Syllabi

Four Year Undergraduate Programme (FYUGP)

Gauhati University

Effective from Academic Year 2023-24

GAUHATI UNIVERSITY
Guwahati-781014

ARTS

Four-Year Undergraduate Programme
Subject: Assamese
Semester: First
Course Name: অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬ চন পর্যন্ত)
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

[এই কাকতখনৰ গোট-১ত অসমীয়া ভাষা-সাহিত্যৰ বুৰঞ্জী (খৃঃ ১৮২৬লৈ) সম্বন্ধে পৰিচয়মূলক অধ্যয়ন কৰিব লাগিব। ঠিক তেনেদৰে গোট-২, গোট-৩ আৰু গোট-৪ত যুগ অনুযায়ী দাঙি ধৰা নির্বাচিত পাঠসমূহ অধ্যয়ন কৰাৰ জৰিয়তে সেই সেই প্রতিটো যুগৰ ভাষিক আৰু সাহিত্যিক পটভূমিৰ লগতে বৈশিষ্ট্যসমূহৰ লগত পৰিচয় হ'ব লাগিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬ চন পর্যন্ত) : ভাষিক আৰু সাহিত্যিক পটভূমি, সাহিত্যিক আৰু সাহিত্য-কর্ম	১২	২০
২	প্রত্ন (উদ্ভৱকালীন/প্রত্ন/মিশ্র) অসমীয়া আৰু প্রাক্-শংকৰী যুগৰ সাহিত্য **নির্বাচিত পাঠঃ** লোকগীতঃ 'একবাৰ হৰি বোল মন ৰচনা' 'কানাই পাৰ কৰা হে' চর্যাগীতঃ 'উষ্ণা উষ্ণা পৰৱত তই সবৰী বালী' বড় চণ্ডী দাসঃ 'বিজয় নাম বেলাতে' ('জন্মখণ্ড', *শ্রীকৃষ্ণ কীর্তন*) হেম সৰস্বতীঃ *প্রহলাদ চৰিত* (সম্পূর্ণ) মাধৱ কন্দলিঃ 'লংকাৰ বিৱৰণ' ('সুন্দৰাকাণ্ড', *ৰামায়ণ*)	১২	২০
৩	শংকৰদেৱকালীন সাহিত্য **নির্বাচিত পাঠঃ** শংকৰদেৱঃ 'নাৰায়ণ কাহে ভকতি কৰো তেৰা' (বৰগীত) মাধৱদেৱঃ 'চোৰধৰা' (ঝুমুৰা) ৰাম সৰস্বতীঃ 'ভীমচৰিত' (বধকাব্য) সুকবি নাৰায়ণ দেৱঃ বেউলাৰ নৃত্য (*পদ্মা পুৰাণ*)	১২	
৪	শংকৰদেৱৰ পৰৱর্তীকালৰ সাহিত্য **নির্বাচিত পাঠঃ** ভট্টদেৱঃ 'অর্জুনৰ বিষাদ যোগ' (*কথাগীতা*) মহেশ্বৰ নেওগ (সম্পা.): 'গুৰু শিষ্যৰ মণিকাঞ্চন সংযোগ' (*গুৰু চৰিত কথা*) সূর্যকুমাৰ ভূঞা (সম্পা.): 'অসমৰ ৰণোদ্যম' (*সাতসৰী অসম বুৰঞ্জী*) সুকুমাৰ বৰকাথঃ 'হাতীৰ লক্ষণ' (*হস্তীবিদ্যার্ণৱ*)	১২	

পঠন-সামগ্রীঃ

অসমীয়া সাহিত্যৰ চানেকি (প্ৰথম, দ্বিতীয়, তৃতীয় খণ্ড):	হেমচন্দ্ৰ গোস্বামী
অসমীয়া সাহিত্যৰ বুৰঞ্জী:	দেৱেন্দ্ৰ নাথ বেজবৰুৱা
অসমীয়া সাহিত্যৰ বুৰঞ্জী:	ডিম্বেশ্বৰ নেওগ
অসমীয়া সাহিত্যৰ সমীক্ষাত্মক ইতিবৃত্ত:	সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া সাহিত্যৰ ৰূপৰেখা:	মহেশ্বৰ নেওগ
অসমীয়া সাহিত্যৰ বুৰঞ্জী (প্ৰথম খণ্ড):	বিশ্বেশ্বৰ হাজৰিকা (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (দ্বিতীয় খণ্ড):	শিৱনাথ বৰ্মন (সম্পা.)
পুৰণি অসমীয়া সাহিত্যৰ প্ৰাঞ্জল ধাৰা:	তিলক চন্দ্ৰ মজুমদাৰ
বৈষ্ণৱ যুগৰ অসমীয়া সাহিত্য:	ভুৱনেশ্বৰী বৈশ্য
অসমীয়া পাঞ্চালী গীত:	নবীন চন্দ্ৰ শৰ্মা
চৰ্য্যাপদ:	পৰীক্ষিত হাজৰিকা
গোৱালপৰীয়া লোকগীত সংগ্ৰহ:	বীৰেন্দ্ৰনাথ দত্ত (সম্পা.)
অসমীয়া লোকগীত সঞ্চয়ন:	হেমন্তকুমাৰ শৰ্মা (সম্পা.)
শ্ৰীকৃষ্ণ কীৰ্তন:	লীলাৱতী শইকীয়া বৰা (সম্পা.)
অসমৰ বৈষ্ণৱ ধৰ্ম আৰু সাহিত্য:	কনক চন্দ্ৰ চহৰীয়া
মধ্যযুগৰ অসমীয়া ভাষাৰ ৰূপতাত্ত্বিক বিশ্লেষণ:	লক্ষী হাজৰিকা
স্নাতকৰ কথাবন্ধ:	মহেশ্বৰ নেওগ (সম্পা.)
কবিতা মঞ্জৰী:	নিৰ্মলপ্ৰভা বৰদলৈ
অসমীয়া কথা সাহিত্য:	বিৰিঞ্চি কুমাৰ বৰুৱা
Assamese: Its Formation And Development:	Banikanta Kakati
Aspect of Early Assamese Literature:	Banikanta Kakati (Ed.)

Graduate Attributes: জ্ঞান-আধাৰ, সমাজমুখিতা আৰু পৰিৱেশমুখিতা

Course Objective: এই কাকতখনৰ উদ্দেশ্য আৰম্ভণিৰ পৰা ১৮২৬ খ্ৰীষ্টাব্দলৈ অসমীয়া ভাষা সাহিত্যৰ উদ্ভৱ আৰু বিকাশ সম্বন্ধে আভাস দিয়া।

Learning Outcome: কাকতখনৰ জৰিয়তে ছাত্ৰ-ছাত্ৰীসকলে পুৰণি আৰু মধ্যযুগীয় অসমীয়া সাহিত্যৰ গীত-পদ, কাব্য আৰু নাটৰ স্বৰূপ জানিব পাৰিব, লগতে তদানীন্তন অসমীয়া ভাষা সম্পৰ্কে ধাৰণা লাভ কৰিব পাৰিব।

Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Second
Course Name: অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬ চনৰ পৰা ২০০০ চনলৈ)
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

[এই কাকতখনৰ গোট-১ত অসমীয়া ভাষা-সাহিত্যৰ বুৰঞ্জী (খৃঃ ১৮২৬-২০০০) সম্বন্ধে পৰিচয়মূলক অধ্যয়ন কৰিব লাগিব। ঠিক তেনেদৰে গোট-২, গোট-৩ আৰু গোট-৪ত যুগ অনুযায়ী দাঙি ধৰা নিৰ্বাচিত পাঠসমূহ অধ্যয়ন কৰাৰ জৰিয়তে সেই সেই প্ৰতিটো যুগৰ ভাষিক আৰু সাহিত্যিক পটভূমিৰ লগতে বৈশিষ্ট্যসমূহৰ সৈতে পৰিচয় হ'ব লাগিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬-২০০০) : ভাষিক আৰু সাহিত্যিক পটভূমি, সাহিত্যিক আৰু সাহিত্য-কৰ্ম	১২	২০
২	**নিৰ্বাচিত পাঠঃ** মাইলচ্ ব্ৰন্সনঃ 'আভাস' (অচমিয়া-ইংৰাজী অভিধান) আনন্দৰাম ঢেকিয়াল ফুকনঃ 'ইংলেণ্ডৰ বিৱৰণ' হেমচন্দ্ৰ বৰুৱাঃ 'অসমত স্ত্ৰী শিক্ষা' কমলাকান্ত ভট্টাচাৰ্যঃ 'জাতীয় গৌৰৱ' চন্দ্ৰকুমাৰ আগৰৱালাঃ 'প্ৰকৃতি' লক্ষ্মীনাথ বেজবৰুৱাঃ 'বৰবৰুৱাৰ বিমান বিহাৰ' সত্যনাথ বৰাঃ 'জীৱনৰ অমিয়া'	১২	২০
৩	**নিৰ্বাচিত পাঠঃ** যতীন্দ্ৰনাথ দুৱৰাঃ 'পোহৰ' (কথা-কবিতা) ৰঘুনাথ চৌধাৰীঃ 'অন্তিম জ্যোতি' ৰজনীকান্ত বৰদলৈঃ 'মিৰি-জীয়ৰী' জ্যোতিপ্ৰসাদ আগৰৱালাঃ 'নিমাতী কইনা'	১২	২০
৪	**নিৰ্বাচিত পাঠঃ** চৈয়দ আব্দুল মালিকঃ 'কাঠফুলা' (গল্প) ভবেন্দ্ৰ নাথ শইকীয়াঃ 'গহ্ণৰ' বাণীকান্ত কাকতিঃ 'কবিৰ অহৈতুকী প্ৰীতি' নৱকান্ত বৰুৱাঃ 'এটা প্ৰেমৰ পদ্য' নীলমণি ফুকনঃ 'কেনে আছোঁ মোক নুসুধিবা'	১২	২০

পঠন-সামগ্ৰীঃ

অৰুনোদই: মহেশ্বৰ নেওগ (সম্পা.)
অচমিয়া আৰু ইংৰাজী অভিধান: মাইলছ্ ব্ৰন্সন
অসমীয়া সাহিত্যৰ ৰূপৰেখা: মহেশ্বৰ নেওগ
অসমীয়া সাহিত্যৰ সমীক্ষাত্মক ইতিবৃত্ত: সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া সাহিত্যৰ পূৰ্ণ ইতিহাস: হৰিনাথ শৰ্মা দলৈ
অসমীয়া ব্যাকৰণ আৰু ভাষাতত্ত্ব: কালিৰাম মেধি

অসমীয়া ভাষাৰ উদ্ভৱ সমৃদ্ধি আৰু বিকাশ:	উপেন্দ্রনাথ গোস্বামী
অসমীয়া ভাষাৰ ৰূপতত্ত্ব:	লীলাৱতী শইকীয়া বৰা
উদ্ভৱকালীন অসমীয়া ভাষা:	সুবাসনা মহন্ত
মধ্যযুগৰ অসমীয়া ভাষাৰ ব্যাকৰণ:	দীপ্তি ফুকন পাটগিৰি
সাৰথি:	সত্যনাথ বৰা
স্নাতকৰ কথাবন্ধ:	মহেশ্বৰ নেওগ (সম্পা.)
সঞ্চয়ন:	মহেশ্বৰ নেওগ (সম্পা.)
জ্যোতিপ্রসাদ ৰচনাৱলী:	সত্যেন্দ্রনাথ শর্মা (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (পঞ্চম খণ্ড):	ৰঞ্জিৎ কুমাৰ দেৱগোস্বামী (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (ষষ্ঠ খণ্ড):	হোমেন বৰগোহাঞি (সম্পা.)
আধুনিক অসমীয়া কবিতা:	কামালুদ্দিন আহমেদ
আধুনিক কবিতা:	হৰেকৃষ্ণ ডেকা
শ্রেষ্ঠ অসমীয়া চুটিগল্প:	শৈলেন ভৰালী (সম্পা.)
এশবছৰৰ অসমীয়া উপন্যাস:	নগেন ঠাকুৰ (সম্পা.)
প্রসঙ্গঃ ঊনবিংশ শতিকাৰ অসমীয়া সাহিত্য:	ভীমকান্ত বৰুৱা
সাহিত্য আৰু প্রেম:	বাণীকান্ত কাকতি
ৰঘুনাথ চৌধাৰীৰ কাব্য বিচাৰ:	উমেশ ডেকা আৰু নীলমোহন ৰায় (সম্পা.)
কবিতা মঞ্জৰী:	নির্মলপ্রভা বৰদলৈ (সম্পা.)
চন্দ্রকুমাৰৰ কবিতা সমগ্র:	নগেন শইকীয়া (সম্পা.)
Studies in Assamese Vocabulary:	Ramesh Pathak
The Origin and Growth of the Assamese Language:	Dimbeswar Neog

Graduate Attributes: জ্ঞান-আধাৰ, সমাজমুখিতা আৰু পৰিৱেশমুখিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ১৮২৬ খ্রীষ্টাব্দৰ পৰৱর্তী সময়ৰ পৰা ২০০০ চনলৈ অসমীয়া ভাষা-সাহিত্যৰ ইতিহাস আৰু ধাৰাসমূহৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখনৰ জৰিয়তে ছাত্র-ছাত্রীসকলে বৃটিছকালীন মিছনেৰীসকলে ৰচনা কৰা অসমীয়া সাহিত্যৰ লগতে তাৰ পৰৱর্তী ৰোমান্টিক আৰু আধুনিক অসমীয়া সাহিত্যৰ বিষয়ে জানিব পাৰিব, তদুপৰি সেই সময়ছোৱাৰ ভাষাৰ বিষয়ে ধাৰণা লাভ কৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Third
Course Name: অসমৰ সংস্কৃতি অধ্যয়ন
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

[এই কাকতখনৰ গোট-১ত অসমৰ অধিবাসী আৰু সংস্কৃতিৰ স্বৰূপ সম্বন্ধে এটি সাধাৰণ ধাৰণা লাভ কৰিব লাগিব। সেইদৰে গোট-২, গোট-৩ আৰু গোট-৪ত যথাক্রমে অসমৰ লোকসংস্কৃতি, জনজাতীয় সংস্কৃতি আৰু মাৰ্গীয় বা শাস্ত্রীয় সংস্কৃতিৰ লগত পৰিচয় হোৱাৰ লগতে নির্বাচিত উপাদানসমূহৰ বিষয়ে জানিব লাগিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	অসমৰ মানুহ আৰু সংস্কৃতি সংস্কৃতিৰ স্বৰূপ, সংজ্ঞা আৰু শ্রেণীবিভাগ অসমৰ অধিবাসীঃ আর্য (নর্দিক), মঙ্গোলীয় (তিব্বতবর্মী), অষ্ট্রিক, দ্রাবিড়	১২	২০
২	অসমৰ লোক সংস্কৃতি মৌখিক গীত-পদঃ দেৱ-দেৱীৰ নাম, বিহুগীত; লোকাচাৰঃ জন্ম, বিবাহ আৰু মৃত্যুৰ লগত জড়িত; উত্সৱ-পার্বণঃ কৃষিৰ লগত জড়িত; ধর্মীয় পৰম্পৰাঃ শৈৱ, শাক্ত আৰু বৈষ্ণৱ; পৰিৱেশ্য কলাঃ পুতলা নাচ, ওজা পালি, খুলীয়া ভাউৰীয়া, কুশানগান, ভাৰীগান, ঢুলীয়া; হস্তশিল্প আৰু লোক-কলা, স্থাপত্য-ভাস্কর্য	১২	২০
৩	অসমৰ জনজাতীয় সংস্কৃতি পার্বত্য আৰু ভৈয়ামৰ জনজাতি; আর্য্যভূত আৰু অনার্য্যভূত; বড়ো, ৰাভা, কার্বি, মিচিং, সোণোৱাল কছাৰী	১২	২০
৪	অসমৰ মার্গীয় (শাস্ত্রীয়) সংস্কৃতি সত্রীয়া সংস্কৃতিঃ নৃত্য, গীত, বাদ্য, ভাওনা, মুখাশিল্প, পুথিচিত্র, ভাস্কর্য অর্দ্ধমার্গীয়ঃ ব্যাসসঙ্গীত, দেৱদাসী নৃত্য	১২	২০

পঠন-সামগ্রীঃ

অসমীয়া জাতিৰ ইতিবৃত্তঃ — অসম সাহিত্য সভা
অসমৰ লোক সংস্কৃতিঃ — বিৰিঞ্চি কুমাৰ বৰুৱা
অসমীয়া ভাষা আৰু সংস্কৃতিঃ — বিৰিঞ্চি কুমাৰ বৰুৱা
অসমৰ সংস্কৃতিঃ — লীলা গগৈ
অসমৰ মানুহৰ নৃ-বৈজ্ঞানিক পৰিচয়ঃ — ভুবন মোহন দাস
অসমৰ জনজাতিঃ — প্রমোদ চন্দ্র ভট্টাচার্য (সম্পা.)
পুৰণি কামৰূপৰ ধর্মৰ ধাৰাঃ — বাণীকান্ত কাকতি
অসমৰ লোক সংস্কৃতিঃ — নির্মলপ্রভা বৰদলৈ

অসমীয়া লোক সংস্কৃতিৰ আভাসঃ	নবীন চন্দ্ৰ শৰ্মা
লোক সংস্কৃতিঃ	নবীন চন্দ্ৰ শৰ্মা
অসমীয়া সংস্কৃতি অধ্যয়ন	কনক চন্দ্ৰ চহৰীয়া
অসমৰ সংস্কৃতি সমীক্ষাঃ	নবীন চন্দ্ৰ শৰ্মা আৰু কনক চন্দ্ৰ চহৰীয়া (সম্পা.)
দৰঙী লোকসাহিত্যৰ ৰূপৰেখাঃ	কনক চন্দ্ৰ চহৰীয়া
পুৰণি অসমীয়া সমাজ আৰু সংস্কৃতিঃ	মহেশ্বৰ নেওগ
অসমৰ জনজাতি আৰু সংস্কৃতিঃ	মলিনা দেৱী ৰাভা (সম্পা.)
সংমিশ্ৰণত অসমীয়া সংস্কৃতিঃ	আব্দুছ ছাত্তাৰ
অসমৰ জনজাতীয় সামাজিক লোকাচাৰঃ	উপেন ৰাভা হাকাচাম আৰু প্ৰফুল্ল কুমাৰ নাথ (সম্পা.)
অসমীয়া সংস্কৃতিঃ	হৰিপ্ৰসাদ নেওগ আৰু লীলা গগৈ (সম্পা.)
অসমীয়া জাতি আৰু সংস্কৃতিঃ	পৰমানন্দ ৰাজবংশী (সম্পা.)
সত্ৰ সংস্কৃতিৰ ৰূপৰেখাঃ	কেশৱানন্দ দেৱ গোস্বামী
অসমীয়া সংস্কৃতিলৈ জনজাতীয় বৰঙনিঃ	নাহেন্দ্ৰ পাদুন
অসমত শৈৱ সাধনা আৰু শৈৱ সাহিত্যঃ	হৰিনাথ শৰ্মা দলৈ
অসমৰ জনকৃষ্টিঃ	যোগেশ দাস
অসমৰ জনজাতীয় সংস্কৃতিঃ	উপেন ৰাভা হাকাচাম
অসমীয়া পুথিচিত্ৰঃ	নৰেন কলিতা
জনজাতি আৰু গাৰো জনজাতিঃ	বিমল মজুমদাৰ
Bihu: Springtime festival of Assam:	Prafulla Dutta Goswami
History and Civilization of the people of Assam:	Pratap Ch. Choudhury
The Assamese:	Audrey Cantlie

Graduate Attributes: জ্ঞান-আধাৰ, একতা, আৰু সমাজমুখিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য সংস্কৃতিৰ বিষয়ে সাধাৰণ ধাৰণা দিয়াৰ লগতে অসমৰ মানুহৰ জীৱন-ধাৰণ সম্বন্ধে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে অসমৰ মানুহ আৰু তেওঁলোকৰ সংস্কৃতিগত আচৰণ আৰু ৰূপ তথা সেইবোৰৰ সমল সম্বন্ধে জনাৰ লগতে অসমীয়া সংস্কৃতিৰ স্বৰূপ আৰু বৈশিষ্ট্যৰ বিষয়ে জানিব পৰা যাব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: ভাষাবিজ্ঞান পৰিচয়
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	ভাষা আৰু ভাষা-বিজ্ঞানৰ আদিপাঠঃ ভাষাৰ জন্ম-কাহিনী, মানৱীয় ভাষাৰ বৈশিষ্ট্য (হকেট), ভাষা-বিজ্ঞানৰ ইতিহাস আৰু বিভিন্ন শাখা-প্ৰশাখা (বৰ্ণনামূলক, ঐতিহাসিক, তুলনামূলক, প্ৰায়োগিক), ভাষাৰ শ্ৰেণী-বিভাজনঃ বংশগত (ভাষা পৰিয়ালৰ প্ৰাথমিক ধাৰণা) আৰু আকৃতিগত- (বিশ্লেষাত্মক, সংশ্লেষণাত্মক)	১২	২০
২	ধ্বনিবিজ্ঞান আৰু ধ্বনিতত্ত্বৰ আদিপাঠঃ ধ্বনি ,ধ্বনি-উত্পাদন প্ৰক্ৰিয়া; ধ্বনিগোটঃ বৰ্ণ আৰু উপধ্বনিৰ ধাৰণা, বিভাজ্য আৰু অবিভাজ্য ধ্বনি, স্বৰধ্বনি আৰু ব্যঞ্জন ধ্বনি, আন্তঃৰাষ্ট্ৰীয় ধ্বনিলিপিৰ পৰিচয়, ৰূপধ্বনিসাপেক্ষতা	১২	২০
৩	ৰূপতত্ত্ব আৰু বাক্যতত্ত্বৰ আদিপাঠঃ ৰূপ, প্ৰাকৃতি, মুক্ত আৰু বদ্ধ প্ৰাকৃতিঃ প্ৰত্যয়, শব্দমূল; শব্দসাধনৰ সৰ্গ আৰু শব্দৰূপৰ সৰ্গ; ব্যাকৰণগততা (Grammaticality), বাক্য আৰু অৰ্থৰ মাজৰ সম্পৰ্ক, বাক্যতাত্ত্বিক উপাদানঃ শব্দক্ৰম, সহ-সম্পৰ্ক (Co-occurrence), বাক্যগত উপাদান।	১২	২০
৪	ভাষাৰ ভিন্নৰূপঃ উপভাষা, ব্যক্তিভাষা, ভাষা-সম্প্ৰদায়, পৰিস্থিতি-নিৰ্দ্ধাৰক উপভাষা; ভাষা-ভিন্নতাৰ কাৰকঃ আঞ্চলিক, ভৌগোলিক, সামাজিক; ভাষা-সংযোগঃ ভাষা-ঋণ, পিজিন, ক্ৰেওল (প্ৰথমিক ধাৰণা)	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া ব্যাকৰণৰ মৌলিক বিচাৰঃ গোলোক চন্দ্ৰ গোস্বামী
আধুনিক ভাষাবিজ্ঞান পৰিচয়ঃ- ফণীন্দ্ৰ নাৰায়ণ দত্তবৰুৱা
ভাষা আৰু ভাষাচিন্তাঃ- নগেন ঠাকুৰ
ভাষাতত্ত্বঃ- দীপ্তি ফুকন পাটগিৰি
ভাষাবিজ্ঞানঃ- উপেন্দ্ৰ নাথ গোস্বামী
ভাষাবিজ্ঞানৰ জিলিকনিঃ- প্ৰণীতা দেৱী
ভাষাবিজ্ঞান প্ৰৱেশঃ- বসন্ত কুমাৰ ভট্টাচাৰ্য
ভাষাৰ্থ বিজ্ঞানঃ ভগৱান মৰল
A Short Story of Linguistics: R.H. Robins

Contemporary Linguistics: An Introduction:	Eds. William O'Grady, Michael Dobrovolsky and Francis Katamba
Linguistics:	David Crystal

Graduate Attributes: জ্ঞান-আধাৰ, অনুসন্ধান আৰু যোগাযোগ-কৌশল
Course Objective: এই কাকতখনৰ উদ্দেশ্য ভাষাৰ বিজ্ঞানসন্মত ৰূপ আৰু ভাষাবিজ্ঞানৰ ধাৰাসমূহৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়নৰ কৰিলে ছাত্ৰ-ছাত্ৰীসকলে ভাষাৰ উদ্ভৱ আৰু বিকাশৰ বিষয়ে জনাৰ লগতে ইয়াৰ বিজ্ঞানসন্মত ৰূপসমূহ তথা ভাষাবিজ্ঞানৰ ধাৰাসমূহৰ বিষয়ে অৱগত হ'ব পাৰিব। তদুপৰি তেওঁলোকে ভাষাৰ ভিন্নতা, পৰিৱৰ্তন আদি সম্বন্ধেও জানিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: অসমীয়া কবিতা
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

[ছাত্র ছাত্রীসকলে এই কাকতৰ যোগেদি অসমীয়া কবিতাৰ প্ৰাচীন যুগৰ পৰা আধুনিক যুগলৈ পৰিচয় হ'ব পাৰিব। কাকতখনৰ প্ৰথম গোটত পুৰণি অসমীয়া কবিতা, দ্বিতীয় গোটত প্ৰাক্-ৰোমাণ্টিক আৰু ৰোমাণ্টিক (প্ৰথম প্ৰবাহৰ) কবিতা, তৃতীয় গোটত প্ৰধান ৰোমাণ্টিক কবিসকল (দ্বিতীয় প্ৰবাহৰ) কবিতাক প্ৰতিনিধিত্বমূলকভাৱে স্থান দিয়া হৈছে। কাকতখনৰ চতুৰ্থ গোটত ছাত্ৰ-ছাত্ৰীসকলে অসমীয়া আধুনিক কবি নৱকান্ত বৰুৱা, অজিৎ বৰুৱা আৰু নীলমণি ফুকনৰ কবিতা অধ্যয়ন কৰিব পাৰিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	মাধৱ কন্দলি : ৰামবিহীন অযোধ্যাৰ বৰ্ণনা (ৰামায়ণ, অযোধ্যা কাণ্ড) শংকৰদেৱ : শৰৎ বৰ্ণনা (ভাগৱত, দশম) দুৰ্গাবৰ : মায়া অযোধ্যাৰ সৃষ্টি (গীতিৰামায়ণ)	১২	২০
২	ভোলানাথ দাস : মেঘ লক্ষ্মীনাথ বেজবৰুৱা : মালতী চন্দ্ৰকুমাৰ আগৰৱালা : অজেয়	১২	২০
৩	ৰঘুনাথ চৌধাৰী : গোলাপ অম্বিকাগিৰী ৰায়চৌধুৰী : মোৰ বীণা দেৱকান্ত বৰুৱা : মনোৰমা	১২	২০
৪	নৱকান্ত বৰুৱা : পলস অজিৎ বৰুৱা : মনকুঁৱলী সময় নীলমণি ফুকন : ব্ৰহ্মপুত্ৰত সূৰ্যাস্ত	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া সাহিত্যৰ বুৰঞ্জী (দ্বিতীয় খণ্ড) : শিৱনাথ বৰ্মন (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (পঞ্চম খণ্ড) : ৰঞ্জিৎ কুমাৰ দেৱ গোস্বামী (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (ষষ্ঠ খণ্ড) : হোমেন বৰগোহাঞি (সম্পা.)
আধুনিক অসমীয়া কবিতা : পূৰ্ণ ভট্টাচাৰ্য্য
আধুনিক অসমীয়া কবিতা : এম. কামালুদ্দিন আহমেদ
আধুনিক কবিতা : হৰেকৃষ্ণ ডেকা
সঞ্চয়ন : মহেশ্বৰ নেওগ (সম্পা.)
কবিতা মঞ্জৰী : নিৰ্মলপ্ৰভা বৰদলৈ (সম্পা.)

ষোৱা শতিকাৰ কবিতাঃ অসমীয়া নৱন্যাসী সাহিত্যৰ পৰম্পৰা : দিলীপ বৰুৱা

Graduate Attributes: সমাজমুখিতা, পৰিৱেশমুখিতা, সহমর্মিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য পুৰণি অসমীয়া কবিতাৰ লগতে অসমীয়া ৰোমান্টিক আৰু আধুনিক কবিতাৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখনৰ জৰিয়তে অসমীয়া কবিতাৰ ঐতিহ্যৰ বিষয়ে জনাৰ লগতে ইয়াৰ ধাৰা আৰু আন্দোলনসমূহৰ বিষয়ে জানিব পৰা যাব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: অসমীয়া লিপিৰ পৰিচয়
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	লিপিৰ পৰিচয় আৰু ভাৰতীয় লিপি; অসমীয়া লিপিৰ উদ্ভৱ আৰু বিকাশ	১২	২০
২	অসমৰ শিলালিপিঃ নগাজৰী খনিকৰ গাঁৱৰ লিপি, সুৰেন্দ্র বর্মাৰ উমাচল লিপি, ভূতি বর্মাৰ বৰগঙ্গা লিপি, হর্জ্জৰ বর্মাৰ তেজপুৰ লিপি, কানাই বৰশী বোৱা লিপি, মসুদ্র পালৰ আমবাৰী লিপি, গছ্তলৰ লিপি	১২	২০
৩	অসমৰ তাম্রশাসনৰ লিপিঃ ভাস্কৰ বর্মাৰ ডুবি আৰু নিধনপুৰ শাসনৰ লিপি, হর্জ্জৰ বর্মাৰ হায়ুংথল লিপি, বনমাল বর্মাৰ তেজপুৰ আৰু পর্বতীয়া শাসনৰ লিপি, বলবর্মাৰ নগাঁও আৰু হাওৰাঘাট শাসনৰ লিপি	১২	২০
৪	অসমীয়া হাতেলিখা পুথিৰ লিপিঃ কায়থেলী লিপি, বামুণীয়া লিপি, গড়গঞা লিপি; হাতেলিখা পুথিৰ লিখন কলা, লেখন সামগ্রী আৰু পাঠ সমীক্ষাৰ সাধাৰণ ধাৰণা	১২	২০

পঠন-সামগ্রীঃ

অসমীয়া প্রাচীন লিপিঃ — সর্বেশ্বৰ কটকী
অসমীয়া লিপিঃ — উপেন্দ্র নাথ গোস্বামী
অসমীয়া লিপিৰ পৰিচয়ঃ — কনক চন্দ্র চহৰীয়া
বিশ্বলিপিৰ ভূমিকাঃ — নাৰায়ণ দাস
অসমীয়া লিপিতত্ত্ব অধ্যয়নঃ — সতীশ চন্দ্র ভট্টাচার্য
প্রাচ্য শাসনাৱলীঃ — মহেশ্বৰ নেওগ
পাঠসমীক্ষাঃ — মহেশ্বৰ নেওগ
পাঠ সমীক্ষা প্রসঙ্গতঃ — ৰামচৰণ ঠাকুৰীয়া
পাঠ সমীক্ষাঃ সূত্র আৰু প্রয়োগবিধিঃ — মালিনী গোস্বামী
পুৰণি পুথি অধ্যয়ন আৰু সম্পাদনাঃ — কেশৱানন্দ দেৱ গোস্বামী
Development of Script in Ancient Kamrup: T. P. Verma
Inscriptions of Ancient Assam: M.M. Sarma (ed.)
Kamrupasasanavali: D Sarma (pub.)
The evolution of Assamese Script: Mahendra Bora

Graduate Attributes: জ্ঞান-আধাৰ, অনুসন্ধান, পৰীক্ষণমুখিতা

Course Objective: এই কাকতখনৰ উদ্দেশ্য লিপিৰ পৰিচয় দিয়াৰ লগতে অসমীয়া লিপিৰ উদ্ভৱ আৰু বিকাশ সম্বন্ধে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে ছাত্ৰ-ছাত্ৰীসকলে লিপিৰ স্বৰূপ আৰু ইতিহাস সম্পৰ্কে অৱগত হোৱাৰ উপৰি অসমীয়া লিপিৰ ঐতিহ্য আৰু ধাৰা তথা মধ্যযুগীয় অসমীয়া লিপিৰ ৰেহ-ৰূপ, ইয়াৰ লিখন পদ্ধতি আৰু পাঠ সমীক্ষা সম্পৰ্কত সাধাৰণ জ্ঞান লাভ কৰিব পাৰিব।

Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: অসমীয়া লোকসাহিত্য অধ্যয়ন
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	লোকসাহিত্যৰ প্ৰকৃতি বিচাৰ আৰু শ্ৰেণীবিভাগঃ লোকগীত, লোককথা, লোকোক্তি; আঞ্চলিক আৰু জনগোষ্ঠীয় লোকসাহিত্য	১২	২০
২	উত্সৱ অনুষ্ঠান বিষয়ক লোকগীত, দেৱ-দেৱীৰ লগত জড়িত প্ৰাৰ্থনা আৰু মন্ত্ৰ, প্ৰেম-বিৰহ বিষয়ক গীত, শ্ৰমমূলক গীত, দাৰ্শনিক ভাবাপন্ন গীত, নিচুকনি গীত, খেল-ধেমালিৰ গীত	১২	২০
৩	মালিতা আৰু বাৰমাহী বিলাপ গীতঃ পু�ৰাকথাজাতীয় মালিতা, বুৰঞ্জীমূলক মালিতা, জনশ্ৰুতিমূলক মালিতা, কাল্পনিক মালিতা, বাস্তবিক মালিতা; বাৰমাহী বিলাপ গীত	১২	২০
৪	লোককথাঃ পুৰাকথা বা অতিকথা, জনশ্ৰুতি বা কিম্বদন্তী, সাধুকথা; লোকোক্তিঃ প্ৰবাদ-প্ৰবচন, যোজনা-পটন্তৰ আৰু সাঁথৰ	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া জনসাহিত্যঃ প্ৰফুল্লদত্ত গোস্বামী
অসমীয়া লোকসাহিত্যৰ ৰূপৰেখাঃ লীলা গগৈ
অসমৰ লোকসাহিত্যঃ **শশী শৰ্মা**
অসমীয়া লোক সাহিত্যঃ (.সম্পা) প্ৰহলাদ কুমাৰ বৰুৱা
কামৰূপী লোকগীত সংগ্ৰহঃ হেমন্ত কুমাৰ শৰ্মা (সম্পা.)
গোৱালপৰীয়া লোকগীত সংগ্ৰহঃ বীৰেন্দ্ৰনাথ দত্ত (সম্পা.)
দৰঙী লোকগীত সংগ্ৰহঃ (.সম্পা) কনক চন্দ্ৰ চহৰীয়া
আয়তীৰ উৰুলিঃ ফুলকুমাৰী কলিতা (.সম্পা)
অলৌ গুটিতলৌ গুটি-: অসমৰ খেলধেমালিৰ গীত-মাতঃ উপেন ৰাভা হাকাচাম, ধনেশ্বৰ কলিতা (সম্পা.)
অসমৰ জনজাতীয় লোকসাহিত্যঃ কনক চন্দ্ৰ চহৰীয়া
বাৰ মাহৰ তেৰগীতঃ প্ৰফুল্লদত্ত গোস্বামী (.সম্পা)
হেনা-হুচা: অসমীয়া জনজাতীয় লোকসাহিত্যৰ সংকলনঃ (.সম্পা) উপেন ৰাভা হাকাচাম
অসমীয়া লোকসাহিত্যৰ বুৰঞ্জীঃ অসম সাহিত্য সভা

Graduate Attributes: জ্ঞান-আধাৰ, একতা, আৰু সমাজমুখিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য অসমীয়া মৌখিক লোকসাহিত্যৰ প্ৰকৃতি আৰু প্ৰকাৰভেদ সম্বন্ধে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে লোকসাহিত্যত প্রতিফলিত সমাজ সম্পর্কে জানিব পৰা যাব, লগতে অসমৰ জাতি-জনজাতিৰ লোক-সংগীত, শিশু মনস্তত্ত্ব, সৃজনীমূলকতা, কাহিনী-কথন আদিৰ বিষয়ে সম্যক ধাৰণা উপজিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: প্রাচীন ভাৰতীয় আৰু মধ্যভাৰতীয় আর্যভাষাৰ ৰূপৰেখা
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	ভাৰতীয় আর্যভাষাৰ বিৱর্তনঃ বৈদিক-সংস্কৃতৰ উত্থান, পালি-প্রাকৃত-অপভ্রংশ ভাষাৰ বিকাশ	১২	২০
২	ভাৰতীয় আর্যভাষাৰ বিভিন্ন স্তৰৰ নির্বাচিত পাঠ (ক) সংস্কৃতঃ নীতিশতক শ্লোক (১-৫) (খ) অশোকৰ অনুশাসনঃ গিৰ্ণাৰ-১ (গ) পালিঃ ধম্মপদৰ চিত্তবগ্গ (১-৫) (ঘ) প্রাকৃতঃ গাহাসত্তসঈ (প্রথম পাঁচটা গাথা) (ঙ) অপভ্রংশঃ সংনেহ ৰাসউ (প্রথম প্রক্রমৰ প্রথম চাৰিটা শ্লোক)	১২	২০
৩	সংস্কৃত-পালি-প্রাকৃত ভাষাৰ তুলনাঃ স্বৰধ্বনি, ব্যঞ্জনধ্বনি	১২	২০
৪	সংস্কৃত-পালি-প্রাকৃতৰ ধ্বনিগত পৰিৱর্তনৰ প্রক্রিয়াঃ সমীভৱন, স্বৰ-সংগতি, অপিনিহিতি, বিষমীভৱন, নাসিক্যীভৱন, মহাপাৰাণতা, অল্পপ্রাণতা, সমাক্ষৰ লোপ	১২	২০

পঠন-সামগ্রীঃ

পালি প্রকাশঃ বিধুশেখৰ শাস্ত্রী
পালিঅপভ্রংশ ভাষা আৰু সাহিত্যঃ নগেন ঠাকুৰ-প্রাকত-
প্রাকৃত সাহিত্যঃ সত্যেন্দ্রনাৰায়ণ গোস্বামী
প্রাকৃত সাহিত্য চয়নঃ নগেন ঠাকুৰ
প্রাকৃত পাঠঃ কেশৱানন্দ দেৱগোস্বামী আৰু ভীমকান্ত বৰুৱা (.সম্পা)
প্রাকৃত ভাষা সাহিত্য পৰিচয়ঃ- ভূৱনেশ্বৰী বৈশ্য
সংস্কত, পালি-প্রাকৃত আৰু অসমীয়া ব্যাকৰণঃ লীলাৱতী শইকীয়া বৰা
সন্দেশ ৰাসকঃ কেশৱানন্দ দেৱগোস্বামী
ধম্মপদঃ সত্যেন্দ্রনাৰায়ণ গোস্বামী
অশোকৰ অনুশাসনমালাঃ নগেন ঠাকুৰ
ভর্তৃহৰি বিৰচিত নীতিশতকম্ঃ অদিতি বৰুৱা
A Comparative Old Indo-Aryan Grammar: S. Biswas

Graduate Attributes: জ্ঞান-আধাৰ, অনুসন্ধান, একতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ভাৰতীয় আর্যভাষাৰ উদ্ভৱ আৰু বিকাশ সম্বন্ধে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়নৰ জৰিয়তে ভাৰতীয় আর্যভাষাৰ ঐতিহ্য আৰু ধাৰা সম্পর্কে জনাৰ লগতে ইয়াৰ লগত সংলগ্ন সাহিত্য সম্পর্কে অৱগত হ'ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: অসমীয়া নাটক
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	অসমৰ লোকনাট্য প্ৰাচীন অসমৰ সংস্কৃত নাটক অংকীয়া নাট আৰু ঝুমুৰা প্ৰাক্-স্বাধীনতা যুগৰ অসমীয়া নাটক (শ্বেক্সপীয়েৰীয় আৰু ইবছেনীয় ধাৰাৰ বিশেষ উল্লিখনসহ) উত্তৰ-স্বাধীনতা যুগৰ অসমীয়া নাটক (এবছার্ড নাটক, অনাতাঁৰ নাটক, বাটৰ নাট আৰু ভ্ৰাম্যমান নাটকৰ বিশেষ উল্লিখনসহ)	১২	২০
২	শংকৰদেৱঃ পাৰিজাত হৰণ মাধৱদেৱঃ পিম্পৰা গুচোৱা গোপাল আতাঃ জন্মজাত্ৰা	১২	২০
৩	গুণাভিৰাম বৰুৱাঃ ৰামনৱমী জ্যোতিপ্ৰসাদ আগৰৱালাঃ কাৰেঙৰ লিগিৰী	১২	২০
৪	অৰুণ শর্মাঃ আহাৰ প্ৰমোদ দাসঃ হনুমান সাগৰ বান্ধা চাউ	১২	২০

পঠন-সামগ্ৰীঃ

অসমৰ লোকনাটঃ নবীনচন্দ্ৰ শর্মা
অসমীয়া নাটক স্বৰাজোত্তৰ কালঃ : শৈলেন ভৰালী
অসমীয়া নাট্য সাহিত্যঃ সত্যেন্দ্ৰনাথ শর্মা
অসমীয়া নাট্য সাহিত্যৰ জিলিঙনি (আদিৰ পৰা ১৯৬৭ পর্যন্ত): হৰিশ্চন্দ্ৰ ভট্টাচার্য
আধুনিক অসমীয়া নাটক: পৰীক্ষা নিৰীক্ষা আৰু বিভিন্ন ধাৰাঃ কুলদা কুমাৰ ভট্টাচার্য
আহাৰঃ অৰুণ শর্মা
উদ্ভট নাটকঃ বিনোদ শর্মা
নাটক আৰু অভিনয় প্ৰসংগঃ সত্যপ্ৰসাদ বৰুৱা
নাটক আৰু মঞ্চকলাঃ অজিত ভৰালী
অসমীয়া লোক নাট্য পৰম্পৰাঃ- শৈলেন ভৰালী
ছশ বছৰৰ অসমীয়া নাটক পৰম্পৰা আৰু পৰিৱর্তনঃ : অজিত শইকীয়া (.সম্পা)
থিয়েটাৰে আলো তত্ত্ব ও প্ৰয়োগঃ : ৰঞ্জিতকুমাৰ মিত্ৰ
থিয়েটাৰ দৃশ্যের বিকাশ ও সমীক্ষাঃ ৰঞ্জিতকুমাৰ মিত্ৰ
নাট্যচিন্তা নাট্যচর্চাঃ- ভূপেন গোস্বামী
নাট্যশিল্প আৰু অভিনয় তত্ত্বঃ অর্পণ বেজবৰুৱা
মঞ্চলেখাঃ অতুলচন্দ্ৰ হাজৰিকা

মঞ্চ দৃশ্যের পরিকল্পনা ও নির্মাণঃ	রঞ্জিতকুমাৰ মিত্র
Bhaona : The Ritual Play of Assam :	M. Neog
Indian Theatre :	N. Jain
Key Concept in Drama and Performance:	K. Pickering
Music and Drama:	A. D. Ranade
Performance Studies: An Introduction :	R. Schechner

Graduate Attributes: জ্ঞান-আধাৰ, সমাজমুখিতা, সহমর্মিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ছাত্র-ছাত্রীসকলক অসমীয়া নটকৰ ইতিহাস, ধাৰা আৰু উচ্চ অৱস্থান সম্বন্ধে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে ছাত্র-ছাত্রীসকলে প্রাচীন কালৰে পৰা বর্তমানলৈকে অসমীয়া নাটকৰ ঐতিহ্য আৰু ধাৰা সম্পর্কে জনাৰ লগতে নির্বাচিত শ্রেষ্ঠ নাটক সম্পর্কে অৱগত হ'ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: অসমীয়া চুটিগল্প আৰু উপন্যাস
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	অসমীয়া চুটিগল্পৰ ইতিহাস (আৰম্ভণিক পৰা ২০০০ খ্ৰীষ্টাব্দলৈকে)	১২	২০
২	অসমীয়া উপন্যাসৰ ইতিহাস (আৰম্ভণিক পৰা ২০০০ খ্ৰীষ্টাব্দলৈকে)	১২	২০
৩	চুটিগল্প লক্ষ্মীনাথ বেজবৰুৱাৰ ‘মুক্তি’ লক্ষ্মীনাথ ফুকনৰ ‘মেধি’ হোমেন বৰগোহাঞিৰ ‘হাতী’	১২	২০
৪	উপন্যাস যোগেশ দাসৰ ‘ডাৱৰ আৰু নাই’ মামণি ৰয়চম গোস্বামীৰ ‘চেনাবৰ সোঁত’	১২	২০

পঠন-সামগ্ৰীঃ

আধুনিক গল্প সাহিত্যঃ	ত্ৰৈলোক্যনাথ গোস্বামী
চুটিগল্পঃ	উদয় দত্ত
গল্পগুচ্ছঃ	অসম সাহিত্য সভা প্ৰকাশিত
অসমীয়া চুটিগল্পৰ অধ্যয়নঃ	প্ৰহলাদ কুমাৰ বৰুৱা
অসমীয়া চুটিগল্পৰ প্ৰবাহঃ	লীলাৱতী শইকীয়া (.সম্পা)
অসমীয়া চুটিগল্প: ঐতিহ্য আৰু বিৱৰ্তনঃ	অপূৰ্ব বৰা (.সম্পা)
শ্ৰেষ্ঠ অসমীয়া চুটিগল্পঃ	শৈলেন ভৰালী (.সম্পা)
উপন্যাস আৰু অসমীয়া উপন্যাসঃ	গোবিন্দপ্ৰসাদ শৰ্মা
এশ বছৰৰ অসমীয়া উপন্যাসঃ	নগেন ঠাকুৰ (.সম্পা)
অসমীয়া উপন্যাসৰ ভূমিকাঃ	সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া উপন্যাসৰ গতিধাৰাঃ	সত্যেন্দ্ৰনাথ শৰ্মা

Graduate Attributes: সমাজমুখিতা, সহমৰ্মিতা, প্ৰেৰণা
Course Objective: এই কাকতখনৰ উদ্দেশ্য অসমীয়া চুটিগল্প আৰু উপন্যাসৰ বিষয়ে আভাস দি আধুনিক কথা-সাহিত্যৰ সৈতে পৰিচয় কৰোৱা।
Learning Outcome: এই কাকতখন পঢ়িলে ছাত্ৰ-ছাত্ৰীসকলে সমাজ বিৱৰ্তনৰ বিভিন্ন দিশ সম্বন্ধে জানিব পাৰিব, লগতে ঐতিহাসিক আৰু সামাজিক ঘটনা সম্বন্ধে অৱগত হ’ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: অসমীয়া গদ্য সাহিত্য (আৰম্ভণিৰ পৰা ২০০০ খ্ৰীষ্টাব্দলৈ)
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	শঙ্কৰদেৱৰ ‘ৰুক্মিণী হৰণ’ নাটৰ অন্তর্গত ‘ৰুক্মিণীৰ প্ৰেমপত্ৰ’ মাধৱদেৱৰ ‘অর্জুন ভঞ্জন’ নাটৰ অন্তর্গত ‘নন্দ-যশোদাৰ কলহ' বৈকুণ্ঠনাথ ভট্টাচার্যৰ ‘সংক্ষেপে কৃষ্ণলীলা’	১২	২০
২	গোপালচৰণ দ্বিজৰ শ্ৰীভক্তিৰত্নাকৰ কথাঃ ‘গুৰু সেৱা মাহাত্ম্য’ ৰঘুনাথ মহন্তৰ শ্ৰীৰামায়ণ কথাঃ ‘ৰামৰ বন গমন’ ৰত্নাকৰ কন্দলি ,অর্জুন দাস বৈৰাগীৰ ‘ত্ৰিপুৰাত মদন পূজাৰ আড়ম্বৰ মোট খোলাৰ কৌতুক’ (ত্ৰিপুৰা বুৰঞ্জী)	১২	২০
৩	কৰতি মন্ত্রঃ হেমচন্দ্র গোস্বামী সম্পাদিত অসমীয়া সাহিত্যৰ চানেকী, ১ম খণ্ড সপ্তদশ শতিকাৰ চামধৰা গড়ৰ ৰণজয়ৰ শিলৰ ফলি মণিৰাম দেৱান বৰভাণ্ডাৰ বৰুৱা ‘সত্রাধিকাৰৰ অভিষেক উত্সৱ’	১২	২০
৪	নিধিলিবাই ফাৰৱেলৰ ‘নগয়া দ্রোহী লোকৰ চৰিত্র বর্ণন’ লম্বোদৰ বৰাৰ ‘সদানন্দৰ কলাঘুমটি’ সত্যেন্দ্রনাথ শর্মাৰ ‘অঙ্কীয়া নাটৰ ৰস-বিচাৰ’	১২	২০

