$ and $\vec{D}$. Gauss's theorem in dielectrics, linear Dielectric medium, electric succeptibility and permittivity. Electrostatic boundary conditions for $\vec{E}$ and $\vec{D}$.

4. Method of Images **4 Lectures**

Laplace's and Poisson equations. Uniqueness Theorems. Method of Images and its application to: Plane Infinite metal sheet, Semi-infinite dielectric medium and metal Sphere.

5. Electrostatic Energy **3 Lectures**

Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Energy per unit volume in electrostatic field.

6. The Magnetostatic Field **10 Lectures**

(a) Biot-Savart's law. Application of Biot-Savart's law to determine the magnetic field of a straight conductor, circular coil. Force on a moving point charge due to a magnetic field: Lorentz force law. Force between two straight current carrying wires.

(b) Divergence of the magnetic field and its solenoidal nature. Magnetic vector potential, calculation for simple cases.

(c) Curl of the magnetic field. Ampere's circuital law. Its application to (1) Infinite straight wire, (2) Infinite planar surface current, and (3) Infinite Solenoid.

7. Magnetic properties of matter **7 Lectures**

(a) Potential and field due to a magnetic dipole. Magnetic dipole moment. Force and torque on a magnetic dipole in a uniform magnetic field.

(b) Magnetization, Bound currents. The magnetic intensity $\vec{H}$. Relation between $\vec{B}$, $\vec{H}$ and $\vec{M}$. Linear media. Magnetic Susceptibility and Permeability. Boundary conditions for $\vec{B}$ and $\vec{H}$. Brief introduction of dia-, para- and ferro-magnetic materials. B-H curve and hysteresis.

8. Electro-magnetic induction **7 Lectures**

Ohms law and definition of E.M.F. Faraday's laws of electromagnetic induction, Lenz's law. Self-Inductance and Mutual Inductance. Reciprocity Theorem. Introduction to Maxwell's Equations. Charge conservation. Displacement current and resurrection of Equation of Continuity.

9. Electrical circuits **8 Lectures**

AC Circuits: Kirchhoff's laws for AC circuits. Complex Reactance and Impedance. Series LCR Circuit: (1) Resonance, (2) Power Dissipation and (3) Quality Factor, and (4) Band Width. Parallel LCR Circuit

Reference Books

1. Feynman Lectures Vol.2, R.P.Feynman, R.B.Leighton, M. Sands, 2008, Pearson Education
2. Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings
3. Electricity and Magnetism, D.Chattopadhyay and P.C.Rakshit, New Central Book Agency, 2011
4. Fundamentals of Electricity and Magnetism, B. Ghosh, Books and Allied (P) Ltd., 4th edition, 2015.

Additional Reference Books

1. Electricity, Magnetism and Electromagnetic Theory, S. Mahajan and Choudhury, 2012, Tata McGraw Hill
2. Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education
3. Elements of Electromagnetics, M.N.O. Sadiku, 2010, Oxford University Press
4. Classical Electromagnetism, Jerrold Franklin, Pearson Education

5. Electricity and Magnetism, J.H.Fewkes & J.Yarwood. Vol. I, 1991, Oxford Univ. Press

6. Electricity and Magnetism, D. C. Tayal, Himalayan Publisher

2.1.2 Electricity and Magnetism (Practical)

Paper: PHS-A-CC-2-3-P	**Credit: 2**

General Topics

- Potentiometric measurement technique of voltage, advantage over the use of voltmeter
- idea of potential lead and current lead of low resistance
- idea of the order of value of the resistance per unit length of Carey foster Bridge with the value of resistance used for measurement, the expected accuracy
- use of multimeter in different modes
- frequency response for CR circuit
- details of ballistic galvanometer
- variation of mutual inductance for angle between primary and secondary coil

List of Practicals

1. To determine an unknown Low Resistance using Potentiometer.

2. To determine an unknown Low Resistance using Carey Foster's Bridge.

3. To study response curve of a Series LCR circuit and determine its (a) Resonant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width.

4. To study the ac characteristics of a series RC Circuit. Study as low/high pass filter. Calculation of capacitance from current reactance graph.

5. To study mutual inductance between two coils .

6. Determination of horizontal component of the Earth's magnetic field.

Reference Books

1. Practical Physics Vol 1, Vol 2, B. Ghosh, K. G. Majumder, Sreedhar Publisher

2. An Advanced Course in Practical Physics, D. Chattopadhyay, P.C. Rakshit, New Central Book Agency (P) Ltd

Additional Reference Books

1. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited

2. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited

3. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited

4. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd

5. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press

2.2 Waves and Optics

2.2.1 Waves and Optics (Theory)

Paper: PHS-A-CC-2-4-TH	**Credit:4**

1. Oscillations **8 Lectures**

Differential equation of Simple Harmonic Oscillation and its solution. Kinetic energy, potential energy, total energy and their time average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor.

2. Superposition of Harmonic Oscillations **4 Lectures**

(a) Superposition of Two Collinear Harmonic oscillations having equal frequencies and different frequencies (Beats).

(b) Superposition of Two Perpendicular Harmonic Oscillation for phase difference $\delta = 0$, $\frac{\pi}{2}$, π: Graphical and Analytical Methods, Lissajous Figures with equal and unequal frequency and their uses.

3. Wave motion **4 Lectures**

Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Traveling) Waves. Wave Equation for travelling waves . Particle and Wave Velocities. (Solution of spherical wave equation may be assumed)

4. Superposition of Harmonic Waves **9 Lectures**

(a) Velocity of Transverse Vibrations of Stretched Strings, Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. (form of the solution of wave equation may be assumed). Plucked and Struck Strings.

(b) Superposition of N Harmonic Waves. Phase and Group Velocities.

5. Wave optics **4 Lectures**

(a) Electromagnetic nature of light. Definition and properties of wave front. Huygens Principle.

(b) Temporal and Spatial Coherence.

6. Interference **10 Lectures**

Division of amplitude and wavefront. Young's double slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: Measurement of wavelength and refractive index.

7. Interferometers **5 Lectures**

(a) Michelson Interferometer (1) Idea of form of fringes (No theory required), (2) Determination of Wavelength, (3)Wavelength Difference, (4) Refractive Index, and (5) Visibility of Fringes.

(b)Multiple beam interferometry, Fabry-Perot interferometer.

8. Diffraction **16 Lectures**

(a) Fraunhofer diffraction: Single slit. Circular aperture (solution may be assumed), Resolving Power of a telescope. Double slit. Multiple slits. Diffraction grating. Resolving power of grating. Rayleigh criterion for resolution.

(b) Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half-Period Zones for Plane Wave. Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate. Fresnel's Integral, Fresnel diffraction pattern of a straight edge, a slit.

Reference Books

1. The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons
2. Advanced Acoustics, D. P. Roychowdhury, Chayan Publisher
3. Waves and Oscillations, N. K. Bajaj, Tata McGrow Hill
4. Optics, 4th Edn., Eugene Hecht, Pearson Education Limited, 2014
5. Optics, Ajoy Ghatak, 2008, Tata McGraw Hill

Additional Reference Books

1. Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill
2. Fundamentals of Optics, F.A. Jenkins & H.E. White, 1981, McGraw- Hill
3. Introduction to Optics, F.L. Pedrotti, L.S. Pedrotti, L.M. Pedrotti, Pearson Education
4. Principles of Optics, Max Born & Emil Wolf, 7th Edn., 1999, Pergamon Press
5. Fundamental of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. Chand Publications
6. A textbook of Optics; N Subramanyam, B. Lal and M.N.Avadhanulu; S.Chand. Publishing

2.2.2 Waves and Optics (Practical)

Paper: PHS-A-CC-2-4-TH	**Credit: 2**

General topic

- Construction and measurment process in Spectrometer
- Theory of Schuster's focusing

List of Practicals

1. To determine the frequency of an electric tuning fork by Melde's experiment and verify $\lambda^2 - T$ law.

2. To study the variation of refractive index of the Material of a prism with wavelengths and hence the Cauchy constants using mercury/helium source.

3. To determine wavelength of sodium light using Fresnel Biprism.

4. To determine wavelength of sodium light/radius of plano convex lens using Newton's Rings.

5. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film.

6. Measurement of the spacing between the adjacent slits in a grating by measuring $\sin\theta$ vs graph of a certain order of grating spectra.

Reference Books

1. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited
2. Advanced Practical Physics, Vol 1, B. Ghosh, K.G.Majumdar, Shreedhar Publishers
3. An Advanced Course in Practical Physics, D. Chattopadhyay, P.C. Rakshit, New Central Book Agency (P) Ltd

Additional Reference Books

1. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited
2. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited

Honours: Semester 3

CC 5, CC 6, CC 7, SEC A

CC 5	Mathematical Physics II	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
CC 6	Thermal Physics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
CC 7	Modern Physics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
SEC A 1	Scientific Writing	Theory	Project
	Credit 2	Credit 1	Credit 1
		Classes 15	Classes 15
SEC A 2	Renewable Energy	Theory	
	Credit 2	Credit 2	
		Classes 30	

3.1 Mathematical Physics II

3.1.1 Mathematical Physics II (Theory)

Paper: PHS-A-CC-3-5-TH **Credit:4**

1. Fourier Series **10 Lectures**

(a) Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Complex representation of Fourier series. Expansion of functions with arbitrary period. Expansion of non-periodic functions over an interval. Even and odd functions and their Fourier expansions. Applications. Summing of Infinite Series. Term-by-Term differentiation and integration of Fourier Series. Parseval Identity.

2. Frobenius Method and Special Functions **20 Lectures**

Singular Points of Second Order Linear Differential Equations and their importance. Power series solution of 2nd order differential equation. Frobenius method and its applications to differential equations. Legendre, Bessel, Hermite Differential Equations. Properties of Legendre Polynomials: Rodrigues Formula, Generating Function, Orthogonality. Simple recurrence relations. Expansion of function in a series of Legendre Polynomials. Multipole expansion in Electrostatics. Bessel Functions of the First Kind: Generating Function, simple recurrence relations. Zeros of Bessel Functions ($J_0(x)$ and $J_1(x)$) and Orthogonality. Airy's disc for Fraunhofer diffraction through circular aperture.

3. Some Special Integrals **4 Lectures**

Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions. Error Function (Probability Integral).

4. Integrals Transforms **10 Lectures**

Fourier Transforms: Fourier Integral theorem. Fourier Transform. Examples. Fourier transform of trigonometric, Gaussian, finite wave train & other functions. Representation of Dirac delta function as a Fourier Integral. Fourier transform of derivatives, Inverse Fourier transform, Properties of Fourier transforms (translation, change of scale, complex conjugation, etc.). Three dimensional Fourier transforms with examples. Application of Fourier Transforms to differential equations: One dimensional Wave and Diffusion/Heat Flow Equations.

5. Introduction to probability **6 Lectures**

Independent random variables: Sample space and Probability distribution functions. Binomial, Gaussian, and Poisson distribution with examples. Mean and variance.

6. Partial Differential Equations **10 Lectures**

Solutions to partial differential equations using separation of variables: Solutions of Laplace's equation in problems with cylindrically and spherically symmetric boundary conditions. Examples from Electrostatics. Wave equation and its solution for vibrational modes of a stretched string, rectangular and circular membranes. Diffusion Equation.

Reference Books

1. Mathematical Methods for Physicists: Arfken, Weber, 2005, Harris, Elsevier
2. Fourier Analysis by M.R. Spiegel, 2004, Tata McGraw-Hill
3. Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill
4. Differential Equations, S.L. Ross, 2007, Wiley
5. Mathematical Physics, P.K. Chattopadhyay,2014, New Academic Science
6. Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press
7. Fourier Series and Boundary Value Problems , J.W. Brown and R.V. Churchill, 2017, McGraw Hill Education
8. Introduction to Mathematical Physics, Charlie Harper, PHI Learning Pvt. Ltd.

Additional Reference Books

1. Mathematics for Physicists, Susan M. Lea, 2004, Thomson Brooks/Cole
2. Mathematical Methods of Physics. J. Mathews and R.L. Walker, 2004, Pearson
3. Engineering Mathematics, S.Pal and S.C. Bhunia, 2015, Oxford University Press
4. Mathematical methods for Scientists and Engineers, D.A. McQuarrie, 2003, Viva Books
5. Mathematics for Physicists, P. Dennery and A.Krzywicki, 1967, Dover Publications.
6. Elementary Differential Equations and Boundary Value Problems, W.E. Boyce and R.C. Diprima, 2009, Wiley
7. Fourier Series, G.P. Tolstov, R. A. Silverman, 1976, Dover Publications Inc
8. A Students Guide to Fourier Transforms: With Applications In Physics And Engineering, J.F. James, 2011, Cambridge University Press
9. An Introduction to Partical Differential Equations for Science Students, G Stephenson, ELBS and Longman
10. Partial Differential Equations for Scientists and Engineers, S.J. Farlow, 1993, Dover Pub

3.1.2 Mathematical Physics II (Practical)

Paper: PHS-A-CC-3-5-P	**Credit: 2**

1. Introduction to numpy and scipy

- **the numpy array** **3 Lectures + 9 Classes**
  - properties: size, shape, ndim, dtype
  - creating arrays
    - zeros, one(), full(), fill()
    - arange(),linspace(),logspace()
    - identity(), eye()
    - astype()
  - indexing and slicing arrays (view versus copy)
  - important array methods
    - reshape(), ravel(), flatten()
    - hstack() and vstack()
  - Element wise functions:native numpy functions,the vectorise() method
  - Aggregate functions
    np.sum(),np.prod(),np.mean(),np.std(),np.var(),np.min(),np.max(), np.argmin(), np.argmax()
- **Using numpy for matrix operators (the 2D numpy array)** **2 Lectures + 6 Classes**
  - addition, multiplication(dot)
  - Gauss elemination (using partial pivoting)(numpy code)

  - for evaluating the determinant
  - for solving linear equation
- the numpy linalg module
  - solving equations
  - diagonalisation

- **Scientific Applications**
  - **Interpolation** **2 Lectures + 6 Classes**
    - Lagrange Interpolation
    - Newton Forward Interpolation
      Using both numpy and scipy.interpolate(for visualization of the results use mathplotlib)
      -basic numerical analysis theory to be explained.
  - **Numerical Integration:(for both functions and equi-spaced data)** **4 Lectures + 8 Classes**
    - Trapezoidal rule
    - Simpson's one-third rule
      Using both numpy and scipy.integrate.quad(), scipy.integrate.trapz(), scipy.intgrate.simps()
      -basic numerical analysis theory to be explained.
    - Numerical Integration by n-point Gaussian Quadrature method. [Basic theory and numpy code - nodes and weights to be read from files, Integration by scipy.integrate.quad().]
  - **Solution of ODE** **2 Lectures + 3 Classes**
    - Solution of 1st order and 2nd order ordinary differential equation using 4th order Runge Kutta (RK4) algorithm [algorithm and numpy code - detailed theory not required]
  - **Curve fitting** **2 Lectures + 3 Classes**
    - with numpy polinomials
    - with user defined functions using scipy.optimize module

2. Introduction to mathplotlib (Using the pyplot submodule) **3 Lectures + 7 Classes**

- figure, axes, subplot
- plot(), scatter(), show()
- labels, legends, titles, styles, ticks
- dynamically updating curves
- saving graphs

Reference Books

1. Numerical Methods, Arun Kr Jalan, Utpal Sarkar, Univeristy Press
2. Scientific Computing in Python. Abhijit Kar Gupta, Techno World
3. Physics in Laboratory including python Programming (Semester III), Mandal, Chowdhuri, Das, Das, Santra Publication

4. mathplotlib Plotting Cookbook, Alexandre Devert, PACKT Publishing

5. Programming for Computation-Python, Svein Linge, Hans Petter Lantangen, Springer

6. Numerical Python, Robert Johansson, Apress Publication

Additional Reference Books

1. Introduction to Numerical Analysis, S.S. Sastry, 5th Edn. , 2012, PHI Learning Pvt. Ltd

2. Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition

3. An Introduction to computational Physics, T.Pang, 2nd Edn., 2006,Cambridge Univ. Press

4. Computatioal Physics problem solving with Computers, Landau, Paez, Bordeianu etextbook in Python 3rd Edition

3.2 Thermal Physics

3.2.1 Thermal Physics (Theory)

Paper: PHS-A-CC-3-6-TH	**Credit:4**

1.Introduction to Thermodynamics **25 Lectures**

(a) Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics & Concept of Temperature. Concept of Work & Heat, State Functions, Internal Energy and First Law of Thermodynamics. Its differential form, First Law & various processes. Applications of First Law: General Relation between C_P and C_V, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Coefficient.

(b) Second Law of Thermodynamics: Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work. Heat Engines. Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence.

(c) Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

(d) Entropy: Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy. Entropy of a perfect gas. Principle of Increase of Entropy. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Principle of Increase of Entropy. Temperature-Entropy diagrams for Cycle. Third Law of Thermodynamics. Unattainability of Absolute Zero.

2. Thermodynamic Potentials **15 Lectures**

(a) Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy, Their Definitions, Properties and Applications. Surface Films and Variation of Surface Tension with Temperature. Magnetic Work, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations.

(b) Maxwell's Thermodynamic Relations. Derivations and applications of Maxwell's Relations: (1) Clausius Clapeyron equation, (2) Values of C_P-C_V, (3) TdS Equations, (4) Joule-Kelvin coecient for Ideal and Van der Waal Gases, (5) Energy equations, (6) Change of Temperature during Adiabatic Process. Joule's Experiment. Free Adiabatic Expansion of a Perfect Gas.

(c) Joule-Thomson Porous Plug Experiment: Joule- Thomson Effect for Real and Van der Waal Gases. Temperature of Inversion. Joule Thomson Cooling.

3. Kinetic Theory of Gases **15 Lectures**

(a) Distribution of Velocities: Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Doppler Broadening of Spectral Lines and Stern's Experiment. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (No proof required). Specific heats of Gases.

(b) Molecular Collisions: Mean Free Path. Collision Probability. Estimates of Mean Free Path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian Motion and its Significance.

(c) Real Gases: Behavior of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO_2 Gas. Critical Constants. Continuity of Liquid and Gaseous State. Vapour and Gas. Boyle Temperature. Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves. P-V Diagrams.

4. Conduction of Heat **5 Lectures**

Thermal conductivity, diffusivity. Fourier's equation for heat conduction its solution for rectilinear flow of heat.

Reference Books

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill
2. Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger. 1988, Narosa
3. Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press
4. Thermodynamics , E. Fermi, 2007 , Sarat Book House
5. Basic Thermodynamics, E. Guha, 2010, Narosa
6. Kinetic theory of gases , Loeb, Radha Publishing House
7. A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press

Additional Reference Books

1. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer
2. Thermodynamics and an introduction to thermostatistics, H. B. Callen, 1985, Wiley
3. Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. Chand Publications
4. Elements of Classical Thermodynamics A.B. Pippard , 1957, Cambridge University Press
5. Equilibrium Thermodynamics, C.J. Adkins, 1983, Cambridge University Press
6. Principles of Thermodynamics , M. Kaufman, 2002, CRC Press

3.2.2 Thermal Physics (Practical)

Paper: PHS-A-CC-3-6-P	**Credit: 2**

List of Practicals

1. Determination of the coefficient of thermal expansion of a metallic rod using an optical lever.

2. Calibration of a thermocouple by direct measurement of the thermo-emf using potentiometer and the constants. [one end in ice and another end at water bath which to be heated.

3. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.

4. To determine the boiling point of a liquid using Platinum Resistance Thermometer (PRT).

5. To determine Temperature Coefficient of Resistance using Carey Foster bridge.

Reference Books

1. Advanced Practical Physics, Vol 1, B. Ghosh, K. G. Majumder, Sreedhar Publication
2. An Advanced Course in Practical Physics, D. Chattopadhyay, P.C. Rakshit, New Central Book Agency (P) Ltd

3.3 Modern Physics

3.3.1 Modern Physics (Theory)

Paper: PHS-A-CC-3-7-TH	**Credit:4**

1. Radiation and its nature **15 Lectures**

(a) Blackbody Radiation, Planck's quantum hypothesis, Planck's constant (derivation of Planck formula is not required). Photoelectric effect and Compton scattering - light as a collection of photons. Davisson-Germer experiment. De Broglie wavelength and matter waves. Wave-particle duality. Wave description of particles by wave packets. Group and Phase velocities and relation between them. Probability interpretation: Normalized wave functions as probability amplitudes.

(b) Two-slit experiment with photons and electrons. Linear superposition principle as a consequence.

(c) Position measurement, gamma ray microscope thought experiment. Heisenberg uncertainty principle (Statement with illustrations). Impossibility of a particle following a trajectory.

2. Basics of Quantum Mechanics **15 Lectures**

(a) Quantum measurements: Deterministic vs probabilistic view points. States as normalised vectors (normalised wave functions). Dynamical variables as linear Hermitian operators (position, momentum, angular momentum, and energy as examples).

(b) Schrödinger equation as a first principle. Probabilistic interpretation of wavefunction and equation of continuity (in 1D). Time evolution of wavefunction and $\exp(iHt/\hbar)$ as the evolution operator. Stationary states. Eigenvalue equation.

(c) Application to one dimensional systems: Boundary conditions on wave functions. Particle in an infinitely rigid box: energy eigenvalues and eigenfunctions, normalization. Quantum dot. Quantum mechanical tunnelling across a step potential & rectangular potential barrier, α-decay as an example.

(d) Simultaneous measurements: Compatible and incompatible observables and their relation to commutativity. Heisenberg's uncertainty relation for a pair of incompatible observables. Illustration of the ideas using $[x_i, p_j]$ and $[L_i, L_j]$.

3. Nuclear Structure **10 Lectures**

(a) Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle.

(b) Nature of nuclear force, NZ graph.

(c) Nuclear Models: Liquid Drop model. semi-empirical mass formula and binding energy. Nuclear Shell Model. Magic numbers.

4. Interaction with and within nucleus **12 Lectures**

(a) Radioactivity: Beta decay - energy released, spectrum and Pauli's prediction of neutrino; Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus.

(b) Fission and fusion: mass deficit, relativity and generation of energy. Fission - nature of fragments and emission of neutrons. Nuclear reactor: slow neutrons interacting with Uranium 235; Fusion and thermonuclear reactions driving stellar energy (brief qualitative discussions)

5. Lasers **8 Lectures**

Einstein's A and B coefficients. Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion. Three-Level and Four-Level Lasers. Ruby Laser and He- Ne Laser. Basic lasing action.

Reference Books

1. Feynman Lectures Vol.3, R.P.Feynman, R.B.Leighton, M. Sands, 2008, Pearson Education
2. Basic Quantum Mechanics, A.K.Ghatak , 2004, Macmillan
3. Quantum Mechanics, A Textbook for Undergraduates, M. C. Jain, Prentice-Hall of Indial Private Limited
4. Introduction to Quantum Mechanics, David J. Griffiths, 2005, Pearson Education
5. Quantum Physics, Stephen Gasiorowicz, John Wiley & Sons, Inc.
6. Nuclear Physics, Irving Kaplan, Oxford & Publishing Co. Pvt. Ltd
7. Nuclear Physics, An Introduction, S.B. Patel, New Age International (P) Ltd. Publishers
8. Laser Physics and Spectroscopy, P.N.Ghosh, Levant Books, India, 2016

Additional Reference Books

1. Primer of Quantum Mechanics; M. Chester; John Wiley & Sons, 1987
2. Physics for scientists and Engineers with Modern Physics, Jewett and Serway, 2010, Cengage Learning
3. Modern Physics, G.Kaur and G.R. Pickrell, 2014, McGraw Hill
4. Quantum Physics, Berkeley Physics, Vol.4
5. Nuclear Physics, S.N.Ghosal; S. Chand Publishing
6. Nuclear Physiscs, Principles and Applications, John Lilley, John Wiley India
7. Atom, Laser and Spectroscopy, S.N. Thakur, D.K. Rai, PHI Learning Private Ltd
8. Laser and NON Linear Optics, B.B. Laud, New Age International (P) Ltd. Publishers
9. Modern Physics, J.R. Taylor, C.D. Zaratos, M.A. Dubson, 2004, PHI Learning
10. Schaum's outline, Theory and Problems of Modern Physics, R. Gautreau and W. Savin, 2nd Edn, Tata McGraw-Hill Publishing Co. Ltd
11. Theory and Problems of Modern Physics, E.H.Wichman, 1971, Tata McGraw-Hill Co
12. Basic ideas and concepts in Nuclear Physics, K.Heyde, 3rd Edn., Institute of Physics Pub
13. Six Ideas that Shaped Physics: Particle Behave like Waves, T.A.Moore, 2003, McGraw Hill

3.3.2 Modern Physics (Practical)

Paper: PHS-A-CC-3-7-P	**Credit: 2**

List of Practicals

1. Measurement of Plank constant using LED

2. Verification of Stefan's law of radiation by the measurement of voltage and current of a torch bulb glowing it beyond draper point.

3. Determination of e/m of electrons by using bar magnet.

4. To study the photoelectric effect: variation of photocurrent versus intensity and wavelength of light.

5. To show the tunneling effect in tunnel diode using I-V characteristics.

Reference Books

1. B.Sc. Practical Physics, C.L. Arora, S. Chand And Company Limited
2. Practical Physics Vol 1, Vol 2, B. Ghosh, K. G. Majumder, Sreedhar Publisher

SEC A-1 (Technical Skill)

3.4 Scientific Writing (Project type)

3.4.1 Scientific Writing (Theory)

Paper: PHS-A SEC-B-TH	**Credits: 1**

1. Introduction to LaTeX **2 Lectures**
The difference between WYSIWYG and WYSIWYM. Preparing a basic LaTeX file. Compiling LaTeX file.

2. Document classes : **1 Lectures**
Different type of document classes, e.g., article, report, book etc.

3. Page Layout **2 Lectures**
Titles, Abstract, Chapters, Sections, subsections, paragraph, verbatim, References, Equation references, citation.

4. List structures: **1 Lectures**
Itemize, enumerate, description etc.

5. Representation of mathematical equations **5 Lectures**
Inline math, Equations, Fractions, Matrices, trigonometric, logarithmic, exponential functions, line-surface-volume integrals with and without limits, closed line integral, surface integrals, Scaling of Parentheses, brackets etc.

6. Customization of fonts **1 Lectures**
Bold fonts, emphasise, mathbf, mathcal etc. Changing sizes Large, Larger, Huge, tiny etc.

7. Writing tables **2 Lectures**
Creating tables with different alignments, placement of horizontal, vertical lines.

8. Figures **1 Lectures**
Changing and placing the figures, alignments

Packages : amsmath,amssymb, graphics, graphicx, Geometry, algorithms, color, Hyperref etc. Use of Different LaTeX commands and environments, Changing the type style, symbols from other languages. special characters.

Note: Software required: LaTeX in Linux and MikTeX in Windows. Preferred editor Kile/emacs in Linux and TeXStudio in Windows.

Reference Book

1. LaTeX- A Document Preparation System , Leslie Lamport , 1994, Addison-Wesley
2. LaTeXTutorials A PRIMER, Indian TeXuser group, E. Krishnan
3. Practical LaTeX, George Gratzer, Springer
4. Official LaTeXsite : https://www.latex-project.org/

5. The Not So Short Introduction to LaTeX: http://mirror.iopb.res.in/tex-archive/info/lshort/english/lshort.pd
6. LaTeXWikibook https://en.wikibooks.org/wiki/LaTeX
7. TeXLive http://www.tug.org/texlive/

3.4.2 Scientific Writing (Project)

Paper: PHS-A SEC-B-PR	**Credits: 1**

List of some sample Projects

1. Writing articles/ research papers/reports

2. Writing mathematical derivation

3. Writing Resume

4. Writing any documentation of a practical done in laboratory with results, tables graphs.

5. Writing graphical analysis taking graphs plotted in gnuplot

SEC A-2 (Knowledge Skill)

3.5 Renewable energy and Energy Harvesting (Theory)

Paper: PHS-A SEC-B-TH	**Credits: 2**

1. Fossil fuels and Alternate Sources of energy **5 Lectures**

Fossil fuels and nuclear energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in Ocean shore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.

2. Solar energy **5 Lectures**

Solar energy, its importance, storage of solar energy, solar pond, non-convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, role of maximum power point tracking for harvesting maximum energy and sun tracking systems.

3. Wind Energy harvesting **4 Lectures**

Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies. (only idea of synchronisation, current injection, islanding etc with utility grid)

4. Ocean Energy **4 Lectures**

Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass.

5. Geothermal Energy **2 Lectures**

Geothermal Resources, Geothermal Technologies.

6. Hydro Energy **2 Lectures**

Hydropower resources, hydropower technologies, environmental impact of hydro power sources.

7. Piezoelectric Energy harvesting **3 Lectures**

Introduction, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modeling piezoelectric generators, Piezoelectric energy harvesting applications.

8. Electromagnetic Energy Harvesting **3 Lectures**

(a) Linear generators, physics mathematical models, recent applications
(b) Carbon captured technologies, cell, batteries, power consumption.
(c) Environmental issues and Renewable sources of energy, sustainability.

9. Fuel cell **2 Lectures**

Introduction, Design principle and operation of fuel cell, Types of fuel cells, conversion efficiency of fuel cell, application of fuel cells

Reference Books

1. Non-conventional energy sources, G.D Rai, Khanna Publishers, New Delhi

Additional Reference Books

1. Solar energy, M.P. Agarwal, S Chand and Co. Ltd
2. Solar energy, Suhas P Sukhative, Tata McGraw Hill Publishing Company Ltd
3. Renewable Energy, Power for a sustainable future, Godfrey Boyle, Oxford University Press, in association with The Open University
4. Solar Energy: Resource Assesment Handbook, Dr. P Jayakumar, 2009
5. Photovoltaics, J.Balfour, M.Shaw and S. Jarosek, Lawrence J Goodrich (USA)

Honours: Semester 4

CC 8, CC 9, CC 10, SEC B

CC 8	Mathematical Physics III	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
CC 9	Analog Electronics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
CC 10	Quantum Mechanics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
SEC B 1	Arduino	Theory	Project
	Credit 2	Credit 1	Credit 1
		Classes 15	Classes 15
SEC B 2	Electrical Circuits &	Theory	
	Network Skill	Credit 2	
	Credit 2	Classes 30	

4.1 Mathematical Physics III

4.1.1 Mathematical Physics III (Theory)

Paper: PHS-A-CC-4-8-TH **Credit: 4**

1. Complex Analysis **20 Lectures**

(a) Brief Revision of Complex Numbers and their Graphical Representation. Euler's formula, Roots of Complex Numbers. Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity, branch cuts. Integration of a function of a complex variable. Cauchy's Inequality. Cauchy's Integral formula. Simply and multiply connected region. Laurent and Taylor's expansion. Residues and Residue Theorem. Application in solving Definite Integrals. only single valued integrals; simple poles on and off the real axis.

2. Variational calculus in Physics **20 Lectures**

Functionals. Basic ideas of functionals. Extremization of action as a basic principle in mechanics. Lagrangian formulation. Euler's equations of motion for simple systems: harmonic oscillators, simple pendulum, spherical

pendulum, coupled oscillators. Cyclic coordinates. Symmetries and conservation laws. Legendre transformations and the Hamiltonian formulation of mechanics. Canonical equations of motion. Applications to simple systems.

3. Special theory of Relativity **20 Lectures**

(a) Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity. Relativistic Dynamics. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Transformation of Energy and Momentum.

(b) A short introduction to tensors Covariant and contravariant vectors. Contraction. Covariant, contravariant, and mixed tensors of rank-2, transformation properties. The metric tensor (flat space-time only). Raising and lowering of indices with metric tensors. (Consistent use of convention $\rightarrow$ diag(1,-1,-1,-1).)

(c) Relativity in Four Vector Notation: Four-vectors, Lorentz Transformation and Invariant interval, Space-time diagrams. Proper time and Proper velocity. Relativistic energy and momentum - Four momentum. Conservation of four momentum and applications to collisions. Minkowski Force.

Reference Books

1. Complex Variables, Schuam's Outline Series, 2nd ed, M.R. Spiegel, S. Lipschutz, J.J. Schiller, D. Spellman, McGraw Hill Private Ltd.
2. Complex Variables and Applications, J.W. Brown and R.V. Churchill, 7th Ed. 2003, Tata McGraw-Hill
3. Classical Mechanics , N.C. Rana and P. Joag, McGraw Hill Education
4. Classical Mechanics, Goldstein, Poole & Safco, Pearson Education
5. Introduction to Special Relativity, R. Resnick, 2010, John Wiley and Sons
6. Theoretical Physics 4, Special Theory of Relativity, Wolfgang Nolting, Springer
7. Introduction to Electrodynamics, D.J. Griffiths, 3rd Ed., Pearson Education

Additional Reference Books

Books on Complex Variables

1. Complex Variables, A.S.Fokas and M.J.Ablowitz, 8th Ed., 2011, Cambridge Univ. Press
2. Complex Variables, A.K. Kapoor, 2014, Cambridge Univ. Press
3. Complex analysis , D.G. Zill and P.D. Shanahan, 2015 Jones and Bartlett

Books on variational principle and mechanics

1. Classical Mechanics: Systems of Particles and Hamiltonian Dynamics. W. Greiner, 2004, Springer
2. Classical Mechanics. J.R. Taylor, 2005, University Science Books
3. Classical Mechanics, Goldstein, Pearson Education

4. Mechanics: Volume 1, Landau & Lifshitz, Butterworth-Heinemann
5. The Variational Principles of Mechanics, C. Lanczos , 1986, Dover Publications Inc
6. Classical Mechanics, A course of Lectures, A.K. Raychaudhuri, 1983, Oxford University Press

Books on relativity

1. Relativity - The Special and General Theory, A. Einstein, Methuen and Co. Ltd., 1920
2. Special Relativity (MIT Introductory Physics). A.P. French, 2018, CRC Press
3. Special Relativity: For the Enthusiastic Beginner , D. Morin, 2017, Createspace Independent Pub
4. The Special Theory of Relativity, Banerji and Banerjee 2nd Ed., PHI Learning Private Ltd.
5. Introduction to Special Relativity , J.H. Smith, 2003, Dover Publications Inc
6. The Special Theory of Relativity , D. Bohm, 2006, Routledge
7. It's About Time Understanding Einstein's Relativity, N.D. Mermin, Princeton University Press
8. Classical Electrodynamics, J.D. Jackson, 2007, Wiley

4.1.2 Mathematical Physics III (Practical)

Paper: PHS-A-CC-4-8-P **Credit: 2**

1. Exploring Gaussian Integrals and the delta function **3 Lectures + 8 Classes**

- Numerically handling improper integrals over infinite intervals
- Numerically verifying the Gaussian integral result

$$\int_{-\infty}^{\infty} \exp\left(-ax^2+bx+c\right) = \sqrt{\frac{\pi}{a}} \exp\left(\frac{b^2}{4a}+c\right)$$

- Verifying that the convolution of two Gaussian function is a Gaussian
- Verifying that $\int_{a-x_1}^{a+x_2} \delta(x-a) f(x)\, dx = f(a)$ using different limiting representation of $\delta(x)$.

2. Solution of Differential Equation **3 Lectures + 6 Classes**

First order and 2nd order ODE by scipy.integrate.odeint().

3. Special functions **3 Lectures + 6 Classes**

Use of special functions taken from scipy.special. Plotting and verification of the properties of special functions. Orthogonality relations and recursion relations. Examples,

(a) $zJ'_\nu(z) + \nu J_\nu(z) = zJ_{\nu-1}(z)$

(b) $\left(1-x^2\right) P'_n(x) + (n+1)\, xP_n(x) - (n+1)\, P_{n+1}(x)$

(c) $\int_{-\infty}^{\infty} P_n(x)\, P_m(x)\, dx = \frac{2}{2n+1}\delta_{mn}$

4. Solution of some basic PDEs **5 Lectures + 20 Classes**

(a) Boundary value problems. Finite discrete method with fixed step sizes. Idea of stability. Application to simple physical problems.

(b) Laplace equation $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$, on a square grid with specified potential at the boundaries.

(c) Wave equation in 1+1 dimension: $\frac{\partial^2\phi}{\partial t^2} = \lambda\frac{\partial^2\phi}{\partial x^2}$. Vibration of a string with ends fixed with given initial configurations: $\phi(x,0)$ and $\frac{\partial\phi}{\partial t}(x,0)$.

(d) Heat equation in 1+1 dimension, $\frac{\partial u}{\partial t} = \alpha\frac{\partial^2 u}{\partial x^2}$ with specified value of temperature at the boundaries with given initial temperature at the boundaries with given initial temperature profile.

5. Fourier Series **2 Lectures + 4 Classes**

Evaluate the Fourier coefficients of a given periodic function using scipy.integrate.quad(). Examples: square wave, triangular wave, saw-tooth wave. Plot to see a wave form from scipy.signal and the constructed series along with.

Reference Books

1. Numerical Analysis, Mathematics of Scientific Computing, David Kincaid, Ward Cheney, Reprint First Indian Edition 2013, American Mathematical Society
2. Numerical Methods for Engineers, 2nd Edition, D.V. Griffiths and I.M. Smith, , Chapman & Hall/CRC, Special Indian Edition
3. An Introduction to computational Physics, T.Pang, 2nd Edn., 2006,Cambridge Univ. Press
4. Scientific Computing in python, Avijit Kar Gupta, Techno World
5. Computational Physics problem solving with Computers, Landau, Paez, Bordeianu etextbook in Python 3rd Edition
6. Computational Methods for physcs, Joel Franklin, Cembridge University Press
7. Programming for Computation-Python, Svein Linge, Hans Petter Lantangen, Springer
8. Numerical Python, Robert Johansson, Apress Publication

4.2 Analog Electronics

4.2.1 Analog Systems and Applications (Theory)

Paper: PHS-A-CC-4-9-TH	**Credits: 4**

1. Circuits and Network **4 Lectures**

Discrete components, Active & Passive components, Ideal Constant voltage and Constant current Sources. Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, Maximum Power Transfer theorem. Applications to dc circuits.

2. Semiconductor Diodes and application **8 Lectures**

(a) P and N type semiconductors. Energy Level Diagram. Conductivity and Mobility, Concept of Drift velocity. PN Junction Fabrication (Simple Idea). Barrier Formation in PN Junction Diode. Static and Dynamic Resistance.

Current Flow Mechanism in Forward and Reverse Biased Diode. Drift Velocity. Derivation for Barrier Potential, Barrier Width and Current for Step Junction.

(b) Rectifier Diode: Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers, Calculation of Ripple Factor and Rectification Efficiency, L and C filter. Circuit and operation of clipping and clamping circuit.

(c) Principle and structure of

- LEDs
- Photodiode
- Solar Cell
- Varactor diode

3. Bipolar Junction transistors and biasing **10 Lectures**

(a) n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Configurations. Physical Mechanism of Current Flow. Current gains α and β, Relations between them. Active, Cut-off and saturation Regions. DC Load line and Q-point.

(b) Transistor Biasing and Stabilization Circuits; Fixed Bias, collector to base bias, emitter or self bias, voltage Divider Bias. Transistor as 2 port Network. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance.

4. Field Effect transistors **5 Lectures**

JFET and MOSFET (both depletion and enhancement type) as a part of MISFET. Basic structure & principle of operations and their characteristics. Pinch off, threshold voltage and short channel effect.

5. Regulated power supply **3 Lecture**

Load regulation and line regulation. Zener diode as a voltage regulator. The problem with the zener regulator circuit. Requirement of feedback and error amplifier. Study of series regulated power supply using pass and error transistor assisted by zener diode as a reference voltage supplier.

6. Amplifiers **5 Lectures**

Transistor amplifier; CB, CE and emitter follower circuit and their uses. Load Line analysis of Transistor amplifier. Classification of Class A, B & C Amplifiers with respect to placement to Q point. Frequency response of a CE amplifier. The role of series and parallel capacitors for cut off frequencies. The idea about the value of coupling and bypass capacitor with respect to lower cut-off frequencies. Miller capacitance and its role in higher cut-off frequency.

7. Feedback amplifiers and OPAMP **15 Lectures**

(a) Effects of Positive and Negative Feedback. Voltage series, current series, voltage shunt and current shunt feedback and uses for specific amplifiers. Estimation of Input Impedance, Output Impedance, Gain, Stability, Distortion and Noise for voltage series feedback

(b) Operational Amplifiers (Black Box approach): Characteristics of an Ideal and Practical Op-Amp. (IC 741) Open-loop and Closed-loop voltage Gain. Frequency Response. CMRR. Slew Rate and concept of Virtual ground.

(c) Application of OPAMP:

D.C. Application:

- Inverting and non-inverting amplifiers
- Inverting and non inverting Adder

- Differentiator as Subtractor
- Logarithmic & anti logarithmic amplifiers
- Error amplifier
  - Comparator
  - Schmidt Trigger

A.C. Application:

- Differentiator
- Integrator

8. Multivibrator: **5 Lectures**

Transistor as a switch, Explanation using CE output characteristics. Calculation of component values for a practical transistor switch. Transistor switching times, use of speed up capacitor (Physical explanation only) Construction and operation, using wave shapes of collector coupled Bistable, Monostable andAstable Multivibrator circuits, Expression for time period.

9.Oscillators **5 Lectures**

Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator, Wein Bridge oscillator, determination of feedback factor and frequency of oscillation. Reactive network feedback oscillators: Hartley's & Colpitt's oscillators. Relaxation oscillator using OPAMP.

Reference Books

1. Circuits and Networks, Analysis and Synthesis, A Sudhakar, Shyammohan S Palli, Tata McGraw Hill Education Private Ltd.
2. Solid State Electronic Devices, B.G.Streetman & S.K.Banerjee, 6th Edn.,2009, PHI Private Ltd.
3. Fundamental Principles of Electronics, B Ghosh, 2nd ed, 2008, Books & Allied (P) Ltd.
4. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata McGraw Hill Education Private Ltd.
5. Electronics: Fundamentals and Applications, J.D. Ryder,2004, Prentice Hall India Private Ltd.
6. Learning OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition,2000, Prentice Hall India Private Ltd.

Additional Reference Books

1. Electronic Devices and Circuit Theory, R.L. Boylestad, L. Nashelsky, PHI Private Ltd.
2. Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6th Edn., Oxford University Press
3. Electronic circuits: Handbook of design & applications, U.Tietze, C.Schenk,2008, Springer

4. Semiconductor Devices: Physics and Technology, S.M. Sze, 2nd Ed., 2002, Wiley India

5. Microelectronic Circuits, M.H. Rashid, 2nd Edition, Cengage Learning

6. Electronic Devices, Thomas L. Floyd, 7/e 2008, Pearson India

7. Microelectronics, Jacob Millman, Arvin Grabel, Tata McGRAW Hill

8. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, McGraw Hill Education Private Ltd.

4.2.2 Analog Systems and Applications (Practical)

Paper: PHS-A-CC-4-9-P	**Credits: 2**

List of Practicals

1. To study the reverse characteristics of Zener diode and study the load and line regulation.

2. To study the static characteristics of BJT in CE Conguration.

3. To design and study the frequency response of the BJT amplifier in CE mode.

4. Construction of a series regulated power supply from an unregulated power supply.

5. To study OPAMP: inverting amplifer, non inverting amplier, adder, substractor, comparator, Schmitt trigger, Integrator, differentiator, relaxation oscillator.

6. To design a Wien bridge oscillator for given frequency using an op-amp.

Reference Books

1. Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill

2. Advanced Practical Physics (volume II), B. Ghosh , Shreedhar Publication

3. An Advanced Course in Practical Physics, D. Chattopadhyay, P.C. Rakshit, New Central Book Agency (P) Ltd

4. Laboratory Manual for Operational Amplifiers and Linear ICs, David A. Bell, Prentice Hall of India Pvt Ltd.

.

4.3 Quantum Mechanics

4.3.1 Quantum Mechanics (Theory)

Paper: PHS-A-CC-4-10-TH	**Credit: 4**

1. Wavepacket description **5 Lectures**

Description of a particle using wave packets. Spread of the Gaussian wave-packet for a free particle in one dimension. Fourier transforms and momentum space wavefunction. Position-Momentum uncertainty.

2. General discussion of bound states in an arbitrary potential **8 Lectures**

Continuity of wave function, boundary condition and emergence of discrete energy levels. Application to one dimensional square well potential of finite depth.

3. Quantum mechanics of simple harmonic oscillator **6 Lectures**

Setting up the eigenvalue equation for the Hamiltonian. Energy levels and energy eigenfunctions in terms of Hermite polynomials (Solution to Hermite differential equation may be assumed). Ground state, zero point energy & uncertainty principle.

4. Quantum theory of hydrogen-like atoms **8 Lectures**

Reduction of a two body problem to a one body problem. The time independent Schrodinger equation for a particle moving under a central force, the Schrodinger equation in spherical polar coordinates. Separation of variables. Angular equation and orbital angular momentum. Spherical Harmonics (Solution to Legendre differential equation may be assumed). Radial equation for attractive coulomb interaction - Hydrogen atom. Solution for the radial wavefunctions (Solution to Laguerre differential equation may be assumed). Shapes of the probability densities for ground & first excited states. Orbital angular momentum quantum numbers l and m; s, p, d shells.

5. Generalized Angular Momenta and Spin **10 Lectures**

(a) Generalized angular momentum. Electron's magnetic Moment and Spin Angular Momentum. $\mathbf{J} = \mathbf{L} + \mathbf{S}$. Gyromagnetic Ratio and Bohr Magneton and the g factor. Energy associated with a magnetic dipole placed in magnetic field. Larmor's Theorem. Stern-Gerlach Experiment.

(b) Addition of angular momenta - statement only. Allowed values of angular momentum.

6. Spectra of Hydrogen atom and its fine structure **5 Lectures**

(a) Formula for first order nondegenerate perturbative correction to the eigenvalue statement only.

(b) Spin-orbit interaction and relativistic correction to the kinetic energy and Darwin term.

(c) Fine structure of the hydrogen atom spectrum (No rigorous derivation is required).

7. Atoms in Electric & Magnetic Fields **8 Lectures**

(a) Zeeman Effect: Normal and Anomalous Zeeman Effect (Formula for first order perturbative correction to the eigenvalue to be assumed). (b) Paschen Back effect & Stark effects (Qualitative Discussion only).