পঠন-সামগ্রীঃ

অসমীয়া কথা সাহিত্যঃ	বিৰিঞ্চি কুমাৰ বৰুৱা
অসমীয়া গদ্য সাহিত্যৰ গতিপথঃ	হৰিনাথ শর্মাদলৈ
স্নাতকৰ কথাবন্ধঃ	(.সম্পা) মহেশ্বৰ নেওগ
ক্রমবিকাশত অসমীয়া কথাশৈলীঃ	প্রফুল্ল কটকী
অসমীয়া গদ্যৰীতিঃ	স্মৃতিৰেখা ভূঞা
প্রাচ্য শাসনাৱলীঃ	(.সম্পা) মহেশ্বৰ নেওগ
অঙ্কাৱলীঃ	কালিৰাম মেধি
সাতসৰী অসম বুৰঞ্জীঃ	(.সম্পা) সূর্যকুমাৰ ভূঞা
প্রাচীন অসমীয়া গদ্যশৈলীঃ	অর্পনা কোঁৱৰ
ভাষা সাহিত্যৰ সুবাসঃ-	লীলাৱতী শইকীয়া বৰা
ঊনবিংশ শতিকা আৰু লম্বোদৰ বৰাঃ	জগন্নাথ বর্মণ

Graduate Attributes: জ্ঞান-আধাৰ, সমালোচনাত্মক চিন্তন, বিশ্লেষণাত্মক মনোভাব

Course Objective: এই কাকতখনৰ উদ্দেশ্য আৰম্ভণিৰে পৰা অসমীয়া ভাষাত ৰচিত গদ্যৰ বিষয়ে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে অসমীয়া গদ্যসাহিত্যৰ ইতিহাস, স্তৰ বিভাজন, গদ্যৰ বৈশিষ্ট্য, পৰিৱর্তনৰ ধাৰা, চিন্তা-শিল্প আদি সম্পর্কে জানিব পৰা যাব।

Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: সাহিত্য আৰু সাহিত্য সমালোচনা
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	সাহিত্য আৰু সাহিত্য সমালোচনাৰ অন্তঃসম্পর্ক সংজ্ঞা আৰু প্ৰকাৰভেদঃ কাব্য, দৃশ্য কাব্য (প্ৰাচ্য দৃষ্টিভংগীত), কবিতা, নাটক, চুটিগল্প আৰু উপন্যাস (পাশ্চাত্য দৃষ্টিভংগীত)	১২	২০
২	শব্দশক্তি আৰু ৰস এৰিষ্ট'টলৰ ধাৰণাত ট্ৰেজেদি, কমেদি আৰু এপিক (মহাকাব্য)	১২	২০
৩	ছন্দঃ পদ বা পয়াৰ, দুলড়ি, ছবি, ঝুনা, কুসুমমালা অলংকাৰঃ অনুপ্ৰাস, যমক, শ্লেষ, বক্ৰোক্তি, উপমা, ৰূপক, ভ্ৰান্তিমান, উৎপ্ৰেক্ষা কবিতাত অনুকৰণ আৰু কল্পনাৰ প্ৰভাৱ আধুনিক কবিতাত কল্পনা আৰু প্ৰতীকবাদ	১২	২০
৪	এবছার্ড নাটক আৰু ৰেখটীয় মহাকাব্যিক নাটক বাস্তৱিক আৰু মনঃস্তাত্ত্বিক কথা সাহিত্য	১২	২০

পঠন-সামগ্ৰীঃ

ট্ৰেজেডী বিচাৰ : শৈলেন ভৰালী
ধ্বনি আৰু ৰসতত্ত্ব : মুকুন্দমাধৱ শৰ্মা
নন্দনতত্ত্বঃ প্ৰাচ্য আৰু পাশ্চাত্য : ত্ৰৈলোক্যনাথ গোস্বামী
সাহিত্য উপক্ৰমণিকা : মহেন্দ্ৰ বৰা
সাহিত্যৰ তত্ত্ব আৰু প্ৰয়োগ : বিমল মজুমদাৰ
চুটিগল্প : উদয় দত্ত
উপন্যাস : প্ৰহ্লাদকুমাৰ বৰুৱা
সাহিত্যবিদ্যা পৰিক্ৰমা : তীৰ্থনাথ শৰ্মা
সাহিত্যদৰ্পণ : বিশ্বনাৰায়ণ শাস্ত্ৰী
সাহিত্যৰ বাদ-বৈচিত্ৰ্য : নগেন শইকীয়া
সাহিত্যঃ সংজ্ঞা আৰু আংগিক : পৰাগ কুমাৰ ভট্টাচাৰ্য্য
আধুনিকতাবাদ আৰু অন্যান্য প্ৰবন্ধ : হৰেকৃষ্ণ ডেকা
Romantic Imagination: C.M. Bowra

Graduate Attributes: সহমৰ্মিতা, সমালোচনাত্মক মনোভাব, বিশ্লেষণ-ক্ষমতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য প্ৰাচ্য-পাশ্চাত্য সমালোচনাৰ আভাস দি ছাত্ৰ-ছাত্ৰীসকলক সাহিত্য-সমালোচনাৰ বাবে প্ৰস্তুত কৰি তোলা।

Learning Outcome: এই কাকতখন পঢ়িলে ছাত্ৰ-ছাত্ৰীসকলে প্ৰাচ্য-পাশ্চাত্য সমালোচনাৰ বিভিন্ন দিশ সম্বন্ধে জানিব পাৰিব, লগতে সাহিত্যৰ কেতবোৰ ভাগ সম্বন্ধে অৱগত হ'ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: অসমৰ আৰ্যভিন্ন ভাষা
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	আৰ্যভিন্ন ভাষাৰ পৰিচয় আৰু অসমত তেওঁলোকৰ বিস্তৃতি (বিশেষকৈ চীন-তিব্বতীয় আৰু অষ্ট্ৰিক ভাষা)	১২	২০
২	আৰ্যভিন্ন ভাষাৰ উত্তৰণ আৰু স্থিতি (বৰো, ৰাভা, কাৰ্বি, মিচিং আৰু গাৰো ভাষাৰ উল্লিখনেৰে বৃটিছ্ সময়ৰ পৰা বৰ্তমান সময়লৈ)	১২	২০
৩	অসমৰ আৰ্যভিন্ন ভাষাৰ সাধাৰণ বৈশিষ্ট্য (ধ্বনিতাত্ত্বিক, ৰূপতাত্ত্বিক আৰু বাক্যতাত্ত্বিক)	১২	২০
৪	আৰ্য আৰু আৰ্যভিন্ন ভাষাৰ পাৰস্পৰিক প্ৰভাৱ (ক) আৰ্যভিন্ন ভাষাৰ ওপৰত অসমীয়া ভাষাৰ প্ৰভাৱ (খ) অসমীয়া ভাষাৰ ওপৰত আৰ্যভিন্ন ভাষাৰ প্ৰভাৱ	১২	২০

পঠন-সামগ্ৰীঃ

অসমৰ ভাষা : ভীমকান্ত বৰুৱা
অসমৰ ভাষা : বিভা ভৰালী আৰু বনানি চক্ৰৱৰ্তী(সম্পা.)
অসমীয়া অৰু অসমৰ তিব্বতবৰ্মীয় ভাষা : উপেন ৰাভা হাকাচাম
ভাৰতীয় ভাষাৰ পৰিচয় : নগেন ঠাকুৰ
ভাষাবৈজ্ঞানিক অধ্যয়নত তুলনা প্ৰসংগ : উপেন ৰাভা হাকাচাম, প্ৰণীতা দেৱী (সম্পা.)
গাৰো ভাষাৰ মৌলিক বিচাৰ : প্ৰণীতা দেৱী
মিচিং ভাষাৰ পৰিচয় : নাহেন্দ্ৰ পাদুন
পৃথিৱীৰ বিভিন্ন ভাষা : নগেন ঠাকুৰ
তিব্বত বৰ্মীয় ভাষাৰ সম্বন্ধ বাচক শব্দৰ অধ্যয়ন : প্ৰণীতা দেৱী
A Descriptive Analysis of Bodo Language: P.C. Bhattacharya
Assamese and Bodo : A Comparative and Contrastive Study : Madhuram Boro
Karbi People and their Language : Arpana Konwar
Languages of North-East : P.N. Dutta Baruah
Linguistic Survey of India (Vol.II, Part II) : G.A. Grierson
North-East India Linguistics : Stephen Morey and Mark Post
Sino-Tibetan: A Conspectus : Paul K. Benedict
Studies in Sino-Tibetan Languages : S.N. Goswami
Structure of Garo : Pranita Devi

Graduate Attributes: জ্ঞান-আধাৰ, ভ্ৰাতৃত্ববোধ, ভাষা-বিশ্লেষণ ক্ষমতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য অসম তথা উত্তৰ-পূৰ্বাঞ্চলৰ আৰ্যভিন্ন ভাষাৰ আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়নৰ জৰিয়তে অসমীয়া ভাষাৰ লগত আৰ্যভিন্ন ভাষাৰ পাৰস্পৰিক ভাষিক সম্পৰ্ক জনাৰ লগতে আৰ্যভিন্ন ভাষাসমূহৰ সাম্প্ৰতিক স্থিতি সম্পৰ্কে পৰ্যালোচনা কৰিব পৰা যাব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: ব্যাকৰণ আৰু অসমীয়া ব্যাকৰণ
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	ব্যাকৰণ : সংজ্ঞা, ইতিহাস (প্রাচ্য আৰু পাশ্চাত্য— পাণিনীয় আৰু গ্রীক ধাৰাৰ উল্লিখন), ব্যাকৰণৰ উপাদান (ধ্বনি, ৰূপ, শব্দ আৰু বাক্য), অসমীয়া ব্যাকৰণৰ ইতিহাস	১২	২০
২	অসমীয়া ভাষাৰ ধ্বনিতত্ত্ব বিভাজ্য ধ্বনি : স্বৰধ্বনি, ব্যঞ্জনধ্বনি অবিভাজ্য ধ্বনি : শ্বাসাঘাত, সন্ধি, অনুনাসিকতা, সুৰ-লহৰ	১২	২০
৩	অসমীয়া ভাষাৰ ৰূপতত্ত্ব : প্রাকৃতি, প্রকৃতি, সৰ্গ(প্রত্যয়, বিভক্তি), পদ আৰু পদৰ শ্রেণীবিভাজন (নামপদ, ক্রিয়াপদ), বচন, লিংগ, কাৰকবাচক শব্দৰূপ, ধাতুৰূপ (কাল, ভাব, দশা, পুৰুষ)	১২	২০
৪	অসমীয়া ভাষাৰ বাক্যতত্ত্ব : অসমীয়া বাক্যৰ শ্রেণীবিভাজন, বাক্যৰ উপাদান পদৰ সংগতি আৰু ক্রম, নিকটস্থ অংগবিচাৰ, খণ্ডবাক্য গঠনৰ নিয়ম, ৰূপান্তৰ উৎপাদক ব্যাকৰণ	১২	২০

পঠন-সামগ্রীঃ

অসমীয়া বৰ্ণ প্রকাশ : গোলোক চন্দ্র গোস্বামী
অসমীয়া ব্যাকৰণ আৰু ভাষাতত্ত্ব : কালিৰাম মেধি
অসমীয়া ব্যাকৰণৰ মৌলিকবিচাৰ : গোলোক চন্দ্র গোস্বামী
অসমীয়া ব্যাকৰণ প্রৱেশ : গোলোক চন্দ্র গোস্বামী
অসমীয়া ভাষাৰ ব্যাকৰণ : উপেন্দ্রনাথ গোস্বামী
অসমীয়া ভাষাৰ ৰূপকথা : উপেন্দ্রনাথ গোস্বামী
অসমীয়া ভাষাৰ ৰূপতত্ত্ব : লীলাৱতী শইকীয়া বৰা
উচ্চতৰ অসমীয়া ব্যাকৰণ : ৰমেশ পাঠক
ব্যাকৰণ আৰু প্রাকৃতিবিজ্ঞান : ৰমেশ পাঠক
ব্যৱহাৰিক ধ্বনিবিজ্ঞান : দীপংকৰ মৰল
ব্যাকৰণঃ প্রাচ্য আৰু পাশ্চাত্য : খগেশসেন ডেকা
ভাষাবিজ্ঞান উপক্রমণিকা : অর্পণা কোঁৱৰ
Assamese; Its Formation and Development : B.K. Kakati
Syntactic Structure : Noam Chomsky

Graduate Attributes: জ্ঞান-আধাৰ, যোগাযোগ-কৌশল, অনুসন্ধানমূলক মনোভাব
Course Objective: এই কাকতখনৰ উদ্দেশ্য উচ্চ ব্যাকৰণৰ ৰীতি অনুযায়ী অসমীয়া ভাষাৰ বৈয়াকৰণিক আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে ছাত্ৰ-ছাত্ৰীসকলে ব্যাকৰণৰ সংজ্ঞা, ইতিহাস (প্ৰাচ্য-পাশ্চাত্য) আদিৰ লগতে অসমীয়া ভাষাৰ ধ্বনিতত্ত্ব, ৰূপতত্ত্ব আৰু বাক্যতত্ত্ব সম্বন্ধে জ্ঞান লাভ কৰিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: তুলনামূলক ভাৰতীয় সাহিত্য
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

[এই পাঠ্যক্রমৰ (পাঠ্য) অধ্যয়নৰ জৰিয়তে তুলনামূলক ভাৰতীয় সাহিত্য সম্পৰ্কে পৰিচয় কৰাই দিয়াৰ লগতে আধুনিক ভাৰতীয় সাহিত্য (বাংলা, হিন্দী, ওড়িয়া, ব্রজবুলি) সম্পৰ্কে সামান্যভাৱে পৰিচয় কৰাই দিয়াৰ প্রয়াস কৰা হ'ব।]

Unit No.	Unit Content	No. of Classes	Marks
১	তুলনামূলক সাহিত্যৰ পৰিচয় সংজ্ঞা, অধ্যয়নৰ পদ্ধতি আৰু প্রধান সম্প্রদায়সমূহ (Schools), ভাৰতীয় সাহিত্যৰ ধাৰণা আৰু ভাৰতীয় সাহিত্য অধ্যয়নৰ ইতিহাস	১২	২০
২	ভাৰতীয় কাব্য সাহিত্যৰ পৰিচয় (ব্রজবুলি আৰু আধুনিক কবিতা) বিদ্যাপতি : ৰাধাৰ বয়ঃসন্ধি চণ্ডীদাস : শ্রীৰাধাৰ পূর্বৰাগ জ্ঞানদাস : প্রথম মিলন গোবিন্দদাস : বর্ষাভিসাৰ ৰবীন্দ্রনাথ ঠাকুৰ : সোণাৰ তৰী জয়শংকৰ প্রসাদ : ভাৰত মহিমা	১২	২০
৩	ভাৰতীয় চুটিগল্পৰ চানেকি শৰৎচন্দ্র চট্টোপাধ্যায় : মন্দিৰ (বাংলা) প্রেমচান্দ : শিশু (হিন্দী) ৰাজকিশোৰ ৰায় : বিয়াৰমুকুট (ওড়িয়া) অনিতা দেশাই : সঙ্গত (ইংৰাজী)	১২	২০
৪	ভাৰতীয় উপন্যাসৰ চানেকি মাণিক বন্দোপাধ্যায় : পদ্মানদীৰ মাঝি ফকীৰ মোহন সেনাপতি : ঊনিশ পুৰা দুকঠা (অনু. ভামতী দেৱী)	১২	২০

পঠন-সামগ্রীঃ

আধুনিক বাংলা সাহিত্য : মোহিতলাল মজুমদাৰ
আধুনিক ভাৰতীয় সাহিত্য : শৈলেন ভৰালী
বঙ্গসাহিত্যে উপন্যাসেৰ ধাৰা : শ্রীকুমাৰ বন্দোপাধ্যায়
তুলনাত্মক সাহিত্য : দিলীপ বৰা
তুলনামূলক ভাৰতীয় সাহিত্য : নীৰাজনা মহন্ত বেজবৰা

প্রেমচন্দ ঔৰ উনকা যুগ : ৰামবিলাস শর্মা
তুলনামূলক ভাৰতীয় সাহিত্য : প্রফুল্ল কুমাৰ নাথ
তুলনামূলক সাহিত্যঃ তত্ত্ব আৰু প্রয়োগ : প্রফুল্লকুমাৰ নাথ
উপন্যাস আৰু লনামূলক ভাৰতীয় উপন্যাস : প্রফুল্লকুমাৰনাথ
প্রেমচন্দৰ চুটিগল্প : মামণি ৰয়চম গোস্বামী (অনূদিত)
নির্বাচিত ভাৰতীয় চুটিগল্প : নৰকান্ত বৰুৱা (সম্পা.)
বাংলা ছোটগল্প : শিশিৰ কুমাৰ দাশ
Aspects of Comparative Literature : Indranath Choudhury (Ed.)
Comparative Literature : Indian Dimensions : Swapan Mazumdar

Graduate Attributes: সহমর্মিতা, ভ্রাতৃত্ববোধ, সাহিত্য -বিশ্লেষণ ক্ষমতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ছাত্র-ছাত্রীসকলক তুলনামূলক সাহিত্যৰ ধাৰণা দিয়াৰ লগতে ভাৰতীয়, বাংলা, ব্রজবুলি, হিন্দী, উড়িয়া আৰু ভাৰতীয় ইংৰাজী সাহিত্যৰ সৈতে পৰিচয় কৰাই দিয়া। **Learning Outcome:** এই কাকতখন অধ্যয়ন কৰিলে ছাত্র-ছাত্রীসকলে আধুনিক ভাৰতীয় সাহিত্যৰ বর্তমানৰ স্থিতি সম্পর্কে জানিব পাৰিব, লগতে এইবোৰৰ সৈতে অসমীয়া সাহিত্যৰ তুলনামূলক বিচাৰ-বিশ্লেষণ কৰিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-year Undergraduate Programme
Subject: Economics
First Semester

Course Name: Introductory Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199

Unit No	Unit Content	No. of Classes	Marks
1.	**The Essences of the Economic Problem:**	15	25
	Scarcityand Alternative Usability of Resources, Problem of Choice and Optimization by an Economic Agent. The Notion of Opportunity Cost. Notions of Individual Demand and Supply. Individual Demand Function, Demand Curve and the Law of Demand, Shift of the Demand Curve, The Idea and calculation of Elasticity: Price, Income and Cross Elasticities of Demand and their Significance. Cost of Production and Supply. Elasticity of supply.		
2	**Market and Its Role in the Economy**	**12**	**20**
	Market and its Different Forms - Perfectly Competitive Market versus Monopoly. Individual Demand to Market Demand, Individual Supply to Market Supply. Price determination in a Competitive Market. Stability of the Competitive Market Equilibrium. Consumers' and Producers' Surplus and Efficiency of theMarkets Equilibrium.		
3	**National Income and its Measurement**	**10**	**15**
	From Microeconomics to Macroeconomics. Income (Hicks' Definition), Domestic Income and National Income, GNP and its Measurement, Circular Flow of the Economy, NDP at Factor Cost as Domestic Income. Personal and Disposable Income, Purchasing Power Parity. Concepts of Unemployment, Inflation and Recession Balance of Payment –current and capital accounts		
4	**Macroeconomic Equilibrium and Income Determination**	**12**	**20**
	Idea of Equilibrium as Applied to a Basic Macroeconomy, Ex Post and Ex Ante Savings and Investment, Keynes' Approach of Aggregate Effective Demand and Determination of Income, Multiplier Analysis		
5	**Basic Concepts in Public Finance Operations**	**12**	**20**
	Definition of Tax,Direct and IndirectTax,TaxRate,Buoyancy andElasticityofaTax,Proportionate,ProgressiveandRegressiveTaxation. Government Budget and Its Revenue and Capital Components;		

	F i s c a l and Primary Deficits.		

Readings:

1. N C Ray,*Microeconomic Theory*, MacMillan
2. Dominick Salvatore, Microeconomic Theory, Schaum's Outline Series, McGraw Hill
3. Soumyen Sikdar, *Principles of Macroeconomics*, Oxford

Graduate Attributes:

Course Objective:

The course is designed to expose the students to the basic idea of microeconomics, macroeconomics and public finance. The emphasis will be on thinking like an economist and the course will illustrate how the concepts of microeconomics, macroeconomics and public finance can be applied to analyze real-life situations.

Learning outcome:

This course aims to develop the simple conceptual frameworks which will enable students to understand and comments upon real economic issues like the basic economic problems, demand, supply, GDP and their inter-linkages and also simple ideas of public finance. It will also allow them to evaluate economic policies in terms of coherent logical structure.

Prerequisites: -

Theory Credit: 04

Practical Credit: -

No. of Required Classes:

No. of Contact Classes: 60

No. of Non-contact Classes: -

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Particulars of Course Designer 2:

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Subject: Economics

Paper: Basic Elements of Economics

Semester: 2nd Semester

Existing base syllabus:

Course Level: 100-199

Course Objective: The course is designed to introduce the students to the basic ideas of Development Economics, Statistics, Indian economy and elements of the financial system. The focus will be on exposing the students to the various issues of the global and national economy along with the basic statistical tools for analysing these issues.

Graduate Attributes:

At the end of the course, the students will be able to:

 Understand and critically evaluate the various measures of development

 Use and apply the relevant statistical tools to systematically examine any given economic phenomenon

 Describe and analyse the Indian economy in terms of its income and demographic features

 Understand the functioning of a financial system

 Relate and analyse the current events of the global and national economy

Prerequisites: None

Theory credit: 4

Practical credit: None

Number of required classes

Number of contact classes: 50

Number of non-contact classes: 10

Basic Elements of Economics

Content	Marks/Classes
Unit 1: Basics of data collection - Primary and Secondary, Census versus Sample Survey, Distinction between population and sample, Distinction between population parameters and sample statistics, Principal steps in a sample survey, Methods of sampling - random, stratified, multi-stage and	25/20

systematic random sampling. Measures of Central Tendency – Mean: Arithmetic mean (simple and weighted), Geometric mean, Harmonic mean, Median, Mode. Measures of Dispersion: Range, Inter-quartile deviation, mean deviation, standard deviation, Variance.	
Unit 2: Index Number - Meaning and Types, Construction, uses and limitations of index numbers, Cost of Living Index Numbers. Consumer Price Index Numbers for Agricultural Labourers in India, Consumer Price Index Numbers for Industrial Workers in India (concept only)	10/8
Unit 3: Economic growth and development, Per Capita Income (PCI) as a measure of development, International comparison of PCI and role of Purchasing Power Parity (PPP). Human Development Index (HDI), Concept of Sustainable development.	25/10
Unit 4: Financial System and its functions, Formal and informal financial system, Components of a financial system and their interdependence, Relationship between financial system and economic growth	20/10
Unit 5: Basic features of Indian economy, Trend of national and per capita income, Sector-wise composition of GDP, Basic demographic features – age, sex composition, density, urbanization, Labour force and Work force and Participation rate , Unemployment, Occupational Pattern, Demographic Dividend.	20/12

References

A.N. Agarwal: Indian Economy - Problems of Development and Planning, New Age

International Publishers

B. V. Pathak: Indian Financial System, Pearson Education, Singapore.

Debraj Roy: Development Economics

Michael P.Todaro, Stephen C. Smith: Economic Development

Padmalochan Hazarika: Statistical Methods for Economics, Ashok book Stall

S.C. Gupta: Fundamentals of Statistics, Himalayas Publishing House, Seventh Edition

S.K.Misra, V K Puri: Economics of Development and Planning

V.K.Puri and S.K.Mishra: Indian Economy, Himalay Publishing House

William G. Cochran: Sampling Techniques, John Wiley, 2007.

Particular of course designer:

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Four-year Undergraduate Programme
Subject: Economics
Third Semester
Course Name: Intermediate Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299

Unit No	Unit Content	No. of Classes	Marks
1.	**Consumer's Behaviour**	**12**	**20**
	Consumer's Budget Constraints and Effects of Income and Price Changes on it, Consumer's Preference Ordering and Indifference Curves, Axioms of Preference and Properties of Indifference Curves: Consumer's Optimized Choice; Income and Substitution Effects, Derivation of Demand Theorem. Normal and Inferior Goods and the Giffen Paradox		
2	**Theory of Production and Cost**	**15**	**20**
	Total, Average and Marginal Product of a Single Variable Factor; Production Function with Two Variable Factors, Isoquant, Marginal Rate of Technical Substitution and Elasticity of Substitution; Homogeneity of Production Function and Returns to Scale, The Least Cost Factor Combination, Expansion path, cost curves-Short and Long-run.		
3	**Firm's Revenue and Equilibrium**	**9**	**14**
	Total, Average and Marginal Revenue of a Firm under Perfect Competition and Monopoly, Equilibrium of a Profit Maximizing Firm under Perfect Competition and Monopoly. Need for Regulation of Monopoly		
4	**Money, Interest, Income**	**10**	**17**
	Definition and Functions of Money, Classical Theory of Full Employment Equilibrium, Quantity Theory of Money Keynes' Critique of the Classical Theory, Liquidity Preference and the Rate of Interest, Keynesian Income Determination Model with Rate of Interest		
5	**Credit Creation, Money Supply and Inflation**	**8**	**14**
	Banking System and Credit Creation Process; Money Supply;		

	Inflation: Demand-pulled and cost-pushed, Effects on production and distribution; Central Bank's Tools of Monetary Control		
6	**Elements of International Trade Theory**	**6**	**15**
	Autarky versus Trade, Absolute and Comparative cost, Gains from Trade		

Readings:

1. N C Ray, *Microeconomic Theory*, MacMillan
2. Dominick Salvatore, *Microeconomic Theory*, Schaum's Outline Series, McGraw Hill
3. Soumyen Sikdar, *Principles of Macroeconomics*, Oxford
4. Dominick Salvatore, *International Economics*,

Graduate Attributes:

Course Objective:

The course is designed to provide a sound training in micro and macroeconomic theory and elementary exposure to International Economics. This involves more formal treatment of behavior of individual economic agents and outcome of their decisions on the aggregated levels. Students will also get further insights to the subjects of money, inflation and Credit system

Learning Outcome:

This course aims to develop the broad conceptual frameworks which will enable students to understand the contents upon real economic issues like consumer behavior, producer behavior, money, inflation, employment, International Economics and basic theories.

Prerequisites: -

Theory Credit: 04

Practical Credit: -

No. of Required Classes:

No. of Contact Classes: 60
No. of Non-contact Classes: -

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Fourth Semester

1. **Subject Name:** **Economics**
2. **Course Name:** **Public Finance**
3. **Existing Base Syllabus:** **GU -UGCBCS**
4. **Course Level:** **200-299**
5. **Graduate Attributes:**

Course Description:
This course introduces the nature and scope of Public Finance. It will look into efficiency and equity aspects of taxation and expenditure. It examines the objective of fiscal policy and explores Fiscal Federalism in India.

Learning Outcomes**:**

The course will be useful for students aiming for careers in the government sector, policy analysis, business and journalism.

6. **Pre-requisites:** This course requires successful completion of first and second semester courses in Economics.

7. **Theory Credit:** **04**
8. **Practical Credit:** **00**

9. **Number of Required classes:**
   a) **Number of Contact classes:** **50**
   b) **Number of No-contact classes:** **10**

10. **Reference Books and Materials:**

1. Browning E K & Browning J M, Public Finance and the Price System, Pearson Education. Singapore.

2. Hyman D N, Public Finance: A Contemporary application of Theory to Policy, Thomson South Western.

3. Ulbrich H, Public Finance in Theory and Practice, Thompson South Western.
4.Mukherjee S, Ghose A & Nag N N, Analytical Public Finance. Public Economics-Public Choice-Public Policies, New Central Book Agency (P), Kolkata.

5. Musgrave & Musgrave., Public Finance in Theory and Practice, McGraw Hill, Singapore.

11. Particulars of Course Designer:

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Public Finance
Class: 4th Semester
Paper Code:

Credit: 04
Total marks: 100

Unit 1: Meaning, Scope and Nature (10 classes, 15 marks)

Public Financeand its nature. Objectives of Fiscal Intervention: Allocation, Distribution and Stabilization. Parameters for policy evaluation: *Equity, Efficiency, Paternalism*

Unit 2: Market Failure and Public Intervention(10 classes, 15 marks)

Public Goods and the Free Rider Problem. Externalities: inefficiencies and corrections, property rights, Coase theorem

Unit 3: Taxation (10 classes, 20 marks)

Principles of taxation: Benefit vs Ability. Shifting and Incidence of tax. Economic effects, dead weight loss and distortion. Efficiency and equity considerations.

Unit 4: Public Expenditure (10 classes, 20 marks)

Principles of Expenditure Analysis, Fixed Quantity Subsidy for Marketed goods: overconsumption and underconsumption. Excise Subsidy: Allocative and Distributive Effect. Public Investment and Social Cost-Benefit Analysis

Unit 5: Public Debt and Budgeting (10 classes, 15 marks)

Sources of Public Debt and its redemption. Burden of Public Debt.
Strategies of Debt Management.
Budgeting: Incremental vs Zero-based budgeting. Outcome Budget.

Unit-6 Fiscal Policy and Federal Finance (10 classes, 15 marks)

Objectives and Strategies, Compensatory fiscal policy, pump priming, functional finance.Balanced Budget Multiplier.

Fiscal Federalism: Vertical and Horizontal Equity, Inter-governmental Transfers. Finance Commission of India.

Subject Name: **Economics**

Course Name: **Advanced Macroeconomics**

Existing Base Syllabus: **GU -UGCBCS**

Course Level: **200-299**

Graduate Attributes:

Learning Outcomes:

This course is designed to provide a comprehensive knowledge in macroeconomics. It provides basic ideas on macroeconomic indicators or variables. It discusses various alternative theories of output and employment determination in a closed economy in short-run, medium-run. In addition, it covers long run dynamic issues like growth and technical progress. It also provides different theoretical understanding of issues related to an open economy.

Pre-requisites: This course requires successful completion of Intermediate Economics course offered in the third semester.

Theory Credit: **04**

Practical Credit: **0**

Number of Required classes:

c) **Number of Contact classes:** **50**

d) **Number of Non-contact classes:** **10**

Reference Books and Materials:

- Debraj Ray, Development Economics, Oxford University Press, 2009
- Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010
- Dominick Salvatore, International Economics: Trade and Finance, John Wiley, 10th Edition 2011
- N. Gregory Mankiw. Macroeconomics, Worth Publishers, 7th edition, 2010
- Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005
- Thirlwall, A. P. "Growth and Development" Palgrave, 9th edition, 2011.

Particulars of Course Designer:

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Advanced Macroeconomics
Class: 4th Semester
Paper Code:

Credit: 04
Total Marks: 100

Course Outline:

Unit 1: Consumption Function: (15 Classes, 20 marks)

Average and Marginal Propensity to Consume; Factors influencing Consumption spending; Keynesian consumption function; An Overview of Post Keynesian theories of consumption: absolute income, relative income, permanent income & life cycle hypothesis.

Unit 2: Investment Function: (15 Classes, 20 marks)

Types of investment- Autonomous and Induced, residential investment and inventory investment; determinants of business fixed investment; marginal efficiency of capital, marginal efficiency of investment; Accelerator theory of Investment; Multiplier-Accelerator interaction.

Unit 3: Macro economic modeling: (14 Classes, 30 marks)

IS-LM model and policy analysis, Income determination in an open economy; Mundell-Fleming model; Exchange rate and its determination; Purchasing power parity; Demand-Supply and Balance of Payments theory.

Unit 4: Inflation, Unemployment and Expectations: (08 Classes, 15 marks)

Inflation-unemployment trade off and Phillips curve; Adaptive and Rational expectations; policy ineffectiveness debate.

Unit 5: Economic Growth: (08 Classes, 15 marks)

Harrod- Domar model**;** Solow model**;** Technological progress and elements of endogenous growth.

References:

1. Debraj Ray, Development Economics, Oxford University Press, 2009
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010
3. Dominick Salvatore, International Economics: Trade and Finance, John Wiley, 10th Edition 2011
4. N. Gregory Mankiw. Macroeconomics, Worth Publishers, 7th edition, 2010
5. Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005
6. Thirlwall, A. P. "Growth and Development" Palgrave, 9th edition, 2011.

Four-year Undergraduate Programme
Subject: Economics
Fourth Semester
Course Name: Introductory Quantitative Techniques for Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299

1. Preliminaries of Mathematics (Classes: 8) (Marks: 10)
Constants and Variables, Number system, Sets and set operations, Ordered pairs and Cartesian products, relations and functions, Types of functions: quadratic, polynomial, power, exponential, logarithmic, Limit and Continuity of a Function.

2. Differential Calculus (Classes: 12) (Marks: 20)
Differentiation of a function, Basic rules of differentiation, partial and total differentiation, second and higher order derivatives for single variable, economic applications of differentiation.

3. Integration of Functions (Classes: 12) (Marks: 20)
Meaning and significance of integration, basic rules of integration, significance of a constant after integration, applications: derivations of total functions (total cost, total revenue, consumption and saving functions) from marginal functions, Definite integral and its application-consumer's surplus and producer's surplus.

4. Single Variable Optimization (Classes: 8) (Marks: 20)
Local and global optima: geometric characterization, characterization using calculus: tests for maximization and minimization, applications: profit maximization, cost minimization, revenue maximization.

5. Correlation Analysis(Classes: 10) (Marks: 15)
Correlation, Coefficient of linear correlation, Properties of Correlation coefficient, Rank Correlation, Partial Correlation, Multiple Correlation.

6. Regression Analysis(Classes: 10) (Marks: 15)
Regression: Concept, Difference with Correlation Analysis, Properties, Estimation of regression line in a bivariate distribution-Least squares method, properties of regression coefficients.

Readings:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia: Delhi, 2002
2. Chiang A.C. and K. Wainwright, *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition
3. Baruah S.N., *Basic Mathematics and its Economic Applications*, MacMillan
4. Jay L. Devore, Probability *and Statistics for Engineers,* Cengage Learning, 2010.
5. John E. Freund, *Mathematical Statistics*, Prentice Hall, 1992.
6. Richard J. Larsen and Morris L. Marx, *An Introduction to Mathematical Statistics and its Applications,* Prentice Hall, 2011.
7. S.C Gupta. Fundamentals of Statistics

Graduate Attributes:

The course is designed to provide some ideas related to basic mathematics and elementary statistics. The main objective is to acquaint the students with the basic quantitative techniques like calculus, optimization techniques, correlation, regression etc. which are very much helpful for studying economic theories and analyzing economic phenomena. This course will enable students to have some basic ideas of elementary mathematics like number system, sets, functions, calculus and some basics on statistical measures to be applied for solvingeconomic problems.

Prerequisites: -

Theory Credit:	04
Practical Credit:	-
No. of Required Classes:	
No. of Contact Classes:	60
No. of Non-contact Classes:	-

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Advanced Microeconomics

Class: 4th Semester

Difficulty Level: 200-299

Credit: 4

Total Marks: 100

Course Objective:

The course is designed to provide a sound understanding of the concepts and theories of advanced microeconomics. Since students have been taught perfect competition, this course focuses on the main pillars of Microeconomics such as Imperfect Competition, General Equilibrium, Welfare Economics, and Information Economics. In addition, the principle of factor pricing, input markets, consumer theory, production and cost analysis have been included.

Learning Outcome:

- To provide a better understanding of the market structure.
- To provide an understanding of general equilibrium, welfare economics, market structure, game theory, and economics of information.
- To demonstrate that the theories discussed in class will usually be applied in real-life situations.

Unit 1: Input Markets (20 Marks) (10 Classes)

Labour and land markets - basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product); demand for labour; input demand curves; shifts in input demand curves; competitive labour markets; and labour markets and public policy.

Factors share & Technical progress- Backward bending supply curve of Labor.

Unit - 2: Theory of Production and Cost (15 Marks) (10 Classes)

Forms of Production Function; Cobb-Douglas, CES and Fixed coefficient Type – the Ideas of Partial and Total Factor Productivity– Derivation of Cost Function from Production Function – Multi-product Firm: production Efficiency Locus, Production Possibility Frontier.

Unit 3: Consumer Theory and Information Economics (20 Marks) (10 Classes)

A review of Indifference Curve, Violation of premises of Indifference curve approach, Revealed Preference Theory.

Inter-temporal choice, Choice under risk-Expected Return, variability and Expected utility hypothesis- Asymmetric information- Adverse Selection and Moral Hazard

Unit 4: Market Structure and Game Theory (25 Marks) (10 Classes)

Monopoly, Pricing with Market Power; Degree of Monopoly, Price Discrimination- Different Degrees; Multi-plant Monopoly.

Monopolistic competition: Product Differentiation, Perceived and Proportionate Demand Curves, Price-Output Determination.

Oligopoly and Game Theory (Two Person Zero Sum Game, Basic ideas and examples of non-zero-sum games, Prisoner's Dilemma), Applications of Game Theory in Oligopolistic Markets (Cournot Equilibrium).

Unit 5: General Equilibrium & Welfare Economics (20 Marks) (10 Classes)

Partial versus General Equilibrium Approaches- Walrasian General Equilibrium System.

Pareto optimality, Kaldor-Hicks compensation criteria, Social Welfare Function, Fundamental Theorems of Welfare Economics, Arrow's Impossibility Theorem.

Recommended Readings

1. Dominick Salvatore,Schaum's Outline of Microeconomics, McGraw-Hill Education
2. G.S. Maddala and Ellen Miller, Micro Economic Theory and Application, Tata McGraw Hill.
3. Koutsoyiannis. A, Modern Micro-Economics, ELBS/Macmillan.
4. Pindyck, R. &Rubinfield, D.L., " Microeconomics", Pearson
5. C. Snyder and W. Nicholson, Fundamentals of Microeconomics, Cengage Learning (India).
6. Anindya Sen, Microeconomics-Theory and Application, Oxford University Press

Number of required classes

No of Contact classes: 50
No of non-Contact classes:10

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Fifth Semester

Subject: Economics

Paper: Development Economics

Semester: 5th Semester

Existing base syllabus:

Course Level: 300-399

Course Objective: The course is designed to introduce the students to the basic ideas of Development Economics, namely the concepts and meaning of development. The focus will be on exposing the students to the various theories and strategies of development and relate them to issues of poverty, inequality and the environment.

Graduate Attributes:

At the end of the course, the students will be able to:

 Understand and critically evaluate the process of development.

 Interpret the various development strategies and theories to assess the different development paths followed by different societies of the world.

 Gain awareness on the real meaning of development and comprehend how poverty, inequality and environment are linked to the process of development.

Prerequisites: None

Theory credit: 4

Practical credit: None

Number of required classes

Number of contact classes: 50

Number of non-contact classes: 10

Syllabus

Unit 1: Concepts of Development (Marks - 20, No. of classes – 10)

Measurement of development: Traditional measure of development, HDI as a measureof development, Gender Related Development Index.Structural Change and Economic Development. Sustainable Development Goals, Climate Change Challenges and Global Coordination Initiatives.

Unit 2: Poverty, Inequality and Development (Marks - 15, No. of classes – 10)

Poverty - Conceptual Issues, Its Measurement, Poverty Trap - Definition, Causes and Economic Implications
Inequality - Conceptual Issues, Its Measurement, Connections between Inequality and Development

Unit 3: Theories of Economic Growth and Development (Marks - 25, No. of classes – 15)

The Lewis Growth Model
Kaldor Growth Model
Dependency School of Development
Haris-Todaro Model
Myrdal Cumulative Causation Theory
Issues relating to Informal Sector

Unit 4: Strategies of Development (Marks - 20, No. of classes – 15)

Rostow's Stages of Growth
Big Push Theory
Balanced and unbalanced Growth Theory
Leibenstein Critical Minimum Theory

Unit 5: Economic Development and Environmental Problems (Marks - 20, No. of classes – 10)

Causes of Environmental Problems
Rural Poverty and Environmental Destruction
Industrialisation and Environmental Pollution
Lowering the Peak of the Inverted-U-Shape Curve

References:

Bhattacharyya, R.N. (ed) (2004), Environmental Economics: An Indian Perspective, Oxford

University Press, New Delhi.

Ray, Debraj (2012), Development Economics, Oxford University Press, New Delhi.

Thirwall, A.P. (2006), Growth and Development: With Special Reference to Developing Economies, Palgrave.

Todaro, M., Smith, S (2015), Economic Development, Pearson.

Particular of course designer:

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INDIAN ECONOMY

5th Semester

Credit: 4 Total Marks: 100

Difficulty level: 300-399

Course objective/Description:

This course will give the students an idea of the Indian economy at the time of independence to the contemporary time. The course is expected to provide students a better pictureof the situation and appreciate the challengesand opportunities.

Course outcome:

 Help students to know the status of Indianeconomy in some development indicators since independence

 Built up an analytical thought among students to see the relevance of policies and its effects on different sectors.

Graduate Attributes:

This syllabus will help the students to update their knowledge along with the requisite data which will be of immense help in competitive exams and in getting jobs.

OTHER DETAILS

1. Subject Name- ECONOMICS

2. Course Name- 4-year Degree course (ECONOMICS)

Paper- Indian Economy

3. Existing base syllabus- CBCS present syllabus ECO-HC-5016 and 6016

4. 300-399

5. Theory credit-3

6. No of required classes- a) No of contact classes- 53

b) No of non-contact classes-07

Unit	Content	Classes	Marks
1	Broad Trends and Compositions	10	20
	State of the Indian Economy at the time of independence – Growth in GDP and per capita income and changes in sector-wise		

	composition during 1951-80 - BOP crisis brewing in 1980s – market oriented economic reforms initiated in 1991 – Growth trends, sector-wise composition, poverty and inequality in the post reform period		
2	Agriculture and the rural sector	13	25
	Land reforms – Green Revolution – Agrarian crisis of 1990s - Horticulture and livestock as new areas of growth – Role of PMGSY and MGNREGS in rural transformation - Challenges in the 21st century: GM crops, Climate smart agriculture and doubling of farmers' income – Reforms in agriculture		
3	Manufacturing and Service Sectors	12	20
	Slow growth of manufacturing and its impact on employment generation – Growing role of services in income and employment generation – Definition, composition and prospects of MSME		
4	Key Initiatives and Reforms	08	15
	GST – Direct Benefit Transfer – Jan Dhan Yojana and financial inclusion – Outstanding reforms: Land acquisition, Labour laws, and banking sector reforms – the challenge of formalizing of the economy		
5	India in the Global Economy	10	20
	Size of the Indian Economy in the global context - Trade openness in the post-reforms and post-WTO regime – trends in the trade-GDP ratio - Capital flows (FDI and FII) and their impact – BIMSTEC and India-ASEAN free trade initiatives		

Books Recommended:

1. Arvind Panagariya (2010): *India the Emerging Giant*, OUP
2. Jagdish Bhagyawati and Arvind Panagariya (2015)*Why Growth Matters*, OUP
3. Abhijit Banerjee, Rajan, Raghuram Rajan, Gita Gopinath, Mihir S. Sharma (2019) *What the Economy Needs Now*, Juggernaut Books, New Delhi
4. Statistical Appendix of the Latest Economic Survey, Ministry of Finance, Government of India

Moderator: Prof. Madhurjya P. Bezbaruah, GU

Prof. Ratul Mahanta, Department of Economics, GU

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Four-year Undergraduate Programme
Subject: Economics
Fifth Semester
Course Name: International Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

1. Evolution of International Trade Theories (Classes: 15) (Marks: 25)
The Ricardian theory- comparative advantage, Heckscher-Ohlin model, Factor price equalisation- Absolute and Relative, specific factors model, Empirical testing of H-O model: Leontief Paradox, factor-intensity reversal.

2. Advances in Trade Theories (Classes: 13) (Marks: 20)
International trade in the context of economies of scale and imperfect competition, technological gap model of Posner and product cycle theory of Vernon; multinational enterprises and international trade.

3. Trade Policy (Classes: 12) (Marks: 25)
Instruments of trade policy- tariff and quota- partial equilibrium analysis; political economy of trade policy- free trade vs. protection; controversies in trade policy, fixed versus flexible exchange rates; system of managed floating exchange rate.

4. International Economic Integration (Classes: 10) (Marks: 15)
Importance and forms of economic integration; costs of economic integration; Theories of Customs Union- partial equilibrium analysis.

5. International Monetary System(Classes: 10) (Marks: 15)
International monetary systems-definition, properties of a good international monetary system, Evolution of international monetary system from past to present; financial globalization and historical financial crises.

Readings:
1. Paul Krugman, Maurice Obstfeld, and Marc Melitz, *International Economics: Theory and*
Policy, Addison-Wesley (Pearson India Education Services), 10th edition, 2019.
2. Dominick Salvatore, *International Economics: Trade and Finance*, John Wiley International Student Edition, 10th edition, 2011.
3. Bo Sodersten and Geoffrey Reed: International Economics, Macmillan, 3rd edition, 1994.
4. H G mannur, *International Economics: Theory and Practice*, Vikash Publishing House

Graduate Attributes: This course helps students to comprehend the economic relationships among countries in terms of both trade and monetary issues. It also assists the students in understanding and explaining the composition, direction and consequences of international trade, and the

determinants and effects of trade policy. It covers extensive discussions on advances in trade theories over the years,trade policies as well as international monetary systems. Although the course is based on abstract theoretical models, students will also be exposed to real-world examples and case studies.

Prerequisites: Preliminary knowledge on international Economics as outlined in 3rd semester course on Intermediate Economics.

Theory Credit: 04

Practical Credit: -

No. of Required Classes:

No. of Contact Classes: 60

No. of Non-contact Classes: -

Particulars of Course Designer 1:

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Four-year Undergraduate Programme
Subject: Economics
Fifth Semester
Course Name: Intermediate Quantitative Techniques for Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

1. Linear Algebra (Classes: 10) (Marks: 25)
Matrix: various types of matrices, vector and vector space-concept, matrix operations: addition, subtraction and multiplication; rank, norm and trace of a matrix, introduction to the concept of determinants and their properties, non-singularity of matrix, matrix inversion, solutions of simultaneous equations by using matrix inversion and Cramer's rule, simple market model and national income model.

2. Functions of Real Variables (Classes: 6) (Marks: 10)
Homogeneous and homothetic functions: concepts, Differentiable functions: concepts, Implicit Function Theorem and applications; convex, quasi-convex and concave functions.

3. Multi-variable Optimization (Classes: 12) (Marks: 20)
Unconstrained optimization: geometric characterization, characterization using calculus and applications: price discrimination and multi-plant firm; constrained optimization with equality constraints, Lagrange multiplier, applications: consumer's equilibrium and producer's equilibrium.

4. Elementary Probability Theory(Classes: 12) (Marks: 15)
Sample spaces and events; probability axioms and properties; addition and multiplication theorem of probability, counting techniques; conditional probability and Bayes' rule (concept only); Defining random variables; expected values of random variables.

5. Theoretical distributions (Classes: 10) (Marks: 15)
Functions of random variables (probability mass function and probability density function), Commonly used discrete and continuous distributions (Uniform, Binomial, Poisson and Normal).

6. Introduction to Time Series (Classes: 10) (Marks: 15)
Time Series Analysis-Concept and Components; Measurement of Trend-
Moving average and Least square method, Fitting of linear trend curves.

Readings:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia: Delhi, 2002
2. Chiang A.C. and K. Wainwright, *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition
3. Baruah S.N., *Basic Mathematics and its Economic Applications*, MacMillan
4. Jay L. Devore, Probability *and Statistics for Engineers,* Cengage Learning, 2010.
5. John E. Freund, *Mathematical Statistics*, Prentice Hall, 1992.

6. Richard J. Larsen and Morris L. Marx, *An Introduction to Mathematical Statistics and its Applications,* Prentice Hall, 2011.
7. S. C. Gupta and V.K. Kapoor. Fundamentals of Applied Statistics
8. S. C. Gupta and V.K. Kapoor. Fundamentals of Mathematical Statistics

Graduate Attributes:

This course is designed to give students the knowledge of mathematical tools like matrix algebra, multivariable optimization, etc. along with statistical tools of probability, theoretical distribution and time series to build up strong quantitative skill. On completion of this course, students are expected to be able to apply these quantitative tools for solving economic problems.

Prerequisites: Preliminary knowledge on Mathematical Economics as outlined in 4th semester course on Introductory Quantitative Techniques for Economics.

Theory Credit: 04

Practical Credit: -

No. of Required Classes:

No. of Contact Classes: 60
No. of Non-contact Classes: -

Particulars of Course Designer 1:

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Assam Economy

6th Semester

Credit: 4 Total Marks: 100

Difficulty level: 300-399

Course objective/Description:

This course will provide students an idea of Assam economy since independence to the contemporary time. The course is expected to help students to better appreciate the challenges and opportunities of the economy of Assam in the present context.

Course outcome:

 Help students to know the status of Assam economy in some development indicators since independence

 To enhance knowledge about the linkage between human capital formation and different sectors of an economy.

 Built up an analytical thought among students to see the relevance of policies and its effects on different sectors.

Graduate Attributes:

This syllabus will help the students to update their knowledge base on Assam along with the requisite data which will be of immense help in competitive exams and in getting jobs.

OTHER DETAILS

1. Subject Name- ECONOMICS

2. Course Name- 4 year Degree course (ECONOMICS)

Paper- Assam Economy

3. Existing base syllabus- CBCS present syllabus ECO-HE-6036 The Economy of Assam

4. 300-399

5. Theory credit-3

6. No of required classes- a) No of contact classes- 60

Unit	Content	Classes	Marks
1	**The Economy under Colonial Rule (1837 -1947)**		
	Imposition of Land Revenue and Its Impact, Prohibition of Opium Production and State Takeover of Opium Trade, Inflow of Colonial	10	15

	Investment in Plantation, Mining and Other Industries. Development of Water Transport and Railways, In-migration of Population and its Impact on the Economy: Shock of Partition and its Impact		
2	**Growth and Sectoral Composition in the Post-Independence Period**	15	25
	Population growth trends before and after 1971, Trends in Demographic Parameters: Population Density, Sex Ratio, Life Expectancy, Fertility Rate and Infant Mortality Rate – Work Force and Labour Force Participation, Occupational Distribution. Trends and Sector-wise Composition of GSDP, Trend in Per Capita NSDP in comparison with trends in all-India Per Capita Income Trends in Other Indicators of Development in Comparison with all-India standard: Life expectancy, Literacy, Enrolment and Forest Cover		
3	**Sectoral Status and Prospects**:	20	35
	Infrastructure: Status of Road, Rail and Air Connectivity within and out of the State; Potentials and Limitation of Waterways Development; Status of Power and Telecommunication **Agriculture:** Land Holding Patterns, Land Tenure and Land Reforms, Cropping Pattern, Production and Productivity of Principal Crop –Diversification of the Rural Economy to Horticulture, Fishery, Livestock and Non-farm activities – Prospects and Challenges of the Sector. **Industry:** Tea Industry and Role of Small Tea Growers, The Future of Hydrocarbon Industry. Traditional Handloom Handicraft and their Prospect; **Service Sector**: Size and Composition. Tourism Resources and their Economic Potentials: Policies for sustainable realization		
4	**State Finances**:	9	15
	Trends and composition of State Government receipts before and after GST regime. Composition of Public Expenditure and its implications. Sustainability of Government Borrowing. Fiscal Devolution to Local Bodies (Panchayats, Municipalities and Autonomous Councils)		
5	**Assam Economy in its Neighborhood**	6	10
	Mutual inter-dependence with neighboring States Stakes of Assam in the Act East Policy		

Readings:

Atul Goswami "Assam's Industrial Development: Urgency of New Direction", Economic and Political Weekly 1981

Department of Economics, Gauhati University, “Identity Aspirations, Developmental Backlogs and Governance Issues in Northeast India” Maliyata Offset Press, Mirza, 2016

Directorate of Economics and Statistics, Government of Assam, “Economic Survey Assam” [recent issues] https://des.assam.gov.in/information-services/economic-survey-assam

Directorate of Economics and Statistics, Government of Assam, “Statistical Handbook of Assam” 2018 or later addition

Guha, Amalendu, Planter’s Raj to Swaraj, Second Edition (paperback)

India Brand Equity Foundation “About Assam: Tourism, Industries In Assam, Agriculture, Economy & Geography”, June 2020, https://www.ibef.org/states/assam.aspx

J B Ganguli, "Economic Conditions and Change in North-East India" in A.P. Singha (ed) Changing North East India, Ludhiana: Gagan Publishers, 1986

J N Sarma, “Problems of Economic Development in Assam" Economic and Political Weekly, Vol. 1, No. 7, Pp. 281+283-286.

Planning and Development Department, Government of Assam “Assam Human Development Report 2014”

Moderator: Prof. Madhurjya P. Bezbaruah, GU

Prof. Ratul Mahanta, Department of Economics, GU

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Basics of Econometrics
Class: 6th Semester
Difficulty Level: 300-399
Number of Contact Class: 52
Number of Non-contact Class: 08
Credit: 4
Total Marks: 100

Course objective:

This course aims to provide students with an introduction to the theory and application of econometrics. The course will cover basic concepts such as linear regression, estimation techniques, hypothesis testing, and other topics related to the analysis of economic data. Students will gain an understanding of how econometrics can be used to explain economic relationships, forecast future outcomes, and analyze public policy.

Learning outcome:

The main learning outcomes of the paper include:

1. Understanding the basic concepts and principles of econometrics,

2. Developing an understanding of the components of a linear regression model, including the intercept and slope terms,

3. Applying linear regression analysis to real-world data,

4. Understanding the meaning and interpretation of a linear regression analysis results

5. Employ alternative estimation techniques such as multi-variable regression,

6. Understanding the assumptions underlying linear regression models and the implications of violating these assumptions

7. Using software tools to facilitate the application of econometric methods.

Unit-1: Statistical Background: (Marks: 15) (Class: 10)

Normal distribution, chi-square, t- distribution, and F-distribution; estimation of parameters, properties of estimators, Statistical Inferences, Hypothesis testing, Type I and Type II errors, power of a test; Level of Significance, Confidence Interval.

Unit-2: Simple Linear Regression Model: (Marks: 25) (Class: 12)

Two Variable Case, Estimation of model by method of ordinary least squares, properties of estimators, Gauss-Markov theorem, BLUE, goodness of fit; tests of hypotheses, scaling and units of measurement, confidence intervals, forecasting.

Unit-3: **Multiple Linear Regression Model: (Marks: 15) (Class: 10)**

Estimation of parameters, properties of OLS estimators, goodness of fit, $R^2$and adjusted R^2, partial regression coefficients, testing hypotheses – individual and joint, functional forms of regression models, qualitative (dummy) independent variables.

Unit-4: Violations of Classical Assumptions: **(Marks: 15) (Class: 10)**

Sources, Consequences, Detection and Remedies of Multicollinearity, heteroscedasticity, serial correlation

Unit-5: Specification Analysis: (Marks: 10) (Class: 10)

Omission of a relevant variable, inclusion of irrelevant variable, tests of specification errors

Unit-5: Applications: (Marks: 20) (Class: 8)

Use of MS Excel in applications and solutions for econometric models.

Reference books & materials

1. R P Hooda, Statistics for Business and Economics, Vikas Publishing
2. D. N. Gujarati and D.C. Porter, Essentials of Econometrics, McGraw Hill, 4th edition, International Edition, 2009.
3. Christopher Dougherty, Introduction to Econometrics, Oxford University Press,4th edition, Indian edition, 2011.
4. Wooldridge J.M., Introductory Econometrics: A Modern Approach, Cengage Learning India Pvt. Ltd, 2014

Co-ordinator
Prof. M.P. Bezbaruah
Prof. Ratul Mahanta
Members
Dr. Pranabjyoti Das
Dr. Kingshuk Chakraborty
Dr. Mofidul Hassan

Subject: Economics

Paper: FUNDAMENTALS OF FINANCIAL ANALYSIS

Semester: 6th Semester

Existing base syllabus: None

Course Level: 300-399

Course Objective: The course is designed to introduce the students to the basic ideas of finance and financial analysis.The focus will be on exposing the students to the various financial instruments, markets and strategies along with the tools for analysing the same.

Graduate Attributes:

At the end of the course, the students will be able to:

- Understand and undertake valuation of both debt and equity instruments
- Gain awareness on the structure and functions of financial markets
- Illustrate the trading in the stocks market and analyze the complexities of the derivative market.

Prerequisites: None

Theory credit: 4

Practical credit: 0

Number of required classes

Number of contact classes: 45

Number of non-contact classes: 15

Syllabus

Unit 1 Financial Markets(15 Classes, 25 marks)
Money Market: Structure and functions, Instruments in the money market. Liquidity Management Instruments in the Money Market
The Capital Market: Nature and functions, Primary Capital Market: Instruments of resource mobilization- *Public Issues: IPO & FPO, Right Issues, and Private Placement.* Pricing of new issues.
Secondary Capital Market: Trading & Settlement. Stock Market Index. Mutual Fund and its functional classification.

Unit- 2. Valuation of Financial Assets(12 Classes, 20 marks)
The law of One Price and Arbitrage, The valuation of debt instruments: Pure Discount Bonds. Coupon Bonds, Current Yield and Yield to Maturity, Valuing stock: Value of a Common Stock and the Dividend Discount Model: Zero Growth and Constant Growth.

Unit-3 Financial Analysis(12 Classes, 20 marks)
Financial Ratios: Liquidity Ratios, Leverage Ratios, Turnover Ratios, Profitability Ratios, Valuation Ratios. Dupont Analysis, Relationships, Interpretations and Analysis

Unit -4 Risk and Return (11 Classes, 20 marks)
Risk and Return of an Asset and a Portfolio.
Measurement of Market Risk. Beta of a stock.
The Risk Management Process. Dimensions of Risk Transfer.

Unit 5: The Derivative Market(10 Classes, 15 marks)
Nature of the Derivative Market, Traders and Instruments in a derivative market, Trading Strategies: Hedging, Speculation for ArbitrageStrategies.

References

Alexander G J, Sharpe W F & Bailey J V. ***Fundamentals of Investments*** Pearson Education, Singapore

Bodie Z, Merton R. C. &Cleeton D. L. ***Financial Economics***. Pearson/ Prentice Hall.

Madura J. ***Financial Institutions and Markets***, Thomson South Western.

Pathak B. V. ***Indian Financial System***, Pearson Education, Singapore.

Prasanna Chandra.**Fundamentals of Financial Management**. McGraw Hill Education

Rustagi, R.P. **Fundamentals of Financial Management**. Taxmann Publication Pvt. Ltd.

Particular of course designer:

1) Name: Prof Nissar A Barua

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3) Name: Anshuman Barua

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6th Semester

Environmental Economics,

Full Marks 100, Total Credit = 4

Contact Classes: 55 Non-contact classes:05

Syllabus Components

1. **Subject Name** : Economics
2. **Course Name**: Environmental Economics
3. **Existing base Syllabus**: Existing CBCS Economics (Hons Course) Paper ECO-HE-6016 Environmental Economics and Non CBCS (M503) Introduction to Environmental Economics and (M605) Economics of Natural Resources and Sustainable Development
4. **Course Level**: 300-399 Higher level course which is required for majoring in Economics for the award of a degree
5. **Graduate Attributes:**

Course Objective:

This course focuses on economic causes of environmental problems. In particular, economic principles are applied to environmental questions and their management through various economic institutions, economic incentives and other instruments and policies. Economic implications of environmental policy are also addressed along with selected topics on international environmental problems. Selected topics of international environmental problems are also selected.

Learning Outcome:

- Help to develop a comprehensive knowledge and understanding of the issues related to environment and economy.
- Acquaint someone with the issues related to market failure of environmental goods and the instruments which can prevent the damages of market failure of environmental goods.
- Build up a critically analysis as to how an economy should use the natural resources in an optimum way, such that an economy can take up the path of sustainable development.
- Make aware of global environmental issues.

Unit	Topic	Marks	Class Hrs
Unit-1	**Introduction:** Basic concepts: Environment, Ecology, Economy and the ecosystem. Definition and scope of Environmental economics, why study environmental economics. Interaction between the environment and the economy, environmental economics and ecological economics, Environmental economics and resource economics.	20	10
Unit-2	**Market Failure in allocation of Environmental resources:** Externality and its types; Market Failure: Meaning, Causes of market failure; Environment as a public good, Solutions to market failure: Government Intervention; Common Property Resources and its management.	20	10
Unit-3	**The Design and Implementation of Environmental Policy:** Environmental Policies: Overview; Conventional Instruments: Command and Control (CAC) approach; Economic Instruments of Environmental Policies: Pigovian taxes and effluent fees, tradable permits and Liability rules. Monitoring and Enforcement: Meaning, Penalties, Cost of abatement.	20	15
Unit-4	**Sustainable Development:** Approaches to Sustainable Development: weak sustainability, strong sustainability, Safe minimum standard approach, ecological perspective and social perspective, Rules and indicators of Sustainable Development; Green Accounting (concept only)	20	10
Unit-5	**International Environmental Problems and Initiatives:** Transboundary pollution (Problems of International Externalities), Economics of Climate change and Variability: Causes and Consequence; Inter linkages and trade off between Environment and Development. Environmental Kuznet Curve. Trade and environment: pollution haven hypothesis. Global Intervention for Sustainable Development	20	10

Reference Books:

1. Charles Kolstad, Intermediate Environmental Economics, Oxford University Press,
2. Bhattacharyya R, Environmental Economics, Oxford University Press.
3. Nick Hanley, Jason F. Shogren and Ben White, Introduction to Environmental Economics,Oxford University Press.
4. Robert N. Stavins (ed.), Economics of the Environment: Selected Readings, W.W. Norton, 5th edition, 2005.
5. Roger Perman, Yue Ma, James Mc Gilvray and Michael Common, Natural Resource and Environmental Economics, Pearson Education/Addison Wesley, 3rd edition, 2003.
6. Maureen L. Cropper and Wallace E. Oates, 1992, ―Environmental Economics: ASurvey, ‖ Journal of Economic Literature, Volume 30:675-740.

7. Subhashini Muthukrishnan, Economics of Environment, PHI Learning Private Limited, 2nd edition, 2015.

1. Theory Credit: **4**
2. Practical Credit: 0
3. Number of required Classes: **Contact Classes:55 Non-contact classes:05**

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Four Year Undergraduate Programme (FYUGP) Syllabus

1ST SEMESTER

Subject Name: Education

Course Name: PRINCIPLES OF EDUCATION

Course level: 100 – 199

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After going through this paper the students will be

- Able to know the meaning, types and sound principles of education.
- Students will be able to get acquainted with the concepts like different aims of education , Curriculum , Democracy, discipline , Freedom, etc
- Have knowledge about different aims of education and its application in educational setting.
- Able to understand the democratic ideals and set up of education.

Course contents

Unit No	Contents	No of classes	Marks
Unit-1	**Concept of Education** • Meaning , nature and scope of Education • Functions of Education • Different Forms of Education –Formal , Informal and Non Formal Education and different agencies imparting Formal , Informal and Non Formal Education • School and its manifold functions, Relationship between school and society • Development and present status of Distance and Open Education with special reference to	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)

	India		
Unit -2	**Aims of Education** • Concept and importance of Aim of Education • Determinants of Aims • Different Aims of Education and their pioneers • Individual vs. Social aim , Liberal vs. Vocational Aim • Democratic ,Citizenship, Moral and Complete Living as Aims of Education		
Unit -3	**Curriculum** • Meaning and Nature of Curriculum and importance of Curriculum • Types of curriculum, Principles of Curriculum Construction, Determinants of Curriculum • Philosophical Bases of Curriculum construction specifically Idealism, Naturalism and Pragmatism • Correlation of Curriculum/Studies – meaning , importance and different types • Co-scholastic Activities - meaning , importance and different types		

Unit -4	**Discipline and Freedom** • Meaning and Importance of Discipline and Freedom • Various Forms of Discipline , Discipline Vs. Order • Importance of Reward and Punishment in school • Concept of Freedom and Free discipline • Maintenance of Discipline in school		
Unit -5	**Democracy and Education** • Meaning of Democracy in Education • Democracy and education for all • The Child in a democratic educational Environment • Role of teachers and administrators in Democracy • Methods of teaching in Democracy		

Recommended Reading :

- Agarwal, J. C. (2010). *Theory and Principles of Education,* Delhi, Vikas Publishing House Ltd.
- Baruah, J. (2006). *Sikshatatta Adhyayan*. Guwahati Lawyer's Book Stall
- Bhatia , K. & Bhatia(1994), B. D. *Theory and Principles of Education: Philosophical & Sociological Bases of Education* , 20th ed.,Delhi, Doaba House
- Chaterjee, S. (2012) *Principles and Practices of Modern Education*, Delhi, Books & Alied Ltd.

- Goswami, D.(2012).*Principles of Education*, Guwahati, LBS Publications
- Kalita, U., Saharia, S. B. & Sharma, A. (2019). *Sikshar Niti*, Tushar Publishing House, Guwahati, India.
- Raymont T. (1904) *Principles of Education*, London, Newyork & Bombay: Longman's Green & Co
- Ross, J.S. (1945) *The Ground Work of Educational Theory*. London, Toronto, Bombay, Sydney: George G. Harrap & Co. Ltd
- Safaiya R.N. & Shaida B.D. (2010). *Modern Theory and Practice of Education*, New Delhi: Dhanpatraj Publishing Company Pvt. Ltd.

Course designer : Dr. Sima Kalita , Department of Education, Gauhati University

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Four Year Undergraduate Programme (FYUGP) Syllabus

2ND SEMESTER

Subject Name: Education

Course Name: EDUCATIONAL PSYCHOLOGY

Course Code: 100 – 199

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcomes:

After completion of this course the students will be able to:

- Understand the relationship between education and psychology.
- Explain the need of educational psychology in teaching learning process.
- Describe the nature and theories of learning and role of motivation in learning.
- Understand the concept of memory, forgetting, attention and interest.
- Understand intelligence, its theories and measurement and acquaint themselves with different types of personality and the adjustment mechanism.
- Understand the types of exceptional children and significance of individual differences in a classroom.

Course contents

Units	Contents	No of classes	Marks
Unit-1	**Psychology and Education:** • Meaning and nature of Psychology • Relation between education and psychology • Educational Psychology-Nature and Scope, • Importance of Educational Psychology in teaching – learning process	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Learning and Motivation:** • Learning -Meaning and nature • Theories of learning—Connectionism, Classical conditioning, Operant conditioning and Theory of Insightful learning • Laws of learning--law of readiness, law of exercise ,law of effect • Factors affecting learning • Motivation-meaning, role of motivation in learning		
Unit-3	**Memory, Attention and Interest:** • Memory—Meaning, nature and types • Economy in memorization through different methods • Forgetting—meaning and causes • Attention-concept, characteristics, determinants and types • Interest-Meaning, relation between Attention and Interest • Role of attention and Interest in learning		

Unit-4	**Intelligence, Creativity and personality** • Intelligence-Meaning, nature and theories :Two-factor theory, Group factor theory • Creativity-concept, characteristics • Personality—meaning and nature • Theories of personality-Type and trait theory		
Unit-5	**Exceptional children & Individual Differences** • Concept of Exceptional Children and their types • Identification and Characteristics of Gifted, Intellectually Challenged and Children with Learning Disabilities • Education of Exceptional Children • Individual Differences-Meaning and Nature; Psychological implications of Individual Differences in the Classroom and role of the teachers.		

Recommended Readings:

- Baron,R.A. (2001). *Psychology*. New Delhi: Prentice Hall.
- Bichler,R.F. and Snowman,J. (1993). *Psychology Applied to Teaching.* Boston: Houghton Mifflin
- Chauhan,S.S. (1996). *Advanced Educational Psychology.*New Delhi: Vikash Publishing House Pvt. Ltd.
- Crow & Crow (1962).*Educational Psychology.*New Delhi: Prentice Hall.
- Guilford,J.P. (1965). *General Psychology*. New Delhi: East West Press Pvt. Ltd.
- Kuppuswamy B. (2013).*Advanced Educational Psychology,*New Delhi: Sterling Publishers Private Limited.
- Mangal, S.K.(2009). *Advanced Educational Psychology*. New Delhi: PHI Learning Private Limited.

- Saikia, L.R. (2018). *Psychological and Physiological Experiments in Education*. Guwahati.
- Skinner, Charles,(2012).*E- Educational Psychology.* New Delhi: Prentice Hall.

Course designer : Dr. Purabi Baishya , Deptt. Of Education, Gauhati University

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Four Year Undergraduate Programme (FYUGP) Syllabus

3RD SEMESTER

Subject Name: Education

Course Name: EDUCATIONAL SOCIOLOGY

Course Code: 200 – 299

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this paper the learner will be able to:

- Understand the concept and nature of sociology
- Analyse the relationship of sociology with education.
- Understand the concept and nature of culture
- Analyse the relationship of culture with education.
- Understand the concept of socialization and its processes,
- Explain the role of education on socialization.
- Understand the concept, nature and factors of social change.
- Explain the role of education on social change.
- Understand the concept and nature of social group and its types.
- Analyse the difference between social group and crowd.

Course contents

Units	Contents	No of Classes	Marks
Unit-1	**Sociology and Education**	Contact class: 50	Total: 100 (Internal –

	• Concept, Nature and Methods of Sociology • Educational Sociology: Meaning, Nature, Scope and its importance • Relation between Education and Sociology	Non contact class:10	20 External – 80)
Unit-2	**Culture and Education** • Concept, Nature and Functions of Culture • Types of Culture: Material and Non-Material Culture • Relationship between Culture and Education		
Unit-3	**Socialization** • Concept, Nature and Processes of Socialization • Agents of Socialization: Family and School • Education as a Socialisation Process		
Unit-4	**Social Change** • Concept and Nature of Social Change • Factors of Social Change • Education as an instrument of Social Change		
Unit-5	**Social Group** • Meaning and Nature of Social Group • Difference between Social Group and Crowd • Types of Social Group: Primary and Secondary Group • Importance of Primary and Secondary Groups		

Recommended Readings:

- Bhatia & Narang (2013). *Philosophical and Sociological Bases of Education*. Ludhiana: Tandon Publications.

- Brown, F. J. (1954): *Educational Sociology (2nd Edition).* New York: Prentice Hall.
- Chanda, S.S. & Sharma, R. K. (2002). *Sociology of Education*. New Delhi: Atlantic Publishers.
- Ogburn, W.F. & Nimkoff, W.F. (1966). *A handbook of Sociology*. New Delhi: Eurasia Publishing House (Pvt.) Ltd.
- Rao, C. N. Shankar (2005). *Sociology-Principles of Sociology with an introduction to Social Thought.* New Delhi: S. Chand & Company.
- Ravi, S. S. (2015). *Philosophical and Sociological Bases of Education*. New Delhi: Prentice Hall India Pvt. Ltd.
- Saikia, Polee (2019) 2nd Edition. *Sociological Foundations of Education*. Guwahati: DVS Publishers.

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Four Year Undergraduate Programme (FYUGP) Syllabus

4TH SEMESTER

Subject Name: Education

Course Name: EDUCATIONAL PHILOSOPHY

Course Code: 200 – 299

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this paper the learner will be able to:

- Understand the concept, nature, functions and branches of philosophy.
- Analyse the relationship of philosophy with science.
- Understand the concept, nature, scope and functions of educational philosophy.
- Analyse the relationship of philosophy with education.

- Understand different Indian schools of philosophy.
- Analyse the educational implications of different Indian philosophy.
- Understand different Western schools of philosophy.
- Analyse the educational implications of different Western philosophy.
- Understand the philosophy of great philosophers and their contributions.

Course contents

Units	Contents	No of classes	Marks
Unit -1	**Philosophy** • Concept, Nature and Scope of Philosophy • Functions and branches of Philosophy • Relationship of Philosophy with Science	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit -2	**Educational Philosophy** • Concept, Nature and Scope of Educational Philosophy • Functions of Educational Philosophy • Relationship between Philosophy and Education		
Unit -3	**Indian Schools of Philosophy** • Vedic Philosophy and their Educational Implications • Buddhist Philosophy and their Educational Implications • Islamic Philosophy and their Educational Implications		
Unit -4	**Western Schools of Philosophy** • Idealism and their Educational Implications • Pragmatism and their Educational Implications • Naturalism and their Educational Implications		
Unit -5	**Great Philosophers** • Contribution of Indian		

	Philosophers: Swami Vivekananda and Rabindranath Tagore • Contribution of Western Philosophers: John Dewey and Jean-Jacques Rousseau		

Selected readings

- Shrivastava, K. K. : Philosophical Foundation of Education (Kanishka Publishers, Distributers, New Delhi, 2003)
- Chaube, S.P. and Akhilesh Choube, Philosophical and Sociological Foundation of Education, Vinod Pustak Mandir, Agra-2
- Sahu, Bhagirathi : The New Educational Philosophy, Sarup and Sons : New Delhi, 2002
- Wingo, G. Max: Philosophies of Education, Sterling Publishers Pvt. Ltd. New Delhi, 1975
- Brubacher J.S : Modern Philosophies of Education, McGRAW-HILL BOOK COMPANY, INC, New York, Toronto London, 1950
- Chakrabarti, Mohit, Pioneers in Philosophy of Education, Concept Publishing Company: New Delhi, 2002
- Goswami, Dulumoni, Philosophy of Education, DVS Publishers, Guwahati, 2014
- Bryan Magee, The Story of Philosophy, The Dorling Kindersley Book, London

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Subject Name: Education
Course Name: DEVELOPMENT OF EDUCATION IN INDIA
Course Code: 200 – 299
Credit: 4
Total: 100 (Internal – 20 External – 80)

Learning Outcome:
After completion of this course the learner will be able to:

- Recount the concept of Ancient Indian education system
- Describe the education system in Ancient India, particularly Vedic Education
- Examine the education system in Medieval India.
- Analyse the education system during British Period
- Understand the Educational situation during the time of Independence
- Explain the recommendations and educational importance of different Education Commission and Committees in post Independent India
- Analyse the National Policy on Education in different times
- Accustom with the recent Educational Development in India

Unit No	Contents	No of classes	Marks
Unit-1	**Education in Ancient and Medieval India** • **Education in Ancient India** The Vedic System of Education: Concept and Salient Features • **Education during Buddhist Period** General Features of Buddhist Education Ancient Universities and Centres of Education: Taxila, Nalanda,Vikramshila,Varanasi, **Education in Medieval India** • **The Islamic System of Education** General Features of Muslim Education, Defects of Muslim Education	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Education in British India: The 19th Century** • Educational Activities of Missionaries in Assam • The Charter Act of 1813 • The Anglicists-Orientalists Controversy • Macaulay's Minute, 1835 • Wood's Despatch of 1854 • Indian Education Commission-1882		
Unit-3	**Education in British India : 19th Century, before independence**		

	• Indian University Commission- 1902, Major Recommendations • Lord Curzon's Education policy on Primary, Secondary and Higher Education, The University Act of 1904 • Gokhale's Bill for Compulsory Primary Education- 1910-1912 • Calcutta University Commission-1917, Major Recommendations • Hartog Committee Report-1929, • Basic Education-1937 • The Sargent Report- 1944		
Unit-4	**Development of Indian Education : the post independence period** • University Education Commission – 1948, Recommendations and evaluation of the recommendations • Educational Provisions of the Indian Constitution and their Implementation • Secondary Education Commission-1952-53, recommendations and evaluation • Education Commission 1964-66, Major recommendations, Critical assessment and relevance of the recommendation in the present education system • National Policy on Education-1968 and its evaluation and implementation • National Education Policy 1986 and Revised National Policy of Education-1992		
Unit-5	**Recent Developments and programmes in Indian Education** • The National Knowledge Commission Report**,** Backgroundand Recommendations • Report of the Committee to Advise on Renovation and Rejuvenation of Higher Education, Recommendations • Government Programmes of Education: SSA, RMSA, RUSA • Right to Education (RTE) • National Education Policy 2020,		

	Paradigm shift in School Education and Higher Education including Teacher Education.		

Recommended Readings:

- Aggarwal, J.C. (2004). *Landmarks in the History of the Modern Indian Education.* New Delhi: Vikas Publishing House Pvt. Ltd.
- Chaube, S. P. and Chaube, A. (2005). *Education in Ancient and Medieval India.* New Delhi: Vikas Publishing House Pvt. Ltd.
- Dash, B.N. (2014). *History of Education in India.* New Delhi: Dominant Publishers and Distributors Pvt. Ltd.
- Ghosh, Suresh C. (2007). *History of Education in India.* New Delhi: Rawat Publications.
- Thakur, A.S. and Thakur, A. (2015). *Development of Education System in India: Problems and Prospects.* Agra: Agarwal Publications
- Draft National Education Policy 2019. MHRD, Govt of India
- Bharatar Shiksha Etihasar Adhyan (Assamese) , Jatin Baruah , Lawyers Book Stall, Guwahati
- Rastriya Shiksha niti 2020 (Assamese), Shiksha Mantranaloy, Bharat Sarkar

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Four Year Undergraduate Programme (FYUGP) Syllabus

4TH SEMESTER

Subject Name: Education

Course Name: GUIDANCE AND COUNSELING

Course Code: 200 – 299

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcomes:

After completion of this course the students will be able to:

- Understand the concept, need and importance of Guidance and Counselling
- Know the different types and approaches to Guidance and Counselling
- Acquaint themselves with the organization of guidance service and school guidance clinic
- Enable themselves to understand the challenges faced by the teacher as guidance worker.

Course contents

Units	Contents	No of classes	Marks
Unit-1	**Introduction to Guidance** • Meaning, objectives and scope of guidance • Need and principles of guidance • Types of guidance and their importance : Educational guidance, Vocational guidance, Personal guidance, Social guidance, Health guidance	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Introduction to Counselling** • Meaning, objectives and scope of counselling • Need and principles of counselling • Types of counselling : Directive, Non-directive and Eclectic counselling • Relation between Guidance and Counselling		
Unit-3	**Organization of guidance service** • Meaning of guidance service		

	• Need and principles of organizing guidance service • Components of guidance service: counselling service, techniques of counselling service • Qualities of a good counselor		
Unit-4	**Guidance needs of students** • Guidance needs of students in relation to home-centred and school-centred problems • Group guidance and Group counselling • Guidance for CWSN • School Guidance Clinic		
Unit-5	**School guidance programme** • Importance of guidance and counselling cells in educational institutions • Follow-up Services • Role of the Head of the institution and parents in guidance and counselling • Challenges and functions of the teacher as guidance provider/ counselor		

Recommended Readings:

- Agarwal, Rashmi(2010).*Educational, Vocational guidance and Counselling, Principles, Techniques and programmes*. New Delhi: Shipra Publication.
- Aggarwal J.C. (1989):*Educational and Vocational Guidance and Counselling*. New Delhi: Doaba House.
- Bhatia,K.K.(2009). *Principles of Guidance and Counselling*. New Delhi: Kalyani Publishers
- Kochhar,S.K. (2010).*Educational and vocational guidance in secondary schools*. New Delhi: Starling Publishers Pvt. Ltd.

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Four Year Undergraduate Programme (FYUGP) Syllabus
4TH SEMESTER
Subject Name: Education
Course Name: HUMAN RIGHTS, VALUE AND PEACE EDUCATION
Course Code: 200 – 299
Credit: 4
Total: 100 (Internal – 20 External – 80)

Learning Objectives:

After completion of this course the learners will be able to demonstrate the ability to

- Explain the basic concept, nature and scope of human rights
- Describe the meaning, nature, principles, curriculum and teaching methods of human rights education at different levels of Education.
- Know the role of United Nations on human rights
- Understand enforcement mechanism in India
- Know the role of advocacy groups

Course Contents

Units	Contents	No of classes	Marks
Unit-1	**Basic Concept of Human Rights** • Concept, Nature , objectives, principles and of Scope Human Rights • Needs and Significance of Human Rights Education in India. • Human Rights Education at Different levels: - Elementary level - Secondary level - Higher level. • Methods and Activities of Teaching Human Rights • Curriculum of Human Rights Education	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**United Nations and Human rights** • Universal Declaration of Human Rights (1948) by UN		

	• UN and Promotion and Protection of Human Rights • Human Rights and Indian Constitution • Fundamental Rights similar to the UN Human Rights in Constitution of India		
Unit-3	**Role of Advocacy Groups for Promotion of Human Rights** • Role of Global Agencies: UN, UNESCO, Vienna Declaration • Role of Government and Non-Governmental Organizations; • Role of educational institutions Role of press and mass media		
Unit-4	**Basic concept of values** • Meaning, concept and definition and Characteristics of values • Classifications of values • Functions of Values • Sources of Values • Values in Indian Philosophical Thoughts • Role of Education in inculcation of values • Strategy for value orientation through Social Institutions		
Unit-5	Introduction to peace and peace education • Meaning , Concept, definition and characteristics of Peace • Importance of Peace in Human life • Role of teacher in promoting peace • Meaning, Concept, definition, aims and objectives of peace education • Characteristics of peace education • Philosophy of peace education • Need and importance of education • Peace Education and International Understanding		

Reference Books:

- Aggarwal, J.C.(2008). *Education in the Emerging Indian Society*. New Delhi:Shipra Publication.
- Chand, Jagdish (2007). *Education for Human Rights*.New Delhi:Anashah Publishing House.
- Mohanty, J. (2006). *Human Rights Education*. New Delhi: Deep & Deep Publications.
- Naseema, C. (2008). *Human Rights Education Theory and Practice*. New Delhi: Shipra Publications.
- Rao, Digumarti Bhaskara (2004). *Human Rights Education*. New Delhi: Discovery Publication House.
- Reddy & Others (2015). *Human Rights Education*. Hyderabad: Neelkamal Publications Pvt. Ltd.

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Four Year Undergraduate Programme (FYUGP) Syllabus

5TH SEMESTER

Subject Name: Education

Course Name: EDUCATIONAL TECHNOLOGY

Course Code: 300 – 399

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Objectives:

After completion of this course the learners will be able to demonstrate the ability to:

- Make the students understand the objective of educational technology in teaching learning process
- Acquaint the students with innovations in the field of education through technology
- Make the students understand about various methods and devices of teaching
- Acquaint students with levels, effectives of teaching and classroom management

Make the students understand the strategies of effective teaching as a profession

Units	Contents	No of classes	Marks
Unit:1	**Educational technology:** • Meaning, nature and scope of Educational technology • Approaches of Educational Technology Educational Technology I or Hardware Approach Educational Technology II or Software Approach Educational Technology III or Systems Approach • Psychological Bases for the use of Hardware and Software Technologies-Edger Dale's Cone of Experiences • Instructional Strategies- Programmed Instruction-Meaning, Characteristics, Fundamental Principles of Programming- Concept of Extrinsic and Intrinsic programming(Linear and Branching Programming)	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit:2	**Communication and Teaching-Learning** • Concept , Nature and Types of Communication • Principles of communication • Classroom Communication • Marks of effective classroom communication		

	• Barriers of effective classroom communication • Application of ICT in communication the teaching-learning Process • Resources of learning- Projected and Non-projected resources, • E-learning, EDUSAT, INFLIBNET and Social media		
Unit:3	**Methods and techniques of teaching** • Teaching learning process- Meaning and Nature of teaching and learning • Criteria of good teaching • Teaching Methods- lecture method, play way method, Activity method, Discussion, Project method, problem solving method • Teaching techniques- Maxims of teaching, devices of teaching-Narration, Illustration, Questioning		
Unit:4	**Strategies of Teaching and Learning** Teaching Behavior- Authoritarian, Democratic, Laissez Faire Phases of Teaching-Pre-Active, Interactive and Post-Active Phase • Levels of Teaching-Memory Level, Understanding Level, Reflective Levels of Teaching		
Unit:5	**Lesson Planning and Micro Teaching** • Lesson plan –Its meaning and Importance • Types of Lessons- Knowledge Lesson, Skill Lesson, Appreciation Lesson		

	• Herbartian Steps of Lesson Planning • Criteria of a good lesson plan • Micro teaching- meaning and components		

Reference Books:

- Aggarwal J.C. (2005). *Educational Technology*. New Delhi: Vikash Publishing House Pvt. Ltd.
- Chauhan, S. S. (2008). *Innovations in Teaching-learning Process*. New Delhi: Vikash Publishing House Pvt. Ltd.
- Kochhar, S. K. (1996). *Methods and Techniques of Teaching*. New Delhi: Sterling Publishers Pvt. Ltd.
- Mangal, S.K. and Mangal, Verma (2009). *Essentials of Educational Technology*. New Delhi: PHI Learning Pvt. Ltd.
- Passi, B.K. (1976). *Becoming Better teacher-Micro Teaching Approach*. Ahmedabad: SahityaMudranalaya
- Sharma, R.A. (2000). *Teaching Foundation of Education*. Meerut: R. Lall Book Depot
- Siddiqui, M.H.(2008).*Models of teaching*. New Delhi: APH Publishing Corporation
- Singh, Amarjit (2006): Classroom Management, New Delhi: Kanishka Publishers

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Four Year Undergraduate Programme (FYUGP) Syllabus
5TH SEMESTER
Subject Name: Education
Course Name: EMERGING ISSUES IN EDUCATION
Course Code: 300 – 399

Credit: 4
Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this unit, students will able to-

- Make the students acquaint with major emerging issues national, state, and local
- Acquaint the students with the various issues in education that are emerging in the recent years in the higher education system
- Address the various problems and challenges of education in India at all levels.

Course contents

Units	Contents	No of classes	Marks
Unit-1	**Social Inequality in Education and Constitutional Safeguards** • Concept of Social Inequality • Constitutional Provision for Ensuring Equality in Education • Education of Socially Disadvantaged Section: SCs, STs and Minorities , Education of people of Char area of Assam • Education for Backward Children, Child Labour, Street Children and Slum Dwellers • Gender Disparity and Rural-Urban Disparity in Education	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Liberalization, Privatization and Globalization of Education** • Liberalization: Concept and its impact on education • Privatization: Concept and its impact on education • Globalization: Concept and its impact on education • Public-private Partnership • Education as investment		
Unit-3	**Issues related to Students** • Youth Unrest: Concept, Causes and Remedies		

	• Campus Disturbance: Concept, Causes and Remedies • Examination Anxiety: Concept, Causes and Remedies • Issues related to Educated Unemployment.		
Unit-4	**Environmental Education and Population Education** • Main Environmental Issues: Global Warming, Ozone Depletion and Environmental Pollution • Role of Environmental Education for Sustainable Development • Role of Different Stakeholders (Government and Non-Government Organisations, Women, Media) in Environmental Protection • Population Explosion: Its Causes and Consequences • Population Education for Population Control		
Unit-5	**Multi-Cultural Education and Alternative Education** • Concept, Objectives and Need of Multi-Cultural Education • Curriculum and Instruction of Multi-Cultural Education • Issues related to Multi-Cultural Education • Concept of Alternative Education and its related Issues • Role of NIOS and Sakshar Bharat Mission in Alternative Education • Role of IGNOU and KKHSOU in Alternative Higher Education • MOOC and its related Issues.		

Recommended Readings:

- Aggarwal J. C. (1997). *Development and Planning of Modern Education*. New Delhi: Vikas Publishing House Ltd.
- Chandel and Nand (2011).*Population Education*. Agra: ShriVinodPustakMandir.
- Krishnamacharyulu, V. (2005).*Environmental Education*. Hyderabad: Neelkamal Publications Pvt. Ltd.
- Mishra and Mohanty (2013).*Trends and Issues in Indian Education.* Meerut: R. Lall Book Depot.
- Taj, Haseen (2011).*Current Challenges in Education.* Hyderabad: Neelkamal Publications Pvt. Ltd.
- Tiwari, R.P. *Problems of Education in N.E. India*. Ludhiana: Tandon Publications.

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Four Year Undergraduate Programme (FYUGP) Syllabus

5TH SEMESTER

Subject Name: Education

Course Name: ENVIRONMENTAL EDUCATION

Course Code: 300 – 399

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

On completion of this course, the students will be able to

1. Understand the concept of environment and its relation between human beings
2. Realise the importance of Environmental Education and learn the strategies aware people on environment

3. Discuss on Environmental Issues and Challenges and learn to deal effectively with environmental hazards
4. Evaluate the environmental status at regional and global level and acquire skills to conserve and preserve environment
5. Acquaint themselves with the SDGs and true causes of decline of environmental values among people.

Course Contents

Units	Contents	No of classes	Marks
Unit-1	**Concept of Environment** • Meaning, Definitions and characteristics of Environment • Components and Types of Environment. Ecology and Ecosystem • Man's relation with Environment through ages • Interdependency in environment- Food Chain and Food web	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Concept of Environmental Education** • Environmental Education: Meaning & definition, characteristics and objectives • Need and importance of environmental Education • Environmental Awareness through formal and informal education, Role		

	of educational institutions and NGOs in creating environmental awareness and attitudinal change among students and common people. • Strategies of teaching Environmental Education at different levels with reference to objectives		
Unit-3	**Environmental Degradation and Hazards** • Concept of environmental degradation, environmental hazards and environmental pollution • Environmental Hazards: Natural and man-made • Types of common environmental pollution • Role of Education in mitigation of environmental degradation.		
Unit-4	**Environmental conservation** • Needs and objectives of environmental conservation • Characteristics of conservation • Categories of conservation: In situ conservation and Ex situ conservation • Environmental movements/ projects and conferences for conservation of environment: Chipko Movement, Silent Valley project, Narmada Valley Project, Stockholm		

	Conference 1972, Rio Summit 1992		
Unit -5	**Environmental Ethics and Sustainable Development** • Environmental Ethics and values • Causes of decline of environmental values among people • Environmental education for sustainable development • UN Sustainable Development Goals: Goal 7(Affordable and clean energy), Goal 12 (Responsible consumption and production), Goal 13 (Climate action)		

Recommended Readings:

- Chitrabhanu, T.K: Environmental Education. Authorspress. New Delhi 2007
- Gupta P.K : Population Education. R. Lall Book Depot. Meerut. 2004
- Ramakrishnana and Panneeselvam: Environmental science Education. Sterling Publishers Pvt. Ltd. New Delhi. 2007
- Reddy and Reddy: Environmental Education. Neelkamal Publications pvt. Ltd. Hyderabad/New Delhi.
    - 2007
- Sharma and Maheswari: Education for environment and Human Values, R.Lall Book Depot. Meerut.2005
- Sharma, R.A: Environmental Education. R.Lall Book Depot. Meerut. 2008
- Shrivastava, K.K: Environmental Education (Principles, Concepts and Management).Kanishka Publishers, Distributors. New Delhi. 2014

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Four Year Undergraduate Programme (FYUGP) Syllabus

5TH SEMESTER

Subject Name: Education

Course Name: RESEARCH METHODOLOGY

Course Code: 300 – 399 (Elective-1)

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this course the learner will be able to:

- Enable the students to understand the concept of Educational Research.
- Acquaint the students with the different steps of Educational Research
- Develop an understanding of different types of educational research
- Acquaint the students about the preparation of Research Proposal

Course contents

Units	Contents	No of classless	Marks
Unit-1	**Educational Research:** • Meaning, Definition, Characteristics and Objectives of Educational Research • Types of Educational Research: Fundamental, Applied and Action Research	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)

Unit-2	**Research Proposal :** • Meaning, Steps in formulating Research Problem • Research Questions, Research Objectives, Research Hypothesis and Variables • Research Tools Meaning of Questionnaire, Interview Schedule and Observation Schedule		
Unit-3	**Review of the Related Literature:** • Meaning and nature • Sources and Importance		
Unit-4	**Research Design :** • Meaning of Research design • Meaning of Population and Sample **Analysis and Interpretation of the data**: • Meaning of data and its types , Collection of data, organization of the data, Analysis and Interpretation of the data		
Unit-5	**Report Writing :** • Meaning • Structure of Research Report: Preliminary Section, Main body of the Report , Reference Section		

Recommended Readings:

- Best and Khan ,Research in Education , (10t^{h} Edition) Prentice Hall PVT Limited M-97 Connaught Place, New Delhi, New Delhi
- Langenbach Michle and Courtney Vaughn (7th Edition).; An Introduction to Educational Research, Allyn and Bacon, London
- Shefali R Pandya, Educational research , 2010, APH Publishing Corporation, Ansari Road , Darya Ganj New Delhi 110002

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Four Year Undergraduate Programme (FYUGP) Syllabus
5TH SEMESTER
Subject Name: Education
Course Name: DEVELOPMENTAL PSYCHOLOGY
Course Code: 300 – 399 (Elective 2)
Credit: 4
Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this course the learner will be able to:

- Understand the meaning, nature, scope and different methods of developmental psychology
- Understand the pre-natal period of development.
- Know the characteristics and different developmental aspects of infancy period.
- Explain the parental attitude and family role in the development of infants.
- Know the characteristics and different developmental aspects of childhood period.
- Understand the role of family and school in social and personality development of childhood.
- Understand the meaning, characteristics and developmental tasks of adolescence.
- Explain the need and importance of studying adolescence.
- Understand the social, emotional and personality development of adolescence.
- Analyse the role of family, school and peers on adolescents' development.

Course contents

Units	Topics	No of classes	Marks

Unit-1	**Introduction to Developmental Psychology** • Meaning, definition, nature and scope of developmental psychology • Different methods of studying developmental psychology • Hereditary and other factors that affect pre-natal development • Periods of pre-natal development • Characteristics of pre-natal development • Precautionary measures to be taken in pre-natal development	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Infancy** • Characteristics of infancy • Different developmental aspects during infancy - Physical development - Cognitive development - Motor development - Language development - Emotional development • Conditions that affect parental attitude towards the infant • Role of family in the development of infants		
Unit-3	**Childhood** • Characteristics of childhood • Developmental tasks of childhood - Physical development of early and late childhood - Emotional development of early and late childhood • Influence of family and school in social and personality development in childhood		
Unit-4	**Adolescence** • Meaning and definition of adolescence • Need and importance of studying adolescence • Characteristics of adolescence • Developmental tasks of adolescent period • Adolescence – age of transition		

	• Physical changes during adolescence • Intellectual development during adolescence		
Unit-5	**Social, Emotional and Personality Development of Adolescence** • Social development during adolescence • Role of family, school and peers in the development of adolescents • Emotionality during adolescence • Personality development during adolescence • Adjustment problems and juvenile delinquency		

Recommended Readings:

- Bee, H. and Denise Boyd (2006). *The Developing Child*. New Delhi: Pearson Education Inc. India edition
- Chaube, S. P. (2011). *Developmental Psychology*. New Delhi: Neelkamal Publications Ltd.
- Cole, L. (1936). *Psychology of Adolescence*, New York: Rinchart and Winsten
- Goswamee, G. (2008). *Child Development and Child Care.* Guwahati: Arun Prakashan.
- Hurllock, E. B. (1980). *Developmental Psychology-A Life span approach*. New Delhi: Tata McGraw Hill Publishing Com. Ltd.
- Hurlock, E.B. (1942). *Child Development*. New Delhi: Tata McGraw Hill Publishing Com. Ltd
- Thompson, G.G. (1969). *Child Psychology*. Bombay: The Times of India Press.

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Four Year Undergraduate Programme (FYUGP) Syllabus

5TH SEMESTER

Subject Name: Education

Course Name: TEACHER EDUCATION

Course Code: 300 – 399 (Elective 3)
Credit: 4
Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this course the learner will be able to:

- Explain the Concept, Scope, Aims & Objectives and Significance of teacher education
- Acquaint with the development of Teacher Education in India
- Acquaint with the different organising bodies of teacher education in India and their functions in preparation of teachers for different levels of education
- Acquaint with the innovative trends and recent issues in teacher education, and be able to critically analyse the status of teacher education in India
- Understand and conceive the qualities, responsibilities and professional ethics of teachers

Course Contents

Units	Contents	No of classes	Marks
Unit-1	**Conceptual Framework and Historical Perspectives of Teacher Education in India** • Teacher Education-Concept, scope and aims and objectives • Need and Significance of Teacher Education in 21st Century • Types of Teacher Education-Pre-service and In-service • Development of Teacher Education in India • Shifting focus from Teacher Training to Teacher Education	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Teacher Education For Different Levels of Education** • Preparation of Teachers for Pre-Primary Level of education • Preparation of Teachers for Primary Level of education • Preparation of Teachers for Secondary Level of education		

	• Preparation of Teachers for Higher Level of education		
Unit-3	**Structure and Organisations of Teacher Education in India** • Basic Training Centre (BTC) • District Institute for Education and Training (DIET) • State Council for Educational Research and Training (SCERT) • National Council for Educational Research and Training (NCERT) • National Council for Teacher Education (NCTE) • National University of Educational Training and Administration (NUEPA) • Regional Colleges of Education		
Unit-4	**Status of Teacher Education in India: Trends, Issues and Challenges** • Skill and Competency based Teacher Education, Flanders Interaction Analysis, Micro Teaching and Simulated Social Skill Teaching (SSST) • National Curriculum Framework for Teacher Education (NCFTE), 2009 • NCTE Regulations, 2014 • Present problems of Teacher Education in India and their solution • Quality Assurance in Teacher Education and its challenges		
Unit-5	**Quality, Responsibility and Professional Ethics of Teachers** • Qualities and responsibilities of a teacher • Teacher as a Facilitator, Counsellor and Practitioner-Researcher		

	• Role expectations of Teachers in twenty first century • Professional ethics and accountability of teachers		

Recommended Readings:

- Aggarwal, J.C. (2004). *Teacher and Education in a Developing Society.* New Delhi: Vikas Publishing House Pvt. Ltd.
- Bhargava, M. & Saikia, L.Rasul (2012). *Teacher in 21st Century- Challenges, Responsibilities, Creditability.* Agra: Rakhi Prakashan.
- Flanders, Ned, A. (1970). *Analysing Teacher Behaviour*. London: Wesly Publishing Company.
- Gurrey, P. (). *Education and the Training of Teachers*. London: Longmans, Green and Company.
- Mukherjee, S.N. (1968). *Education of Teachers in India, Vol.-I and II.* New Delhi: S. Chand and Company.
- Rajput, J.S. and Walia, K. (2002). *Teacher Education in India*. New Delhi: Sterling Publishers Pvt. Ltd.
- Sharma, Sashi Prabha (2004). *Teacher Education in India.* New Delhi: Vikash Publications Pvt. Ltd.

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Four Year Undergraduate Programme (FYUGP) Syllabus
5TH SEMESTER
Subject Name: Education
Course Name: EDUCATIONAL MANAGEMENT

Course Code: 300 – 399 (Elective 4)
Credit: 4
Total: 100 (Internal – 20 External – 80)

Learning Objectives:

After completion of this course the learners will be able to demonstrate the ability to

- Develop an understanding of the basic concept of educational management.
- Enable the students to know about the various resources in education and their application
- Enable the students to understand the concept and importance of educational planning.
- Enable the students to know about the financial resources and financial management in education.