8. Many electron atoms **10 lectures**

(a) Identical particles. Symmetric & Antisymmetric Wave Functions. Pauli's Exclusion Principle. Hund's Rule. Periodic table.

(b) Fine structure splitting. L-S and J-J coupling scheme. Spectral Notations for Atomic States and Term symbols. Spectra of Alkali Atoms (Na etc.).

Reference Books

1. Introduction to Quantum Mechanics, D.J. Griffiths, 2nd Ed. 2005, Pearson Education
2. Quantum Mechanics, Robert Eisberg and Robert Resnick, 2nd Edn., 2002, Wiley.
3. A Text book of Quantum Mechanics, P.M.Mathews and K.Venkatesan, 2nd Ed., 2010, McGraw Hill Private Ltd.

Additional Reference Books

1. Quantum Mechanics, Leonard I. Schiff, 3rd Edn. 2010, Tata McGraw Hill
2. Quantum Mechanics, G. Aruldhas, 2nd Edn. 2002, PHI Learning of India
3. Quantum Mechanics, Bruce Cameron Reed, 2008, Jones and Bartlett Learning
4. Quantum Mechanics for Scientists & Engineers, D.A.B. Miller, 2008, Cambridge University Press
5. Quantum Mechanics, Eugen Merzbacher, 2004, John Wiley and Sons, Inc
6. Quantum Mechanics, Walter Greiner, 4th Edn., 2001, Springer

.

4.3.2 Quantum Mechanics (Practical)

Paper: PHS-A-CC-4-10-P **Credit:2**

1. Finding eigenstates solving transcendental equation **3 Lectures + 6 Classes**

To find eigenvalues of the bound state particle of mass in a one dimensional potential well by solving the transcendental equation that appears as the eigenvalue condition (graphs are to be plotted for appropriate guess values, scipy root searching package may be used) and to plot the eigenfunctions.

2. Use of shooting algorithm **7 Lectures + 20 Classes**

Shooting algorithm for solving bound state problems (solving the ode using both Euler and Numerov algorithms) : conversion to dimensionless variable, eigenvalues and eigenvectors of the ground and first excited states.

- in one dimension (for example, the Harmonic oscillator, the Morse potential, the triangular well etc.)
- the s wave radial equation for a particle moving in a central potential, $\frac{d^2U(r)}{dr^2} = A(r)U(r)$ where $A(r) = \frac{2m}{\hbar^2}[V(r) - E]$
  some Examples

  - ☐ $V(r) = -\frac{e^2}{r}$
  - ☐ $V(r) = -\frac{e^2}{r}e^{-r/a}$

- ☐ $V(r) = \frac{1}{2}kr^2 + \frac{1}{3}br^3$
- ☐ $V(r) = D\left(e^{-2\alpha r'} - e^{-\alpha r'}\right)$, where $r' = \frac{r-r_0}{r}$

3. Time Evaluation of Wave Packet **6 Lectures + 18 Classes**

- Time evolution of a wave packet moving in free space by the numerical solution of the time dependent Scrödinger equation.
- Solving the TDSE to study Barrier penetration and tunneling for an initially Gaussian wavepacket.

Reference Books

1. An Introduction to computational Physics, T.Pang, 2nd Edn., 2006,Cambridge Univ. Press
2. Scientific Computing in Python, Abhijit Kar Gupta, Techno World
3. Computational Physics problem solving with Computers, Landau, Paez, Bordeianu etextbook in Python 3rd Edition
4. Computational Methods for physcs, Joel Franklin, Cembridge University Press
5. Computational Quantum Mechanics, Joshua Izaac, Jingbo Wang, Springer

SEC B -1 (Technical Skill)

4.4 Arduino (Project type)

4.4.1 Arduino

Paper PHS-A-SEC-B-TH	**Credit 1**

1. Introduction to Arduino **2 Lectures**

Brief history of the Arduino; open-source electronics prototyping.

2. Basic ideas **3 Lectures**

Basic ideas of Arduino, Familiarize the Arduino board, Setting up the arduino board. Installation of IDE in PC/ laptop for Arduino programming(Sketch)

3. Arduino Programming: **10 Lectures**

(a) Program structure:

data types, variables and constants, operators, control statements, loops, functions, string.

(b) Interfacing:

serial communication, digital and analog input/output, getting input from sensors(e.g. temperature sensor, ultrasonic sensor etc)

Books and references

1. Arduino Cookbook, Michael Margolis, O'Reilly Media (2011)
2. Getting Started with Arduino, Massimo Banzi, O'Reilly Media(2009)
3. Arduino as a tool for physics experiments, Giovanni Organtini 2018 J. Phys.: Conf. Ser. 1076 012026
4. https://www.arduino.cc/en/Guide/HomePage
5. Physics Today 66, 11, 8 (2013); https://doi.org/10.1063/PT.3.2160
6. The Physics Teacher 52, 157 (2014); https://doi.org/10.1119/1.4865518

4.4.2 Practical Projects

Paper PHS-A-SEC-B-PR	**Credit 1**

1. LED Blinking and fading.

2. Measurement of voltages (Below 5 V and above).

3. Interfacing 7 Segment display.

4. Construction of thermometer using LM35 or Others.

5. Construct the experimental set up for studying simple pendulum and hence determine the acceleration's due to gravity.

6. Construct data logger for studying charging and discharging of RC circuit.

NOTE: Software required: Arduino Integrated Development Environment, Hardware required: Arduino Uno

SEC B -2 (Knowledge Skill)

4.5 Electrical Circuits and Network skills (Theory)

PHS-A SEC-B -TH	**Credit 2**

1. DC generator : **10 Lectures**

(a) EMF generated in the armature for simplex lap and wave winding, concept of pole, Methods of Excitation, Armature reaction, Dc motor : Torque equation of D.C motor, speed& torque Operating Characteristics of separately excited, Shunt, Series &Compound motors with emphasis on application areas.

(b) Three phase generator, concept of stator and rotor, star and delta connections – their current voltage relationships (both line and phase current & voltage).

2. Transformer : **5 Lectures**

Types of transformer, basic emf equation, no load current, leakage inductance, Magnetising current and equivalent circuit of single phase transformer on no-load and on load, idea of star/star, star/delta, delta/star, and zig-zag connection of 3 phase transformer, 3 phase to 2 phase transformation, Scott T connection.

3. AC motor **6 Lectures**

(a) Single phase AC motor – double field revolving theory, slip-speed characteristics,

(b) Construction of 3 phase induction motor and its action using rotating field theory, equivalent circuit of induction motor, Speed control by V/f control of induction motor (block diagram only).

4. Measurements and faults **9 Lectures**

(a) Measurement of three phase power by two and three wattmeter method,theory of induction type wattmeterand its use as energy meter in domestic house. Megger.

(b) Unsymmetrical faults in distribution system, Common switchgear equipments like relay, circuit breakers and fuses, Simple oil circuit breaker and SF6 circuit breaker, Construction of protective relay in distribution bus-bar system, Block diagram of a utility distribution sub-station.

Reference Books

1. Text book on Electrical Technology (vol 1 & 2), Thereja and Thereja
2. Power System, V. K. Meheta
3. Electrical Machines, S. K. Bhattacharya

Honours: Semester 5

CC 11, CC 12, DSE A1, DSE B1

CC 11	Electromagnetic Theory Credit 6	Theory Credit 4 Classes 60	Practical Credit 2 Classes 60
CC 12	Statistical Physics Credit 6	Theory Credit 4 Classes 60	Practical Credit 2 Classes 60
DSE A 1	(a) Advanced Mathematical Methods Or (b) Laser and Fiber Optics Credit 6	Theory Credit 5 Classes 75	Tutorial Credit 1 Classes 15
DSE B 1	(a) Astronomy and Astrophysics Or (b) Nuclear and particle Physics Credit 6	Theory Credit 5 Classes 75	Tutorial Credit 1 Classes 15

5.1 Electromagnetic Theory

5.1.1 Electromagnetic Theory (Theory)

Paper: PHS-A-CC-5-11-TH **Credit: 4**

1.Maxwell Equations **12 Lectures**

Review of Maxwell's equations. Vector and Scalar Potentials. Gauge Transformations: Lorentz and Coulomb Gauge. Boundary Conditions at Interface between Different Media. Wave Equations. Plane Waves in Dielectric Media. Poynting Theorem and Poynting Vector. Electromagnetic (EM) Energy Density. Physical Concept of Electromagnetic Field Energy Density, Momentum Density and Angular Momentum Density.

2. EM Wave Propagation in Unbounded Media **10 Lectures**

Plane EM waves through vacuum and isotropic dielectric medium, transverse nature of plane EM waves, refractive index and dielectric constant, wave impedance. Propagation through conducting media, relaxation time, skin depth.

3. EM Wave in Bounded Media **10 Lectures**

Boundary conditions at a plane interface between two media. Reflection & Refraction of plane waves at plane interface between two dielectric media. Laws of Reflection & Refraction. Fresnel's formulae for perpendicular & parallel polarization cases, Reflection & Transmission coefficients, Brewster's law. Total internal reflection, evanescent waves. Metallic reflection (normal Incidence).

4. Polarization **7 Lectures**

Description of Linear, Circular and Elliptical Polarization. Propagation of E.M. Waves in birefringent medium.

5. Polarization in uniaxial crystals **15 Lectures**

Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction. Nicol Prism. Ordinary & extraordinary refractive indices. Phase Retardation Plates: Quarter-Wave and Half-Wave Plates. Production & analysis of polarized light. Babinet Compensator and its Uses.

6. Rotatory polarization **6 Lectures**

Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of optical rotation. Calculation of angle of rotation. Experimental verification of Fresnel's theory. Specific rotation. Laurent's half-shade and biquartz polarimeters.

Reference Books

1. Introduction to Electrodynamics, D.J. Griffiths, 3rd Ed., Pearson Education
2. Optics, E. Hecht, 2016, Pearson Education
3. Elements of Electromagnetics, M.N.O. Sadiku, 2001, Oxford University Press
4. Introduction to Electromagnetic Theory, T.L. Chow, 2006, Jones & Bartlett Learning
5. Fundamentals of Electromagnetics, M.A.W. Miah, 1982, Tata McGraw Hill

Additional Books for Reference

1. Electromagnetic field Theory, R.S. Kshetrimayun, 2012, Cengage Learning
2. Engineering Electromagnetic, Willian H. Hayt, 8th Edition, 2012, McGraw Hill
3. Electromagnetic Field Theory for Engineers & Physicists, G. Lehner, 2010, Springer
4. Electromagnetic Fields & Waves, P.Lorrain & D.Corson, 1970, W.H.Freeman & Co
5. Electromagnetics, J.A. Edminster, Schaum Series, 2006, Tata McGraw Hill
6. Electromagnetic field theory fundamentals, B. Guru and H. Hiziroglu, 2004,Cambridge University Press
7. Advanced Engineering Electromagnetics , C.A. Balanis, 2012, John Wiley & Sons
8. Electromagnetic Field Theory, Bo Thide, 2011, Dover Publications
9. Optical Electronics, Ajoy Kumar Ghatak , K. Thyagarajan, Cambridge University Press
10. Problems And Solutions In Electromagnetics, Ajoy Ghatak K. Thyagarajan R. K. Varshney, Viva Books

5.1.2 Electromagnetic Theory (Practical)

Paper: PHS-A-CC-5-11-P	**Credit: 2**

List of Practicals

1. To determine Brewster's angle for air-glass interface using a prism.

2. To study Fresnels law by the reflection on the surface of a prism.

3. To verify the Malus law using a pair of polaroids.

4. To study the specific rotation of optically active solution using polarimeter.

5. To determine dispersive power and resolving power of a plane diffraction grating

Reference Books

1. Advanced Practical Physics (Vol 1 & Vol 2), B. Ghosh, K. G. Majumder, Sreedhar Publication

5.2 Statistical Physics

5.2.1 Statistical Physics (Theory)

Paper: PHS-A-CC-5-12-TH	**Credit: 4**

1. Classical Statistical Mechanics **25 Lectures**

(a) Macrostate & Microstate, Elementary Concept of Ensemble and Ergodic Hypothesis (statement only). Phase Space.

(b) Microcanonical ensemble, Postulate of Equal a-priori probabilities. Boltzmann hypothesis: Entropy and Thermodynamic Probability.

(c) Canonical ensemble, Partition Function, Thermodynamic Functions of an Ideal Gas, Classical Entropy Expression, Gibbs Paradox. Equivalence of microcanonical and canonical ensemble.

(d) Sackur Tetrode equation, Law of Equipartition of Energy (with proof) Applications to Specific Heat and its Limitations. Thermodynamic Functions of a Two-Energy Level System. Negative Temperature.

(e) Grand canonical ensemble. Application of ideal gas using grand canonical ensemble. chemical potential.

2. Systems of Identical particles **6 Lectures**

Collection of non-interacting identical particles. Classical approach and quantum approach: distinguishability and indistinguishability. Occupation number and MB distribution, emergence of Boltzmann factor. Composite system postulate and symmetry postulate of quantum mechanics (for a pair of particles only). Bosons and Fermions. Symmetric and Antisymmetric wave functions. state counting for bosons and fermions.

3. Bose-Einstein Statistics **12 Lectures**

B-E distribution law. Thermodynamic functions of a strongly degenerate Bose Gas, Bose Einstein condensation and properties of liquid He IV (qualitative description only).

4. Radiation: classical and quantum aspects **7 Lectures**

(a) Spectral Distribution of Black Body Radiation. Rayleigh-jeans law, UV catastrophe, Planck's Quantum Postulates. Planck's Law of Blackbody Radiation: Experimental Verification. Deduction of Rayleigh- Jeans Law, Stefan-Boltzmann Law, Wien's Displacement law from Planck's law.

(b) Bose derivation of Planck's law. Radiation as a photon gas and Thermodynamic functions of photon gas. chemical potential of photon gas.

5. Fermi-Dirac Statistics **10 Lectures**

Fermi-Dirac Distribution Law. Thermodynamic functions of strongly Degenerate Fermi Gas, Fermi Energy, Electron gas in a Metal, Specific Heat of Metals due to electrons.

Reference Books

1. Introductory Statistical Mechanics , R. Bowley and M. Sanchez, 2007, Oxford Science Publications.
2. Statistical Physics, Berkeley Physics Course, F. Reif, 2008, Tata McGraw- Hill Publishing Company Ltd.
3. Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press
4. Statistical Physics, F. Mandl, 2014, Wiley India Pvt. Ltd.
5. An Introduction to Thermal Physics, D.V. Schroeder, 2014, Pearson Education, India
6. Thermal Physics, Garg, Bansal, Ghosh, Tata McGraw- Hill Publishing Company Ltd.

Additional Reference Books

1. Statistical Mechanics, R.K. Pathria, Butterworth Heinemann: 2nd Ed.,1996, Oxford University Press
2. Statistical and Thermal Physics, S. Lokanathan and R.S. Gambhir. 1991, Prentice Hall
3. Thermodynamics, Kinetic Theory and Statistical Thermodynamics, Francis W. Sears and Gerhard L. Salinger, 1986, Narosa
4. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer
5. An Introduction to Statistical Mechanics & Thermodynamics, R.H. Swendsen, 2012, Oxford Univ. Press
6. Statistical Mechanics an elementary outline, A. Lahiri, 2008, Universities Press
7. Intermediate Statistical Mechanics. J. Bhattacharjee and D. Banerjee, 2017, World Scientific (HBA)
8. An Introductory Course of Statistical Mechanics. P.B. Pal,2008, Narosa
9. Thermal Physics, Kittel and Kroemer, 1980, W. H. Freeman
10. Elementary Statistical Physics , Kittel, 2004, Dover Publications
11. Thermodynamics and Statistical Mechanics, W. Greiner, 2001, Springer

5.2.2 Statistical Mechanics (Practical)

Paper: PHS-A-CC-5-12-P	**Credit: 2**

1. Study of Random Numbers and Time series **5 Lectures + 15 Classes**

Introduction to the numpy.random() module

- Histogram (by matplotlib.pyplot.hist) and autocorrelation function of a given time series.
- Generating exponential variates from uniform variate using transformation
- Gaussian variate from uniform variate using central limit theorem.
- Study of histogram and moments of random sequences of different probability density using numpy.random.

2. Applications of Random Numbers **8 Lectures + 20 Classes**

- Coin tossing. Fit with binomial distribution.
- Nuclear Decay: Simulation assuming a constant decay probability per unit time.
- Random Walk:
  - In 1D and in 2D (Square grid)
  - Plot of r.m.s. value of end to end distance as a function of time step
  - fitting and finding of exponent
- Monte Carlo Integration

3. Scaling and plots, exponents and parameters: **4 Lectures + 8 Classes**

Laws and distributions from Statistical Mechanics
Some Problems

- Maxwell-Boltzmann distribution
- Bose-Einstein distribution
- Fermi-Dirac distribution
- Plot of specific Heat of Solids
  - Dulong-Petit law
  - Einstein distribution function
  - Debye distribution function for high temperature and low temperature and compare them for these two cases

Reference Books

1. Introduction to Modern Statistical Mechanics, D. Chandler, Oxford University Press, 1987

2. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer

3. Statistical and Thermal Physics with computer applications, Harvey Gould and Jan Tobochnik, Princeton University Press, 2010

4. Scientific Computing in Python. Abhijit Kar Gupta, Techno World

5. Computatioal Physics problem solving with Computers, Landau, Paez, Bordeianu etextbook in Python 3rd Edition

6. Computational Methods for physcs, Joel Franklin, Cembridge University Press

DSE A1 (a)

5.3 Advanced Mathematical Methods (Theory)

Paper: PHS-A-DSE-A1-TH	**Credits: 5 (+1 for Tutorial)**

1. Linear Algebra and Vector Space **30 Lectures**

(a) Abstract systems. Binary operations and relations. Introduction to Groups and Fields. Vector spaces over real and complex fields. Subspaces. Homomorphism and isomorphism of Vector Spaces. Linear independence and dependence of vectors. Completeness of a set of vectors. Basis and dimension of a vector space.

(b) Inner product space. Norm (defined in terms of inner product). Orthogonality. Orthonormal basis. Gram-Schmidt orthogonalisation - proof that an orthonormal basis always exists. Schwarz inequality. Linear functionals on a vector space. Addition and multiplication by scalars on linear functionals. Dual space. Bra and ket vectors and the bra-ket notation. Dual basis. Construction of bra from ket and vice-versa.

(c) Linear operators. Consequences of linearity: Action of an operator on the whole space in terms of its action on the basis vectors. Representation of linear operators by matrices. Transformation of representations under change of basis. Algebra of linear operators. Singular and non-singular operators (with examples). The adjoint or hermitian conjugate of an operator. Hermitian, orthogonal and unitary operators with examples. Projection operators.

(d) Eigenvalues and eigenvectors of an operator - non-degenerate and degenerate cases. Hermitian and unitary operators; reality and unimodularity of eigenvalues. Condition of diagonalizability. Normal operators. Commuting operators and simultaneous eigenstates for non-degenerate and degenerate eigenvalues. Complete sets of commuting operators.

(e) Tensor products of inner product spaces. Tensor products of vectors and operators.

2. Tensors **20 Lectures**

(a) Introduction of the Levi-Civita symbol and its uses in deriving the vector identities. The summation convention.

(b) Cartesian tensors in 3-d: Definition of a tensor, tensor algebra, sum, difference, and outer product of two tensors. Contraction, quotient law, symmetric and antisymmetric tensors. Krönecker tensor. Isotropic tensors. Tensorial Character of Physical Quantities. Examples of index contraction: triple products of vectors, divergence of tensors. Construction of the moment of inertia tensor I_{ij}, its properties, principal moments and axes of inertia, parallel and perpendicular axis theorem, relation of I_{ij} with scalar moment of inertia. Metric tensor in cartesian and curvilinear coordinates. Introduction to stress tensor.

(c) Tensors in $3+1$ dimensional space-time: Definition in terms of Lorentz transformation, Metric tensor in Minkowski space-time and invariant interval, contravariant and covariant tensors, contraction of tensors (example: four-divergence and equation of continuity, mass-energy relationship). Introduction to $F^{\mu\nu}$ and evaluation of its components from the definition of electric and magnetic fields, Lorentz transformation of $\mathbf{E}$ and $\mathbf{B}$, $\partial_\mu F^{\mu\nu} = j^\nu$ as Maxwell's equations with a source term. (Introduction of dual tensor not needed.)

3. Group Theory **25 Lectures**

(a) Definition of groups with examples. Uniqueness of identity and inverse. Discrete groups (Z_n, symmetry and permutation groups) and continuous groups ($O(n)$, $SO(n)$, $U(n)$, $SU(n)$). Abelian and non-abelian groups.

(b) Discrete groups: Multiplication table, rearrangement theorem. Conjugacy relations and classes. Subgroups. Homomorphism (example: Z_2 with Z_4) and isomorphism (example: 3-object permutation group S_3 with symmetry group of an equilateral triangle C_3) of groups. Matrix representations of groups: Reducible and irreducible representations.

(c) Lie groups and Lie algebras: Compactness, continuous connection to identity, representation by unitary matrices. Generators and their representation by hermitian matrices. Algebra of generators. Jacobi identity for generators. Non-abelian Lie groups and structure constants, their properties. Abelian invariant subalgebras and semisimple Lie groups. Real and complex representations. Fundamental and adjoint representations.

(d) $SU(2)$: Algebra, fundamental and adjoint representations. Connection with the angular momentum algebra. Decomposition of a higher dimensional representation into irreducible representations: spin singlet and triplet states as example of $\mathbf{2} \otimes \mathbf{2} = \mathbf{3} \oplus \mathbf{1}$. Combination of two angular momentum states and Clebsch-Gordan coefficients.

(e) $SO(3)$: Identification as the group of 3-d rotation, algebra, homomorphism with $SU(2)$.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Mathematical Methods for Physicists: Weber and Arfken, 2005, Academic Press
2. Mathematical Methods for Physicists: A Concise Introduction: Tai L. Chow, 2000, Cambridge Univ. Press
3. Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press
4. Mathematics for Physicists, P. Dennery and A. Krzywicki, 1967, Dover Publications
5. Linear Algebra, S. Lipschutz and M.L.Lipson, Schaums Outline Series, 2009 McGraw Hill
6. Introduction to Electrodynamics, D.J. Griffiths, 3rd Ed., Pearson Education
7. Classical Electrodynamics, J.D. Jackson, 2007, Wiley
8. Elements of Group Theory for Physicists by A. W. Joshi, 1997, John Wiley
9. Lie Algebras in Particle Physics, H.Georgi, 2009

Additional Reference Books

1. Linear Algebra and Its Applications, G. Strang, 2005, Cengage Learning
2. Introduction to Mathematical Physics: Methods & Concepts: Chun Wa Wong, 2012, Oxford University Press
3. Introduction to Matrices and Linear Transformations, D.T. Finkbeiner, 1978, Dover Pub
4. Schaums Outline of Tensor Calculus , D. Kay, 2011, McGraw-Hill Education
5. Introduction to Tensor Calculus and Continuum Mechanics, J.H. Heinbockel, 2001, Trafford Publishing

6. An Introduction to Tensor Calculus and Relativity, D.F.Lawden, 2013, Literary Licensing, LLC
7. Group Theory and its Applications to Physical Problems by Morton Hamermesh, 1989, Dover
8. Group Theory in Physics, Volume I & II, J.F.Cornwell, Academic Press, 1984
9. Group Theory In Physics, W.K. Tung, 1985, World Scientific Publishing Co Pvt. Ltd.

DSE A1 (b)

5.4 Laser and Fiber Optics (Theory)

Paper: PHS-A-DSE-A2-TH **Credits: 5 (+1 for Tutorial)**

1.Einstein coefficients and Rate equations **20 Lectures**

Historical background of laser, Einstein coefficients and stimulated light amplification: population inversion. Three level & four level lasers: Rate equation, condition for population inversion and threshold condition. minimum amount of pump power.

2. Basic properties of laser **4 Lectures**

Coherence, directionality, monochromaticity, brightness.

3. Resonantors **8 Lectures**

Optical resonators. Different configurations of optical resonators. stability condition (no derivation required) and stability diagram for optical resonators. Cavity lifetime. The Quality factor.

4. Transient effect **5 Lectures**

Transverse and Longitudinal mode selection. Principle of Q-switching and Mode locking. Different methods of Q-switching : electro-optic Q-switching, Pockels cell .

5. Basic Laser Systems **7 Lectures**

(i) Gas Laser

- He-Ne laser
- CO_2 Laser

(ii) Solid state laser

- Ruby Laser
- Nd:YAG laser
- Semiconductor laser

(iii) Liquid laser: Dye laser.

6. Practical properties and uses of laser **5 Lectures**

(a) The Line-shape function. Various Line broadening mechanisms: collisional broadening , Natural broadening, Doppler broadening.

(b) Basic idea of Laser cooling and trapping.

7. Fiber optics **12 Lectures**

Optical fiber, coherent bundle, Numerical aperture. Attenuation of optical fibers. Ray paths , Ray paths in a homogeneous medium, in square law media. Pulse dispersion in parabolic index medium and in planar step index waveguide. Modes of a planar waveguide: TE and TM modes. Physical understanding of modes, Optical fibers: Guided modes of step-index and graded index fibers. Applications of optical fibers in Communication and Sensing.

8. Holography **4 Lectures**

Principle of Holography. Recording and Reconstruction Method. Theory of Holography between two plane waves. Point source holograms.

9. Introductory Nonlinear Optics **10 Lectures**

Origin of nonlinearity, susceptibility tensor, phase matching, second harmonic generation, Sum frequency generation, Difference frequency generation, Sum and Difference Frequency generation, for second-order nonlinear optical medium. Nonlinear susceptibility of a classical anharmonic oscillator in case of noncentrosymmetric medium.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Lasers: Theory and Applications , A. Ghatak & K. Thyagarajan
2. Principles of Lasers , O. Svelto, 2009, Springer
3. Laser Physics, M. Sargant, M. Scully & W. Lamb , 1974, Westview Press
4. Introduction to Fiber Optics, A. Ghatak, 1998, Cambridge University Press
5. Introduction to Modern Optics, G. Fowles, 1989, Dover Publications
6. Optics, E. Hecht & A. Ganesan, 2009, Pearson Prentice Hall
7. Nonlinear Optics, R. Boyd, 2008, Academic Press

DSE B1 (a)

5.5 Astronomy and Astrophysics (Theory)

Paper: PHS-A-DSE-A2-TH **Credits: 5 (+1 for Tutorial)**

1. Tools of Astronomy **15 Lectures**

(a) Contents of our Universe: basic introduction of stars, galaxies, clusters, interstellar medium, black holes, our own galaxy Milky Way.

(b) Mass, length, time and magnitude scales in astronomy.

(c) Interaction of light and matter fundamentals of radiative transfer (emission, absorption, radiative transfer equation, mean free path, optical depth), thermal radiation and thermodynamic equilibrium (Kirchhoff's law of thermal emission, Boltzmann and Saha equation, thermodynamics of black body radiation, concept of local thermodynamic equilibrium.

(d) Observational tools for multi-wavelength astronomy - telescope as a camera, optical telescopes (refracting and refrecting telescopes), radio telescopes, astronomical instruments and detectors, observations at other wavelengths (infrared, ultraviolet, X-ray and Gamma ray astronomy), all-sky surveys.

2. Stars and stellar systems **25 Lectures**

(a) Properties of stars (distance, brightness, size, mass, temperature, luminosity).

(b) Measurement of stellar parameters: distance parallax, Cepheid variables, nova and supernovae, red shift), stellar spectra, spectral lines, the Hertzsprung-Russell diagram, luminosity and radius, binary system and mass determination, scaling relation on the Main Sequence.

(c) Basic equation of stellar structure hydrostatic equilibrium and the virial theorem, radiative and convective energy transport inside stars, nuclear energy production. Equation of state, opacity, Derivation of scaling relations.

(d) Formation and evolution of stars star formation, pre-main-sequence collapse (gravitational instability and mass scales, collapse of spherical cloud, contraction onto the Main Sequence, Brown Dwarfs), evolution of high-mass and low-mass stars (core and shell hydrogen burning, helium ignition), late-stage evolution of stars, evolution of Sun-like stars and solar system.

(e) End stages of stars white dwarfs (electron-degeneracy pressure, mass-radius relation), neutron stars (mass limit of neutron stars, neutron stars observable as pulsars), black holes as end point of stellar evolution, supernovae.

3. Galaxies and the Universe **10 Lectures**

(a) Milky Way galaxy: components, morphology and kinematics of the Milky way, the galactic center, spiral arms.

(b) Classification and morphology of galaxies - quiet and active galaxies, types of active galaxies, Active Galactic Nuclei (AGN) and Quasars, accretion by supermassive black holes.

4. Cosmology **25 Lectures**

(a) Newtonian cosmology, Olber's paradox, Hubble's law and the expanding Universe, scale factor and comoving coordinate.

(b) Standard cosmology, the Friedmann equations from Newtonian cosmology, fluid equation , equation of state for matter, dust etc. from basic thermodynamics, cosmological redshift, dark matter, dark energy and the accelerating universe, tests and probes of Big Bang cosmology (the Cosmic Microwave Background, primordial nucleosynthesis).

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. An Introduction to Modern Astrophysics, B.W. Carroll & D.A. Ostlie, Addison-Wesley Publishing Co
2. Introductory Astronomy and Astrophysics, M. Zeilik and S.A. Gregory, 4 th Edition, Saunders College Publishing
3. Astrophysics in a Nutshell (Basic Astrophysics), Dan Maoz, Princeton University Press
4. An Invitation to Astrophysics, T. Padmanabhan, World Scientic Publishing Co
5. Foundations of Astrophysics, Barbara Ryden and Bradley M. Peterson, Addison Wesley

Additional Reference Books

1. Astronomy and Astrophysics, A. B. Bhattacharya, S. Joardar, R. Bhattacharya, Overseas Press (India) Pvt. Ltd

2. Astrophysics for Physicists, Arnab Rai Choudhuri, Cambridge University Press

3. Introduction to Astronomy and Cosmology, Ian Morison, John Wiley & Sons Ltd

4. Theoretical Astrophysics, Volume III: Galaxies and Cosmology, T. Padmanabhan, Cambridge University Press

DSE B1 (b)

5.6 Nuclear and Particle Physics (Theory)

Paper: PHS-A-DSE-A2-TH **Credits: 5 (+1 for Tutorial)**

1. Introduction **5 Lectures**

Recapitulation of general properties of nuclei, nuclear models and radioactivity.

2. Nuclear Reactions **10 Lectures**

Types of Reactions, Conservation Laws, kinematics of reactions, Q value, reaction rate, reaction cross section, Concept of compound and direct Reaction, resonance reaction, Coulomb scattering (Rutherford scattering).

3. Interaction of Nuclear Radiation with matter **15 Lectures**

Energy loss due to ionization (Bethe- Block formula), energy loss of electrons, Cerenkov radiation. Gamma ray interaction through matter, photoelectric eect, Compton scattering, pair production, neutron's interaction with matter.

4. Detector for Nuclear Radiations **15 Lectures**

Gas detectors: estimation of electric eld, mobility of particle, for ionization chamber and GM Counter. Basic principle of Scintillation Detectors and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si and Ge) for charge particle and photon detection (concept of charge carrier and mobility), neutron detector.

5. Particle Accelerators **15 Lectures**

Accelerator facility available in India, Different type of accelerators

- Van-de Graaf generator (Tandem accelerator)
- Linear accelerator
- Cyclotron
- Betatron
- Synchrotrons

6. Particle Physics **15 Lectures**

Fundamental particles and their families. Fundamental particle-interactions and their basic features. Gellmann Nishijima formula. Quark structure of hadrons. Symmetries and Conservation Laws: energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness and charm. concept of quark model, color quantum number and gluons.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Introductory nuclear Physics by Kenneth S. Krane (Wiley India Pvt. Ltd., 2008)
2. Concepts of nuclear physics by Bernard L. Cohen. (Tata Mcgraw Hill, 1998)
3. Introduction to Elementary Particles, D. Griffiths, John Wiley & Sons
4. Basic ideas and concepts in Nuclear Physics - An Introductory Approach by K. Heyde (IOP- Institute of Physics Publishing, 2004)
5. Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, 2000)
6. Nuclear Physics, Irving Kaplan, Oxford & IBH Publishing Co. Pvt. Ltd.

Additional Reference Books

1. Introduction to the physics of nuclei & particles, R.A. Dunlap. (Thomson Asia, 2004)
2. Introduction to High Energy Physics, D.H. Perkins, Cambridge Univ. Press
3. Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi
4. Physics and Engineering of Radiation Detection, Syed Naeem Ahmed (Academic Press, Elsevier, 2007)
5. Particle and Nuclei, Povh, Rith, Scholz, Zetsche, 6th Ed., Springer
6. Introduction to Nuclear and Particle Physics, A. Das and T. Ferbel, World Scientific
7. Theoretical Nuclear Physics, J.M. Blatt & V.F.Weisskopf (Dover Pub.Inc., 1991)

Honours: Semester 6

CC 13, CC 14, DSE A2, DSE B2

CC 13	Digital Electronics Credit 6	Theory Credit 4 Classes 60	Practical Credit 2 Classes 60
CC 14	Solid State Physics Credit 6	Theory Credit 4 Classes 60	Practical Credit 2 Classes 60
DSE A 2	(a) Nanomaterials Or (b) Advanced Classical dynamics Credit 6	Theory Credit 5 Classes 75	Tutorial Credit 1 Classes 15
DSE B 2	(a) Communication Electronics Or (b) Advanced Statistical Mechanics Credit 6	Theory Credit 5 Classes 75	Tutorial Credit 1 Classes 15

6.1 Digital Systems and Applications

6.1.1 Digital Systems and Applications (Theory)

Paper: PHS-A-CC-6-14-TH **Credits: 4**

1. Integrated Circuits **5 Lectures**

Principle of Design of monolithic Chip. Advantages and drawbacks of ICs. Scale of integration: SSI, MSI, LSI and VLSI (basic idea and definitions only w.r.t. micron/submicron feature length).

2. Number System **7 Lectures**

Binary Numbers. Decimal to Binary and Binary to Decimal Conversion. BCD, Octal and Hexadecimal numbers. Signed and unsigned number representation of binary system. Representation of negative number. 1's Complement and 2's Complement method of subtraction.

3. Digital Circuits **16 Lectures**

(a) Difference between Analog and Digital Circuits. Introduction of switching algebra, Huntington's postulates. Combinational logic, Truth table. Introduction of basic logic functions AND, OR and NOT. Implementation of OR, AND, NOT Gates (realization using Diodes and Transistor). De Morgan's Theorems. NAND and NOR Gates as

Universal Gates. XOR and XNOR Gates and application as Parity Checkers. Circuit representation of gates (both Usual and IEEE symbols). Introduction to different logics like DTL, TTL, MOS and CMOS. MOS and CMOS inverter circuit. NAND/NOR circuit using MOS logic.

(b) Product term and sum term in logical expression. Sum of Product and Product of Sum and mixed expression. Minterm and Maxterm in the expressions. Conversion between truth table and logical expression. Simplification of logical expression using Karnaugh Map.

4. Implementation of different circuits **6 Lectures**

Half and Full Adders. Subtractors, 4-bit binary adder/Subtractor. Combinational logic circuits using PAL/PLA, use of IC 7483 as adder and subtractor.

5. Data processing circuits **5 Lectures**

Basic idea of Multiplexers, De-multiplexers, Decoders, Encoders.

6. Sequential Circuits: **6 Lectures**

Introduction to Next state present state table, excitation table and truth table for Sequential circuits. SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race condition in SR and Race-around conditions in JK Flip-Flop. M/S JK Flip-Flop, T type FF.

7. Registers and Counters **6 Lectures**

(a) Shift registers: Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel-in-Parallel-out Shift Registers (only up to 4 bits).

(b) Counters (4 bits): Asynchronous counters: ripple counter, Decade Counter. Synchronous Counter, Ring counter.

8. Computer Organization **6 Lectures**

Input/Output Devices. Data storage (idea of RAM and ROM, EPROM). Computer memory. Memory organization & addressing. Memory Interfacing. Memory Map.

9. Data Conversion **3 Lectures**

A/D (Ladder and weighted resistance) and D/A conversion circuit

Reference Books

1. Digital Circuits, Part I & II, D. Raychaudhuri, Eureka Publisher
2. Digital Logic and Computer Design, M. Morris Mano, Pearson Education
3. Digital Principles and Applications, A.P. Malvino, D.P. Leach and Saha, 7th Ed., 2011, Tata McGraw Hill
4. Electronic devices & circuits, S. Salivahanan & N.S. Kumar, 2012, Tata Mc-Graw Hill
5. Fundamental of Digital Circuits, A. Anand Kumar, Prentice Hall India Learning Pvt. Ltd.
6. Digital Systems, Principles and Applications, R. Tocci, N. S. Widemer, Prentice Hall India Learning Pvt. Ltd.
7. Modern Digital Electronics, R. P. Jain, Tata McGrow Hill Publishing Company
8. Digital Electronics An Introduction to Theory and Practice, Prentice Hall India Learning Pvt. Ltd.
9. Digital Computer Electronics, A. Malvino & Jerald Brown, Tata McGrow Hill Publishing Company.

6.1.2 Digital Systems and Applications (Practical)

Paper: PHS-A-CC-6-14-P	**Credits: 2**

List of Practicals

1. To design OR & AND logic with diode and resistor. Basic logic gates with Transistors. To verify the logics by any type of universal gate NAND/NOR.

2. Construction of half adder and full adder

3. Construction of SR, D, JK FF circuits using NAND gates.

4. Construction of 4 bit shift registers (serial & parallel) using D type FF IC 7476.

5. Construction of 4 × 1 Multiplexer using basic gates and IC 74151.

Reference Books

1. Advanced Practical Physics, B. Ghosh, K. G. Majumder, Sreedhar Publication
2. An Advanced Course in Practical Physics, D. Chattopadhyay, P.C. Rakshit, New Central Book Agency (P) Ltd

6.2 Solid State Physics

6.2.1 Solid State Physics (Theory)

Paper: PHS-A-CC-6-13-TH	**Credits: 4**

1. Crystal Structure **12 Lectures**

(a) Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis; Central and Non-Central Elements. Unit Cell. Miller Indices. Reciprocal Lattice. Types of Lattices. Brillouin Zones. Diffraction of X-rays by Crystals. Laue and Bragg's Law and their equivalance. Atomic and Geometrical Structure Factor. Basic idea of crystal indexing: examples with SC, BCC, FCC structure.

2. Elementary Lattice Dynamics **10 Lectures**

(a) Lattice Vibrations and Phonons: Linear Monatomic and Diatomic Chains. Acoustical and Optical Phonons. Qualitative Description of the Phonon Spectrum in Solids. Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids, T^3 law.

3. Magnetic Properties of Matter **8 Lectures**

Dia, Para, Ferri and Ferromagnetic Materials. Classical Langevin Theory of Dia and Paramagnetic Domains. Quantum Mechanical Treatment of Paramagnetism (using parition function). Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss.

4. Dielectric Properties of Materials **8 Lectures**

Polarization. Local Electric Field at an Atom. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mosotti Equation. Classical Theory of Electric Polarizability. Normal and Anomalous Dispersion. Cauchy and Sellmeir relations. Langevin-Debye equation. Complex Dielectric Constant.

5.Drude's theory **4 Lectures**

Free electron gas in metals, effective mass, drift current, mobility and conductivity, Hall effect in metals. Thermal conductivity. Lorentz number, limitation of Drude's theory.

6.Elementary band theory **12 Lectures**

Kronig Penny model. Band Gap. effective mass and effective mass tensor. Conductor, Semiconductor (P and N type) and insulator. Conductivity of Semiconductor, mobility, Hall Effect. Measurement of conductivity (4 probe method) & Hall coefficient.

7. Superconductivity **6 Lectures**

Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect.

Reference Books

1. Introduction to Solid State Physics, Charles Kittel, 8th Edition, 2004, Wiley India Pvt. Ltd.
2. Solid-state Physics, H. Ibach and H. Luth, 2009, Springer Solid State Physics, Rita John, 2014, McGraw Hill
3. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
4. Solid State Physics and Electronics, A.B.Gupta and N.Islam, Books and Allied (P) Ltd
5. Solid State Physics, M.A. Wahab, 2011, Narosa Publications

Additional Reference Books

1. Elements of Solid State Physics, J.P. Srivastava, 4th Edition, 2015, Prentice- Hall of India
2. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill
3. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning
4. The Oxford Solid State Basics, S.H. Simon, 2017, Oxford University Press
5. Solid-State Physics: Introduction to the Theory , J.D. Patterson and B.C. Bailey, 2018 , Springer
6. Solid State Physics, G. Grosso, 2005, Elsevier India
7. Basic Solid State Physics , A. Raychaudhuri, 2014, Sarat Book House
8. Solid State Physics, M.S.Rogalski and S.B. Palmer, 2018, CRC Press

6.2.2 Solid State Physics (Practical)

Paper: PHS-A-CC-5-12-P	**Credits: 2**

List of Practicals

1. To study BH hysteresis of ferromagnetic material

2. To determine dielectric constant of different materials (solid and liquid) using fixed frequency alternating source.

3. Measurement of variation of resistivity in a semiconductor and investigation of intrinsic band gap using linear four probe.

4. Measurement of hall voltage by four probe method

5. To study temperature coefficient of a semiconductor (NTC thermistor) and construction of temperature controller with comperator and relay switch.

6. Measurement of magnetic susceptibility of solids

Reference Books

1. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

2. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House

3. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice Hall of India

DSE A2 (a)

6.3 Nano Materials and Applications (Theory)

Paper: PHS-A-DSE-A2-TH	**Credits: 5 (+1 for Tutorial)**

1. Nanoscale Systems **10 Lectures**

Length scales in physics, Nanostructures: 1D, 2D and 3D nanostructures (nanodots, thin films, nanowires, nanorods), Band structure and density of states of materials at nanoscale, Size Effects in nano systems, Quantum connement: Applications of Schrodinger equation: Infinite potential well, potential step, potential box, quantum confinnement of carriers in 3D, 2D, 1D nanostructures and its consequences.

2. Synthesis of Nanostructure Materials **15 Lectures**

(a) Top down and Bottom up approach, Photolithography. Ball milling. Gas phase condensation.

(b) Vacuum deposition

- Physical vapor deposition (PVD)
- Thermal evaporation
  - Electron beam evaporation
  - Pulsed Laser deposition
- Chemical vapor deposition (CVD)
- MBE growth of quantum dots

(c) Chemical Synthesis

- Chemical bath deposition
- Electro deposition
- Spray pyrolysis
- Hydrothermal synthesis
- Sol-Gel synthesis

- Preparation through colloidal methods

3. Characterization **10 Lectures**

(a) X-Ray Diffraction. Optical Microscopy. Scanning Electron Microscopy (SEM). Transmission Electron Microscopy (TEM). Atomic Force Microscopy (AFM). Scanning Tunneling Microscopy (STM).

4. Optical Properties **15 Lectures**

(a) Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure. Quasi-particles and excitons. Excitons in direct and indirect band gap semiconductor nanocrystals. Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization, absorption, emission and luminescence. Optical properties of heterostructures and nanostructures.

5. Electron Transport **10 Lectures**

(a) Carrier transport in nanostrucutures. Coulomb blockade effect, thermionic emission, tunneling and hoping conductivity. Defects and impurities: Deep level and surface defects.

6. Applications **15 Lectures**

(a) Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells). Single electron transfer devices (no derivation). CNT based transistors. Nanomaterial Devices: Quantum dots heterostructure lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots -magnetic data storage. Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS).

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Introduction to Nanotechnology (Wiley India Pvt. Ltd.), C.P. Poole, Jr. Frank J. Owens
2. Nanotechnology: Principles & Practices, S.K. Kulkarni, (Capital Publishing Company)
3. Introduction to Nanoscience and Technology, K.K. Chattopadhyay and A. N. Banerjee, (PHI Learning Private Limited)
4. Nanotechnology, Richard Booker, Earl Boysen, (John Wiley and Sons)
5. Nanoparticle Technology Handbook (Elsevier, 2007), M. Hosokawa, K. Nogi, M. Naita, T. Yokoyama
6. Introduction to Nanoelectronics, V.V. Mitin, V.A. Kochelap and M.A. Stroscio, 2011, Cambridge University Press
7. Handbook of Nanotechnology, Bharat Bhushan, Springer (Springer-Verlag, Berlin, 2004)

DSE A2 (b)

6.4 Advanced Classical Dynamics (Theory)

Paper: PHS-A-DSE-A2-TH **Credits: 5 (+1 for Tutorial)**

1. Calculus of Variations **30 Lectures**

(a) Definition of a functional : Idea of a functional as a definite integral. Examples: shortest distance between two points in a plane, on a sphere, Brachistochrone problem. Fermat's principle.

(b) Extremization of the Lagrangian to obtain the equation of motion, i.e. the Euler Lagrange equation.

(c) Calculus of variations in presence of constraints: Lagrange's equation for the first kind using undetermined multipliers. Applications using simples examples: block moving on a fixed and freely movable frictionless inclined plane, particle sliding along a cylinder and losing contact etc.

(c) Lagrangian and its formulation for a non-inertial frame; appearance of the centrifugal force and the Coriolis' force from the Lagrangian picture. Lagrangian for charged particle in electromagnetic field and Lorentz force law.

(d) Symmetries and Conservation laws. Virial theorem in classical mechanics.

(e) Formulation of Hamiltonian Mechanics. Basic idea of Poisson bracket and its properties. Hamilton's EOM using Poisson bracket.

2.Small Oscillations **10 Lectures**

Minima of potential energy and points of stable equilibrium, expansion of the potential energy around a minimum, small amplitude oscillations about the minimum, normal modes of oscillations example of 3 identical masses connected in a linear fashion to 2 - identical springs.

3. Rigid Body Motion **10 Lectures**

Idea of rigid body in terms of constraints and degrees of freedom. Combination of translation and rotation as a general motion. Rotation of rigid body about an arbitrary axis; angular momentum, angular velocity, moments of inertia, products of inertia, kinetic energy. Principal axis transformation.