Course Contents

Units	Contents	No of classes	Marks
Unit-1	**Introduction to Educational Management** • Meaning, nature and scope of Educational Management • Objectives/Purpose of Educational Management • Principles of Educational Management • Types of Educational Management- Centralised Vs. Decentralised Autocratic Vs. Democratic Creative Vs. Laissez-Faire Management • Functions of Educational Management- Planning, Organizing, Directing, Supervising and controlling • Classroom Management- Principles, Strategies and Techniques.	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit-2	**Resources in Education** • Meaning of		

	resources • Types of resources- Human resource, Material resource and Financial resource • Management of Human, Material and Financial resources • Optimum Utilization of resources in educational institutions		
Unit-3	**Educational Planning** • Meaning, Nature and Importance of educational planning • Types of educational planning • Principles of educational Planning • Central State Relationship in Educational Planning, Central and State Educational Advisory Bodies- MHRD, UGC, NCERT, SCERT		
Unit-4	**Institutional Planning** • Concept, Nature, and Scope of Institutional Planning • Institutional Planning for Infrastructural Development and Personnel Development • Procedure of Institutional Planning • Organisation of Time Table and Co-curricular Activities		
Unit-5	**Financing of Education and Recent Trends in Management** • Concept of Educational Finance • Sources of Educational Finance • Principles of Educational Finance • Budget: Concept		

	and Components, Process of Preparing Institutional Budget • Recent Trends in Educational Management - Total Quality Management - SWOT Analysis		

Reference Books:

- Bhatnagar and Gupta (2006). *Educational Management*. Meerut: R. Lall Book Depot.
- Bhattacharya, Shantanu (2012). *Educational Management-Theory and Practice*. Guwahati: EBH Publishers.
- Krishnamacharyulu, V. (2008). *School Management and System of Education*. Hyderabad: Neelkamal Publications Pvt. Ltd.
- Mathur and Mathur (2010). *School Organisation and Management*. Agra: Agrawal Publication.
- Sharma, R. N. (2010). *Educational Administration, Management and Organisation*. Delhi: Surjeet Publications.
- Sidhu, I. S. (2012). *Educational Administration and Management*. Delhi: Pearson India Publishers
- Taj Haseen and Bhatnagar,Piyush (2012). Modern Perspectives of Organizational Behaviour, Agra: Harprasad Institute of Behavioural Studies.

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Four Year Undergraduate Programme (FYUGP) Syllabus

6TH SEMESTER

Subject Name: Education

Course Name: EDUCATIONAL MEASUREMENT AND LABORATORY PRACTICAL
Course Code: 400 – 499
Credit: 4 (3+1)
Total: 100 (Internal – 20 External – 60+20)

Learning Outcome:
After completion of this course the learner will be able to:

- Understand the concept of measurement and evaluation in education.
- Acquaint the students with the general procedure of test construction and characteristics of a good test.
- Develop an understanding of different types of educational tests and their uses.
- Acquaint the students about personality test, and aptitude tests.

Course contents

Units	Contents	No of classes	Marks
Unit-1	**Measurement and Evaluation in Education** • Meaning and concept of measurement, Functions of measurement, Types of measurement, Scales of measurement • Evaluation -Its meaning, basic principles • Relationship and difference between Measurement and Evaluation • Examination and Evaluation • Formative and Summative evaluation • Role of evaluation in education	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 60+20)
Unit-2	**Test Construction** • General procedure of Test Construction and Standardization • Item Analysis • Characteristics of a good test • Validity, Reliability, Objectivity and Norms		
Unit-	**Educational Achievement Test**		

3	• Meaning and objectives of Achievement Test • Difference between Achievement test and Intelligence Test • Construction of Educational Achievement Test • Different types of Educational Achievement Test		
Unit-4	**Personality Test** • Personality Test- Meaning and Nature • Types of Personality Measurement -Subjective Technique (Personality Inventory or Questionnaire-MMPI) -Objective Technique (Rating Scale) -Projective Technique (Thematic Apperception Test, Ink-Blot-Test) -Situational Technique (Psycho Drama)		

Unit-5	**Laboratory Practical** • Recall and Recognition, Trial and Error learning, • Span of attention • Ink Blot Test • Free Association Test, Control Association Test • Personality Test for Introversion-Extroversion

Recommended Readings:

- Asthana, Bipin (2009). *Measurement and Evaluation in Psychology and Education*. Agra: Vinod Pustak Mandir
- Freeman, F.S. (1965). *Theory and Practice of Psychological Testing*. New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd.
- Goswami, Marami (2012). *Measurement and Evaluation in Psychology and Education.*Hyderabad: Neel Kamal Publications Pvt. Ltd.

- Saikia, L.R. (2018). *Psychological and Physiological Experiments in Education*. Guwahati.

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Four Year Undergraduate Programme (FYUGP) Syllabus

6TH SEMESTER

Subject Name: Education

Course Name: EDUCATIONAL STATISTICS AND PRACTICAL

Course Code: 400 – 499

Credit: 4 (3+1)

Total: 100 (Internal – 20 External – 60+20)

Learning Outcome:

After completion of this course the learner will be able to:

- Develop the basic concept of Statistics,
- Be acquainted with different statistical procedures used in Education.
- Develop the ability to represent educational data through graphs.
- Familiarize the students about the Normal Probability Curve and its applications in Education

Course contents

Units	Contents	No of classes	Marks
Unit-1	**Basics of Educational Statistics** • Statistics- Meaning, Nature and Functions • Need of statistics in Education • Measures of central tendency and their uses • Mean. Median and Mode from ungrouped and grouped data • Measures of variability –Concept, Types and their uses, merits and demerits • Quartile Deviation, Average Deviation, Standard deviation- (grouped and ungrouped data-short method), Combined SD	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 60+20)
Unit-2	**Graphical presentations of data** • Usefulness of Graphical presentations of data, • Basic principle of constructing a graph, • Different types of graph –histogram, frequency polygon, • Cumulative frequency percentage curve (Ogive), Smoothed graph.		
Unit-3	**Co-efficient of Correlation and Percentiles** • Coefficient of correlation – Meaning and types, • Computation of, co-efficient of correlation by Rank difference method & Product-moment method and interpretation of result • Calculation of Percentile and Percentile Rank		
Unit-4	**Normal Probability Curve and Its Application** • Normal Probability Curve: Its Meaning, Properties and Uses • Table of Area under NPC • Applications of Normal Probability Curve • Divergence from Normality: Skewness and Kurtosis		
Unit-5	**Statistical Practical** • To determine the Mean Median and Mode • Graphical Representation – Frequency Polygon, Histogram and Pie diagram		

Recommended Readings:

- Garrett, H.E. (2014). *Statistics in Psychology and Education*. Mumbai: Vakils, Feffer and Simons Pvt. Ltd.
- Goswami, Marami (2012). *Measurement and Evaluation in Psychology and Education*. Hyderabad: Neel Kamal Publications Pvt. Ltd.
- Mangal, S.K. (2005). *Statistics in Psychology and Education*. New Delhi: Prentice Hall of India.
- Saha,Kaberi (2012). *Statistics in Education and Psychology*. New Delhi: Asian Books Pvt. Ltd.
- Sahu, Binod, K. (1998). *Statistics in Psychology and Education*. New Delhi: Kalyani Publishers.

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Four Year Undergraduate Programme (FYUGP) Syllabus

6TH SEMESTER

Subject Name: Education

Course Name: MENTAL HEALTH AND HYGIENE

Course Code: 400 – 499

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After completion of this course the learner will be able to:

- Acquaint with the fundamentals and development of mental health and the characteristics of a mentally healthy person.
- Understand the concept and importance of mental hygiene and its relationship with mental health.
- Acquire knowledge about the principles, factors promoting mental health and the role of home, school, and society in maintaining proper mental health.

- Learn the meaning and problem of adjustment and also the different adjustment mechanisms.
- Familiarise with the concept and issues of positive psychology, mental health of women, role of WHO and stress management.
- Will be able to apply the knowledge gained from this course ,for Upliftment of one's mental health

Unit No	Contents	No of classes	Marks
Unit -1	**Fundamentals of Mental Health** • Mental Health – Concept and Definitions • Need and importance of Mental Health • Scope of Mental Health , Dimensions of Mental Health • History of the development of Mental Health Movement • Characteristics of a mentally healthy person	Contact class: 50 Non contact class: 10	Total: 100 (Internal – 20 External – 80)
Unit -2	**Fundamentals of Mental Health** • Mental Hygiene –it's meaning and Definitions • Need and importance of Mental hygiene • Goals of Mental Hygiene • Functions of Mental Hygiene • Relationship between Mental health and hygiene		
Unit -3	**Mental Health and Education** • Principles of sound Mental Health • Factors affecting Mental Health • Mental Health Hazards • Maintaining Mental Health of Students-Role of Home , School and Society • Mental Health of Teachers-causes of Mal adjustment and remedial measure		
Unit -4	**Preservation of Mental Health and Hygiene-Role of positive Psychology** • Positive Psychology – Meaning and Nature and importance • Five pillars of positive		

	psychology-PERMA • Contribution of WHO on Mental Health • Stress management-Role of Adjustment mechanisms • Mental Health Care Act, 2017		
Unit -5	**Restoring Mental Health by Yoga** • Concept of Yoga • Importance of Yoga for Physical and Mental Health • Role of Yoga for Personality Development • Role of Yoga for management of Stress • Principles of Yoga for Healthy Living • Pranayama and Meditation for Promoting Mental Health		

Recommended Readings:

- Baumgardner, S. And Crother, M. (2009).*Positive Psychology.* New Delhi: Pearson India Education Services Pvt. Ltd.
- Coleman J. C. (2016): *Abnormal Psychology and Modern life*. Chicago: Scott, Foresman and Company.
- Chauhan, S.S. (2007). *Advanced Educational Psychology.* New Delhi: Vikas Publishing House Pvt. Ltd.
- Crow, L.D. and Crow, A. (1951). *Mental Hygiene.* New York: McGraw Hill
- Gururani, G.D. (2006).*Textbook on Mental Health and Hygiene*. New Delhi: Akansha Publishing House.
- Mangal, S.K. (1999). *Essentials of Educational Psychology.* New Delhi: PHI Learning Pvt. Ltd.
- Mangal, S.K. (2008).*Abnormal Psychology*. New Delhi: Sterling Publication
- Safaya, R.N., Shukla, C.S. and Bhatia, B.D. (2002).*Modern Educational Psychology*. Delhi: Dhanpat Rai Publishing Company.

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Four Year Undergraduate Programme (FYUGP) Syllabus

6TH SEMESTER

Subject Name: Education

GENDER STUDIES

Course Code: 400 – 499

Credit: 4

Total: 100 (Internal – 20 External – 80)

Learning Outcome:

After going through this paper the students will be

- able to know the meaning of gender , difference between sex and gender ,types like Family, Marriage, Kinship, Religious institution, Gender Stereotype
- able to understand the meaning of the subject gender studies, its importance and features, different roles on the basis of gender
- able to get acquainted with the process of Socialization and Gender biases in the School ,Family and Society
- have knowledge about different provisions for gender equality

- able to apply gender sensitive approach

Unit No	Contents	No of classes	Marks
Unit -1	**Basic Concepts of Gender and related Terms** • Concept of Gender , Sex • Feminity and Masculinity ,Patriarchy, Matriarchy • Difference between sex and gender • Gender and social institutions – Family, Marriage, Kinship, Religious institution • Gender Stereotype	Contact class: 50 Non contact class: 10	Total: 100 (Interna l – 20 Externa l – 80)
Unit- 2	**Gender Studies** • Meaning of gender studies • Importance of gender studies • Features of gender studies • Women studies vs. gender studies • From Women studies to Gender studies :a paradigm shift		
Unit - 3	**Gender Roles: Biological and Cultural** • Biological role – Male-Female • Cultural role- Masculine and Feminine • Productive role • Reproductive Role • Community role • Religion and its role in creation and preservation of gender inequality		
Unit - 4	**Socialization and Gender biases –in the School, Family and Society** • School-Gender biases in Organization, Gender biases in Textbooks, Curricular Choices , Teachers' Bias • Training of teacher for Gender equality • Society-Gender biases in Education , Employment, work and pay Preferences, political		

	representation ,Voting Behaviour, stereotype in media • Female foeticide, Infanticide, dowry , child abuse, Rape, Devdashi system • Family-Gender biases in Educational opportunity, decision making, marriage, distribution of resources • Domestic violence of different forms, , wife battering , forced polyandry, widowhood		
Unit-5	**Gender Equality and Mainstreaming** • Concept of Gender equality , difference between gender equality and women empowerment • Importance of gender equality, role of parents, teachers and curriculum, gender-inclusive language to achieve gender equality • Role of Family and community , Role of mass Media , Role of civil Society • Gender mainstreaming and ways to achieve it in the educational setting, , Adult Education and Mass Literacy programe targeting women • UN's Gender Equality Concern, Sustainable Development Goals – goal 5 : achieve Gender equality and empower all women and girls • Gender Equality and Human Right , National Education Policy(NEP) 2020 on gender equality		

Recommended Readings:

- Bagchi, Jasodhara, Guha, Jaba and Sengupta, Piyali (eds). (1997). *Loved and Unloved: the Girl Child in West Bengal*. Kolkata: Stree Publishers
- Batliwala, S.(1993). *Empowerment of Women in South Asia: Concepts and Practices.*
- Bhasin, K.(2000). *Understanding Gender.* New Delhi: Kali for Women.
- Bhasin, K.(2004). *Exploring Masculinity*. New Delhi: Women Unlimited.
- Bhatia , R. L. & Ahuja , B. N. (2006) *Modern Indian Education and it's Problems* , Surjeet Publication , Delhi, India

- Chanana, K(ed.). (1988). *Socialisation, Education and Women: Explorations in Gender Identity*. New Delhi: Orient Longman.
- Devaki , J.(2005) *"Women development and the UN: A Sixty year quest for equality and justice"*. Bloomeston, Indiana University
- Govinda, R. (ed.). (2002). I*ndia Education Report: A Profile of Basic Education*. New Delhi: Oxford University Press. 10. Gould, S. J. (1981). *The Mismeasure of Man*. London: Penguin Books.
- Gupta A. S. et. al (Eds.) (2005) *"Reflections of the right to development, centre for development and human rights".* New Delhi, Sage Publication
- Lier,F.(2006) "School Culture and Gender "In c Skeleton , B.Skelton , B. francis &L. Smulyan (Eds). *The SAGE Handbook of Gender and Education (Pp 425-38*). Thousands Oaks , CA:Sage.
- Kalita, U., Sharma, A. & Barman, S. (2022) *Mahila Aaru Samaj*, Shanti Prakashan, Guwahati, India
- Kathleen, W. (1988). *Women Teaching for Change: Gender, Class, and Power*. New York: Bergin Garvey.
- Momsen J. H. (2010) "*Gender and Development, 2nd edition"*, New York, Routledge
- Ramachandran, V. (2004). Gender *and Social Equity in Education: Hierarchies of Access*. New Delhi: Sage.
- Sadker D. Sadker ,M.&zittleman K.R.(2009).*Still failing of Fairness : How Gender Bias Cheats Girls and Boys in school and what we Can Do About it*. New York , NY: Scribner.
- Rege,S(Ed.). (2003) *"Sociology of Gender: The Challenge of Feminist Sociological Knowledge".* Sage, New Delhi.
- Vishwanthan N. Ed (2006) *"The women gender and development reader".* New Delhi, Zubaa
- Wharton. A.S (2005) *"The Sociology of Gender: An Introduction to Theory and Research".* (Key Themes in Sociology) Blackwell Publishing, UK, Indian Reprint, Kilaso Books, New Delhi.

Journal: Gender and Development in India, 1970s-1990s: Some reflections on the constitutive role of context, Mary E. John, *Economic and Political Weekly*, Nov 1996

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VALUE ADDED COURSE

Four Year Undergraduate Programme (FYUGP) Syllabus

1st SEMESTER Value Added course
Subject Name: Yoga for Well being

Credit: 2 (1 Theory + 1 Practical)

Learning Outcomes:
Students will be able to demonstrate the ability to

1. Perform yogasanas and Pranayams
2. Deal with stress in life
3. Apply Yogic knowledge for maintaining a balanced physical and mental self.
4. Express thoughts and ideas effectively and communicate through appropriate media

a. Theory (1 Credit)

Unit 1: Introduction to Yoga

- Concept of Yoga, origin of Yoga
- History and Development of Yoga
- Classification of Yoga
- Aim of Yoga in Health and Wellness.
- Contribution of Maharishi Patanjali in the field of Yoga
- Scope of Yoga - Role of Yoga in stress management, Yoga as a tool for Academic Excellence

Unit 2: Introduction to Yogic Exercises- Ashan, Mudra and Pranayam

-- Yogasanas or Kumbhira-

(i) Asanas for Dhyan-Bajrasan**,** Sastikasan, Bhadrasan, Padmasan, Siddsan,

(ii) Asanas for Swasthya-Tarasan, Tirjak Tarasan, Katichakrasan, Trikonasan, Brikshasan, Padahastan, Ustrasan, Setubandhan, Marjasan, Pabanmuktasan, Bhujangasan, Salabhasan,Dhanursan, Mamarasan, Surjya Namaskar, Savasana.

- **Mudras**- Biparitkarani Mudra, Saktisalini Mudra, Ashwini Mudra, Yoga Mudra, Udranbandha Mudra

- **Pranayam**- (i) Laghu Pranayam or Hatha Yoga Pranayam, (ii) Pachchatya Pranayam(ii) Sahaj Pranayam

b. Practical (1 Credit):

Guidelines:

1) Students will perform few warm-up exercises before the practical class.

1) Students will be guided by the teacher to perform minimum 5 basic Yogasanasfrom the above-mentioned Asanas (in Unit 2)

2) Students will Learn 3 Mudras from the above-mentioned list (in Unit 2)

3) Students will Learn Pranayams from any one group mentioned (in Unit 2)

3) Teacher will teach the students to do meditation methodically.

Evaluation Plan:

- For theory part, written examination will be conducted for 20 marks.
- The Practical Examination will be conducted by an External Examiner for 30 marks.

No. of Contact Classes-

- 1 Class per week

No. of Non-Contact Classes-

- 1 class per week

Medium of Instruction-

Medium of instruction will be Assamese

Reference Books

1. Srimad Swami Sivananda Saraswati(2017) *Yoga Bole Rog Aragya,* Umachal Granthawali-24, Guwahati
2. Bibekananda Kendra(1991) Yoga Ashan- Pranayam- Mudra, Guwahati

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Paper 1
English CORE
English Literary and Social History
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits
(15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Graduate Attributes: Course Objective

This paper is designed to introduce students to English literary and social history in terms of ideas and/or events that bear on the production of texts earmarked for study of the basics of English literature. Students will here be expected to familiarise themselves with the literary and social aspirations of English as revealed in its literature through the different periods and ages. Topics are broad and general enough to be readily manageable in the first semester and have been selected with a view to sensitising students to the vast panorama of socio-cultural changes across different ages.

Learning Outcome

This paper on English Literary and Social History aims to enable students to acquaint themselves with literary and cultural institutions understand the contexts of literature engage with social and political realities that have impacted English literature learn the different trajectories of social and cultural movement analyse the inter-connections between texts, contexts and influences situate modes of reading through an examination of social and cultural embeddedness in the context of English literature.

Key Features

- A chronological focus on English literary and cultural history.
- An engagement with the essential timeline for contextualizing literature.
- A focus on location, culture, text and context in the shaping of literary traditions.
- A close processing of cultural and social imperatives in the development of the worlds of literary markers
- An engagement that enables the placement of literary studies within a broad but grounded spectrum of reading processes that open new pathways of critical reception

Unit 1: Medieval to the Renaissance (1 Credit)

- Feudalism and the Medieval World
- Chaucer, Langland, Gower
- Medieval and Renaissance English Theatre
- Elizabethan and Metaphysical Poetry
- The Print Revolution

Unit 2: The Enlightenment to the Nineteenth Century (1 Credit)

- The Scientific Revolution and the Enlightenment
- Restoration Drama
- Defoe and the Rise of the Novel
- The Industrial Revolution
- Romantic and Victorian Poetry
- Fiction in the Nineteenth Century

Unit 3: Modern to the Present (1 Credit)

- The Contexts of the Modernism: Fiction, Poetry, Drama
- Literature in the Postcolonial World
- The 'Woman' Question and Gender Studies
- Popular Culture and Literature
- Migration, Consumerism and Globalisation
- Postmodern and Contemporary Literature

Unit 4: Terms & Themes (1 Credit)

The Norman Conquest | Dream Allegory | Courtly Love | The University Wits | The Reformation and English Literature | Interludes | Moralities & Miracle Plays | Puritanism | Darwinism | Suffragette Movement | Bestsellers | Social Media and Literature

Recommended Reading:

Andrew Sanders. *The Short Oxford History of English Literature*, Fourth edition, Oxford: OUP, 2004
J. M. Roberts. *The Penguin History of the World*, London: Penguin, 2004
Robert Tombs. *The English and their History*, London: Penguin, 2015
Ronald Carter and John McRae. *The Routledge History of Literature in English: Britain and Ireland*, 3rd edn, London: Routledge, 2021
Simon Jenkins. *A Short History of England*, London: Profile Books, 2018

Paper 2
English CORE
Forms, Genres and Concepts of English Literature
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits
(15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Graduate Attributes: Course Objective

This paper is designed to introduce students to the major forms, genres and concepts of English literature. Students will here be expected to familiarise themselves with the themes, ideas and different generic dimensions of literary writing and practice. The topics are broad and general enough to be readily manageable in the second semester and have been selected with a view to enable students to connect and associate these concepts and forms with reference to texts and their specific contexts.

Learning Outcome

This paper on the major forms, genres and concepts of English literature aims to enable students to acquaint themselves with the fundamental categories of literary practice, both in terms of their emergence in history and by reference to the way they have evolved in practice. Students will also be able to situate and envision the interconnections between these terms, apart from engaging with the variations and departures through the study of these concepts and forms.

Key Features

- A genre-based focus on English literary practice.
- An engagement with the essential forms for contextualising literature.
- A focus on forms of textual writing and their impact in the shaping of literary traditions.
- A close processing of generic and formative imperatives in the development of the primary markers in English literature
- An engagement that enables the placement of English literary studies within a broad but grounded spectrum of reading processes that open new pathways of critical reception

Unit 1: Forms and Genres in Poetry (1 Credit)

- The Epic in English and the Western World
- Sonnet Writing and Sonnet Traditions
- Elegies and Traditions of Lament Verse in English
- Lyric Writing Poetic Practice
- Satirical Poetry

Unit 2: Forms and Genres in Fiction (1 Credit)

- The Novel as Narrative
- The Short Story in English
- The Picaresque Novel
- Realism, Naturalism and the Novel
- The Novella in English Literature
- Postmodern Fiction

Unit 3: Forms and Genres in Drama (1 Credit)

- Tragedy in English Literature
- Comedy: Types and Forms in Comic Theatrical Practice
- Farce in English literary history
- Music in the Theatre
- Tragicomedy
- Melodrama

Unit 4: Basic Terms & Themes (1 Credit)

Absurd Drama | Novel of Manners | Comedy of Manners | The Stream of Consciousness Novel | Poetic Drama | Science Fiction | Crime Fiction | Dramatic Monologue | The Bible and English Prose | The Historical Novel | Autobiography | Biography | The Self-Reflexive Novel | Metafiction | Drama of Ideas | Point of View (PoV) | The Essay | The Periodical Essay | The Personal Essay | Letters by Writers

Recommended Reading:

Chris Baldick. *The Oxford Dictionary of Literary Terms*, Oxford: OUP, 2015

M.H. Abrams and Geoffrey Galt Harpham. *A Glossary of Literary Terms*, Eleventh edition, Wadsworth, 2015

Ross Murfin and Supriya Ray. *The Bedford Glossary of Critical & Literary Terms*, Fourth edition, Bedford, 2019

J.A. Cuddon and M.A.R. Habib. *The Penguin Dictionary of Literary Terms and Literary Theory*, Fifth Edition, London: Penguin, 2015

Paper 3
English CORE
Rhetoric, Prosody, Grammar and Comprehension
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits
(15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Graduate Attributes: Course Objective

This course on Rhetoric, Prosody and Comprehension is designed to enable the graduates to acquire, by the end of this course, a comprehensive knowledge of literary devices and their effective use in both academic and non-academic sectors. Graduates will also be able to develop critical thinking and analytical reasoning which will enable them to think out of the box in their professional lives as well. By the end of the course the graduates should also be able to make a practical application of the information and communication technology that will be used in the classes to illustrate the concepts in rhetoric and prosody. Graduates will further acquire listening, understanding and analytical skills as part of the comprehension component of the course.

Learning Outcome:

- A detailed knowledge of the most widely used concepts of rhetoric and prosody in literature in English
- The ability to identify and use these concepts in both academic and non-academic fields as well as in one's own use of English
- The practical application of these concepts in close reading of literature
- The ability to analyze and interpret texts in terms of their literary and representational qualities

Key Features:

- to equip students with the basics of understanding and appreciating texts through literary devices
- to develop an expertise in the practical application of rhetorical devices in English
- to hone their practical skills in applying the knowledge of literature in their personal, social and professional interactions

Unit I: Rhetoric (2 Credits)

In this section the aim is to introduce students the use of rhetorical devices through a discussion of poems and prose passages. The teachers should ensure that apart from giving the definitions of these devices, it is equally important to show how they are used by the poets and writers and the overall purpose such uses evoke in the literary piece. This section will, by its very nature rely heavily on the use of ICT in order to make these concepts clearer to the students.

- **Figures of Speech:**

Simile | Metaphor | Personification | Alliteration | Assonance | Interrogation | Irony | Onomatopoeia | Hypallage | Pun | Oxymoron | Hyperbole | Anti-climax | Asyndeton and Polysyndeton | Metonymy | Synecdoche | Paradox | Euphemism | Tautology | Ellipsis| Catachresis

- **Sentence and Paragraph Structure*:**

Syntactic structure | unity of a paragraph | logical arrangement of ideas in composition | precision in writing | simplicity and clarity of ideas | economy of expression | avoiding a diffused style (tautology,

pleonasm or redundancy and verbosity) | enhancing the visual element in writing | choice and arrangement of words.

**These elements will be taught and assessed through practical demonstrations and exercises*

Unit 2: Prosody (1 Credit)

Understanding meter in a poem is essential for a studied appreciation of poetry. Writing poetry involves following certain rhyme scheme and meter which is studied under prosody. In this section the students will be introduced to some key concepts in prosody which will be discussed and illustrated through selections from a wide range of poems. This section, as the previous one, will, by its very nature, rely heavily on the use of ICT in order to make these concepts clearer to the students.

> Poetry and verse | syllable | accent | rhythm and meter | measure or foot (Iambic, Trochaic, Spondee; Pyrrhic; Anapaestic, Dactylic; Amphibrachic) | verses (dimeter, trimeter, tetrameter, pentameter) | variations in rhythm and metre | scansion | pauses | rhyme | stanzas (couplet, heroic couplet, tercet, quatrain, quintain, sestina, rhyme royal, ottava rima, the Spenserian stanza) | the sonnet | blank verse | free verse

Unit 3: Grammar and Comprehension (1 Credit)

The comprehension of passages requires certain abilities which when practised can be improved. Learners at this stage will be trained how to think and write logically by looking at some examples that demonstrate excellent comprehension. Here, the aim is to hone the comprehension skills of learners addressing the following points:

- Analysing | Summarizing | Sequencing | Inferencing | Comparing and contrasting | Drawing conclusions | Self-questioning | Problem-solving | Relating background knowledge | Distinguishing between fact and opinion | Finding the main idea, important facts, and supporting details
- Analysis of an unseen passage to demonstrate comprehension skills
- Grammatical exercises

Recommended Reading:

Beum, Robert & Karl Shapiro. *The Prosody Handbook*. Dover, 2006

Bose, M.N. & T.S. Sterling. *Elements of English Rhetoric and Prosody*. Chuckervertty, Chatterjee & Co. Ltd., 2021 (rpt.)

Cushman, Stephen *et al*. *The Princeton Encyclopedia of Poetry and Poetic, Fourth Edition*. Princeton University Press, 2012

Lanham, Richard A. *A Handlist of Rhetorical Terms (Second Edition)*. University of California Press, 1991

Sarkar, Jaydip & Anindya Bhattacharya. *A Handbook of Rhetoric and Prosody*, Orient Blackswan, 2017

Paper 4
English CORE
British Poetry: Renaissance to Romanticism
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits
(15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Graduate Attributes: Course Objective

This course will introduce the students to some of the best examples of British poetry written between the sixteenth and the early nineteenth century. It will give the students a fair idea of what constitutes the canon within this time frame and make the students cognizant of the dominant genres of the different epochs. The paper will situate the various thematic concerns within their historical contexts.

Course Outcome:

Having completed this paper, the student will be able to locate the poetic text within the contextual framework, it will facilitate the understanding of the genre, themes, structures and the philosophical underpinnings of poetry. Students will be able to distinguish between the subtle differences of the poetic voice in different epochs.

Unit 1 (2 Credits)

Philip Sidney: "My True Love hath my Heart…"
William Shakespeare: Sonnet 116.
John Donne: "The Good Morrow"
George Herbert: "Easter Wings"
Aemilia Lanyer: "To the Doubtfull Reader"
John Milton: "On His Blindness"
Ben Jonson: Song: "To Celia"

Unit 2 (2 Credits)

Alexander Pope: "Epistle to Dr Arbuthnot"
Charlotte Smith: "To the Shade of Burns"
William Blake: " The Tyger"
William Wordsworth: "Composed upon Westminster Bridge"
Anne Latetia Barbauld: "A Little Invisible Thing"
Percy Bysshe Shelley: "Ozymandias of Egypt"
John Keats: "To a Grecian Urn"

Recommended Reading:

C.S. Lewis. *The Allegory of Love*, Cambridge: CUP, 1936
Harold Bloom and Lionel Trilling. *Romantic Poetry and Prose*, Oxford: OUP, 1973
M.H. Abrams. *The Mirror and the Lamp*, Oxford: OUP, 1972
Michael Ferber. *Romanticism: A Very Short Introduction*, Oxford: OUP, 2010
Robert C. Evans. *Perspectives on Renaissance Poetry*, New York: Bloomsbury, 2015

Paper 5
English CORE
British Drama: Renaissance to the Eighteenth Century
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Graduate Attributes: Course Objective

This course will encourage the student to understand drama as a distinctive literary genre with unique characteristics. It will introduce the students to some representative examples of British Drama written between the Renaissance and the eighteenth century. The paper will familiarize students with the evolution and growth of drama as the dominant genre during the Renaissance and its displacement in the later epoch. Students will be able to situate the various thematic concerns within their historical contexts and locations

Course Outcome:

Having completed this paper, the student will be able to locate the dramatic text within its historical, contextual and performative framework. Students will understand the generic differences between various modes of drama and recognize the themes and the dialectical interplay that affect the structuring of the plays which will enable various ways of critically engaging with the dramatic text.

Unit 1: (Credit 1)

Concepts: audience | plot | character | chorus | climax | actor-acting | aside | impersonation | monologue | protagonist | role | scene-scenography | stage direction | set-setting | stage machinery | allegory in drama

Unit 2: (3 Credits)

Christopher Marlowe: *Dr Faustus*
William Shakespeare: *The Merchant of Venice*
John Webster: *The Duchess of Malfi*
William Congreve: *Way of the World*

Recommended Reading:

John L. Styan. *The English Stage: A History of Drama and Performance*, Cambridge: CUP, 1996
Robert Edmond Jones. *The Dramatic Imagination*, New York: Theatre Arts, 1992
A. R. Braunmulle & Michael Hattaway (eds). *The Cambridge Companion to English Renaissance Drama*, Cambridge: CUP, 2003

Paper 6
English CORE
British Fiction: Augustan to Victorian
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Course Objectives:

-- Through the carefully selected texts, to give the students an in-depth idea of the evolution and timeline of the British novel from Augustan to Victorian times
-- To acquaint the students about different novel forms of this time-period such as picaresque fiction and the bildungsroman
-- To enlighten the students about the fundamentals of traditional fiction

Course Outcomes:

-- The students will acquire the necessary knowledge about different contexts that shape novel-writing
-- They will be able to analyse novels of the period in terms of elements such as plot, character and setting

Course Contents:

Unit 1 (2 credits)

Daniel Defoe. *Moll Flanders*
Jane Austen. *Emma*

Unit 2 (2 Credits)

Emily Bronte. *Wuthering Heights*
Charles Dickens. *Hard Times*
Thomas Hardy. "The Distracted Preacher"

Recommended Reading:

Grahame Smith. *The Novel and Society: Defoe to George Eliot*, B&N Books, 1984
Terry Eagleton. *The English Novel: An Introduction*, Wiley 2004
Barbara Dennis. *The Victorian Novel: Cambridge Contexts in Literature*, Cambridge University Press, 2000
James Kilroy. *The Nineteenth Century English Novel: Family Ideology and Narrative Form*, Palgrave Macmillan, 2007

Paper 7
English CORE
British Poetry: Victorian to Postmodern
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Objective of the Paper

This paper is designed to introduce students to English poetry from the Victorian period to the present. Students will have an opportunity to engage with and read the major poets covering two centuries of verse composition encompassing a variety of poetic styles and practices.

Graduate Attributes: Learning Objectives

This paper on British Poetry, Victorian to Postmodern aims to enable students to acquaint themselves with the poetic traditions of the last two centuries. It is designed to facilitate a sustained critical responsiveness to the forms and variations of poetic practice through a sampling of writing that charts the development of poetry in English.

Course Outcome

- A focus on English poetry of the Victorian age and the following period up to the present.
- An engagement with the essential poetic themes through specific poems.
- A focus on the issues shaping literary traditions in poetry of the stated periods.
- A close processing of cultural imperatives in the development of British poetry up to the present

Section A: Victorian Poetry (1 Credit)

- Alfred Tennyson: *Ulysses*
- Robert Browning: *My Last Duchess*
- Christina Rossetti: *A Better Resurrection*
- Matthew Arnold: *Dover Beach*

Section B: Modern Poetry (1 Credit)

- T. S. Eliot: *Love Song of J. Alfred Prufrock*
- Wilfred Owen: *Futility*
- W. B. Yeats: *Sailing to Byzantium*
- Mina Loy: *Brancusi's Golden Bird*

Section C: Poetry after Modernism (1 Credit)

- Ted Hughes: *The Thought Fox*
- Seamus Heaney: *The Tollund Man*
- Philip Larkin: *Church Going*
- Carol Ann Duffy: *Warming her Pearls*

Section D: Basic Issues (1 Credit)

Victorian Poetry and Pathos | Modernist Poetry and the City | Alienation in Modern and Contemporary British Poetry | The Gender Question in 19th and 20th Century British Poetry | Victorian Poetry and

Social 'Values' | Experimentation in Modern Poetry | Reality and History in Contemporary British Poetry

Recommended Reading:

Isobel Armstrong. *Victorian Poetry: Poetry, Poets and Politics*, London: Routledge, 1993
Joseph Bristow. *The Cambridge Companion to Victorian Poetry*, Cambridge: CUP, 2000
Alex Davis and Lee M. Jenkins. *The Cambridge Companion to Modernist Poetry*, Cambridge: CUP, 2007
David Wheatley. *Contemporary British Poetry*, London: Palgrave, 2014

Paper 8
English CORE
British Drama: Victorian to Postmodern
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)
Contact + Non-Contact Classes: Total 60

Course Objective:
This course would enable the students:

- to learn about Modern British Drama from the early years of the twentieth century to the new millennium
- to do close reading of the plays by British playwrights.
- to understand genre, style and theme of these plays.
- to locate British drama within its historical contexts.
- to learn how social and political situations influence playwrights' choice of plot and characterisation.
- learn about Avant Garde or experimental drama.

Outcomes/Graduate Outcomes:
After completion of the course, a student would:

- learn literary tradition, historical and cultural contexts of a play.
- know various new techniques and forms of drama
- learn to analyse a play.
- evaluate gestures and use of time/space by different playwrights.
- apply concepts of dramatic composition and performance
- get ideas of stagecraft, direction and key scene compositions.
- analyse how plays deal with personal and public spaces.
- learn British drama and its significance in World Literature.

Unit 1: Concepts (1 Credit)

Realism; Naturalism; Problem Play; Poetic Drama; Irish Theatre; Theatre of the Absurd; Expressionism; Symbolism; Avant Garde; Contemporary British Drama; Theatre of Catastrophe/Modern Tragedy; Farce; Comedy of Horrors.

Unit 2: Drama Texts (3 Credits)

Shaw, George Bernard: *Pygmalion*
T.S. Eliot: *Murder in the Cathedral*
Tom Stoppard: *Rosencrantz and Guildenstern Are Dead*
Timberlake Wertenbaker: *The Ash Girl*

Recommended Reading:

Richard Eyre and Nicholas Wright. *Changing Stages: A View of British Theatre in the Twentieth Century*, Bloomsbury, 2000.
Martin Esslin. *The Theatre of the Absurd*, Methuen, 2001.
Christopher Innes. *Modern British Drama: The Twentieth Century*. Cambridge, 2002.
David Ian Rabey, *English Drama Since 1940*, Routledge. 2016.
Peter Brook: *The Empty Space*, Penguin, 2008.
Howard Barker: *Arguments for a Theatre* (4th Edition). Oberon Books, 2016

Paper 9
English CORE
Life Narratives
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Course Objectives:

-- Students will be educated about the distinctiveness and variety of the genre of Life Narratives
-- At the same time students will be exposed to the range and inclusiveness of the genre, which has many sub-genres that invite study
-- Students will be acquainted with narratological approaches which lead to more analytical interpretations of Life Narratives
-- They will also learn about the affinities with other genres and disciplines such as History and Fiction.

Course Outcome:

At the end of the Course the students should be able to
-- Go beyond the traditional approaches to study Life Narratives, which are often confined to splitting the genre into biographies and autobiographies of canonical western authors.
-- Appreciate the broader conditions and contexts that enable and nurture Life Narratives in specific junctures of history
-- Be equipped to closely look at themes and strategies employed by the writers and write critical essays on them.

Unit 1 (2 credits)

Emily Dickinson. Letters: to Mrs. A.P. Strong January 29 1850 / to William A. Dickinson, November 17 1851
Ismat Chugtai. *A Life in Words: Memoirs*

Unit 2 (2 credits)

Samuel Johnson, "Life of Dryden" from *The Lives of the Poets*
Zora Neale Hurston. *Barracoon; The Story of the Last Slave*
Jhumpa Lahiri. *The Clothing of Books*

Recommended Reading:

Laura Marcus. *Autobiography: A Very Short Introduction*, Oxford University Press, 2018
Lloyd E. Ambrosius. ed. *Writing Biography: Historians & Their Craft*, University of Nebraska Press, 2004
Leon Edel. *Literary Biography*, University of Toronto Press, 1957
Paul Murray Kendall, *The Art of Biography*, Allen & Unwin, 1965

Paper 10
English CORE
Fiction: Modern and After
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Objectives:

This paper is designed to

- Give students an overview of the development of fiction in the English language during the 20th & 21st centuries
- Familiarize them with the contexts in which fiction emerges in different cultures in this period
- Acquaint them with themes and concerns of this fiction
-

Outcomes (Graduate attributes)

- Comprehensive historical knowledge of fiction in the 20th and 21st centuries (disciplinary attribute)
- Critical thinking (critical and analytical ability to understand contemporary life and times through the fiction)
- Creativity (Enhanced imagination and emotional intelligence through exposure to a variety of human situations and experiences in fiction)
- Multicultural spirit (Broad perspective on diversity and multiple cultures)

Unit 1: Contexts, Ideas and Concepts (1 Credit)

Contexts of fiction (selected events and conditions of the 20th and 21st centuries and a corresponding overview of fiction of each of the following)

- War and Conflict (the World Wars, decolonization, 9/11)
- Society, Economy, Politics
- Gender, Class and Race
- Environmental Crises

Unit 2: Fiction (3 Credits)

D.H. Lawrence: "The Rocking Horse Winner"
Joyce Carol Oates: "Where are You Going, Where Have You Been?"
Jean Rhys: *Wide Sargasso Sea*
John Boyne: *The Boy in the Striped Pyjamas*
Graham Swift: "England" from *England and Other Stories*

Recommended Reading:

Chris Baldick: *The Modern Movement*, *1910-1940*, Oxford University Press, 2004
Bruce King: *The Internationalization of English Literature* Oxford University Press, 2004
Peter Boxall: *The Value of the Novel*, Cambridge University Press, 2015
Jesse Matz: *The Modern Novel: A Short Introduction*, Wiley, 2004
Debjani Ganguly: *This Thing Called the World: The Contemporary Novel as Global Form*, Duke University Press, 2016

Paper 11
English CORE
Literary Criticism
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Objectives:

This paper is designed to

- Provide learners with a foundational understanding of the genesis and development of the field.
- Familiarize learners with the various concept and thoughts generic to the field.
- Provide training into critical approached to various genres of literature.
- Provide insights into various critical tools required for the study of literature.

Outcomes (Graduate attributes)

- Comprehensive historical knowledge of the growth of criticism from the beginning to the 20th century.
- Critical ability to comprehend and examine texts.
- Critical understanding of the difference between genres of literature.
-

UNIT-1: (Concepts & Ideas): 2 Credits

- Plato - Mimesis
- Longinus – The Sublime
- Philip Sidney – Defence of Poetry
- Stephen Gosson – Views against Poetry
- Samuel Johnson – Views of Shakespeare and the "Three Unities".
- Samuel Taylor Coleridge – Imagination and Fancy
- John Keats – Negative Capability
- F.R. Leavis – Enactment
- W.K. Wimsatt & Monroe C. Beardsley – Affective Fallacy, Intentional Fallacy.

UNIT 2: Seminal Texts: 2 Credits

- Aristotle: *Poetics*
- William Wordsworth: Preface to *The Lyrical Ballads* (1802)
- Mathew Arnold: The Study of Poetry
- T. S. Eliot: Tradition and the Individual Talent
- Cleanth Brooks: The Heresy of Paraphrase

Recommended Reading:

Habib, M.A.R. *A History of Literary Criticism: From Plato to the Present*. Oxford: Blackwell, 2005
Wimsatt W.K and Cleanth Brooks. *Literary Criticism: A Short History*, New Delhi: Oxford, 2004
Abrams, M.H. *The Mirror and the Lamp: Romantic Theory and the Critical Tradition*. NY: OUP, 1971
Eaves, M., and M. Fischer, eds. *Romantic and Contemporary Criticism*. Cornell University Press, 1986

Paper 12
English CORE
Women's Writing
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Graduate Attributes:

This course will acquaint students with women's writing across genres, cultures and historical periods. They will study these writings with the help of some key concepts and ideas in women's/feminist studies. The study of the specific texts will develop the students' critical thinking and analytical abilities. They will acquire knowledge of different cultures and the challenges faced by women in diverse social settings. They will develop empathy and gender sensitivity which will help them to tackle problems in real life situations.

Course Outcome:

- An understanding of the basic concepts which are of use in analyzing women's writing
- A familiarity with women's writing across genres, times and cultures
- An ability to analyze a text setting it against its socio-cultural and historical background
- An appreciation of the basic themes, issues and stylistic features of a particular piece of women's writing.

Unit I: History, Concepts and Ideas (1 Credit)

Waves of feminism, the body, ecofeminism, third world feminism, black feminism, communities of women, gynocriticism, gender

Unit II: Texts (3 Credits)

Kamala Das : An Introduction
Elizabeth Barrett Browning: Sonnet XLIII (How do I Love Thee? Let me count the ways) from *Sonnets from the Portuguese*
Emily Dickinson: The Soul Selects her own Society
Adrienne Rich: Power
Louisa May Alcott: *Little Women*
Alice Walker: *The Color Purple*
Manjula Padmanabhan : Lights Out
Lady Mary Wortley Montagu: from *The Turkish Embassy Letters* (to Lady-Adrianople,1 April 1717; To Lady Mar, 1 April 1717)
Toru Dutt: *from* Letters to Mary Martin (Baugmaree Garden House, Calcutta. December 19,1873)
Emily Bronte: from *Diary* (Haworth, Thursday, July 30th, 1845)

Recommended Reading:

Andermahr, Sonya et al. *A Glossary of Feminist Theory*. London: Arnold, 2000
Auerbach, Nina. *Communities of Women: An Idea in Fiction*. Harvard UP, 1978
Beauvoir, Simone de. *The Second Sex*. trans. Constance Borde and Shiela Malovany-Chevallier. Vintage, 2010
Gilbert, Sandra and Susan Gubar (ed). *The Norton Anthology of Literature by Women: The Traditions in English*. Norton, 1996
Pearce, Lynne. *Feminism and the Politics of Reading*. Arnold, 1997
Showalter, Elaine. *A Literature of their Own*. Virago, 1978

Tharu, Susie & K. Lalita. ed *Women Writing in India* OUP,1993
Woolf, Virginia. *A Room of One's Own*. New York: Harcourt, 1952

Paper 13
English CORE
Literature and the Environment
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Graduate Attributes

- To equip students with a comprehensive knowledge of multiple perspectives on the relationship between literature and environment.
- To provide students with a historical and contextual knowledge of the representation of and approaches to the environment through literature.
- To develop skills in critical analysis, research, and writing, which will enable students to engage in scholarly discussions on this area.
- To develop in the students a critical vocabulary pertaining to the field of environmental humanities

Course Outcome:

This course on Literature and the Environment focuses on exploring the relationship between literature and the environment, which has been an ongoing topic of exploration for many decades now. Literature has the ability to capture and reflect the myriad and complex relationships between humans, non-human animals and the environment. The course thus aims to provide a comprehensive understanding of the ways in which environmental concerns and the ecological crisis in the contemporary world are represented and addressed in literature.

Students will have to attempt questions from both units.

UNIT I (1 Credit)

This unit is designed to give students a basic idea of some key concepts and issues in environmental humanities, environmental ethics and ecocriticism. The topics to be discussed in this paper include the following:

Anthropocentrism
Deep Ecology
Ecocriticism
Ecofeminism
Anthropocene
Climate Change
Environmental History

UNIT II (3 Credits)

This unit involves a reading of select texts in the light of the concepts discussed in Unit I and a practical application of those ideas in interpretation and analysis of the texts while placing them in their historical, cultural and other contexts.

Texts:
Francis Bacon (1561-1626): "Of Gardens"
Gilbert White (1720-1793): Letter LXIV (From *The Natural History of Selborne*)
William Wordsworth: "The Solitary Reaper"

Henry David Thoreau: "The Ponds" (From Walden)
Emily Dickinson: "A Narrow Fellow in the Grass".
Robert Frost: "The Wood-Pile"
D. H. Lawrence: "Snake"
Amitav Ghosh: *The Living Mountain*
Easterine Kire: *Son of the Thundercloud*

Recommended Reading:

Armbruster, Karla, and Wallace, Kathleen (eds.) *Beyond Nature Writing: Expanding the Boundaries of Ecocriticism*. Charlottesville and London: University Press of Virginia, 2001.
Finch, Robert, and John Elder (Eds.) *Nature Writing: The Tradition in English*. New York: W. W. Norton & Company, 2002.
Garrard, Greg. *Ecocriticism*. New York: Routledge, 2004.
Glotfelty, Cheryll, and Harold Fromm (Eds.) *The Ecocriticism Reader*, The University of Georgia Press, 1996.
Heise, Ursula K., Jon Christensen, and Michelle Niemann (Eds.) *The Routledge Companion to the Environmental Humanities*, Routledge, 2017.

Paper 14
English CORE
Northeast Indian Literature
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Course Objectives:

This course on Northeast Indian Literature is designed to familiarize students with the literature emerging from the 8 states of Northeast India so that as students from the region they know the history, culture, oral and writing traditions as well as the diversity of the region. While some writers write in English, some works will be read in English translations. The course aims:

- To provide a sampling of literatures in English and in translation
- To train students to appreciate literature emerging from Northeast India
- to make students see how folk stories, myths and legends frame the narratives of the region
- To introduce students to the themes, concerns and styles adapted by the writers and also look at aspects which are specific to the region and find reflection in their works

Course Outcome (Graduate Attributes):

Having studied core English literature in the previous semesters the students are expected to expand their horizons of English studies which includes literatures other than British. By the end of the course the students are expected to have developed an understanding of:

- The Folk in Narrative as many writers are seen to draw resources for their work from available folk forms and tales.
- Myths and Legends how they are reworked and find expression in the prescribed texts.
- The Diverse Traditions, History and Landscape specific to each state of the region which find reflection in the representative works.

Section I: Poetry (1 Credit)

Chandrakanta Murasingh: (Tripura) 'Forest - 1987'
Robin Ngangom: (Manipur) 'Native Land'
Kympham Sing Nongkynrih: (Meghalaya) 'Hiraeth'
Malsawmi Jacob: (Mizoram) 'Flute Player'

Section II: Fiction (3 Credits)

Mamang Dai: (Arunachal Pradesh) *Legends of Pensam*
Nirupama Borgohain: (Assam) 'Celebration'
Prajwal Parajuly: (Sikkim) 'No Land is her Land'
Temsula Ao: (Nagaland) 'An Old Man Remembers'
Tapan Das: (Assam): 'Gogoponti Lakratua'

Recommnded Reading:

Ao, Temsula. *These Hills Called Home: Stories from a War Zone*. Penguin India, 2005
Dai, Mamang. *The Legends of Pensam*. Penguin India, 2006
Misra, Tilottoma (Ed.). *The Oxford Anthology of Writings from North-East India: Poetry and Essays*. OUP, 2011.
Mukhim, Patricia. 'Where is this North-east?' https://www.jstor.org/stable/23006026
Parajuly, Prajwal. 'The Gurkha's Daughter' Quercus, 2014

Paper 15
(Any one option)
English CORE
Indian Writing (Option A)
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Course Objectives:
The course aims to:

- give the student a taste of Indian writing from different regions of the country.
- to make students see how different historical and cultural backgrounds of the various Indian languages and literatures add to the complexity of Indian Writing.
- To introduce students to the themes, concerns and styles adapted by the writers and also look at aspects which are specific to the region and find reflection in their works

Graduate Attributes:

- Critical thinking (A wide familiarity with the range of themes that are evoked from the Indian context; the rich and innovative styles used by the writers; the Indian literary landscape; concepts in postcolonial studies and the practical application of these in reading and interpreting Indian literature.)
- Analytical reasoning/thinking (The ability to critically analyze and interpret texts in terms of their literary and cultural qualities with specific reference to the Indian literary landscape, and an awareness of the political aspects of any literary representation.)
- Research-related skills (The ability to problematize concepts in Indian literature and culture and consequently to ask relevant questions regarding them.)
- Creativity (An ability to view a problem or situation from multiple perspectives to develop a richer, more nuanced, and more analytical responses to it)
- Multicultural competence and inclusive spirit (A capacity for the minute observation of attitudes and beliefs of diverse cultures that find their way into literature. An extensive knowledge of the values and beliefs of multiple cultures. Acquisition of a sensitive and an empathetic approach to multiple cultures and multiple identities and the literature emerging from that.)

Texts
Poetry: 1 Credit

Nissim Ezekiel: "Poet, Lover, Birdwatcher"
Kamala Das: "The Old Playhouse"
Keki N. Daruwalla: "Wolf"
Navakanta Barua: "Bats"
Dilip Chitre: "The Felling of the Banyan Tree"

Fiction: 2 Credits

R K Narayan: *Malgudi Days*
Amrita Pritam: "The Weed"
Fakir Mohan Senapati: *Six Acres and a Third*
Sunil Gangopadhyay: "Shah Jahan and His Private Army"

Drama: 1 Credit

Girish Karnad: *Tughlaq*

Recommended Reading:

Stephen Alter and Wimal Dissanayake. Eds. *Indian Short Stories*, Penguin, 2001.
Arvind Krishna Mehrotra ed. *The Oxford Anthology of Twelve Indian Poets*, Oxford University Press, 1992.
Tilottoma Misra ed. *The Oxford Anthology of Writings from North-East India: Poetry and Essays*, OUP, 2011.
Sarkar, Sumit. *Modern Times: India: 1880s-1950s: Environment, Economy, Culture*, Permanent Black, 2014.
Arvind Krishna Mehrotra. *Partial Recall: Essays on Literature and Literary History*. Orient Blackswan, 2012.

Paper 15
(Any one option)
English CORE
American Literature (Option B)
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Objectives:
This paper is designed to

- Give students a general understanding of the development of American Literature
- Familiarize them with historical contexts of this literature
- Acquaint them with themes and forms that makes this literature distinctive

Outcomes (Graduate attributes)

- Comprehensive literary-historical knowledge (disciplinary attribute)
- Critical thinking (critical and analytical ability in comprehending today's world)
- Creativity (Enhanced imagination and emotional intelligence through exposure to a variety of situations in American literary experience)
- Multicultural spirit (Broad perspective on diversity and multiple cultures)
- Empathy (Ability to empathize with and understand human suffering and the creative expression of moods and emotions)

Unit 1: 1 credit
General Surveys of Contexts and themes:

- History of American Literature (important authors, genres and texts)
- Important contexts (Puritan era, Slavery, Revolution, Civil War, Civil Rights Movement, Racism, 9/11, Multicultural America)
- Themes of nation, selfhood, family, land/nature

Unit 2: 3 credits
Texts:

Washington Irving: "Rip Van Winkle" (short narrative)
Walt Whitman: "Cavalry Crossing a Ford"; "Vigil Strange I Kept on the Field One Night" (from 'Drum-Taps' section of *Song of Myself*)
Zora Neale Hurston: "How It Feels to Be Colored Me" (essay)
Louise Erdrich: "Dear John Wayne" (poem)
Cathy Song: "Heaven" (poem)
Art Spiegelman: *In the Shadow of No Towers* (graphic novel on 9/11)
Colson Whitehead: *The Underground Railroad* (Novel)

Recommended Reading:

Richard Gray: *History of American Literature*, Wiley: 2012
Robert J. Levine *et al* eds. *Norton Anthology of American Literature*, 10th ed. (5 vols.), Norton: 2022
John Ernest (Ed). *Race in American Literature and Culture*, Cambridge University Press, 2022
Paul Johnson: *A History of the American People*, Weidenfeld & Nicolson, 1999

Paper 15
(Any one option)
English CORE
Shakespeare (Option C)
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Objectives:

- Give students a sense of Shakespeare in his time
- Acquaint them with Shakespeare's plays, poetry, and themes
- Point them towards the afterlife of Shakespeare in other sites, media and forms

Outcomes (Graduate attributes):

- Comprehensive knowledge of the subject of this paper
- Creativity (Think in new ways about issues and concerns of our world)
- Communication skills (Articulate complex thoughts with clarity and precision)
- Research related skills (Undertake research in the fields explored)
- Multicultural competence and inclusive spirit (Demonstrate national and global perspective on
- the field and sympathy for alternative modes of expression in the arts)
- Value inculcation (Demonstrate humanist, ethical and moral values)
- Empathy (Identify with and understand other perspectives and feelings)

Unit 1: 1 Credit
Surveys (Students are expected to acquire basic information in the following areas and they will be tested on what they learn about these)

- All Shakespeare's works
- Shakespeare productions (Titus Andronicus [Deborah Warner [1987])
- Shakespeare in fiction (to be briefly discussed with the help of the following – The book series
- Hogarth Shakespeare, *Ophelia* by Lisa Klein, *A Thousand Acres* by Jane Smiley, *Vinegar Girl* by Anne Tyler)
- Shakespeare in film (*As You Like It* [1912-2012], *Richard III* [1912-2016]

Unit 2: 3 Credits

Texts
Macbeth
A Midsummer Night's Dream
Sonnets (Nos. 2, 12, 18, 22, 137, 141)

Recommended Reading:

The Arden Shakespeare Complete Works. (Revised edition 2016)
Malcolm Smuts (Ed). *The Oxford Handbook of the Age of Shakespeare* (2016)
Marjorie Garber: *Shakespeare and Modern Culture* (2008)
Michael Kahn "Shakespeare Meets the 21st Century" (Washington Post, August 3, 2012 washintonpost.com)

Paper 15
(Any one option)
English CORE
Contemporary Writing (Option D)
(External Evaluation: 60 + Internal Assessment 40): Total Marks 100
4 Credits (15 Classes Per Credit)

Objectives:

This paper is designed to introduce students to writings of the contemporary period from a variety of locations and cultures. Students will have an opportunity to engage with and read the major writers encompassing a variety of writing styles and practices and in different genres.

Graduate Attributes: Learning Objectives

This paper on Contemporary Writing aims to enable students to acquaint themselves with the writing traditions of the present times. It is designed to facilitate a sustained critical responsiveness to the forms and variations of writing practice through a sampling of literature that charts the development of creative texts in English. Texts originally written in other languages will also be studied in English translation for a more wide-ranging dialogue with global contexts in the present period.

Course Outcome
A focus on contemporary writing through a reading of important texts.
An engagement with the essential themes through a sustained critical assessment.
A focus on the issues shaping literary traditions in the contemporary world.
A close processing of cultural imperatives in the development of writing of the present times

Section A: Poetry (1 Credit)

Nilmani Phookan: "What Were We Talking About Just Now"
Simon Armitage: "Look, Stranger"
Yusef Komunyakaa: "No Good Blues"
Claudia Rankine: "Making Room"

Section B: Novels (1 Credit)

Emily St. John Mandel: *Station Eleven*
Kyung-sook Shin: *Please Look After Mom*

Section C: Drama (1 Credit)

David Auburn: *Proof*
Gérald Sibleyras: *Heroes*

Section D: Basic Issues (1 Credit)

Contemporary Writing and Identity | Writing and Ethics in the Twenty-First Century | Alienation Contemporary Literature | The Gender Question in Contemporary Writing | Contemporary Writing and Social 'Values' | Inter-generic Practices in Contemporary Literature | Reality and History in Contemporary Writing

Recommended Reading:

Cristina M. Gamez-Fernandez and Miriam Fernandez-Santiago. *Representing Vulnerabilities in Contemporary Literature*, Routledge, 2022

Suman Gupta. *Contemporary Literature: The Basics*, Routledge, 2011

David Hershberg. *Perspectives on Contemporary Literature: Literature and the Other Arts*, University of Kentucky Press, 2014

Steve Padley. *Key Concepts in Contemporary Literature*, Palgrave, 2006

Prepared by UG CCS English, GU | Contact: Chairperson UG CCS English, GU

FOUR-YEAR UNDER GRADUATE COURSE (FYUGP) 2023

GAUHATI UNIVERSITY

HISTORY SYLLABUS

Department of History

Gauhati University

Guwahati-781014

Assam

SYLLABUS IN HISTORY FOR THE FOUR-YEAR UNDER GRADUATE COURSE (FYUGP) 2023 UNDER GAUHATI UNIVERSITY

The CCS (UG) in History of Gauhati University has drafted and recommended the syllabuses in History for the first three years of the Four Years Under Graduate Course in History in its meetings held on 15.03.2023 and 03.05.2023. The syllabus was approved the Academic Council in its meeting held on

This syllabus will be implemented from the academic session 2023-2024 under Gauhati University as per the Regulations approved for the purpose.

The courses will help the students to meet several important parts of the overall programme learning outcomes to be achieved by students on completion of the programme of study leading to the award of an undergraduate Certificate, Diploma or Degree.

Some of the Programme Learning Outcomes are

(i) Knowledge and understanding

Upon completion of the programme, the graduates would be able to demonstrate the acquisition of: knowledge of facts, concepts, principles, theories, and processes that the subject History is embedded in. The graduates will have an understanding of both World, Indian and regional histories and also the political, social and economic forces that shaped the histories. Overall, the programme will help the students develop broad multidisciplinary learning contexts especially in the field of humanities and social sciences.

(ii) Generic learning outcomes

The students completing the programme will be able to think Critically will be to apply analytic thought to history in particular and humanities and social sciences in general, including the analysis and evaluation of policies and practices, as well as evidence, arguments, claims, beliefs and the reliability and relevance of evidence.

The Graduates will be able to identify relevant assumptions or implications; and formulate coherent arguments; identify logical flaws in the arguments of others, analyse and synthesise data/information related to issues and arguments of history from a variety of sources and draw valid conclusions and support them with evidence and logic.

Graduates with history as is being offered under FYUGP of Gauhati University will acquire knowledge of the values and beliefs of multiple cultures and a global perspective to honour diversity. The graduates will be able to identify the migration of people and their settlements in Bharat and link them with cultural diversity. Graduates will be capable to effectively engage in a multicultural group/society and interact respectfully with diverse group.

(iii) Course Learning Outcomes : The course learning outcomes are stated as Course Outcomes in each of the courses.

COURSE LIST OF B.A. (Major and Minor) PROGRAMME IN ISTORY UNDER FYUGP - GAUHATI UNIVERSITY

(2023)

Semester	Course Name	Credit	Course level
First	History of India (Up to 1206 CE)	4	100-199
Second	History of India (1206-1757 CE)	4	100-199
Third	History of India (c. 1757 to 1947 CE)	4	100-199
Fourth	History of Assam (upto 1826 CE)	4	200-299
	Social Formation and Cultural Patterns of the Ancient and Medieval World	4	300-399
	History: Concepts and Ideas	4	300-399
	Social and Economic History of India (Up to 1206 CE)	4	300-399
Fifth	Rise of the Modern West	4	200-299
	History of Europe (1648-1870 CE)	4	300-399
	History of East Asia : China and Japan (1839-1949)	4	300-399
	Social and Economic History of India (1206-1757 CE)	4	300-399
Sixth	History of Assam (1826-1947 CE)	4	200-299
	Social and Economic History of Assam (Upto 1947 CE)	4	200-299
	History of Europe (1870-1945 CE)	4	300-399
	Social and Economic History of India (1757-1947 CE)	4	300-399

FYGUP 2023
First Semester (History 1/1)

Course Name: **History of India (Up to 1206 CE)**

Credit : 4
Course level: 100-199

Course Outcome: Upon completion of this course, a student will be able to:

- explain the emergence of state system in North India as well as development of imperial state structure and state formation in South India in the early period.
- They will be able to relate the changes and transformations in polity of early India and the linkages developed through contacts with the outside world.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Sources for reconstructing Ancient Indian History: archaeological; literary
[b] Harappan Civilization: origin, extent, characteristics; first urbanization; decline.
[c] Vedic Culture-Early and Later Vedic periods: Tribal Polity, economic developments; social stratification; religion and philosophy;

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Second Urbanization; Rise of territorial states: *Mahajanapadas*
[b] Religious movements in North India: Jainism; Buddhism
[c] The Mauryas: Administrative system, Society and Economy; Asoka's Dhamma; Decline.
[d] Greek Invasion and its Impact.

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Political developments in Post–Mauryan period with special reference to Sungas, Kushanas, Kharavelas, Satavahanas.
[b] Sangam Age: Literature, Society and Culture.

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Gupta Empire: administrative system, economy, society, art and architecture, cultural developments.
[b] Post-Gupta Period: Land Grant Economy and Early Feudalism.
[c] Harshavardhana; Samanta system

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Emergence of Rajputs in North India
[b] Political developments in South India with special reference to Cholas, Rashtrakutas, Chalukyas of Badami.
[c] Arabs; Ghaznavids and Ghorids.

Readings :

Altekar. A.S. 1966. *State and Government in Ancient India.* Delhi: Motilal Banarasidass.

Chakravarti. Ranabir. 2013. *Exploring Early India up to c. AD 1300*. Second Edition. Delhi: Macmillan

Champakalakshmi, R. 1996. *Trade, Ideology and Urbanization: South India, 300 CE to 1300 AD*. Delhi: Oxford University Press.

Chattopadhyaya, B.D. 1994. *The Making of Early Medieval India*. New Delhi: Oxford University Press.

Jha, D.N. 2012. *Ancient India in Historical Outline.* Delhi: Manohar Publishers. Reprint.

Kangle. R.P (ed. and tr.). 1960-65. *Kautilya's Arthasastra*. Bombay: University of Bombay

Kulke, Hermann(ed). 1994. *The State in India, AD 1000-1700*. New Delhi: Oxford University Press

Ratnagar. Shereen. 1991. *Enquiries into the Political Organization of Harappan Society*. Pune: Ravish Publishers.

Roy, Kumkum. 1994. *Emergence of Monarchy in North India*. New Delhi: Oxford University Press

Sahu, Bhairabi Prasad. 2012. 'Recent Perspectives of the State and Debates in Early Indian History'. *Indian Historical Review* 39(2)145-162.

Sharma, R.S. 1983. *Aspects of Political Ideas and Institutions in Ancient India*. New Delhi: Macmillan

Sharma. R.S. 2006. *India's Ancient Past*. New Delhi: Oxford University Press.

Sharma, R.S.1983.*Material Culture and Social Formations in Ancient India.* New Delhi: Macmillan.

Singh, Upinder. 2009. *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. Delhi: Pearson India.

Thapar. Romila.1984. *From Lineage to State.* New Delhi: Oxford University Press**.**

Thapar. Romila. 2003. *The Penguin History of Early India: From origins to AD 1300.*Haryana: Penguin Random House India.

Thapar, Romila. 1978. *Ashoka and the Decline of the Mauryas.* Delhi: Oxford University Press.

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FYUGP 2023

Second Semester : (History 1/1)

Course Name : **History of India (1206-1757 CE)**

Credit : 4
Course level: 100-199

Outcomes: Upon completion of this course, students will be able to :

- Explain the political transition that took place under the Sultanate and the Mughals and how it changed the geo-political structure between 1206-1757.
- Identify the regional kingdoms and analyse their administration and polity.
- Explain the formation of different pre-modern states apart from the Sultanate and the Mughals during this period along with their administrative system, political ideologies, legitimation, and the institution of kingship.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Conceptualising 'medieval' Indian history; Sources
[b] Persian *tarikh* tradition
[c] Foreigners' accounts, vernacular literature.
[d] Regional history writing: *bakkhars, buranjis, khyats*

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Foundation, Consolidation and Expansion of the Sultanate: Iltutmish, Razia Sultan, Balban, Alauddin Khilji, Muhammad Bin Tughluq, Firoz Shah Tughluq, Sayyids
[b] Theories of Kingship, Nobility, *khalifa* and *ulemas*
[c] Administration and policies under the Sultanate, *Iqta* system

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Lodis and Battle of Panipat, Babur's victory and consequences
[b] Rajput's origin and polity: Mewar, Marwar and Amer
[c] Sher Shah Suri and his administration
[d] Vijayanagar and Bahmani Sultanate: Krishna Deva Raya; Administration, Battle of Talikota, Mahmud Gawan, disintegration of Bahmani- Bijapur, Ahmednagar, Bera, Golconda and Bidar.
[e] Gajapatis of Orissa, Gujarat, and Malwa Sultanate, Jaunpur, Bengal, Kashmir Sultanate

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Mughal emperors: Akbar, Jahangir, Shahjahan, Aurangzeb

[b] Mughals and Central Asia contacts; Mughals-Rajput relations: matrimonial and political

[c] Nobility, Mansabdars-Jagirdars, administration

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Khalsa tradition and challenges to the Mughals

[b] Marathas under Shivaji, Peshwa administration

[c] Later Mughals and Bahadur Shah Jafar

[d] The 18th century: Decline of Mughals state, theories and interpretation, Power contestation: Awadh, Bengal and Hyderabad

Readings

Kulke, Hermann. (1995). *The Early and the Imperial Kingdom: A Processual Model of Integrative State Formation in Early Medieval India* in Kulke, H (ed), "The State in India, 1000-1700", ed., New Delhi: Oxford University Press. 1997.

H. Kulke and B. P. Sahu, (2018). *History of Precolonial India: Issues and Debates*, Delhi: Oxford University Press, Part II

Kumar, Sunil. (2007). *The Emergence of the Delhi Sultanate*, *1192-1286*. Ranikhet: Permanent Black.

Tod, James. (1920). *Annals and Antiquities of Rajasthan*, William Crooke (Ed.). London: Oxford University Press, 3 volumes.

Mukhia, Harbans (1976). *Historians and Historiography during the Reign of Akbar*. Vikas: Publishing House

Mukhia, Harbans (2004). *The Mughals of India*, Oxford, United Kingdom: Wiley India, Blackwell Publishing

Tripathi, R P. (1959). *Some Aspects of Muslim Administration.* Allahabad: The Indian Press

Alam, M and S Subrahmanyam (eds.) (1998). *The Mughal State, 1526-1750*, Delhi: OUP

Chandra, Satish. (Ed.) (2005). *Religion, State and Society in Medieval India: Collected Works of Nurul Hasan*, Delhi: Oxford University Press

Bhargava, Meena (ed.) Exploring Medieval India. Sixteenth to Eighteenth Century, Vol. II, New Delhi: Orient BlackSwan

Bhargava, Meena (Ed.) (2014). The decline of the Mughal Empire, Delhi: OUP

Alavi, Seema (Ed.) (2000). The Eighteenth Century in India (New Delhi: Oxford University Press

Marshall, P.J (Ed.) (2003). The Eighteenth Century in Indian History: Evolution or Revolution? Oxford University Press

Rizvi, S.A.A (1987). The Wonder That Was India. Vol.II. India. Picador

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FYUGP 2023

Third Semester (History 1/1)

Course Name : **History of India (c. 1757 to 1947 CE)**

Credit : 4
Course level 100-199

Course Outcome: Upon completion of this course, students will be able to:

- Explain the major factors that led to the establishment and consolidation of British rule in India.
- Identify the events, personalities and the process that led to development of resistance against British colonial rule and the eventual growth of Indian nationalist movement, that ultimately led to the end of the British rule in the country.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Political condition in post-Mughal period and rise of regional powers.
[b] European trading companies in India : Portuguese, Dutch, English and French
[c]The Battle of Plassey and the Battle of Buxar - the establishment of the British rule in India.
[d] Robert Clive and Dual Administration in Bengal.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Expansion and Consolidation of the British rule under Warren Hastings and Lord Cornwallis.
[b] British relations with the Marathas and Mysore.
[c] Lord Wellesley and the Policy of Subsidiary Alliance
[d] Lord Hastings and the relations with the Indian States.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Growth and expansion of Sikh power under Ranjit Singh; British occupation of Punjab
[b] Lord Dalhousie and his policy of expansion- the Doctrine of Lapse
[c] Wars against Afghanistan and Burma (British Frontier Policy)
[d] Colonial State and policies of governance : army, police, law.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Revolt of 1857- its causes and consequences, the Government of India Act of 1858.
[b] The growth of national awakening in India and the establishment of the Indian National Congress.
[c] Lord Curzon and the Partition of Bengal; the Swadeshi Movement in India, Muslim League; growth of Revolutionary Terrorism.

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Gandhi in Indian politics - the Khilafat and the Non-Cooperation Movement, the Civil Disobedience Movement.
[b] The growth of the Left, Muslim League and Communal politics in India.
[c] The Quit India Movement – The INA and Partition of India.

Readings:

Bandyopadhya, Sekhar*: From Plassey to Partition: A History of Modern India*, Orient Longman Ltd. Hyderabad, 2004.

Chandra, B, Mukherjee, M *et al* : *India's Struggle for Independence*, Penguin Books, New Delhi, 2003.

Chandra, B., : *History of Modern India*¸ Orient BlackSwan, 2010

Grover B.L and Grover, S., *A New Look at Modern Indian History*, S. Chand & Company, New Delhi, 2004.

Banerjee-Dube, Ishita, *History of Modern India,* Cambridge University Press, New Delhi, 2014

Sarkar, Sumit : *Modern India*, Macmillan, New Delhi, 1983.

Gopal, S :*The British Policy in India, 1858-1905*, McMillan, New Delhi, 1992.

Grewal, J. S :*The Sikhs of the Punjab*, Cambridge University Press, New Delhi, 1999.

Gordon, Stuart :*The Marathas*, Cambridge University Press, New Delhi, 1999.

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Fourth Semester FYUGP (HISTORY 1/4)

Course Name : **History of Assam (upto 1826 CE)**

Credit : 4
Course level: 100-199

Course Outcome: After completion of this course a student will be able to :

- Explain in general outline the history of Assam from the earliest times to the advent of the British.
- Identify major events and personalities in the political history of Assam from the earliest times to the occupation of Assam by the English East India Company

Unit: I	Contact Classes : 6	Non-contact classes : 2	Marks : 15

[a] A survey of the sources: indigenous literature; accounts of foreign travellers (Chinese, Arabian, Persian, French); archaeological sources.
[b] Land and people: Migration routes and settlement pattern.

Unit: II	Contact Classes : 9	Non-contact classes : 2	Marks : 20

[a] The kingdom of Pragjyotisha-Kamarupa; Politico-cultural centres in the valleys of Doiyang-Dhansiri, Kapili-Jamuna and at Bhaitbari.
[b] Political dynasties: Varmana; Salastambha; Pala
[c] Administration: Central and Provincial; Judicial; Revenue

Unit: III	Contact Classes : 10	Non-contact classes : 4	Marks : 25

[a] Political condition of Assam in the Post-Pala period.
[b] Disintegration of the Kingdom of Kamarupa (Vaidyadeva, Tingyadeva, Vallavadeva)
[c] Turko-Afghan invasions
[d] Kamata, Chutiya, Kachari, and the Koch kingdoms; the Bara Bhuyans

Unit: IV	Contact Classes : 12	Non-contact classes : 4	Marks : 25

[a] Foundation of the Ahom kingdom by Siukapha
[b] Expansion and consolidation of the Ahom kingdom : Suhungmung, Pratap Singha, Gadadhar Singha, Rudra Singha, Rajeswar Singha.
[c] Ahom-Mughal conflict: the Treaty of 1639, Mirjumla's invasion, Battle of Saraighat (1671) and Battle of Itakhuli
[d] Ahom system of administration: Central administration, the *Paik* system and *Posa* system

Unit: V	Contact Classes : 8	Non-contact classes : 3	Marks : 15

[a] Decline and fall of the Ahom Kingdom: the Moamariya Rebellion;
[b] Burmese Invasions.
[c] Ahom policy towards the Hill tribes.
[d] The English East India Company in Assam Politics;

[e] Treaty of Yandaboo and Assam

Readings:

Barpujari, H. K. 1992 : *The Comprehensive History of Assam Vol. I, II and III,* Publication Board Assam.
Baruah, K. L. 2019: *Early History of Kamrupa,* Bhabani Books, Guwahati,.
Baruah, S.L. 1985: *A Comprehensive History of Assam*, Munshiram Monoharlal, New Delhi,
Devi, Lakshmi 1968 : *Assam Buranji* (Assamese), LBS Publishers, Guwahati
Dutta, A.K. 1991:*Maniram Dewan and the Contemporary Assamese Society*, Jorhat.
Gait, E. A. 1906 **:** *A History of Assam*
Gogoi, Padmeswar 2016 (Reprint) : *The Tai and the Tai Kingdoms,* Gauhati University Press.
Guha, A. 1991:*Medieval and Early Colonial Assam*, Bhabani Books,.
Nath, D. 1987: *Asom Buranji* (Assamese) Bidya Bhawan.
Neog, M. 1965: *Sankardeva and His Times*, Gauhati University Press, First Print

Fourth Semester FYUGP (HISTORY 2/4)

Course name : Social Formation and Cultural Patterns of the Ancient and Medieval World

Credit : 4
Course level : 200-299

Course Outcome: After completion of this course a student will be able to :

- Describe some of the most significant events and societies of pre-modern world.
- Explain political events relating to the ancient Greece city states and Rome.
- Analyse the complexities of historical forces in West Asia and the rise of Islam.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Civilization : The Nile Valley, Mesopotamia, China
[b] The Maya Civilization, the Incas, the Aztecs
[c] Polity, Economy and Social life and activities.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Ancient Greece and Roman Empire
[b] Evolution of the 'polis' and changing political formations in ancient Greece: Athens and Sparta
[c] Slavery in the Ancient Greek and Roman world
[d] Greek Culture-Science and Philosophy, religion, art, and architecture

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Late Roman World, The Arabs
[b] Religion in the Late Roman Empire, Judaism and Christianity
[c] Spread of Christianity, Development of the Catholic Church

[d] Pre-Islamic society, Tribal background and the Rise of Islam, Foundation of the Islamic state, Caliphate and Crusades

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Feudalism : its features and debates
[b] Feudal society and the Church
[c] Transitions in the feudal economy from 11th – 14th centuries

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Growth of trade and towns and their impact
[b] Oceanic trade with the East
[c] Emergence of Europe as a centre of World trade, Medieval Cities,
[d] Trading communities- Jews, Arabs, Italians, Flanders, English, German and Dutch

Readings :

Anderson, P. (1988). *Passages from Antiquity to Feudalism*. London and New York: Verso
Finley, M.I. (1963/1991). *The Ancient Greeks*, London: Penguin (1991 reprint)
Green, P. (1973). *A Concise History of Ancient Greece to the close of Classical era*, London: Thames and Hudson ltd.
Hopkins, K. (1978). *Conquerors and Slaves*. Cambridge: Cambridge University Press
Joshel, S. R. (2010). *Slavery in the Roman World*, Cambridge: Cambridge University Press
Bloch, M. (1961). *Feudal Society* Vol. I, Chicago: University of Chicago Press
Brunt, P.A. (1971). *Social Conflicts in the Roman Republic.* London: Chatty and Windus
Donner, F.M. ed. (2016). *The Expansion of the Early Islamic State*, London and New York: Routledge
Duby, G. (1978). *The Early Growth of the European Economy: Warriors and Peasants from the Seventh to the Twelfth century*. Cornell: Cornell University Press
Hodgson, M.G.S. (1974). *The Venture of Islam, Volume 1: The Classical Age of Islam*, Chicago: University of Chicago Press
Perry Anderson, *Passages from Antiquity to Feudalism*.
Marc Bloch, *Feudal Society*, 2 Vols.
Bloch, M. (1966). "The Rise of Dependent Cultivation and Seigniorial Institutions." in M.M. Postan (Ed.), *The Cambridge Economic History of Europe*, Volume 1. Cambridge: Cambridge University Press.
Cambridge History of Islam, 2 Vols.
Georges Duby, *The Early Growth of the European Economy*.
Finley, M.I. (1983). *Politics in the Ancient World*. Cambridge: Cambridge University Press
Kumar, R. (2018). *Ancient and Medieval World: From Evolution of Humans to the Crisis of Feudalism*, New Delhi: Sage
Le Goff, J. (1992) *Medieval Civilisation*, 400-1500, (translated by Julia Barrow), Oxford UK & Cambridge USA: Blackwell
Hodgson, Marshall G.S (1974). *The Venture of Islam, Conscience and History in a World Civilisation.* 3 Vols. Chicago and London
Lapidus, Ira M(1988). *History of Islamic Societies*. Cambridge
Frederick Mote (1990). *Imperial China:* 900-1800 .Cambridge.Mass.Harvard University Press

Butterfield, H.J (1958). *The Origins of Modern Science: 1300-1800*. New York.
Chaunu, Pierre (1979). *European Expansion in the later Middle Ages*. General Editor Richard Vaughan, Vol. 10. North-Holland Publishing Company. Amsterdam
Pirenne, Henry (1937). *Economic and Social History of Medieval Europe*.New York. Craft Production

Fourth Semester FYUGP (History 3/4)

Course Name: **History: Concepts and Ideas**

Credit : 4
Course level : 300-399

Course Outcome: After completion of this course a student will be able to:

- Explain the concepts and scope of History.
- Compare and contrast History with other disciplines.
- Analyse the traditions of historical writing.
- Evaluate critical issues relating to the subject of History.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

History : Nature and Scope

i) What is History? Definition and Scope
ii) The Subject Matter of History: A Brief Survey of Changing Perspectives
iii) Types of Historical Evidence: Archival, Archeological, Literary and Oral.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Categorization of History:

i) Economic
ii) Social
iii) Political
iv) Literary
v) Intellectual
vi) Diplomatic
vii) Universal
viii) Legal

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

History and other Disciplines

i) Archaeology
ii) Geography
iii) Sociology
iv) Economics
v) Political Science

vi) Philosophy
vii) Literature

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Traditions of Historical writing
i) Greco- Roman Traditions
ii) Chinese Tradition
iii) Traditions in Early India
iv) Traditions in Medieval India
v) History writing in Modern India

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Issues in Historical understanding
i) Writing History: Objectivity and Interpretation;
ii) Bias in History
iii)Periodization of Indian History: James Mill's periodization and the Nationalist critique

Readings:

Ali, B. Sheikh, 2022. (Reprint) *History: Its Theory and Methods*, Laxmi Publication
Sreedharan E., 2004. *A Textbook of Historiography* Orient BlackSwan
Carr, E.H., 2018. *What is History?* Penguin Paperbacks
Marwick, A, 1989. *The Nature of History,* Palgrave Macmillan
Cannadine, David, 2004. *What is History Now?* Palgrave Macmillan
Thapar, R, 2014. *The Past as Present,* Aleph Book Company
Thapar, R., Mukhia, Chandra, Bipan. 1969. *Communalism and the Writing of Indian History,* People's Publishing House.

4th Semester FYUGP (HISTORY 4/4)

Course Name: **Social and Economic History of India (Up to 1206 CE)**

Credit : 4
Course level : 300-399

Course Outcome: After completion of this course a student will be able to:

- Explain in general outline the economic history of Early India.
- Analyse the phases of development of economy from pastoral to Settled Agriculture.
- Identify major factors that influenced society and religions.
- Appreciate art and architecture of Ancient India

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Pre-History to Proto-History

(i) Hunting-Gathering Societies – Paleolithic
(ii) Advent of Food Production – Neolithic-Chalcolithic Cultures
(iii) First Urbanisation- Harappan Culture - Agriculture, Craft, Trade, Society, Religion and Art

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Transition from Rural to Urban

(i) Transition from Mixed Pastoral Economy to Settled Agriculture (1500-500 BCE)
(ii) Second Urbanisation in the Ganga Valley – Agriculture, Craft, Trade, Guilds and Labour
(iii) State Controlled Economy of the Mauryas
(iv) Post-Mauryan Economy – Trade Routes, Coinage, Urban Centres ; External Trade Networks – Indo-Roman, Indo-China

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society and Religion

(i) Emergence of Social Stratification – *Varna-jati*, *Varnashrama dharma*, Untouchability, Gender Relations
(ii) Emergence and Spread of Jainism, Buddhism and other Religious Sects
(iii) Puranic Religion
(iv) Emergence and Development of Bhakti

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Towards Early Medieval India (300-1200 CE)

(I) Land Grants, Changing Production Relations, Graded Land Rights and Peasantry, Debates on Indian Feudalism
(II) Patterns of Trade, Currency and Urban Settlements
(III) Land Grant Economy in South India – Brahmadeyas and Agraharas, Temple Economy (Cholas)

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Literature and Art

(i) Literature – Survey of Sanskrit, Pali, Prakrit and Tamil
(ii) Art and Architecture – Mauryan, Post- Mauryan, Gupta, Post- Gupta; Evolution of Regional Styles

Readings :

B.D. Chattopadhyaya, 1994. *The Making of Early Medieval India*, OUP, New Delhi.
B & F. Raymond Allchin, 1982. *The Rise of Civilization in India and Pakistan*, CUP.
B.P. Sahu (ed.), 1997. *Land System and Rural Society in Early India*, Manohar, New Delhi.
B. Stein, 1980. *Peasant State and Society in Medieval South India*, OUP, New Delhi.
D.D. Kosambi, 2016 *An Introduction to the Study of Indian History*, Sage Publications India Pvt. Ltd, New Delhi, (First Published 1956)
D.K. Chakrabarti, 2003, *India: An Archaeological History: From Paleolithic Beginnings to Early Historic Foundations*, OUP, New Delhi,
D.P. Agarwal, 1982. *The Archeology of India*, Curzon Press, London.

G.L. Possehl, 2003. *The Indus Civilization: A Contemporary Perspective*, Vistaar Publications, New Delhi,

R. Chakravarti (ed.), 2005. *Trade in Early India,* OUP, New Delhi.

R. Champakalakshmi, 1996. *Trade, Ideology and Urbanization: South India, 300 BC- AD 1300*, OUP, New Delhi.

R. Gurukkal, 2012. *Social Formations of Early South India*, OUP, New Delhi.

R.S. Sharma, 2004. *India's Ancient Past*, OUP, New Delhi.

R.S. Sharma, 2007. *Material Culture and Social Formations in Ancient India*, Macmillan, (2nd Edn.)

R.S. Sharma, 2005 (3rd revised Edn.) *Indian Feudalism*, *(circa, 300 - 1200 A.D)*, Macmillan, (First Published 1965)

R.S. Sharma, 1987. *Urban Decay in India, (c.300 – c.1000)*, Munshiram Manohar Lal, Delhi.

R.S. Sharma, 2003. *Early Medieval Indian Society: A Study in Feudalisation*, Orient BlackSwan, New Delhi.

R. Thapar, 2002. *The Penguin History of Early India: From the Origins to AD 1300*, Penguin, New Delhi.

S. Huntington, 2014. *The Art of Ancient India: Buddhist, Hindu and Jain*, Motilal Banarsidass, Delhi, (First Published, New York, 1985)

S.K. Maity, 1957. *Economic Life of North India in the Gupta Period (c. 300-500 A.D)*, The World Press, Calcutta.

S.K. Maity, 1970. *Early Indian Coins and Currency System*, Munshiram Manoharlal, Delhi.

U, Chakravarti, 1987. *The Social Dimensions of Early Buddhism*, OUP, New Delhi,

U. Singh, 2008. *A History of Ancient and Early Medieval India*, Pearson, New Delhi.

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Fifth Semester FYUGP (HISTORY 1/4)

Course Name : **Rise of the Modern West**

Credit : 4
Course level : 200-299

Course Outcome: On completion of this course, the students will be able to

- Explain the major trends and developments in the Western world between the 14th to the 16th century CE.
- Analyse the significant historical shifts and events and the resultant effects on the civilizations of Europe in the period.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Transition from feudalism (to capitalism):

[a]concepts of feudalism; regional variations

[b]The Crisis of Feudalism

[c]The transition debate: Maurice Dobb and Paul Sweezy; Marc Bloch, Georges Duby; the Brenner Debate

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Geographical explorations and early colonial expansion:

[a] Factors and motives behind voyages and explorations

[b] the conquests of the Americas:

[c] beginning of the era of colonization;

[d] mining and plantation; the African slaves.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Renaissance:

[a]Origins of Renaissance

[b]Humanism in Renaissance

[c] Italian influence on Art, Architecture, Culture, Education and Polity; Northern Humanism

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Reformation in the 16th century: Origin and impact

[a] Martin Luther, John Calvin, Zwingli

[b]The Radical Reformation: Anabaptists, Huguenots

[c] English Reformation and the state

[d] Counter Revolution

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economic developments of the sixteenth century:

[a] Development of science: Renaissance to the 17th century.

[b] Shift of economic balance from the Mediterranean to the Atlantic;

[c] Agricultural revolution, Enclosure movement;

[d] Commercial Revolution; Influx of American silver and the Price Revolution.

[e] Concepts of Mercantilism and Imperialism: Mercantilism in the 17th and 18th centuries.

Readings:

Fisher, H.A.L., 1938. *A History of Europe,* Eyre and Spottiswoode, London

Sinha, Arvind, 2010. *Europe in Transition from Feudalism to Industrialization*, Manohar Books, Delhi.

Hayes, C J H, 1982 (Third Indian Reprint) *Modern Europe Upto 1870*, Surjeet Publications, Delhi.

Phukan, Meenaxi, 2012. *Rise of the Modern West: Social and Economic History of Early Modern Europe,* Trinity Press Pvt. Ltd

Aston, T.S. and Philpin, C. H. E. (eds.) 1976, *The Brenner Debate: Agrarian Class Structure and Economic Development in Pre-Industrial Europe,* Cambridge University Press.

H. Butterfield, 1949 (1997 edition). *The Origins of Modern Science* Free Press.

Cipolla, Carlo M., 1976. *Fontana Economic History of Europe*, Vols. II and III. Barnes and Noble.

Cipolla, Carlo M., 1993 (3rd edition) *Before the Industrial Revolution, European Society and Economy.* 1000 -1700

Dobb, Maurice, 1947. *Studies in the Development of Capitalism.*

Hale, J. R., 2000, *Renaissance Europe.* Wiley Blackwell

Hall, A. Rupert, 1963. *From Galileo to Newton*. Dover Publications Inc.

Hill, Christopher, 2001. *A Century of Revolutions 1603-1714* Routledge

Hilton, Rodney, 1950 *Transition from Feudalism to Capitalism*, Verso Books

Lee, Stephen J., 1984 *Aspects of European History, 1494 - 1789*. Routledge

Parker, G., 2001. *Europe in Crisis. 1598- 1648.* Wiley Blackwell

Vries, Jan de, 1976. *Economy of Europe in an Age of Crisis 1600 - 1750*.Cambridge University Press.

Bath, Slicher van, 1963. *The Agrarian History of Western Europe. AD.500 - 1850.* Cambridge University Press

Elton, G. R., 1956. *Reformation Europe, 1517 -1556,* Harper Touchbooks

Gilmore, Myron P. 1962, *The World of Humanism. 1453 -1517.* Harper Touchbooks

Kriedte, Peter, 1983. *Peasants, Landlords and Merchant Capitalists,* Cambridge University Press.

Mathias, Peter, 1969. *The First Industrial Nation: The Economic History of Britain 1700–1914,* Routledge

Miskimin, Harry A., 1975. *The Economy of Later Renaissance Europe: 1300-1460*, Cambridge University Press.

Nauert, Charles G., 1995. *Humanism and the Culture of the Renaissance Europe,* Cambridge University Press.

Rice, Eugene F., and Grafton, Antony, 1994. *The Foundations of Early Modern Europe 1460-1559.* W.W. Norton and Company

Fifth Semester FYUGP (HISTORY 2/4)

Course Name: **History of Europe (1648-1870 CE)**

Credit : 4
Course level 300-399

Course Outcome: After the completion of this course the students will be able to

- Evaluate the historical evolution and political developments that occurred in Europe in the period between 1648 to 1870.
- Analyse the evolution of social classes, nation states, evolution of capitalism and nationalist sentiment in Europe.
- Relate to the variety of causes that dragged the world into devastating wars in the intervening period.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] End of Thirty Years' War
[b] Treaty of Westphalia and the new state system
[c] France under Henry IV, Richelieu and Mazarin
[d] Era of Louis XIV
[e] Bourbon succession to Spain

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Germanies in the Seventeenth and Eighteenth centuries
[b] Russia: Careers of Peter the Great and Catherine the Great; Warm Water Policy
[c] Conflict between Hohenzollern Prussia and Habsburg Austria
[d] British expansion: successes against Spain and foundation of Overseas Empire
[e] The British and American Revolutions : Causes and consequences

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The French Revolution : Crisis of *ancien regime*
[b] Causes :Intellectual currents and emerging Social classes.
[c] Phases of the French Revolution 1789 - 99.
[d] Napoleonic consolidation - reform and empire.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Congress of Vienna: Forces of conservatism & restoration of old hierarchies.
[b] Revolutionary and Radical movements, 1830 - 1848.
[c] Process of capitalist development in industry and agriculture: case Studies of Britain,France, the German States and Russia.
[d] Evolution and Differentiation of social classes: Bourgeoisie, Proletariat, land owning classes and peasantry.

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Eastern Question : The Crimean War

[b] Era of Second Napoleonic Empire : Napoleon III : Foreign Policy
[c] Unification of Italy
[d] Unification of Germany

Readings:

Hayes, C.J.H.,1953. *Modern Europe to 1870*
Lipson, E., 1960. : *Europe in the Nineteenth and Twentieth Century*
Hobsbawm, E.J. 1962: *The Age of Revolution 1789-1848.*
Baldwin, M.W. & : *History of Europe* (Relevant Chapters)
Thompson, D.: *Europe since Napoleon*
Fisher, H .A.L.*: History of Europe*, Book III
Cameron, Euan (ed.) : *Early Modern Europe An Oxford History,* New Delhi, 2004
Phukan, Meenaxi, 2000. : *Rise of the Modern West: Social and Economic History of Early Modern Europe*

Fifth Semester FYUGP (HISTORY 3/4)

Course Name: **History of East Asia : China and Japan (1839-1949)**

Credit : 4
Course level 300-399

Course Outcome: After completion of the course, a student will be able to

- Explain the gradual opening of China and the increasing influence of European powers therein.
- Analyse the reaction to Western imperialism up to the establishment of the Communist Republic in modern China.
- Describe Japan's transition from feudalism to modernity, internal reconstruction, changes in socio-economic and political structures up to the rise of militarism.

PART I: CHINA

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Opening Up of China

i) Opium Wars (1839 -1860), Unequal Treaties
ii) Increasing Western Economic Interests; Open Door Policy

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Emergence of Nationalism

i) Popular Movements: Taiping, Self-Strengthening Movement, Boxer Rebellion
ii) Nationalism in China: Revolution of 1911, Sun Yat Sen and Three Peoples Principles
iii) Emergence of the Republic and Yuan Shi Kai, Warlordism (1916-1925)
iv) New Intellectual Ideas and May Fourth Movement

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Communism in China

i) Political crisis in the 1920's
ii) Problem of early industrialisation
iii) Kuomintang and The First United Front
iv) Communist Party under Mao Tse-tung, Second United Front, Long March, The Chinese Revolution (1949), Establishment of the Peoples' Republic of China.

PART II: JAPAN

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

End of Isolation to Meiji Restoration

A. Pre- Restoration Period
i) Tokugawa Shogunate
ii) Japan and the West- Perry Mission, Harris Treaty
B. Meiji Restoration (1867-68)
i) Meiji Constitution; Rise of Political Parties
ii) Processes and nature of modernization: Abolition of feudalism, Industrialisation, Zaibatsu, military changes.

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Emergence of Japan as an Imperial Power

i) Sino- Japanese War, 1894-95
ii) Russo-Japanese War, 1904-05
iii) Washington Conference
iv) Manchurian Crisis: Rise of Militarism

Readings:

Beasley. W.G. 1963. *The Modern History of Japan*. London: Weidenfeld and Nicolson.

Clyde P. H. and B. F. Beers. 1972. *The Far East.* New Delhi: Prentice Hall of India.

Chow Tse-tung. 1962. *The May Fourth Movement: Intellectual Revolution in Modern China*. Cambridge: Harvard University Press.

Chesneaux. Jean et al. 1976. *China, From Opium Wars to the 1911 Revolution*. New York: Pantheon Books

Chesneaux. Jean et al. 1977. *China, From 1911 Revolution to Liberation*. New York: Pantheon Books

Fairbank, John K. *et al.,*1989. *East Asia: Tradition and Transformation.* Revised Edition. Cambridge, Massachusetts: Harvard University Press.

Hsu, Immanuel. 1970. *The Rise of Modern China.* New York: Oxford University Press.

Purcell, Victor. 1963. *The Boxer Uprising: A Background Study.* UK: Cambridge University Press.

Schurmann F. and Schell O. (eds). 1967. *Readings in China: The Eighteenth and Nineteenth Centuries.* New York: Penguin.

Vinacke, H.M. 1978. *A History of the Far East in Modern Times*. Delhi: Kalyani Publication.

Wright, Mary C. 1969. *China in Revolution: The First Phase, 1900 -1913.* New Haven, Connecticut: Yale University Press.

Fifth Semester FYUGP (HISTORY 4/4)

Course Name : **Social and Economic History of India (1206-1757 CE)**

Credit : 4
Course level : 300-399

Course Outcome: After completing the course, the students will be able to :

- Describe the changes in the society of medieval India including the rise of nobility and the Bhakti and Sufi movements.
- Analyse how the economy of Medieval India developed under the Sultanate and the Mughal rule.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society (13th-mid 16th century CE)

(a) Emergence of a new nobility; Changes in rural society
(b) Development of regional identities: art, architecture and literature
(c) Bhakti movements and monotheistic traditions in South and North India; Women Bhaktas; Nathpanthis; Kabir, Nanak and the Sant tradition: *Saguna* and *Nirguna*
(d) Ulema: Emergence and role
(e) Sufi *silsilas*: Chishti and Suhrawardi; doctrines and practices; social roles; literature

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy (13th to mid-16th century CE)

(a) *Iqta* and Iqtadari; revenue systems; revenue-free grants
(b) Agricultural production; technology
(c) Growth of urban centres Monetization; market regulations
(d) Trade and commerce: Overland trade; Indian Ocean trade

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society (mid-16th to 18th century CE)

(a) Incorporation of Rajputs and other indigenous groups in Mughal nobility
(b) Pressure from the *ulema*; Sufi mystical and intellectual interventions
(c) Land rights and revenue system; Zamindars and peasants; rural tensions

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy (mid-16th to 18th century CE)

(a) Crafts and technologies; Monetary system

(b) Markets; transportation; urban centres
(c) Indian Ocean trade network
(d) Extension of agriculture; agricultural production; crop patterns
(e) Trade routes and patterns of internal commerce; overseas trade; rise of Surat

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Issues and Debates

(a) Rural society: proliferation of castes; growth of artisanal groups
(b) Women in Medieval India : Role in polity; Position in Society
(c) 18th century debate: economic interpretations

Readings:

Alavi Seema (ed), 2008. *The Eighteenth Century in Indian History,* Oxford University Press

Chandra, Satish 2019 : *Medieval India from Sultanat to the Mughals*, Vols. I, II, Har Anand Publication

Majumdar, R.C. (ed) :*The History and Culture of the Indian People*, Vols. VI

Chitnis, K.N. 1990 : *Socio- Economic History of Medieval India,* Atlantic Publishers and Distributors.

Habib, Irfan 2013 (Third Edition): *Agrarian System of Mughal India 1556-1707*, Oxford University Press.

Habib, Irfan 2011.: *Economic History of Medieval India,* Pearson.