4. Nonlinear Dynamics **25 Lectures**

(a) Definition of a dynamical system. Casting Newton's equation for a particle in the dynamical system form. Autonomous and non autonomous system through examples: free, forced and damped oscillators. Idea of conservative dissipative and anti dissipative systems. Discussion of Mathieu, Duffing, and van der Pol oscillator in this context.

(b) Idea of fixed points in one dimensional problems. Flows. Linear stability analysis. Classification of fixed points through simple examples: both geometrical and linear stability analysis approach should be emphasized.

(c) Canonical forms and their discussions. Associated phase diagrams. Physical examples.

(d) Two dimensional systems and their analysis from the point of view of linear stability. Periodic obits in the form of center and limit cycles. Their stability. Examples: Lotka Volterra (predator-prey), Duffing and Van der Pol oscillator.

(e) One dimensional maps. Idea of fixed point of a map through iterations. Stability of the fixed point and the cobweb plot.Tent and Bernoulli maps. Their graphical representation. Idea of a period two orbit.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Classical Mechanics: A Course of Lectures. A.K. Raychaudhuri, 1983, Oxford University Press
2. Mechanics, L. D. Landau and E. M. Lifshitz, 1976, Pergamon
3. Classical Mechanics, P.S. Joag, N.C. Rana, , McGraw Hill
4. Classical Mechanics, H.Goldstein, C.P. Poole, J.L. Safko, 3rd Edn. 2002, Pearson Education
5. Introduction to Classical Mechanics With Problems and Solutions , D. Morin, 2008, Cambridge University Press
6. Nonlinear Dynamics and Chaos, S.H. Strogatz, Levant Books, Kolkata, 2007
7. Introduction to dynamics , Perceival & Richards, 1983 , Cambridge University Press

8. Introduction to Chaos: Physics and Mathematics of Chaotic phenomena: H. Nagashima & Y. Baba , 1998, CRC Press

9. **Also see book references in core courses of classical mechanics.

DSE B2 (a)

6.5 Communication Electronics (Theory)

Paper: PHS-A-DSE-A1-TH	**Credits: 5 (+1 for Tutorial)**

1. Electronic communication **10 Lectures**

Introduction to communication means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals. Concept of Noise, signal-to-noise (S/N) ratio

2. Analog Modulation **15 Lectures**

(a) Amplitude Modulation, mathematical analysis for modulation index, frequency spectrum and power in AM Generation of AM (Emitter Modulation), Diode/square law modulator, Amplitude Demodulation (diode detector), Balanced modulator for DSB, Concept of Single side band generation and detection, concept of vestigial side band.

(b) Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, Transistor/FET reactance modulator, equivalence between FM and PM, Generation of FM using VCO, FM detector : slope detector, Balanced slope detector, Idea of Phase discriminator and ratio detector, Qualitative idea of IF and Super heterodyne receiver.

3. Analog Pulse Modulation **10 Lectures**

Channel capacity, Sampling theorem, Basic Principles- PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing – FDM and TDM and its application in communication.

4. Digital Pulse Modulation **15 Lectures**

Need for digital transmission, Sampling and Shanon's criteria, Quantization and Encoding, Quantisation error, non-uniform quantisation, Impulse sampling, Natural sampling and flat top sampling, Pulse Code Modulation (PCM), Differential PCM , Digital Carrier Modulation Techniques, Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK).

(b) Idea of 8-PSK, QPSK, BPSK, use of Constellation diagram (idea only), Delta modulation. Concept of companding- A law and μ law. Line Coder: Unipolar and bipolar RZ & NRZ, Manchester format.

5. Introduction to Communication and Navigation systems: **25 Lectures**

(a) Satellite Communication: Introduction, need, Geosynchronous satellite orbits geostationary satellite advantages of geostationary satellites. Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth station. Uplink and downlink.

(b) Mobile Telephony System _ Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only). GPS navigation system (qualitative idea only).

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India
2. Advanced Electronics Communication Systems, Tomasi, 6th edition, Prentice Hall
3. Electronic Communication systems, G. Kennedy, 3rd Edn, 1999, Tata McGraw Hill
4. Principles of Electronic communication systems, Frenzel, 3rd edition, McGraw Hill
5. Communication Systems, S. Haykin, 2006, Wiley India
6. Electronic Communication system, Blake, Cengage, 5th edition
7. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press
8. Communication System by Sanjay Sharma, S.K. Kataria and Sons
9. Electronic Communication: Modulation and Transmission by Schoenbeck, Prentice Hall India Learning Private Limited

DSE B2 (b)

6.6 Advanced Statistical Mechanics (Theory)

Paper: PHS-A-DSE-B2-TH	**Credits: 5 (+1 for Tutorial)**

1. Review of classical statistical mechanics **25 Lectures**

(a) Idea of phase space, classical Liouville theorem, different enseembles. Evaluation of thermodynamic parameters using microcanonical ensemble for (i) harmonic oscillator, (ii) classical ideal gas (Sackur Tetrode Equation), (iii) paramagnets. Partition function and thermodynamic parameters evaluation for other simple examples. Anharmonic oscillator: mean energy ,mean position, specific heat using canonical ensemble, idea of thermal expansion of solids. Virial theorem and equipartion theorem . Energy fluctuatiuon in canonical ensemble.

(b) Grand canonical ensemble, various thermodynamic parametrs in grand canonical ensemble. Chemical potential for classical ideal gas. Saha ionization equation.Density and energy fluctuation in grand canonical ensemble. Equivalence of different ensembles.

2. Quantum statistical mechanics **10 Lectures**

Density matrix formulation. Random phase approximattion. Ensemble average for micro, canonical and grand canonical ensemble. Density matrix Examples: electron in magnetic field, free particle, harmonic oscillator. Distribution function of identical particles: bosons and fermions.

3.Ideal Bose systems and Fermi systems **20 Lectures**

Ideal bose gas. Thermodynamic relations, equation of state. bose-einstein condensation,: evaluation of various thermodynamic parameters . chemical potential for bose gas. Ideal fermi gas: thermodynamic relations.equation

of state. Pauli paramagnetism, degenerate and non-degenerate fermi gas. Relativistic fermi gas. White dwarf and chandrasekhar mass limit.

4. Ising model **10 Lectures**

Ising model : Bragg-Williams theory and relation with binary alloy.

5.Non-equilibrium statistical mechanics **10 Lectures**

Equilibrium time scales, irreversibility and role of fluctuation; coarse grained description. Random walk : calculation of occupation probability.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Statistical Mechanics, R.K. Pathria, Butterworth Heinemann: 2nd Ed.,1996, Oxford University Press
2. Statistical Physics, Berkeley Physics Course, F. Reif, 2008, Tata McGraw- Hill
3. Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press
4. An Introductory Course of Statistical Mechanics. P.B. Pal,2008, Narosa
5. Statistical Mechanics an elementary outline, A. Lahiri, 2008, Universities Press
6. Statistical Mechanics, K. Huang, J Wiley India

Additional Reference Books

1. An Introduction to Thermal Physics, D.V. Schroeder, 2014, Pearson Education, India
2. Intermediate Statistical Mechanics. J. Bhattacharjee and D. Banerjee, 2017, World Scientific (HBA)
3. A Modern Course in Statistical Physics, L. Reichl, 2016, Wiley-VCH
4. Equilibrium Statistical Mechanics , G.F. Mazenko, 2000, Wiley VCH
5. Elements of Nonequilibrium Statistical Mechanics , V. Balakrishnan, 2008, CRC Press
6. Principles of Condensed Matter Physics , P.M. Chaikin & T.C. Lubensky , 2000, Cambridge University Press
7. **Also see reference books in statistical mechanics core course.

Question patterns in different examinations for Honours Course in Physics

The number allotted for each course is 100. The marks distributions are given previously. The duration of examinations and details of marks distribution are given in the following table.

Examination		Conducted by	Center	Total Marks	Marks Division		Total Question to be allotted	Time allotted
					Question	Marks		
Internal Assessment		College	Home	10 Marks	10×2=20 (scaled down to 10)		15 Question	1 Hour
CC-Theory		University	Away	50 marks	$5 \times 2 = 10$		7 Questions	2 Hours
					$4 \times 10 = 40$		6 Questions	
CC-Practical		University	Away	30 marks	LWB	5		3 Hours
					Viva	5		
					Experiment	20		
GE-Theory		University	Away	50 marks	$5 \times 2 = 10$		7 Questions	2 Hours
					$4 \times 10 = 40$		6 Questions	
GE-Practical		College	Home	30 marks	LWB	5		3 Hours
					Viva	5		
					Experiment	20		
DSE-Theory		University	Away	65 marks	$5 \times 2 = 10$		7 Questions	3 Hours
					$3 \times 5 = 15$		5 Questions	
					$4 \times 10 = 40$		6 Questions	
DSE-Tutorial		College	Home	15 marks	****			
SEC (Theory)		University	Away	80 marks	$10 \times 2 = 20$		12 Questions	3 Hours
					$4 \times 5 = 20$		6 Questions	
					$4 \times 10 = 40$		6 Questions	
SEC	Th	University	Away	20 marks	$10 \times 2 = 20$		12 MCQ type	30 minute
(Project type)	Proj	College	Home	60 marks				

**** Students must be given a set of problems/assignments (at least 2). On the basis of regularity of submission and evaluation of assignments by the respective Teacher credits should be awarded to the students.

Part II

Physics Syllabus : General Course

Basic Course Structure for General Course (B.Sc. Programme)

Students of B.Sc. General or B.Sc. Programme should take three subjects in their carriculum. In first four semester students will take one core course, CC from each subject in each semester. We refer to the subjects as 111, 222 & 333. As a general student the subject code will be 111G, 222G, 333G. e.g., a student who had opted Physics, Chemistry and Mathematics his/her subject codes will be PHSG, CEMG, and MTMG. Thus 111 ≡PHS, 222 ≡CEM and 333 ≡MTM. Skill Enhancement Course, SEC must be opted in 3rd, 4th and 5th, 6th Semesters. SEC A is meant for odd (i.e., 3rd & 5th) Semesters and SEC B is meant for even (i.e., 4th & 6th) Semesters. Student will take two SEC A courses from two subjects in 3rd and 5th semesters and similarly he/she will take two SEC B courses from the same two subjects in 4th and 6th semesters. i.e., in each semester student will study one SEC. The details for choice of SEC is given later.

The core course (CC) are absent in 5th and 6th Semesters. Student should take Discipline specific elective courses, DSE there. DSE-A and DSE-B are for 5th and 6th Semesters respectively. Student will chose one DSE-A from each subject in 5th semester and similarly DSE-B from each subject in 6th Semester.

The DSE courses are so arranged that a student can choose practical based DSE or theoretical DSE as type A and B.

Detail plans with credits are given in following table (XXX for SEC will be cleared in fourth table).

General Course: Credit Distribution

Courses	Semester 1	Semester 2	Semester 3	Semster 4	Semester 5	Semester 6
CC	111G-CC-1 (6)	111G-CC-2 (6)	111G-CC-3 (6)	111G-CC-4 (6)		
	222G-CC-1 (6)	222G-CC-2 (6)	222G-CC-3 (6)	222G-CC-4 (6)		
	333G-CC-1 (6)	333G-CC-2 (6)	333G-CC-3 (6)	333G-CC-4 (6)		
SEC			XXXG-SEC A (2)	XXXG-SEC B (2)	XXXG-SEC A (2)	XXXG-SEC B (2)
DSE					111G-DSE-A (6)	111G-DSE-B (6)
					222G-DSE-A (6)	222G-DSE-B (6)
					333G-DSE-A (6)	333G-DSE-B (6)
AECC	AECC -1 (2)	AECC-2 (2)				
Total Credit	20	20	20	20	20	20
Number	400	400	400	400	400	400

The term in the parentheses represents credit of a course. Thus a general stuents completes $20 \times 6 = 120$ Credits in his/her course. In each semeser the student appear for four 100 marks paper. However, if student will take a course with practical module then the practical examination also will be there.

Physics courses for general students (B.Sc. Programme)

In physics all the core courses have practical.There are two types of SEC are there one is project type and other is theoretical paper. The DSE also of two types. In one type of DSE there is practical module and other type of DSE comprises of theoretical part only.

The courses offered in Physics general are given in the next Table.

General Course: Physics Modules distribution

Semester	Core Course	SEC-A	SEC-B	DSE-A	DSE-B
Semester-1	CC1/GE1 Mechanics				
Semester-2	CC2/GE2 Electricity & Magnetism				
Semester-3	CC3/GE3 Thermal Physics	SEC A-1 Scientific Writing Or SEC A-2 Renewable Energy			
Semester-4	CC4/GE4 Waves & Optics		SEC B-1 Arduino Or SEC B-2 Electrical Circuit & Network Skill		
Semester-5		SEC A-1 Scientific Writing Or SEC A-2 Renewable Energy		DSE-A(1) Analog Electronics Or DSE-A(2) Modern Physics	
Semester-6			SEC B-1 Arduino Or SEC B-2 Electrical Circuit & Network Skill		DSE-B(1) Digital Electronics Or DSE-B(2) Nuclear Physics

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Choice of Skill Enhancement Course (SEC)

According to the CSR for CBCS it was mentioned that

One paper from Group A, i.e., SEC A of each of the two subjects to be chosen in the third and fifth semester; one papaer from Group B, i.e., SEC B of each of the two core subjects to be chosen in the fourth and sixth semester.

The stuedents take three subjects as core in B.Sc. Programme. For SEC he/she took pic up any two subjects among these three core subjects. Thus, three possible combinations are

- 111G & 222G
- 111G & 333G
- 222G & 333G

Again for a specific choice there are several distributions. Let us take for the subject combinations of 111G and 222G.

Combination	3rd Semester	4th Semester	5th Semester	6th Semester
1	111G SEC A	111G SEC B	222G SEC A	222G SEC B
2	111G SEC A	222G SEC B	222G SEC A	111G SEC B
3	222G SEC A	222G SEC B	111G SEC A	111G SEC B
4	222G SEC A	111G SEC B	111G SEC A	222G SEC B

To be specific if any one have opted Physics and Mathematics for SEC then the combinations are

Combination	3rd Semester	4th Semester	5th Semester	6th Semester
1	PHSG SEC A	PHSG SEC B	MTMG SEC A	MTMG SEC B
2	PHSG SEC A	MTMG SEC B	MTMG SEC A	PHSG SEC B
3	MTMG SEC A	MTMG SEC B	PHSG SEC A	PHSG SEC B
4	MTMG SEC A	PHSG SEC B	PHSG SEC A	MTMG SEC B

In Physics carriculum two SEC courses are given, one is for knowledge skill (theory type) other is for technical skill (project type). The evaluation process for knowledge skill SEC courses is theoretical examination (of 80 marks) and the skill based SEC will be evaluated through a project (of 60 marks) and an examination containing MCQ type questions (of 20 marks).

Choice of Discipline Specific Elective Course (DSE)

According to the CSR for CBCS it was mentioned that

A student shall have to study 6 DSE courses strictly on 3 subjects, opted for pursuing core courses, taking exactly two courses from each subject. Such a student shall have to study the carriculum of DSE of the subject concerned as specified for the relevent semester, i.e., DSE-A in the 5th Semester and DSE-B in 6th Semester.

Since, the students have taken three subjects as the core subjects they need to take one DSE A course from all those subjects in 5th Semester and one DSE B course from all those subjects in 6th Semster. The available DSE A courses and DSE B courses are mentioned in each subjects. Thus, the options are mentioned below

5th Semester	6th Semester
111G-DSE A	111G-DSE B
222G-DSE A	222G-DSE B
333G-DSE A	333G-DSE B

In Physics carriculum two DSE A courses are mentioned in 5th Semester and two DSE B courses are given in 6th Semester. DSE A(1) and DSE B(1) have both theory and practical components. Therefore, two examinations i.e., theory (for 50 marks) and practical (for 30 marks) will be held for these DSE courses. The second type DSE, i.e., DSE A(2) and DSE B(2) are of theory type. There will be theoretical examinations (for 80 marks) only for these DSE courses.

Choice of Generic Elective Subjects for Honours students

Students who will take **Honours** Course in subject other than physics may take **physics as a generic elective upto 4th semester** along with another subject. In that situation the student will have to study Physics general in any two semesters only.

In each semester there is a single core course offered for B.Sc. general students. The same coureses will be treated as generic elective subjects for them. That is why the courses are referred to as CC/GE in each semester. Students have to accept the course running in that semester in which they had decided to take physics general.

The Honours student can take Physics as Generic elective in any following combinations.

Combination	GE1	GE2	GE3	GE4
1	PHSG	OG	OG	PHSG
2	OG	PHSG	PHSG	OG
3	PHSG	PHSG	OG	OG
4	OG	OG	PHSG	PHSG
5	PHSG	OG	PHSG	OG
6	OG	PHSG	OG	PHSG

Here, PHSG represents generic elective from Physics and OG represents the other subject which is opted by the student as second generic subject.

Therefore, the SEC or DSE mentioned in previous sections are not for the students continuing Honours course in the subject other than Physics.

General: Semester 1

CC1/GE1

CC 1/GE 1	Mechanics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60

1.1 Mechanics

1.1.1 Mechanics (Theory)

Paper: PHS-G-CC-1-1-TH **Credits: 4**

1. Mathematical Methods **15 Lectures**

(a) Vector Algebra: Addition of vectors and multiplication by a scalar. Scalar and vector products of two2 vectors, vector triple product. Representation of vectors in terms of basis vectors.

(b) Vector Analysis: Derivatives of a vector with respect to a parameter. Gradient, divergence and Curl. Vector integration, line, surface and volume integrals of vector fields. Gauss divergence theorem and Stoke's theorem of vectors (Statement only) and their significances.

(c) Ordinary Differential Equations: 1st order homogeneous differential equations. 2nd order homogeneous and inhomogeneous differential equations with constant coefficients.

2. Introduction to Newtonian Mechanics **5 Lectures**

(a) Laws of Motion: Idea of space time for Newtonian Mechanics, frames of reference, Newton's Laws of motion. Dynamics of a system of particles. Conservation of momentum. Centre of Mass.

(b) Work-energy theorem. Conservative forces. Concept of Potential Energy. Conservation of energy.

3. Rotational Motion **10 Lectures**

Rotation of a rigid body about a fixed axis. Angular velocity and angular momentum. Moment of Inertia. Calculation of moment of inertia for rectangular, cylindrical and spherical bodies. Torque. Conservation of angular momentum.

4. Central force and Gravitation **10 Lectures**

(a) Motion of a particle in a central force field. Conservation of angular momentum leading to restriction of the motion to a plane and constancy of areal velocity. Kepler's Laws (statement only). Newton's Law of Gravitation. Satellite in circular orbit and applications. Geosynchronous orbits. Basic idea of global positioning system (GPS).

5. Oscillations **9 Lectures**

Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations. Forced oscillations with harmonic forces.

6. Elasticity **6 Lectures**

(a) Hooke's law, elastic moduli, relation between elastic constants, Poisson's Ratio, Expression for Poisson's ratio in terms of elastic constants.

(b) Twisting couple on a cylinder. Determination of Rigidity modulus by static torsion. Torsional pendulum.

(c) Bending of beams, Cantilever.

(d) Work done in stretching and work done in twisting a wire.

7. Surface Tension **5 Lectures**

Molecular theory of surface tension, surface energy, comparison between surface tension and surface energy, variation of surface tension with temperature, application to spherical drops and bubbles Synclastic and anticlastic surface, excess of pressure, capilary rise of liquid.

Reference Books

1. A Handbook of Degree PHYSICS (Vol I), C. R. Dasgupta, Asok Kumar Das, Book Syndicate Private Limited
2. University Physics. FW Sears, MW Zemansky and HD Young13/e, 1986. Addison Wesley
3. Physics, Resnick, Halliday & Walker 9/e, 2010, Wiley.
4. Engineering Mechanics, Basudeb Bhattacharya, 2nd ed, 2015, Oxford University Press
5. Physics for Degree Students (For B.Sc. 1st Year); C.L. Arora & P.S. Hemme; S.Chand Publishing

1.1.2 Mechanics (Practical)

Paper: PHS-G-CC-1-1-P	**Credits: 2**

General Topics

1. Measurements of length (or diameter) using vernier caliper, screw gauge and traveling microscope.

2. Idea of systematic and random errors introduced in different instruments.

List of Practicals

1. Determination of Moment of inertia of cylinder/bar about axis by measuring the time period, of the cradle and with body of known moment of Inertia.

2. Determination of Y modulus of a metal bar of rectangular cross section by the method of exure.

3. Determination of rigidity modulus of wire by measuring the time period of torsional oscillation of a metal cylinder attached to it.

4. Determination of Moment of Inertia of a flywheel.

5. Determination gravitational acceleration, g using bar pendulum.

Reference Books

1. A handbook of Degree PRACTICAL PHYSICS (Vol 1), Dasgupta, Das, Paul, Book Syndicate Private Limited
2. Porikshagare Podarthovidya, Das, Das, Santra Publication
3. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited
4. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited
5. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited
6. Advanced Practical Physics, Vol 1, B. Ghosh, K.G.Majumdar, Shreedhar Publishers

General: Semester 2

CC2/GE2

CC 2/ GE 2	Electricity and Magnetism	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60

2.1 Electricity and Magnetism

2.1.1 Electricity and Magnetism (Theory)

Paper: PHS-G-CC-2-2-TH	**Credits: 4**

1. Essential Vector Analysis **5 Lectures**

(a) Vector Algebra: Addition of vectors and multiplication by a scalar. Scalar and vector products of two vectors.

(b) Vector Analysis: Gradient, divergence and Curl. Vector integration, line, surface and volume integrals of vector fields. Gauss'divergence theorem and Stoke's theorem of vectors (Statement only) and their significances.

2. Electrostatics **25 Lectures**

(a) Coulombs law, principle of superposition, electrostatic field. Electric field and charge density, surface and volume chargev density, charge density on the surface of a conductor. Force per unit area on the surface.

(b) Electric dipole moment, electric potential and field due to an electric dipole, force and Torque on a dipole. Electric Fields inside matter, Electric Polarisation, bound charges, displacement density vector, linear Dielectric medium, electric Succeptibility and Permittivity.

(c) Divergence of the Electrostatic field, flux, Gauss's theorem of electrostatics, applications of Gauss theorem to find Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Gauss's theorem in dielectrics.

(d) Curl of the Electrostatic Field. Conservative nature of electrostatic field, Introduction to electriostatic potential, Calculation of potential for linear, surface and volume charge distributions, potential for a uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Energy per unit volume in electrostatic field.

3. Magnetism **15 Lectures**

(a) Introduction of magnetostatics through Biot-Savart's law. Application of Biot Savart's law to determine the magnetic field of a straight conductor, circular coil, solenoid carrying current. Force between two straight current carrying wires. Lorentz force law.

(b) Divergence of the magnetic field, Magnetic vector potential.

(c) Curl of the magnetic field. Ampere's circuital law. Determination of the magnetic field of a straight current carrying wire. Potential and field due to a magnetic dipole. Magnetic dipole moment. Force and torque on a magnetic dipole.

(d) Magnetic fields inside matter, magnetization, Bound currents. The magnetic intensity H. Linear media. Magnetic susceptibility and Permeability. Brief introduction of dia, para and ferro-magnetic materials.

4. Electromagnetic Induction **5 Lectures**

Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils.

5. Electrodynamics **10 Lectures**

Maxwell's Equations, Equation of continuity of current, Displacement current, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, Poynting vector, decay of charge in conducting medium.

Referrence Books

1. A Handbook of Degree PHYSICS (Vol II), C. R. Dasgupta, Asok Kumar Das, Book Syndicate Private Limited
2. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education
3. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House
4. Electricity and Magnetism; R.Murugeshan; S. Chand Publishing

2.1.2 Electricity and Magnetism (Practical)

Paper: PHS-G-CC-2-2-P	**Credits: 2**

List of Practicals

1. Determination of unknown resistance by Carey Foster method.
2. Measurement of a current flowing through a register using potentiometer.
3. Determination of the horizontal components of earths magnetic field.
4. Conversion of an ammeter to a voltmeter.
5. Conversion of a voltmeter to an Ammeter.

Reference Books

1. A handbook of Degree PRACTICAL PHYSICS (Vol 2), Dasgupta, Das, Paul, Book Syndicate Private Limited
2. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited
3. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited

4. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited

5. Practical Physics, B. Ghosh, K.G.Majumdar, Shreedhar Publishers

General: Semester 3

CC3/GE3, SEC A

CC 3/ GE 3	Thermal Physics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
SEC A 1	Scientific Writing	Theory	Project
	Credit 2	Credit 1	Credit 1
		Classes 15	Classes 15
SEC A 2	Renewable Energy	Theory	
	Credit 2	Credit 2	
		Classes 30	

3.1 Thermal Physics and Statistical Mechanics

3.1.1 Thermal Physics and Statistical Mechanics (Theory)

Paper: PHS-G-CC-3-3-TH **Credits: 4**

1. Laws of Thermodynamics **18 Lectures**

(a) Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between C_P and C_V, Work Done during Isothermal and Adiabatic Processes. Compressibility and Expansion Coeficients, Reversible and irreversible processes.

(b) Second law and Entropy, Carnot's cycle & Carnot's theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams.

(c) Third law of thermodynamics, unattainability of absolute zero.

2. Thermodynamical Potentials **9 Lectures**

Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations and applications: Joule-Thompson Effect, Clausius- Clapeyron Equation, Expression for (C_P and C_V). TdS equations.

3. Kinetic Theory of Gases **10 Lectures**

Derivation of Maxwell's law of distribution of velocities and its experimental verication, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases.

4. Theory of Radiation **8 Lectures**

(a) Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh- Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law.

5. Statistical Mechanics **15 Lectures**

Phase space, Macrostate and Microstate. Ensemble, Ergodic hypothesis. Entropy and Thermodynamic probability, Boltzmann hypothesis. Maxwell-Boltzmann law of distribution of velocity. Quantum statistics (qualitative discussion only). Fermi-Dirac distribution law (statement only), electron gas as an example of Fermi gas. Bose-Einstein distribution law (statement only), photon gas as an example of Bose gas. Comparison of three statistics.

Reference Books

1. A Handbook of Degree PHYSICS (Vol III), C. R. Dasgupta, Asok Kumar Das, Book Syndicate Private Limited
2. Thermal Physics, A. B. Gupta, H. P. Roy, Books and Allied (P) Ltd

3.1.2 Thermal Physics and Statistical Mechanics (Practical)

Paper: PHS-G-CC-3-3-P	**Credits: 2**

List of Practicals

1. Determination of the coefficient of thermal expansion of a metalic rod using an optical lever.

2. Verication of Stefan's law of radiation by the measurement of voltage and current of a torch bulb glowing it beyond draper point.

3. To determine Thermal coefficient of Resistance using Carey forster bridge.

4. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.

5. Determination of the pressure coefficient of air using Jolly's apparatus.

Reference Books

1. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited
2. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited
3. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited
4. Advanced Practical Physics, B. Ghosh, K.G.Majumdar, Shreedhar Publishers

SEC A-1 (Technical Skill)

3.2 Scientific Writing (Project type)

3.2.1 Scientific Writing (Theory)

Paper: PHS-A SEC-B-TH	**Credits: 1**

1. Introduction to LaTeX **2 Lectures**
The difference between WYSIWYG and WYSIWYM. Preparing a basic LaTeX file. Compiling LaTeX file.

2. Document classes : **1 Lectures**
Different type of document classes, e.g., article, report, book etc.

3. Page Layout **2 Lectures**
Titles, Abstract, Chapters, Sections, subsections, paragraph, verbatim, References, Equation references, citation.

4. List structures: **1 Lectures**
Itemize, enumerate, description etc.

5. Representation of mathematical equations **5 Lectures**
Inline math, Equations, Fractions, Matrices, trigonometric, logarithmic, exponential functions, line-surface-volume integrals with and without limits, closed line integral, surface integrals, Scaling of Parentheses, brackets etc.

6. Customization of fonts **1 Lectures**
Bold fonts, emphasise, mathbf, mathcal etc. Changing sizes Large, Larger, Huge, tiny etc.

7. Writing tables **2 Lectures**
Creating tables with different alignments, placement of horizontal, vertical lines.

8. Figures **1 Lectures**
Changing and placing the figures, alignments

Packages : amsmath, amssymb, graphics, graphicx, Geometry, algorithms, color, Hyperref etc. Use of Different LaTeX commands and environments, Changing the type style, symbols from other languages. special characters.

Note: Software required: LaTeX in Linux and MikTeX in Windows. Preferred editor Kile/emacs in Linux and TeXStudio in Windows.

Reference Book

1. LaTeX- A Document Preparation System, Leslie Lamport, 1994, Addison-Wesley
2. LaTeXTutorials A PRIMER, Indian TeXuser group, E. Krishnan
3. Practical LaTeX, George Gratzer, Springer
4. Official LaTeXsite : https://www.latex-project.org/

5. The Not So Short Introduction to LaTeX: http://mirror.iopb.res.in/tex-archive/info/lshort/english/lshort.pd
6. LaTeXWikibook https://en.wikibooks.org/wiki/LaTeX
7. TeXLive http://www.tug.org/texlive/

3.2.2 Scientific Writing (Project)

Paper: PHS-A SEC-B-PR	**Credits: 1**

List of some sample Projects

1. Writing articles/ research papers/reports

2. Writing mathematical derivation

3. Writing Resume

4. Writing any documentation of a practical done in laboratory with results, tables, graphs.

5. Writing graphical analysis taking graphs from outside.

SEC A-2 (Knowledge Skill)

3.3 Renewable energy and Energy Harvesting (Theory)

Paper: PHS-A SEC-B-TH	**Credits: 2**

1. Fossil fuels and Alternate Sources of energy **5 Lectures**

Fossil fuels and nuclear energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in Ocean shore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.

2. Solar energy **5 Lectures**

Solar energy, its importance, storage of solar energy, solar pond, non-convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, role of maximum power point tracking for harvesting maximum energy and sun tracking systems.

3. Wind Energy harvesting **4 Lectures**

Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies. (only idea of synchronisation, current injection, islanding etc with utility grid)

4. Ocean Energy **4 Lectures**

Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass.

5. Geothermal Energy **2 Lectures**

Geothermal Resources, Geothermal Technologies.

6. Hydro Energy **2 Lectures**

Hydropower resources, hydropower technologies, environmental impact of hydro power sources.

7. Piezoelectric Energy harvesting **3 Lectures**

Introduction, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modeling piezoelectric generators, Piezoelectric energy harvesting applications.

8. Electromagnetic Energy Harvesting **3 Lectures**

(a) Linear generators, physics mathematical models, recent applications
(b) Carbon captured technologies, cell, batteries, power consumption.
(c) Environmental issues and Renewable sources of energy, sustainability.

9. Fuel cell **2 Lectures**

Introduction, Design principle and operation of fuel cell, Types of fuel cells, conversion efficiency of fuel cell, application of fuel cells

Reference Books

1. Non-conventional energy sources, G.D Rai, Khanna Publishers, New Delhi
2. Solar energy - M P Agarwal - S Chand and Co. Ltd
3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.
4. Renewable Energy, Power for a sustainable future, Godfrey Boyle, Oxford University Press, in association with The Open University
5. Solar Energy: Resource Assesment Handbook, Dr. P Jayakumar, 2009
6. Photovoltaics, J.Balfour, M.Shaw and S. Jarosek, Lawrence J Goodrich (USA)

General: Semester 4

CC4/GE4, SEC B

CC 4/ GE 4	Waves and Optics	Theory	Practical
	Credit 6	Credit 4	Credit 2
		Classes 60	Classes 60
SEC B 1	Arduino	Theory	Project
	Credit 2	Credit 1	Credit 1
		Classes 15	Classes 15
SEC B 2	Electrical Circuits &	Theory	
	Network Skill	Credit 2	
	Credit 2	Classes 30	

4.1 Waves and Optics

4.1.1 Waves and Optics (Theory)

Paper: PHS-G-CC-4-4-TH **Credits: 4**

1. Accoustics **10 Lectures**

(a) Review of SHM, damped & forced vibrations: amplitude and velocity resonance. Fourier's Theorem amd its application for some waveforms e.g., Saw tooth wave, triangular wave, square wave. Intensity and loudness of sound. Intensity levels, Decibels.

2. Superposition of vibrations **5 Lectures**

(a) Superposition of Two Collinear Harmonic oscillations having equal frequencies and different frequencies (Beats).

(b) Superposition of Two Perpendicular Harmonic Oscillation for phase difference $\delta = 0$, $\frac{\pi}{2}$, π: Graphical and Analytical Methods, Lissajous Figures with equal and unequal frequency and their uses.

3. Vibrations in String **8 Lectures**

(a) Wave equation in streched string and its solutions. Boundary conditions for plucked and struck strings. Expression of amplitude for both the cases (no derivation), Young's law, Ideal of harmonics. Musical scales and notes.

4. Introduction to wave Optics **2 Lectures**

Definition and Properties of wave front. Huygens Principle, Electromagnetic nature of light.

5. Interference **15 Lectures**

Superposition of two waves with phase difference, distribution of energy, formation of fringes, visibility of fringes.Division of amplitude and division of wavefront. Young's Double Slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stoke's treatment. Interference in Thin Films: parallel and wedge-shaped lms. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: measurement of wavelength and refractive index. Michelson's Interferometer (a) Idea of form of fringes (no theory needed), Determination of wavelength, Wavelength dierence, Refractive index.

6. Diffraction **10 Lectures**

(a) Fraunhofer diffraction Single slit; Double Slit. Multiple slits and Diffraction grating.
(b) Fresnel Diraction: Half-period zones. Zone plate.

7. Polarization **10 Lectures**

Transverse nature of light waves. Plane polarized light, production and analysis. Circular and elliptical polarization. Optical activity.

Reference Books

1. Advanced Acoustics, D. P. Roychowdhury, Chayan Publisher
2. Waves and Oscillations, N. K. Bajaj, Tata McGrow Hill
3. A textbook of Optics; N Subramanyam, B. Lal and M.N.Avadhanulu; S.Chand. Publishing
4. Optics, B. Ghosh, Sreedhar Publications

4.1.2 Waves and Optics (Practical)

Paper: PHS-G-CC-4-4-P	**Credits: 2**

List of Practicals

1. Determination of the focal length of a concave lens by auxiliary lens method.

2. Determination of the frequency of a tuning fork with the help of sonometer.

3. Determination of radius of curvature of plano convex lens/wavelength of a monochromatic or quasi monochromatic light using Newtons ring.

4. Measurement of thickness of a paper from a wedge shaped film.

5. Measurement of specific rotation of active solution (e.g., sugar solution) using polarimeter.

Reference Books

1. Practical Physics, P.R. Sasi Kumar, PHI Learning Private Limited
2. B.Sc. Practical Physics, Harnem Singh, P.S. Hemne, S Chand and Company Limited
3. B.Sc. Practical Physics, C.L. Arora, S Chand and Company Limited
4. Advanced Practical Physics, Vol 1 & 2, B. Ghosh, K.G.Majumdar, Shreedhar Publishers

SEC B -1 (Technical Skill)

4.2 Arduino (Project type)

4.2.1 Arduino

Paper PHS-A-SEC-B-TH	**Credit 1**

1. Introduction to Arduino **2 Lectures**

Brief history of the Arduino; open-source electronics prototyping.

2. Basic ideas **3 Lectures**

Basic ideas of Arduino, Familiarize the Arduino board, Setting up the arduino board. Installation of IDE in PC/ laptop for Arduino programming(Sketch)

3. Arduino Programming: **10 Lectures**

(a) Program structure:

data types, variables and constants, operators, control statements, loops, functions, string.

(b) Interfacing:

serial communication, digital and analog input/output, getting input from sensors(e.g. temperature sensor, ultrasonic sensor etc)

Books and references

1. Arduino Cookbook, Michael Margolis, O'Reilly Media (2011)
2. Getting Started with Arduino, Massimo Banzi, O'Reilly Media(2009)
3. Arduino as a tool for physics experiments, Giovanni Organtini 2018 J. Phys.: Conf. Ser. 1076 012026
4. https://www.arduino.cc/en/Guide/HomePage
5. Physics Today 66, 11, 8 (2013); https://doi.org/10.1063/PT.3.2160
6. The Physics Teacher 52, 157 (2014); https://doi.org/10.1119/1.4865518

4.2.2 Practical Projects

Paper PHS-A-SEC-B-PR	**Credit 1**

1. LED Blinking and fading.

2. Measurement of voltages (Below 5 V and above).

3. Interfacing 7 Segment display.

4. Construction of thermometer using LM35 or Others.

5. Construct the experimental set up for studying simple pendulum and hence determine the acceleration's due to gravity.

6. Construct data logger for studying charging and discharging of RC circuit.

NOTE: Software required: Arduino Integrated Development Environment, Hardware required: Arduino Uno

SEC B -2 (Knowledge Skill)

4.3 Electrical Circuits and Network skills (Theory)

PHS-A SEC-B -TH **Credit 2**

1. DC generator : **10 Lectures**

(a) EMF generated in the armature for simplex lap and wave winding, concept of pole, Methods of Excitation, Armature reaction, Dc motor : Torque equation of D.C motor, speed& torque Operating Characteristics of separately excited, Shunt, Series &Compound motors with emphasis on application areas.

(b) Three phase generator, concept of stator and rotor, star and delta connections – their current voltage relationships (both line and phase current & voltage).

2. Transformer : **5 Lectures**

Types of transformer, basic emf equation, no load current, leakage inductance, Magnetising current and equivalent circuit of single phase transformer on no-load and on load, idea of star/star, star/delta, delta/star, and zig-zag connection of 3 phase transformer, 3 phase to 2 phase transformation, Scott T connection.

3. AC motor **6 Lectures**

(a) Single phase AC motor – double field revolving theory, slip-speed characteristics,

(b) Construction of 3 phase induction motor and its action using rotating field theory, equivalent circuit of induction motor, Speed control by V/f control of induction motor (block diagram only).

4. Measurements and faults **9 Lectures**

(a) Measurement of three phase power by two and three wattmeter method,theory of induction type wattmeterand its use as energy meter in domestic house. Megger.

(b) Unsymmetrical faults in distribution system, Common switchgear equipments like relay, circuit breakers and fuses, Simple oil circuit breaker and SF6 circuit breaker, Construction of protective relay in distribution bus-bar system, Block diagram of a utility distribution sub-station.

Reference Books

1. Text book on Electrical Technology (vol 1 & 2), Thereja and Thereja
2. Power System, V. K. Meheta
3. Electrical Machines, S. K. Bhattacharya

General: Semester 5

DSE A, SEC A (Same as Semester 3)

SEC A 1	Scientific Writing Credit 2	Theory	Project
		Credit 1	Credit 1
		Classes 15	Classes 15
SEC A 2	Renewable Energy Credit 2	Theory	
		Credit 2	
		Classes 30	
DSE A 1	Analog Electronics Credit 6	Theory	Practical
		Credit 4	Credit 2
		Classes 60	Classes 60
DSE A 2	Modern Physics Credit 6	Theory	Tutorial
		Credit 5	Credit 1
		Classes 75	Classes 15

DSE-A(1)

5.1 Analog Electronics

5.1.1 Analog Electronics(Theory)

Paper: PHS-G-DSE-A-TH	**Credits: 4**

1. Circuits and Network **6 Lectures**

Discrete components, Active & Passive components, Ideal Constant voltage and Constant current Sources. Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, Maximum Power Transfer theorem. Applications to dc circuits.

2. Semiconductor Devices **20 Lectures**

(a) Semiconductor Diodes: P and N type semiconductors. Barrier Formation in PN Junction Diode. Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode. PN junction and its characteristics. Static and Dynamic Resistance.

Principle and structure of

- Light Emitting Diode

- Photo Diode
- Solar Cell

(b) Application of Diode: Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers, Ripple Factor and Rectification Eciency. Basic idea about capacitor filter. (b) Zener Diode and Voltage Regulation.

(c) Bipolar Junction transistors: n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Congurations. Active, Cut-off & Saturation regions. Current gains α and β. Relations between them. Load Line analysis of Transistors. DC Load line & Q- point. Voltage Divider Bias Circuit for CE Amplier. Class A, B & C Ampliers.

3. Regulated Power Supply **4 Lectures**

Difference between regulated and unregulated power supply. Load regulation and line regulation. Zener as voltage regulator. Principle of series regulated power supply, IC controlled regulated power supply.

4. Field Effect transistors **5 Lectures**

Construction, operation, characteristics,and parameters of junction FET. MOSFET (both depletion and enhancement type) as a part of MISFET. Basic structure & principle of operations and their characteristics. Pinch off, threshold voltage and short channel effect. Comparison of JFFET and MOSFET.

4. Feedback Amplifiers **5 Lecutures**

Necessity of negative feedback for stability. Voltage series, voltage shunt, current series and current shunt feedback. Change in input impedance, output impedence, voltage gain for a voltage series feedback in a voltage amplifer.

5. Operational Ampliers **15 Lectures**

(a) Characteristics of an Ideal and Practical Op-Amp (IC 741), Open loop and closed loop Gain. CMRR, concept of Virtual ground.

Applications of Op-Amps

- Inverting and non-inverting Ampliers
- Inverting Adder
- Subtractor
- Differentiator
- Integrator
- Zero crossing detector

6. Sinusoidal Oscillators: **5 Lectures**

Barkhausen's Criterion for Self-sustained Oscillations. Wien bridge oscillator.

Reference Books

1. Electronic Principle, Albert Malvino, 2008, Tata Mc-Graw Hill.
2. Electronics: Fundamentals and Applications, D. Chattopadhyay, P.C. Rakshit, New Age Publication

5.1.2 Analog Electronics (Practical)

Paper: PHS-G-DSE-A-P	Credits: 2

List of Practicals

1. Veryfication of Thevenin and Norton's theorem, super position theorem and maximum power transfer theorem for resistive network fed by D.C. power supply.

2. Study the emitter characteristics of a photo transistor illuminated by LED.

3. To study the characteristics of a Transistor in CE conguration.

4. Construction of a regulated power supply using LM 317 IC.

5. To study OPAMP: inverting amplifer, non inverting amplier, adder, substractor.

Reference Books

1. Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
2. Practical Physics, B. Ghosh, Sreedhar Publication

DSE A (2)

5.2 Modern Physics

5.2.1 Modern Physics (Theory)

Paper: PHS-G-DSE-A-TH	Credits: 5 (+1 for Tutorial)

1. Radiation and its nature **22 Lectures**

(a) Blackbody Radiation, Planck's quantum hypothesis, Planck's constant (derivation of Planck formula is not required). Photoelectric effect and Compton scattering - light as a collection of photons. Davisson-Germer experiment. De Broglie wavelength and matter waves. Wave-particle duality. Wave description of particles by wave packets. Group and Phase velocities and relation between them. Probability interpretation: Normalized wave functions as probability amplitudes.

(b) Two-slit experiment with photons and electrons. Linear superposition principle as a consequence.

(c) Position measurement, gamma ray microscope thought experiment. Heisenberg uncertainty principle (Statement with illustrations). Impossibility of a particle following a trajectory.

2. Foundation of Quantum Mechanics **28 Lectures**

(a) Schrödinger equation as a first principle. Probabilistic interpretation of wavefunction and equation of continuity (in 1D). Time evolution of wavefunction and $\exp(iHt/\hbar)$ as the evolution operator. Stationary states. Eigenvalue equation.

(b) Postulates of Quantum Mechanics: States as normalized wavefunctions. Dynamical variables as linear Hermitian operators (position, momentum, angular momentum, and energy as examples). Expectation values of operators and their time evolution. Ehrenfest theorem.

(c) Application to one dimensional systems, Boundary conditions on wave functions.

- Particle in an infinitely rigid box ($x = 0$ to $x = a$), energy states, wave function and its normalisation.
- Particle in front of a step potential, reflection coefficient.

3. Special Theory of Relativity **15 Classes**

(a) Michelson-Morley experiment. Lorentz transformation. Time dilation and length contraction. Velocity addition rule.

(b) Relativistic dynamics. Elastic collision between two particles. Idea of relativistic momentum and relativistic mass. Mass-energy equivalence.

4. Lasers **10 Lectures**

Einstein's A and B coefficients. Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion. Three-Level and Four-Level Lasers. Ruby Laser and He- Ne Laser. Basic lasing action.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill
2. Modern Physics; R.Murugeshan & K.Sivaprasath; S. Chand Publishing
3. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons
4. Theory and Problems of Modern Physics, Schaum's outline, R. Gautreau and W. Savin, 2nd Edn, Tata McGraw-Hill Publishing Co. Ltd
5. An Introduction to Lasers, M. N. Avadhanulu (Author), P. S. Hemne, S. Chand Publication

General: Semester 6

DSE B, SEC B (Same as Semester 4)

SEC B 1	Arduino Credit 2	Theory Credit 1 Classes 15	Project Credit 1 Classes 15
SEC B 2	Electrical Circuits & Network Skill Credit 2	Theory Credit 2 Classes 30	
DSE B 1	Digital Electronics Credit 6	Theory Credit 4 Classes 60	Practical Credit 2 Classes 60
DSE B 2	Nuclear Physics Credit 6	Theory Credit 5 Classes 75	Tutorial Credit 1 Classes 15

DSE B (1)

6.1 Digital Electronics

6.1.1 Digital Electronics (Theory)

Paper: PHS-G-DSE-B-TH **Credits: 4**

1. Integrated Circuits **4 Lectures**

Principle of Design of monolithic Chip. Advantages and drawbacks of ICs. Scale of integration: SSI, MSI, LSI and VLSI (basic idea and definitions only w.r.t. micron/submicron feature length).

2. Number System **7 Lectures**

Binary Numbers. Decimal to Binary and Binary to Decimal Conversion. BCD, Octal and Hexadecimal numbers. Signed and unsigned number representation of binary system. Binary addition, Representation of negative number. 1's Complement and 2's Complement method of subtraction.

3. Digital Circuits **20 Lectures**

(a) Difference between Analog and Digital Circuits.

(b) AND, OR and NOT Gates (Realization using Diodes and Transistor). NAND and NOR Gates as Universal Gates. XOR and XNOR Gates. De Morgan's Theorems.