Habib, M & Nizami : *Comprehensive History of India*, Vol. V

Mehta, J.L. : *Advanced Study in History of Medieval India*, Vol. I & II

Nizami, K.A. :*Studies in Medieval Indian History and Culture*

Rashid, A :*Society and Culture in Medieval India*

Marshall, P.J. (ed), 2005. *The Eighteenth Century in Indian History,* Oxford University Press

Rizvi, S.A.A., 2005 :*The Wonder that was India*, Part-II : *A History of Sufism in India*, Picador

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Sixth Semester FYUGP (HISTORY 1/4)

Course Name: History of Assam (1826-1947 CE)

Credit : 4
Course level 200-299

Course Outcome: Upon completion of this course, students will be able to

- Describe the annexation of Assam by the imperialist British forces.
- Explain the expansion and consolidation of the British colonial rule in Northeast India.
- Analyse the development of nationalism in Assam and its role in India's freedom struggle.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Political condition in Assam on the eve of the British rule.
[b] Establishment and Consolidation of the British rule
[c] David Scott – Annexation of Lower Assam, Administrative Reorganisation and Revenue Measures of Scott
[d] ; Robertson – Administrative and Revenue measures; Jenkins' Administrative Measures

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a]Ahom Monarchy in Upper Assam (1833-38)
[b] Annexation of Cachar
[c]Early phase of Revolts and Resistance to British rule- Gomdhar Konwar, Piyali Phukan, U. Tirut Singh,
[d] The Khamti and the Singpho rebellion
[e] The 1857 Revolt in Assam and its aftermath.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Establishment of Chief Commissionership in Assam.
[b] Land Revenue Measures and Peasant Uprisings in 19th century Assam
[c] Growth of national consciousness – Assam Association, Sarbajanik Sabhas, Raiyat Sabhas.
[d] Government of India Act, 1919 – Dyarchy on Trial in Assam.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Non Co-operation Movement and Swarajist Politics in Assam
[b]The Civil Disobedience Movement
[c] Trade Union and Allied Movements
[d]Tribal League and Politics in Assam

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Quit India Movement in Assam.
[b] Cabinet Mission Plan and the Grouping Controversy
[c] The Sylhet Referendum.
[d] Migration, Line System and its Impact on Politics in Assam

Readings:

Barpujari, H. K : (ed) 1992. *The Comprehensive History of Assam, Vols. IV & V*. Publication Board Assam

Baruah, Swarnalata 1985 : *A Comprehensive History of Assam*, Munshiram Monoharlal Publishers Pvt. Ltd., New Delhi.

Goswami, Priyam 2012: *From Yandabo to Partition*, Orient Black Swan,.

Barpujari, H. K., Bhuyan, S.K., et. al. (eds.) 1999 (Second Edition). *Political History of Assam, Vol. I*., Publication Board Assam

Barpujari, H. K. 1980: *Assam in the Days of the Company,* Spectrum, Guwahati.

Bhuyan, A.C and De, S. (eds) 1999 (Second Edition). *Political History of Assam, Vols. II & III.* Publication Board Assam.

Bhuyan, A.C : (ed) 2000 *Nationalist Upsurge in Assam*, Publication Board, Assam.

Dutta, Anuradha 1991: *Assam in the Freedom Movement*, Darbari Prakashan, Calcutta.

Bora.S. 1996 :*Student Revolution in Assam*, Mittal Publications, Delhi

Chakravarti, B. C 1964 : *British Relations with the Hill Tribes of Assam*, Firma KLM, Calcutta

Guha, Amalendu :*Planters Raj to Swaraj, Freedom Struggle and Electoral Politics in Assam.*

Lahiri, R.M 1954 : *Annexation of Assam (1824-1854),* General Printers and Publishers, Calcutta.

Sixth Semester FYUGP (HISTORY 2/4)

Course Name : **Social and Economic History of Assam (Upto 1947 CE)**

Credit : 4
Course level : 200-299

Course Outcome: Upon completion of this course, students will be able to

- Analyse the socio-economic history of Assam including among others the development of caste system, religious beliefs, agriculture and land system.
- Explain the development trade and commerce, various agricultural regulations, plantation economy, development of modern industries, transport system, education, the emergence of middle class, development of literature and press, and growth of public associations.
- Appreciate the diversity of Assam.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society and Economy in Early Assam

[a] Proto-historic period: Myths and Legends
[b] Society: Varnashrama dharma, social classes
[c] Economy: land grants, expansion of agriculture, revenue and trade relations
[d] Religious beliefs and practices : Saivism, Vaishnavism, Saktism, animism.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society in Medieval Assam

[a] Social Organisation– Caste-Class Relationship, Nobility, *Paiks*, Slaves and Servants
[b] Neo-Vaishnavite Movement in Assam – Impact on Society
[c] Development of *Satra* Institutions; four *Sanghatis*

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy in Medieval Assam

[a] Agriculture and Land System – Classification and Ownership of Land
[b] Land Revenue and other Taxes
[c] Trade and Trade routes
[d] Economic Relations between the Hills and Plains : *Posa* system, khats.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy in Colonial Assam

[a] Agriculture Regulations and revenue system
[b] Plantation Economy of the Tea Industry
[c] Development of Modern Industries-Coal and Oil.
[d] Development of Transport System

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society in Colonial Assam

[a] Growth of Modern Education and the role of Christian Missionaries.
[b] Language Controversy in 19th century Assam
[c] Emergence of Middle Class
[d] Literary and Cultural Development: *Jonaki Yug, Ramdhenu Yug*.
[e] Development of Press and Growth of Public Associations – The Assam Sahitya Sabha.

Readings:

Barpujari, H.K.: (ed) 1992 : *The Comprehensive History of Assam*, Vol. I, III, IV & V, Publication Board, Assam.
Barua B.K. 1951: *A Cultural History of Assam,* K K Barooah, Nowgong, Assam
Baruah, S.L. 1985 : *A Comprehensive History of Assam*, Munshiram Monoharlal Publishers Pvt. Ltd., New Delhi,1985
Gogoi Nath, Jahnabi 2002: *Agrarian System of Medieval Assam*, Concept, New Delhi.
Guha, Amalendu 2022 (Reprint) :*Planters Raj to Swaraj: Freedom Struggle and Electoral Politics in Assam 1826-1947,* Tulika Books, Delhi.
Choudhury, P.C. 1959 :*History of Civilization of the People of Assam to the Twelfth Century A.D.,* DHAS, Guwahati.
Gait, E.A. 1906 : *A History of Assam*.
Guha, Amalendu 1990 :*Medieval and Early Colonial Assam,* K.P Bagchi& Co., Calcutta.
Medhi, S. B 1978 :*Transport System and Economic Development in Assam*, Publication Board, Assam.
Mahanta, P.K., 1921 (Fourth edition) *Asomiya Madhyabritya Srenir Itihas,* Purbanchal Prakash, Guwahati
Nath, D. (ed) 2011:*Religion and Society in North East India*, DVS, Guwahati.
Saikia, Rajen 2002 :*Social and Economic History of Assam (1853- 1921),*Manohar Books.
Sarma, S.N. 2001 (Reprint) : *A Socio Economic and Cultural History of Medieval Assam 1200-1800 A.D.*, Guwahati, Bina Library, Guwahati
Sharma, Monorama 1990 : *Social and Economic Change in Assam: Middle Class Hegemony,* Ajanta Publications.

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Sixth Semester FYUGP (HISTORY 3/4)

Course Name : **History of Europe (1870-1945 CE)**

Credit : 4
Course level 300-399

Course Outcome: After completing the course, the students will be able to :

- Explain the major political developments in Europe from 1870 to 1939.
- Describe how the rise of two unified nations of Germany and Italy gave rise of intense imperialist contest the world over.
- Analyse the causes and consequences of World War I and the developments leading to World War II.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Treaty of Frankfurt (1871) : Impact on Germany and Italy
[b] *Kulturkamph* : Conflict between the Church and State
[c] Foreign policy of Germany under Bismarck

[c] The Paris Commune
[c] Imperialism in Africa

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Eastern Question: Role of Imperialist powers
[b] Russo-Turkish War and the Berlin Congress
[c] Rise of nationalism and the Balkan Wars.
[d] Triple Alliance
[e] Triple Entente

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The First World War: Causes and consequences
[b] The Paris Peace Conference and the Peace Settlements
[b] League of The Nations – Origin and activities
[c] The Bolshevik Revolution (1917) – Rise of the USSR

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Rise of Nazism – Germany under Hitler
[b] Rise of Fascism - Italy under Benito Mussolini
[c] The Spanish Civil War
[d] Policy of appeasement

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] European involvement in East Asia
[b] Anglo-Japanese Treaty (1902)
[c] Russo-Japanese War (1904-05)
[d]The Second World War: Causes and Course

Readings:

Hayes, C J H : 1953. *Contemporary Europe Since 1870.* Macmillan Company, New York.
Hazen, C.D. 1919, *History of Europe, 1870-1919,* London G Bells & Co.
Carr, E.H., 1961, *International Relations Between the Two World Wars 1919-1939*, Palgrave Macmillan
Thompson D 1923 : *Europe since Napoleon,* Longmans, London
Lipson E 1960 : *Europe in 19th and 20th Centuries,* A. & C. Black, London,
Vernadsky, H., 1961 : *A History of Russia,* Yale University Press
Fisher, H.A.L 1916 (first published) : *A History of Europe,* Edward Arnold Publishers Ltd., London
Fay, Sidney Bradshaw, 1930. *The Origins of World War Vol. I,* The Macmillan Company, New York

Sixth Semester FYUGP (HISTORY 4/4)

Course Name : **Social and Economic History of India (1757-1947 CE)**

Credit : 4
Course level : 300-399

Course Outcome: After completing the course, the students will be able to :

- Describe how the imperial British rule economically exploited India and caused drain of wealth.
- Analyse how the colonial encounter effected social change in India.
- Appreciate the socio-cultural diversity of India.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Indian Economy at the advent of British rule

[b] Early Phase of Colonial Economy: Mercantilism, British overseas trade

[c] Decline of Traditional Industries : De-industrialization

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Agrarian Settlements: Permanent settlement; Ryotwari settlement; Mahalwari settlement.

[b] Commercialization of agriculture and Rural indebtedness

[c] Famines.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Trade and fiscal policy,

[b] Development of Railways and Indian Economy

[c] Emergence of Indian Industries and capitalist enterprise.

[d] Banking and Currency.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a]Social consequence of the transformation of Indian agriculture : rise of new social classes zamindars, tenants, kisans; emergence of middle class.

[b] Impact of modern education; Emergence of new intelligentsia and its composition.

[c]The advent of printing and its implications

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Socio-Religious Reform Movements: Reform and Revival: Brahmo Samaj, Prarthna Samaj, and Ramakrishna and Vivekananda, Arya Samaj, Wahabi, Deoband, Aligarh and Singh Sabha Movements.

[b] Changing caste equations.

[c] Women: Changing position and attitudes.

[d] Women's issues: property rights, reform legislation, political participation.

Readings:

Chandra, B 1990: *The Rise and Growth of Economic Nationalism in India*, Peoples Publication House, New Delhi.

Bandyopadhyay, Sekhar, 2004*: From Plassey to Partition: A History of Modern India*, Orient Longman Ltd. Hyderabad.

Banerjee Dube, Ishita, 2014 :*History of Modern India,* Cambridge University Press, New Delhi.

Sarkar, Sumit, 1983: *Modern India*, Macmillan, New Delhi.

Desai, A. R., 1990 : *Social Background of Indian Nationalism*, Popular Publication, New Delhi,.

Gopal, S., 1992 :*The British Policy in India, 1858-1905*, McMillan, New Delhi.

Jones, K.W., 1999:*Socio-Religious Reform Movements in British India*, Cambridge University Press, New Delhi.

Kumar, Ravinder, 1983. *Essays in the Social History of Modern India,* Oxford University Press, New Delhi.

Roy, Tirthankar, *The Economic History of India,* Oxford University Press, New Delhi, 2006.

Kumar, Dharma (Ed.) 2010The Cambridge Economic History of India, Vol. II, 1757-2003, Orient Blackswan, Delhi.

Bhattacharya, Sabyasachi (ed.), 2015. *Essays in Modern Indian Economic History,* Primus Books, New Delhi.

Dutt, R.P., 1940. *India To-day*, Victor Gollancz Ltd. London

Forbes, Geraldine, 1999., *Women in Modern India,* Cambridge University Press, New Delhi.

Kaushal, G., 1979. *Economic History of India 1757-1966,* Kalyani Publishers, New Delhi,

Bayly, Susan, 1999. *The New Cambridge History of India IV-3 Caste, Society and Politics in India from the Eighteenth Century in the Modern Age,* Cambridge University Press, New Delhi.

Vishwanathan, Gauri, 1998. *Masks of Conquest, Literary Studies and British Rule in India*, Oxford University Press.

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LIST OF 15 CORE PAPERS [PHILOSOPHY]

CORE [PHILOSOPHY] - I

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIRST
d. Course Name: **ANCIENT INDIAN THOUGHT**
e. Existing Base Syllabus: NA
f. Course Level: 100-199
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:**Vedic Thought**	-Saṃhita: Meaning, Theology, Cosmology, Ethics -Brāhmaṇas: Meaning, General Character, Theory of Sacrifice, Ethics -Āraṇyakas and Upaniṣads: Meaning, Doctrines of Upaniṣads	15	25
II:**Non-Vedic Thought**	-Bauddha: Four Noble Truths, Impermanence and Momentariness, No-soul -Jaina: Anekāntvāda, Syādvāda, Bondage and Liberation -Cārvaka: Theory of Knowledge, Rejection of Transcendental Entities, Ethics	15	25
III: **Smriti and Epics**	-Manusaṃhita: Dharma -Mahābhārata: Religion, Dharma -Rāmāyaṇa: Idea of Perfect Life	15	25
IV : **Pūrāṇas**	-Pūrāṇa: Meaning, Origin -Pūrāṇa: Content -Pūrāṇa: Ethics	15	25

h. Reading list:

Chatterjee, S. and D. Dutta : *An Introduction to Indian Philosophy*

Dasgupta, S. A : *History of Indian Philosophy. Volume I*

De, S.K., U. N. Ghosal, A. D. Pusalker, R.C. Hazra (eds) : *The Cultural Heritage of India. Volume III*

Keith, A. B : *The Religion and Philosophy of the Veda and Upanisads. Volume II*

Radhakrishnan, S : *Indian Philosophy. Volume I*

Sinha, Jadunath : *Indian Philosophy. Volume I*

Winternitz, M : *A History of Indian Literature. Volume I*

i. Graduate Attributes

i. Course Objectives :

-The Course introduces the students to thoughts which were available in ancient India.
-The Course introduces the ideas and concepts which helped systems of Indian Philosophy to develop.
-The Course introduces the students to the objectives towards which knowledge was directed in ancient India.

ii. Learning Outcomes:

- At the completion of the Course, a student is expected to be able to articulate the distinct areas of thoughts of ancient India.
- At the completion of the Course, a student is expected to be able to determine the characteristics/ distinguishing marks of a specific area of thought in ancient India.
- At the completion of the Course, a student is expected to be able to identify/ trace ideas of ancient India that have continued.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Shakuntala Bora, Gauhati University, shakuntalabora@yahoo.com

CORE [PHILOSOPHY]- II

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SECOND
d. Course Name: **GREEK PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-2016
f. Course Level: 100-199
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Pre- Socratics**	-The Milesians: Thales, Anaximander, -The Eleatics: Parmenides, Zeno -The Physicists: Heraclitus, Empedocles	15	25
II: **Sophists and Socrates**	-Protagoras and Gorgias -Socrates' Method -Socrates' Virtue	15	25
III: **Plato**	-Knowledge and Opinion -Theory of Forms -Justice	15	25
IV : **Aristotle**	-Forms and Matter -Causation -Actuality and Potentiality	15	25

h. Reading list:

Stace W.T: *A Critical History of Greek Philosophy*

Barnet J: *Early Greek Philosophy*

B.A.G. Fuller: *History of Philosophy*

F. Copleston : *History of Philosophy, Volume I*

Zeller: *Outlines of Greek Philosophy*

Gomperz: *The Greek Thinkers*

W.K.C. Guthrie: *History of Greek Philosophy*

B.N. Moore: *Philosophy- The Power of Ideas*

ii. Graduate Attributes

i. Course Objectives :

-The objective of the course is to introduce the student to the main tenets of Greek philosophy.

-The objective is to trace the origin of Greek philosophy, beginning from Pre-Socratic to Socrates, Plato and Aristotle.

ii. Learning outcomes:

- It will give the students a comprehensive understanding of early Greek Philosophy. -
-The student will learn about the questions concerning virtue, justice, theory of forms, and causality.

-The student will learn about the different philosophical theories about the composition of the stuff that makes up the world .

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Akoijam Thoibisana, Gauhati University, akoijamthoibisana@gauhati.ac.in

CORE [PHILOSOPHY]- III

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: THIRD
d. Course Name: **INTRODUCTION TO SYSTEMS OF INDIAN PHILOSOPHY**
e. Existing Base Syllabus: NA
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:**Bauddha-Jaina**	-Bauddha: Source Books and Doctrines of Abhidhamma Buddhism, Source Books and Doctrines of Mahāyāna Buddhism -Jaina: Source Books, Sects, Atheism	15	25
II:**Sāṅkhya-Yoga**	-Sāṅkhya: Early School of Sāṅkhya, Source Books, Basic Doctrines -Yoga: Source Books, Basic Doctrine	15	25
III:**Nyāya-Vaiśeṣika**	-Nyāya: Source Books, Aim and Scope, Basic Doctrines -Vaiśeṣika: Source Books, Aim and Purpose, Basic Doctrines	15	25
IV : **Mīmāṃsā-Vedānta**	-Pūrva-Mīmāṃsā: Source Books, Aim and Purpose, Basic Doctrines -Vedānta: Source Books, Aim and Purpose, Basic Doctrines	15	25

h. Reading list:

Chatterjee, S. and D. Dutta : *An Introduction to Indian Philosophy*

Dasgupta, S : *A History of Indian Philosophy. Volume I*

Mullar, Max : *The Six Systems of Indian Philosophy*

Radhakrishnan, S : *Indian Philosophy. Volume I & II*

Raju, P. T : *Structural Depth of Indian Thought*

Sinha, Jadunath : *Indian Philosophy. Volume I & II*

Sharma, C : *A Critical Survey of Indian Philosophy*

iii. Graduate Attributes

i. Course Objectives :

-The Course introduces the students to systems of Philosophy which developed in India before the widespread influence of outside thoughts.
-The Course introduces the students to the books and scholars need to be studied to have a proper understanding of the systems.
- The Course introduces the students to the basic ideas and thoughts of each specific system.

ii. Learning outcomes:

-At the completion of the Course, a student is expected to be able to name the systems of philosophy that originated in India before outside influence became prevalent.
- At the completion of the Course, a student is expected to be able to identify the books and scholars to be studied to develop an understanding of a definite system of Indian Philosophy.
-At the completion of the Course, a student is expected to be able to state the basic concepts and theories that are specific to a system.

j. Theory credit : 4
k. Practical credit: NA
l. No. of required Classes: 60
m. No. of contact Classes: 45
n. No. of non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Shakuntala Bora, Gauhati University, shakuntalabora@yahoo.com

CORE [PHILOSOPHY]- IV

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **INTRODUCTION TO WESTERN PHILOSOPHY**
e. Existing Base Syllabus: PHI-HG-1016
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:	-Definition, Nature and Scope of Philosophy -Branches of Philosophy	15	25
II:	-Substance: Descartes, Spinoza, Leibnitz -Hume: causality -Kant: Space and Time	15	25
III:	-Empiricism, Rationalism -Scepticism -Criticism	15	25
IV :	-Realism -Idealism -Absolutism	15	25

h. Reading list:

Descartes: *Discourse on Method; Meditation on First Philosophy*

Spinoza: *Ethics (Part I: Concerning God; and Part 2: On the Nature and Origin of the Mind)*

Leibniz: *Monadology*

Locke: *An Essay Concerning Human Understanding (Book I: Neither Principles nor Ideas Are Innate; and Book 2: Of Ideas)*

Berkeley: *Three Dialogues between Hylas and Philonous (The First Dialogue)*

Hume: *An Enquiry Concerning Human Understanding (Part I, Section II and III: The Origin and Association of Ideas; Part II, Section VII: Of the Idea of Necessary Connexion)*

Kant: *Prolegomena to Any Future Metaphysics*

Hegel: *Phenomenology of the Spirit*

Anthony Kenny: *A New History of Philosophy*

Barlingay and Kulkarni: *Critical History of Western Philosophy*

D.W. Hamlyn: *Routledge History of Philosophy*

B.N. Moore and K. Bruder: *Philosophy- The Power of Ideas*

F. Thilly: *A History of Philosophy*

F. Copleston: *A History of Western Philosophy*

R. Scruton: *A Short History of Modern Philosophy*

i. Graduate Attributes

i. **Course Objectives :**

- The course will introduce the students to the history of Modern Western Philosophy.
- Philosophers like Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, as well as the German Idealists like Kant and Hegel will be studied.
- The questions that concern these philosophers and their intensive argument will be read.

ii. Learning Outcomes:

-The course will enable students to understand various philosophical concepts like substance, causality, space and time, etc.
- Students will become familiar with certain ways of putting arguments about the concepts
- Students will also learn the different approaches taken up by rationalism, empiricism and critical thinkers in understanding the concepts.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of required Classes: 60
m. No. of contact Classes: 45
n. No. of con-contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Akoijam Thoibisana, Gauhati University, akoijamthoibisana@gauhati.ac.in

CORE [PHILOSOPHY]-V

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **THEORY OF KNOWLEDGE (INDIAN)**
e. Existing Base Syllabus: NA
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Prama and Aprama -Pramanyavada -Debate on Smriti	15	25
II:	-Pratyaksa: Meaning; Definition (Nyaya, Buddhism, Jaina, Mimamsa, Vedanta) -Anumana: Meaning; Definition (Nyaya, Buddhism, Jaina, Mimamsa, Vedanta)	15	25
III:	-Sabda: Meaning; Definition (Nyaya, Jaina, Mimamsa, Vedanta) -Upamana: Meaning; Definition (Nyaya, Mimamsa, Vedanata) Arthapatti, Anupalabdhi: Meaning; Definition (Mimamsa, Vedanata)	15	25
IV :	-Khyativada: Anyathakhyati, Viparitakhyati -Akhyati, Atmakhyati -Satkhyati, Anirvacaniyakhyati	15	25

h. Reading list:

Chatterjee, S.C: *Nyaya Theory of Knowledge*

Datta, D. M : *Six Ways of Knowing*

Devaraja , N.K: *Advaita Theory of Knowledge*

Kar, V: *Indian Theories of Error*

Sinha, J. N : *Indian Philosophy, Vol I & II*

Dasgupta, S.N: *History of Indian Philosophy*

i Graduate Attributes

i. Course Objectives :

-The course is introduced to make the students familiar with the traditional analysis of knowledge.
-The course is introduced to make the students familiar with the *pramanas* as accepted in the various schools of Indian Philosophy.
-The course is introduced to acquaint the students with various theories of truth and error.

ii. Learning outcomes:

-The course is expected to make the students know how to categorize various theories of knowledge advocated by the schools of Indian Philosophy.
-The course is expected to make the students know how to distinguish various kinds of valid knowledge and to explain the sources of valid knowledge.
- The course is expected to make the students able to analyze various theories of validity and invalidity of knowledge and theories of error.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of required Classes: 60
m. No. of contact Classes: 45
n. No. of non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE [PHILOSOPHY]-VI

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **ETHICS**
e. Existing Base Syllabus: PHI-HC-3036
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:	-Introduction to Ethics, Definition, Nature and Scope of Ethics, -Utility of Ethics -The Psychological Basis of Ethics: Moral and Non moral action, Voluntary and Non Voluntary actions	15	25
II:	-Moral Concepts: Right and Wrong, Good and Bad, Duty, Ought, Virtue and Vice, Justice -Moral Judgment: Nature of Moral Judgments -Distinction between value judgment and factual judgment	15	25
III:	-Virtue Ethics -Deontological Ethics -Utilitarianism	15	25
IV :	-Ethics and Conflict of Interests and Duties -Freedom and Responsibility -Theories of Punishment: Deterrent, Reformative and Retributive Theory	15	25

h. Reading list:

Bernard Williams: *Ethics and the Limits of Philosophy*

Plato: *Republic*

Aristotle: *Nicomachean Ethics*

Kant : *Groundwork for the Metaphysic of Morals*

John Stuart Mill: *Utilitarianism*

J.C. Smart and Bernard Williams : *Utilitarianism: For and Against*

Peter Singer (ed.): *Applied Ethics*

David Bostock: *Aristotle's Ethics*

N. Pappas : *Routledge Philosophy Guidebook to Plato and the Republic*

W. David Ross: *Foundations of Ethics*

John S. Mackenzie: *Manual of Ethics*

William K . Frankena : *Ethics*

i Graduate Attributes

i. Course Objectives :

-The course attempts to introduce students to the fundamental questions of moral philosophy, with attention to both classic and contemporary readings. What determines the right action from wrong, and how to act morally? How do we decide what morality demands of us in some situations? etc.
- The course also addresses some issues of current moral debate.

ii. Learning outcomes:

- The course will develop analytic and critical thinking regarding ethical dilemmas.
- The course will enhance the ability to apply ethical principles in decision making.
- Students will be able to see how moral principles are involved in different concrete situations.
- It will help the students develop critical thinking on prejudices, superstitions and dogmatic behavior in the domain of ethics

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Padmadhar Choudhury, Gauhati University, padmadhar@gauhati.ac.in

CORE [PHILOSOPHY]-VII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **TRADITIONAL LOGIC**
e. Existing Base Syllabus: PHI-HC-1026
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Basic Logical Concepts**	-Nature and Scope of Logic, Use of Logic -Argument and Argument Form, Differences between Deduction and Induction -Truth and Validity	15	25
II:**Categorical Propositions and Immediate Inference**	-Four Categorical Propositions—A, E, I and O; Distribution of Terms -Translating Ordinary Proposition into Categorical Form, Traditional Square of Opposition -Immediate Inference: Conversion, Obversion and Contraposition	15	25
III: **Categorical Syllogism**	-Mediate Inference: Standard Form Syllogisms, Figure and Mood -Venn Diagrams for Categorical Propositions -Testing validity of Syllogisms by Venn Diagram	15	25
IV : **Syllogism in Ordinary Language**	-Enthymemes, Sorites -Disjunctive and Hypothetical Syllogisms -Dilemma	15	25

h. Reading list:

Chakraborti, Chhanda: Logic: *Informal, Symbolic & Inductive*

Copi, I. M. & Cohen, Carl: *Introduction to Logic*

Hurley, Patrick: *Introduction to Logic*

i Graduate Attributes

i. Course Objectives :

- The course introduces students to the basics of traditional logic (Aristotelian) logic.
- The course is designed to introduce the students the basic concepts and terms used in reasoning and argumentation.
- The course introduces the students the methods and principles for distinguishing correct from incorrect reasoning.

ii. Learning Outcomes:

- On the completion of the course students will be able to distinguish valid and invalid deductive arguments.
- The students will be able to identify the basic logical structure of arguments in ordinary language by translating them into proper logical form.
- The students will be able to construct valid syllogisms, and they will learn about syllogisms in ordinary language.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr Jahnabi Deka, Gauhati University, jahnabideka@gmail.com

CORE [PHILOSOPHY]-VIII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **PHILOSOPHY OF RELIGION**
e. Existing Base Syllabus: PHI-HC-4026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Philosophy of Religion: Definition, Nature and Scope -Distinction between Philosophy of Religion and Theology -Mysticism	15	25
II:	-Cosmological Argument -Ontological Argument -Teleological Argument; Moral Argument	15	25
III:	-Reason, Faith, Revelation -Immortality of Soul -Miracle; Incarnation	15	25
IV :	-Deism, Pantheism, Panentheism -Anti-religious theories- Logical Positivism, Marxism -Freedom of will	15	25

h. Reading list:

John Hick: *Philosophy of Religion*

John Hick: *Classical and Contemporary Readings in the Philosophy of Religion*

Miall Edwards: *Philosophy of Religion*

B. Mitchell: *Philosophy of Religion*

Peterson and Others: *Reason and Religious Belief: An Introduction to the Philosophy of Religion*

i. Graduate Attributes

ii. **Course Objectives :**

-The course is introduced to acquaint the students with the meaning, nature and scope of Philosophy of Religion.
-The course is introduced to make the students familiar with basic religious concepts along with its philosophical significance.
-The course is introduced to develop in the students a critical and philosophical outlook towards various faiths and dogmas.

iii. Learning Outcomes:

-The course is expected to enable the students to provide philosophical justification of the important religious concepts like proofs for the existence of God, relation between God and the world, faith and reason, etc.
-The course is expected to enable the students to justify the issues of immortality of the soul, freedom of the will, miracle, incarnation, etc.
-The course is expected to provide the students with proper understanding and clarification of the concepts.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE [PHILOSOPHY]-IX

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **THEORY OF REALITY (INDIAN)**
e. Existing Base Syllabus: NA
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Māyā and Jagat: Advaita Vedānta -Acit: Viśiṣṭādvaita Vedanta -Guṇa ; Prakṛti: Sāṅkhya	15	25
II:	-Brahman and Iśvara: Advaita Vedānta, Viśiṣṭādvaita Vedanta, Nyāya-Vaiśeṣika -Jīva: Advaita Vedānta, Viśiṣṭādvaita Vedanta -Puruṣa: Sāṅkhya	15	25
III:	-Padārtha: Nyāya -Padārtha: Vaiśeṣika -Tattva: Jaina	15	25
IV :	-Theories of Evolution and Illusion (*Pariṇāmavāda, Vivartavāda*) -Theory of Atomic Agglomeration (*Ārambhavāda*) -Theory of Dependent Co-origination (*Pratītyasamutpāda*)	15	25

h. Reading list:

Chatterjee, S. and D. Dutta : *An Introduction to Indian Philosophy*

Dasgupta, S : *A History of Indian Philosophy. Volume I*

Mullar, Max : *The Six Systems of Indian Philosophy*

Radhakrishnan, S : *Indian Philosophy. Volume I & II*

Sinha, Jadunath : *Indian Philosophy. Volume I & II*

Sinha, J: *Indian Realism*

Sharma, C : *A Critical Survey of Indian Philosophy*

i Graduate Attributes

i Course Objectives :

-The Course introduces the students to what is considered as reality by various systems of Indian Philosophy.
- The Course introduces the students to ideas of reality, whose knowledge is considered as essential by systems of Indian Philosophy.
- The Course introduces the students to Concepts which are considered as essential by systems of Indian Philosophy for having understanding of reality.

ii. Learning outcomes:

-At the completion of the Course, a student is expected to be able to state clearly what are the different realities admitted by different systems of Indian Philosophy.
-At the completion of the Course, a student is expected to be able to explain the nature of the realities as accepted by systems of Indian Philosophy.
-At the completion of the Course, a student is expected to be able to point out and elucidate the concepts whose understanding is considered as important by systems of Indian Philosophy for understanding the nature of reality.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Shakuntala Bora, Gauhati University, shakuntalabora@yahoo.com

CORE [PHILOSOPHY]-X

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **ANALYTIC PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-5016
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Introduction to Analytic Philosophy, Distinction between Classical Philosophy and Analytic Philosophy -Analytic Philosophy as a revolt against traditional Philosophy -Brief introduction to prominent philosophers of Analytic Philosophy	15	25
II:	-G. E. Moore: A defence of Common Sense (Textual Study)	15	25
III:	-Russell**:** On Denoting (Textual Study)	15	25
IV :	Early Wittgenstein: Picture Theory of Meaning (Textual Study)	15	25

h. Reading list:

Moore, G. E. : "*Defence of Common Sense*"

Russell, B : *"On Denoting"*

Wittgenstein, L: *Tractatus Logico-Philosophicus*

Ammerman, R.R .(ed) : *Classics of Analytic Philosophy*

Gross, B.R : *Analytic Philosophy*

Pitcher, G : *Philosophy of Wittgenstein*

Pradhan, R.C : *Recent Developments in Analytic Philosophy*

i.Graduate Attributes

i. Course Objectives :

- The course is designed to get the students acquainted with one of the most influential schools of Contemporary Western Philosophy.
- The course introduces to the students analytic philosophers like G. E. Moore, Bertrand Russell and Early Wittgenstein.

ii. Learning Outcomes:

- The students will be able to understand the features of analytic philosophy, and will be able to distinguish between classical philosophy and analytic philosophy.
- The students will understand the importance of language in dissecting philosophical issues.
- The students will be able to inculcate critical and reflective thinking.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Prof. Sauravpran Goswami, Gauhati University, sauravpran2@gauhati.ac.in

CORE [PHILOSOPHY]-XI

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **SYMBOLIC LOGIC**
e. Existing Base Syllabus: PHI-HC-2026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Introduction to Symbolic Logic**	-Symbolic Logic –its development -Nature and Scope of Symbolic Logic -Symbols and their uses	15	25
II:**Logical Connectives and Symbolization**	-Simple and Compound Statements -Logical Connectives and Variables -Symbolization of everyday language	15	25
III: **Truth Function and Truth Table Method**	-Truth Functions, Interdefinability of Logical Connectives -Construction of Truth Tables -Determining Tautology, Contradiction and Contingent Statements; and validity of arguments (Direct and Indirect) by using Truth Tables, Decision Procedure	15	25
IV:**Method of Deduction**	-Formal Proof of Validity -Rules of Inference and Rules of Replacement -Construction of Formal Proof of validity for arguments	15	25

h. Reading list:

Chakraborti, Chhanda: *Logic: Informal, Symbolic & Inductive*

Copi, I. M : *Symbolic Logic*

Copi, I. M. & Cohen, Carl: *Introduction to Logic*

Hurley, Patrick: *Introduction to Logic*

i . Graduate Attributes

i. Course Objectives :

- The course introduces students to the basics of symbolic logic (modern deductive logic).
- The course introduces tools for symbolizing everyday language and arguments using symbolic notation.
- The course is designed to introduce the students the formal principles and techniques of modern symbolic logic for distinguishing valid arguments from the invalid arguments.

ii. Learning Outcomes:

- On the completion of the course, students will be able to break down an argument and analyze the truth conditions of its component parts.
- The students will be able to symbolize everyday language.
- The students will be able to construct formal proof of validity.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr Jahnabi Deka, Gauhati University, jahnabideka@gmail.com

CORE [PHILOSOPHY]-XII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **SOCIAL AND POLITICAL PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-4036
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:	-Nature and Scope of Social and Political Philosophy -Concept of Individual and Society, Relation between Individual and Society -Different Theories concerning evolution of society	15	25
II:	-Socialism: Marxism, Class Struggle -Democracy -Human Rights and Gender Justice	15	25
III:	-Mahabharata: Dandaniti, Rajdharma -Law and Governance -Lokasamgraha	15	25
IV :	-Kautilya: Sovereignty, Seven Pillars of state craft -Society, Social Life -Internal security, External affairs	15	25

h. Reading list:

Chatterjee, P.B: *A Handbook of Social Philosophy*
Robert N. Beck: *Handbook in Social Philosophy*
Garcia, Manuel B : *Introductory Sociology: A Unified Approach*
George Sabine: *A History of Political Theory*
J. Sinha: *Outlines of Political Philosophy*

Priyanka Pandey : *Rajdharma in Mahabharata*

Sitansu S. Chakravarty: *Ethics in the Mahabharata*

Kavita A. Sharma & Indu Ramchandani : *Teachings from the Mahabharata*

Kautilya- Chanakya Arthasastra: *A Treatise on the Art of Government*

R. Shmasastry: *Kautilya's Arthasastra*

i.Graduate Attributes

i. **Course Objectives :**

-To explore different theories and concepts regarding the evolution of the society and the individual.

-To make a critical analysis regarding the relation between society and individual.

-To make learners aware of the problems faced by the individual in the society in the name of class and caste division, gender discrimination etc.

-The course will explore how social systems, political beliefs and public institutions can impact human flourishing.

-The course is introduced to make the students familiar with various social and political concepts as found in the Mahabharata and in the Arthsastra

ii. **Learning Outcome:**

- Learners will be able to express thoughts on some major philosophical questions in the area of social philosophy with respect to the intellectual and historical developments of the questions.

- Learners will be able to articulate some of the major problems.

- Students will be able to think about questions like 'how should human beings live together?' , 'what sort of society should we aim at?,' etc.

- Learners will have a clear vision of human rights and gender discrimination, which will help them understand some social and political prejudices.

- The course is expected to make the students describe as well as analyse the social and political concepts such as rajadharma, dandaniti, lokasamgraha, seven pillars of state craft as found in these two sastras.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Padmadhar Choudhury, Gauhati University, padmadhar@gauhati.ac.in, and Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE[PHILOSOPHY]-XIII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **CONTEMPORARY INDIAN PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-4016
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	- K.C. Bhattacharya: Concept of Philosophy, Absolute and its alternative forms -Aurobindo: Evolution , Integral Yoga	15	25
II:	-Vivekananda: Practical Vedanta, Universal Religion -Tagore: Concept of Man, Humanism	15	25
III:	-Radhakrishnan: Religious Experience, Intellect and Intuition - Iqbal: Intuition, Self	15	25
IV :	-Gandhi: Truth and Non-violence, Religion, Sarvodaya, Trusteeship -Ambedkar: Social Justice, Democracy	15	25

h. Reading list:

K.C. Bhattacharya: *Studies in Philosophy, Vol II*

K. Bagchi: *The Philosophy of K.C. Bhattacharya*

S.K. Maitra: *An Introduction to the Philosophy of Sri Aurobindo*

Complete Works of Swami Vivekananda (relevant chapters)

R.N. Tagore: *Religion of Man*

S. Radhakrishnan: *An Idealist View of Life*

M. Iqbal: *The Secrets of Self; The Mysteries of Selflessness*

D.M. Datta: *The Philosophy of Mahatma Gandhi*

D. Keer : *Ambedkar, Life and Mission*

Nilima Sharma: *Twentieth Century Indian Philosophy*

D. M. Datta: *Chief Currents of Contemporary Philosophy*

i . Graduate Attributes

i . Course Objectives :

-The course is introduced to make the students familiar with the contemporary approach to philosophy.
-The course is introduced to acquaint the students with the philosophical ideas of contemporary Indian philosophers like K.C. Bhattacharya, Aurovindo, Vivekananda, Tagore, Radhakrishnan, Iqbal, Gandhi and Ambedkar.

ii .Learning Outcomes:

- The course is expected to make the students learn how to compare the contemporary approach to philosophy with the traditional one.
- The course is expected to make the students explain as well as analyze the concepts as found in the philosophies of these philosophers
- The course is expected to make the students revise their philosophical outlook in the light of contemporary Indian philosophy.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE[PHILOSOPHY]-XIV

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **EXISTENTIALISM**
e. Existing Base Syllabus: PHI-HC-5026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Kierkegaard**	-The three stages of human existence -Subjectivity and Truth	15	25
II: **Nietzsche**	-Nihilism, Perspectivism, The Death of God -The Superman, The Will to Power	15	25
III: **Heidegger**	-*Dasein*; Being-in-the-world -Care and the Problem of Primordial Truth	15	25
IV : **Sartre**	-Existentialism; Being -Freedom and Bad-Faith	15	25

h. Reading list:

Kierkegaard: *Concluding Unscientific Postscript*

Nietzsche: *The Will to Power; Basic Writings of Nietzsche*

Heidegger: *Being and Time [Part One:: Division One : Preparatory Fundamental Analysis of Dasein]*

Sartre: *Basic Writings; Existentialism and Humanism; Being and Nothingness*

H. J. Blackham : *Six Existentialist Thinkers*

Margaret Chatterjee: *Existentialist Outlook*

M.K. Bhadra: *Phenomenology and Existentialism*

Mary Warnock: *Existentialism*

Hubert L. Dreyfus: *Being-in-the-World: A Commentary on Heidegger's Being and Time, Division I*

i. Graduate Attributes

i. **Course Objectives** :

-The objective of the course is to introduce students to various existentialist thinkers like Kiekeggard, Nietzsche, Heidegger and Sartre.
-The objective of the course is to make them families with the existential issues that all humans face in their everyday lives, like anxiety, fear, dread, freedom, death, etc.

ii. **Learning Outcomes**:

-The learning objective of the course is to enable students to understand the meaning of life that is not superficial.
-The learning objective is to make the students come face-to-face with real life-problems and also various ways to improve and work on their will to live life well.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Akoijam Thoibisana, Gauhati University, akoijamthoibisana@gauhati.ac.in

CORE[PHILOSOPHY]-XV

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **PHILOSOPHY OF LANGUAGE**
e. Existing Base Syllabus: PHI-HE-6026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Nature of Philosophy of Language -Scope of Philosophy of Language -History of Philosophy of Language	15	25
II:	-Ideational Theory of Meaning: Locke -Verifiability Theory of Meaning: Ayer -Use Theory of Meaning: Wittgenstein	15	25
III:	-Correspondence Theory of Truth -Coherence Theory of Truth -Pragmatic Theory of Truth	15	25
IV :	-Speech Act Theory of: Austin -Performative and Constative Utterance -Locutionary Act and Illocutionary Act	15	25

h. Reading list:

Alston, William P : *Philosophy of Language*

Austin, J. L : *How to Do Things with Words*

Devitt M. & Richard Hanley (ed.) : *The Blackwell Guide to Philosophy of Language*

Frege, Gottlob : *On Sense and Reference*

Lycan, G : *Philosophy of Language: A Contemporary Introduction*

Russell, B: *On Denoting*

Searle, J. R : *Philosophy of Language*

Wittgenstein, L : *Philosophical Investigations (Relevant Sections)*

i . Graduate Attributes

i. Course Objectives :

-Introduce the students with the philosophical study of Language as distinct from linguistics, concepts of meanings related to various theories of truth.
-Distinction between constative and performative utterances and the different acts that are performed while making different utterances

ii. Learning Outcomes:

-Students will be able to make the basis difference between philosophical study of Language and scientific study of Language.
- Students will be able to appreciate the different approaches to meaning.
- They will be able to appreciate the different acts that are performed by different utterances.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Prof. Begum Bilkis Banu, Gauhati University, begumbilkisbanu@gauhati.ac.in

Four Year Undergraduate Programme
Subject: Political Science

Semester	Paper
1st Semester	POL 01-01: Introduction to Political Theory (Core)
2nd Semester	POL 02-01: Indian Govt. & Politics (Core)
3rd Semester	POL 03-01: Perspectives on Public Administration (Core)
4th Semester	POL 04-01: Understanding International Relations (Compulsory) POL 04-02: Political Theory: Concepts and Debates (Compulsory) POL 04-03: Political Processes in India (Compulsory) POL 04-04: Public Policy and Administration in India (Compulsory)
5th Semester	POL 05-01: Western Political Philosophy (Compulsory) POL 05-02: Indian Political Thought (Compulsory) POL 05-03a: United Nations and Global Conflict (Optional) POL 05-03b: Optional Comparative Government and Politics (Optional) POL 05-04a: Introduction to India's Foreign Policy (Optional) POL 05-04b: Understanding South Asia (Optional)
6th Semester	POL 06-01: Human Rights: Traditions and Debates (Compulsory) POL 06-02: Feminism: Theory and Practice (Compulsory) POL 06-03a: Politics in Northeast India (Optional) POL 06-03b: Conflict and Peace Building (Optional) POL 06-04a: Rural Local Governance: Theory & Practice (Optional) POL 06-04b: Urban Local Governance: Theory & Practice (Optional)

Four Year Undergraduate Programme

Subject: Political Science

Semester: 1st Semester

Course Name: POL 01-01: Introduction to Political Theory (Core)

Existing Base Syllabus:

Course Level: 100

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Barasa Deka, Gauhati University, barasajnu@gmail.com

Dr. Joanna Mahjebeen, Gauhati University, jmajebeen@gmail.com

Dr. Pallabi Medhi, Guwahati College, Guwahati, pallabiamal@gmail.com

Course Objectives:

- This course aims to introduce the students to the idea of political theory, its history and approaches, and an assessment of its critical and contemporary trends.
- It is also designed to introduce the basic concepts of political theory.
- The course also attempts reconcile political theory and practice through reflections on the ideas and practices related to democracy.

Course Outcomes:

- After completing the course students will be better equipped to understand the key concepts in political theory and various related conceptual categories.
- They will also be in a better position to engage in application of concepts and understand the limitations.

- It will also help in developing critical thinking regarding the functioning of the political system in relation to the context the students are situated in.
- The foundation for understanding the contemporary political developments would also be laid down by the course.

Unit I: Understanding Political Theory

a. What is Politics?
b. What is Political Theory?
c. Relevance of political theory

Unit II: Approaches and Contemporary Perspectives on Political Theory

a. Liberal
b. Marxist
c. Feminist

Unit III: Concepts in Political Theory

a. State

b. Rights

c. Liberty

d. Equality

e. Justice

Unit IV: Understanding Democracy

a. Concept of Democracy

b. Types of democracy

c. Critique of democracy

Readings List:

Unit-I

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.

Bhargava, R. (2008) 'What is Political Theory', in Bhargava, R and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 2-16.

Bharghava, R, 'Why Do We Need Political Theory', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 17-36.

Mukherjee, S. and Ramaswami, S. (1999). What is Political Theory in Mukherjee, S. and Ramaswami, S. A History of Political Thought: Plato to Marx. New Delhi, Prentice Hall of India Pvt. Ltd. Pp. 1-8

Mukhopadhyay, A.K. (2019), An Introduction to Political Theory, New Delhi: Sage Publications

Sabine, George H. (1939) What is A Political Theory? in the Journal of Politics, Vol. 1, No 1. Pp. 1-16

Unit-II

Asirvatham, E & K.K. Misra (1998), *Political Theory,* Upper India Publishing, pp. 20-39.

Callinicos, A. (2004) "Marxism and Politics" in in Leftwich, A. (ed.) What is Politics? Cambridge, Polity Press, pp.53-65

Corrin, Chris(1999), Feminist perspectives on Politics, Routledge, London and New York, pp. 1-18.

Gauba, O.P (2009), An Introduction to Political Theory, Macmillan Publishers India Ltd, pp. 80-93.

Glaser, D. (1995) 'Normative Theory', in Marsh, D. and Stoker, G. (eds.) *Theory and Methods in Political Science.* London: Macmillan, pp. 21-40.

Menon, N. (2008) 'Gender', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 224-235.

Sanders, D. (1995) 'Behavioral Analysis', in Marsh, D. and Stoker, G. (eds.) *Theory and Methods in Political Science.*London: Macmillan, pp. 58-75.

Squires, J. (2004) 'Politics Beyond Boundaries: A Feminist Perspective' in Leftwich, A. (ed.) What is Politics? Cambridge, Polity Press, pp. 119-134

Unit-III

Acharya, A. (2008) 'Equality', in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 58-73.

Das, S. (2008) 'State', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi:Pearson Longman, pp. 170-187.

Menon, K. (2008) Justice', in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 74-82.

Shorten, A. (2008) 'Nation and State', in McKinnon, C. (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 33-55.

Sriranjani, V. (2008) 'Liberty', in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction.New Delhi: Pearson Longman, pp. 40-57.

Talukdar, P.S. (2008) 'Rights', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 88-105.

Talukdar, P.S. (2008) 'Rights', in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 88-105.

Unit-IV

Acharya, A. (2008) 'Affirmative Action', in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 298-307.

Arblaster, A. (1994) *Democracy*. (2nd Edition). Buckingham: Open University Press.

Christiano, Thomas. (2008) 'Democracy', in McKinnon, Catriona. (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 80-96.

Sen, A. (2003) ‘Freedom Favours Development,’ in Dahl, R., Shapiro, I. and Cheibub, A. J. (eds.) *The Democracy Sourcebook.* Cambridge, Massachusetts: MIT Press, pp. 444-446.

Sethi, A. (2008) ‘Freedom of Speech and the Question of Censorship’, in Bhargava, R. And Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 308-319.

Srinivasan, J. (2008) ‘Democracy’, in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.*New Delhi: Pearson Longman, pp. 106-128.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 2nd Semester

Course Name: POL 02-01: Indian Government and Politics (Core)

Existing Base Syllabus:

Course Level: 200

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Vikas Tripathi, Gauhati University, vikastripathi@gauhati.ac.in

Dr. Sumana Das, B. Baruah College, Guwahati, sumana_ghy1@yahoo.com

Course Objectives:

- The paper aims at introducing students to the nature, emergence and functioning of the Constitution of India.
- The paper seeks to impart learning on the significance of the idea of citizenship and rights and how has constitution incorporated them and what does it reflect on the nature of Indian constitution.
- The paper intends to make students understand the normative basis of key public institutions in India and the nature of their functioning.
- The paper aims to explore the distinctiveness of Indian federalism and how does the emergence of new institutions like NITI Aayog reflect on the changing character of federalism in India.

Course Outcomes:

- Students will develop an understanding of the legacy of national movement and the principles that shaped the formation and functioning of the Constituent Assembly of India.

It will help in developing critical thinking about role of ideas and norms in shaping democracy in India. It will make them understand what is constitution and how has the working of contributed to the consolidation of democracy in India.

- Students will be able to make sense of the institutional design, challenges and resilience marking key public institutions in India.
- The students will develop basic understanding on the constitutional provisions related to the legislative procedures in Indian Parliament. It will enhance their understanding related to the procedures, practices related to the passage of a bill from drafting to its passage by the Parliament.
- It will help students in developing a nuanced understanding of the importance of states in Indian politics and how the changing character of federalism in India made states the key player.