(c) Switching algebra, Simplication of logical expression using switching Algebra. Fundamental Products and sum term (p term and s term). Minterms and Maxterms. Conversion of a Truth Table into an algebraic expression

in (1) Sum of Products form and (2) Product of sum term form. Implementation of a truth table by NAND or NOR gate. Simplification of algebraic expression from truth table using Karnaugh Map.

4. Data processing circuits **5 Lectures**

Basic idea of Multiplexers, De-multiplexers, Decoders, Encoders.

5. Sequential Circuits: **12 Lectures**

Introduction to Next state present state table, excitation table and truth table for Sequential circuits. SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race condition in SR and Race-around conditions in JK Flip-Flop. M/S JK Flip-Flop, T type FF.

6. Registers and Counters **12 Lectures**

(a) Shift registers: Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel-in-Parallel-out Shift Registers (only up to 4 bits).

(b) Counters (4 bits): Asynchronous counters: ripple counter, Decade Counter. Synchronous Counter, Ring counter.

Reference Books

1. Digital Principles and Applications, A.P. Malvino, D.P. Leach and Saha, 7th Ed., 2011, Tata McGraw Hill
2. Electronic devices & circuits, S. Salivahanan & N.S. Kumar, 2012, Tata Mc-Graw Hill
3. Electronics: Fundamentals and Applications, D. Chattopadhyay, P.C. Rakshit, New Age Publication

6.1.2 Digital electronics (Practical)

Paper: PHS-G-DSE-B-P **Credits: 2**

1. To verify and design AND, OR, NOT and XOR gates using NAND gates.

2. Construction of half adder, and full adder using NAND/NOR gate.

3. Construction of SR, D FF circuits using NAND gates.

4. Construction of 4 bit shift registers (serial & parallel) using D type FF IC 7476.

5. Construction of 4 $\times$ 1 Multiplexer using IC 74151.

Reference Books

1. Advance Practical Physics (Vol 2), B. Ghosh, Sreedhar Publication
2. Electronic devices & circuits, S. Salivahanan & N.S. Kumar, 2012, Tata Mc-Graw Hill

DSE B (2)

6.2 Nuclear & Particle Physics

6.2.1 Nuclear & Particle Physics (Theory)

Paper: PHS-G-DSE-B-TH Credits: **5 (+1 for Tutorial)**

1 General Properties of Nuclei **10 Lectures**

(a) Constituents of nucleus and their Intrinsic properties, quantitative facts about mass, radii, charge density (matter density), binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, N/A plot.

2. Nuclear Models **10 Lectures**

(a) Liquid drop model approach, semi empirical mass formula and significance of its various terms, condition of nuclear stability, two nucleon separation energies.

(b) Evidence for nuclear shell structure - nuclear magic numbers. Basic assumptions of shell model, concept of nuclear force.

3. Radioactivity **12 Lectures**

(a) α decay: basics of α decay processes. Theory of α emission, Geiger Nuttall law, α decay spectroscopy.

(b) β decay: energy and kinematics of β decay, positron emission, electron capture, neutrino hypothesis.

(c) γ decay: Gamma ray emission & kinematics, internal conversion.

4. Nuclear Reactions **7 Lectures**

Types of Reactions, Conservation Laws, kinematics of reactions, Q value, reaction rate, reaction cross section, Concept of compound and direct Reaction, resonance reaction.

5. Detector for Nuclear Radiations **15 Lectures**

Gas detectors: estimation of electric eld, mobility of particle, for ionization chamber and GM Counter. Basic principle of Scintillation Detectors and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si and Ge) for charge particle and photon detection (concept of charge carrier and mobility), neutron detector.

6. Particle Accelerators **15 Lectures**

Accelerator facility available in India, Different type of accelerators

- Van-de Graaf generator (Tandem accelerator)
- Linear accelerator
- Cyclotron
- Betatron
- Synchrotrons

8. Particle Physics **6 Lecuters**

Fundamental particles and their families. Fundamental particle interactions and their basic features. Symmetries and Conservation Laws, Baryon number, Lepton number, Isospin, Strangeness and Charm. Quark model, Quark structure of hadrons.

Tutorial: In tutorial section, problems in the theory classes should be discussed. Problems and solutions regarding the theory course may be discussed.

Reference Books

1. Nuclear Physics, D. C. Tayal, Himalayan Publisher
2. Atomic and Nuclear Physics, Subramanyam, Brij Lal, Seshan, S. Chand Publications

3. Physics of the Nucleus, Books and Allied Private Limited

4. Introduction to Nuclear and Particle Physics, Mittal, Verma, Gupta, Prentice Hall India Learning Private Limited

Question patterns in different examinations for General Course in Physics

The number allotted for each course is 100. The marks distributions are given previously. The duration of examinations and details of marks distribution are given in the following table.

Examination		Conducted by	Center	Total Marks	Marks Division		Total Question to be allotted	Time allotted
					Question	Marks		
Internal Assessment		College	Home	10 Marks	10×2=20 (scaled down to 10)		15 Question	1 Hours
CC/GE-Theory		University	Away	50 marks	$5 \times 2 = 10$		7 Questions	2 Hours
					$4 \times 10 = 40$		6 Questions	
CC/GE-Practical		College	Home	30 marks	LWB	5		3 Hours
					Viva	5		
					Experiment	20		
DSE -Theory		University	Away	50 marks	$5 \times 2 = 10$		7 Questions	2 Hours
					$4 \times 10 = 40$		6 Questions	
DSE-Practical		College	Home	30 marks	LWB	5		3 Hours
					Viva	5		
					Experiment	20		
DSE-Theory		University	Away	65 marks	$5 \times 2 = 10$		7 Questions	3 Hours
					$3 \times 5 = 15$		5 Questions	
					$4 \times 10 = 40$		6 Questions	
DSE-Tutorial		College	Home	15 marks	****			
SEC (Theory)		University	Away	80 marks	$10 \times 2 = 20$		12 Questions	3 Hours
					$4 \times 5 = 20$		6 Questions	
					$4 \times 10 = 40$		6 Questions	
SEC (Project type)	Th	University	Away	20 marks	$10 \times 2 = 20$		12 MCQ type	30 minute
	Proj	College	Home	60 marks				

**** Students must be given at least one assignment or set of small problems. On the basis of regularity of submission and evaluation of assignment by the respective Teacher credits should be awarded to the students.

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Spaul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

University of Calcutta

Final Draft BA (Honours)-CBCS Syllabus in Political Science, 2018 (Section I)

Core Courses

[Fourteen courses; Each course: 6 credits (5 theoretical segment+ 1 for tutorial-related segment). Total: 84 credits (1400 marks).

- Each course carries 80 marks^ ^^ (plus 10 marks each for Attendance and Internal Assessment).
- Minimum 30 classes for Theory and 15 contact hours for Tutorial per module.

^End Semester Assessment for each course--- 65 marks for theoretical segment: 50 marks for subjective/descriptive questions + 15 marks for category of 1 mark-questions. Question Pattern for subjective/descriptive segment of 50 marks: 2 questions (within 100 words; one from each module) out of 4 (10 x2 = 20) + 2 questions (within 500 words; one from each module) out of 4 (15 x 2 = 30).

^^15 marks for tutorial-related segments as suggested below (any one item from each mode):

i) Written mode: upto 1000 words for one Term Paper/upto 500 words for each of the two Term Papers/ equivalent Book Review/equivalent Comprehension/equivalent Quotation or Excerpt Elaboration.

ii) Presentation Mode: Report Presentation/Poster Presentation/Field work--- based on syllabus-related and/or current topics (May be done in groups)[The modes and themes and/or topics are be decided by the concerned faculty members of respective colleges.]

- Core courses: First 2 each in Semesters 1 and 2;Next 3 each in Semesters 3 and 4; 2 each in Semesters 5 and 6. [Sequentially arranged]

IMPORTANT NOTES:

- The Readings provided below include many of those of the UGC Model CBCS Syllabus in Political Science. For further details of Course Objectives and additional references it is advised that the UGC model CBCS syllabus* concerning relevant courses and topics be provided due importance and primarily consulted.
  *Website: BA Political Science (Honours): https://www.ugc.ac.in/pdfnews/2085906_B.A-Hons.-Pol-Science.pdf
- Cited advanced texts in Bengali are not necessarily substitutes, but supplementary to the English books.
- Paper Code Format: Subject-Course-Semester-Paper Number-Paper Component.
- The format isstrictly subject to the parameters of the common structural CBCS format of the University.

List of Core Courses

1 – Understanding Political Theory: Concepts

2 - Understanding Political Theory: Approaches and Debates

3 - Constitutional Government in India

4 – Politics in India: Structures and Processes

5 – Indian Political Thought – I

6 - Comparative Government and Politics

7 – Perspectives on International Relations

8 - Indian Political Thought – II

9 – Global Politics since 1945

10 – Western Political Thought & Theory I

11 – Western Political Thought & Theory II

12 - Political Sociology

13 – Public Administration: Concepts and Perspectives

14 – Administration and Public Policy in India

[Semester-level break-up provided below]

Semester I

Understanding Political Theory: Concepts Code: PLS-A-CC-1-1-TH+TU

Module I:

1.Conceptualising politics: meaning of *political*.
2.Key concepts I: State; Nation; Sovereignty (evolution); Power and Authority--- types and linkages;
3.Key concepts II: Law. Liberty, Equality--- interrelationships.

Module II:

4. Key concepts III: Rights; Justice (with special reference to Rawls); Freedom.
5. Key concepts IV: Democracy (with special reference to David Held); Authoritarianism.
6. Key concepts V: Citizenship.

Readings:

Bhargava, R. (2008) 'What is Political Theory' in Bhargava, R and Acharya, A. (eds.) PoliticalTheory: An Introduction.pp. 2-16.
Bellamy, R. (1993) 'Introduction: The Demise and Rise of Political Theory', in Bellamy, R. (ed.) Theories and Concepts of Politics. New York: Manchester University Press, pp. 1-14.
Glaser, D. (1995) 'Normative Theory', in Marsh, D. and Stoker, G. (eds.) Theory and Methodsin Political Science. London: Macmillan, pp. 21-40.
D. Held: Political Theory Today.
D. Held: Models of Democracy.
N. Daniels: Reading Rawls.
Andrew Heywood: The Basic Political Concepts.
S. Ramaswamy: Political Theory--- Ideas and Concepts.
S.P. Verma: Modern Political Theory.
T. Ball and R. Bellamy: Twentieth Century Political Thought.
R. Bellamy: Theories and Concepts in Politics: An Introduction.
C. McKinnan: Issues in Political Theory.
Menon, Krishna. (2008) 'Justice', in Bhargava, Rajeev and Acharya, Ashok. (eds.) PoliticalTheory: An Introduction, pp. 74-86.

Understanding Political Theory: Approachesand Debates Code: PLS-A-CC-1-2-TH+TU

Module I:

1.Approaches I: Normative; Legal-Institutional; Empirical-Behavioual---Systems Analysis; Structural Functionalism.
2. Approaches II: Liberalism; Social Welfarism; Neo-Liberalism.
3. Approaches III: Postcolonial; Feminist.

Module II:

4.Marxian approach--- Dialectical Materialism and Historical Materialism.
5. Key ideas: State (focus on Relative Autonomy); Class and Class Struggle; Surplus Value; Alienation.
6. Party--- Democratic Centralism; Lenin-Rosa Luxemburg debate; Revolution--- Lenin and Mao. Hegemony and Civil Society: Gramsci.

Readings:

K. Marx and F. Engels: The Communist Manifesto.
V. I. Lenin: The State.
John Gray: Liberalism.
David McLellan: The Thought of Karl Marx.
David McLellan: Marxism after Marx.
Tom Bottomore ed.: A Dictionary of Marxist Thought.
D. Riaznov ed.: The Communist Manifesto of Marx and Engels.
M Cornforth: Dialectical Materialism.
R. Miliband: Marxism and Politics.
Laszek Kolakowski: Main Currents of Marxism (3 volumes).
Ravi Kumar: Contemporary Readings in Marxism.
Kymlicka: Multiculturalism.
Marxist Internet Archive: www.marxist.org
Gurpreet Mahajan: The Multicultural Path.
R. Young: Postcolonialism: A Very Short Introduction.
Richard Bellamy: Citizenship: A Very Short Introduction.
Margaret Walters: Feminism: A Very Short Introduction.
Arpita Mukhopadhyay: Feminisms.

For Courses I and II:
কার্ল মার্ক্স ও ফ্রিডরিশ এঙ্গেলস রচনা সংকলন
লেনিন নির্বাচিত রচনাবলী (বড়ো খণ্ড)
টম বটমোরঃ মার্ক্সীয় সমাজতত্ব (অনুবাদঃ হিমাংশু ঘোষ)
দীপক কুমার দাস (সম্পাদিত): রাজনীতির তত্বকথা (২ খণ্ড)
শোভনলাল দত্তগুপ্ত : মার্কসীয় রাষ্ট্রচিন্তা (২০০৬ সং)
ভোলানাথ বন্দ্যোপাধ্যায় : মরিস কর্নফোর্থ:দ্বন্দ্বমূলক বস্তুবাদ (অনুবাদ)
চৈতালি বসু: রাজনীতিশাস্ত্র ও অভিজ্ঞতাবাদী রাষ্ট্রতন্ত্র
রাজশ্রী বসু ও বাসবী চক্রবর্তী (সম্পা): প্রসঙ্গ মানবীবিদ্যা
অশোক সরকার: রাষ্ট্রবিজ্ঞান অভিধান
শোভনলাল দত্তগুপ্ত, রতন খাসনবিশ, সৌরীন ভট্টাচার্য: উত্তর-উপনিবেশবাদ ও মার্কসবাদ
দেবারতি সেনগুপ্ত ও পারমিতা ব্যানার্জি: পিতৃতন্ত্র কাহাকে বলে (কমলা ভাসিনের What is Patriarchy-র অনুবাদ)

Semester II

Constitutional Government in India

Code: PLS-A-CC-2-3-TH+TU

Module I:

1.Evolution of the Indian Constitution. Role of the Constituent Assembly--- debates (overview). The Preamble.
2.Citizenship. Fundamental Rights and Duties. Directive Principles.
3.Nature of Indian Federalism: Union-State Relations.
4.Union Executive: President, Vice-President: election, position, functions (focus on Emergency Powers), Prime Minister, Council of Ministers, relationship of Prime Minister and President.

Module II:

5.Union Legislature: Rajya Sabha, Lok Sabha: Organisation, Functions – Lawmaking procedure, Parliamentary procedure, Privileges, Committee system. Speaker.
6.Government in states: Governor, Chief Minister and Council of Ministers: position and functions – State Legislature: composition and functions.
7.Judiciary: Supreme Court and the High Courts: composition and functions – Judicial activism.
8.Constitutional amendment. Major recommendations of National Commission to Review the Working of the Constitution.

Readings:

Constitution of India: Government of India.
G. Austin: The Indian Constitution.
G. Austin: Working a Democratic Constitution
S.K. Chaube: The Constituent Assembly--- Springboard of a Revolution (latest edition).
M.V. Pylee: India's Constitution.
S.L. Sikri: Indian Government and Politics.
S.C. Kashyap ed.: Perspectives on the Constitution.
A.G. Noorani: Constitutional Question in India.
G. Austin, (2010) 'The Constituent Assembly: Microcosm in Action', in The IndianConstitution: Cornerstone of a Nation, New Delhi: Oxford University Press, 15th print, pp.1-25.
R. Bhargava, (2008) 'Introduction: Outline of a Political Theory of the Indian Constitution', in R. Bhargava (ed.) Politics and Ethics of the Indian Constitution, New Delhi: Oxford University Press, pp. 1-40.
D. Basu, (2012) Introduction to the Constitution of India, New Delhi: Lexis Nexis.
S. K. Chaube, (2009) The Making and Working of the Indian Constitution, Delhi: National Book Trust.
G. Austin, (2000) 'The Social Revolution and the First Amendment', in Working a DemocraticConstitution, New Delhi: Oxford University Press, pp. 69-98.
B. Shankar and V. Rodrigues, (2011) 'The Changing Conception of Representation: Issues, Concerns and Institutions', in The Indian Parliament: A Democracy at Work, New Delhi: Oxford University Press, pp. 105-173.
V. Hewitt and S. Rai, (2010) 'Parliament', in P. Mehta and N. Jayal (eds.) The OxfordCompanion to Politics in India, New Delhi: Oxford University Press, pp. 28-42.
J. Manor, (2005) 'The Presidency', in D. Kapur and P. Mehta P. (eds.) Public Institutions inIndia, New Delhi: Oxford University Press, pp.105-127.
J. Manor, (1994) 'The Prime Minister and the President', in B. Dua and J. Manor (eds.) Nehruto the Nineties: The

Changing Office of the Prime Minister in India, Vancouver: University ofBritish Columbia Press, pp. 20-47.
H. Khare, (2003) 'Prime Minister and the Parliament: Redefining Accountability in the Age of Coalition Government', in A. Mehra and G. Kueck (eds.) The Indian Parliament: AComparative Perspective, New Delhi: Konark, pp. 350-368.
U. Baxi, (2010) 'The Judiciary as a Resource for Indian Democracy', Seminar, Issue 615, pp. 61-67.
R. Ramachandran, (2006) 'The Supreme Court and the Basic Structure Doctrine' in B. Kirpal et.al (eds.) Supreme but not Infallible: Essays in Honour of the Supreme Court of India, New Delhi: Oxford University Press, pp. 107-133.
M. Singh, and R. Saxena (eds.), (2011) 'Towards Greater Federalization,' in Indian Politics:Constitutional Foundations and Institutional Functioning, Delhi: PHI Learning Private Ltd., pp.166-195.
V. Marwah, (1995) 'Use and Abuse of Emergency Powers: The Indian Experience', in B. Arora and D. Verney (eds.) Multiple Identities in a Single State: Indian Federalism in a ComparativePerspective, Delhi: Konark, pp. 136-159.
Additional Reading:
The Constitution of India: Bare Act with Short Notes, (2011) New Delhi: Universal, pp. 4-16.

ভারতীয় সংবিধান (বাংলা সংস্করণ)
দূর্গাদাস বসু – ভারতের সংবিধান পরিচয়
সুভাষ সি কাশ্যপ – আমাদের সংবিধান (অনুবাদঃ পার্থ সরকার)
অমল কুমার মুখোপাধ্যায় – ভারতীয় সংবিধানের সহজ পাঠ

Politics in India:Structures and Processes Code: PLS-A-CC-2-4-TH+TU

Module I:

1.Party system: features and trends – major national political parties in India: ideologies and programmes. Coalition politics in India: nature and trends. Political parties in West Bengal: Overview.
2.Electoral process: Election Commission: composition, functions, role. Electoral reforms.
3. Role of business groups, working class, peasants in Indian politics.

Module IV:

4.Role of (a) religion (b) language (c) caste (d) tribe.
5. Regionalism in Indian politics.
6. New Social Movements since the 1970s: (a) environmental movements (b) women's movements (c) human rights movements.

Readings:

R. Kothari, (2002) 'The Congress System', in Z. Hasan (ed.) Parties and Party Politics in India, New Delhi: Oxford University Press, pp 39-55.
E. Sridharan, (2012) 'Introduction: Theorizing Democratic Consolidation, Parties and Coalitions', in Coalition Politics and Democratic Consolidation in Asia, New Delhi: Oxford University Press.
Y. Yadav and S. Palshikar, (2006) 'Party System and Electoral Politics in the Indian States, 1952-2002: From Hegemony to Convergence', in P. deSouza and E. Sridharan (eds.) India'sPolitical Parties, New Delhi: Sage Publications, pp. 73-115.
R. Hardgrave and S. Kochanek: India: Government and Politics in a Developing Nation (Latest edition).
S. Palshikar, (2008) 'The Indian State: Constitution and Beyond', in R. Bhargava (ed.) Politicsand Ethics of the Indian Constitution, New Delhi: Oxford University Press, pp. 143-163.
Partha Chatterjee: State and Politics in India.
Sudipta Kaviraj ed.: Politics in India.

R. Kothari, (1970) 'Introduction', in Caste in Indian Politics, Delhi: Orient Longman, pp.3-25. M. Weiner, (2001) 'The Struggle for Equality: Caste in Indian Politics', in Atul Kohli (ed.) TheSuccess of India's Democracy, New Delhi: Cambridge University Press, pp. 193-225.
C. J. Nirmal ed.: Human Rights in India.
Y. Yadav, (2000) 'Understanding the Second Democratic Upsurge', in F. Frankel, Z. Hasan, and R. Bhargava (eds.) Transforming India: Social and Political Dynamics in Democracy, New Delhi: Oxford University Press, pp. 120-145.
C. Jaffrelot, (2008) 'Why Should We Vote? The Indian Middle Class and the Functioning of World's Largest Democracy', in Religion, Caste and Politics in India, Delhi: Primus, pp. 604-619.
Deshpande, (2004) 'How Gendered was Women's Participation in Elections 2004?', Economic and Political Weekly, Vol. 39, No. 51, pp. 5431-5436.
Siddhartha Guha Roy: Human Rights, Democratic Rights and Popular Protest.
G. Shah: Social Movements in India.Raka Ray and M.F. Katzenstein eds.: Social Movements in India.
S. Corbridge and J. Harris: Reinventing India: Liberalization, Hindu nationalism and Popular Democracy.
Bipan Chandra et al.: India after Independence (1947-2000).
Rajni Kothari ed.: Caste in Indian Politics.
Bharati Ray and Aparna Basu eds.: From Independence to Freedom--- Indian Women since 1947.
Fields of Protest: Women's Movement in India.
D.N. Sen: From Raj to Swaraj.
R. Chatterjee ed.: Politics India--- State-Society Interface.
Sumit Ganguly et al. eds.: The State of India's Democracy.
Z. Hasan: Politics and Party Politics in India.
B.L. Shankar and V. Rodrigues: The Indian Parliament: A Democracy at Work.
Ashutosh Varshney: India and the Politics of Developing Countries.
Achin Vanaik and Rajiv Bhargava: Understanding Contemporary India: Critical Perspectives.
A. Kohli and P. Singh eds.: The Routledge Handbook of India Politics.
N.G. Jayal and P.B. Mehta eds.: The Oxford Companion to Politics in India.
Anil Jana ed., Decentralizing Rural Governance and Development.
Z. Hasan et al eds.: India's Living Constitution.

বিপান চন্দ্রঃ সমসাময়িক ভারত বিষয়ক নিবন্ধ (অনুবাদঃ দিলীপ ভট্টাচার্য্য)
বিপান চন্দ্র, মৃদুলা মুখার্জী, আদিত্য মুখার্জীঃ ভারতবর্ষ স্বাধীনতার পরে ১৯৪৭-২০০০ (অনুবাদঃ আশীষ লাহিড়ি)
সত্যব্রত দত্ত: বাংলা বিধানসভার একশো বছর
শাশ্বতী ঘোষ: সমতার দিকে আন্দোলনে নারী
শুভেন্দু দাশগুপ্ত (সম্পা): প্রসঙ্গ মানবাধিকার
ভারতীয় সংবিধান (বাংলা সংস্করণ)

Semester III

Indian Political Thought– I Code: PLS-A-CC-3-5-TH+TU

Module I:

1 Ancient Indian Political ideas: overview.
2. Kautilya: Saptanga theory, Dandaniti, Diplomacy.
3. Medieval political thought in India: overview (with reference to Barani and Abul Fazal). Legitimacy of kingship.
4. Principle of Syncretism.

Module II:

5. Modern Indian thought: Rammohun Roy as pioneer of Indian liberalism – his views on rule of law, freedom of thought and social justice.
6. Bankim Chandra Chattopadhyay, Vivekananda and Rabindranath Tagore: views on nationalism.
7. M.K. Gandhi: views on State, Swaraj, Satyagraha.

Readings:

R.S. Sharma: Aspects of Political Ideas and Institutions in Ancient India.
Saiyid Athar Abbas Rizvi – A History of Sufism in India (Vol.2)
Amit Dey – Sufism in India
V.R. Mehta: Foundation of Indian Political Thought.
T. Pantham, and K. Deutsch (eds.), Political Thought in Modern India.
A. Altekar, (1958) 'The Kingship', in State and Government in Ancient India, 3rd edition
Advaita Ashram: Complete Works of Swami Vivekananda.
U.N. Ghosal: The History of Hindu Political Theories.
J. Bandopadhyay: Social and Political Thought of Gandhi
D.D. Kosambi: Ancient India.
Romila Thapar: From Lineages to State.
K.A. Nizami ed.: Politics and Society during the Early Medieval Period.
B. Bhattacharya: Evolution of the Political Philosophy of Gandhi.
B.R. Nanda: Gandhi and His Critics.
Partha Chatterjee: Nationalist Thought and the Colonial World.
Rabindranath Tagore: Nationalism.
Sudipta Kaviraj: The Unhappy Consciousness: Bankimchandra Chattopadhyay and the Formation of Nationalist Discourse in India.
Bidyut Chakrabarty and R.K. Pandey: Modern Indian Political Thought--- Text and Context.

সুধীন্দ্রনাথ ভৌমিক: নব্যবঙ্গে রাষ্ট্রচিন্তার ধারা
ভারতী মুখার্জী: প্রাচীন ভারতের রাষ্ট্রনৈতিক চিন্তা
নৃসিংহ প্রসাদ ভাদুড়ি: দণ্ডনীতি
সত্যব্রত চক্রবর্তী (সম্পা): ভারতবর্ষ: রাষ্ট্রভাবনা
সুমিত সরকার: আধুনিক ভারত
সরল চট্টোপাধ্যায়: ভারতীয় স্বাধীনতা সংগ্রামের ক্রমবিকাশ
মনস্বিতা সান্যাল (অনু.): ভারতীয় জাতীয়তাবাদের সামাজিক পটভূমি (A R Desai: Social Background of Indian Nationalism–র অনুবাদ)
দিলীপ কুমার বিশ্বাস: রামমোহন সমীক্ষা
তরুণ কুমার বন্দ্যোপাধ্যায়: নেতাজী সুভাষচন্দ্রের রাষ্ট্রদর্শন
দেবজ্যোতি বন্দ্যোপাধ্যায়: রবীন্দ্রনাথের জাতীয়তাবাদ-বিরোধী স্বদেশপ্রেম

Comparative Government and Politics Code: PLS-A-CC-3-6- TH+TU

Module I:

1. Evolution of Comparative Politics. Scope, purposes and methods of comparison.
Distinction between Comparative Government and Comparative Politics.
2. Major approaches to the study of comparative politics---Institutional approach (dominant schools: Systems approach and Structural Functional approach)---limitations; New Institutionalism, Political Economy--- origin and key features.
3. Development and democratization: S.P. Huntington.
4. Classification of political systems. Nature of liberal and socialist political systems; distinguishing features---conventions, rule of law (UK), separation of powers, checks and balances, judicial review (USA), democratic centralism (PRC), referendum, initiative (Switzerland).
5. Political Parties: Typology, features and roles (UK, USA, PRC and Bangladesh). Interest groups: roles (UK and USA).

Module II:

6. Unitary system: UK, Bangladesh. Federal system: USA, Russia.
7. Legislature in UK, USA and PRC: composition and functions of legislative chambers; Committee System in UK and USA
8. Executive in UK, USA, France and Russia: A comparative study of (i) Russian, French and American Presidency; (ii) British and French cabinet systems.
9. Judiciary in UK, USA and PRC (with focus on the Procuratorate): comparative study.
10. Rights of the citizens of UK, USA and PRC: A comparative study.

Readings:

Gabriel Almond et al eds.: Comparative Politics Today: A World View (latest edition).
J. Kopstein and M. Lichbach (eds.) Comparative Politics:Interest, Identities and Institutions in a Changing Global Order.
Subrata Mukherjee and S. Ramaswamy: Theoretical Foundations of Comparative Politics.
J. Bara and M Pennington eds.: Comparative Politics.
J. Kopstein and H. Lichbach eds. : Comparative Politics.
J. Harvey and S. Bather: The British Constitution.
J. Wilson: American Government.
S.E. Finer: Comparative Government.
J. Blondel: An Introduction to Comparative Politics.
The Constitution of People's Republic of China.
J. Gittings: China Changes Face: The Road from Revolution 1949-89.
S. Boyron: The Constitution of France: A Contextual Analysis.
M. Burgess: Comparative Federalism: Theory and Practice.
J. McCormick, Jr.: Comparative Politics in Transition.
R. Chatterjee: Introduction to Comparative Political Analysis.
N.K. Singh: Bangladesh--- Constitution, Law and Justice.
J. Henderson: Constitution of the Russian Federation: A Contextual Analysis.
S. P. Huntington: The Third Wave: Democratization in the Late Twentieth Century.
M. Duverger: Political Parties.

রাখহরি চ্যাটার্জীঃ তুলনামূলক রাজনীতিপরিচয়
অমিতাভ রায় (সম্পা): তুলনামুলক রাজনীতি
রাজশ্রী বসু (সম্পাদিত)–তুলনামূলক শাসনব্যবস্থা ও রাজনীতি
পঞ্চানন চট্টোপাধ্যায়: ফ্রান্সের সাধারণতন্ত্র

Perspectives on International Relations Code: PLS-A-CC-3-7-TH+TU

Module I:

1. Understanding International Relations: outline of its evolution as academic discipline.
2. Major theories: (a) Classical Realism and Neo-Realism (b) Dependency (c) World Systems theory.
3. Emergent issues: (a) Development (b) Environment (c) Terrorism (d) Migration.

Module II:

4. Making of foreign policy.
5. Indian foreign policy: major phases: 1947-1962; 1962-1991; 1991-till date.
6. Sino-Indian relations; Indo-US relations.

Readings:

M. Nicholson, International Relations: A Concise Introduction, New York: Palgrave.
Jackson and G. Sorensen, Introduction to International Relations: Theories and Approaches, 3rd Edition.
Joshua. Goldstein and J. Pevehouse, (2007) International Relations.
C. Brown and K. Ainley, (2009) Understanding International Relations
H.J. Morgenthau: Politics among Nations.
K. Booth and S. Smith, (eds), International Relations Theory Today
S.H. Hoffman: Essays in Theory and Politics of International Relations.
K.J. Holsti: International Politics: A Framework for Analysis.
J. Frankel: The Making of Foreign Policy.
J. Frankel: Contemporary International Theory and Behaviour of States.
J. Bennett: International Organizations.
J. Bandopadhyay: The Making of India's Foreign Policy.
D.A. Baldwin ed.: Neo-realism and Neo-liberalism.
M. Smith and R. Little: Perspectives on World Politics.
P.R. Viotti and M.V. Kauppi: International Relations and World Politics.
Muchkund Dubey: India's Foreign Policy: Coping with the Changing World.
Peu Ghosh: International Relations.
S.D. Muni: Indian Foreign Policy: The Democracy Dimension.
K.P. Bajpai and H.V. Panth: India's Foreign Policy--- A Reader.
Sumit Ganguly: India's Foreign Policy: Retrospect and Prospect.
V. P. Dutt: India's Foreign Policy since Independence.
V.P. Dutt: Indian Foreign Policy in a Changing World.

পুরুষোত্তম ভট্টাচার্য ও অনিন্দ্যজ্যোতি মজুমদার (সম্পা.): আন্তর্জাতিক সম্পর্কের রূপরেখা
গৌতম বসু: আন্তর্জাতিক সম্পর্ক: তত্ব ও বিবর্তন

Semester IV

Indian Political Thought IICode: PLS-A-CC-4-8-TH+TU

Module I:

1. M.N. Roy: Radical Humanism.
2. Narendra Deva, Ram Manohar Lohia, Jayaprakash Narayan: Socialist ideas
3. Syed Ahmed Khan and Iqbal: views on colonialism and nationalism.

Module II:

4. Nehru: views on Socialism and Democracy. Subhas Chandra Bose: views on Socialism and Fascism.
5. Contested notions of 'nation'--- Savarkar, Jinnah.
6. Jyotiba Phule and Ambedkar on caste system and untouchability. Pandita Ramabai's views on social justice

Readings:

V. R. Mehta and T. Pantham (eds.), 'A Thematic Introduction to Political Ideas in ModernIndia: Thematic Explorations, History of Science, Philosophy and Culture in Indian civilization, Vol. 10, Part: 7, pp. xxvii-ixi.
V. Mehta and Th. Pantham (eds.), Political ideas in modern India: Thematic Explorations
S. Hay (ed.), Sources of Indian Tradition, Vol. 2.Second Edition.
T. Pantham and K.L. Deutsch: Political Thought in Modern India.
Sumit Sarkar: Modern India.
Bipan Chandra: Nationalism and Colonialism in Modern India.
A. Parel, (ed.), 'Introduction', in Gandhi, freedom and Self Rule
D. Dalton, (1982) 'Continuity of Innovation', in Indian Idea of Freedom: Political Thought ofSwami Vivekananda, Aurobindo Ghose, Rabindranath Tagore and Mahatma Gandhi.
J. Nehru: Discovery of India.
B. Zachariah, Nehru.
S. Thorat and Aryana eds.: Ambedkar in Retrospect.
J. Sharma, (2003) Hindutva: Exploring the Idea of Hindu Nationalism
Y. Meherally ed.: Narendra Deva: Socialism and National Revolution.
Ramchandra Guha: India after Gandhi.
Uma Chakrabarti: Rewriting History: The Life and Times of Pandita Ramabai.
B. K. Bhattacharya ed., Salient Ideas of Rammonohar Lohia.
Bidyut Chakrabarty and R.K. Pandey: Modern Indian Political Thought--- Text and Context.

Global Politics since 1945Code: PLS-A-CC-4-9-TH+TU

Module I:

1. Cold War and its evolution: outline.Emergence of Third World: NAM; Pan Africanism. Post-Cold War world: overview. Globalization: conceptions and perspectives.
2. Europe in transition: European Union, Brexit (overview).
3. Major institutions of global governance: World Bank, IMF, WTO--- overview. Major regional organizations: ASEAN, OPEC, SAFTA, SAARC and BRICS. West Asia and the Palestine question.

Module II:

4.India and her neighbours I: Pakistan; Bangladesh.

5. India and her neighbours II: Nepal; Bhutan; Sri Lanka.

6. UNO: background; Major organs--- General Assembly, Security Council and Secretariat (with focus on Secretary General). Role of UNO in peace-keeping, human rights, and development (Millennium Development Goals and Sustainable Development Goals).

Readings:

P. Calvocoressi: World Politics since 1945 (latest edition).
R. Mansbach and K. Taylor, (2012) Introduction to Global Politics
J. Baylis and S. Smith (eds), The Globalization ofWorld Politics: An Introduction to International Relations.
G. Ritzer: Globalization--- A Basic Text.
J.A. Moore, Jr. and J. Pubantz: The New United Nations.
S. Juyal and B. Ramesh Babu: The United Nations and World Peace.
K. Bajpai and H.C. Shukul eds.: Interpreting World Politics.
J. Baylis and S. Smith: The Globalization of World Politics.
L.M. Goodriche: The UN in Changing World.
M.S. Rajan: Essays in Non-Alignment and UN.
Alvin Y. So: Development and Social Change.
J. Haynes: Third World Politics.
Ankie Hoogvelt: Globalization and the Postcolonial World
N.O. Sullivan ed.: Terrorism, Ideology and Revolution.
D. Nayyar: Governing Globalization.
G. Ritzer: Globalization--- A Basic Text.
S.D. Muni: Responding to Terrorism in South Asia.
Peter Burnel: Politics in the Developing World.
B.C. Smith: Understanding Third World Politics.
Björn Hettne: Development Theory and the Three Worlds.

রাধারমণ চক্রবর্তী ও সুকল্পা চক্রবর্তী: সমসাময়িক আন্তর্জাতিক সম্পর্ক
পুরুষোত্তম ভট্টাচার্য ও অনিন্দ্যজ্যোতি মজুমদার (সম্পা.):আন্তর্জাতিক সম্পর্কের রূপরেখা
গৌতম বসু: আন্তর্জাতিক সম্পর্ক: তত্ত্ব ও বিবর্তন
অনীক চট্টোপাধ্যায়: ঠাণ্ডাযুদ্ধের পর আন্তর্জাতিক সম্পর্ক

WESTERN POLITICAL THOUGHT AND THEORY I

Code: PLS-A-CC-4-10-TH+TU

Module I:

1. Greek political thought: main features – Plato: justice, communism – Aristotle: state, classifications of constitutions.
2. Roman political thought: theories of Law and Citizenship – contributions of Roman thought.
3. Medieval political thought in Europe: major features.
4. Contribution of Machiavelli. Significance of Renaissance. Political thought of Reformation.

Module II:

5. Bodin: Idea of Sovereignty.
6. Hobbes: founder of science of materialist politics.

7. Locke: founder of Liberalism. views on natural rights, property and consent.
8. Rousseau: views on freedom and democracy.

Readings:

A.Skoble and T. Machan: Political Philosophy: Essential Selections.
D. Boucher and P. Kelly, (eds) Political Thinkers: From Socrates tothe Present
G. H. Sabine and T.I. Thorson: A History of Political Theory.
D. Boucher and P. Kelly: Political Thinkers: From Socrates to the Present.
S. Mukherjee and S. Ramaswamy: A history of Political Thought: From Plato to Marx.
R.G. Gettell: History of Political Thought.
B. Barker: The Political Thought of Plato and Aristotle.
Q. Skinner: Machaivelli: A Very Short Introduction.
A.K. Mukhopadhyay: Western Political Thought: from Plato to Marx.

Semester V

WESTERN POLITICAL THOUGHT AND THEORY II

Code: PLS-A-CC-5-11-TH+TU

Module I:

1. Bentham: Utilitarianism. John Stuart Mill: views on liberty and representative government.
2. Hegel: Civil Society and State.
3. T. H. Green: Freedom, Obligation.

Module II:

4. Utopian and Scientific Socialism: basic characteristics.
5. Varieties of non-Marxist socialism: Fabianism, Syndicalism, Guild Socialism.
6. Anarchism: overview.
7. Cultural Marxism: Frankfurt School (overview). Post-Marxism: emergence and basic contentions.

Readings:

A.Skoble and T. Machan: Political Philosophy: Essential Selections.
D. Boucher and P. Kelly, (eds) Political Thinkers: From Socrates tothe Present
G. H. Sabine and T.I. Thorson: A History of Political Theory.
D. Boucher and P. Kelly: Political Thinkers: From Socrates to the Present.
S. Mukherjee and S. Ramaswamy: A history of political Thought: From Plato to Marx.
R.G. Gettell: History of Political Thought.
Q. Skinner: The Foundations of Modern Political Thought (2 Volumes).
A.K. Mukhopadhyay: Western Political Thought: from Plato to Marx.
C.E.M. Joad: Political Theory.
L. Kolakowski: Main Currents of Marxism (3 Volumes).
D.K. Das and T. Chattopadhyay: Varieties of Socialism.
D. McLellan: The Thought of Karl Marx.
D. McLellan: Marxism after Marx.

S. Mukherjee and S. Ramaswamy: A History of Socialist Thought.
Frankfurt School: Internet Encyclopedia of Philosophy, http://www.iep.utm.edu/frankfur/

শোভনলাল দত্তগুপ্ত (সম্পা.:পাশ্চাত্য রাষ্ট্রভাবনা)
অমল কুমার মুখোপাধ্যায়: রাষ্ট্রদর্শনের ধারা
রামকৃষ্ণ ভট্টাচার্য: মার্কসবাদ জিজ্ঞাসা
অমৃতাভ বন্দ্যোপাধ্যায়: পাশ্চাত্য রাষ্ট্রচিন্তার ইতিহাস
সুদীপ্ত দে: গণরাজ্য (প্লেটোর Republic র অনুবাদ)
নির্মলকান্তি মজুমদার: এ্যারিস্টটলের Politics –র অনুবাদ
সুনীল বরণ বিশ্বাস: ম্যাকিয়াভেলীর Prince –র অনুবাদ
হিমাংশু ঘোষ: রাজনৈতিক তত্ত্বের ইতিহাস (J H Sabine র ভাষান্তর)
শোভনলাল দত্তগুপ্ত: মার্কসীয় রাষ্ট্রচিন্তা–মার্কস থেকে মাও সে তুং

Political Sociology Code: PLS-A-CC-5-12-TH+TU

Module I:

1. Social bases of politics. Emergence of Political Sociology.
2. Political culture and Political socialization: nature, types and agencies.
3. Political participation: concept and types.
4. Political development and social change.
5. Political Communication: Concept and structures.

Module II:

6. Social stratification and politics: caste, tribe, class, elite.
7. Gender and politics: basic issues.
8. Religion and politics: varying perspectives.
9. Military and politics: conditions and modes of intervention.
10. Electorate and electoral behaviour (with special reference to the Indian context).

Readings:

Michael Rush: Politics and Sociology.
B. Axford et al.: Politics--- An Introduction.
Tom Bottomore: Political Sociology.
Amal K. Mukhopadhyay: Political Sociology.
S. Chakraborty ed.: Political Sociology.
Tom Bottomore: Classes in Modern Society.
R. Chatterjee ed.: Religion, Politics and Communalism.
B. Lindenfeld ed.: Reader in Political Sociology.
Pradip Basu (ed.) – Political Sociology
J. Forbes: Women in Modern India.
M. Evans ed.: The Women Question.
P. Worsley: The Three Worlds: Culture and World Development.
Samuel Huntington: Political Order in a Changing Society.
G.A. Almond and J.S. Coleman eds.: The Politics of Developing Areas.

J. Manor: Rethinking Third World Politics.
J. Kantola et al eds.: The Oxford Handbook of Gender Politics.
J. Blondel: Comparative Government.
G.A. Almond and G.B. Powell, Jr.: Comparative Politics: A Developmental Approach.
S. Oates: Introduction to Media and Politics.

টম বটমোরঃ মার্ক্সীয় সমাজতত্ত্ব (অনুবাদঃ হিমাংশু ঘোষ); সত্যব্রত চক্রবর্তীঃ রাষ্ট্র, সমাজ ও রাজনীতি

Semester VI

Public Administration-- Concepts and Perspectives Code: PLS-A-CC-6-13-TH+TU

Module I:

1. Nature, Scope and Evolution of Public Administration – Private and Public Administration. Principles of Socialist Management.
2. Challenges to discipline of Public Administration and responses: New Public Administration, Comparative Public Administration, Development Administration (Indian context).
3. Major concepts of administration: (a) Hierarchy (b) Unity of Command (c) Span of Control (d) Authority (e) Centralization, Decentralization and Delegation (f) Line and Staff.
4. Public Administration in the era of globalization, liberalization and privatization. Governance: conceptual emergence--- distinction with government. e-governance: features and significance.

Module II:

5. Bureaucracy: views of Marx and Weber.
6. Ecological approach to Public Administration: Riggsian Model.
7. Administrative Processes: (a) Decision making (b) Communication and Control (c) Leadership
(d) Coordination.
8. Public Policy: definition, characteristics. Models. Policy implementation.

Readings:

Nicholas Henry: Public Administration and the State.
W. Wilson, (2004) 'The Study of Administration', in B. Chakrabarty and M. Bhattacharya (eds), Administrative Change and Innovation: a Reader, New Delhi: Oxford University Press, pp. 85-101
Mohit Bhattacharya: Public Administration: Structure, Process and Behaviour.
M. Bhattacharya, Public Administration: Issues and Perspectives.
A. Avasthi and S. Avasthi: Pubic Administration.
M. Bhattacharya: Restructuring Public Administration.
B. Chakrabarty: Public Administration: From Government to Governance.
B. Chakrabarty and M. Bhattacharya eds.: Pubic Administration: A Reader.
B. Chakrabarty and M. Bhattacharya eds.: The Governance Discourse.
Shivani Singh: Governance: Issues and Challenges.
M.P. Sharma: Public Administration in Theory and Practice.
Rumki Basu: Public Administration: Concepts and Theories.
G.H. Frederickson: New Public Administration.
R. Prasad et al. eds.: Administrative Thinkers.

S.R. Maheswari: Administrative Theory.
Ramesh Arora: Comparative Public Administration.
R.K. Sapru: Development Administration.
M. Bhattacharya: New Horizons of Public Administration.
T. Dye, (1984) Understanding Public Policy, 5th Edition.
Xun Wu, M.Ramesh, Michael Howlett and Scott Fritzen, The Public Policy Primer: ManagingThe Policy Process.
Prabir Kumar De, *Public Policy and Systems*,
B. Chakrabarty and P. Chand: Public Administration in a Globalizing World: Theories and Practices.
U. Medury, Public administration in the Globalisation Era.
Additional Reading: The Oxford Handbook of Public Policy.

Administration and Public Policy in India Code: PLS-A-CC-6-14-TH+TU

Module I

1. Continuity and change in Indian administration: brief historical overview.
2. Civil Service in India (Bureaucracy): recruitment (role of UPSC, SPSC), training.
3. Organization of Union Government: Secretariat Administration: PMO, Cabinet Secretariat.
4. Organization of State Government: Chief Secretary – relations between Secretariat and Directorate.
5. District Administration: role of District Magistrate, SDO, BDO.

Module II:

6.Local Self Government: Corporations, Municipalities and Panchayats in West Bengal, structure and functions. 73rd and 74th Amendment: overview.
7. Planning: Planning Commission, National Development Council. District Planning. Changing nature of planning: NITI Ayog. Budget--- concept and significance.
8. Financial Administration: Public Accounts Committee, Estimates Committee – role of CAG.
9. Citizen and administration: functions of Lokpal and Lokayukt. Right to Information--- Citizen Charter.
10. Citizen and social welfare policies: MGNREGA; Sarva Shiksha Abhiyan (SSA); National Health Mission (NRHM).

Readings:

Bidyut Chakrabarty, Reinventing Public Administration: The Indian Experience.
S. R. Maheswari: Indian Administration.
R.B. Jain: Contemporary Issues in Indian Administration.
B. Chakrabarty and P. Chand: Indian Administration.
Noorjahan Bava, Development Policies and Administration in India.
Satyajit Singh and Pradeep K. Sharma [eds.] Decentralisation: Institutions and Politics inRural India.
Basu Rumki: Public Administration in India Mandates, Performance and FuturePerspectives.
A.Celestine: How to Read the Union Budget PRS, Centre for Policy Research, New Delhi, Available at http://www.prsindia.org/parliamenttrack/primers/how-to-read-the-union-budget-1023/
Primer on the Budget Process published by PRS, Available athttp://www.prsindia.org/parliamenttrack/primers/the-budget-process-484/
R.V. Vaidyanatha Ayyar, Public Policy Making In India, Pearson.

B. Chakrabarty and P. Chand: Public Policy: Concepts, Theory and Practice.
S. Singh and P. Sharma: Decentralization: Institutions and Politics in Rural India.
Anil Jana ed.: Decentralizing Rural Governance and Development.
P. Datta: Panchayats, Rural Development and Local Autonomy: the West Bengal Experience.
A. Mukhopadhyay: Panchayat Administration in West Bengal.

For both Courses 13 and 14:

মোহিত ভট্টাচার্য ও বিশ্বনাথ ঘোষ: জনপ্রশাসন ও পরিকল্পনা
সোমা ঘোষ: জনপ্রশাসন: তত্ত্ব ও প্রয়োগ
রাজশ্রী বসু: জনপ্রশাসন
পদ্মা রামচন্দ্রনঃ ভারতে সরকারী প্রশাসন (অনুবাদঃ সন্তোষ কুমার অধিকারী)
অসিত বসু: পশ্চিমবঙ্গে পঞ্চায়েত ব্যবস্থা
প্রভাত দত্ত: প্রসঙ্গ পঞ্চায়েত

Guidelines:

i) For very contemporary topics, such as, NITI Ayog and MGNREGA, the respective official websites may be consulted.

ii) For supplementary readings, relevant reputed websites of recognized academic credential may be legally accessed.

iii) Bengali books cited in a particular course may be used in another *related* course, if found relevant.

University of Calcutta

Final Draft BA (Honours)-CBCS Syllabus in Political Science, 2018
(Section II)

Discipline- specific Elective Category: 4 courses (8 courses provided). One from Group A and one from Group B in Semesters 5 and one from Group A and one from Group B in Semester 6.

Generic Elective Category: 4 courses(Core Courses of the General Syllabus from a subject other than Political Science. Not provided here.)

Each DSE and GE course: 6 credits (5 theoretical segment+ 1 for tutorial-related segment).

Skill Enhancement/Skill-based Category: 2 courses(4 courses provided). Each Course: 2 credits. Theoretical only (no Tutorial). Any one course from Group A in Semester 3 and any one course from Group B in Semester 4.

Ability Enhancement Compulsory Category:2 courses: Common for all. Not provided here.

- Each course carries 80 marks ^combining theoretical and tutorial segments (plus 10 marks each for Attendance and Continuous Internal Assessment).
- 6 credit course: Minimum 30 classes for Theory and 15 contact hours for Tutorial per module. 2 credit course: 30 teaching/lecture hours in total.

^End Semester Assessment--- 65 marks for theoretical segment: 50 marks for subjective/descriptive questions + 15 marks for 1 mark-questions. Question Pattern for subjective/descriptive segment of 50 marks: 2 questions (within 100 words; one from each module) out of 4 (10 x2 = 20) + 2 questions (within 500 words; one from each module) out of 4 (15 x 2 = 30).>>For Skill Enhancement Courses the last component would carry 6 questions--- 15 marks each--- out of which 3 (at least one from each module) to be attempted because such courses have no Tutorial.

- 15 marks for tutorial-related segments as suggested below (any one item from each mode): i) Written mode: upto 1000 words for one Term Paper/upto 500 words for each of the two Term Papers/ equivalent Book Review/equivalent Comprehension/equivalent Quotation or Excerpt Elaboration. ii) Presentation Mode: Report Presentation/Poster Presentation/Field work--- based on syllabus-related and/or current topics (May be done in groups) [The modes and themes and/or topics are be decided by the concerned faculty members of respective colleges.]
- Discipline-specific: 2 each (one from Group A and one from Group B) in Semesters 5 and 6.
- Generic Elective: 1 each in Semesters 1-4.**<>**Skill Enhancement: 1 each in Semesters 3 and 4.

IMPORTANT NOTES:

- The Readings provided below include many of those of the UGC Model CBCS Syllabus in Political Science. For Course Objectives and references it is advised that the UGC model CBCS syllabus* concerning relevant courses and topics be provided due importance and primarily consulted.

*Website: BA Political Science (Honours): https://www.ugc.ac.in/pdfnews/2085906_B.A-Hons.-Pol-Science.pdf

- Cited advanced texts in Bengali are not necessarily substitutes, but supplementary to English books.
- Paper Code Format: Subject Code-Course Code-Semester Code-Paper Number-Paper Component.
- The format is strictly subject to the parameters of the common structural format of CU CBCS.

Honours in Political Science

List of Discipline-specific Elective Courses:

- Gender and Politics
- Understanding South Asia
- Indian Foreign Policy in a Globalising World
- Development Process and Social Movements in Contemporary India
- Public Policy in India
- Understanding Global Politics
- Citizenship in a Globalising World
- Human Rights in a Comparative Perspective

List of Skill Enhancement Courses:

- Democratic Awareness through Legal Literacy
- Understanding the Legal System
- Legislative Practices and Procedures
- Elementary Aspects of Social Research

Discipline-specific Electives:

Gender and Politics

Code: PLS-A-DSE-5-A(1)-TH+TU

Module I

I. Groundings
1. Patriarchy
a. Sex-Gender Debates
b. Public and Private
c. Power
2. Feminism
3. Family, Community, State
a. Family
b. Community
c. State

Module II

II. Movements and Issues
1. History of the Women's Movement in India
2. Violence against women
3. Work and Labour
a. Visible and Invisible work
b. Reproductive and care work
c. Sex work

Readings:

I. Groundings
1. Patriarchy
T. Shinde, (1993) 'Stree Purusha Tulna', in K. Lalitha and Susie Tharu (eds), *Women Writingin India,* New Delhi, Oxford University Press, pp. 221-234.
a. Sex Gender Debates
Readings:
V Geetha, (2002) *Gender,* Kolkata, Stree, pp. 1-20
b. Public and Private
Readings:
M. Kosambi, (2007) *Crossing the Threshold,* New Delhi, Permanent Black, pp. 3-10; 40-46
c. Power
Readings:
N. Menon, (2008) 'Power', in R. Bhargava and A. Acharya (eds), *Political Theory: AnIntroduction,* Delhi: Pearson, pp.148-157
2. Feminism
Readings:
B. Hooks, (2010) 'Feminism: A Movement to End Sexism', in C. Mc Cann and S. Kim (eds), *The Feminist Reader: Local and Global Perspectives,* New York: Routledge, pp. 51-57
R. Delmar, (2005) 'What is Feminism?', in W. Kolmar & F. Bartkowski (eds) *Feminist Theory: A Reader,* pp. 27-37
3.Family, Community and State

a.Family

Readings:

R. Palriwala, (2008) 'Economics and Patriliny: Consumption and Authority within the Household' in M. John. (ed) *Women's Studies in India,* New Delhi: Penguin, pp. 414-423

b. Community

Readings:

U. Chakravarti, (2003) *Gendering Caste through a Feminist Len,* Kolkata, Stree, pp. 139-159.

c. State

C. MacKinnon, 'The Liberal State' from *Towards a Feminist Theory of State,* Available at http://fair-use.org/catharine-mackinnon/toward-a-feminist-theory-of-the-state/chapter-8, Accessed: 19.04.2013.

Additional Readings:

K. Millet, (1968) *Sexual Politics,* Available at http://www.marxists.org/subject/women/authors/millett-kate/sexual-politics.htm, Accessed: 19.04.2013.

N. Menon (2008) 'Gender', in R. Bhargava and A. Acharya (eds), *Political Theory: AnIntroduction,* New Delhi: Pearson, pp. 224-233

R. Hussain, (1988) 'Sultana's Dream', in *Sultana's Dream and Selections from the SecludedOnes – translated by Roushan Jahan,* New York: The Feminist Press

S. Ray 'Understanding Patriarchy', Available at http://www.du.ac.in/fileadmin/DU/Academics/course_material/hrge_06.pdf, Accessed: 19.04.2013.

S. de Beauvoir (1997) *Second Sex,* London: Vintage.

Saheli Women's Centre, (2007) *Talking Marriage, Caste and Community: Women's Voicesfrom Within,* New Delhi: monograph

II. Movements and Issues

1. History of Women's Movement in India

Readings:

I. Agnihotri and V. Mazumdar, (1997) 'Changing the Terms of Political Discourse: Women'sMovement in India, 1970s-1990s', *Economic and Political Weekly*, 30 (29), pp. 1869-1878.

R. Kapur, (2012) 'Hecklers to Power? The Waning of Liberal Rights and Challenges toFeminism in India', in A. Loomba *South Asian Feminisms,* Durham and London: DukeUniversity Press, pp. 333-355

2. Violence against Women

Readings:

N. Menon, (2004) 'Sexual Violence: Escaping the Body', in *Recovering Subversion,* New Delhi:Permanent Black, pp. 106-165

3. Work and Labour

a. Visible and Invisible work

Readings:

P. Swaminathan, (2012) 'Introduction', in *Women and Work,* Hyderabad: Orient Blackswan,pp.1-17

b. Reproductive and care work

Reading:

J. Tronto, (1996) 'Care as a Political Concept', in N. Hirschmann and C. Stephano, *Revisioningthe Political*, Boulder: Westview Press, pp. 139-156

c. Sex work

Readings:

Darbar Mahila Samanwaya Committee, Kolkata (2011) 'Why the so-called Immoral Traffic(Preventive) Act of India Should be Repealed', in P. Kotiswaran, *Sex Work,* New Delhi,Women Unlimited, pp. 259-262

N. Jameela, (2011) 'Autobiography of a Sex Worker', in P. Kotiswaran, *Sex Work,* New Delhi:Women Unlimited, pp. 225-241

Additional Readings:

C. Zetkin, 'Proletarian Woman', Available at
http://www.marxists.org/archive/zetkin/1896/10/women.htm, Accessed: 19.04.2013.
F. Engles, *Family, Private Property and State*, Available at
http://readingfromtheleft.com/PDF/EngelsOrigin.pdf, Accessed: 19.04.2013.
J. Ghosh, (2009) *Never Done and Poorly Paid: Women's Work in Globalising India,* Delhi:Women Unlimited
Justice Verma Committee Report, Available at http://nlrd.org/womens-rightsinitiative/
justice-verma-committee-report-download-full-report, Accessed: 19.04.2013.
N. Gandhi and N. Shah, (1992) *Issues at Stake – Theory and Practice in the Women'sMovement,* New Delhi:
Kali for Women.
V. Bryson, (1992) *Feminist Political Theory,* London*:* Palgrave-MacMillan, pp. 175-180; 196-200.
M. Mies, (1986) 'Colonisation and Housewifisation', in *Patriarchy and Accumulation on a*
World Scale London: Zed, pp. 74-111, Available at
http://caringlabor.wordpress.com/2010/12/29/maria-mies-colonization-andhousewifization/,
R. Ghadially, (2007) *Urban Women in Contemporary India,* Delhi: Sage Publications.
S. Brownmiller, (1975) *Against our Wills,* New York: Ballantine.
Saheli Women's Centre (2001) 'Reproductive Health and Women's Rights, Sex Selection and
feminist response' in S Arya, N. Menon, J. Lokneeta (eds), *Nariwadi Rajneeti,* Delhi, pp. 284-306.
V. Bryson (2007) *Gender and the Politics of Time,* Bristol: Polity Press.

Understanding South Asia

Code: PLS-A-DSE-5-A(2)-TH+TU

Module I

I. South Asia- Understanding South Asia as a Region
(a) Historical and Colonial Legacies
(b) Geopolitics of South Asia
II. Politics and Governance
Regime types: democracy, authoritarianism, monarchy
(b) Emerging constitutional practices: forms of government in India, Nepal, Bhutan, Sri Lanka and Pakistan

Module II

III. Socio-Economic Issues
(a) Identity politics: challenges and impacts (case studies of
India, Nepal, Sri Lanka)
IV. Regional Issues and Challenges
(a) South Asian Association for Regional Cooperation (SAARC): problems and prospects
(b)Terrorism: Political and Social Consequences in South Asia;
(c) Refugee crisis.

Readings:

Hewitt, V. (1992) 'Introduction', in The International Politics of South Asia. Manchester:
Manchester University Press, pp.1-10.
Hewitt, V. (2010) 'International Politics of South Asia' in Brass, P. (ed.) Routledge Handbook
of South Asian Politics. London: Routledge, pp.399-418.
Muni, S.D. (2003) 'South Asia as a Region', South Asian Journal, 1(1), August-September, pp.

1-6

Baxter, C. (ed.) (1986) The Government and Politics of South Asia. London: Oxford University Press, pp.376-394.
Baxter, C. (2010) 'Introduction', Brass, P. (ed.) Routledge Handbook of South Asian Politics. London: Routledge, pp.1-24

II. Politics and Governance

De Silva, K.M. (2001)'The Working of Democracy in South Asia', in Panandikar, V.A (ed.) Problems of Governance in South Asia. New Delhi: Centre for Policy Research & Konark Publishing House, pp. 46-88.
Wilson, J. (2003) 'Sri Lanka: Ethnic Strife and the Politics of Space', in Coakley, J. (ed.) The Territorial Management of Ethnic Conflict. Oregon: Frank Cass, pp. 173-193.
Mendis, D. (2008) 'South Asian Democracies in Transition', in Mendis, D. (ed.) Electoral Processes and Governance in South Asia. New Delhi: Sage, pp.15-52.
Subramanyam, K. (2001) 'Military and Governance in South Asia', in V.A (ed.) Problems of Governance in South Asia. New Delhi: Centre for Policy Research & Konark Publishing House, pp.201-208.
Hachethi, K. and Gellner, D.N.(2010) 'Nepal : Trajectories of Democracy and Restructuring of the State', in Brass, P. (ed.) Routledge Handbook of South Asian Politics. London: Routledge, pp. 131-146.
Kukreja, V. 2011. 'Federalism in Pakistan', in Saxena R. (ed.) Varieties of Federal Governance. New Delhi: Foundation Books, pp. 104-130.
Jha, N.K. (2008) 'Domestic Turbulence in Nepal: Origin, Dimensions and India's Policy Options', in Kukreja, V. and Singh, M.P. (eds.) Democracy, Development and Discontent in South Asia. New Delhi: Sage, pp. 264-281.
Burki, S.J. (2010) 'Pakistan's Politics and its Economy', in Brass, P. (ed.) Routledge Handbook of South Asian Politics. London: Routledge, pp. 83-97.
Kaul, N. (2008)'Bearing Better Witness in Bhutan', Economic and Political Weekly, 13 September, pp. 67-69.

III. Socio-Economic Issues

Phadnis, U.(1986) 'Ethnic Conflicts in South Asian States', in Muni, S.D. et.al. (eds.) Domestic Conflicts in South Asia : Political, Economic and Ethnic Dimensions. Vol. 2. New Delhi: South Asian Publishers, pp.100-119.
Kukreja, V. (2003) Contemporary Pakistan. New Delhi: Sage, pp. 75-111 and 112-153.

IV. Regional Issues and Challenges

Narayan, S. (2010) 'SAARC and South Asia Economic Integration', in Muni, S.D. (ed.) Emerging dimensions of SAARC. New Delhi: Foundation Books, pp. 32-50.
Muni, S.D. and Jetley, R. (2010) 'SAARC prospects: the Changing Dimensions', in Muni, S.D. (ed.) Emerging dimensions of SAARC. New Delhi: Foundation Books, pp. 1-31.
Baral, L.R. (2006) 'Responding to Terrorism: Political and Social Consequences in South Asia', in Muni, S.D. (ed.) Responding to terrorism in South Asia. New Delhi: Manohar, pp.301-332.
Muni, S.D. (2006) 'Responding to Terrorism: An Overview', in Muni, S.D. (ed.) Responding to terrorism in South Asia. New Delhi: Manohar, pp.453-469.
Hoyt, T.D. (2005) 'The War on Terrorism: Implications for South Asia', in Hagerty, D.T. (ed.) South Asia in World Politics. Lanham: Roman and Littlefield Publishers, pp.281-295.
Lama, M. (2003) 'Poverty, Migration and Conflict: Challenges to Human Security in South Asia', in Chari, P.R. and Gupta, S. (eds.) Human Security in South Asia: Gender, Energy, Migration and Globalisation. New Delhi: Social Science Press, pp. 124-144
Acharya, J. and Bose, T.K. (2001) 'The New Search for a Durable Solution for Refugees: South Asia', in Samaddar, S. and Reifeld, H. (eds.) Peace as Process: Reconciliation and Conflict Resolution in South Asia. New Delhi: Vedams ,pp-137-157

Additional Readings

Baxter, C. (ed.) (1986) The Government and Politics of South Asia. London: Oxford University Press.
Rizvi, G. (1993) South Asia in a Changing International Order. New Delhi: Sage.
Thakur, R. and Wiggin, O.(ed.) (2005) South Asia and the world. New Delhi: Bookwell.
Hagerty, D.T.(ed.) (2005) South Asia in World Politics, Oxford: Rowman and Littlefield.
Samaddar, R. (2002) 'Protecting the Victims of Forced Migration: Mixed Flows and Massive Flows', in Makenkemp, M. Tongern, P.V. and Van De Veen, H. (eds.) Searching for Peace in Central and South Asia. London: Lynne Reinner.
Kukreja, V. and Singh, M.P. (eds) (2008) Democracy, Development and Discontent in SouthAsia. New Delhi: Sage.

Indian Foreign Policy in a Globalising World

Code: PLS-A-DSE-5-B (1)-TH+TU

Module I

I. India's Foreign Policy: From a Postcolonial State to an Aspiring Global Power
2. India's Relations with the USA and USSR/Russia
3. India's Engagements with China

Module II

4. India in South Asia: Debating Regional Strategies
5. India's Negotiating Style and Strategies: Trade, Environment and Security Regimes
6. India in the Contemporary Multipolar World

Readings:

I. India's Foreign Policy: From a Postcolonial State to an Aspiring Global Power

S. Ganguly and M. Pardesi, (2009) 'Explaining Sixty Years of India's Foreign Policy', in India Review, Vol. 8 (1), pp. 4–19.
Ch. Ogden, (2011) 'International 'Aspirations' of a Rising Power', in David Scott (ed.), Handbook of India's International Relations, London: Routeledge, pp.3-31
W. Anderson, (2011) 'Domestic Roots of Indian Foreign Policy', in W. Anderson, Trysts with Democracy: Political Practice in South Asia, Anthem Press: University Publishing Online.
J. Bandhopadhyaya, (1970) The Making of India's Foreign Policy, New Delhi: Allied Publishers.

II: India's Relations with the USA and USSR/Russia

S. Mehrotra, (1990) 'Indo-Soviet Economic Relations: Geopolitical and Ideological Factors', in India and the Soviet Union: Trade and Technology Transfer, Cambridge University Press: Cambridge, pp. 8-28.
R. Hathaway, (2003) 'The US-India Courtship: From Clinton to Bush', in S. Ganguly (ed.), India as an Emerging Power, Frank Cass: Portland.
A. Singh, (1995) 'India's Relations with Russia and Central Asia', in International Affairs, Vol. 71 (1): 69-81.
M. Zafar, (1984), 'Chapter 1', in India and the Superpowers: India's Political Relations with the Superpowers in the 1970s, Dhaka, University Press.
H. Pant, (2008) 'The U.S.-India Entente: From Estrangement to Engagement', in H. Pant, Contemporary Debates in Indian Foreign and Security Policy: India Negotiates Its Rise in the International System, Palgrave Macmillan: London.
D. Mistry, (2006) 'Diplomacy, Domestic Politics, and the U.S.-India Nuclear Agreement', in Asian Survey, Vol. 46 (5), pp. 675-698.

III: India's Engagements with China

H. Pant, (2011) 'India's Relations with China', in D. Scott (ed.), Handbook of India's International Relations, London: Routeledge, pp. 233-242.
A. Tellis and S. Mirski, (2013) 'Introduction', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.
S. Raghavan, (2013) 'Stability in Southern Asia: India's Perspective', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.
Li Li, (2013) 'Stability in Southern Asia: China's Perspective', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.
IV: India in South Asia: Debating Regional Strategies
S. Muni, (2003) 'Problem Areas in India's Neighbourhood Policy', in South Asian Survey, Vol. 10 (2), pp. 185-196.
S. Cohen, (2002) India: Emerging Power, Brookings Institution Press.V. Sood, (2009) 'India and regional security interests', in Alyssa Ayres and C. Raja Mohan (eds), Power realignments in Asia: China, India, and the United States, New Delhi: Sage.
M. Pardesi, (2005) 'Deducing India's Grand Strategy of Regional Hegemony from Historical and Conceptual Perspectives', IDSS Working Paper, 76,
D. Scott, (2009) 'India's "Extended Neighbourhood" Concept: Power Projection for a Rising Power', in India Review, Vol. 8 (2), pp. 107-143 112
V: India's Negotiating Style and Strategies: Trade, Environment and Security Regimes
S. Cohen, (2002) 'The World View of India's Strategic Elite', in S. Cohen, India: Emerging Power, Brookings Institution Press, pp. 36-65.
A. Narlikar, (2007) 'All that Glitters is not Gold: India's Rise to Power', in Third World Quarterly, Vol. 28 (5) pp. 983 – 996.
N. Dubash, (2012) 'The Politics of Climate Change in India: Narratives of Enquiry and Cobenefits', Working Paper, New Delhi: Centre for Policy Research. N. Jayaprakash, (2000) 'Nuclear Disarmament and India', in Economic and Political Weekly, Vol. 35 (7), pp. 525-533.
P. Bidwai, (2005) 'A Deplorable Nuclear Bargain', in Economic and Political Weekly, Vol. 40 (31), pp. 3362-3364.
A. Anant, (2011) 'India and International Terrorism', in D. Scott (ed.), Handbook of India's International Relations, London: Routledge, pp. 266-277.

VI: India in the Contemporary Multipolar World
R. Rajgopalan and V. Sahni (2008), 'India and the Great Powers: Strategic Imperatives, Normative Necessities', in South Asian Survey, Vol. 15 (1), pp. 5–32.
C. Mohan, (2013) 'Changing Global Order: India's Perspective', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.
A. Narlikar, (2006) 'Peculiar Chauvinism or Strategic Calculation? Explaining the Negotiating Strategy of a Rising India', in International Affairs, Vol. 82 (1), pp. 59-76.
P. Mehta, (2009) 'Still Under Nehru's Shadow? The Absence of Foreign Policy Frameworks in India', in India Review, Vol. 8 (3), pp. 209–233.

Development Process and Social Movements in Contemporary India

Code: PLS-A-DSE-5-B(2)-TH+TU

Module I

I. Development Process since Independence
a. State and planning
b. Liberalization and reforms
II. Industrial Development Strategy and its Impact on the Social Structure

a. Mixed economy, privatization, the impact on organized and unorganized labour
b. Emergence of the new middle class
III. Agrarian Development Strategy and its Impact on the Social Structure
a. Land Reforms, Green Revolution
b. Agrarian crisis since the 1990s and its impact on farmers

Module II

IV. Social Movements
Social movements and New Social movements
Approaches to the study of social movements: Marxist theory, Gandhian theory, Resource Mobilisation theory, Relative Deprivation theory
V. Globalisation and Social Movements in India (18classes)
Environmental movements
Tribal movements
Women's movements
Civil rights movements

Readings:

I. The Development Process since Independence

A. Mozoomdar, (1994) 'The Rise and Decline of Development Planning in India', in T. Byres(ed.) *The State and Development Planning in India*. Delhi: Oxford University Press, pp. 73-108.

A. Varshney, (2010) 'Mass Politics or Elite Politics? Understanding the Politics of India'sEconomic Reforms' in R. Mukherji (ed.) *India's Economic Transition: The Politics of Reforms*,Delhi: Oxford University Press, pp 146-169.

P. Chatterjee, (2000) 'Development Planning and the Indian State', in Zoya Hasan (ed.), *Politics and the State in India*, New Delhi: Sage, pp.116-140.

P. Patnaik and C. Chandrasekhar, (2007) 'India: Dirigisme, Structural Adjustment, and theRadical Alternative', in B. Nayar (ed.), *Globalization and Politics in India*. Delhi: OxfordUniversity Press, pp. 218-240.

P. Bardhan, (2005) 'Epilogue on the Political Economy of Reform in India', in *The PoliticalEconomy of Development in India*. 6th impression, Delhi: Oxford University Press.

T. Singh, (1979) 'The Planning Process and Public Process: a Reassessment', *R. R. KaleMemorial Lecture*, Pune: Gokhale Institute of Politics and Economics.

II. Industrial development strategy and its impact on social structure

Readings:

A. Aggarwal, (2006) 'Special Economic Zones: Revisiting the Policy Debate', in *Economic and Political Weekly*, XLI (43-44), pp.4533-36.

B. Nayar (1989) *India's Mixed Economy: The Role of Ideology and its Development*, Bombay:Popular Prakashan.

F. Frankel, (2005) 'Crisis of National Economic Planning', in *India's Political Economy (1947-2004): The Gradual Revolution*, Delhi: Oxford University Press, pp. 93-340.

L. Fernandes, (2007) *India's New Middle Class: Democratic Politics in an Era of EconomicReform*, Delhi: Oxford University Press.

S. Shyam, (2003) 'Organizing the Unorganized', in *Seminar*, [Footloose Labour: A Symposiumon Livelihood Struggles of the Informal Workforce, 531] pp. 47-53.

S. Chowdhury, (2007) 'Globalization and Labour', in B. Nayar (ed.) *Globalization and Politicsin India*, Delhi: Oxford University Press, pp.516-526.

V. Chibber, (2005) 'From Class Compromise to Class Accommodation: Labor's Incorporationinto the Indian Political Economy' in R. Ray, and M.F. Katzenstein (eds.) *SocialMovements inIndia*, Delhi: Oxford University Press, pp 32-60.

III. Agrarian development strategy and its impact on social structure

Readings:

A. Desai, (ed.), (1986) *Agrarian Struggles in India after Independence*, Delhi: OxfordUniversity Press, pp. xi-xxxvi.
F. Frankel, (1971) *India's Green Revolution: Economic Gains and Political Costs*, Princetonand New Jersey: Princeton University Press.
F. Frankel, (2009) *Harvesting Despair: Agrarian Crisis in India*, Delhi: Perspectives, pp. 161-169.
J. Harriss, (2006) 'Local Power and the Agrarian Political Economy' in Harriss, J. (ed) *Power Matters: Essays on Institutions, Politics, and Society in India*, Delhi. Oxford University Press,pp. 29-32.
K. Suri, (2006) 'Political economy of Agrarian Distress', in *Economic and Political Weekly*,XLI(16) pp. 1523-1529.
P. Joshi, (1979) *Land Reforms in India: Trends and Perspectives*, New Delhi: Allied publishers.
P. Appu, (1974) 'Agrarian Structure and Rural Development', in *Economic and PoliticalWeekly*, IX (39), pp.70 – 75.
P. Sainath, (2010) 'Agrarian Crisis and Farmers', Suicide', *Occasional Publication*22, NewDelhi: India International Centre (IIC).
M. Sidhu, (2010) 'Globalisation vis-à-vis Agrarian Crisis in India', in R. Deshpande and S.Arora, (eds.) *Agrarian Crises and Farmer Suicides (Land Reforms in India Series),* New Delhi:Sage, pp. 149-174.
V. Sridhar, (2006) 'Why Do Farmers Commit Suicide? The Case Study of Andhra Pradesh', in *Economic and Political Weekly*, XLI (16).

IV. Social Movements

G. Shah, (ed.), (2002) *Social Movements and the State*. New Delhi: Sage Publications.
R. Singh (2001), *Social Movements, Old and New:A Post-Modernist Critique*, New Delhi: Sage
P. Wignaraja (ed.), (1993), *New Social Movements in the South:Empowering the People*, New Delhi: Vistar
V. Globalisation and Social Movements in India

Readings:

G. Haragopal, and K. Balagopal, (1998) 'Civil Liberties Movement and the State in India', in M. Mohanty, P. Mukherji and O. Tornquist, (eds.) *People's Rights*: *Social Movements and the State in the Third World* New Delhi: Sage, pp. 353-371.
M. Mohanty, (2002) 'The Changing Definition of Rights in India', in S. Patel, J. Bagchi, and K. Raj (eds.) *Thinking Social Sciences in India: Essays in Honour of Alice Thorner* Patel, NewDelhi: Sage.
G. Omvedt, (2012) 'The Anti-caste Movement and the Discourse of Power', in N. Jayal (ed.) *Democracy in India*, New Delhi: Oxford India Paperbacks, sixth impression, pp.481-508.
P. Ramana, (2011) 'India's Maoist Insurgency: Evolution, Current Trends and Responses', in M. Kugelman (ed.) *India's Contemporary Security Challenges*, Woodrow Wilson International Centre for Scholars Asia Programme, Washington D.C., pp.29-47.
A. Ray, (1996) 'Civil Rights Movement and Social Struggle in India', in *Economic and Political Weekly*, XXI (28). pp. 1202-1205.
A. Roy, (2010) 'The Women's Movement', in N.Jayal and P. Mehta (eds.) *The OxfordCompanion to Politics in India*, New Delhi: Oxford University Press, pp.409-422.
N. Sundar, (2011) 'At War with Oneself: Constructing Naxalism as India's Biggest SecurityThreat', in M. Kugelman (ed.) *India's Contemporary Security Challenges*, Woodrow WilsonInternational Centre for Scholars Asia Programme, Washington D.C., pp.46-68.
M. Weiner, (2001) 'The Struggle for Equality: Caste in Indian Politics', in A.Kohli. (ed.) *TheSuccess of India's Democracy*, Cambridge: CUP, pp.193-225.

S. Sinha, (2002) 'Tribal Solidarity Movements in India: A Review', in G. Shah. (ed.) *SocialMovements and the State*, New Delhi: Sage, pp. 251-266.

Additional Readings:

S. Banerjee, (1986) 'Naxalbari in Desai', in A.R. (ed.) *Agrarian Struggles in India AfterIndependence*. Delhi: Oxford University Press, pp.566-588.
B. Nayar, (ed.), (2007) *Globalization and Politics in India*. Delhi: Oxford University Press.S. Roy and K. Debal, (2004) *Peasant Movements in Post-Colonial India: Dynamics ofMobilization and Identity*, Delhi: Sage.
G. Omvedt, (1983) *Reinventing Revolution, New Social Movements and the SocialistTradition in India*, New York: Sharpe.
G. Shah, (ed.), (2002) *Social Movements and the State*. New Delhi: Sage Publications.
G. Shah, (2004) *Social Movements in India: A Review of Literature*, New Delhi: SagePublications.
G. Rath, (ed.), (2006) *Tribal development in India: The Contemporary Debate*, New Delhi:Sage Publications.
J. Harris, (2009) *Power Matters: Essays on Institutions, Politics, and Society in India*. Delhi:Oxford University press.
K. Suresh, (ed.), (1982) *Tribal Movements in India*, Vol I and II, New Delhi: Manohar(emphasis on the introductory chapter).
M. Mohanty, P. Mukherji and O.Tornquist, (1998) *People's Rights: Social Movements andthe State in the Third World*. New Delhi: Sage Publications.
M. Rao, (ed.), (1978) *Social Movements in India*, Vol. 2, Delhi: Manohar.
N. Jayal, and P. Mehta, (eds.), (2010) *The Oxford Companion to Politics in India*, Delhi:OxfordUniversity Press.
P. Bardhan, (2005) *The Political Economy of Development in India*, 6th impression, Delhi:Oxford University Press.
R. Mukherji, (ed.), (2007) *India's Economic Transition: The Politics of Reforms*, Delhi: OxfordUniversity Press.
R, Ray and M. Katzenstein, (eds.), (2005) *Social Movements in India*, Delhi: Oxford UniversityPress.
S. Chakravarty, (1987) *Development Planning: The Indian Experience*, Delhi: OxfordUniversity Press.

Public Policy in India

Code: PLS-A-DSE-6-A(3)-TH+TU

Module I

1.Introduction to Policy Analysis
2. The Analysis of Policy vis-à-vis the Theories of State

Module II

3. Political Economy and Policy: Interest Groups and Social Movements.
4. Ideology and Policy: Nehruvian Vision, Economic Liberalisation and recent developments

Readings:

I Introduction to Policy Analysis

Jenkins, B. (1997) 'Policy Analysis: Models and Approaches' in Hill, M. (1997) *The PolicyProcess: A Reader* (2nd Edition). London: Prentice Hall, pp. 30-40.
Dye, T.R. (2002) *Understanding Public Policy*. Tenth Edition. Delhi: Pearson, pp.1-9, 32-56 and 312-329.
Sapru, R.K.(1996) *Public Policy : Formulation, Implementation and Evaluation*. New Delhi: Sterling Publishers, pp. 26-46.
Wildavsky, A.(2004), ' Rescuing Policy Analysis from PPBS' in Shafritz, J.M. & Hyde, A.C. (eds.) *Classics of Public Administration*. 5th Edition. Belmont: Wadsworth, pp.271-284.

II. The Analysis of Policy in the Context of Theories of State

Dunleavy, P. and O'Leary, B. (1987) *Theories of the State*. London: Routledge.

McClennan, G. (1997) 'The Evolution of Pluralist Theory' in Hill, M. (ed.) *The Policy Process:A Reader.* 2nd Edition. London: Prentice Hall, pp. 53-61.
Simmie, J. & King, R. (eds.) (1990) *The State in Action: Public Policy and Politics.* London: Printer Publication, pp.3-21 and 171-184.
Skocpol, T. et al (eds.) (1985) *Bringing the State Back In.* Cambridge: Cambridge University Press, pp. 3-43 and 343-366.
Dye, T.R. (2002) *Understanding Public Policy*. 10th Edition. Delhi: Pearson, pp.11-31.

III. Political Economy and Policy: Interest Groups and Social Movements.

Lukes, S. (1986) *Power.* Basil: Oxford, pp. 28-36.
Lukes, S. (1997) 'Three Distinctive Views of Power Compared', in Hill, M. (ed.), *The Policy Process: A Reader.* 2nd Edition. London: Prentice Hall, pp. 45-52.
Giddens, A. (1998) *The Third Way: The Renewal of Social Democracy.* Cambridge: Polity Press, pp. 27-64 and 99-118.

IV. Ideology and Policy: Nehruvian Vision, Economic Liberalisation and recent developments

Basu Rumki (2015) Public Administration in India Handates, Performance and Future Perspectives, New Delhi, Sterling Publishers
Self, P. (1993) *Government by the Market? The Politics of Public Choice*. Basingstoke: MacMillan, pp. 1-20,70-105,113-146,198-231 and 262-277.
Girden,E.J.(1987) 'Economic Liberalisation in India: The New Electronics Policy' in *AsianSurvey*. California University Press. Volume 27, No.11. Available at -www.jstor.org/stable/2644722.

Understanding Global Politics

Code: PLS-A-DSE-6-A(4)-TH+TU

Module I

I. What Makes the World What it is
a. The Sovereign State System

i Evolution of the state system
ii The concept of Sovereignty

b. The Global Economy
i Discussing the Bretton Woods Institutions and WTO
ii Ideological underpinnings
iii Transnational Economic Actors

c. Identity and Culture

ii. What Drives the World Apart
a.Global Inequalities
b.Violence: Conflict, War and Terrorism

III. Why We Need to Bring the World Together

a.Global Environment b. Global Civil Society

Readings:

I. What Makes the World What it is? a. The Sovereign State System

S. Elden, (2009) 'Why Is The World Divided Territorially?', in J. Edkins and M. Zehfuss (eds.) *Global Politics: A New Introduction*, New York: Routledge, pp. 192-219.

M. Shapiro, (2009) 'How Does The Nation- State Work?', in J. Edkins and M. Zehfuss (eds.) *Global Politics: A New Introduction*, New York: Routledge, pp. 220-243.

R. Mansbach and K.Taylor, (2012) 'The Evolution of the Interstate System and Alternative Global Political Systems', *Introduction to Global Politics*, 2nd edition, New York: Routledge, pp. 34-68.

D. Armstrong, (2008) 'The Evolution of International Society', in J. Baylis, S. Smith, and P. Owens (ed.) *The Globalization of World Politics: An Introduction to International Relations,* New York: Oxford University Press, pp. 36-52.

N. Inayatullah and D. Blaney, (2012) 'Sovereignty' in B. Chimni and S. Mallavarapu (ed.) *International Relations: Perspectives For the Global South*, New Delhi: Pearson, pp. 124-134.

b. The Global Economy

Readings:

V. Peterson**,** (2009) 'How Is The World Organized Economically?', in J. Edkins and M. Zehfuss (eds.) *Global Politics: A New Introduction*, New York: Routledge, pp. 271- 293.

Bourke, (2009) 'Why Does Politics Turn Into Violence?', in J. Edkins And M. Zehfuss (eds.), *Global Politics: A New Introduction*, New York: Routledge, pp. 370-396.

Bajpai, (2012) 'Global Terrorism', in B. Chimni and S. Mallavarapu (ed.), *InternationalRelations: Perspectives For the Global South*, New Delhi: Pearson, pp. 312-327.

R. Mansbach, and K. Taylor, (2012) 'The Causes of War and the Changing Nature Of Global Politics', in *Introduction to Global Politics,* 2nd edition, New York: Routledge, pp. 248-283.

R. Collin and P. Martin, 'Kinds Of Conflict: The World When Things Go Wrong', in *AnIntroduction To World Politics: Conflict And Consensus On A Small Planet*, London: Rowman& Littlefield Publishers, pp. 267-425.

III. Why We Need to Bring the World Together? a. Global Environment

Readings:

S. Dalby, (2009) 'What Happens If We Do not Think In Human Terms?', in J. Edkins and M. Zehfuss (eds.), *Global Politics: A New Introduction*, New York: Routledge, pp. 45-69.

R. Collin and P. Martin, (2013) 'The Greening of A Blue Planet', in *An Introduction To WorldPolitics: Conflict And Consensus On A Small Planet*, Maryland: The Rowman & LittlefieldPublication Group, pp. 527-570.

A. Heywood, (2011) 'Global Environmental Issues', in *Global Politics,* London: Palgrave, 2011, pp. 383-411.

N. Carter, (2007) *The Politics of Environment: Ideas, Activism, Policy*, 2nd edition, Cambridge: Cambridge University Press, pp 13-81.

b. Global Civil Society

Readings:

Zehfuss, (2009) 'What Can We Do To Change The World?', in J. Edkins and M. Zehfuss (eds.), *Global Politics: A New Introduction* , New York: Routledge, pp. 483-501.

N. Chandhoke, (2011) 'The Limits of Global Civil Society,' Available at www.gcsknowledgebase.org/wp-content/uploads/2002chapter2.pdf, Accessed: 19.04.2013.

K. Mingst and J. Snyder (eds.), (2011) 'Transnational Issues', in *Essential Readings In WorldPolitics,* 4th Edition, New York: W. W. Norton And Company, pp. 574-626.

M. Keck and K. Sikkink, (2007) 'Transnational Activist Networks,' in Robert J. Art and R. Jervis (eds.) *International Politics: Enduring Concepts and Contemporary Issues,* 8th Edition, London: Pearson, pp. 532-538.

M. Naim, (2007) 'The Five Wars Of Globalization', in R. Art and R. Jervis (eds.) *InternationalPolitics: Enduring Concepts And Contemporary Issues,* 8th Edition, London: Pearson, pp. 558-566.

S. Mallaby, (2007) 'NGOs: Fighting Poverty, Hurting the Poor', in R. Art and R. Jervis (eds.)

International Politics: Enduring Concepts and Contemporary Issues, 8th edition, New York:Pearson, pp. 539-545.
G. Lexter and S. Halperin (eds.), (2003) *Global Civil Society and Its Limits,* New York: Palgrave, pp. 1-21.

Citizenship in a Globalising World

Code: PLS-A-DSE-6-B(3)-TH+TU

This course will explore theories of citizenship, the historical development of the concept and its practice of in an increasingly globalizing world.

Module I

1. Classical conceptions of citizenship
2. The Evolution of Citizenship and the Modern State

Module II

3. Citizenship and Diversity
4. Citizenship beyond the Nation-state: Globalization and global justice
5. The idea of cosmopolitan citizenship

Essential Readings

- Acharya, Ashok. (2012) *Citizenship in a Globalising World.* New Delhi: Pearson.
- Beiner, R. (1995) *Theorising Citizenship*. Albany: State University of New York Press.
- Held, David (1995), *Democracy and the Global Order: From the Modern State toCosmopolitan Governance* (Stanford: Stanford University Press).
- Kymlicka, Will (1999), "Citizenship in an Era of Globalization: A Response to Held," in Ian Shapiro and Casiano Hacker-Cordon (eds.), *Democracy's Edges* (Cambridge, UK: Cambridge University Press).
- Oliver, D. and D. Heater (1994). *The Foundations of Citizenship*. London, Harvester Wheatsheaf.
- Scholte, Jan Aart (2000), *Globalization: A Critical Introduction* (New York: St. Martin's).
- Zolo, Danilo (1997), *Cosmopolis: Prospects for World Government* (Cambridge, UK: Polity Press).

Human Rights in a Comparative Perspective

Code: PLS-A-DSE-6-B(4)-TH+TU

Module I

Human Rights: Theory and Institutionalization

Understanding Human Rights: Three Generations of Rights
Institutionalization: Universal Declaration of Human Rights
Rights in National Constitutions: South Africa and India

Issues:

Torture: USA and India; Surveillance and Censorship: China and India; Terrorism and Insecurity of Minorities: USA and India

Module II

Structural Violence:

Caste and Race: South Africa and India

Gender and Violence: India and Pakistan
Adivasis/Aboriginals and the Land Question: Australia and India

READING LIST

Human Rights: Theory and Institutionalization

Essential Readings:

I. Hoffman and P. Graham, (2006) 'Human Rights', *Introduction to Political Theory*, Delhi, Pearson, pp. 436-458.

SAHRDC (2006) 'Introduction to Human Rights'; 'Classification of Human Rights: An Overview of the First, Second, and Third Generational Rights', in *Introducing Human Rights*, New Delhi: Oxford University Press.

The Constitution of the Republic of South Africa, Chapter 2: Bill of Rights.

The Constitution of India, Chapter 3: Fundamental Rights

Issues

Torture: USA and India

Essential Readings:

M. Lippman, (1979) 'The Protection of Universal Human Rights: The Problem of Torture' *Universal Human Rights*, Vol. 1(4), pp. 25-55

J. Lokaneeta, (2011) 'Torture in the TV Show 24: Circulation of Meanings'; 'Jurisprudence on Torture and Interrogations in India', in *Transnational Torture Law, Violence, and State Powerin the United States and India,* Delhi: Orient Blackswan,

D. O'Byrne, (2007) 'Torture', in *Human Rights: An Introduction***,** Delhi: Pearson, pp. 164-197.

Surveillance and Censorship: China and India

Essential Readings:

D. O'Byrne, (2007) 'Censorship', in *Human Rights: An Introduction***,** Delhi: Pearson, pp. 106-138.

D. Lyon, (2008) Surveillance Society, Talk for Festival del Diritto, Piacenza, Italia, September 28, pp.1-7.

Fu Hualing, (2012) 'Politicized Challenges, Depoliticized Responses: Political Monitoring in China's Transitions', paper presented at a conference on States of Surveillance: Counter-Terrorism and Comparative Constitutionalism, at the University of New South Wales, Sydney, 13-14 December.

U. Singh, (2012) 'Surveillance Regimes in India', paper presented at a conference on States of Surveillance: Counter-Terrorism and Comparative Constitutionalism, at the University of New South Wales, Sydney, 13-14 December.

Terrorism and Insecurity of Minorities: USA and India

Essential Readings:

E. Scarry, (2010) 'Resolving to Resist', in *Rule of Law, Misrule of Men***,** Cambridge: Boston Review Books**,** MIT, pp.1-53.

M. Ahmad, (2002) 'Homeland Insecurities: Racial Violence the Day after September 11', *Social Text*, 72, Vol. 20(3), pp. 101-116.

U. Singh, (2007) 'The Unfolding of Extraordinariness: POTA and the Construction of Suspect Communities', in *The State, Democracy and Anti-terror Laws in India***,** Delhi: Sage Publications, pp.165-219

Structural Conflicts

Caste and Race: South Africa and India

Essential Readings:

A. Pinto, (2001) 'UN Conference against Racism: Is Caste Race?', in *Economic and PoliticalWeekly*, Vol. 36(30)

D. O'Byrne, (2007) 'Apartheid', in *Human Rights: An Introduction,* Delhi: Pearson, pp. 241-262.

R. Wasserstorm, (2006), 'Racism, Sexism, and Preferential Treatment: An approach to the Topics', in R.

Goodin and P. Pettit, *Contemporary Political Philosophy: an Anthology*, Oxford: Blackwell, pp-549-574
R. Wolfrum, (1998) 'Discrimination, Xenophobia and Racism' in J. Symonides, *Human Rights:New Dimensions and Challenges*, Aldershot, Ashgate/UNESCO, pp.181-198.

Gender and Violence: India and Pakistan

Essential Readings:

A. Khan and R. Hussain, (2008), 'Violence Against Women in Pakistan: Perceptions and Experiences of Domestic Violence', *Asian Studies Review*, Vol. 32, pp. 239 – 253

K. Kannabiran (2012) 'Rethinking the Constitutional Category of Sex', in *Tools of Justice:Non-Discrimination and the Indian Constitution*,New Delhi, Routledge, pp.425-443

Adivasis/Aboriginals and the Land Question: Australia and India

Essential Readings:

H. Goodall, (2011) 'International Indigenous Community Study: Adivasi Indigenous People in India', in A. Cadzow and J. Maynard (eds.),*Aboriginal Studies,* Melbourne: Nelson Cengage Learning, pp.254-259.
K. Kannabiran, (2012) 'Adivasi Homelands and the Question of Liberty', in *Tools of Justice:Non-Discrimination and the Indian Constitution*, New Delhi: Routledge, pp.242-271.
N. Watson (2011) 'Aboriginal and Torres Strait Islander Identities' in A. Cadzow and J. Maynard (eds.),*Aboriginal Studies*, Melbourne: Nelson Cengage Learning, pp.43-52.
W. Fernandes (2008) 'India's Forced Displacement Policy and Practice. Is Compensation up to its Functions?', in M. Cernea and H. Mathus (eds), *Can Compensation PreventImpoverishment? Reforming Resettlement through Investments and Benefit-Sharing*,pp.181-207, New Delhi: Oxford University Press.