Unit-I: Indian Constitution: Emergence and Distinctiveness

a. Constituent Assembly: Historical Backdrop and Formation
b. Basic Features of Indian Constitution
c. Amendment of Constitution: Nature and Procedure

Unit-II: Citizenship and Rights

a. Citizenship: Meaning and Provisions in the Constitution
b. Fundamental Rights and Fundamental Duties
c. Directive Principles of State Policy

Unit-III: Institutions

a. The Executive: President, Prime Minister and the Council of Ministers, Bureaucracy in India
b. The Parliament: Composition, Legislative Procedure in Parliament, Question of Decline
c. The Judiciary: The Supreme Court, Appointment of Judges, Independence, Judicial Activism

Unit-IV: Federalism and Local Government

a. Nature of Federal System: Constitutional Provisions, Distinctive Features, NITI Ayog and Changing Character
b. Integration of Princely States in India,Union and Its Territory
c. Panchayati Raj Institutions in India: Emergence, Composition, Powers and Functions, Actual Working

Reading List:

Unit-I

Austin, Granville. 1966. The Indian constitution: cornerstone of a nation. New Delhi: Oxford University Press.

Austin, Granville. 1999. Working a democratic constitution: the Indian experience. New Delhi: Oxford University Press.

Bhargava, Rajeev. 2008. Politics and ethics of the Indian constitution. New Delhi: Oxford University Press.

Bhatia, Gautam. 2019. The Transformative Constitution: a radical biography in nine acts. New Delhi: Oxford University Press.

Chaube, Shibani Kinkar. 2000. Constituent assembly of India: springboard of revolution. New Delhi: Manohar Publishers & Distributors.

Choudhry, Sujit, Madhav Khosla & Pratap Bhanu Mehta.2016. The Oxford Handbook of the Indian Constitution. New Delhi : Oxford University Press.

Hasan, Zoya, Eswaran Sridharan, and R. Sudarshan. 2004. India's living constitution: ideas, practices,controversies. Delhi: Permanent Black.

Indian Politics, Contemporary Issues and concerns, M.P Singh and Rekha Saxena, PHI pvt. Ltd, New Delhi, 2008

Khosla, Madhav. 2020. India's founding moment: the constitution of a most surprising democracy.Cambridge, Massachusetts: Harvard University Press.

Pylee, M V. 1967. Constitutional History of India. Bombay : Asia Publishing House

Unit-II

Austin, Granville. 1966. The Indian constitution: cornerstone of a nation. New Delhi:Oxford University Press.

Basu, Durga Das. 2022. Introduction to the Constitution of India. New Delhi : Lexis Nexis

Bhargava, Rajeev. 2008. Politics and ethics of the Indian constitution. New Delhi: Oxford UniversityPress.

Choudhry, Sujit, Madhav Khosla & Pratap Bhanu Mehta.2016. The Oxford Handbook of the Indian Constitution. New Delhi : Oxford University Press

Khosla, Madhav. 2020. India's founding moment: the constitution of a most surprising democracy.Cambridge, Massachusetts: Harvard University Press.

Unit-III

Agrawal, Arun. 2005. “The Indian Parliament” in Devesh Kapur and Pratap Bhanu Mehta (ed.) PublicInstitutions in India: Performance and Design, New Delhi: Oxford University Press, 77-104.

Burra, Arudra. 2010. “The Indian Civil Service and the nationalist movement: neutrality, politics andcontinuity”. Commonwealth & Comparative Politics. 48 (4): 404-432.

Choudhry, Sujit, Madhav Khosla & Pratap Bhanu Mehta.2016. The Oxford Handbook of the Indian Constitution. New Delhi : Oxford University Press

Das, SK. 2013. The Civil Services of India. New Delhi : Oxford University Press.

Hewitt, Vernon and Shirin M. Rai. 2010. “Parliament,” in Niraja Gopal Jayal and Pratap Bhanu Mehta(ed.). The Oxford companion to politics in India. New Delhi: Oxford University Press, pp.28-42.

M.P Singh and Rekha Saxena. 2008. Indian Politics: Contemporary Issues and concerns, New Delhi, PHI Pvt. Ltd.

Khare, H. 2003. “Prime Minister and Parliament: Redefining accountability in the age of coalitiongovernment,” in Ajay K. Mehra, and G.W. Kueck, (ed.). The Indian Parliament: A Comparative Perspective. New Delhi: Konark, pp.350- 368.

Krishna, Anirudh. 2010. “Continuity and change: the Indian administrative service 30 years ago andtoday”. Commonwealth & Comparative Politics. 48 (4): 433-444.

Manor, James. 2015. “The Presidency,” in Devesh Kapur , Pratap Bhanu Mehta and Milan Vaishnav (ed.). Rethinking Public Institutions in India. New Delhi: Oxford University Press.

Mehta, Pratap Bhanu. 2007. “The rise of judicial sovereignty,” Journal of Democracy 18 (2), pp.70-83.

Saxena, N. C. 2010. “The IAS officer - predator or victim?” Commonwealth & Comparative Politics.48 (4): 445-456.

Shankar, B. L., and Valerian Rodrigues. 2010. The Indian Parliament: a democracy at work. Oxford:Oxford University Press.

Shankar, Shylashri. 2009. Scaling justice: India's Supreme Court, anti-terror laws, and social rights.New Delhi: Oxford University Press.

Verma, Rahul and Vikas Tripathi. 2013. Making Sense of the House: Explaining the Decline of theIndian Parliament amidst Democratization, Studies in Indian Politics, 1(2), pp.153-177.

Unit-IV

Arora Balveer. 2015. "Foundations and Development of Indian Federalism: Lessons Learnt andUnlearnt", Yojana, pp. 22-26.

Arora, Balveer. et. al. 2013. "Indian federalism," in K.C. Suri (ed.) ICSSR Research Surveys andExplorations: Political Science: Indian Democracy, Volume 2. New Delhi: Oxford University Press.

Indian Politics, Contemporary Issues and Concerns, M.P Singh and Rekha Saxena, PHI pvt. Ltd, New Delhi, 2008.

Krishna, Anirudh. 2010. "Local Politics", in: Mehta, Pratap B. and Niraja Gopal Jayal (eds.).The Oxford Companion to Politics in India. New Delhi et al.: Oxford University Press, pp.299-316

Kumar, Rajiv. 2021. "NITI Aayog: Redefining Federalism", Yojana, pp. 8-11.

Manor, James. 2010. "Local Governance", in: Mehta, Pratap B. and Niraja Gopal Jayal (eds.).The Oxford Companion to Politics in India. New Delhi et al.: Oxford University Press, pp.61-79.

Pehl Malte and Subtra Mitra. 2010. "Federalism", in: Mehta, Pratap B. and Niraja Gopal Jayal (eds.).The Oxford Companion to Politics in India. New Delhi et al.: Oxford University Press, pp.43-60.

Rao, M Govind. 2016. Role and Functions of NITI Aayog, Economic and Political Weekly, pp. 13-16, Vol. 50 No. 4

Tillin, Louise. 2019. Indian Federalism. (OSIIC) New Delhi: Oxford University Press.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 3rd Semester

Course Name: POL 03-01: Perspectives on Public Administration (Core)

Existing Base Syllabus:

Course Level: 300

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Course Objectives:

- The course seeks to provide an introduction to the discipline of Public Administration and its significance in contemporary times.
- The course aims to encompass Public Administration in its historical context with an emphasis on the various classical and contemporary administrative theories.
- The course intends to explore some of the recent trends including good governance, new public management, feminism, ecological conservation and how the call for greater democratization is restructuring public administration.
- The course attempts to provide the students a comprehensive understanding on contemporary administrative developments.

Course Outcomes:

- Students will learn the basic concepts related to Public Administration and its significance

- Students will understand the major classical and contemporary administrative theories and approaches and a critical thinking on them.
- It will help students to understand importance of personnel administration in an administrative system and issues related to it including civil service neutrality and need, role and independence of Public Service Commission.
- Students will develop basic understanding on recent debates in public administration.

Unit-I: Public Administration as a Discipline

a. Meaning, Dimensions and Significance
b. Public and Private Administration
c. Evolution of Public Administration

Unit-II: Theoretical Perspectives

a. Scientific Management (Frederick Winslow Taylor)
b. Administrative Management (Luther Gulick, Lyndall Urwick and Henri Fayol)
c. Ideal-Type Bureaucracy (Max Weber)
d. Human Relations Theory (George Elton Mayo)
e. Ecological Approach (Fred Warren Riggs)

Unit-III: Personnel Administration

a. Recruitment-Training-Promotion
b. Public Service Commission: Need, Role and Independence
c. Neutrality in the Public Service

Unit -IV: Major Approaches in Public Administration

a. New Public Service Approach
b. New Public Management
c. Good Governance
d. Feminist Perspective

Reading List:

Unit-I

Basu, Rumki, *Public Administration: Concepts and Theories*, Sterling Publishers, New Delhi, 2014

D. Rosenbloom, R. Kravchuk and R. Clerkin, (2009) *Public Administration: Understanding Management, Politics and Law in Public Sector*, 7th Edition, New Delhi: McGraw Hill, pp.1-40

G. Alhson(1997): 'Public and Private Management', in Shafritz, J. and Hyde , A (eds) *Classics of Public Administration*, 4th Edition. Forth Worth: Hartcourt Brace. TX. PP 510-529

M. Bhattacharya (2008) *New Horizons of Public Administration*, 5th Revised Edition. New Delhi: Jawahar Publishers, pp 37-44

M. Bhattacharya , *RestructuringPublic Administration: A New Look*, New Delhi: Jawahar Publishers, 2012

M. Bhattacharya, *New Horizons of Public Administration*, New Delhi: Jawahar Publishers, 2011

N. Henry, *Public Administration and Public Affairs*, 12th Edition, New Jersey: Pearson, 2013

Nicholas Henry, *Public Administration and Public Affairs*, Prentice Hall, 1999

P. Dunleavy and C. Hood, 'From old Public Administration to New Public Management', Public Money and Management, VOL. XIV No 3, 1994

W.Wilson (2004) 'The Study of Administration', in B. Chakravarty and M. Bhattacharya (eds), *Administrative Change and Innovation : a Reader*, New Delhi: Oxford University Press, pp.85-101.

Unit-II

A. Singh, *Public Administration: Roots and Wings*. New Delhi: Galgotia Publishing Company, 2002

B. Miner, 'Elton Mayo and Hawthrone', in *Organisational Behaviour 3: Historical Origins and the Future.* New York: M.E. Sharpe, 2006

D. Gvishiani, *Organisation and Management*, Moscow: Progress Publishers, 1972

D. Gvishiani, *Organisation and Management*, Moscow: Progress Publishers, 1972

D. Ravindra Prasad, Y. Pardhasaradhi, V. S. Prasad and P. Satyrnarayana, [eds.], Administrative Thinkers, Sterling Publishers, 2010

E. J. Ferreira, A. W. Erasmus and D. Groenewald , Administrative Management, Juta Academics, 2010

F. Riggs, *Administration in Developing Countries: The Theory of Prismatic Society*. Boston: Houghton Miffin, 1964

F. Taylor, 'Scientific Management', in J. Shafritz, and A. Hyde, (eds.) *Classics of Public Administration,* 5th Edition. Belmont: Wadsworth, 2004

M. Weber,'Bureaucracy', in C. Mills, and H. Gerth, F*rom Max Weber: Essays in Sociology*. Oxford: Oxford University Press, 1946

P. Mouzelis, 'The Ideal Type of Bureaucracy' in B. Chakrabarty, And M. Bhattacharya, (eds), *Public Administration: A Reader*, New Delhi: Oxford University Press,2003

R. Arora, 'Riggs' Administrative Ecology' in B. Chakrabarty and M. Bhattacharya (eds), *Public Administration: A reader*, New Delhi, Oxford University Press, 2003

Warren. G.Bennis, *Beyond Bureaucracy*, Mc Graw Hill, 1973

Unit-III

Appleby, H Paul, 'Public Administration in India', Report of a survey, Manager of a publication, Govt. of India, Delhi, 1953, p-12.

Article 319 of the Indian Constitution.

Articles 315 to 317 of the Indian Constitution.

Chopra, K. Rakesh, *Management of Human Resources*, V. K. Publishing House Barrelly, 1989, p-10, 20.

First Report of UPSC, 1951, P-9.

Gladden, The Civil Service: Its Problems and Future, p-88, 180.

Goel, S. L., *Personnel Administration and Management*: Sterling Publishers, New Delhi, 1993 (ed) p-7, 40, 105-111.

Journal of Public Administration, Vol-XXXI, 1153.

Jucious, M.J. *Personnel Management*, Richard Inco, Illinois, p-2.

Pfiffner, *Public Administration*, p-251.

Pigors, P, and Myres, C.A., Personnel *Administration*: McGraw Hill, Tokyo, 1961, p-1.

Rastogi, T. N. , *Personnel Management, Perspecters and Techniques,* Anand Publication Pvt. Ltd, New Delhi, 1995, p-46, 54, 137.

Refurbishing of Personnel Administration - Scaling New Heights.

Report of the Royal Commission on the Civil Services, 1929-31, pp, 6-69.

Tenth Reports of the Second Administrative Reforms Commission (Relevant Portions) https://darpg.gov.in/sites/default/files/personnel_administration10.pdf.

The Civil Services (Classification, Control and Appeal), Rules. Nos 38, 39, 42 and 44.

Tickner, E. J., *Modern Staff Training*, p-9.

Unit-IV

A. Gray, and B. Jenkins, 'From Public Administration to Public Management' in E. Otenyo and N. Lind, (eds.) *Comparative Public Administration: The Essential Readings*: Oxford University Press, 1997.

A. Leftwich, 'Governance in the State and the Politics of Development', in *Development and Change*. Vol. 25, 1994.

B. Chakrabarty, *Reinventing Public Administration: The India Experience.* New Delhi: Orient Longman, 2007.

Basu, Rumki, *Public Administration in the 21st Century: A Global South Perspective* , Taylor and Franchis, 2019.

C. Hood, 'A Public Management for All Seasons', in J. Shafritz, & A. Hyde, (eds.) *Classics of Public Administration*, 5th Edition, Belmont: Wadsworth, 2004.

F. Riggs,*The Ecology of Public Administration, Part 3,* New Delhi: Asia Publishing House, 1961.

H. Frederickson, 'Toward a New Public Administration', in J. Shafritz, & A. Hyde, (eds.) *Classics of Public Administration*, 5th Edition, Belmont: Wadsworth, 2004.

M. Bhattacharya, 'Chapter 2 and 4', in *Social Theory, Development Administration and Development Ethics,* New Delhi: Jawahar Publishers, 2006.

M. Bhattacharya, 'Contextualizing Governance and Development' in B. Chakrabarty and M. Bhattacharya, (eds.) *The Governance Discourse.* New Delhi: Oxford University Press,1998.

M. Bhattacharya, *Public Administration: Issues and Perspectives,* New Delhi: Jawahar Publishers, 2012.

R. B. Denhart& J. V. Denhart [Arizona State University] " The New Public Service: Serving Rathet Than Steering", in Public Administration Review ,Volume 60, No-6,November-December 2000.

Singh, Shivani. (2016), Governance: Issues and Challenges, New Delhi, Sage Publications.

Stivers, Camilla, 'Feminist Theory of Public Administration' in *Defining Public Administration*, eBook ISBN-9780429501074, 2000.

U. Medury, *Public administration in the Globalisation Era*, New Delhi: Orient Black Swan, 2010.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-01: Understanding International Relations (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in

Dr. Rubul Patgiri, Gauhati University, rubulpatgiri@gauhati.ac.in

Dr. Anubhav Sarma, Damdama College, Kulhati, anubhabsarmah1988@gmail.com

Course Objectives:

- The course aims to introduce the students to the basic understanding of international relations.
- To the growing linkages and interactions between domestic and international issues under the evolving process of globalization imperative for knowing and understanding global politics is increasingly being felt.
- The course is designed to equip the students with theoretical, historical and conceptual insights to understand the evolving dynamics of international relations.

Course Outcomes:

- To make students understand the key theoretical approaches in international relations
- To familiarize students with the history of evolution of international relations in the twentieth century
- To enable students to comprehend the nature of global economy.
- To demonstrate the basic knowledge of some of the contemporary global issues.

Unit-I: Theoretical Perspectives

a. Classical Realism and Neo-Realism

b. Liberalism and Neo-Liberalism

c. Marxist Approaches

d. Feminist Perspective

Unit-II: An Overview of Twentieth Century IR History-World War II onwards

a. World War II: Causes and Consequences

b. Origin, Evolution and End of the Cold War

c. Post Cold War Era and Emerging Centres of Power

Unit-III: The Global Economy

a. Global economic order and the Bretton Woods Institutions (IMF, WB and WTO)

b. Neoliberal Economic Policies-Economic Globalization and TNCs

c. Regionalism and Regional Economic Groupings-ASEAN and European Union

d. Emerging Multilateralism-G20 and BRICS

Unit-IV: Contemporary Global Issues

a. Ecological Issues

b. International Terrorism

c. Human Security

d. Migration

Reading List:

Unit-I

A. Frank, (1966) 'The Development of Underdevelopment' *Monthly Review,* pp. 17-30.

E. Carr, (1981) The Twenty Years Crisis, 1919-1939: An Introduction to the Study of International Relations, London: Macmillan, pp. 63-94.

F. Halliday, (1994) *Rethinking International Relations,* London: Macmillan, pp. 147-166.

H. Bull, (2000) ‘The Balance of Power and International Order’, in M. Smith and R. Little (eds), Perspectives on World Politics, New York: Routledge, pp. 115-124.
H. Morgenthau, (2007) ‘Six Principles of Political Realism’, in R. Art and R. Jervis, International Politics, 8th Edition, New York: Pearson Longman, pp. 7-14
I. Wallerstein, (2000) ‘The Rise and Future Demise of World Capitalist System: Concepts for Comparative Analysis’, in Michael Smith and Richard Little (eds), *Perspectives on World Politics,* New York: Routledge, pp. 305-317.
J. Galtung, (2000) ‘A Structural Theory of Imperialism’, in M. Smith and R. Little, (eds), *Perspectives on World Politics*, New York: Routledge, pp. 292-304.
J. Goldstein and J. Pevehouse, (2007) International Relations, New York: Pearson Longman, pp. 127-137. R. Jackson and G. Sorensen, (2007) Introduction to International Relations: Theories and Approaches, 3rd Edition, Oxford: Oxford University Press, pp. 97-128.
J. Goldstein and J. Pevehouse, (2007) *International Relations,* New York: Pearson Longman, pp. 494-496; 500-503.
J. Goldstein and J. Pevehouse, (2007) *International Relations,* New York: Pearson Longman, pp. 138-148.
J. Goldstein and J. Pevehouse, (2007) *International Relations,* New York: Pearson Longman,
J. Tickner, (2007) ‘A Critique of Morgenthau’s Principles of Political Realism’, in R. Art and R. Jervis, *International Politics,* 8th Edition, New York: Pearson Longman, pp. 15-28.
K. Waltz, (2007) ‘The Anarchic Structure of World Politics’, in R. Art and R. Jervis, International Politics, 8th Edition, New York: Pearson Longman, pp. 29-49.
M. Nicholson, (2002) International Relations: A Concise Introduction, New York: Palgrave, pp. 6-7.
M. Nicholson, *International Relations: A Concise Introduction*, New York: Palgrave, 2002, pp. 120-122.
M. Nicholson, *International Relations: A Concise Introduction*, New York: Palgrave, 2002, pp.
Modern History Sourcebook: Summary of Wallerstein on World System Theory, Available at http://www.fordham.edu/halsall/mod/Wallerstein.asp, Accessed: 19.04.2013
New York: Oxford University Press, pp. 142-149; 155-158.
P. Viotti and M. Kauppi (2007), *International Relations and World Politics: Security, Economy, Identity*, Pearson Education, pp. 40-85.
R. Keohane and J. Nye, (2000) ‘Transgovernmental Relations and the International Organization’, in M. Smith and R. Little (eds.), Perspectives on World Politics, New York: Routledge, pp. 229-241.

Rumki Basu, (ed)(2012) International Politics: Concepts, Theories and Issues New Delhi, Sage.
S. Hobden and R. Jones, (2008) 'Marxist Theories of International Relations' in J. Baylis and S. Smith (eds), *The Globalization of World Politics: An Introduction to International Relations*,
S. Smith and P. Owens, (2008) 'Alternative Approaches to International Theory' in J. Baylis and S. Smith (eds), *The Globalization of World Politics: An Introduction to International Relations*, New York: Oxford University Press, pp. 181-184.
S. Smith and P. Owens, (2008) 'Alternative Approaches to International Theory' in J. Baylis
T. Dunne and B. Scmidt, (2008) 'Realism', in J. Baylis and S. Smith (eds), The Globalization of World Politics: An Introduction to International Relations, New York: Oxford University Press, pp. 90-107.
T. Dunne, (2008) 'Liberalism', in J. Baylis and S. Smith (eds.), The Globalization of World Politics: An Introduction to International Relations, New York: Oxford University Press, pp. 108-123.

Unit-II

Brezeznski, Z. (2005) *Choice: Global Dominance or Global Leadership*. New York: Basic Books, pp. 85-127.34
Carrtuthers, S.L. (2005) 'International History, 1900-1945' in Baylis, J. and Smith, S. (eds.) (2008) *The Globalization of World Politics. An Introduction to International Relations*.4th edn. Oxford: Oxford University Press, pp. 76-84.
Calvocoressi, P. (2001) *World Politics: 1945—2000*. Essex: Pearson, pp. 3-91.
Gill, S. (2005) 'Contradictions of US Supremacy' in Panitch, L. and Leys, C. (eds.) *Socialist Register: The Empire Reloaded*. London: Merlin Press. 2004, London, Merlin Press and New York, Monthly Review Press. *Socialist Register*, pp.24-47.
Hobsbawm, E. (1995) *Age of Extreme: The Short Twentieth Century, 1914—1991*. London: Abacus, pp. 225-226.
Scott, L. (2005) 'International History, 1945-1990' in Baylis, J. and Smith, S. (eds.) (2008) *The Globalization of World Politics An Introduction to International Relations*.4th edn. Oxford: Oxford University Press, pp. 93-101.
Taylor, A.J.P. (1961) *The Origins of the Second World War*. Harmondsworth: Penguin, pp.29-65.
Therborn, G. (2006) 'Poles and Triangles: US Power and Triangles of Americas, Asia and Europe' in Hadiz, V.R. (ed.) *Empire and Neo Liberalism in Asia.* London: Routledge, pp.23-37.

Unit-III

A. Heywood, (2011) *Global Politics,* New York: Palgrave-McMillan, pp. 454-479.

A. Narlikar, (2005) *The World Trade Organization: A Very Short Introduction,* New York: Oxford University Press, pp. 22-98.

Chatterjee, Aneek. International Relations Today: Concepts and Application. Pearson

Crane, Robert (ed.). Building bridges among the BRICS

Dattagupta, Rupak. Global Politics. Pearson

J. Goldstein, (2006) *International Relations,* New Delhi: Pearson, pp. 392-405 (MNC).

J. Goldstein, (2006) *International Relations,* New Delhi: Pearson, pp. 327-368, 392-405 (MNC).

Andrew Heywood, (2015) *Global Politics* London: Palgrave, pp.466-486.

Kripalini, Manjeet. India in the G20: Rule taker to Rule maker. Routledge

Larionova, Marina and Kirton, John (eds.). BRICS and Global Governance. Routledge

Gilpin, R. (2003) *Global Political Economy: Understanding the International Economic Order.* Hyderabad: Orient Longman, pp. 278- 304.

John Stopford, Multinational Corporations, Foreign Policy, Fall, 1998

Oliver Stuenkel, (2020). *The BRICS and Future of Global Order*, London: Lexinton Books.

P. Hirst, G. Thompson and S. Bromley, (2009) *Globalization in Question,* Cambridge: Polity Press, pp. 68-100 (MNC).

Pero, Siti Darwinda Mohamed. Leadership in Regional Community Building: Comparing ASEAN and the European Union. Palgrave Macmillan

R. Mansbach and K. Taylor, (2012) 'International Political Economy', *Introduction to Global Politics,* 2nd Edition, New York: Routledge, pp. 470-478.

R. Picciotto, (2003) 'A New World Bank for a New Century', in C. Roe Goddard et al., *International Political: State-Market Relations in a Changing Global Order*, Boulder: Lynne Reinner, pp. 341-351.

T. Cohn, (2009) *Global Political Economy: Theory and Practice,* pp. 130-140 (IMF), 208-218 (WTO).

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.

Unit-IV

A. Acharya, (2011) 'Human Security', in J. Baylis, S. Smith and P. Owens (eds.) *Globalization of World Politics,* New York: Oxford University Press, pp. 480-493.

A. Acharya, (2001) 'Human Security: East versus West', in *International Journal,* Vol. 56, no. 3, pp. 442-460.

A.Heywood, (2011) *Global Politics,* New York: Palgrave, pp. 282-301.

A.Heywood, (2011) *Global Politics,* New York: Palgrave, pp. 383-411.

A. Vanaik, (2007) *Masks of Empire,* New Delhi: Tulika, pp. 103-128.

Jindal, N. & Kumar, K. (2018), Global Politics: Issues and Perspectives, New Delhi, Sage Publications

J. Kiras, (2011) 'Terrorism and Globalization', in J. Baylis, S. Smith and P. Owens (eds.) *Globalization of World Politics,* New York: Oxford University Press, pp. 366-380.

J. Volger, (2011) 'Environmental Issues', in J. Baylis, S. Smith and P. Owens (eds.) *Globalization of World Politics*, New York: Oxford University Press, pp. 348-362.

K. Shimko, (2005) *International Relations Perspectives and Controversies,* New York: Hughton-Mifflin, pp. 317-339.

P. Bidwai, (2011) 'Durban: Road to Nowhere', in *Economic and Political Weekly,* Vol.46, No. 53, December, pp. 10-12.

P. Viotti and M. Kauppi, (2007) *International Relations,* New Delhi: Pearson, pp. 276-307.

N. Carter, (2007) *The Politics of Environment: Ideas, Activism, Policy*, Cambridge: Cambridge University Press, pp. 13-81.

S. Tadjbakhsh and A. Chenoy, (2007) *Human Security,* London: Routledge, pp. 13-19; 123-127; 236-243

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-02: Political Theory: Concepts and Debates (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Akhil Ranjan Dutta, Gauhati University, akhilranjan@gauhati.ac.in
Ms. Bondita Borbora, Dudhnoi College, Dudhnoi, bonditaborbora@gmail.com

Course Objectives:

- Help the students familiarize with the basic normative concepts of political theory. Each concept is related to a crucial political issue that requires analysis with the aid of our conceptual understanding.
- Encourage critical and reflective analysis and interpretation of social practices through the relevant conceptual toolkit.
- Introduce the students to the important debates in the subject. These debates prompt us to consider that there is no settled way of understanding concepts and that in the light of new insights and challenges, besides newer ways of perceiving and interpreting the world around us, we inaugurate new modes of political debates.

Course Outcomes:

- Understand the dimensions of shared living through these political values and concepts.
- Appreciate how these values and concepts enrich the discourses of political life, sharpening their analytical skills in the process.
- Reflect upon some of the important debates in political theory.

- Develop critical thinking and the ability to make logical inferences about socio-economic and political issues, on the basis of comparative and contemporary political discourses in India.

Unit-I: Freedom and Equality

a. Freedom: Lockean notion of Negative Freedom & Amartya Sen's notion of Development as Freedom

b. Equality: Procedural Equality and Substantive Equality

c. Egalitarianism: Background inequalities and differential treatment

Unit-II: Justice

a. Distributive Justice: John Rawls
b. Libertarian theories of Justice: F. A. Hayek
c. Global Justice

Unit-III: Rights and Obligation

a. The Universality of Rights and Differentiated Rights
b. Rights, Obligation and Civil Disobedience
c. Theories of Political Obligation: Conservatism, Consent Theory, Anarchism

Unit-IV: Major Debates

a. Whatever happens to nation-state? *Sovereignty under Globalization*.
b. How do we accommodate diversity in plural society? *Diversity and Multiculturalism*.
c. How do we deal with the *climate changes*? *Ecological Rights* as human rights

Reading List:

Unit-I

Acharya, Ashok. (2008) 'Affirmative Action', in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 298-307.

Andrew Heywood (1994) Political Theory. London: Palgrave Macmillan, PP. 253-258, 284-294

Carter, Ian. (2003) 'Liberty', in Bellamy, Richard and Mason, Andrew (eds.). Political Concepts. Manchester: Manchester University Press, pp. 4-15.

Casal, Paula & William, Andrew.(2008) 'Equality', in McKinnon, Catriona. (ed.) Issues in Political Theory. New York: Oxford University Press, pp. 149- 165.

Knowles, Dudley. (2001) Political Philosophy. London: Routledge, pp. 69- 132.
Riley, Jonathan. (2008) 'Liberty' in Mckinnon, Catriona (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 103-119.
Swift, Adam. (2001) Political Philosophy: A Beginners Guide for Student's and Politicians. Cambridge: Polity Press, pp. 51-88, 91-132.

V. Sriranjani (2008) 'Liberty', in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 41-57.

Unit-II

Bedau, Hugo Adam. (2003) 'Capital Punishment', in LaFollette, Hugh (ed.). The Oxford Handbook of Practical Ethics. New York: Oxford University Press, pp. 705-733.

Dutta, Akhil Ranjan. (ed.) (2011) "Political Theory-Issues, Concepts and Debates" Arun Prakashan, Panbazar, Guwahati.
Menon, Krishna. (2008) 'Justice', in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political

Theory: An Introduction. New Delhi: Pearson Longman, pp. 74-86.

Wolf, Jonathan. (2008) 'Social Justice', in McKinnon, Catriona. (ed.) Issues in Political

Theory.New York: Oxford University Press, pp. 172-187.

Swift, Adam. (2001) Political Philosophy: A Beginners Guide for Student's and Politicians.

Cambridge: Polity Press, pp. 9-48.

Knowles, Dudley. (2001) Political Philosophy.London: Routledge, pp. 177-238.

McKinnon, Catriona. (ed.) (2008) Issues in Political Theory.New York: Oxford University Press, pp. 289-305.

Unit-III

Seglow, Jonathan. (2003) 'Multiculturalism' in Bellamy, Richard and Mason, Andrew (eds.). Political Concepts. Manchester: Manchester University Press, pp. 156-168.

Tulkdar, P.S. (2008) 'Rights' in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory:

An Introduction. New Delhi: Pearson Longman, pp. 88-104.

McKinnon, Catriona. (2003) 'Rights', in Bellamy, Richard and Mason, Andrew. (eds.)

Young, Iris M. 1989. 'Polity and Group Difference: A Critique of the Ideal of Universal Citizenship' *Ethics*, No.2 pp.250-274

Unit-IV

Hyums, Keith. (2008) 'Political Authority and Obligation', in Mckinnon, Catriona. (ed.) Issues in Political Theory, New York: Oxford University Press, pp. 9-26

Martin, Rex. (2003) 'Political Obligation', in Bellamy, Richard and Mason, Andrew. (eds.)

Political Concepts, Manchester: Manchester University Press, pp. 41-51.

Gutmann, Amy. '*Multiculturalism and "The Politics of Recognition": Essays by Charles Taylor*. Princeton: Princeton University Press.

Kymlicka, Will.1995.*Multicultural Citizenship: A Liberal Theory of Minority Rights*. Oxford: Clarendon Press.

Kymlicka, Will.2002. *Contemporary Political Philosophy: An Introduction*. New York: Oxford University Press. (pp.327-377)

Mahajan, Gurpreet(ed.).1999. *Democracy, Difference and Social Justice.* New Delhi: Oxford University Press

Mahajan, Gurpreet.2002. *The Multicultural Path: Issues of Diversity and Discrimination in Democracy*. New Delhi: Sage. .(pp.85-123)

Parekh, Bhiku.1999. 'Cultural Diversity and Liberal Democracy' in Gurpreet Mahajan (ed.) *Democracy, Difference and Social Justice.* New Delhi: Oxford University Press.

Raz, Joseph. 1989. 'Multiculturalism: A Liberal Perspective' *Dissent*, winter pp.67-69

Taylor, Charles.1994.' The Politics of Recognition' in Amy Gutmann (ed.) *Multiculturalism and the Politics of Recognition.* New Jersey: Princeton University Press.

Mookherjee, Monica, 'Multiculturalism', in Mckinnon, Catriona. (ed.) Issues in Political Theory. New York: Oxford University Press, pp. 218- 234.

Seglow, Jonathan, ‘Multiculturalism’, in Bellamy, Richard and Mason, Andrew. (eds.) Political Concepts, Manchester: Manchester University Press, pp. 156-168

M. Shamsul Haque, ‘Environmental Discourse and Sustainable Development: Linkages and Limitations’*, Ethics and the Environment*, Vol. 5, No. 1 (2000), pp. 3-21

Guha. Ramachandra (ed) *Social Ecology,* Oxford University Press, Delhi, 1990

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-03: Political Processes in India (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Vikas Tripathi, Gauhati University, vikastripathi@gauhati.ac.in

Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Dadul Dewri, Pub-Kamrup College, Baihata, daduldewri79@gmail.com

Course Objectives:

- An understanding of the political process thus calls for a different mode of analysis that is offered by political sociology.
- This course maps the working of 'modern' institutions, premised on the existence of an individual society, in a context marked by communitarian solidarities and their mutual transformation thereby.
- It also familiarizes students with the working of the Indian State, paying attention to the contradictory dynamics of modern state power.

Course Outcomes:

- This Course is helpful in making students familiar with the significant political processes shaping Indian Politics in last seven decades.
- As such, the paper would help the students to know in detail about electoral processes and trends, party system in India, dynamics of Indian politics including regionalism, caste and religion as well as the changing nature of the Indian State.
- Their engagement with the selected scholarly articles included in the reading list will essentially orient them towards the larger intellectual and research tradition on issues of Indian politics.
- The paper will be helpful in terms of competitive examinations including NET/JRF, SLET as well as research in the field of Indian Politics.

Unit-I: Electoral Process in India

a. Election Process: First Past the Post System, Proportional Representation System
b. Representation of the People Act,1951
c. Election Commission of India and Electoral Reforms

Unit-II: Party System

a. National and State Party
b. Trends in the Party System
c. Voting Behaviour, Determinants of Voting Behaviour

Unit-III: Dynamics of Indian Politics

a. Regionalism and Secessionism
b. Caste and Politics
c. Religion and Politics, Debates on Secularism

Unit-IV: Changing Nature of Indian State

a. Developmental, Welfare and Coercive Dimensions
b. Affirmative Action Policies

c. Development and Displacement Debate

Reading List:

Unit-I

A. Heywood, (2002) 'Representation, Electoral and Voting', in *Politics*, New York; Palgrave pp. 223-245

A. Evans, (2009) 'Elections System', in J. Bara and M. Pennington, (eds.) *Comparative Politics*, New Delhi: Sage Publications, pp. 93-119

https://eci.gov.in/files/file/9315-the-representation-of-people-act-1951/

E. Sridhar and M. Vaishnav, (2017) 'Election Commission of India', in D. Kapur, P B Mehta and M Vaishnav, (eds.) *Rethinking Public Institutions in India*, New Delhi: Oxford University Press, pp. 417-463.

Lok Sabha Secretariate, (2020) 'Electoral Reforms in India: Reference Note' https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/04022020_105450_102120474.pdf

P.B. Mehta. 2001. "Is Electoral and Institutional Reform the Answer?", *Seminar,* 506 https://www.indiaseminar.com/2001/506/506%20pratap%20bhanu%20mehta.htm

U.K. Singh and A. Roy, (2019) 'Introduction' in *Election Commission of India: Institutionalising Democratic Uncertainties,* New Delhi: Oxford University Press.

Unit-II

A. H. Schakel, C. K. Sharma & W. Swenden, (2019). India after the 2014 general elections: BJP dominance and the crisis of the third-party system, Regional & Federal Studies, 29 (3), 329-354.

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

E. Sridharan, (2012) 'Introduction: Theorizing Democratic Consoloidation, Parties and Coalitions', in *Coalition Politics and Democratic Consolidation in Asia,* New Delhi: Oxford University Press.

R. Kothari, (2002) 'The Congress System', in Z. Hasan (ed.) *Parties and Party Politics in India,* New Delhi: Oxford University Press, pp. 39-55.

P. Chibberand R. Verma, (2019). 'The Rise of the Second Dominant Party System in India: BJP's New Social Coalition in 2019', *Studies in Indian Politics*, 7(2), 131-148.

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

Y. Yadav and S. Palshikar, (2006). 'Party System and Electoral Politics in the Indian States, 1952-2002: From hegemony to convergence.' *India's Political Parties* 6, 73-116.
Y. Yadav (1999). Electoral Politics in the Time of Change: India's Third Electoral System, 1989-1999. Economic and Political Weekly, 34 (35), 2393-2399.
Y. Yadav, (200) '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

Unit-III

Narain Iqbal. 1976. "Cultural Pluralism, National Integration and Democracy in India", *Asian Survey*, 16(10), October, 903-17

Baruah, Sanjib. 2010. "Regionalism and Secessionism", in Jayal and Mehta (eds). *The Oxford Companion to Politics in India.* pp 181-92

M. Chadda, (2010) 'Integration through Internal Reorganization', in S. Baruah (ed.) *Ethnonationalism in India: A Reader,* New Delhi: Oxford University Press, pp. 379-402

P. Brass, (1999) 'Crisis of National Unity: Punjab, the Northeast and Kashmir', in *The Politics of India Since Independence,* New Delhi: Cambridge University Press and Foundation Books, pp.192-227.

M. Weiner, (2001) 'The Struggle for Equality: Caste in Indian Politics', in Atul Kohli (ed.) *The Success of India's Democracy*, New Delhi: Cambridge University Press, pp. 193-225.

N. Chandhoke, (2010) 'Secularism', in P. Mehta and N. Jayal (eds.) The Oxford Companion to Politics in India, New Delhi: Oxford University Press, pp. 333-346.

R. Kothari, (1970) 'Introduction', in *Caste in Indian Politics,* Delhi: Orient Longman, pp. 3-25

T. Pantham, (2004) 'Understanding Indian Secularism: Learning from its Recent Critics', in R. Vora and S. Palshikar (eds.) *Indian Democracy: Meanings and Practices,* New Delhi: Sage pp. 235-256

Unit-IV

Ashok Acharya. (2008). Affirmative Action. In Rajeev Bhargava & Ashok Acharya (Eds.), *Political theory:An introduction,* Delhi: Pearson, pp.

Ashwini Deshpande. 2008. 'Quest for Equality: Affirmative Action in India', Indian Journal of Industrial Relations, 44 (2).

A Verma, (2007) 'Police Agencies and Coercive Power', in S. Ganguly, L. Diamond and M. Plattner (eds.) *The State of India's Democracy,* Baltimore: John Hopkins University Press, pp. 130-139.

Bina Agarwal. (1997). 'Bargaining and Gender Relations: Within and Beyond the Household', *Feminist Economics,* 3 (1).

Chandra, Kanchan. 2007. "Counting heads: a theory of voter and elite behavior in patronage democracies", in Herbert Kitschelt and Steven Wilkinson, (eds.) *Patrons, Clients and Policies: Patterns of Democratic Accountability and Political Competition,* Cambridge University Press: Cambridge, 84-140

Kohli Atul. 2006 "Politics of Economic Growth in India1980-2005: Part I", Economic and Political Weekly, 41(13), April 1, pp.1251-59.

Kohli, Atul. 2006 "Politics of Economic Growth in India1980-2005: Part II", Economic and Political Weekly, 41(14), April 8, pp.1361-70.

S. Palshikar, (2008) 'The Indian State: Constitution and Beyond', in R. Bhargava (ed.) *Politics and Ethics of the Indian Constitution,* New Delhi: Oxford University Press, pp. 143-163.

T. Byres, (1994) 'Introduction: Development Planning and the Interventionist State Versus Liberalisation and the Neo-Liberal State: India, 1989-1996', in T. Byres (ed.) *The State Development Planning and Liberalisation in India,* New Delhi: Oxford University Press, 1994, pp.1-35

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-04: Public Policy and Administration in India (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Alaka Sarmah, Gauhati University, alakasarmah63@gauhati.ac.in

Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Course Objectives:

- The course seeks to provide an introduction to the discipline of public policy and its significance in contemporary times.
- The course seeks to explain the various aspects of public financial administration.
- The course seeks to provide an introduction to the interface between public policy and administration in India
- The course attempts to provide the students a comprehensive understanding on social welfare administration.

Course Outcomes:

- The students will understand the basic concept of public policy, policy analysis , public policy process and governance.The students also get the knowledge of different stages of public policy in terms of theoretical formulation.
- The student will learn about the principles of financial management, which are necessary for the examination purpose.
- Students will develop basic understanding on the best practices in public administration such as RTI, e-Governance etc
- The student will learn about the various welfare policies and the role of governance in it.

Unit -I: Public Policy

a. Concept, Relevance and Approaches

b. Formulation, Implementation and Evaluation

c. Public Policy Process in India

Unit-II: Financial Administration

a. Concept and Significance of Budget

b. Various Approaches and Types of Budgeting

c. Budget cycle in India

Unit -III: Citizen and Administration Interface

a. Public Service Delivery

b. Redressal of Public Grievances: Lokpal

c. Citizens' Charter

Unit-IV: Social Welfare Administration

a. Concept and Approaches of Social Welfare

b. Social Welfare Policies

- Education: Right to Education
- Health: National Health Mission

- Food: Right to Food Security
- Employment: MNREGA

Reading List:

Unit-I

Chakrabarty, B. & Chand, P. (2016), Public Policy: Concepts, Theory and Practice, New Delhi: Sage Publications

J. Anderson, (1975) *Public Policy Making*. New York: Thomas Nelson and sons Ltd.

M. Howlett, M. Ramesh, and A. Perl, (2009), *Studying Public Policy: Policy Cycles and Policy subsystems,* 3rd edition, Oxford: Oxford University Press

Mary Jo Hatch and Ann .L. Cunliffe Organisation Theory :*Modern, Symbolicand Postmodern Perspectives*, Oxford University Press,2006

Michael Howlett, *Designing Public Policies : Principles And Instruments*, Rutledge, 2011 *The Oxford Handbook Of Public Policy*, Oxford University Press, 2006

Prabir Kumar De, *Public Policy and Systems*, Pearson Education, 2012

R.B. Denhardt and J.V. Denhardt, (2009) *Public Administration,* New Delhi: Brooks/Cole

R.V. Vaidyanatha Ayyar, *Public Policy Making In India*, Pearson,2009

Surendra Munshi and Biju Paul Abraham [Eds.] *Good Governance, Democratic Societies and Globalisation*, Sage Publishers, 2004

T. Dye, (1984) *Understanding Public Policy,* 5th Edition. U.S.A: Prentice Hall, pp. 1-44 *The Oxford Handbook of Public Policy,* OUP, 2006

T. Dye, (2002) *Understanding Public Policy*, New Delhi: Pearson

Xun Wu, M.Ramesh, Michael Howlett and Scott Fritzen , *The Public Policy Primer: Managing The Policy Process*, Rutledge, 2010

Y. Dror, (1989) *Public Policy Making Reexamined.* Oxford: Transaction Publication

Unit-II

Caiden, N.(2004) ‘ Public Budgeting Amidst Uncertainity and Instability’, in Shafritz, J.M. &

Erik-Lane, J. (2005) *Public Administration and Public Management: The Principal Agent Perspective.* New York: Routledge

Henry, N.(1999) *Public Administration and Public Affairs.* New Jersey: Prentice Hall

Hyde, A.C. (eds.) *Classics of Public Administration*. Belmont: Wadsworth

Unit-III

Jenkins, R. and Goetz, A.M. (1999) 'Accounts and Accountability: Theoretical Implications of the Right to Information Movement in India', in *Third World Quarterly.* June

M.J.Moon, *The Evolution of Electronic Government Among Municipalities: Rheoteric or Reality*, American Society For Public Administration, Public Administration Review, Vol 62, Issue 4, July –August 2002

Mukhopadyay, A. (2005) 'Social Audit', in *Seminar.* No.551. 37

Pankaj Sharma, E-*Governance: The New Age Governance*, APH Publishers, 2004

Pippa Norris, *Digital Divide: Civic Engagement, Information Poverty and the Internet in Democratic Societies*, Cambridge: Cambridge University Press, 2001.

R. Putnam, *Making Democracy Work*, Princeton University Press, 1993

Sharma, P.K. &Devasher, M. (2007) 'Right to Information in India' in Singh, S. and Sharma, P. (eds.) *Decentralization: Institutions and Politics in Rural India*. New Delhi: Oxford University Press

Stephan Goldsmith and William D. Eggers, *Governing By Network: The New Shape of the Public Sector*, Brookings Institution [Washington], 2004

United Nation Development Programme, *Reconceptualising Governance*, New York, 1997

Vasu Deva, *E-Governance In India: A Reality*, Commonwealth Publishers, 2005

World Development Report, World Bank, Oxford University Press, 1992.

Unit-IV

Basu Rumki (2015) *Public Administration in India Mandates, Performance and Future Perspectives*, New Delhi, Sterling Publishers

http://www.cefsindia.org

J.Dreze and Amartya Sen, *Indian Development: Selected Regional Perspectives*, Oxford: Clareland Press, 1997

Jean Drèze and Amartya Sen, *India, Economic Development and Social Opportunity,* Oxford: Oxford University Press, 1995

Jugal Kishore, *National Health Programs of India: National Policies and Legislations*, Century Publications, 2005

K. Lee and Mills, *The Economic Of Health In Developing Countries*, Oxford: Oxford University Press, 1983

K. Vijaya Kumar, *Right to Education Act 2009: Its Implementation as to Social Development in India,* Delhi: Akansha Publishers, 2012.

Marma Mukhopadhyay and Madhu Parhar(ed.) *Education in India: Dynamics of Development*, Delhi: Shipra Publications, 2007

Nalini Juneja, *Primary Education for All in the City of Mumbai: The Challenge Set By Local Actors'*, International Institute For Educational Planning, UNESCO: Paris, 2001

National Food Security Mission: **nfsm**.gov.in/Guidelines/XIIPlan/**NFSM**XII.pdf

Pradeep Chaturvedi [ed.], *Women And Food Security: Role of Panchayats*, Concept Publishers, 1997

Reetika Khera- Rural Poverty And Public Distribution System, EPW, Vol-XLVIII, No.45-46, Nov 2013

Surendra Munshi and Biju Paul Abraham [eds.] *Good Governance, Democratic Societies and Globalisation*, Sage Publishers, 2004

www.righttofoodindia.org

www.un.org/millenniumgoals

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-01: Western Political Philosophy (Compulsory)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Barasa Deka, Gauhati University, barasa@gauhati.ac.in
Dr. Barnali Deka, Mangaldai College, dekabarnali067@gmail.com

Course Objectives:

- This course attempts to introduce the close interconnectedness of philosophy and politics.
- It is attempted at taking the students through the history of western political thought in various periods of its development.
- This course also attempts to explore the political questions of different periods and their relevance in analysing the contemporary political developments.

Course Outcomes:

- It will help the students in understanding the interconnectedness of philosophy and politics and interpret ideas underlying traditions in political philosophy
- It will help to analyze the debates and arguments of leading political philosophers belonging to different traditions.

- The students will be in a position to appraise the relevance of political philosophy in understanding contemporary politics.

Unit-I: Antiquity

a. Plato: Theory of Forms, Justice, Philosopher Ruler

b. Aristotle: Citizenship, Justice, Classification of governments

Unit-II: Interlude

a. Renaissance

b. Machiavelli: Virtue, Morality and Statecraft, Republicanism

Unit-III: Social Contract Tradition

a. Hobbes: State of Nature, Social Contract, State

b. Locke: Laws of Nature, Natural Rights, Social Contract, Property

c. Rousseau: State of nature, Social Contract, General Will

Unit-IV: Liberal and Marxist Thought

a. J.S. Mill: Utilitarianism and Liberty

b. Marry Wollstonecraft: Women and Rights

c. Karl Marx: Historical Materialism, Class Struggle

Reading List:

Unit-I

C. Reeve, (2009) 'Plato', in D. Boucher and P. Kelly, (eds) *Political Thinkers: From Socrates to the Present,* Oxford: Oxford University Press, pp. 62-80

C. Taylor, (1995) 'Politics', in J. Barnes (ed.), *The Cambridge Companion to Aristotle*. Cambridge: Cambridge University Press, pp. 232-258

J. Coleman, (2000) 'Aristotle', in J. Coleman *A History of Political Thought: From Ancient Greece to Early Christianity,* Oxford: Blackwell Publishers, pp.120-186

R. Kraut, (1996) 'Introduction to the study of Plato', in R. Kraut (ed.) *The Cambridge Companion to Plato*. Cambridge: Cambridge University Press, pp. 1-50.

S. Okin, (1992) 'Philosopher Queens and Private Wives', in S. Okin *Women in Western Political Thought,* Princeton: Princeton University Press, pp. 28-50

T. Burns, (2009) 'Aristotle', in D. Boucher, and P. Kelly, (eds) *Political Thinkers: From Socrates to the Present.* Oxford: Oxford University Press, pp.81-99.