Additional Readings:

A. Laws and V. Iacopino, (2002) 'Police Torture in Punjab, India: An Extended Survey', in *Health and Human Rights,* Vol. 6(1), pp. 195-210
D. O'Byrne, (2007) 'Theorizing Human Rights', in *Human Rights: An Introduction,* Delhi, Pearson, pp.26-70.
J. Morsink, (1999) *The Universal Declaration of Human Rights: Origins, Drafting and Intent*, Philadelphia: University of Pensylvania Press, pp. ix-xiv
J. Nickel, (1987) *Making Sense of Human Rights: Philosophical Reflections on the UniversalDeclaration of Human Rights*,Berkeley: University of California Press.
J. Goldman, (2005) 'Of Treaties and Torture: How the Supreme Court Can Restrain the Executive', in *Duke Law Journal*, Vol. 55(3), pp. 609-640.
J. Tsutsui and C. Wotipka, (2004) Global Civil Society and the International Human Rights Movement: Citizen Participation in Human Rights International Nongovernmental Organizations, in *Social Forces*, Vol. 83(2), pp. 587-620.
J. Rabben, (2001) Amnesty International: Myth and Reality, in *Agni*, No. 54, Amnesty International Fortieth Anniversary pp. 8-28

K. Mohanty, (2010) 'In Pursuit of People's Rights: An Introduction', in M. Mohanty et al., *Weapon of the Oppressed: Inventory of People's Rights in India*, New Delhi: Danish Books,pp.1-11
M. Cranston, (1973) *What are Human Rights?* New York: Taplinger
M. Ishay, (2004) *The History of Human Rights: From Ancient Times to the Globalization Era*, Delhi: Orient Blackswan.
R. Sharan, (2009) 'Alienation and Restoration of Tribal Land in Jharkhand in N Sundar (ed.) *Legal Grounds*, New Delhi: Oxford University Press, pp. 82-112
Text of UDHR available at http://www.un.org/en/documents/udhr/index.shtml
U. Baxi, (1989) 'From Human Rights to the Right to be Human: Some Heresies', in S. Kothari and H. Sethi (eds.), *Rethinking Human Rights*, Delhi: Lokayan, pp.181-166.

Skill Enhancement Courses

Democratic Awareness through Legal Literacy

Code: PLS-A-SEC-3-A(1)-TH

Module I

1. Laws relating to Criminal jurisdiction-provisions relating to filing an FIR, arrest, bail, search and seizure and some understanding of the questions of evidence and procedure in the Criminal Procedure Code.
2. Offences under IPC.
3. India: Personal laws. Customary Laws
4. Laws relating to Dowry, sexual harassment and violence against women.

Module II

5. Laws relating to consumer rights.
6. Right to Information.
7. Laws relating to Cybercrimes.
8. Anti-terrorist laws: Implications for security and human rights.

Readings:

Pandey, (2008) 'Laws Relating to Criminal Justice: Challenges and Prospects', in K. Sankaran and U. Singh, *Towards Legal Literacy,* New Delhi: Oxford University Press, pp.61-77.SAHRDC, (2006)'Reporting a Crime: First Information Report', in *Oxford Handbook of Human Rights and Criminal Justice in India - The system and Procedure*, New Delhi:Oxford University Press, pp.16-26.

SAHRDC, (2006) 'Bail', in *Oxford Handbook of Human Rights and Criminal Justice in India - The system and Procedure*, New Delhi: Oxford University Press, pp.59-71.

SAHRDC, (2006) 'Detention', in *Oxford Handbook of Human Rights and Criminal Justice in India - The system and Procedure*. New Delhi: Oxford University Press, pp.72-84.
P. Mathew, (2003) *Your Rights if you are Arrested,* New Delhi. Indian Social Institute.
P. Mathew, (2002) *The Law on Atrocities Against Scheduled Castes and Scheduled Tribes,* New Delhi: Indian Social Institute.
K. Saxena, (2011) 'Dalits', in M. Mohanty et al., *Weapon of the Oppressed, Inventory of People's Rights in India*. Delhi: Danish Books, Pp.15-38
K. Saxena, (2011) 'Adivasis', in M. Mohanty et al., *Weapon of the Oppressed, Inventory of People's Rights in India*, Delhi: Danish Books, Pp.39-65.
S. Durrany, (2006) *The Protection of Women From Domestic Violence Act 2005*, New Delhi: Indian Social Institute.
V. Kumari, (2008) 'Offences against Women', in K, Sankaran and U. Singh (eds.) *Towards Legal Literacy,* New Delhi: Oxford University Press.
P. D. Mathew (2004)*The Measure to Prevent Sexual Harassment of Women in Work Place.* New Delhi: Indian Social Institute.
D. Srivastva, (2007) 'Sexual Harassment and Violence against Women in India: Constitutional and Legal Perspectives', in C. Kumar and K. Chockalingam (eds) *HumanRights, Justice, and Constitutional Empowerment*, Delhi: Oxford University Press.
S. Naib, (2013) 'Right to Information Act 2005', in *The Right to Information in India,* New Delhi: Oxford University Press, Available at

http://www.humanrightsinitiative.org/publications/rti/guide_to_use_rti_act_2005_English2012_light_Aspire.pdf.

Bare Acts**:**
Consumer Protection Act, 1986, Available at http://chdslsa.gov.in/right_menu/act/pdf/consumer.pdf.
Criminal law Amendment Act, 2013, Available at http://egazette.nic.in/WriteReadData/2013/E_17_2013_212.pdf , Accessed: 10.04.2013.
Protection of Women Against Domestic Violence Act, 2005, Available at http://wcd.nic.in/wdvact.pdf.
Right to Information Act, 2005, Available at http://righttoinformation.gov.in/rti-act.pdf.
Scheduled Castes and Scheduled Tribes Prevention of Atrocities Act, 1989, Available at http://tribal.nic.in/writereaddata/linkimages/poaact989E4227472861.pdf.
Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, Available at http://tribal.gov.in/writereaddata/mainlinkFile/File1033.pdf.
The Persons with Disabilities (Equal Opportunities, Protection of Rights, Full Participation) Act, 1995, Available at http://bhind.nic.in/Sparsh_disability%20act%201995.pdf.
The Right of Children to Free and Compulsory Education Act, 2009, Available at http://www.delta.org.in/form/rte.pdf.
The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Bill, 2012**,** Available at http://164.100.24.219/BillsTexts/LSBillTexts/PassedLoksabha/144C_2010_LS_Eng.pdf.
Criminal Law Amendment Act, 2013**,** Available at mha.nic.in/pdfs/TheCrimnalLaw030413.pdfFile Format: PDF/Adobe Acrobat – Quick View.

Understanding the Legal System

Code: PLS-A-SEC-3-A(2)-TH

Module I

1) Outline of the legal system in India
2) System of Courts/tribunals and their jurisdiction in India-Criminal and civil courts, writ jurisdiction.
3) Specialized Courts such as juvenile courts, mahila courts and tribunals.

Module II

4) Role of the police and executive in criminal law administration.
5) Alternate dispute mechanisms such as Lok Adalats, non-formal mechanisms.

Readings:
Creating Legal Awareness, edited by Kamala Sankaran and Ujjwal Singh (Delhi: OUP, 2007)
S..K. Agarwala, *Public Interest Litigation in India*, K.M. Munshi Memorial Lecture, Second Series, Indian Law Institute, Delhi, 1985.
Asha Bajpai, *Child Rights in India : Law, Policy, and Practice*, Oxford University Press, New Delhi,2003
B.L. Wadhera, *Public Interest Litigation - A Handbook*, Universal, Delhi, 2003.
P.C. Rao and William Sheffiled *Alternate Dispute Resolution: What it is and How it Works*, Universal Law Books and Publishers, Delhi, 2002
V.N. Shukla's *Constitution of India* by Mahendra P. Singh, Eastern Book Co. 10th edition.

Parmanand Singh, *'Access to Justice and the Indian Supreme Court'*, 10 & 11 Delhi Law Review 156, 1981-82.
J. Kothari, (2005) 'Criminal Law on Domestic Violence', *Economic and Political Weekly,* Vol. 40(46), pp. 4843-4849.
H. Mander, and A. Joshi, *The Movement for Right to Information in India, People's Power for the Control of Corruption*. Available at http://www.rtigateway.org.in/Documents/References/English/Reports/12.%20An%20article%20on%20RTI%20by%20Harsh%20Mander.pdf.
P. Mathew, and P. Bakshi, (2005) '*Indian Legal System'*, New Delhi: Indian Social Institute.
P. Mathew, and P. Bakshi, (2005) '*Women and the Constitution'*, New Delhi: Indian Social Institute.
N. Menon, (2012) 'Sexual Violence', in *Seeing Like a Feminist* New Delhi: Zubaan and Penguin, pp. 113-146.
M, Mohanty et al. (2011) *Weapon of the Oppressed, Inventory of People's Rights in India*. Delhi: Danish Books.
Centre for Good Governance, (2008) *Right to Information Act, 2005: A Citizen's Guide*, Available at http://www.rtigateway.org.in/Documents/Publications/A%20CITIZEN'S%20GUIDE.pdf,
Pandey, (2004) *Rights of the Consumer*. New Delhi: Indian Social Institute.
Pandey, (2008) 'Laws Relating to Criminal Justice: Challenges and Prospects', in K. Sankaran and U. Singh, *Towards Legal Literacy,* New Delhi: Oxford University Press, pp.61-77.
SAHRDC, (2006)'Reporting a Crime: First Information Report', in *Oxford Handbook of Human Rights and Criminal Justice in India - The system and Procedure*, New Delhi: Oxford University Press, pp.16-26.
SAHRDC, (2006) 'Bail', in *Oxford Handbook of Human Rights and Criminal Justice in India- The system and Procedure*, New Delhi: Oxford University Press, pp.59-71.
SAHRDC, (2006) 'Detention', in *Oxford Handbook of Human Rights and Criminal Justice in India- The system and Procedure*. New Delhi: Oxford University Press, Pp.72-84.
P. Mathew, (2003) *Your Rights if you are Arrested,* New Delhi. Indian Social Institute

Legislative Practices and Procedures

Code: PLS-A-SEC-4-B(1)-TH

Module I

1) Members of Parliament: Powers and Privileges-Constituency Work.
2) State legislative Assemblies: Powers and functions.
3) Functionaries of rural and urban local self-government from Zila Parishad, Municipal Corporation to Panchayat/ Ward.

Module II

4) How a bill becomes a law, role of standing committees in reviewing a bill, legislative consultants, the framing of rules and regulations.
5) Types of committees.
6) Role of committees in reviewing government finances, policy, programmes and legislation.
7) Powers and functions of people's representative at different tiers of governance

Readings:

M. Madhavan, and N. Wahi, (2008) Financing of Election Campaigns PRS, Centre for Policy Research, New Delhi, Available at: http://www.prsindia.org/uploads/media/conference/Campaign_finance_brief.pdf, Accessed: 19.04.2013 S.

Vanka, (2008) Primer on MPLADS, Centre for Policy Research, New Delhi, Available at http://www.prsindia.org/parliamenttrack/primers/mplads-487/, Accessed: 19.04.2013 129 H. Kalra, (2011) Public Engagement with the Legislative Process PRS, Centre for Policy Research, New Delhi, Available at: http://www.prsindia.org/administrator/uploads/media/Conference%202011/Public%20Eng agement%20with%20the%20Legislative%20Process.pdf, Accessed: 19.04.2013. Government of India (Lok Sabha Secretariat), (2009) Parliamentary Procedures (Abstract Series), Available at http://164.100.47.132/LssNew/abstract/index.aspx, Accessed: 19.04.2013

The legislative process

Readings:

Government of India, (Ministry of Parliamentary Affairs), (2009) Legislation, Parliamentary Procedure, Available at http://mpa.nic.in/Manual/Manual_English/Chapter/chapter- 09.htm, Accessed: 19.04.2013 Government of India, (Ministry of Parliamentary Affairs) (2009), Subordinate Legislation, Parliamentary Procedure, Available at: http://mpa.nic.in/Manual/Manual_English/Chapter/chapter-11.htm Accessed: 19.04.2013 D. Kapur and P. Mehta, (2006) 'The Indian Parliament as an Institution of Accountability', Democracy, Governance and Human Rights, Programme Paper Number 23, United Nations Research Institute for Social Development, Available at: http://www.unrisd.org/UNRISD/website/document.nsf/240da49ca467a53f80256b4f005ef2 45/8e6fc72d6b546696c1257123002fcceb/$FILE/KapMeht.pdf, Accessed: 19.04.2013 O. Agarwal and T. Somanathan, (2005) 'Public Policy Making in India: Issues and Remedies', Available at: http://www.cprindia.org/admin/paper/Public_Policy_Making_in_India_14205_TV_SOMANA THAN.pdf, Accessed: 19.04.2013 B. Debroy, (2001) 'Why we need law reform' Seminar January.

Legislative Committees

Readings:

P. Mehta, 'India's Unlikely Democracy: The Rise of Judicial Sovereignty', Journal of Democracy, Vol. 18(2), pp.70-83. Government link: http://loksabha.nic.in/; http://rajyasabha.nic.in/; http://mpa.nic.in/ K. Sanyal, (2011) Strengthening Parliamentary Committees PRS, Centre for Policy Research, New Delhi, Available at: http://www.prsindia.org/administrator/uploads/media/Conference%202011/Strengthening %20Parliamentary%20Committees.pdf, Accessed: 19.04.2013

Elementary Aspects of Social Research

Code: PLS-A-SEC-4-B(2)-TH

Module I

1. Fundamental issues in Research Methodology: concepts, variables, proposition and hypotheses; hypothesis construction and verification; measurement – scales; ethics in social research.

2. Research design: definition, purpose of research, unit of analysis, fallacy (ecological fallacy and fallacy of reductionism), factors affecting research design.

3. Sources and techniques of data collection -- qualitative and quantitative; Sampling –different types; Basic statistical methods – types of statistics; measures of central tendencies and measures of dispersion; graphic representation of data.

Module II

4. Participatory field research: Modes and methods of participant observation; advantages and limitations; Case study: definition; types; steps involved in the method; uses. Focus group method: nature and uses; role of the researcher.

5. Survey method: Definition, types; techniques of survey research: Pilot survey; interviewing – techniques; different types; qualities of a good interviewer; questionnaire – framing a questionnaire; problem of non-response; advantages and disadvantages of survey method.

6. Aggregate data analysis: Sources of aggregate data; uses of aggregate data; advantages of aggregate data; fallacy of inference. Experimental design: key concepts in experimental design; steps and planning the research; issues of equivalence and validity; classical experimental design.

[The Course may be supplemented with the use of computers though it is not obligatory].

Readings:

R. Kumar, Research Methodology: A Step-by-Step Guide for Beginners, Sage, 2010.
W.L. Neuman, Social Research Methods: Qualitative and Quantitative Approaches, Pearson.
D. E. McNabb, (2004) Research Methods for Political Science- Quantitative and Qualitative Methods, New Delhi: Prentice-Hall of India Pvt. Ltd.
R. Chatterjee, (1979) Methods of Political Enquiry, Calcutta: The World Press Pvt. Ltd., 1979.

University of Calcutta

Final Draft BA (General)-CBCS Syllabus in Political Science, 2018

Core Courses* (4 courses provided). Discipline-specific Elective (4 courses provided); Skill Enhancement(4 courses provided).[Students will also have to take courses from other subject/s]

*Core Courses mentioned hereunder are to be treated as the Generic Elective Courses of students pursuing Honours in a subject *other than Political Science*.

- ^Each coursecarries 80 marks--- theoretical and tutorial (plus 10 marks each for Attendance and Internal Assessment).
- 6 credit course:Minimum 30 classes for Theory and 15 contact hours for Tutorial per module. 2 credit course: 30 teaching/lecture hours in total.
- Core, DSE (and GE) Course: 6 credits (5 Theoretical + 1 Tutorial-related).
- Skill Enhancement/Skill-based Courses: 2 credits (no Tutorial).

^End SemesterAssessment--- 65 marks for theoretical segment: 50 marks for subjective/descriptive questions + 15 marks for the category of 1 mark-questions.Question Pattern for subjective/descriptive segment of 50 marks: 2 questions (within 100 words; one from each module) out of 4 (10 x2 = 20) + 2 questions (within 500 words; one from each module) out of 4 (15 x 2 = 30).>>For Skill Enhancement Courses the last component would carry 6 questions--- 15 marks each--- out of which 3 (at least one from each module) to be attempted because such courses have no Tutorial.

15 marks for tutorial-related segments as suggested below (any one item from each mode):

Any one of the following modes: i) Written mode: upto 1000 words for one Term Paper/upto 500 words for each of the two Term Papers/ equivalent Book Review/equivalent Comprehension/equivalent Quotation or Excerpt Elaboration. ii) Presentation Mode: Report Presentation/Poster Presentation/Field work--- based on syllabus-related and/or current topics (May be done in groups)[The modes and themes and/or topics are be decided by the concerned faculty of respective colleges.]

- **Core Courses in Semesters I-IV; Discipline-specific courses in Semesters V and VI; Skill Enhancement courses in Semesters III-VI.**

IMPORTANT NOTES:

- The Readings provided below (except Bengali books) include those of the UGC Model CBCS Syllabus in Political Science. For Course Objectives and references it is advised that the UGC model CBCS syllabus* concerning relevant courses and topics be provided due importance and primarily consulted.

*BA General https://www.ugc.ac.in/pdfnews/0693504_BA-with-Pol-Science-.pdf

- Bengali books are not necessarily substitutes, but supplementary to the English books.
- The format isstrictly subject to the parameters of the Common Structural Format of the University.

General (Political Science) Courses

Core:

Introduction to Political Theory

Comparative Government and Politics

Government and Politics in India

International Relations

DSE:

Public Administration

Indian Foreign Policy

Feminism: Theory and Practice

Human Rights: Theory and Indian Context

SEC:

Legal Literacy

Elementary Dimensions of Research

Understanding the Legal System

Basic Research Methods

Core Courses

Introduction to Political Theory Code: PLS-G-CC-1-1-TH+TU

Module I

1. Political Science: nature and scope; Different approaches--- Normative, Behavioural, Post-Behavioural, Marxist, Feminist.
2. State: Contract theory; Idealist theory; Liberal theory; Marxist theory; Gandhian theory. Sovereignty of the State: Monistic and Pluralist theories. Doctrine of Popular Sovereignty.
3. Foundational concepts: Law; Right; Liberty; Equality--- meanings, sources, interrelationships.
4. Key concepts: Nationalism and Internationalism—meanings and features; Democracy--- meaning and nature.

Module II

5. Marxism: Dialectical and Historical Materialism; Class and Class Struggle; Theory of Revolution; Lenin's Theory of Imperialism.
6. Fascism: meaning, features, significance.
7. Political parties and interest groups: functions and role; Methods of representation: territorial, functional, proportional.

Readings:

R. Bhargava and A. Acharya eds., Political Theory: An Introduction.
Mohit Bhattacharya and Amal Roy: Political Theory: Ideas and Institutions.
S. Ramasway: Political Theory: Ideas and Concepts.
O. P Gauba: An Introduction to Political Theory.
J. C. Johari: Political Theory
S.P. Verma: Modern Political Theory.
Maurice Cornforth: Dialectical Materialism.
Robin Goodfellow: Marxism in a Nutshell.
Tom Bottomore ed.: A Dictionary of Marxist Thought.
V. I. Lenin: Imperialism--- The Highest Stage of Capitalism.
Margaret Walters: Feminism: A Very Short Introduction.

মোহিত ভট্টাচার্য, বিশ্বনাথ ঘোষঃ আধুনিক রাষ্ট্রবিজ্ঞান
অনাদি কুমার মহাপাত্রঃ রাষ্ট্রবিজ্ঞান
হিমাচল চক্রবর্তীঃ রাষ্ট্রবিজ্ঞান
সত্যসাধন চক্রবর্তী, নির্মলকান্তি ঘোষঃ রাষ্ট্রবিজ্ঞান
দেবাশীষ চক্রবর্তীঃ রাষ্ট্রতত্ব ও প্রতিষ্ঠান
এমিল বার্নসঃ মার্কসবাদ(What is Marxism-এরঅনুবাদ)
ভোলানাথ বন্দ্যোপাধ্যায়ঃ দ্বন্দ্বমূলক বস্তুবাদ(মরিস কর্নফোর্থের Dialectical Materialism-এর অনুবাদ)
রাজশ্রী বসু ও বাসবী চক্রবর্তী (সম্পা): প্রসঙ্গ মানবীবিদ্যা

Comparative Government and Politics Code: PLS-G-CC-2-2-TH+TU

Module I

1 Political System: Liberal-democratic, Authoritarian .Socialist – forms of Political Systems: Unitary and Federal, Parliamentary and Presidential.

2. U.K.: (a) Basic features with major focus on Conventions and rule of Law.
(b) Legislature: composition and functions with major focus on the concept of parliamentary sovereignty. (c) Executive: composition and functions of the Cabinet with major focus on the role of the Prime Minister – the concept of Cabinet Dictatorship; (d) Role of the Crown;(e) Party system – role of the Opposition.

3. U.S.A.: (a) Basic features (b) US federalism (c) Bill of rights (d) Legislature: composition and functions with major focus on the Presiding Officers and Committee System; (e) The Executive: The President: election, powers and functions. US Cabinet: composition and functions; (f) Supreme Court: composition and functions; (g) Party system.

Module II

4. PRC (1982 Constitution):(a) Significance of the Revolution (b) Basic features with special reference to General Principles(c) Communist Party: structure, functions, role (d) Rights and Duties of Citizen (e) The National Government: i) The Executive: President, Premier, State Council, ii) The Legislature: National People' Congress ,Standing Committee iii) The Judiciary.
5. Salient features of the Constitutions of Bangladesh,France,Switzerland.

Readings:

S. A. Palekar: Comparative Government and Politics.
J. C. Johari: Major Modern Political Systems.
The Constitution of the People's Republic of China (1982)
D.C. Bhattacharya: Modern Political Constitutions.
A.C. Kapoor and K.K. Misra: Select Constitutions.

নিমাই প্রামাণিকঃ নির্বাচিত আধুনিক শাসন ব্যবস্থার রূপরেখা
হিমাচল চক্রবর্তীঃ তুলনামূলক রাজনীতি ও শাসন ব্যবস্থা
অনাদি কুমার মহাপাত্রঃ নির্বাচিত শাসন ব্যবস্থা ও রাজনীতি
নির্মলকান্তি ঘোষঃ নির্বাচিত তুলনামূলক শাসন ব্যবস্থা ও রাজনীতি
দিনেশচন্দ্র ভট্টাচার্যঃ তুলনামূলক রাজনীতি ও বিদেশের শাসন ব্যবস্থা

Government and Politics in India Code: PLS-G-CC-3-3-TH+TU

Module I

1. Evolution of the Constitution (brief). The Preamble; Fundamental Rights. Directive Principles;
2. Union-State Relations – nature of federalism.
3. Union Executive: President, Vice-President, Prime Minister, Council of Ministers.
4. Union Legislature: Lok Sabha and Rajya Sabha--- organisation, functions, law Making procedure, Privileges, Committee System, Speaker.

5. The Judiciary: Supreme Court and High Courts--- composition and functions; Judicial Activism in India.
6. Constitutional amendment procedure.

Module II

7. Government in States: Governor; Council of Ministers and the Chief Minister; State Legislature: composition and functions.
8. Local Government: rural and urban. Significance of 73rd and 74th Amendments.
9. Election Commission and election reforms.
10. Party System in India: national political parties: Ideologies and programmes. Recent trends in India: rise of regional political parties; coalition politics.
11. Regionalism: Nature, roots, types.
12. Varieties of social and political movements: a) caste; tribe; b) religion; c) environment;
d) women's movements.

Readings:

B. Chakrabarty and K. P. Pandey: Indian Government and Politics.
H. Abbas et al.: Indian Government and Politics.
D. Basu: Introduction to the Constitution of India.
M. V. Pylee: India's Constitution.
Subhas Kashyap: Our Constitution.
M.P. Singh and R. Saxena: Indian Politics: Contemporary Issues
J. C. Johari: Indian Government and Politics (2 Vols.)
Rajinder Singh: Social Movements in India.
Devki Jain Ed., Indian Women.

অমল কুমার মুখোপাধ্যায় ও ভোলানাথ বন্দ্যোপাধ্যায়ঃ সাম্প্রতিক ভারতীয় রাজনীতি ও প্রশাসন
নিমাই প্রামাণিকঃ ভারতের শাসন ব্যবস্থা ও রাজনীতি
অনাদি কুমার মহাপাত্রঃ ভারতের শাসন ব্যবস্থা ও রাজনীতি
নির্মলকান্তি ঘোষঃ ভারতের শাসন ব্যবস্থা ও রাজনীতি
অনাদি কুমার মহাপাত্রঃ ভারতের রাজনীতিক ব্যবস্থা প্রকৃতি ও প্রয়োগ
প্রভাত দত্তঃ প্রসঙ্গ পঞ্চায়েত
হিমাংশু ঘোষঃ সমকালীন ভারতীয় রাজনীতি ও প্রশাসন
শাশ্বতী ঘোষ: সমতার দিকে আন্দোলনে নারী

International Relations Code: PLS-G-CC-4-4-TH+TU

Module I

1. International Relations as a field of study. Approaches:
(a) Classical Realism (Hans Morgenthau) and Neo-Realism (Kenneth Waltz)
(b) Neo-Liberalism: Complex Interdependence (Robert O. Keohane and Joseph Nye)
(c) Structural Approaches: World Systems Approach (Immanuel Wallerstein) and Dependency School (Andre Gunder Frank)
(d) Feminist Perspective (J. Ann Tickner)
2. Cold War:(a) Second World War & Origins of Cold War; (b) Phases of Cold War: First Cold War; Rise and Fall of Detente Second Cold War.

Module II

3. End of Cold War and Collapse of the Soviet Union

(b) Post Cold- War Era and Emerging Centers of Power (European Union, China, Russia and Japan)

4. India's Foreign Policy

(a) Basic Determinants (Historical, Geo-Political, Economic, Domestic and Strategic); (b) India's Policy of Non-Alignment; (c) India as emerging Power

Readings:

William, P., Goldstein, D. M. and Shafritz, J. M. (eds.): Classic Readings of InternationalRelations.
Goldstein, J. and Pevehouse, J.C.: International Relations.
Art, R. J. and Jervis, R. (eds.): International Politics: Enduring Concepts andContemporary Issues.
Jackson, R. and Sorenson, G.: Introduction to International Relations: Theories andApproaches.
Tickner, J. A.: Gendering World Politics: Issues and Approaches in the Post-Cold WarEra.
Baylis, J. and Smith, S. (eds.): The Globalization of World Politics: An Introduction toInternational Relations.
Wenger, A. and Zimmermann, D. (eds.): International Relations: From the Cold WorldWar to the Globalized World.
Vanaik, A.: India in a Changing World: Problems, Limits and Successes of Its ForeignPolicy. .
Basu, Rumki (ed.): International Politics: Concepts theories and Issues, New Delhi.
Mewmillians, W.C. and Piotrowski, H.: The World since 1945: A History ofInternational Relations.
Smith, M., Little, R. and Shackleton, M. (eds.): Perspectives on World Politics.
Ganguly, S. (ed.): India's Foreign Policy: Retrospect and Prospect.

গৌতম বসু: আন্তর্জাতিক সম্পর্ক: তত্ব ও বিবর্তন
রাধারমণ চক্রবর্তী ও সুকল্পা চক্রবর্তী: সমসাময়িক আন্তর্জাতিক সম্পর্ক
পুরুষোত্তম ভট্টাচার্য ও অনিন্দ্যজ্যোতি মজুমদার (সম্পা):আন্তর্জাতিক সম্পর্কের রূপরেখা
রুমকী বসু ও অঞ্জনা ঘোষঃ সম্মিলিত জাতিপুঞ্জ
অনীক চট্টোপাধ্যায়: ঠাণ্ডাযুদ্ধের পর আন্তর্জাতিক সম্পর্ক
নির্মলকান্তি ঘোষঃ আন্তর্জাতিক সংগঠন ও জাতিপুঞ্জ
গৌরীপদ ভট্টাচার্যঃ আন্তর্জাতিক সম্পর্ক
শক্তি মুখার্জী, ইন্দ্রাণী মুখার্জীঃ আন্তর্জাতিক সম্পর্ক

Discipline-specific Electives

The choice is between Courses in 1A and 1B and between Courses in 2A and 2B--- one each from the two segments offered.

Public Administration Code: PLS-G-DSE-A-5-1A-TH+TU

Module I

1. Nature and Scope of Public Administration.
2. Key Concepts: Hierarchy; Unity of Command; Span of Control; Authority; Centralization and Decentralization; Line and Staff; Communication and Control; Delegation; Decision-making;Coordination and Leadership.
3. Major Approaches: New Public Administration; Comparative Public Administration; Development Administration; New Public Management.

Module II

4. Bureaucracy: Views of Weber and Marx.
5.Public Policy: Formulation and Implementation.
6. Major Programmes (basic features and objectives): MGNREGA; Sarva Shiksha Abhiyan; National Rural Health Mission.

Readings:

Mohit Bhattacharya: Public Administration: Structure, Process and Behaviour.
A. Avasthi and S. Avasthi: Pubic Administration.
M. Bhattacharya: Restructuring Public Administration.
M.P. Sharma: Public Administration in Theory and Practice.
Rumki Basu: Public Administration: Concepts and Theories.
Sapru, R.K. Public Policy: Formulation, Implementation and Evaluation. New Delhi: Sterling Publishers.

মোহিত ভট্টাচার্য ও বিশ্বনাথ ঘোষ: জনপ্রশাসন ও পরিকল্পনা
সোমা ঘোষ: জনপ্রশাসন: তত্ত্ব ও প্রয়োগ
রাজশ্রী বসু: জনপ্রশাসন

Indian Foreign Policy Code: PLS-G-DSE-A-5-1B-TH+TU

Module I

1. Foreign Policy: meaning and determinants.

2. National Interest as key concept in foreign policy.

3. Instruments of foreign policy: diplomacy; propaganda; military.

Module II

4. Evolution of Indian foreign policy.

5. Basic principles of Indian foreign policy.

6. India and her neighbours: Bangladesh; Pakistan; Nepal; Sri Lanka.

Readings:

K.K Ghai, *International Relations: Theory and Practice of International Politics*
Vinay Kumar Malhotra, *International Relations*, Fourth edition, Vikas Publications.
Peu Ghosh, *International Relations*, Pretince Hall Publishers.
Pushpesh Pant, *International Relations in the Twenty-first Century*, Tata McGraw Hill Publishers.
Prakash Chander and Prem Aroa, *International Relations and Comparative Politics*, Cosmos Bookhive Publicaitons.
Aneek Chatterjee, *Neighbours, Major Powers and Indian Foreign Policy*, Orient Blackswan.
Prem Arora, *Foreign Policy of India*, Cosmos Bookhive Publishers.

Feminism: Theory and Practice Code: PLS-G-DSE-B-6-2A-TH+TU

Module I

1. Distinction between sex and gender. Biologism and Social Constructivism.

2. Patriarchy and Feminism.

3. Theoretical foundation: Liberal; Socialist; Marxist; Radical Feminism; New Feminist ideas

Module II

4. Traditional historiography and Feminist critiques.

5. Social reform movements and position of women: Indian context.

6. Gender relations in family: consumption; entitlement; property rights.

Readings:

B. Hooks, (2010) 'Feminism: A Movement to End Sexism', in C. Mc Cann and S. Kim (eds), *The Feminist Reader: Local and Global Perspectives,* New York: Routledge, pp. 51-57
R. Delmar, (2005) 'What is Feminism?', in W. Kolmar & F. Bartkowski (eds) *Feminist Theory: A Reader,* pp. 27-37.
U. Chakravarti, (2003) *Gendering Caste through a Feminist Len,* Kolkata, Stree, pp. 139-159.
C. MacKinnon, 'The Liberal State' from *Towards a Feminist Theory of State,* Available at http://fair-use.org/catharine-mackinnon/toward-a-feminist-theory-of-the-state/chapter-8
N. Menon (2008) 'Gender', in R. Bhargava and A. Acharya (eds), *Political Theory: An Introduction,* New Delhi: Pearson, pp. 224-233.

রাজশ্রী বসু ও বাসবী চক্রবর্তী (সম্পা): প্রসঙ্গ মানবীবিদ্যা

Human Rights: Theory and Indian Context Code: PLS-G-DSE-B-6-2B-TH+TU

Module I

1. History of the idea of human rights; Evolution of generations of human rights.
2. Universal Declaration of Human Rights: provisions and significance.
3. UN and human rights: charters; UN Human Rights Commission; Vienna Declaration and Programme of Action.

Module II

4. Indian Constitution and the foundation of rights.
5. National and State Human Rights Commissions: structure and functions.
6. Human rights in India: problems and remedies.

Readings:

Universal Declaration of Human Rights, www.un.org/en/udhrbook/pdf/udhr_booklet_en_web.pdf

Alok Kumar Meena, *Human Rights in India: Concepts and Concerns*, India: Pointer Publishers.
S.C. Joshi, *Human Rights: Concepts, Issues and Laws*, India: Akansha Publishing House.
Amit Bhattacharya and Bimal Kanti Ghosh (eds.), *Human Rights in India, Historical Perspective and Challenges Ahead*.
D. O'Byrne, (2007) 'Theorizing Human Rights', in *Human Rights: An Introduction,* Delhi, Pearson.
M. Ishay, (2004) *The History of Human Rights: From Ancient Times to the Globalization Era*, Delhi: Orient Blackswan.

Skill Enhancement Courses

[The choice lies between Courses 1 and 2 of Section A and Courses 1 and 2 of Section B. One particular course in Gr. A --- between PLS-G-SEC-3/5-A(1)-TH and PLS-G-SEC-3/5-A(2)-TH is to be chosen either in Sem-III or in Sem-V. One particular course in Gr. B--- between PLS-G-SEC-4/6-B(1)-TH and PLS-G-SEC-4/6-B(2)-TH is to be chosen either in Sem IV or in Sem VI]

Legal Literacy Code: PLS-G-SEC-3-A(1)-TH

Module I

1. Legal Issues of Criminal Jurisdiction: History, Definition and Concept, Major Processes— Detention, Arrest, Bail, Search and Seizure.
2. Indian Penal Code: History, Definition. Major Aspects—Protection of Primary and Secondary Personal Rights, Criminal Conspiracy, Offences against the State, Offences related to Marriage.
3. Personal Laws: Laws related to Marriage (examples from Hindu, Islam and Christian Laws).

Module II

4. Consumer Rights Laws: Definition of Consumer Rights, Process of filing a complaint. Right to Information Act: provisions; importance.

5. Anti-Terror Laws: Meaning, Terrorist and Disruptive Activities (Prevention) (TADA) Act 1987, 2002 and Prevention of Terrorism (POTA) Act 2002.

6.Human Rights Laws: Meanings, Universal Declaration of Human Rights (UDHR), Human Rights Act of 1993, Issues of rights of Children and Women.

Readings:

K. Sankaran and U. Singh, *Towards Legal Literacy,* New Delhi: Oxford University Press, 2008. Articles on Laws relating to criminal justice and offences against Women.
Oxford Handbook of Human Rights and Criminal Justice in India- The system and Procedure. New Delhi: Oxford University Press, 2006. Relevant articles on FIR, Detention, Bail.
M. Mohanty et al., *Weapon of the Oppressed, Inventory of People's Rights in India*, Delhi: Danish Books, 2011. Articles on Adivasis and Dalits.
S. Durrany, *The Protection of Women From Domestic Violence Act 2005*, New Delhi: Indian Social Institute, 2006.
V. Kumari, (2008) 'Offences Against Women', in K, Sankaran and U. Singh (eds.) *Towards Legal Literacy,* New Delhi: Oxford University Press.

P. D. Mathew,(2004)*The Measure to Prevent Sexual Harassment of Women in Work Place.* New Delhi: Indian Social Institute.
D. Srivastva, (2007) 'Sexual Harassment and Violence against Women in India: Constitutional and Legal Perspectives', in C. Kumar and K. Chockalingam (eds) *HumanRights, Justice, and Constitutional Empowerment*, Delhi: Oxford University Press.
S. Naib, (2013) 'Right to Information Act 2005', in *The Right to Information in India,* New Delhi: Oxford University Press, Available at http://www.humanrightsinitiative.org/publications/rti/guide_to_use_rti_act_2005_English2012_light_Aspire.pdf.
Bare Acts**:**

Consumer Protection Act, 1986, http://chdslsa.gov.in/right_menu/act/pdf/consumer.pdf.
Criminal law Amendment Act, 2013, http://egazette.nic.in/WriteReadData/2013/E_17_2013_212.pdf 10.04.2013.
Protection of Women Against Domestic Violence Act, 2005, http://wcd.nic.in/wdvact.pdf.
Right to Information Act, 2005, http://righttoinformation.gov.in/rti-act.pdf.
Scheduled Castes and Scheduled Tribes Prevention of Atrocities Act, 1989, http://tribal.nic.in/writereaddata/linkimages/poaact989E4227472861.pdf.
Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, http://tribal.gov.in/writereaddata/mainlinkFile/File1033.pdf.
The Persons with Disabilities (Equal Opportunities, Protection of Rights, Full Participation) Act, 1995, http://bhind.nic.in/Sparsh_disability%20act%201995.pdf.
The Right of Children to Free and Compulsory Education Act, 2009, http://www.delta.org.in/form/rte.pdf.
*The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Bill, 2012***,** http://164.100.24.219/BillsTexts/LSBillTexts/PassedLoksabha/144C_2010_LS_Eng.pdf.
Criminal Law Amendment Act, 2013**,** mha.nic.in/pdfs/TheCrimnalLaw030413.pdfFile Format: PDF/Adobe Acrobat –Quick View

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Elementary Dimensions of Research

Code: PLS-G-SEC-4-B(1)-TH

Module I

1. Concepts, variables (dependent and independent), propositions and hypothesis.
2. Research design: definition, purpose of research, units of analysis, fallacies.
3. Ethics in research---issues and problems.
4. Research Report writing.

Module II

4. Sources and Techniques of data collection – quantitative and qualitative data
5. Sampling: definition, probability and non-probability. Scales and Measurement
6. Statistical method of data analysis: descriptive and inferential (Overview). Graphic representation of data (Bar graph, Histogram, Pie Chart)

Readings:

R. Kumar, Research Methodology: A Step-by-Step Guide for Beginners, Sage pub., 2010.
W.L. Neuman, Social Research Methods: Qualitative and Quantitative Approaches, Pearson.
R. Chatterjee, (1979) Methods of Political Enquiry, Calcutta: The World Press Pvt. Ltd.

Understanding the Legal System Code: PLS-G-SEC-5-A(2)-TH

Module I

1. Historical background, procedures of Supreme Court and High Court in India (special focus on writ jurisdictions), Judicial Activism and Judicial Restraint.
2. Public Interest Litigation (PIL): Meaning, major features and Scope, principles, Major Guidelines for admitting PIL.
3. Administrative Tribunals: Concepts and major Features, tribunals for other matters.

Module II

4. Subordinate Courts: Constitutional provisions, structure and jurisdiction, National Legal Services Authority, Lok Adalats, Family Courts and Gram Nyayalayas.
5. Elections Laws: Representation of People Act 1950, Representation of People Act 1951, Delimitation Act 2002.
6. Other Constitutional Dimensions: Anti-defection Laws (major provisions of 91st Amendment Act, 2003), Co-operative Societies (provisions of 97th Amendment Act), Mahila Courts.

Readings:

Creating Legal Awareness, edited by Kamala Sankaran and Ujjwal Singh (Delhi: OUP, 2007)
Asha Bajpai, *Child Rights in India: Law, Policy, and Practice*, Oxford University Press, New Delhi,2003.
B.L. Wadhera, *Public Interest Litigation - A Handbook*, Universal, Delhi, 2003.
P.C. Rao and William Sheffiled *Alternate Dispute Resolution: What it is and How it Works*, Universal Law Books and Publishers, Delhi, 2002
J. Kothari, (2005) 'Criminal Law on Domestic Violence', *Economic and Political Weekly,* Vol. 40(46), pp. 4843-4849.
H. Mander, and A. Joshi, *The Movement for Right to Information in India, People's Power for the Control of Corruption*, http://www.rtigateway.org.in/Documents/References/English/Reports/12.%20An%20article%20on%20RTI%20by%20Harsh%20Mander.pdf.
M, Mohanty et al. (2011) *Weapon of the Oppressed, Inventory of People's Rights in India*. Delhi: Danish Books.
Centre for Good Governance, (2008) *Right to Information Act, 2005: A Citizen's Guide*, http://www.rtigateway.org.in/Documents/Publications/A%20CITIZEN'S%20GUIDE.pdf
K. Sankaran and U. Singh, *Towards Legal Literacy,* New Delhi: Oxford University Press, 2008.
Oxford Handbook of Human Rights and Criminal Justice in India- The system and Procedure, New Delhi: Oxford University Press. Relevant articles.

Basic Research Methods Code: PLS-G-SEC-6-B(2)-TH

Module I

1. Case study.

2. Survey Approach: Interviewing- different types and forms, qualities of a good interviewer; Preparing questionnaire, types of questionnaire. Pilot Survey.
3. Focus Groups: role of researcher; uses and abuses.

Module II

4. Experimental research: types. Aggregate Data analysis: sources, utility and limitations.
5. Content Analysis: major issues.
6. Participant observation: modes, advantages and disadvantages.

Readings:

R. Chatterjee, (1979) Methods of Political Enquiry, Calcutta: The World Press Pvt. Ltd.
D. E. McNabb, (2004) Research Methods for Political Science- Quantitative and Qualitative Methods, New Delhi: Prentice-Hall of India Pvt. Ltd.

UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

University of Calcutta

CBCS Syllabus

B.A.(Honours) Sanskrit

DETAILS OF COURSE STRUCTURE

Distribution of courses in different semesters for B.A. (Honours) Sanskrit

Distribution of course in different Semesters for B.A (Honours) in Sanskrit

CBCS Syllabus, Details of Courses structure, University of Calcutta

	Sem-1	**Sem-2**	**Sem-3**	**Sem-4**	**Sem-5**	**Sem-6**
Core Course(CC)	2Th+2P/TU CC-1& 2	2Th+2P/TU CC-3 & 4	3Th+3P/TU CC-5,6 &7	3Th+3P/TU CC-8,9 &10	2Th+2P/TU CC-11 & 12	2Th+2P/TU CC-13 & 14
Elective Course:						
1.Generic Elective(GE)	1Th+1P/TU GE-1	1Th+1P/TU GE-2	1Th+1P/TU GE-3	1Th+1P/TU GE-4		
2.Discipline Specific Elective(DSE)					2Th+2P/TU DSE-1,2	2Th+2P/TU DSE-3,4
Ability Enhancement Compulsory Course (AECC)	1Th+0P/TU (AECC-1)	1Th+0P/TU (AECC-2)				
Skill Enhancement Course (SEC)			1Th+0P/TU SEC-A-1	1Th+0P/TU SEC-B-2		
Total Number of Courses and Marks	4x100=400	4x100=400	5x100=500	5x100=500	4x100=400	4x100=400
Total Credits	20	20	26	26	24	24

TH=Theory, P=Practical, TU=Tutorial

CC for Honours (Sanskrit) Coding

Semester-1	SAN-A-CC-1-TH/TU SAN-A-CC-2-TH/TU
Semester-2	SAN-A-CC-3-TH/TU SAN-A-CC--4TH/TU
Semester-3	SAN-A-CC-5-TH/TU SAN-A-CC-6-TH/TU SAN-A-CC-7-TH/TU
Semester-4	SAN-A-CC-8-TH/TU SAN-A-CC-9-TH/TU SAN-A-CC-10-TH/TU
Semester-5	SAN-A-CC-11-TH/TU SAN-A-CC-12-TH/TU
Semester-6	SAN-A-CC-13-TH/TU SAN-A-CC-14-TH/TU

DSE for Honours (Sanskrit) Coding

Semester-5	SAN-A-DSE-1-TH/TU SAN-A-DSE-2-TH/TU
Semester-6	SAN-A-DSE-3-TH/TU SAN-A-DSE-4-TH/TU

SEC for Honours (Sanskrit) Coding

Semester-3	SAN-A-SEC-A-1-TH/TU
Semester-4	SAN-A-SEC-B-2-TH/TU

Guideline for execution of CBCS Syllabus 2018-2019

All India CBCS Syllabus keeping in view the UG BOS in Sanskrit (C.U) recommends the following measures.

60% Sanskrit Question and Answer in 1st and 2nd Semester, 80% in 3rd and 4th Semester and 100% in 5th and 6th Semester be strictly followed. In Honours, Sanskrit Language and Devanāgari scripts be used .**For General in all six Semesters 60% answer are to be written in Sanskrit Language and Devanāgari Scripts.**

Each 65% marks of theory papers be sub-divided as follows:

1st and 2nd Semester:

a. Three Broad Questions Carrying 10 marks each: 3x10=30(at least two in Sanskrit)

b. Four textual questions, explanation, translation and Sanskrit rendering (wherever applicable) carrying 5 marks.(4x5-20) (at least two in Sanskrit)

c. Three short/Grammatical Notes carrying 5 marks each. 3x5=15(Two questions be answered in Sanskrit)

3rd and 4th Semester:

a. Out of three ,two broad questions to be answered in Sanskrit (3x10=30)

b. Out of four, three questions to be answered in Sanskrit.(4x5=20)

c. All three short/ Grammatical Notes to be Answered in Sanskrit.(3x5=15)

5th and 6th Semester 100% be answered in Devanāgari scripts and Sanskrit Language.

SEMESTER- 1

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH+ TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC 1</td><td>Classical Sanskrit Literature(POETRY)</td><td></td><td></td><td>INTER -NAL ASSE SS-MEN T (IA)</td><td>ATTEN DANCE</td><td>Comprehen sive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td rowspan="2"><u>Section- A</u>
Raghuvaṃśam :
Canto-I
Verses : 1-25
Allotted Marks-20
Lecture Hours(LH)-20

UNIT I
Canto I
A.M-10
Verses : 1-10
Introduction(Author & Text), Appropriateness of Title, Grammatical analysis, meaning, translation, Explanation, Content analysis, Characteristics of Raghu clan

UNIT II
Canto I
A.M-10
Verses : 11-25
Grammatical Analysis, meaning, translation, Explanation, Role of Dilīpa in the welfare of Subjects

<u>Section -B</u>
Kumārasambhavam :
Canto V
Verses : 1-30
Allotted Marks-20
LH-20

UNIT I
Canto V
A.M-10
Verses : 1-15
Introduction(Author & Text),</td><td></td><td></td><td>10</td><td>10</td><td>Project/ Tutorial
15</td><td>65</td></tr>
<tr><td>6</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

	Appropriateness of Title, Background of given contents, Text reading , grammatical Analysis, translation, explanation, Poetic excellence and plot **UNIT II** **Canto V** **A.M-10** **Verses : 16-30** Grammatical Analysis, translation, Explanation, Penance of Pārvatī, Poetic excellence and plot **<u>Section- C</u>** ***Kirātārjunīyam* :** **Canto-I** **Verses : 1-25** **Allotted Marks-20** **LH-30** **UNIT I** **Canto I** **A.M.-10** **Verses : 1-16** Introduction(Author & Text), Appropriateness of Title, Background of given contents, Grammatical Analysis, , translation, Explanation, Poetic Excellence, Thematic Analysis **UNIT II** **Canto I** **A.M-10** **Verses : 17-25** Grammatical Analysis, translation, Explanation, Poetic Excellence, Thematic Analysis **<u>Section- D</u>** ***Nītiśatakam* :** **Verses : 1-20** **1st Two Paddhatis** **Allotted Marks-10** **LH-20** **UNIT I** **Verses : 1-10** **A.M.-05** Grammatical Analysis, translation, Explanation						

	UNIT II **A.M-05** **Verses : 11-20** Translation, Explanation, Thematic Analysis, Bhartṛhari's Comments on Society **<u>Section- E</u>** **Origin and Development of Mahākāvya and Gītikāvya** **Allotted Marks-20** **LH-10** **UNIT I** **A.M-10** Origin Development of different types of Mahākāvya with special reference to Aśvaghoṣa, Kālidāsa, Bhāravi, Māgha, Bhaṭṭi, Śrīharṣa. **UNIT II** **A.M-10** Origin Development of Sanskrit with Gītikāvya special reference to Kālidāsa, Bihlaṇa, Jayadeva, Amaru, Bhartṛhariand their works.						

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Critical Survey of Sanskrit Literature			**INTERNAL ASSESS-MENT (IA)**	**ATTENDANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 2	**<u>Section- A</u>** **Vedic Literature:** **Allotted Marks-30** **LH-25**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	UNIT I **A.M-20** **Saṃhitā (Ṛk, Yajuṣ, Sāman, Atharva)** Time, Subject matter, Religion & Philosophy, Social life **UNIT II** **A.M-10** **Brāhmaṇa, Āraṇyaka, Upaniṣad,Vedāṅga (Brief Introduction)** **<u>Section-B</u>** ***Rāmāyaṇam* :** **Allotted Marks-15** **LH-15** **UNIT I** **A.M-10** ***Rāmāyaṇam*–** Time, Subject matter, *Rāmāyaṇam* as an *Ādikāvya*. **UNIT II** **A.M-5** ***Rāmāyaṇam* –** Source Text and its Cultural importance **<u>Section- C</u>** ***Mahābhārata* :** **Allotted Marks-15** **LH-15**	**6**	**5+1**				

	UNIT I **A.M--10** ***Mahābhārata* and its Time , Development and Subject matter** **UNIT II** **A.M-05** ***Mahābhārata***: Encyclopaedic nature, as a source, of subsequent literature, Cultural importance **<u>Section- D</u>** ***Purāṇas*** **Allotted Marks-10** **LH-15** **UNIT I** ***Purāṇas* :** Subject matter, Characteristics **UNIT II** ***Purāṇas* :** Social, Cultural and Historical Importance **<u>Section -E</u>** **General introduction to *Vyākaraṇa, Darśana, Sāhitya-Śāstra*** **Allotted Marks-20** **LH--30** **UNIT I** General introduction to *Vyākaraṇa*, Brief History of *Vyākaraṇa-Śāstra* **UNIT II** General introduction to *Darśana*. Major School of Indian Philosophy of *Cārvāka*, *Bauddha*, *Jaina*, *Sāṃkhya*, *Yoga*, *Nyāya-Vaiśeṣika*, *Pūrva Mīmāṃsā*and *Uttara Mīmāṃsā.* **UNIT III** General introduction to poetics- Six Major School of Indian Poetics- *Rasa*, *Alaṃkāra*, *Rīti*, *Dhvani*, *Vakrokti* and *Aucitya*						

AECC-1	**Environmental Science(ENVS)**	**02**	**2+0**				
GE- 1	**(Other than Sanskrit)**	**06**	**5+1**				

Suggested Reference Books: CC-1 & CC-2

1. C.R. Devadhar (Ed.), *Raghuvaṃśam* of Kālidāsa, MLBD. Delhi.

2. M.R. Kale (Ed.), *Raghuvaṃśam* of Kālidāsa, MLBD, Delhi.

3. Gopal RaghunathNandargikar (Ed.), *Raghuvaṃśam* of Kālidāsa, MLBD, Delhi.

4. कृष्णमणित्रिपाठी, रघुवंशम् (मल्लिनाथकृत-सञ्जीवनीटीका), चौखम्बासुरभारतीप्रकाशनम्, वाराणसी

5. नेमिचन्द्रशास्त्री, कुमारसम्भवम्, मोतिलालवाराणसीदास, दिल्ली

6. M.R. Kale (Ed.), *Kumārasambhavam*, MLBD, Delhi.

7. समीरशर्मा, मल्लिनाथकृतघण्टापथटीका, भारविकृत- किरातार्जुनीयम्, चौखम्बाविद्याभवन, वाराणसी

8. *Kirātārjunīyam*(Canto I), (Ed.), Ashoknath Sastri, Calcutta Book Agency.

9. M.R. Kale (Ed.), *Kirātārjunīyam*of Bhāravi, MLBD, Delhi.

10. M.R. Kale (Ed.), *Nītiśatakam* of Bhartṛhari, MLBD., Delhi.

11. विष्णुदत्तशर्माशास्त्री(व्या.), भतृहरिकृतनीतिशतकम्, विमलचन्द्रिकासंस्कृतटीकाहिन्दी-व्याख्यासहितम्, ज्ञानप्रकाशन, मेरठ.

12. Keith, A.B.: *History of Sanskrit Literature*, MLBD, Delhi.

13. Krishnamachariar :*History of Classical Sanskrit Literature*, MLBD, Delhi.

14. GaurinathShastri: *A Concise History of Sanskrit Literature*, MLBD, Delhi.

15. Winternitz, Maurice: *Indian Literature* (Vol. I-III), MLBD, Delhi.

16. वलदेव, उपाध्याय, संस्कृतसाहित्य का इतिहास, शारदा निकेतन, वाराणसी.

17. राधावल्लभ त्रिपाठी, संस्कृत साहित्य का अभिनव इतिहास, विश्वविद्यालय प्रकाशन,वाराणसी.

18. वलदेव। उपाध्याय, वैदिकसाहित्य और संस्कृति, वाराणसी.

19. *Vaiyākaraṇa-siddhāntakaumudī*, (Kāraka, Samāsa), Ayodhyānāth Sānyāl, Sanskrit Pustak Bhandar.

20. *Pāṇinīyam*, Nagendranath Sastri, Sanskrit Book Dipo.

21. *Veder parichay*, *Yogiraj* Basu

SEMESTER-2

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH +TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC 3</td><td>Classical Sanskrit Literature(PROSE)</td><td></td><td></td><td>INTERNAL ASSESS-MENT (IA)</td><td>ATTENDANCE</td><td>Comprehensive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td rowspan="2"><u>Section –A</u>
Śukanāsopadeśa:
Allotted Marks-30
LH-35

UNIT – I
Allotted Marks-20
Introduction – Author and text

UNIT II
Allotted Marks-10

Social and Political Thoughts depicted in Śukanāsopadeśa logical meaning and application of saying like बाणोच्छिष्टं जगत्सर्वम्, वाणी बाणो बभूव, पञ्चाननो बाणः etc.

<u>Section –B</u>
Rājavāhanacaritam:
Allotted Marks-30
LH-40

UNIT I
Allotted Marks-15

Para 1-8
Introduction- Author, Text, TextReading (Grammar, Translation and Explanation), poetic excellence, plot.

UNIT II
Allotted Marks-15

Remaining part- Text reading (Grammar, Translation and Explanation), poetic excellence,</td><td></td><td></td><td>10</td><td>10</td><td>Project/ Tutorial
15</td><td>65</td></tr>
<tr><td>06</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

	plot, Society, Language and style of Daṇḍin, Exposition of saying दण्डिनः पदलालित्यम्, कविर्दण्डी कविर्दण्डी कविर्दण्डी न संशयः **<u>Section –C</u>** **Origin and Development of prose, Important prose romances and fables** **Allotted Marks-30** **LH-25** **UNIT I** **Allotted Marks-15** Origin and Development of prose, Important prose romances and fables i) *Subandhu,Daṇḍī, Bāṇa, Ambikādatta, Vyāsa.* **UNIT II** **Allotted Marks-15** ii) *Pañcatantra, Hitopadeśa Vetālapañcaviṃśatikā,Siṃhāsana dvātriṃśikā, Puruṣaparīkṣā,Śukasaptati*.						

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	SELF MANAGEMENT IN THE *GĪTĀ*			**INTERNAL ASSESS-MENT (IA)**	**ATTENDANCE**	**Comprehensive Continious Assessment (CCA)**	**Theory**
CC 4	**<u>Section -A</u>** ***Gītā : Cognition and emotive apparatus*** **Allotted Marks-30** **LH-25** **UNIT I** Hierarchy of *Indriya, Manas, Buddhi, Ātman* III, 42; XV. 7 Role of the *Ātman* : XV. 7; XV.9 Mind is a product of *Prakṛti* VII.4 Properties of three *Guṇas* and their impact on the Mind. XIII, 5-6; XIV. 5-8, II-13, XIV.17 **<u>Section -B</u>** **Allotted Marks-40** **LH-40** **UNIT I** **Allotted Marks-10** ***Gītā : Controlling the mind Confusion and Conflict*** Nature of conflict I.1 ; IV.16 ; I.45 ; II.6 causal factors- ignorance-II.41 ; *Indriya* II.6o, Mind II.67 *; Rajoguṇa*-III.36-39, XVI. 21 ; weakness of mind .II.3 ; IV.5 **UNIT II** **Allotted Marks-15** Means of controlling the Mind Meditation difficulties-VI. 34-35 ; Procedure VI. 11-14 Balanced life-III.8, VI.6-7 Diet control-XVII. 8-10 Physical and mental discipline-XVII.14-19 ; VI.36			**10**	**10**	**Project/ Tutorial** **15**	**65**
		06	**5+1**				

	UNIT III **Allotted Marks-15** Means of conflict resolution Importance of knowledge –II. 52; IV.38; IV. 42 Clarity of *buddhi*-XVIII.30-32 Process of decision making – XVIII.63 Control over senses-II.59, 64 Surrender of *Kartṛbhāva*-XVIII.13-16 ; V.8-9 Desirelessness-II.48 ; II.55 Putting others before self –III.25 **<u>Section- C</u>** **Allotted Marks-20** **LH-35** **UNIT I** ***Gītā : Self-management through devotion*** Surrender of ego –II. 7; IX.27 ; VIII.7 ; XI. 55 ; II.47 Abandoning frivolous debates-VII.21 ; IV.11 ; IX.26 Acquisition of moral qualities-XII.11 ; XII.13-1						
AECC 2	**ENGLISH/ MIL COMMUNICATION**	**02**	**2+0**				
GE 2	**(Other than Sanskrit)**	**06**	**5+1**				

Reference books : CC- 3 & CC- 4

1.शुकनासोपदेश, प्रह्लाद-कुमार, महेशचन्द्र दाश,,दिल्ली.

2.शुकनासोपदेश, नीरदवरण चक्रवर्त्ती, संस्कृत पुस्तक भाण्डार (Bengali).

3.राजवाहनचरितम्, S. Roy.

4.राजवाहनचरित, सत्यनारायण चक्रवर्त्ती, संस्कृत पुस्तक भाण्डार (Bengali).

5. श्रीमद्भगवद्गीता, स्वामी जगदीश्वरानन्द, उद्बोधन कार्यालय (Bengali).

6. श्रीमद्भगवद्गीता, एस्. राधाकृष्णन् कृत व्याख्या हिन्दी अनुवाद, राजपाल् एण्ड सन्स्, दिल्ली

7. *Śrīmadbhagavadgītārahasya*- The Hindu Philosophy of life & Ethics.

8.*Karmayogaśāstra* Religion, Original Sanskrit stanzas with English Translation, Bal Gangadhar Tilak & Balchandra Sitaram Sukthankar,J.S. Tilak & S.S Tilak.

9. Sri Aurobinda- Essays on the *Gītā*, Sri Aurobinda Ashram, Pandichery.

SEMESTER- 3

Course Code	Course Title / Topic	Credit	TH +TU	MARKS DISTRIBUTION			
	***CLASSICAL SANSKRIT LITERATURE (DRAMA*)**			**INTERNAL ASSESS-MENT (IA)**	**ATTENDANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 5	**Section –A** ***Svapnavāsavadattam*** **ACT I –VI** **Allotted Marks-25** **LH-30** **UNIT I** Act I-IV: Story, Meaning/Translation, Explanation. **UNIT II** Act V-VI: Characterisation, Society, story of regains, Bhāsa's Style. **Section –B** ***Abhijñānaśakuntalam* (Act I-IV)** **Allotted Marks-25** **LH-30** **UNIT I** Introduction, Author, Explanation of terms like *Nāndī, Prastāvanā, Sūtradhāra, Naṭī, Viṣkambhaka, Vidūṣaka*. **UNIT II** Text reading, Grammar, Translation, Explanation, Plot, Timing of Action, Personification of Nature, Purpose and design behind	**06**	**5+1**	**10**	**10**	**Project/ Tutorial** **15**	**65**

	Abhijñānaśakuntalam. **<u>Section- C</u>** ***Abhijñānaśakuntalam* (Act V-VII)** **Allotted Marks-15** **LH-30** **UNIT I** Society,Marriage, Tax system, Poetic excellence, Popular saying about Kālidāsa & Śakuntalam, **UNIT II** Language of Kālidāsa, Use of Prakrit. **<u>Section –D</u>** **Critical Survey of Sanskrit Drama** **Allotted Marks-25** **LH-10** **UNIT I** **Allotted Marks-10** Sanskrit Drama : Origin and Development, Nature of Sanskrit Drama **UNIT II** **Allotted Marks-15** Sanskrit Drama : Origin and Development, works of Bhāsa, Kālidāsa, Śudraka, Viśākhadatta, Śriharṣa, Bhavabhūti, Bhaṭṭanārāyaṇaand Dramatists and their Works.							

REFERENCE of CC- 5

1.Bose, Ramendramohan,*Abhijñānaśakuntalam.*

2. Roy, Saradaranjan,*Abhijñānaśakuntalam*

3. Chakravartti, Satyanarayan,*Abhijñānaśakuntalam*, Sanskrit Pustak Bhandar (Bengali)

4. Basu, Anilchandra, *Abhijñānaśakuntalam*, Sanskrit Book Depot (Bengali)

5. Basu, Anilchanra, *Svapnavāsavadattam*, Sanskrit Book Depot (Bengali)

6. Kale, M.R (Ed) *Abhijñānaśakuntalam*, M L B D, Delhi

7. Gadkar, Gajendra(Ed.), Bose, Ramendramohan, *Abhijñānaśakuntalam*, Calcutta

8. Kale, M. R (Ed.) *Svapnavāsavadattam*, M L B D. Delhi

9.Bhat, G. K, *Sanskrit Drāmā*, Karnataka University Press, Dharwar

10. Keith. A.B, *Sanskrit Drama*, Oxford University Press, London

11. Basu, Debendranath, *Sakuntalāy Nāṭyakalā* (Bengali)

12. Dharmapal, Gauri, *Srotobahā Mālinī.*

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Poetics and Literary Criticism			**INTERNAL ASSESS-MENT (IA)**	**ATTEND-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 6	**<u>Section-A</u>** **Introduction to Sanskrit Poetics** **Allotted Marks-20** **LH-15** **UNIT I** **Allotted Marks-10** Introduction to Poetics, Origin and Development of Sanskrit Poetics, Various names of Sanskrit Poetics. **UNIT II** **Allotted Marks-10** Definition (*Lakṣaṇa*), Objectives (*Prayojana*) and Causes (*Hetu*) of Poetry. (After *Kāvyaprakāśa*) **<u>Section- B</u>** **Forms of *Kāvya*- Literature** **Allotted Marks-15** **LH-15** **UNIT I** Forms of Poetry : *Dṛśya*, *Śravya, Miśra* (*Campū*) (After *Kāvyaprakāśa*) **UNIT II** *Mahākāvya*, *Khaṇḍakāvya*, *Gadyakāvya*, : *Kathā*, Ākhyāyikā, (After *Sāhityadarpaṇa*)			**10**	**10**	**Project/ Tutorial** **15**	**65**
		06	**5+1**				

	<u>Section-C</u> ***Śabda-śakti* and *rasa-sūtra*** **Allotted Marks-25** **LH-30** **UNIT I** **Allotted Marks-10** Power/Function of word and meaning (According to *Kāvyaprakāśa*) *abhidhā* (expression/ denotative meaning)*lakṣaṇa* (indication/ indicative meaning) and *vyañjanā*(suggestion/ suggestive meaning) **UNIT II** **Allotted Marks-15** Rasa : *Rasa-sūtra* of Bharata and its prominent expositions *: utpattivāda, anupattivāda, bhuktivāda* and *abhivyaktivāda, alaukikattva* (transcendental nature of rasa (as discussed in *kāvyaprakāśa*) **<u>Section -D</u>** **Figures of speech and Meter** **Allotted Marks-30** **LH-40** **UNIT I** **Allotted Marks-15** Figures of Speech – *Anuprāsa, Yamaka, Śleṣa, Upamā, Rūpaka, Sandeha, Bhrāntimān, Apahṇuti, Utprekṣā, Atiśayokti, Tulyayogitā, Dīpaka, Dṛṣṭānṭa, Nidarśanā, Vyatireka, Samāsokti, Svabhāvokti, Aprastutapraśaṃsā,*						

	Arthāntaranyāsa, Kāvyaliṅga, Vibhāvanā(According to *Sāhityadarpaṇa* X) **UNIT II** **Allotted Marks-15** **Metres :** *Chandas* : Nature and Classification, *Anuṣṭupa, Āryā, Indravajrā, Upendravajrā, Drutavilambitam, Upajāti, Vasantatilakam, Mālinī, Mandākrāntā, Śikhariṇī, Śārdūlavikrīḍitam, Sragdharā* (According to *Chandomañjarī*)						

REFERENCE BOOKS- CC -6

1. Mukhopadhyaya, Bimalakanta(sa) S*ā*hityadarpa*ṇ*am.

2.Bandyopadhyaya, Udaychandra(sa) S*ā*hityadarpa*ṇ*am. (10th Chapter).

3.Vidyanidhi, Gurunatha,(sa) *Chandomañjarī*.

4. Bhattacharya, Bishnupada, *Prācinbhāratīya Alaṃkāraśāstrer Bhūmikā*.

5. साहित्यदर्पणम्, कृष्णमोहन-शास्त्री (लक्ष्मीटीकासहितम्) चौखाम्बा सुरभारती.

6. साहित्यदर्पणम्, हरिदाससिद्धान्तवागीशः, चौखाम्बा-सुरभारती.

7. Dwivedi, R.C *The Poetic Light*; MLBD.

8. Kane, P.V, History of Sanskrit Poetic and its Hindi translation by Indrachand Shastri, MLBD

9. Ganganath Jha, *Kāvyaprakāśa*(with Eng Translation), Bharatiya Vidya Bhavan Prakashan, Varanasi.

10. Ray,S.R, S*ā*hityadarpa*ṇ*am, Visvanatha (ch I, IV, X) with English exposition, Delhi.

11. S*ā*hityadarpa*ṇ*am (Ch. VI) , Kārikā 6/1,2

12. बलदेव-उपाध्याय, संस्कृत-आलोचना, हिन्दि समिति, सूचना विभाग, उ,प्र.

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Indian Social Institutions and Polity			**INTERNAL ASSESS-MENT (IA)**	**ATTEND-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 7	**<u>SECTION -A</u>** **Indian Social Institutions: Nature and Concepts** **Allotted Marks-20** **LH-20** **UNIT I** **Indian Social Institutions: Definition and scope.** **Allotted Marks-10** Sociological Definition of Social Institutions. Trends of Social Changes, Sources of Indian social Institutions (Vedic Literature *Purāṇa, Rāmāyaṇa, Mahābhārata,* Dharmaśāstra, Buddhist and Jain Literature, Literary Works, Inscription Memories of foreign Writers) **UNIT II** **Social Institution and Dharmaśāstra Literature :** **Allotted Marks-10** Dharmaśāstra as a special branch, studies of social Institution, sources of Dharma (*Manusmṛti, 2.12 , Yājñavalkyasmṛti 1.7)* Different kinds of Dharma in the sense of Social Ethics (*Manusmṛti 10.63 ; Viṣṇupurāṇa* 2.16-			**10**	**10**	**Project/ Tutorial** **15**	**65**
		06	**5+1**				

	17) ; Six kinds of Dharma in the sense of Duties (*Mitākṣarā* ṭīkā on *Yājñavalkyasmṛti* 1.1) Tenfold dharma as Ethical qualities *(Manusmṛti* 6.92), Forteen *Dharmaśāstra* (*Yājñavalkyasmṛti* 1.3). **<u>Section-B</u>** **Structure of Society and Values of Life** **Allotted Marks-30** **LH-30** **Unit I** Varṇa-System and Caste System: Four-fold division of *Varṇa* System, (*Ṛgveda*, 10.90.12), *Mahābhārata*, Śāntiparva,72.3-8); Division of *Varṇa* according to *Guṇa* and *Karma* (*Bhagvadgītā*, 4.13, 18.41-44). **Unit II** Origin of Caste-System from Inter-caste Marriages (*Mahābhārata*, Anuśāsanaparva, 48.3-11); Emergence of non-Aryan tribes in Varṇa-System (*Mahābhārata*, Śāntiparva, 65.13-22). Social rules for up-gradation and down-gradation of Caste System (*Āpastambadharmasūtra* 2.5.11.10-11, *Baudhāyanadharmasūtra*, 1.8.16.13-14, *Manusmṛti*, 10,64, *Yājñavalkyasmṛti*, 1.96) **Unit III** **Position of Women in the Society :** Brief survey of position of						

	women in different stages of Society. Position of women in *Mahābhārata* (*Anuśāsanaparva*, 46.5-11, *Sabhāparva*, 69.4-13. Praise of women in The *Bṛhatsaṁhitā* of Varāhamihira (Strīpraśaṁsā, chapter-74.1-10) **Unit IV** **Social Values of Life :** Social Relevance of Indian life style with special reference to Sixteen *Saṁskāras*. Four aims of life '*Puruṣārtha Catuṣṭaya'*- 1. Dharma, 2. Artha, 3. Kāma, 4. Mokṣa. Four Āśramas- 1. Brahmacarya, 2. Gārhasthya, 3. Vānaprastha, 4. Sannyāsa **<u>Section –C</u>** **Allotted Marks-20** **Indian Polity : Origin and Development** **LH-25** **Unit I** **Allotted Marks-10** **Initial stage of Indian Polity (from Vedic period to Buddhist period).** Election of King by the people: '*Viśas'* in Vedic period (*Ṛgveda*,10.173; 10.174; *Atharvaveda*,3.4.2; 6.87.1-2). Parliamentary Institutions:'Sabhā, 'Samiti' and 'Vidatha' in Vedic period (*Atharvaveda*,7.12.1;12.1.6 ; *Ṛgveda* ,10.85.26); King-maker 'Rājakartāraḥ' Council in *Atharvaveda* (3.5.6-7),Council of 'Ratnin' in *Śatapathabrāhmaṇa*(5.2.5.1);						

	Coronation Ceremony of Samrāṭ in *Śatapathabrāhmaṇa* (51.1.8-13; 9.4.1.1-5) Republic States in the Buddhist Period (Dīgghanikāya, Mahāparinirbbaṇa Sutta, Aṅguttaranikāya,1.213;4.252,256) **Unit II** **Allotted Marks-10** **Later Stages of Indian Polity (From Kauṭilya to Mahatma Gandhi).** Concept of Welfare State in *Arthaśāstra* of Kauṭilya (*Arthaśāstra*, 1.13 : 'mātsyanyāyābhibhuṭḥ' to 'yo' asmān gopāyatīti') Essential Qualities of King (*Arthaśāstra*,6.1.16-18: 'sampādayaty asampannaḥ' to 'jayaty eva na hīyate'); State Politics 'Rājadharma' (*Mahābhārata* , Śāntiparva,120.1-15; *Manusmṛti*, 7.1-15; Śukranīti,1.1-15); Constituent Elements of Jain Polity in *Nitivākyāmṛta* of Somadeva Suri, (Daṇḍanīti- samuddeśa, 9.1.18 and Jānapada-samuddeśa, 19.1.10). Relevance of Gandhian Thought in Modern Period with special reference to 'Satyāgraha' Philosophy **<u>Section –D</u>** **Allotted Marks-20** **Cardinal Theories and Thinkers of Indian Polity** **LH-25** **Unit I** **Cardinal Theories of Indian Polity**: **Allotted Marks-15** 'Saptāṅga' Theory of State: 1. Svāmin, 2. Amātya, 3. Janapada 4. Pura, 5. Kośa, 6.						

	Daṇḍa and 7. Mitra (Arthaśāstra, 6.1. Mahābhārata, Śāntiparva, 56.5, Śukranīti, 1.61-62). 'Maṇḍala'Theory of Inter-State Relations: 1.Ari, 2. Mitra, 3. Ari-mitra, 4.Mitra- mitra, 5.Ari-mitramitra; 'Śāḍgunya'Policy of War and Peace : 1. Sandhi, 2. Vigraha, 3. Yāna, 4. Āsana, 5. Saṁśraya 6.Dvaidhibhāva. 'CaturvidhaUpāya'for Balancing the power of State : 1.Sāma 2.Dāna,3.Daṇḍa.4.Bheda; Three Types of State Power 'Śakti': 1.Prabhu –śakti, 2.Mantra-śakti, 3. Utsāha-śakti. **Unit II** **Important Thinkers on Indian Polity:** **Allotted Marks-05** Manu, Kauṭilya, Kāmandaka, Śukrācārya, SomadevaSuri, Mahatma Gandhi						
SEC-A-1	**Sanskrit Writing Skill** 1.Translation : 40 marks English to Sanskrit 20 marks and Sanskrit to English 20 marks 2. Comprehension in Sanskrit (10 marks) 3.Paragraph Writings(10marks) 4.Letter Writing (10Marks) 5.Essay Writing(20 Marks)	**02**	**2+0**				
GE-3	**(Other than Sanskrit).**	**06**	**5+1**				

Recommended Books/Readings: CC 7

1. *Āpastambadharmaśūtra* - (Trans.), Bühler, George, The Sacred Laws of the Āryas, SBE Vol. 2, Part 1,1879

2. *Arthaśāstra* of Kautilya - (Ed.)Kangale, R.P. Delhi, Motilal Banarasidas 1965

3. *Atharvavedasaṁhitā* - (Trans.) R.T.H. Griffith, Banaras, 1896-97, rept.(2 Vols) 1968.

4. *Baudhāyanadharmaśūtr*a - (Ed.) Umesha Chandra Pandey,Chowkhamba Sanskrit Series Office,Varanasi,1972.

5. *Mahābhārata* (7 Vols) - (Eng. Tr.) H.P. Shastri, London, 1952-59.

6. Manu's Code of Law - (Ed. & Trans.) :Olivelle, P. (A Critical Edition and Translation of the Manava- Dharamaśāstra), OUP, New Delhi, 2006.

7. *Rāmāyaṇa of Vālmīki* — (Eng. Tr.) H.P. Shastri, London, 1952-59. (3 Vols)

8. *Ṛgvedasaṁhitā* (6 Vols)- (Eng. Tr.) H.H. Wilson, Bangalore Printing & Publishing Co., Bangalore, 1946.

9. *Śatapathabrāhmaṇa* - (with Eng. trans. ed.) Jeet Ram Bhatt, Eastern (3 Vols), BookLinkers, Delhi, 2009.

10. *Visṇupurāṇa* - (Eng. Tr.) H.H. Wilson, Punthi Pustak,reprint, Calcutta, 1961.

11. *Yājñavalkyasmṛti* with Mitākṣarā commentary - Chowkhamba Sanskrit Series Office,Varanasi,1967

12. अंगुत्तरनिकाय (1-4 भाग) बनारस 1980

13. आपस्तम्बधर्मसूत्र—हरदत्तकीटीकासहित्, चौखम्बासंस्कृत सीरीज, वाराणसी।

14.कौटिलीयअर्थशास्त्र—हिन्दि अनुवाद—उदयवीरशास्त्री, मेहरचन्द्दलछमनदास,दिल्ली,1968।

15. दिग्घनिकाय(1—2 भाग)—सम्पा०जे०कश्यपविहार 1958।

16. नीतिवाक्यामृतम्—सोमदेवसूरविरचित, व्या०रामचन्द्रमालवीय, चौखम्बा विद्याभवन, वाराणसी, 1972।

17. बौधायनधर्मसूत्र—आनन्द आश्रमसंस्कृतसीरीज, पूना।

18. बृहत्संहिता—वराहमिहिरविरचित हिन्दिअनुवाद—बलदेवप्रसाद मिश्र, खेमराजश्रीकृष्णदास,प्रकाशन, मुम्बई।

19. महाभारत(1—6 भाग)—हिन्द्दीअनुवादसहित, (अनु०) रामनारायणदत्तशास्त्रीपाण्डेय, गीताप्रेस, गोरखपुर।

20. मनुस्मृति (1—13 भाग) — (सम्पा०एवव्या०) उर्मिलारुस्तगी, जे.पी. पल्बिशिं हाउस, दिल्ली, 2005।

21.History of Dharmashastra(Vol.1)- P.V. Kane.

22. Concise History of Dharmaśastra-Sureshchandra Bandyopadhyay, MLBD.

23. Dharma-Artha-Niti- Sastra—Tapati Mukhopadhyayay.

24. Manusaṃhitā- Manabendu Bandyopadhyay - Sanskrit pustak Bhandar.

25. Śukranītisāra- Manabendu Bandyopadhyay, Swadesh.

26. Kauṭilya Arthaśāstra(Vol. 2)- Manabendu Bondhopadhyaya, Sanskrit Pustak Bhandar.

27. Kauṭiliya: The Arthaśāstra- L.N. rangrajan, Penguin Books, India.

SEMESTER- 4

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Indian Epigraphy, Palaeography and Chronology			**INTERN-AL ASSESS-MENT (IA)**	**ATTEND-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 8	**<u>Section -A</u>** **Epigraphy** **Allotted Marks-20** **LH-25**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	Unit I Introduction to Epigraphy and Types of Inscriptions **Unit II** Importance of Indian Inscriptions in the reconstruction of Ancient Indian History and Culture **Unit III** History of Epigraphical Studies in India **Unit IV** History of Decipherment of Ancient Indian Scripts (Contribution of Scholars in the field of epigraphy): Fleet, Cunninghum, Princep, Bùhler, Ojha, D.C.Sircar. **<u>Section- B</u>** **Palaeography** **Allotted Marks-25** **LH-30** **Unit I** Antiquity of the Art of Writing **Unit II** Writing Materials, Inscribers and Library **Unit III** Introduction to Ancient Indian Scripts.	**06**	**5+1**				

	<u>Section -C</u> **Study of selected inscriptions** **Allotted Marks-30** **LH-30** **Unit I** Aśoka's Giranāra Rock Edict-1 Aśoka's Sāranātha Pillar Edict **Unit II** Girnāra Inscription of Rudradāmana **Unit III** Eran Pillar Inscription of Samudragupta 04 Credits Mehrauli Iron Pillar Inscription of Candra **Unit IV** Khalimpur Copperplate Inscription of Dharmapāla **<u>Section -D</u>** **Chronology** **Allotted Marks-15** **LH-15** **Unit I** General Introduction to Ancient Indian Chronology **Unit II** System of Dating the Inscriptions (Chronograms) **Unit III** Main Eras used in Inscriptions - Vikrama Era, Śaka Era and Gupta Era						

Recommended Books/Readings: CC -8

1.अभिलेख—मंजूषा, रणजीतसिंहसैनी,न्यू भारतीयबुककार्पोरेशन, दिल्ली, 2000.

2. उत्कीर्णलेखपञ्चकम्, झाबन्धु ,वाराणसी, 1968.

3. उत्कीर्णलेखस्तबकम्, जियालालकाम्बोज, ईस्टनबुकलिंकर्स्, दिल्ली.

4. भारतीयअभिलेख, एस.एस. राणा, भारतीयविघाप्रकाशन, दिल्ली, 1978.

5. भारतीयप्राचीनलिपिमाला, गौरीशंकर हीराचन्द्दओझा, अजमेर, 1918.

6. *Select Inscriptions* (Vol.I) - D.C. Sircar, Calcutta, 1965.

7. नारायण, अवधकिशोरएवंठाकुरप्रसादवर्मा :प्राचीनभारतीयलिपिशास्त्रऔरअभलेखिकी , वाराणसी, 1970.

8. पाण्डे, राजबली :भारतीयपुराणलणप, लोकभारतीप्रकाशन, इलाहाबाद, 1978.

9. ब्यूलर, जॉज :भारतीयपुरालिपि् शास्त्र, (हिन्दीअनु०) मङ्गलनाथसिंह, मोतीलालबनारसीदास, दिल्ली, 1966.

10. मुले, गुणाकर :अक्षरकथा, प्रकाशनविभाग, भारतसरकार,दिल्ली, 2003.

11. राही, ईश्वरचन्द्द :लेखनकलाकाइतिहास (खण्ड 1—2), उत्तरप्रदेशहिन्दीसंस्थान,

लखनऊ, 1983.

12. सरकार, डी.सी. : भारतीयपुरालिपिविघा, (हिन्दीअनु०) कष्णदत्तवाजपेयी, विघानिधिप्रकाशन,दिल्ली, 1996.

13. सहाय,शिवस्वरूप : भारतीयपुरालेखोंकाअध्ययन, मोतीलालबनारसीदास,दिल्ली. Dani, Ahmad Hasan :Indian Paleography, Oxford, 1963.

14. Pillai, Swami Kannu& K.S. Ramchandran :Indian Chronology (Solar, Lunar and Planetary), Asian Educational Service, 2003.

15. Satyamurty, K. :Text Book of Indian Epigraphy, Lower Price Publication, Delhi, 1992.

16. Debarcana Sarkar, *Nityakaler tui puratan*, Paschimbanga Rajya Pustak Parsad,

17.D.C. Sarkar, Ashoker *Abhilekha*, Mahabodhi Society.

18. Georg Bûhler,*Indian Paleography* , Munshiram Manoharlal.

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Modern Sanskrit Literature			**INTERNAL ASSESS-MENT (IA)**	**ATTEN D-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 9	**<u>Section- A</u>** **Mahākāvya and Charitakāvya** **Allotted Marks-50** **LH-30**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	Unit I **Survey of Modern Sanskrit Literature in Bengal.** **Allotted Marks-20** **UNIT II** **Allotted Marks-30** **General Survey** Pandit Kshama Rao, P. K. Narayana Pillai, S.B. Varmekar, Paramananda Sastri, Rebaprasad Dwivedi Janaki vallabh Sastri,Ramkaran Sarma, Jagannath Pathak, S. Surender Rajan, Shankar Dev Avatare. Haridas Siddhanta Vagisha, Mulasankar, M. Yajnika, Mahalinga Shastri Leela Rao Dayal, Yatindra Vimal Chowdhury, Virendra Kumar Bhattacharya **<u>Section- B</u>** **Gadya and Rūpaka** **Allotted Marks-40** **LH-70** **Unit I** **Allotted Marks-10** Śivarājāvijayam (Niśvāsa-I) By Ambika Datta Vyasa **UNIT II** **Allotted Marks-10**	**06**	**5+1**				

	Atha Kim-Siddheswar Chattopadhyaya. **UNIT III** **Allotted Marks-10** Daridradurdaivam of Shrijiva Nyayatirtha **UNIT IV** **Allotted Marks-10** Rukmiṇīharaṇam (Canto I) Haridasa Siddhantavagisha						

Recommended Books: CC -9

1. मिश्र अभिराजराजेन्द्र,कल्पवल्ली (समकालीन- संस्कृत –काव्य- संखालना)—साहित्य एकादमी, 2013

2. प्रभु शंकर जोशी—भीमायनम्, शारदागौरवग्रन्थमाला, पुणे

3. त्रिपाठी राधावल्लभ—नवस्पन्दः, मध्यप्रदेशहिन्द्दीग्रन्थअकादमी

4.त्रिपाठी राधावल्लभ—आयति, रास्ट्रीय संस्कृत संस्थान, दिल्ली. University Grants Commission (UGC) Page 45 of 141 PROPOSED UNDER GRADUATE COURSES FOR SANSKRIT (HON.) UNDER CHOICE BASED CREDIT SYSTEM (CBCS) Detail of the Core Course for Sanskrit

5. आधुनिक संस्कृत- साहित्य सञ्चयन् (सम्पा०) गिरीशचन्द्रपन्त,विघानिधिप्रकाशन, दिल्ली 2008.

6. तदेवगगनंसैवधरा (काव्यसंग्रह) —श्रीनिवासरथविरचित,

7. विंशशताब्दी संस्कृत—काव्यामृतम् — (संक) अभिराजराजेन्द्रमिश्र (भाग—1)

8. उपाध्याय, रामजी—आधुनिक संस्कृत नाटक, चौखम्बासुरभारतीप्रकाशन, वाराणसी, 1996.

9. त्रिपाठी, राधावल्लभ—संस्क्रुत साहित्य, बीसवींशताब्दी, रास्ट्रीय संस्कृत संस्थान 1999.

10. भार्गव, दयानन्द—आधुनिक संस्कृत साहित्य, राजस्थानीग्रन्थागार, जोधपुर, 1987.

11. त्रिवेदी, मीरा - आधुनिक सस्कृत महिला नाट्यकार, परिमल, परिमल् पाब्लिकेशन्, दिल्ली 2000.

12. रुचिश्रेष्ठ-—बीसवींशताब्दी,संस्कृत लोक कथा साहित्य, रास्ट्रीय संस्कृत संस्थान, 2008.

13. शास्त्री, कलानाथ—आधुनिक काल का संस्कृत गद्य—साहित्य, रास्ट्रीय संस्कृत संस्थान, 1995.

14. शुक्ल, हीरालाल— आधुनिक सस्कृत साहित्य,रचनाप्रकाशन, इलाहाबाद, 1971.

15. Joshi, K.R. & S.M. Ayachuit ² Post Independence Sanskrit Literature, Nagpur, 1991.

16. Prajapati, Manibhai K. ² Post Independence Sanskrit Literature: A Critical Survey, Patna, 2005.

17. UshaSatyavrat, Sanskrit Dramas of the Twentieth Century, Mehar Chand Lachmandas, Delhi, 1987.

18. Dwivedi Rahas Bihari – AdhunikMahakāvya Samikshanam

19. Tripathi RadhaVallabha– Sanskrit SahityaBeesaveenShatabdi , 1999, Delhi

20. Musalgaonkar Kesava Rao – Adhunik Sanskrit KāvyaParampara, 2004

21. Narang, S.P. – KalidasaPunarnava,

22.Upadhyaya, Ramji–Adhunik Sanskrit Natak, Varanasi

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH+ TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC 10</td><td>SANSKRIT WORLD LITERATURE</td><td></td><td></td><td>INTER N-AL ASSES S-MENT (IA)</td><td>ATTEN D-ANCE</td><td>Comprehe nsive Continuou s Assessmen t (CCA)</td><td>Theory</td></tr>
<tr><td rowspan="2"><u>Section- A</u>
Allotted Marks--15
LH-15

Unit I
Sanskrit Studies in West:
William Jones, Charles Wilkins, H. Wilson, MaxMùller, J.G. Buhler.

<u>Section- B</u>
Allotted marks-15
LH-20

Unit I
Sanskrit Studies in East:
Swami Vivekananda , Sri Aurobindo, Dayānanda Sarasvatī, Haridāsa Siddhāntavāgiśa, Śrījīva Nyāyatīrtha, Kshitish Chandra Chatterji, Roma Choudhuri, Pañcānana Tarkaratna & Ramaranja Mukherji.

<u>Section- C</u>
Sanskrit Fables in World Literature
Allotted marks-15
LH-15

Unit I
Translation of Paňcatantra in Eastern and Western</td><td></td><td></td><td>10</td><td>10</td><td>Project/ Tutorial
15</td><td>65</td></tr>
<tr><td>06</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

	Translation of Vetālapaṅcaviṁśatikā, Siṁhāsanadvātriṁśikā and Śukasaptati in Eastern **Unit II** Languages and Art. **<u>Section –D</u>** **Allotted marks-15** **LH-20** *Rāmāyaṇa* and *Mahābhārata* in South Eastern Asia **Unit I** Rāma Kathā in south eastern countries **Unit II** *Mahābhārata* stories as depicted in folk cultures of SE Asia **<u>Section- E</u>** **Kālidāsa in the West** **Allotted marks-10** **LH-15** English and German translation of Kālidāsa 's writings and their influence on western literature and theatre. **<u>Section- F</u>** **Sanskrit Studies across the World** **Allotted marks-20** **LH-15** i. Sanskrit Study Centres in Asia ii.Sanskrit Study Centres in Europe iii. Sanskrit Study Centres in America						
SEC-B-2	**Spoken & Computational Sanskrit** **1.Translation : 40 marks** English to Sanskrit 20 marks and Sanskrit to	**02**	**2+0**				

	English 20 marks **2.** Comprehension in Sanskrit (10 marks) 3.Paragraph Writings(10marks) 4.Letter Writing (10Marks) 5.Essay Writing(20 Marks)						
GE 4	**(Other than Sanskrit)**	**06**	**5+1**				

Recommended Books/Readings: -10

1. The Bhagavad Gita and the West: The Esoteric Significance of the Bhagavad Gita and Its Relation to the Epistles of Paul", by Rudolf Steiner, p. 43. arisebharat.com/2011/10/22/impact-of-bhagvad-gita-on-west/

2. Bhagavad Gita - World Religions

3. Bannerji, Suresh Chandra- 'Influence of Sanskrit outside India, A Companion to Sanskrit Literature, MLBD, 1971.

4. Excerpt from Wood's 2008 update of Kalila and Dimna- Fables of Friendship and Betrayal.

5. Falconer, Ion Keith (1885), Kalilah and Dimnah or The Fables of Bidpai, Cambridge University Press, Amsterdam, 1970.

6. Hertel, Johannes(1908-15), The Paňcatantra : a collection of ancient Hindu tales, in the recension called Paňcākhyānaka, and dated 1199 A.D., of the Jaina monk, Pūrṇabhadra, critically edited in the original Sanskrit, Harvard Oriental Series Volume 11,12,13, 14.

7. History of Sanskrit Literature, A Berriedale Keith, Motilal Banarsidas Publishers Pvt. Limited, India, 1993.

8. History of the Migration of Paňcatantra.

9. Impact of Bhagvad Gita on West | Arise Bharat

10. Influence of Bhagavad Gita - Wikipedia, the free encyclopedia

11. Jacobs, Joseph (1888), The earliest English version o the Fables of Bidpai , London.

12. James A. Hijiya, "The Gita of Robert Oppenheimer" Proceeding of the American Philosphical Society, 144, no. 2 (Retrieved on 27 February 2011).

13., कालिदासग्रन्थावली, रेवाप्रसाद्विवेदी, हिन्दुसंस्कृतविश्वविद्यालय,वाराणसी, 1986.

SEMESTER –5

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH+ TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC 11</td><td>Vedic Literature</td><td></td><td></td><td>INTERN-AL ASSESS-MENT (IA)</td><td>ATTEND-ANCE</td><td>Comprehensive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td rowspan="2"><u>Section- A</u>
Allotted Marks-50
LH-40

Unit I
Allotted Marks-30
Ṛgveda- Agni-1.1, Akṣa sukta-10.34, Hiraṇyagarva-10.121, Vāk Sūkta-10.125

Unit II
Allotted Marks-10
Śukla Yajurveda-Rudrādhyāya 16.1-14,

UNIT III
Allotted Marks-10
Atharvaveda-Sāmmanasyam-3.30
Bhūmi-12.1-12

<u>Section –B</u>
Allotted Marks-15
Vedic Grammar
LH-30

Declensions (śabdarūpa), Subjunctive Mood (leṭ), Gerunds (ktvārthaka, Tumarthaka), Vedic Accent and Padapāṭha.

<u>Section-C</u>
Allotted Marks-25
Brāhmaṇa and Upaniāṣad
LH-30

Unit I
Allotted Marks-10</td><td></td><td></td><td>10</td><td>10</td><td>Project/ Tutorial
15</td><td>65</td></tr>
<tr><td>06</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

	A..Manumatsyakathā of Śatapatha Brāhmaṇa. B. Śunasepa Upākhyāna of Aitareya Brāhmaṇa **Unit II** **A.M-15** Bṛhadaranyaka Upanisad-4.4 & 4.5						
DSE -1	**Darśana** **A.M-90** **Section-A** **Unit-I** **A.M-30** **LH-30** Tarkabhāṣā **Unit-II** **A.M-30** **LH-30** Saptapadārthī **Section-B** **Unit-I** **A.M-30** **LH-40** Vivekacūḍāmaṇi	**06**	**5+1**				

Recommended Books/Readings: 11

1.ऋग्वेद संहिता (सायणाचार्यकृतभाष्य एवं हिन्दीव्याख्या सहित), संस्करण) रामगोविन्द त्रिवेदी, चौखम्बासंस्कृतप्रतिष्ठान, दिल्ली.

2. Atharvaveda (Śaunakīya): (Ed.) Vishva Bandhu, VVRI, Hoshiharpur, 1960.

3. शुक्लयजुर्वेदसंहिता, (पदपाठ, उवट-महीधर भाष्य संवलीत तत्त्वबोधिनी हिन्दी व्याख्या सहित) (संस्करण) रामकृष्ण शास्त्री, चौखाम्बा संस्कृत प्रतिष्ठान, दिल्ली

4. Śatapatha Brāhmaṇa , (Ed.) Ganga Prasad Upadhyaya, SLBSRS Vidyapeeth, Delhi.

5. Śuklayajurveda-Saṁhitā, (Vājasaneyi-Mādhyandina), (Ed.) Jagadish Lal Shastri, MLBD, Delhi, 1978.

6. मुण्डकोपनिषद् (शाङकरभाष्य), संस्करण) जियालालकाम्बोज, ईस्टर्णबुकलिंकर्स, दिल्ली.

7. वैदिक संग्रह, कृष्णलाल,ईस्टर्णबुकलिंकर्स, दिल्ली.

8..*Ṛksūktavaijayantī*, H.D. Velankar, Bharatiya Vidya Bhavan, Bombay, 1972.

9. ऋक्सूक्तनिकर ,उमाशंकरशर्मा ऋषि, चौखाम्बा ओरियान्टाल वाराणसी

10. वेदेर भाषा ओ छन्द, गौरिधर्मपाल, पश्चिमस्बङ्ग राज्य पुस्तक पर्षद

11. पुर नतुन वेदेर कविता, गौरिधर्मपाल, प्रेसिडेन्सि लाइब्रेरी

14. *Vedic Selection*,Pt I, I,I III, K. C Chaterjee, C.U

15.वैदिक व्याकरण, अमरकुमार चट्टोपाध्याय, संस्कृत पुस्तक भाण्डार

16. वृहदारण्यकोपनिषद्, झर्णा भट्टाचार्य

17. वृहदारण्यकोपनिषद्, दास घोष गोस्वामी, संस्कृत वुक डिपो

18. Aitariya Brāhmaṇa, ed. Satyabrata Sāmaśramā.

Course Code	Course Title / Topic	Credit	TH +TU	MARKS DISTRIBUTION			
	Sanskrit Grammar			**INTERNAL ASSESS-MENT (IA)**	**ATTEND-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**

CC 12	**<u>Section-A</u>** **Allotted Marks-10** **LH-10** The Concept of the Saṃjñā-Sūtra, Vārtika, Bhāśya, Karmapravacanīya, Nipāta, Gati, Upasarga, Guṇa, Vṛddhi, Ktin, Ghi, Ghu, Nadī, Upadhā, Samprasāraṇa**,** **<u>Section-B</u>** **Allotted Marks-25** **LH-30** General Introduction of Philology, i. Classification of Languages, ii.Production and Classification of Sounds, iii. Phonetic Laws iv. Vedic and Classical Sanskrit v. Ablaut vi. Phonetic Tendencies vii. Semantics **<u>Section-C</u>** **Allotted Marks-30** **LH-30** Kārakaprakaraṇam Vaiyākaraṇasiddhāntakaumudī **<u>Section -D</u>** **Allotted Marks-25** **LH-30** Samāsaprakaraṇam Vaiyākaraṇasiddhāntakaum-udī			**10**	**10**	**Project/ Tutorial** **15**	**65**
DSE-2	**Kāvya** **A.M-90** **Section-A** **Unit-I** **A.M-35** Sāhityadarpaṇa ,Ch-I	**06** **06**	**5+1** **5+1**				

	Unit-II **A.M-35** Sāhityadarpaṇa ,Ch-II **Unit-III** **A.M-30** Sāhityadarpaṇa ,Ch-III						

Recommended Books/Readings: 12

1. Kale, M.R. - *Higher Sanskrit Grammar*, MLBD, Delhi (Hindi Translation also available).

2.शास्त्री, धरानन्द्द —लघुसिद्धान्तकौमुदी, मूल एवं हिन्दीव्याख्या, मोतीलालबनारसीदास, दिल्ली.

2. शास्त्री, भीमसेन — लघसिद्धान्तकौमुदी, भौमीव्याख्या(भाग— 1), भौमीप्रकाशन, दिल्ली

3. Siddhāntakoumudī (samāsa and kāraka prakaraṇam in Bengali by Dr. Sacchidananda Mukhopadhyaya.

4. Vaiyākaraṇa Siddhāntakoumudī (Sañjā Paribhāsāin Bengali)by Prof. M. K Ganguly.

5. Linguistic Introduction to Sanskrit by Batakrishna Ghosh.

6. Sanskrit Grammar by R.G Bhandarkar.

7. Taraporewala, I.J.S. 1931. Elements of the Science of Language. Calcutta: Calcutta University Press. Revised Edn. 1962.

8. Verma, S.K. & Krishnaswamy. 1989. Modern Linguistics. Delhi etc.: Oxford University Press.

9.Astadhyayi of Panini by Sumitra M. Katre

SEMESTER 6

Course Code	Course Title / Topic	Credit	TH +TU	MARKS DISTRIBUTION			
	Indian Ontology & Epistemology			**INTERNAL ASSESS-MENT (IA)**	**ATTEND-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 13	**Section- A** **Allotted Marks-20** **LH-30** **Essentials of Indian Philosophy**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	Unit I Meaning and purpose of darśana, general classification of philosophical schools in classical Indian philosophy **Unit II** Realism (yathārthavāda or vastuvāda) and Idealism (pratyayavāda), Monism (ekatvavāda), Dualism (dvaitavāda) & Pluralism (bahutvavāda) ; dharma (property)-dharmī (substratum) **Unit III** Causation (kāryakāraṇavāda) : naturalism (svabhāvavāda), doctrine of pre-existence of effect (satkāryavāda), doctrine of real Transformation (pariṇāmavāda), doctrine of illusory transformation (vivartavāda), doctrine of nonpreexistence of effect in cause (asatkāryavāda and ārambhavāda) **Section –B** **Ontology(Based on Tarkasaṃgrahaḥ)** **Allotted Marks-30** **LH-30**	**06**	**5+1**				

	Unit- I Concept of padārtha, three dharmas of padārthas, definition of Dravya, **Unit II** Sāmānya, Viśeṣa, Samavāya, Abhāva. **Unit III** Definitions of first seven dravyas and their examination; Ātman and its qualities, Manas **Unit IV** Qualities (other than the qualities of the Ātman) Five types of Karma. **Section-C** **Epistemology(Based on Tarkasaṃgrahaḥ)** **Allotted Marks-40** **LH-40** **Unit I** Buddhi(jñāna) – nature of jñāna in Nyāya vaiśeṣika; smṛti-anubhava; yathārtha and ayathārtha **Unit II** Karaṇa and Kāraṇa, definitions and types of pramā, kartā-kāraṇa-vyāpāra-phala, **Unit III** Pratyakṣa **Unit IV** Anumāna including hetvābhāsa **Unit V** Upamāna and śabda pramāṇa **Unit VI** Types of ayathārtha anubhava						

DSE-3	**Vyākaraṇa** **A.M-90** **Section-A** **Unit-I** Siddhāntakaumudī-Strīpratyaya (Total Marks-30) LH-25 **Section-B** **Unit-I** Siddhāntakaumudī-TiṅantaPrakaraṇa (√bhū) (Total Marks-30) LH-40 **Section-C** **Unit-I** Siddhāntakaumudī-Ajanta Puṃliṅga (Total Marks-30) LH-35	**06**	**5+1**				

Recommended Books/Readings: 13

1. A Primer of Indian Logic, Kuppuswami Shastri, Madras, 1951.

2. Tarkasaṁgraha of Annambhaṭṭa (with Dīpikā & Nyāyabodhinī), (Ed. & Tr.) Athalye & Bodas, Mumbai, 1930.

3. Tarkasaṁgraha of Annambhaṭṭa (with Dīpikā & Nyāyabodhinī), (Ed. & Tr.) Virupakshananda, Sri Ramkrishna Nath, Madras, 1994.

4. Tarkasaṁgraha of Annambhaṭṭa (with Dīpikā commentary with Hindi Translation), (Ed.& Tr), Pankaj Kumar Mishra, Parimal Publication, Delhi-7. 2013.

5. Tarkasaṁgraha, Narendra Kumar, Hansa Prakashan, Jaipur.

6. Chatterjee, S. C. & D. M. Datta - Introduction to Indian Philosophy, Calcutta University, Calcutta, 1968 (Hindi Translation also).

7. Chatterjee, S. C. – The Nyāya Theory of Knowledge, Calcutta, 1968.

8. Hiriyanna, M. - Outline of Indian Philosophy, London, 1956 (also Hindi Translation).

9. Radhakrishnan, S. - Indian Philosophy, Oxford University Press, Delhi, 1990.

10. Chatterjee, S.C. : Introduction to Indian Philosophy, Calcutta

11. D.M. Dutt (हिन्दी अनुवाद) भारतीय दर्शन

12. Bhattacharya, Chandrodaya, The Elements of Indian Logic and Epistemology,

13. Maitra, S.K., Fundamental Questions of Indian Metaphysics & Logic

14. Jha, V. N., Tarkasaṃgraha of Annambhaṭṭa (English Translation with Notes), CIFSS, Kerala (India),2016 (2nd Ed.)

15. तर्कसंग्रह, (अध्यापना सहित),नारायण चन्द्र गोस्वामी, संस्कृत पुस्तक भाण्डार, कोलकाता.

16.भारतीय दर्शनेर रूपरेखा, अमित भट्टाचार्य, संस्कृत वुक डिपो, कोलकाता

Course Code	Course Title / Topic	Credit	TH +TU	MARKS DISTRIBUTION			
	Sanskrit Composition & Communication			**INTERNAL ASSESS-MENT (IA)**	**ATTEND-ANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
CC 14	**Section- A** **Vibhaktyartha, Voice & Kṛt** **Allotted Marks-25** **LH-35**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	Unit I (i) Vibhaktyartha Prakaraṇa of Laghusiddhāntakaumudī (ii) Voice (kaṭṛ, karma and bhāva) **Unit II** Selections from Kṛt Prakaraṇa-	**06**	**5+1**				

	from Laghusiddhantakaumudī Major Sūtras for the formation of kṛdanta words (tavyat, tavya, anīyar, yat, ṇyat,ṇvul, Tṛc, Aṇ, kta, ktavatu, śatṛi, śāṇac, tumun,ktvā,lyap,lyuṭ,ghañ,ktin **<u>Section -B</u>** **Allotted Marks-30** **LH-35** **Translation and Communication** (i).Translation from Bengali/English to Sanskrit on the basis of cases(10marks), ii.Compounds and kṛt suffixes.(10marks) (iii). Translation from Sanskrit to Bengali and English(10marks) **Unit II** **Allotted Marks-10** Communicative Sanskrit: Spoken Sanskrit. **<u>Section-C</u>** **Essay** **Allotted Marks-35** **LH-30** **Unit-I** Essay (traditional subjects) e.g.Veda, Upaniṣad, Sanskrit Language, Saṃskṛiti, Rāmāyaṇa, Mahābhārata, Purāṇa, Gītā, principal Sanskrit poets. **Unit II** Essay based on issues and topic related to modern subjects like entertainment, sports, national and international affairs and social problems.						

DSE-4	**Veda** **A.M-90** **Section-A** **Unit-I** **LH-25** A. M-20 Eastern & Western interpretation of the Veda **Unit-II** **LH-25** **A.M-25** Śunaḥśepopākhyāna of AitareyaBrāhmaṇa **Section-B** **Unit-I** **LH-25** **A.M-25** TaittiriyopaniṣadŚikṣāvallī(Adhyāya-I, Anuvāka: 1-12 **Unit-II** **LH-25** **A.M-20** Muṇḍakopaniṣad (Muṇḍaka-1.2.2)	**06**	**5+1**				

Recommended Books/Readings: 14

1. शास्त्री, धरानन्द —लघुसिद्धान्तकौमुदी, मूल एवं हिन्दीव्याख्या, मोतीलालबनारसीदास, दिल्ली.

2. शास्त्री, भीमसेन — लघसिद्धान्तकौमुदी, भौमीव्याख्या(भाग— 1), भौमीप्रकाशन, दिल्ली

3. नौटियाल, चक्रधर — बृहद्—अनुवाद—चन्द्रिका, मोतीलालबनारसीदास,दिल्ली.

4. पाण्डेय, राधामोहन —संस्कृतसहचर, स्टूडेण्टस्फ्रेण्डस्, पटना.

5. द्विवेदी, कपिलदेव — रचनानुवादकौमुदी,विश्वविद्यालयप्रकाशन, वाराणसी.

6. द्विवेदी, कपिलदेव — सम्स्कृतनिबन्द्धशतकम्विश्वविद्यालयप्रकाशन, वाराणसी Apte, V.S. - *The Students' Guide to Sanskrit Composition*,Chowkhamba Sanskrit Series, Varanasi (Hindi Translation also available).

7. Kale, M.R. - *Higher Sanskrit Grammar*, MLBD, Delhi (Hindi Translation also available).

8. Kanshiram- *Laghusiddhāntakaumudī* (Vol.1), MLBD, Delhi, 2009.

9. Shastri, Janakinath-*A help to the Study of Sanskrit*, M.L Dey &Co ,Kolkata

University of Calcutta

CBCS Syllabus

DETAILS OF COURSE STRUCTURE

Distribution of courses in different semesters for General Course in Sanskrit

	Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6
Core Course(CC)	2Th+2P/TU CC-1	2Th+2P/TU CC-2	2Th+2P/TU CC-3	2Th+2P/TU CC-4		
Language(LCC)			1Th+1TU LCC 1(1)	1Th+1TU LCC 2(1)	1Th+1TU LCC 1(2)	1Th+1TU LCC 2(2)
Elective Course						
1.Generic Elective(GE)	1Th+1P/TU GE-1	1Th+1P/TU GE-2				
2.Discipline Specific Elective					2Th+2P/T DSE- 1, 2	2Th+2P/TU DSE-3, 4
Ability Enhancement Compulsory Course (AECC)	1Th+0P/TU (AECC-1)	1Th+0P/TU (AECC-2)				
Skill Enhancement Course (SEC)			1Th+0P/TU SEC-A-1	1Th+0P/TU SEC-B-1	1Th+0P/TU SEC-A-2	1Th+0P/TU SEC-B-2
Total Number of Courses and Marks	4x100=400	4x100=400	4x100=400	4x100=400	4x100=400	4x100=400
Total Credits	20	20	20	20	20	20

TH=Theory, P=Practical, TU=Tutorial

CC for General (Sanskrit) Coding

Semester-1	SAN-G-CC-A1-TH/TU G-CC-B1-TH/TU
Semester-2	SAN-G-CC-A2-TH/TU G-CC-B2-TH/TU
Semester-3	SAN-G-CC-A3-TH/TU G-CC-B3-TH/TU
Semester-4	SAN-G-CC-A4-TH/TU G-CC-B4-TH/TU

DSE for general (Sanskrit) Coding

Semester-5	SAN-G-DSE-1-TH/TU SAN-G-DSE-2-TH/TU
Semester-6	SAN-G-DSE-3-TH/TU SAN-G-DSE-4-TH/TU

SEC for general (Sanskrit) Coding

Semester-3	SAN-G-SEC-A-1-TH/TU
Semester-4	SAN-G-SEC-B-1-TH/TU
Semester-5	SAN-G-SEC-A-2-TH/TU
Semester-6	SAN-G-SEC-B-2-TH/TU

Guideline for execution of CBCS Syllabus 2018-2019

All India CBCS Syllabus keeping in view the UG BOS in Sanskrit (C.U) recommends the following measures.

60% Sanskrit Question and Answer in 1st and 2nd Semester, 80% in 3rd Semester and 4th Semester and 100% in 5th and 6th Semester be strictly followed. In Honours Sanskrit Language and Devanāgari script be used .**For General in all six Semesters 60% answer are to be written in Sanskrit Language and Devanagari Scripts.**

Each 65% marks of theories be sub-divided as follows:

1st and 2nd Semester:

a. Three Broad Questions Carrying 10 marks each: 3x10=30(at least two in Sanskrit)

b. Four textual questions explanation, translation and Sanskrit rendering (wherever applicable) carrying 5 marks.(4x5-20) (at least two in Sanskrit)

c. Three short/Grammatical Notes carrying 5 marks each. 3x5=15(Two questions be answered in Sanskrit)

3rd and 4th Semester:

a. Two broad questions to be answered in Sanskrit (3x10=30)

b. Out of four, three questions to be answered in Sanskrit.(4x5=20)

c. All three short/ Grammatical Notes to be Answered in Sanskrit.(3x5=15)

5thand d6th Semester 100% be answered in devanaāgari script and Sanskrit Language.

** **B.A (General) Course may be treated as GE for other Discipline**

SEMESTER-1

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH+ TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC-A1</td><td>Sanskrit Poetry</td><td></td><td></td><td>INTER -NAL ASSE SS-MEN T (IA)</td><td>ATTEN DANCE</td><td>Comprehen sive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td rowspan="2"><u>Section- A</u>
Raghuvaṃśam :
Canto-I
Verses : 1-25
Allotted Marks(A.M)-20
LH-30</td><td></td><td></td><td rowspan="2">10</td><td rowspan="2">10</td><td>Project/ Tutorial
15</td><td rowspan="2">65</td></tr>
<tr><td>6</td><td>5+1</td><td colspan="2"></td></tr>
<tr><td colspan="8">UNIT I
Canto I
A.M-10
Verses : 1-10
Introduction(Author & Text), Meaning/translation, Explanation, Story, Characteristics of Raghu clan, Characteristics of Dilīpa.

UNIT II
Canto I
A.M-10
Verses : 11-25
Meaning/translation, Explanation, Role of Dilīpa for the welfare of the Subjects. Appropriateness of Title, Background of given contents.

<u>Section -B</u>
Śiśupālavadham:
Canto I
Verses : 1-30
Allotted Marks-20
LH-30

UNIT I
Canto I
A.M-10
Verses : 1-15
Introduction(Author & Text), Appropriateness of Title,</td></tr>
</table>

	Background of given contents. Grammar, Translation, Explanation, Poetic excellence, thematic analysis **UNIT II** **Canto I** **A.M-10** **Verses : 16-30** Grammar, Translation, Explanation, Poetic excellence, thematic analysis. माघे सन्तित्रयोगुणाः, मेघे माघे गतो वयः,तावद् भारवेर्भातियावन्माघस्यनोदयः। **<u>Section- C</u>** ***Nītiśatakam* :** **Verses : 1-20** **Allotted Marks-20** **LH-20** **UNIT I** **Verses : 1-10** **A.M-10** Translation, Explanation **UNIT II** **Verses : 11-20** **A.M-10** Translation, Explanation, Social experiences of Bhartṛhari, Types of Fool. **<u>Section- D</u>** **History of Sanskrit Poetry** **Allotted Marks-30** **LH-20** **UNIT I** **A.M-15** Aśvaghoṣa, Kālidāsa, Bhāravi, Māgha, Śrīharṣa, Jayadeva, Bhartṛhari and their works. **UNIT II** **A.M-15** Origin and Development of Different types of MahākāvyaandGītikāvya with						

	special reference to the above mentioned Poets and their works.						
CC-B1	Other than Sanskrit	**06**	**5+1**				
Eng1	Other than Sanskrit	**06**	**5+1**				
AECC (1)	**ENVS**	**2**	**2+0**				

Suggested Books/Readings

1. C.D. Devadhar (Text, Eng. Tr.), *Raghuvaṁśam* of Kālidāsa, MLBD. Delhi.

2. M.R. Kale (Text, Eng. Tr.), *Raghuvaṁśam* of Kālidāsa, MLBD, Delhi.

3. GopalRaghunathNandergikar, *Raghuvaṁśam* of Kālidāsa, MLBD, Delhi.

4. कृष्णमणि त्रिपाठी (सम्पा.) रघुवंशम् (मल्लिनाथकृत-सञ्जीवनीटीका), चौखम्बा सुरभारती प्रकाशन, वाराणसी।

5. Mirashi, V.V., *Kālidāsa* , Popular Publication, Mumbai.

6. Keith, A.B.,*History of Sanskrit Literature*, MLBD, Delhi.

7. Krishnamachariar.M, *History of Classical Sanskrit Literature*, MLBD, Delhi.

8. GaurinathShastri, *A Concise History of Sanskrit Literature*, MLBD, Delhi.

9. Winternitz, Maurice, *Indian Literature* (Vol. I-III), also Hindi Translation, MLBD, Delhi.

10. Ghosh, Yuthika, *Śatakatraya,*RajyaPustakParsad.

11. Das, Devkumar, *Raghuvaṁśam*(Canto-1), BalaramPrakashani.

12. Environmental Awareness Reflected in Sanskrit Literature, ed. by Prof. V.N.Jha. CASS, University of Poona,1991.

13. Vriksayurveda(The Science of Plants of lives) ed. by Surapala, Pub. by Asian Agri-History Foundation 1994.

SEMESTER-2

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Sanskrit Prose			**INTER -NAL ASSE SS-MEN T (IA)**	**ATTEN DANCE**	**Comprehen sive Continuous Assessment (CCA)**	**Theory**
	Section- A ***Śukanāsopadeśa*** **Allotted Marks(A.M)-30** **LH-35** **UNIT I** **(A.M)-15** Introduction- Author/Text（up to the end of the text.) **UNIT II** **(A.M)-15** Society and political thought depicted in *Śukanāsopadeśa*, logical meaning and application of sayings. **Section -B** **Śivarājavijayam,Niśvāsa-I** **Allotted Marks-30** **LH-35** **UNIT I** **Para 1 to 20** **(A.M)-15** Introduction- Author/Text, Text reading (Grammar, Translation, and Explanation), poetic excellence, plot, Timing of Action. **UNIT II** **(A.M)-15** **From Para 21 to the end of the text.** Text reading (Grammar, Translation, and Explanation), Poetic excellence, plot, Timing of Action. **Section- C** **Survey of Sanskrit Literature:**			**10**	**10**	**Project/ Tutorial** **15**	**65**
CC-A2		**6**	**5+1**				

	Prose **Allotted Marks-30** **LH-30** **UNIT I** **(A.M)-15** Origin and development of prose and important prose romances : Subandhu, Bāṇa, Daṇḍin, AmbikādattaVyāsa. **UNIT II** **(A.M)-15** Pañcatantra, Hitopadeśa, Vetālapañcaviṃśatikā, Siṃhāsanadvātriṃśikā and Puruṣaparīkṣā.						
CC-B2	**Other than Sanskrit**	**06**	**5+1**				
ENG2	**English/ Communication/Sanskrit** (Declensions, conjugations, kārakavibhakti Rules, Kṛt-suffixes &comprehention)	**06**	**5+1**				
AECC (2)	**Other than Sanskrit**	**02**	**2+0**				

Suggested Books/Readings:

1. A.B. Keith, *History of Sanskrit Literature*, MLBD, Delhi (हिन्दी अनुवाद, मंगलदेव शास्त्री, मोतिलाल बनारसीदास, दिल्ली।

2. Krishnamachariar.M, *History of Classical Sanskrit Literature*, MLBD, Delhi.

3. GaurinathShastri, *A Concise History of Sanskrit Literature*, MLBD, Delhi.

4. Winternitz, Maurice, *Indian Literature* (Vol. I-III), also Hindi Translation, MLBD, Delhi.

5. Bhattacharyya, Niradbaran, *Śukanāsopadeśa,* Sanskrit PustakBhandar.

- **For Environmental Studies**

1.V.N. jha(Ed.) Environmental Awareness Reflated in Sanskrit Literature; CASS, Pune, 1991(Proceedings of National Seminar)

2.Surapālaśvṛkṣāyurveda, Asian Agni-History Foundation, 1996.

SEMESTER-3

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH+ TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC-A3</td><td>Sanskrit Drama</td><td></td><td></td><td>INTER-NAL ASSESS-MENT (IA)</td><td>ATTEN DANCE</td><td>Comprehensive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td><u>Section- A</u>
Abhijñānaśākuntalam:Kālidāsa
Acts I-IV
Allotted Marks-25
LH-30</td><td></td><td></td><td>10</td><td>10</td><td>Project/ Tutorial
15</td><td>65</td></tr>
<tr><td>UNIT I
Acts I-IV
(a) Explanation of terms like nāndī, prastāvanā, sūtradhāra, naṭī, viṣkambhaka and vidūṣaka.
(b)Text Reading (Grammar, Translation, and Explanation), Poetic excellence, Plot.

<u>Section -B</u>
Abhijñānaśākuntalam:
Kālidāsa
Act V-VII
Allotted Marks-15
LH-30

UNIT I
Acts V-VII
(a) Text Reading (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action. Personification of nature.

(b) Kāvyeṣunāṭakamramyam, upamā, Language of Kālidāsa, dhvani in Kālidāsa, Purpose and design behind Abhijñānaśākuntalam and other problems related to the text.</td><td>6</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

	Section- C **Technical Terms from Sanskrit Dramaturgy:** **Allotted Marks-20** **LH-20** **UNIT I** **Allotted Marks-10** नाटक, नायक, नायिका, पूर्वरङ्ग, नान्दी, सूत्रधार, नेपथ्य, प्रस्तावना, कञ्चुकी एवं विदूषक। **UNIT II** **Allotted Marks-10** अङ्क, स्वगत, प्रकाश, अपवारित, जनान्तिक, आकाशभाषित, विष्कम्भक, प्रवेशक, भरतवाक्यम्। **Section- D** **History of Sanskrit Drama and an Introduction to Principle of Sanskrit Drama** **Allotted Marks-30** **LH-20** **UNIT I** **Allotted Marks-15** Origin and Development **UNIT II** **Allotted Marks-15** Some important dramatists and dramas: Bhāsa, Kālidāsa, Śūdraka, Viśākhadatta, Harṣa, Bhavabhūti, and their works						
	Other than Sanskrit						
CC-B3		**06**	**5+1**				
LCC-1(1)	**English/ Communication/Sanskrit** (Declensions, conjugations, kārakavibhakti Rules, Kṛt-suffixes &comprehention)	**06**	**5+1**				

SEC-A- 1	**Basic Sanskrit** **1. Translation : 40 marks** Vernacular to Sanskrit 20 marks Sanskrit to Vernacular- 20 marks **2. Comprehension in Sanskrit -10 marks** **3. Paragraph Writing- 10 marks** **4. Letter Writing- 10 marks** **5. Easy Writing- 20 marks**	**02**	**2+0**				

Suggested Books/Readings:

1. C.D. Devadhar (Ed.), *Abhijñanaśākuntalam*, MLBD, Delhi.

2. M.R. Kale (Ed.), *Abhijñanaśākuntalam*, MLBD, Delhi.

3. GajendraGadkar (Ed.), *Abhijñanaśākuntalam*.

4. Ramendramohan Bose, Abhijñanaśākuntalam, Modern Book Agency, Calcutta.

5. RatnamayiDikshit, *Women in Sanskrit Dramas*, MeherchandLacchman Das, Delhi.

6. A.B. Keith, *Sanskrit Drama*, Oxford University Press London, 1970.

7. MinakshiDalal, *Conflict in Sanskrit Drama*, Somaiya Publication Pvt. Ltd.

8. G. K. Bhat, *Sanskrit Drama*, Karnataka University Press, Dharwar, 1975.

9. Chakraborty, Satyanarayan, *Abhijñanaśākuntalam*, Sanskrit PustakBhandar.

10. Basu, Anil, *Abhijñanaśākuntalam*, Sanskrit Book Depo.

11. Pt. JivānandaVidyāsāgar, *Hitopadeśa*, Saraswati press, Kolkata.

12. Krishnamacharian, *History of Classical Sanskrit Literature*, MLBD, Delhi.

13. BimanBihari Bhattacharya, *Saṃskṛ̣taSāhityerrūparekhā*, Sanskrit PustakBhandar, Kolkata.

14. YuthikaGhosh, *Śatakatraya*, PachimbangaRajyaPustakParshad.

SEMESTER-4

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH+ TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">CC-A4</td><td>Sanskrit Grammar</td><td></td><td></td><td>INTER-NAL ASSESS-MENT (IA)</td><td>ATTEN DANCE</td><td>Comprehensive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td><u>Section- A</u>
Laghusiddhāntakaumudī : Saṃjñāprakaraṇa
Allotted Marks(A.M)-20
LH-25</td><td></td><td></td><td>10</td><td>10</td><td>Project/ Tutorial
15</td><td>65</td></tr>
<tr><td>UNIT I
Saṃjñāprakaraṇa

<u>Section -B</u>
Laghusiddhāntakaumudī : Sandhiprakaraṇa
Allotted Marks-35
LH-35

UNIT I
(A.M)-15
ac sandhi:
yaṇ, guṇa, dīrgha, ayādi, vṛddhi and pūrvarūpa.
(b) Text Reading (Grammar, Translation, Explanation), Poetic excellence, Plot, Timing of Action. Personification ofnature .

UNIT II
(A.M)-10
halsandhi: ścutva, utva, anunāsikatva, chhatva and jaśtva:

UNIT III
(A.M)-10
visargasandhi: utva, lopa, ṣatva and rutva

<u>Section –C</u>
Laghusiddhāntakaumudī: VibhaktyarthaPrakaraṇa
Allotted Marks-35
LH-40</td><td>6</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

CC –B4	**UNIT I** Vibhaktyarthaprakaraṇa **Other than Sanskrit**	**06**	**5+1**				
LCC-2(1)	**Other than Sanskrit**	**06**	**5+1**				
SEC-B-1	Spoken Sanskrit (Marks: 40) & Computer Awareness for Sanskrit(Basic Computer Awareness, Typing in Unicode for Preservation and Digitalization of Sanskrit Text Web Publishing) (Marks: 50)	**02**	**2+0**				

Suggested Books/Readings:

1. धरानन्द शास्त्री, लघुसिद्धान्तकौमुदी, मूल एवं हिन्दी व्याख्या, दिल्ली।

2. भीमसेनशास्त्री, लघुसिद्धान्तकौमुदी, भैमी व्याख्या (भाग-1), भैमी प्रकाशन, दिल्ली

3. चारुदेव शास्त्री, व्याकरण चन्द्रोदय (भाग-1,2 एवं 3), मोतिलाल बनारसीदास, दिल्ली।

4. सत्यपाल सिंह (सम्पा.), लघुसिद्धान्तकौमुदीः प्रकाशिका नाम्नी हिन्दी व्याख्या सहिता, शिवालिक पाब्लिकेशन, दिल्ली, 2014।

5. V.S. Apte, *The Students' Guide to Sanskrit Composition*, Chowkhamba Sanskrit Series, Varanasi (Hindi Translation also available).

6. M.R. Kale, *Higher Sanskrit Grammar*, MLBD, Delhi (Hindi Translation also available).

7. Kanshiram, *Laghusiddhāntakaumudī* (Vol. I), MLBD, Delhi, 2009.

8. Online Tools for Sanskrit Grammar developed by Computational Linguistics Group, Department of Sanskrit, University of Delhi: http://sanskrit.du.ac.in.

9. Johannes Hertel, *The Panchatantra: a collection of ancient Hindu tales*, Harvard Oriental Series, Vol. 11.

10. ShyamacharanPandey, *Pañcatantram*, MLBD, Delhi.

11. M.R. Kale, *Pañcatantram*, , MLBD, Delhi.

12. Sutapa Bhattacharya, *Laghusiddhāntakaumudī*, Sanskrit Book Depot.

SEMESTER-5

<table>
<tr><th>Course Code</th><th>Course Title / Topic</th><th>Credit</th><th>TH +TU</th><th colspan="4">MARKS DISTRIBUTION</th></tr>
<tr><td rowspan="3">DSE -1</td><td>Philosophy, Religion and Culture in Sanskrit Tradition</td><td></td><td></td><td>INTER-NAL ASSES S-MENT (IA)</td><td>ATTEN DANCE</td><td>Comprehen sive Continuous Assessment (CCA)</td><td>Theory</td></tr>
<tr><td rowspan="2"><u>Section- A</u>
Dharma
Allotted Marks-30
Lecture Hours(LH)-35

UNIT I
Allotted Marks-10
Form of God, Mode of worship, Bhakta as a morally evolved person - Gitā Chapter XII

UNIT II
Allotted Marks-10
Dharma – ten-fold dharma and its versions, definitions of satya, ahiṃsā, asteya, aparigraha, pañcamahāyajña; theory of three debts.

UNIT III
Allotted Marks-10
Man’s initiative and God’s design; God’s līlā and Kṛpā, Daiva versus puruṣakāra, adṛṣṭa, three types of karma – sañcita, kriyamāṇa and prārabdha karma.

<u>Section -B</u>
Saṃskāra and Puruṣārtha
Allotted Marks-30
LH-35

UNIT I
Allotted Marks-15
Process of acculturation – importance of Saṃskāra.

UNIT II</td><td></td><td>10</td><td>10</td><td>Project/
Tutorial
15</td><td>65</td></tr>
<tr><td>6</td><td>5+1</td><td></td><td></td><td></td><td></td></tr>
</table>

	Allotted Marks-15 Aim of human life – theory of Puruṣārtha. **<u>Section- C</u>** **Svadharma** **Allotted Marks-30** **LH-30** **UNIT I** **Allotted Marks-15** An 'amoral' person – svadharma and karmayoga, sthitaprajña in the Gitā (Chapter II). **UNIT II** **Allotted Marks-15** Prakṛti – three guṇas and their impact on personality.						

Suggested Books/Readings:

1. Radhakrishnan, *Gītā*.

2. Gītā with Hindi Translation, Gita Press, Goraphpur.

3. RajbaliPandey, Hindu Samskar.

4.शिवदत्त ज्ञानी, भरतीय संस्कृति।

5. राजबली पाण्डेय, हिन्दु संस्कार।

6. पी. बी. काणे, धर्मशास्त्र का इतिहास (खण्ड-1)।

7. Swami Jagadiswarananda, *Śrīmadbhagavadagītā*, UdbodhanKaryalaya, Kolkata.

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Indian Perspectives in Personality Development			**INTER-NAL ASSESS-MENT (IA)**	**ATTEN DANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
DSE -2	**Section- A** **Historical Perspective** **Allotted Marks(A.M)-15** **LH-20** **UNIT I** Historical Perspective: Ṛgveda, 1.164.37; Chāndogyopaniṣad,VI. 2.3, VI.8.6, VIII.1.4 Bṛhadāraṇyakopaniṣad, II.5.18-19 **Section -B** **Concept of a person** **Allotted Marks-30** **LH-30** **UNIT I** Concept of a person, Gītā, Chapter:1, Verses:1-30 Jīva as Core and Eight-fold Nature as Cover Kṣetrajña as Core and Kṣetra as Cover Chapter-13, Verses-1-2, Chapter-13, Verses: 5-6, Chapter-13, Vrses-19-23. Akṣara as Core and Kṣara as Cover, Chapter-15, Verses:7-11 and 6-19. **Section- C** **Personality Types** **Allotted Marks-15** **LH-20** **UNIT I** Personality Types Gītā, Chapter-14, Verses:5-14, Chapter-17, Verses:2-6, Chapter-17, Verses:11.21	**6**	**5+1**	**10**	**10**	**Project/ Tutorial** **15**	**65**

	Section- D **Measures for behavioural Improvement** **Allotted Marks-30** **LH-30** **UNIT I** Measures for behavioural Improvement Control of Senses and Mind (Gītā: Chapter-2, Verses:59-60, 64 and 68, Chapter:3, Verses:41-43, Chapter: 6, Verses:19-23. Right Faith (Gītā, Chapter: 9, Verses:3, 22, 23-28, 30-34) Recognition of Svadharma - Inner Urge; (Gītā, Chapter: 2, Verses:31,41-44, Chapter:3, Verses:4, 5, 8, 9, 27-30, 33-34, Chapter:4, Verses:18-22, Chapter:5, Verses:11-12, Chapter:7, Verses:15, 18, 20-23, 27-29) Channelizing Innate Urges on Social Lines: (Gītā, Chapter:18, Verses:41-62).						
LCC 1(2)	**Other than Sanskrit**	**06**	**5+1**				
SEC-A-2	**Basic Elements of Āyurveda** Introduction of Āyurveda(Marks – 30) Carakasaṃhitā-(Sūtrasthānam) (Marks – 30) Taittirīyopaniṣad (Marks – 30)	**02**	**2+0**				

Suggested Books/Readings:

1. Radhakrishnan, *TheBhagvadgītā*.

2. Swami Jagadiswarananda, *Śrīmadbhagavadagītā*, UdbodhanKaryalaya, Kolkata.

3.Eassy on the Gītā by Sri Aurobinda, Aurobindo Ashram, Pondicherry, 1992.

SEMESTER- 6

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Literary Criticism			**INTER -NAL ASSE SS-MEN T (IA)**	**ATTEN DANCE**	**Comprehen sive Continuous Assessment (CCA)**	**Theory**
DSE-3	**Section- A** *Kāvyaprakāśa*: Kāvyavaiśiṣṭya and KāvyaPrayojana **Allotted Marks-35** **LH-35**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	UNIT I *Kāvyaprakāśa*: KāvyaVaiśiṣṭya and KāvyaPrayojana **Section -B** *Kāvyaprakāśa*: KāvyaKāraṇa **Allotted Marks-25** **LH-30** **UNIT I** *Kāvyaprakāśa*: KāvyaKāraṇa **Section- C** *Kāvyaprakāśa*: KāvyaSvarūpa and Kāvyabheda **Allotted Marks-30** **LH-35** **UNIT I** *Kāvyaprakāśa*: KāvyaSvarūpa and Kāvyabheda	**6**	**5+1**				

Suggested Books/Readings:

1. Nagendra (Ed.), *Kāvyaprakāśa* of Mammaṭa, Commentary in Hindi by AcharyaVishveshvar, J–ānamaṇḍala Varanasi, 2014.

2. ParasnathDwivedi (ed.), *Kāvyaprakāśa* of Mammaṭa, VinodPustakMandir, Agra, 1986.

3. GanganathJha, *Kāvyaprakāśa* with Eng. translation), BharatiyaVidyaPrakashan, Varanasi.

4. RamanadaAcharya, *Kāvyaprakāśa* (Bengali), Sanskrit PustakBhandar, Kolkata.

Course Code	Course Title / Topic	Credit	TH+ TU	MARKS DISTRIBUTION			
	Nationalism in Sanskrit Literature			**INTER-NAL ASSESS-MENT (IA)**	**ATTEN DANCE**	**Comprehensive Continuous Assessment (CCA)**	**Theory**
DSE-4	**<u>Section- A</u>** **Concepts and Basic Features of Indian Nationalism** **Allotted Marks-30** **LH-35**			**10**	**10**	**Project/ Tutorial** **15**	**65**
	UNIT I **Allotted Marks-15** **Meaning, Definitions and Elements of Indian Nation 'Rāṣṭra':** Meaning of Nation, Definitions and Constituent Elements of Nation in Western Perspective. Indian Concept of Nation: 'Rāṣṭra', Meaning, Etymology and Definitions, Essential Elements of 'Rāṣṭra'in Sanskrit Literature (Atharvaveda,11.9.17; 12.1,1-12 ŚuklaYajurveda, 22.22) 'Rāṣṭra'in the Context of 'Saptāṅga' Theory of State (Kauṭilya'sArthaśāstra, 6.1, Mahābhārata, Śāntiparva, 56.5; Śukranīti, 1.61- 62) **UNIT II** **Allotted Marks-15** **Meaning, Definitions and Elements of Indian Nationality:** Meaning of Nationality, Definitions and Constituent Elements of Nationality, Essential Factors of Nationality: National Integration, Patriotism, Freedom, Religious Tolerance, National Pride, National Consciousness and Citizenship. Special Features of	**6**	**5+1**				

	Indian Nationalism: Social Harmony (SāmājikaSamarsata), Equality of the Religions, International Brotherhood, Unity in Diversity and Cultural Conciousness. **<u>Section -B</u>** **Name of Country, National Symbols and Rise of Nationalism** **Allotted Marks-30** **LH-35** **UNIT I** **Allotted Marks-15** **Name of the Country 'Bharatavarsha' and National Symbols:** Different views regarding name of 'Bharatavarsha' in Vedic and Pauranic Literature, National Symbols of India: National Anthem-'Jana GanaMana', National Song-'VandeMataram', National Flag of India, National Emblem 'Ashok Chakra', National Calendar of India 'ŚakaSaṃvat'. **UNIT II** **Allotted Marks-15** **Rise of Indian Nationalism and Freedom Struggle Movement:** Major Factors which led to the rise of nationalist sentiments in modern period with special reference to Western Thought and Education, Rediscovery of India's Past, Socio-religious reform movements and Impact of contemporary national movements worldwide. Brief survey of Socio-religious nationalistic thought of modern India with special reference to Raja Ram Mohan Ray, Swami DayanandSaraswati, Swami Vivekananda, Bankim Chandra Chattopadhyay, Mahatma						

	Gandhi, Madan Mohan Malaviya, VirSavarkar and Dr.B.R.Ambedkar. **<u>Section- C</u>** **Nationalistic Thought and Modern Sanskrit Literature** **Allotted Marks-30** **LH-30** **UNIT I** **Allotted Marks-15** **Contributions of Sanskrit Literature to Freedom Struggle Movement:** Survey of nationalistic trends in modern Sanskrit literature before Independence; Survey of nationalistic trends in modern Sanskrit literature after Independence. **UNIT II** **Allotted Marks-15** **Modern Nationalistic Thought and Gandhian Sanskrit Literature:** Social, political and religious background of Gandhian Thought with special reference to 'GrāmaSvarāja' (Local Self Government), 'Satyāgraha' (Truth Fullness), 'Ahiṃsā' (Non Violence), 'Prajātantra' (People's Democracy) and 'DhārmikaSahisnuta' (Religious Tolerance). Contemporary Sanskrit Literature on Gandhian Thought with special reference to 'Satyāgrahagitā' of PanditaKsamarava, 'Bhāratavijayanātakam' of Mathura PriadDikshita, 'Gandhicaritam' ofCharudevaShastri, 'Gandhi Gitā' of Prof. Indra.						
LCC2 (2)	**Other than Sanskrit**	**06**	**5+1**				

SEC-B-2	**Yogasūtra of Patañjali (Samādhipāda, Sādhanapāda, Vibhūtipāda)**	**02**	**2+0**				

Suggested Books/Readings:

1. R.P. Kangle (ed.), *Arthaśāstra* of Kauṭilya, MotilalBanarasidas, Delhi, 1965.

2. R.T.H. Griffith (Trans.), *AtharvavedaSamhita* (2 Vol.), Banaras, 1968.

3. H.P. Shastri (Eng. Trans.), *Mahābhārata* (7 Vol.), London, 1952-59.

4. H.P. Shastri (Eng. Trans.), *Ramayana* of Vālmīki(3 Vol.), London, 1952-59.

5. H.H. Wilson (Eng. Tr.), *Viṣṇupurāṇa*, PunthiPustak, Calcutta, 1961.

6. उदयवीर शास्त्री (अनु.), कौटिल्यीय अर्थशास्त्र, मेहरचन्द-लक्ष्मनदास, दिल्ली, 1968।

7. रामनारायण दत्तशास्त्री पाण्डेय (अनु.), महाभारत (1-6 भाग) हिन्दी अनुवादसहित, गीताप्रेस, गोरखपुर।

8. सातवलेकर, यजुर्वेदहिन्दीअनुवादसहित, श्रीपाद दामोदर, पारडी ।

9. मुनिलाल गुप्त (अनु), विष्णुपुराण हिन्दी अनुवाद सहित, गीताप्रेस ,गोरखपुर।

10. शतपथब्राह्मण (1-5भाग) माध्यन्दिनीय शाखा, सायणाचार्य एवं हरिस्वामी टीकासहित, दिल्ली।

11. ब्रह्माशंकर मिश्र, शुक्रनीति हिन्दी अनुवाद, चौखम्भा संस्कृत सिरीज, वाराणसी, 1968।

12. पण्डिता खमाराव, सत्याग्रहगीता, पेरिस, 1932।

13. जानकीनाथ शर्मा ,(सम्पा), श्रीमद्वाल्मीकिरामायणम् (1-2भाग), हिन्दी अनुवाद सहित, गीताप्रेस ,गोरखपुर।

14. अनूप चन्द कपूर, राजनीतिविज्ञान के सिद्धान्त, प्रिमियर पब्लिशिंग हाउस, दिल्ली, 1967।

15.योगेन्द्र गोस्वामी (सम्पा.), राष्ट्रीय एकता और भारतीय साहित्य, काशी अधिवेशन स्मृति ग्रन्थ, 201।

16.कुमुद टंडन, महात्मा गान्धी परख संस्कृत काव्य, ईष्टार्न बुक लिंकर्स, दिल्ली, 1991।

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Directives:

Lecture duration = 1 hour

Per course paper 6 hrs/ week

6*4= 24 hrs /month

24*6= 144 hrs/Sem(6 months)

Average 100 hrs are allotted per course paper (holidays, tutorials, internal assessment will be scheduled in the rest 44 hrs)

DSE

We cannot offer choices in DSE in view of the infrastructural constraints in UG colleges under CU; in this respect we refer to the Syllabi offered by WBSU (Barasat), Burdwan University and Sidho Kanho Birsa University. Only 4 DSE papers are to be answered in 5^{th} and 6^{th} Semester (DSE 1 and 2 in Semester 5 & DSE 3 & 4 in Semester 6). Same pattern is to be followed in DSE General Course.

The UGBOS (CBCS) Syllabus Committee resolved that allotted marks to each course paper should be 90 (notionally fixed) of which 65 will be theoretical, 15 Tutorial (TU) and 10 Internal Assessment (IA); since the syllabi for the TU and IA belong to that of the same CC (of 90 marks).