Unit-II

A. Skoble and T. Machan, (2007) *Political Philosophy: Essential Selections*. New Delhi: Pearson Education, pp. 9-32.

A. Skoble and T. Machan, (2007) *Political Philosophy: Essential Selections*. New Delhi: Pearson Education pp. 131-157.

B. Constant, (1833) 'The Liberty of the Ancients Compared with that of the Moderns', in D. Boaz, (ed), (1997) *The Libertarian Reader*, New York: The Free Press.

D. Baumgold, (2009) 'Hobbes', in D. Boucher and P. Kelly (eds) *Political Thinkers: From Socrates to the Present.* Oxford: Oxford University Press, pp. 189-206.

J. Coleman, (2000) 'Introduction', in *A History of Political Thought: From Ancient Greece to Early Christianity,* Oxford: Blackwell Publishers, pp. 1-20.

Q. Skinner, (2000) 'The Theorist of Liberty', in *Machiavelli: A Very Short Introduction*. Oxford: Oxford University Press, pp. 54-87.

Q. Skinner, (2010) 'Preface', in *The Foundations of Modern Political Thought Volume I,* Cambridge: Cambridge University Press pp. ix-xv.

Unit-III

A. Bloom, (1987) 'Jean-Jacques Rousseau', in Strauss, L. and Cropsey, J. (eds.) History of Political Philosophy, 2nd edition. Chicago: Chicago University Press, pp. 559-580.

A. Ryan, (1996) 'Hobbes's political philosophy', in T. Sorell, (ed.) Cambridge Companion to Hobbes. Cambridge: Cambridge University Press, pp. 208-245.

A. Skoble and T. Machan, (2007) *Political Philosophy: Essential Selections*. New Delhi: Pearson Education, pp. 181-209.

B. Nelson, (2008) *Western Political Thought*. New York: Pearson Longman, pp. 221-255.

C. Macpherson (1962) *The Political Theory of Possessive Individualism: Hobbes to Locke*. Oxford University Press, Ontario, pp. 17-29.

C. Macpherson, (1962) *The Political Theory of Possessive Individualism: Hobbes to Locke*. Oxford University Press, Ontario, pp. 194-214.

I. Hampsher-Monk, (2001) A History of Modern Political Thought: Major Political Thinkers from Hobbes to Marx, Oxford: Blackwell Publishers, pp. 69-116

I.Hampsher-Monk, (2001) 'Thomas Hobbes', in A History of Modern Political Thought: Major Political Thinkers from Hobbes to Marx, Oxford: Blackwell Publishers, pp. 1-67.

J. Waldron, (2009) 'John Locke', in D. Boucher and P. Kelly, (eds) *Political Thinkers: From Socrates to the Present.* Oxford: Oxford University Press, pp. 207-224

M. Keens-Soper, (2003) 'Jean Jacques Rousseau: The Social Contract', in M. Forsyth and M. Keens-Soper, (eds) *A Guide to the Political Classics: Plato to Rousseau.* New York: Oxford University Press, pp. 171-202.

R. Ashcraft, (1999) 'Locke's Political Philosophy', in V. Chappell (ed.) The Cambridge Companion to Locke, Cambridge. Cambridge University Press, pp. 226-251.

Unit-IV

A. Skoble and T. Machan, (2007) Political Philosophy: Essential Selections, New Delhi: Pearson Education, pp. 328-354.

A. Skoble, and T. Machan, (2007) Political Philosophy: Essential Selections, New Delhi: Pearson Education, pp. 286-327.

B. Ollman (1991) Marxism: An Uncommon Introduction, New Delhi: Sterling Publishers. G. Blakely and V. Bryson (2005) Marx and Other Four Letter Words, London: Pluto

C. Jones, (2002) 'Mary Wollstonecraft's *Vindications* and their Political Tradition' in C. Johnson, (ed.) *The Cambridge Companion to Mary Wollstonecraft,* Cambridge: Cambridge University Press, pp. 42-58.

H. Magid, (1987) 'John Stuart Mill', in L. Strauss and J. Cropsey, (eds), *History of Political Philosophy*, 2nd edition. Chicago: Chicago University Press, pp. 784-801.

J. Cropsey, (1987) ‘Karl Marx’, in L. Strauss and J. Cropsey, (eds) *History of Political Philosophy*, 2ndEdition. Chicago: Chicago University Press, pp. 802-828.

L. Wilde, (2003) ‘Early Marx’, in D. Boucher and P. Kelly, P. (eds) *Political Thinkers: From Socrates to the Present.* New York: Oxford University Press, pp. 404-435.

P. Kelly, (2003) ‘J.S. Mill on Liberty’, in D. Boucher, and P. Kelly, (eds.) *Political Thinkers: From Socrates to the Present*. New York: Oxford University Press, pp. 324-359.

S. Ferguson, (1999) ‘The Radical Ideas of Mary Wollstonecraft’, in Canadian Journal of Political Science XXXII (3), pp. 427-50, Available at http://digitalcommons.ryerson.ca/politics, Accessed: 19.04.2013.

Selections from A Vindication of the Rights of Woman, Available at http://oregonstate.edu/instruct/phl302/texts/wollstonecraft/womana. html#CHAPTER%20II, Accessed: 19.04.2013.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-02: Indian Political Thought (Compulsory)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Joanna Mahjebeen, Gauhati University, jmahjebeen@gauhati.ac.in

Dr. Ankita Baruah, Darrang College, Tezpur, ankitabaruah65@gmail.com

Course Objectives:

- To introduce the students to the diversity of thinkers in the Indian political tradition.
- To enable them to understand the trajectory of development of Indian Political Thought spanning over two millennia
- To introduce students to the social context which influenced the formation of such ideas
- To provide a sense of the broad streams of Indian thought while encouraging a specific knowledge of individual thinkers and texts.

Course Outcomes:

- Better understand the themes and issues in political thought of India.
- Compare and contrast positions of leading political thinkers in India on issues that are constitutive of modern India.

- Comprehend the importance of the socio-political context for the emergence of the ideas.
- Assess the relevance of political thought of India in understanding contemporary politics.

Unit-I: Ancient Political Thought

a. Kautilya: Theory of State
b. Manu: Social laws

Unit-II: Medieval Political Thought

a. Ziauddin Barani: Ideal Polity
b. Abul Fazl: Governance and Administration

Unit-III: Modern Political Thought

a. Raja Ram Mohan Roy: Reformist ideas
b. Gandhi: Swaraj; Satyagraha; Critique of Modern Civilisation
c. Nehru: Secularism, Socialism

Unit-IV: Caste, Class and Gender in Indian Political Thought

a. Ambedkar: The Revolution against Caste
b. Lohia: Socialism
c. Tarabai Shinde: Patriarchy and Caste

Reading List:

Unit-I

Kautilya, (1997) 'The Elements of Sovereignty' in R. Kangle (ed. and trns.), *Arthasastra of Kautilya,* New Delhi: Motilal Publishers, pp. 511- 514.

Manu, (2006) 'Rules for Times of Adversity', in P. Olivelle, (ed. &trans.) *Manu's Code of Law: A Critical Edition and Translation of the Manava- Dharamsastra*, New Delhi: OUP, pp. 208-213.

P. Olivelle, (2006) 'Introduction', in *Manu's Code of Law: A Critical Edition and Translation of the Manava –Dharmasastra,* Delhi: Oxford University Press, pp. 3- 50

R. Kangle, (1997) *Arthashastra of Kautilya-Part-III: A Study,* Delhi: Motilal Banarsidass, rpt., pp. 116- 142.

R. Sharma, (1991) 'Varna in Relation to Law and Politics (c 600 BC-AD 500)', in *Aspects of Political Ideas and Institutions in Ancient India,* Delhi: Motilal Banarsidass, pp. 233- 251.

Singh, M.P., (2011), *Kautilya: Theory of Stat,* in M.P. Singh & Himanghsu Roy(ed) Indian Political Thought: Themes and Thinkers, Pearson Publications, New Delhi, pp 1-17.

Sinha, Nalini (2011), Manu: Social Laws*,* in M.P. Singh & Himanghsu Roy(ed) *Indian Political Thought: Themes and Thinkers*, Pearson Publications, New Delhi, pp 18-29

V. Mehta, (1992) 'The Cosmic Vision: Manu', in *Foundations of Indian Political Thought,* Delhi: Manohar, pp. 23- 39.

V.Mehta, (1992) 'The Pragmatic Vision: Kautilya and His Successor', in *Foundations of Indian Political Thought,* Delhi: Manohar, pp. 88- 109.

Unit-II

Fazl, A., (1873) *The Ain-i Akbari* (translated by H. Blochmann), Calcutta: G. H. Rouse, pp. 47-57.

Habib, I. (1998) 'Ziya Barni's Vision of the State', in *The Medieval History Journal*, Vol. 2, (1), pp. 19- 36.

Habib, I. (1998). A Political Theory For The Mughal Empire — A Study Of The Ideas Of Abu'l Fazl. *Proceedings of the Indian History Congress*, *59*, 329–340.

Habib,I. (1998) 'Two Indian Theorist of The State: Barani and Abul Fazal', in *Proceedings of the Indian History Congress*. Patiala, pp. 15- 39.

M. Alam, (2004) 'Sharia Akhlaq', in *The Languages of Political Islam in India 1200- 1800,* Delhi: Permanent Black, pp. 26- 43

M. Alam, (2004) 'Sharia in Naserean Akhlaq', in *Languages of Political Islam in India1200-1800,* Delhi: Permanent Black, pp. 46- 69.

Mehta, V.R. (1992) 'The Imperial Vision: Barni and Fazal', in *Foundations of Indian Political Thought,* Delhi: Manohar, pp. 134- 156.

Unit-III

A. Parel, (ed.), (2002) 'Introduction', in *Gandhi, Freedom and Self Rule*, Delhi: Vistaar Publication.

B. Zachariah, (2004) *Nehru,* London: Routledge Historical Biographies, pp. 169-213.

C. Bayly, (2010) 'Rammohan and the Advent of Constitutional Liberalism in India 1800- 1830', in Sh. Kapila (ed.), *An intellectual History for India*, New Delhi: Cambridge University Press, pp. 18- 34. T.

Chakrabarty, B. & Pandey, R.K. (2009), *Modern Indian Political Thought: Text and Context*, New Delhi, Sage Publications

J. Nehru, (1991) 'Selected Works', in S. Hay (ed.), *Sources of Indian Tradition, Vol. 2,* Second Edition, New Delhi: Penguin, pp. 317-319.

M. Gandhi, (1991) 'Satyagraha: Transforming Unjust Relationships through the Power of the Soul', in S. Hay (ed.), *Sources of Indian Tradition*, Vol. 2.Second Edition, New Delhi: Penguin, pp. 265-270.

Mukherjee, R. (2009). Gandhi's Swaraj. *Economic and Political Weekly*, *44*(50), 34–39. http://www.jstor.org/stable/25663887

P. Chatterjee, (1986) 'The Moment of Arrival: Nehru and the Passive Revolution', in *Nationalist Thought and the Colonial World: A Derivative Discourse?* London: Zed Books, pp. 131-166

Pantham, (1986) 'The Socio-Religious Thought of Rammohan Roy', in Th. Panthom and K. Deutsch, (eds.) *Political Thought in Modern India*, New Delhi: Sage, pp.32-52.

Parekh, Bhikhu (1991), *Nehru and the National Philosophy of India*, Economic and Political Weekly, Vol. 26, No. 1/2 (Jan. 5-12,), pp. 35-48

Parekh, Bhikhu (1997), *Gandhi: A Very Short Introduction*, Oxford University Press, New York, pp 64-91.

R. Pillai, (1986) 'Political thought of Jawaharlal Nehru', in Th. Pantham, and K. Deutsch (eds.), *Political Thought in Modem India*, New Delhi: Sage, pp. 260- 274.

Unit-IV

B. Ambedkar, (1991) 'Constituent Assembly Debates', S. Hay (ed.), *Sources of Indian Tradition, Vol. 2,* Second Edition, New Delhi: Penguin, pp. 342-347.

B. Mungekar, (2007) 'Quest for Democratic Socialism', in S. Thorat, and Aryana (eds.), *Ambedkar in Retrospect - Essays on Economics, Politics and Society,* Jaipur*: IIDS* and Rawat Publications, pp. 121-142.

Doctor, A. H. (1988). Lohia's Quest for an Autonomous Socialism. *The Indian Journal of Political Science*, *49*(3), 312–327.

Kumar, Sanjay, Lohia: Democracy, in M.P. Singh & Himanghsu Roy(ed) Indian Political Thought: Themes and Thinkers, Pearson Publications, New Delhi, pp 251-258.

P. Chatterjee, (2005) 'Ambedkar and the Troubled times of Citizenship', in V. Mehta and Th. Pantham (eds.), *Political ideas in modern India: Thematic Explorations,* New Delhi: Sage, pp. 73-92.

T. Shinde, (1993) 'Stree Purusha Tulna', in K. Lalitha and Susie Tharu (eds), Women Writing in India, New Delhi, Oxford University Press, pp. 221-234

Tolpadi, R. (2010), Context*, Discourse and Vision of Lohia's Socialism*, *Economic and political Weekly*, 45(40), 71–77.

V. Rodrigues, (2007) 'Good society, Rights, Democracy Socialism', in S. Thorat and Aryama (eds.), *Ambedkar in Retrospect - Essays on Economics, Politics and Society,* Jaipur*: IIDS* and Rawat Publications.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-03a: United Nations and Global Conflict (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in
Dr. Ratul Ch. Kalita, Tihu College, Tihu, ratulchkalita70@gmail.com

Course Objectives:

- This course provides a comprehensive introduction to the most important multilateral political organization in international relations.
- It provides a detailed account of the organizational structure and the political processes of the UN, and how it has evolved since 1945, especially in terms of dealing with the major global conflicts.
- The course imparts a critical understanding of the UN's performance until now and the imperatives as well as processes of reforming the organization in the context of the contemporary global system.

Course Outcomes:

- To make students learn the importance of United Nations as an organization.

- To enable students to have a basic understanding of the political processes of the United Nations.
- To make students learn the relevance of United Nations and its intervention in global conflicts critically.
- To help students identify and analyse the key conflicts that have shaped contemporary global politics.

Unit-I: The United Nations

a. A Historical Overview of the United Nations
b. Principles and Objectives
c. Structures and Functions: General Assembly; Security Council, and Economic and Social Council; the International Court of Justice

Unit-II: The United Nations in Conflict Resolution

a. Collective security during the Cold War
b. Peace Keeping, Peace Making and Enforcement, Peace Building and Responsibility to Protect
c. Reforming the UN

Unit-III: Specialised Agencies of the UN: Role and Challenges

a. United Nations Development Programme (UNDP)
b. United Nations Environment Programme (UNEP)
c. United Nations High Commissioner for Refugees (UNHCR)
d. The World Health Organisation (WHO)

Unit-IV: Major Global Conflicts Since the End of the Cold War

a. The war in Afghanistan
b. The war in Iraq
c. The war in Ukraine

Reading List:

Unit-I

Armstrong, D., Lloyd, L. and Redmond, J. (2004) International organisations in world politics.3rd edn. New York: Palgrave Macmillan, pp. 42-43.

Basu, Rumki (2014) United Nations: Structure and Functions of an international organization, New Delhi, Sterling Publishers

Gareis, S.B. and Varwick, J. (2005) The United Nations: An introduction. Basingstoke: Palgrave, pp. 15-21.

Unit-II

Claude, I. (1984) Swords into plowshares: the progress and problems of international organisation. 4th edn. New York: Random House

Baylis, J. and Smith, S. (eds.) (2008) The globalization of world politics. an introduction to international relations. 4th edn. Oxford: Oxford University Press, pp. 405-422.

Calvocoressi, P. (2001) World Politics: 1945-200. 3rd edn. Harlow: Pearson Education, pp. 116-124.

Dodds, F. (ed.) (1987) The way forward: beyond the agenda 21. London: Earthscan.

Ghali, B.B. (1995) An agenda for peace. New York: UN, pp.5-38. United Nations Department of

Public Information. (2008) The United Nations Today. New York: UN.

Nambiar, S. (1995) 'UN peace-keeping operations', in Kumar, S. (eds.) The United Nations at fifty. New Delhi, UBS, pp. 77-94.

Rajan, M.S., Mani, V.S and Murthy, C.S.R. (eds.) (1987) The nonaligned and the United Nations. New Delhi: South Asian Publishers.

Sangal, P.S. (1986) 'UN, peace, disarmament and development', in Saxena, J.N. et.al.United Nations for a better world. New Delhi: Lancers, pp.109-114.

Unit-III

Baxi, U. (1986) 'Crimes against the right to development', in Saxena, J.N. et.al.United Nations for a better world. New Delhi: Lancers, pp.240-248.

Goldstein, J. and Pevehouse, J.C. (2006) International relations.6th edn. New Delhi: Pearson, pp. 265-282.

J.S. (2003) International relations.3rd edn. Delhi: Pearson Education, pp 43-51. Moore, J.A. Jr. and Pubantz, J. (2008) The new United Nations. Delhi: Pearson Education, pp.24-27.

Moore, J.A. Jr. and Pubantz, J. (2008) The new United Nations. Delhi: Pearson Education, pp.119-135.

Moore, J.A. Jr. and Pubantz, J. (2008) The new United Nations. Delhi: Pearson Education, pp. 91-112.

South Asia Human Rights Documentation Centre. (2006) Human rights: an overview. New Delhi: Oxford University Press.

Taylor, P. and Groom, A.J.R. (eds.) (2000) The United Nations at the millennium. London: Continuum, pp. 21-141.

Thakur, R. (1998) 'Introduction', in Thakur, R. (eds.) Past imperfect, future uncertain: The UN at Ffifty. London: Macmillan, pp. 1-14.

Whittaker, D.J. (1997) 'Peacekeeping', in United Nations in the contemporary world. London: Routledge, pp. 45-56.

Unit-IV

Fawcett, L. (2023) The Iraq War 20 years on: towards a new regional architecture, International Affairs, Volume 99, Issue 2, March ,Pages 567–585, https://doi.org/10.1093/ia/iiad002

James Ellison, Michael Cox, Jussi M. Hanhimäki, Hope M. Harrison, N. Piers Ludlow, Angela Romano, Kristina Spohr&VladislavZubok (2023) The war in Ukraine, Cold War History, 23:1, 121-206, DOI: 10.1080/14682745.2023.2162329

Ratten, V. (2023). The Ukraine/Russia conflict: Geopolitical and international business strategies. *Thunderbird International Business Review*, 65(2), 265– 271. https://doi.org/10.1002/tie.22319

Shahrani, M. N. (Ed.). (2018). Modern Afghanistan: The Impact of 40 Years of War. Indiana University Press.https://doi.org/10.2307/j.ctv8j6dx

Walldorf C. W; (2022) Narratives and War: Explaining the Length and End of U.S. Military Operations in Afghanistan. International Security 2022; 47 (1): 93–138. doi: https://doi.org/10.1162/isec_a_00439

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-03b: Comparative Government and Politics (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in
Dr. Jintu Gohain, R. G. Baruah College, Guwahati, gohain89@gmail.com

Course Objectives:

- Students will leave this course with the foundational knowledge they need to understand comparative politics.
- Understanding the topic of Political Science is facilitated by studying the many constitutions, each of which has its own history, institutions, and points of divergence.

Course Outcomes:

- To analyse the importance of different methods of "comparison".
- To understand the different forms of governments..
- To assess the working of institutions .

Unit-I: Introduction to Comparative Politics

a. Meaning and Nature
b. Comparative methods
c. Traditional and modern approaches to understanding of comparative politics

Unit-II: Introduction to British Constitution

a. History, Conventions, Features
b. Monarchy
c. Parliament
d. PM and the cabinet

Unit-III: Introduction to US Constitution

a. History and Features
b. President and the Congress
c. Supreme Court
d. Federalism

Unit-IV: Introduction to the Swiss Constitution

a. History and features
b. Federal Council and the Federal Assembly
c. Swiss Federation
d. Federal Courts

Reading List:

Unit-I

Bara, J & Pennington, M. (eds.). (2009) Comparative Politics. New Delhi: Sage.

Caramani, D. (ed.). (2008) Comparative Politics. Oxford: Oxford University Press.

Hague, R. and Harrop, M. (2010) Comparative Government and Politics: An Introduction.(Eight Edition). London: Palgrave McMillan.

Ishiyama, J.T. and Breuning, M. (eds.). (2011) 21st Century Political Science: A Reference Book. Los Angeles: Sage.
Newton, K. and Deth, Jan W. V. (2010) Foundations of Comparative Politics: Democracies of the Modern World. Cambridge: Cambridge University Press.
O'Neil, P. (2009) Essentials of Comparative Politics.(Third Edition). New York: WW. Norton & Company, Inc.

Unit-II

Bhagwan, Vishnoo and VidyaBhushan and VandhanaMohla (2022)World Constitutions: A comparative Study , Sterling Publishers.
Kapur, A.C. (2010) Select Constitutions, S. Chand.
Palekar, S.A. (2009) Comparative Government and Politics. New Delhi: PHI Learning Pvt. Ltd.

Unit-III

Bhagwan, Vishnoo and VidyaBhushan and VandhanaMohla (2022)World Constitutions: A comparative Study , Sterling Publishers.
Kapur, A.C. (2010) Select Constitutions, S. Chand.
Palekar, S.A. (2009) Comparative Government and Politics. New Delhi: PHI Learning Pvt. Ltd.

Unit-IV

Bhagwan, Vishnoo and VidyaBhushan and VandhanaMohla (2022) World Constitutions: A comparative Study , Sterling Publishers.
Kapur, A.C. & Mishra, K.K. (2010) Select Constitutions, S. Chand.
Palekar, S.A. (2009) Comparative Government and Politics. New Delhi: PHI Learning Pvt. Ltd.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-04a: Introduction to India's Foreign Policy (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Rubul Patgiri, Gauhati University, rubulpatgiri@gauhati.ac.in

Dr. Ankita Baruah, Darrang College, Tezpur, ankitabaruah65@gmail.com

Course Objectives:

- The course seeks to provide basic knowledge of India's foreign policy.
- Foreign policy of India is dynamic and wider area of study.
- By exposing students to the various aspects of foreign policy formulation process in India, evolving nature of India's engagement with different powers and actors and its major foreign policy initiatives, the course is structured to equip them with the basic knowledge necessary to follow India's foreign issues and debates.

Course Outcomes:

- To enable students to learn about the evolution of India's engagement with the world and foreign policy formulation process in India.

- To familiarize students the nature of India's evolving relationship with major powers and its neighbours.
- To demonstrate the knowledge of multilateral diplomacy of India.

Unit-I: Making of India's Foreign Policy:

a. Evolution of India's foreign policy-Nehruvian tradition and India in the new world order
b. Domestic and External determinants,
c. Policy formulation process-the Institutional structure (MEA, PMO and Parliament)

Unit-II: India and Major Powers

India's relations with
a. USA,
b. Russia
c. China

Unit-III: India and its Neighbours

a. Pakistan,
b. Bangladesh
c. Sri Lanka
d. Concept of 'Extended Neighbourhood' and India's Look (Act) East Policy.

Unit-IV: India's Multilateral Diplomacy

a. India and the United Nations
b. India and International financial Institutions,
c. India and Climate change

Reading List:

Unit-I

A. Appadorai (1982). Domestic Roots of India's Foreign Policy: 1947-72, New Delhi: Oxford University Press.

A.P. Rana: The Imperatives of Non-Alignment: A Conceptual Study of India's Foreign Policy Strategy in the Nehru Period. Macmillan, New Delhi, 1976

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.

Ch. Ogden, (2011) 'International 'Aspirations' of a Rising Power', in David Scott (ed.), Handbook of India's International Relations, London: Routeledge, pp.3-31

Chaudhury, Rudra, (2015). 'The Parliament' in David M. Malone et al (eds). *The Oxford Handbook of Indian Foreign Policy*, UK: Oxford University Press.

J. Bandhopadhyaya, (1970). The Making of India's Foreign Policy, New Delhi: Allied Publishers.

Madan, Tanvi, (2015). 'Officialdom: South Block and Beyond' in David M. Malone et al. (eds). *The Oxford Handbook of Indian Foreign Policy*, UK: Oxford University Press.

Mansingh, Surjit , (1998). Nehru s Foreign Policy, Fifty Years On, New Delhi: Mosaic Books

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.

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.

S. Cohen, (2002) India: Emerging Power, Brookings Institution Press.

S. Ganguly and M. Pardesi, (2009) 'Explaining Sixty Years of India's Foreign Policy', in India Review, Vol. 8 (1), pp. 4–19.

Saksena, P. (1996). 'India's Foreign Policy: The Decision Making Process', *International Studies*, 33 (4): 391-405.

Sunil Khilnani, (2015). 'India's Rise: The Search for Wealth and Power in the Twenty-First Century' in David M. Malone et at, eds. *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

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.

Unit-II

A. Singh, (1995) ‘India's Relations with Russia and Central Asia’, in International Affairs, Vol. 71 (1): 69-81.

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.

D. Mistry, (2006) ‘Diplomacy, Domestic Politics, and the U.S.-India Nuclear Agreement’, in Asian Survey, Vol. 46 (5), pp. 675-698.

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.

H. Pant, (2011) ‘India’s Relations with China’, in D. Scott (ed.), Handbook of India’s International Relations, London: Routeledge, pp. 233-242.

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.

M. Zafar, (1984), ‘Chapter 1’, in India and the Superpowers: India's Political Relations with the Superpowers in the 1970s, Dhaka, University Press.

R. Hathaway, (2003) ‘The US-India Courtship: From Clinton to Bush’, in S. Ganguly (ed.), India as an Emerging Power, Frank Cass: Portland.

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.

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.

Unit-III

Amitav Acharya, (2015). 'India's 'Look East' Policy' in David M. Malone et al, (eds.) *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

D. Scott, (2009) 'India's "Extended Neighbourhood" Concept: Power Projection for a Rising Power', in India Review, Vol. 8 (2), pp. 107-143

David M. Malone (2018). Does Elephant Dance?, New Delhi: Oxford University Press

David M. Malone et al, eds. (2015). *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

Haokip, Thongkholal. (2015). India's Look East Policy: Prospects and Challenges for Northeast India. *Studies in Indian Politics*, 3 (2), 198-211

Harsh V. Pant, (2021). Politics and Geopolitics: Decoding India's Neighbourhood Challenges, New Delhi: Rupa Publications.

J. N. Dixit, (2010). India's Foreign Policy and Its Neighbours, New Delhi: Gyan Publishing House

S. Cohen, (2002) 'The World View of India's Strategic Elite', in S. Cohen, India: Emerging Power, Brookings Institution Press, pp. 36-65.

S. Muni, (2003) 'Problem Areas in India's Neighbourhood Policy', in South Asian Survey, Vol. 10 (2), pp. 185-196.

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.

Unit-IV

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.

David M. Malone (2018). Does Elephant Dance?, New Delhi: Oxford University Press

Jason A. Kirk, (2015). India and the International Financial Institutions' in David M. Malone et al, (eds.)*The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

Manu Bhagavan, (2015). 'India and United Nations: Or Things Fall Apart' in David M. Malone et al, eds. *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

N. Dubash, (2012) 'The Politics of Climate Change in India: Narratives of Enquiry and Co benefits', Working Paper, New Delhi: Centre for Policy Research.

Navroz K. Dubash and Lavanya Rajaman, (2015). ‘Multilateral Diplomacy on Climate Change’ in David M. Malone et al, (eds.)*The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

Poorvi Chitalkar and David M. Malone, (2015). ‘India and Global Governance’ in David M. Malone et at, (eds.)*The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

S. Cohen, (2002) ‘The World View of India’s Strategic Elite’, in S. Cohen, India: Emerging Power, Brookings Institution Press, pp. 36-65.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-04b: Understanding South Asia (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in

Dr. Ratul Ch. Kalita, Tihu College, Tihu, ratulchkalita70@gmail.com

Course Objectives:

- The course introduces the historical legacies and geopolitics of South Asia as a region.
- It imparts an understanding of political regime types as well as the socioeconomic issues of the region in a comparative framework.
- The course also apprises students of the common challenges and the strategies deployed to deal with them by countries in South Asia.

Course Outcomes:

- To identify geo-political and historical construction of South Asia as a region.
- To analyse the politics and socio-economic issues of the South Asian Region.

- To assess the relevance of regionalism in South Asia and India's position in the region.

Unit-I: South Asia- Understanding South Asia as a Region

a. Colonial Legacies
b. Geopolitics of South Asia
c. Regional cooperation in South Asia

Unit-II: Politics and Governance in Contemporary South Asia

a. Nepal: Monarchy and Democracy
b. Pakistan: Political Stability and the Role of the Army
c. Bangladesh: State of Democracy and Religious Fundamentalism
d. Sri Lanka: Constitutional Crises and Economy

Unit-III: Foreign Policies of Countries of South Asia

a. Nepal
b. Pakistan
c. Bangladesh
d. Sri Lanka

Unit-IV: South Asia: Regional Issues and Challenges

a. Human Development in South Asia
b. Insurgency and Terrorism
c. Refugees and Migration

Reading List:

Unit-I

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 73

Baxter, C. (ed.) (1986) The Government and Politics of South Asia. London: Oxford University Press.

Brass, P. (ed.) (1986)Routledge Handbook of South Asian Politics. London: Routledge, pp.1-24 72 I.

Hagerty, D.T. (ed.) (2005) South Asia in World Politics, Oxford: Rowman and Littlefield.

Hewitt, V. (1992) 'Introduction', in The International Politics of South Asia. Manchester: Manchester University Press, pp.1-10.

Muni, S.D. (2003) 'South Asia as a Region', South Asian Journal, 1(1), August-September, pp. 1-6

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.

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.

Unit-II

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.

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

Kukreja, V. (2003) Contemporary Pakistan. New Delhi: Sage, pp. 75-111 and 112-153.

Kukreja, V. and Singh, M.P. (eds) (2008) Democracy, Development and Discontent in SouthAsia. New Delhi: Sage.

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.

Unit-III

Ali, G. (Ed.). (2022). Pakistan's Foreign Policy: Contemporary Developments and Dynamics (1st ed.). Routledge.https://doi.org/10.4324/9781003250920

Basrur, Rajesh M., (2011) 'Foreign Policy Reversal: The Politics of Sri Lanka's Economic Relations with India', in E. Sridharan (ed.), International Relations Theory and South Asia: Security, Political Economy, Domestic Politics, Identities, and Images Vol. 1 (Delhi, 2011; online edn, Oxford Academic, 23 Jan. 2014), https://doi.org/10.1093/acprof:oso/9780198069652.003.0007.

Dietrich, Simone; Mahmud, Minhaj; Winters, Matthew S. (2017). Foreign Aid, Foreign Policy, and Domestic Government Legitimacy: Experimental Evidence from Bangladesh. The Journal of Politics, doi:10.1086/694235

Mainali, R. (2022). Analysing Nepal’s Foreign Policy: A Hedging Perspective. Journal of Asian Security and International Affairs, 9(2), 301–317. https://doi.org/10.1177/23477970221098491

Pandey, A. (2021) Routledge Handbook on South Asian Foreign Policy, Routledge.

Unit-IV

Haq, Khadija (ed.) (2017) , 'Human Security for South Asia', in Khadija Haq (ed.), *Economic Growth with Social Justice: Collected Writings of MahbubulHaq* (Oxford), https://doi.org/10.1093/oso/9780199474684.003.0029

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

P. R. Chari, Sonika Gupta (2003) Human Security in South Asia: Energy, Gender, Migration, and Globalisation, Berghahn Books.

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.

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.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-01: Human Rights: Traditions and Debates (Compulsory)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Akhil Ranjan Dutta, Gauhati University, akhilranjan@gauhati.ac.in
Ms. Bondita Borbora, Dudhnoi College, Dudhnoi, bonditaborbora@gmail.com

Course Objectives:

- To understand human rights, its origin and debates. It is important for students to know how debates on human rights have taken distinct forms historically and in the contemporary world.
- To impart knowledge on the significant development of human rights starting from European tradition to Cairo Declaration.
- To deal with several issues which violate Human Rights through a comparative study. The course seeks to anchor all issues in the Indian context, and pulls out another country to form a broader comparative frame.
- To explore challenges on Human Rights and future possibility.

Course Outcomes:

- To understand various dimensions of Human Rights and multiple challenges.

- To make sense of institutional framework as well as theoretical perspectives of human rights.
- To develop critical thinking and the ability to make logical inferences about socio-economic and political issues.

Unit-I: Human Rights: Theories and Institutionalization

a. Growth and Evolution of Human Rights
b. Three Generations of Human Rights
c. Are Human Rights Universal? Issue of Cultural Relativism.
d. Institutionalization: UDHR, ICCPR, ICESCR, Human Rights Council

Unit-II: Traditions of Human Rights

a. European Tradition: European Convention on Human Rights, 1953
b. American Tradition: American Convention of Human Rights, 1969
c. African Tradition: African Charter on Human and Peoples' Rights, 1986
d. Islamic Tradition: Cairo Declaration on Human Rights in Islam, 1990

Unit-III: Structural Violence and Human Rights

a. Caste Question: India
b. Gender and Domestic Violence: India
c. Migration and Refugees: South Asia
d. Race: South Africa

Unit-IV: Contemporary Debates, Issues and Possibilities

a. Challenges: Market economy & Ecological Crisis
b. State Authoritarianism
c. Issues: Human Development and Human Security

d. Possibilities: MDGs, SDGs

Reading List:

Unit-I

Alison Dundes Renteln , *The Concept of Human Rights* , Anthropos, Bd. 83, H. 4./6. (1988), pp. 343-364

D. O'Byrne, (2007) '*Theorizing Human Rights', in Human Rights: An Introduction*, Delhi, Pearson, pp.26-70.

I: J. Hoffman and P. Graham, (2006) 'Human Rights', *Introduction to Political Theory*, Delhi, Pearson, pp. 436-458.

J. Morsink, (1999) *The Universal Declaration of Human Rights: Origins, Drafting and Intent*, Philadelphia: University of Pensylvania Press, pp. ix-xiv

Jack Donnelly, Cultural Relativism and Universal Human Rights, *Human Rights Quarterly*,

Jack Donnelly, Human Rights as Natural Rights, *Human Rights Quarterly*, Vol. 4, No. 3

M. Ishay, (2004) *The History of Human Rights: From Ancient Times to the Globalization* Era, Delhi: Orient Blackswan.

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.

U. Baxi, (1989) 'From Human Rights to the Right to be Human: Some Heresies', in S. Kothari and H. Sethi (ed.), Rethinking Human Rights, Delhi: Lokayan, pp.181-166

Vol. 6, No. 4 (Nov., 1984), pp. 400-419

Yasin, Adil-Ul, and Archana Upadhyay, *Human Rights* Akansha Publishing House, New Delhi, 2004

Unit-II

A guide to the African human rights system: Celebrating 30 years since the entry into force of the African Charter on Human and Peoples' Rights 1986 – 2017 (2017) Edited by Centre for Human Rights, Faculty of Law, University of Pretoria; South Africa: Pretoria University Press

C. Grabenwarter et al., (2014) *European Convention on Human Rights: Commentary, Germany* Beck/Hart Publishing

Irfaan Jaffer (2021), *Traditional Islamic Ethics: The Concept of Virtue and Its Implications for Contemporary Human Rights*, US: Vernon publish

Ludovic Hennebel, Hélène Tigroudja (2021) *The American Convention on Human Rights: A Commentary*, New York: Oxford University Press

Murray and Evans (eds.) *The African Charter on Human and Peoples' Rights: The System in Practice*, 1986-2000; (2002)

Thomas M. Antkowiak and Alejandra Gonza (2017) *The American Convention on Human Rights: Essential Rights*, New York: Oxford University Press

William A. Schabas (2015) The *European Convention on Human Rights: A Commentary, United Kingdom*: Oxford University Press

Unit-III

A. Pinto, (2001) 'UN Conference against Racism: Is Caste Race?', in Economic and Political Weekly, Vol. 36(30)

Ahmad, M. (2002) 'Homeland Insecurities: Racial Violence the Day after September 11', Social Text, 72, Vol. 20(3), pp. 101-116.

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

Singh, U. (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

Unit-IV

Acharya, Amitav "Human Security" in John Baylis, Steve Smith and Patricia Owens (eds) The Globalisation of World Politics (Oxford: Oxford University Press, 2008),pp. 490-505

Caroline Thomas, 'Global Governance, Development and Human Security: Exploring the Links' , *Third World Quarterly*, Vol. 22, No. 2 (Apr., 2001), pp. 159-175

Heike Kuhn et al. *Sustainable Development Goals and Human Rights*. Germany: Springer Berlin Heidelberg

M. Shamsul Haque, 'Environmental Discourse and Sustainable Development: Linkages and Limitations'*, Ethics and the Environment*, Vol. 5, No. 1 (2000), pp. 3-21

Paul Streeten , "Human Development: Means and Ends", *The Bangladesh Development Studies*, Vol. 21, No. 4 (December 1993), pp. 65-76

Roland Paris , 'Human Security: Paradigm Shift or Hot Air?' , *International Security*, Vol. 26, No. 2 (Fall, 2001), pp. 87-102

Stiglitz, Joseph (2002), Globalization and Its Discontents, New York: W.W. Norton & Company

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-02: Feminism: Theory and Practice (Compulsory)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Barasa Deka, Gauhati University, barasa@gauhati.ac.in

Dr. Joanna Mahjebeen, Gauhati University, jmahjebeen@gauhati.ac.in

Dr. Ankita Baruah, Darrang College, Tezpur, ankitabaruah65@gmail.com

Course Objectives:

- This course is designed to introduce students to the structural and institutional basis of patriarchy as well as the basic concepts in gender studies.
- It would also give them an introduction to feminist thought and its evolving theories including the contemporary developments.
- It attempts to highlight the contribution of women's movements in different parts of the world and also highlights the Indian Women's movement from its inception to the post colonial period with a special focus on gender issues in Northeast India.

Course Outcomes:

- It will help to better appreciate key concepts that offer an understanding of gender inequality.
- Students will be in a position to comprehend the meaning of feminism and the theoretical developments associated with it.
- It will help to appraise the origin and development of feminism in the West and Socialist states.
- This course will help the students to comprehend the trajectory of women's movement in India and the issues addressed.
- It will lead to analysing and understanding the importance of gender in Northeast India in certain key aspects.

Unit-I: Understanding Patriarchy

a. Patriarchy and gender
b. Sex/gender distinction: Nature-nurture debate
c. Private-public dichotomy

Unit-II: Feminism: Concept and Theories

a. Concept of Feminism
b. Theories of Feminism: Liberal, Socialist, Marxist, Radical
e. New developments in feminist thought: Eco-feminism, Black feminism, Queer

Unit-III: History of Feminism

a. Origins of Feminism in the West: France, Britain and United States of America
b. Feminism in the Socialist Countries: China, Cuba and erstwhile USSR

Unit-IV: The Indian Experience

a. Social Reforms Movement and women in the nationalist movement

b. Women's movement in the post-colonial period : issue of family and property rights, work and violence
c. Gender issues in Northeast India: conflict, peacemaking and politics

Reading List:

Unit-I

Bhasin, Kamla (1993), *What is Patriarchy?,* Kali for Women

Bhasin, Kamla (2000), *Understanding Gender,* Kali for Women

Davidoff, L. (1998). 'Regarding Some "Old Husbands'" Tales: Public and Private in Feminist History'. In J. Landes (Ed.), Feminism, the Public and the Private. Oxford: Oxford University Press.

Eagly, A. H., & Wood, W. (2013). The Nature-Nurture Debates: 25 Years of Challenges in Understanding the Psychology of Gender. Perspectives on Psychological Science, 8(3), 340–357. http://www.jstor.org/stable/44289881

Geetha, V. (2002) *Gender*. Calcutta: Stree, pp 1-20

Geetha, V. (2007) *Patriarchy*. Calcutta: Stree.

http://www.du.ac.in/fileadmin/DU/Academics/course_material/hrge_06.pdf,

M. Kosambi, (2007) *Crossing Thresholds,* New Delhi, Permanent Black, pp. 3-10; 40-46

N. Menon (2008) 'Gender', in R. Bhargava and A. Acharya (eds), *Political Theory: An Introduction,* New Delhi: Pearson, pp. 224-233

S. Ray 'Understanding Patriarchy', Available at

T. Shinde, (1993) 'Stree Purusha Tulna', in K. Lalitha and Susie Tharu (eds), *Women Writing in India,* New Delhi, Oxford University Press, pp. 221-234

Thornton, M. (1991). The Public/Private Dichotomy: Gendered and Discriminatory. Journal of Law and Society, 18(4), 448–463. https://doi.org/10.2307/1410319

U. Chakravarti, (2001) 'Pitrasatta Par ek Note', in S. Arya, N. Menon & J. Lokneeta (eds.) *Naarivaadi Rajneeti: Sangharsh evam Muddey,* University of Delhi: Hindi Medium Implementation Board, pp.1-7

Unit-II

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

Jagger, Alison. (1983) *Feminist Politics and Human Nature*. U.K.: Harvester Press, pp. 25- 350.

R. Delmar, (2005) 'What is Feminism?', in W. Kolmar & F. Bartkowski (eds) *Feminist Theory: A Reader,* pp. 27-37

Tong, Rosemary (2009), Feminist Thought: A More Comprehensive Introduction, Westview Press, pp11-127.

Unit-III

Bryson Valerie. (1992) Feminist Political Theory : An Introduction. London: Macmillan

Eisentein, Zillah. (1979) *Capitalist Patriarchy and the Case for Socialist Feminism*. New York: Monthly Review Press, pp. 271-353.

Jayawardene, Kumari. (1986) *Feminism and Nationalism in the Third World*. London: Zed Books, pp. 1-24, 71-108, and Conclusion.

Rowbotham, Shiela. (1993) *Women in Movements*. New York and London: Routledge, Section I, pp. 27-74 and 178-218.

Unit-IV

Bhattacharya, J. (2010). GENDER, PEACEMAKING AND THE CASE OF NORTHEAST INDIA. *The Indian Journal of Political Science*, *71*(1), 233–239. http://www.jstor.org/stable/42748384

Chinoy, Anuradha M., *Militarism and Women in South Asia*, New Delhi: Kali for Women, 2002.

Deeka, Meeta, *Women's Agency and Social Change: Assam and Beyond*, New Delhi: Sage, 2013.

Desai, Neera & Thakkar, Usha.(2001) *Women in Indian Society*. New Delhi: National Book Trust.

Dhamala.R, Ranju, and Sukalpa Bhattacharjee (eds.) *Human Rights and Insurgency: The North-East India,* Delhi: Shipra Publications, 2002.

Dutta, Anuradha, *Assam in the Freedom Movement*, Calcutta: Darbari Prokashan, 1991.

Forbes, Geraldine (1998) *Women in Modern India*. Cambridge: Cambridge University Press, pp. 1-150.

Gandhi, Nandita & Shah, Nandita. (1991) *The Issues at Stake – Theory and Practice in Contemporary Women's Movement in India*. Delhi: Zubaan, pp. 7-72.

I. Agnihotri and V. Mazumdar, (1997) 'Changing the Terms of Political Discourse: Women's Movement in India, 1970s-1990s', *Economic and Political Weekly*, 30 (29), pp. 1869-1878.

Mahanta, A. (ed.) (2002) Human Rights and Women of North East India, Centre for Women's Studies, Dibrugarh University, Dibrugarh

Manchanda, Rita, (ed.) *Women, War and Peace in South Asia: Beyond Victimhood to Agency*, New Delhi: Sage Publications, 2001.

R. Kapur, (2012) 'Hecklers to Power? The Waning of Liberal Rights and Challenges to Feminism in India', in A. Loomba *South Asian Feminisms,* Durham and London: Duke

Sharma, Dipti, *Assamese Women in the Freedom Struggle*, Calcutta: Punthi Pustak, 1993.

University Press, pp. 333-355

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-03a: Politics in Northeast India (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Alaka Sarmah, Gauhati University, alakasarmah63@gauhati.ac.in

Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Dipjyoti Bhuyan, T.H.B. College, Jamuguri, djbhuyan100@gmail.com

Course Objectives:

- This course is designed to introduce students to the general perceptions about politics in Northeast India.
- It would also give them an introduction to colonial experience in Northeast India.
- It attempts to highlight the different ethnic movements in different parts of the Northeast India and contemporary politics in Northeast India.

Course Outcomes:

- It will help to better appreciate key concepts that offer an understanding about political development in Northeast India.
- Students will be in a position to comprehend the meaning of political development in Northeast India.
- This course will help the students to comprehend the trajectory of ethnic movement in Northeast India and the issues addressed.
- It will lead to analysing and understanding the importance of Issues of Northeast India in certain key aspects.

Unit-I: Colonial Policy- Annexation and Administration

a. Geo-Strategic Location and Socio-Cultural Diversity.
b. Expansion and Consolidation of Colonial Rule
c. Excluded and Partially Excluded areas: Inner Line.
d. Anti-Colonial revolts (Phulaguri Dhewa and Patharughat) and Freedom Struggle

Unit-II: Post-Colonial Developments

a. Immigration and Problem of Refugees.
b. Question of Identity: Naga Nationalism
c. Sixth Schedule.
d. Re-organisation of Northeast India

Unit-III: Political Developments in Assam

a. Language Politics.
b. Assam Movement.
c. Bodo Movement.
d. Rise of insurgency: ULFA and NDFB.

Unit-IV: Changing Nature of State Politics in Assam

a. Emergence of Regional Parties: AGP.
b. Formation of Autonomous Councils: Rabha and Mising.

c. Citizenship: NRC and CAA.

Reading List:

Barpujari, H.K. (1980), *Assam in the Days of Company 1826-1858*, Spectrum Publications, Sole Distributors: United Publishers, Gauhati, Assam.

Baruah, Sanjib (2007), *Durable Disorder: Understanding the Politics of Northeast India*, Delhi: Oxford University Press.

Bhaumik, Subir (2009), *Troubled Periphery: Crisis of India's North-East*, Sage Publications, New Delhi.

Das, Samir Kumar (1994), *ULFA: United Liberation Front of Assam: A Political Analysis*, Ajanta Publications.

Dutt, K.N. (1958), *Landmarks in the Freedom Struggle of Assam*, Guwahati.

Dutta, Nandana (2012), *Questions of Identity in Assam: Location, Migration, Hybridity*, New Delhi, Sage Publications.

Gait, Edward (2008), *A History of Assam*, Lawyers Book Stall, Guwahati.

Goswami, Sandhya, (1990), *Language Politics in Assam*, Ajanta Publishing House.

Guha, Amalendu, (1977), *Planter Raj to Swaraj- Freedom Struggle and Electoral Politics in Assam 1826-1947*, People's Publishing House Private Limited, New Delhi.

Haokip, T. (2015), *India's Look East Policy and the North East*, New Delhi, Sage Publications.

Hazarika, Jatin and Sharma, Dhruba Pratim (2021), *Administrative History of Undivided Assam (1826-1947)*, Assam Regional Branch, Indian Institute of Public Administration, and Anwesha Publications, Guwahati.

Hussain, Monirul (1993), *The Assam Movement: Class, Ideology and Identity*, Manak Publishing House with Har Anand Publications, Delhi.

Mahanta, Nani G. (2013), *Confronting the State: ULFA's Quest for Sovereignty*, SAGE Studies on India's North East, New Delhi: SAGE Publications India Pvt. Ltd.

Misra, Udayon (1991), *Nation Building and Development in North-East India*, Purbanchal Prakash, Guwahati.

Ray, B. Datta and S.P. Agarwal (1996), *Reorganisation of North-East India since 1947*, Concept Publishing Company.

Saikia, Jaideep (2007), *Frontiers in Flames: North-East India in Turmoil*, Viking, New Delhi

Sanajaoba, Naorem (2005), *Manipur Past and Present*, Mittal Publications, New Delhi.

Sarmah, Alaka (1999), *Impact of Immigration on Assam Politics*, Ajanta Publishing House, New Delhi.

Sarmah, Alaka, (2013) (ed), *Democracy and Diversity in North East India*, DVS Publications, Guwahati.

Sarmah, Alaka and Konwer, Shubhrajeet (2015) (ed.), *Frontier States: Essays on Democracy, Society and Security in NE India*, DVS Publications, Guwahati.

Sengupta, Madhumita (2016), *Becoming Assamese: Colonialism and New Subjectivities in Northeast India*, London: Routledge.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-03b: Conflict and Peace Building (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Akhil Ranjan Dutta, Gauhati University, akhilranjan@gauhati.ac.in
Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Mr. Rahul Bania, Tezpur College, Tezpur, rahulbania81@gmail.com

Course Objectives:

- To create an understanding of a variety of conflict situations among students in a way that they can relate to them through their lived experiences.
- To introduce practical conflict resolution techniques and strategies
- To encourages the use of new information technologies and innovative ways of understanding these issues by teaching students skills of managing and resolving conflicts and building peace.
- To pursue ways to reduce violent conflict and promote justice by means of negotiation and nonviolent action

Course Outcomes:

- To learn the basic concepts about conflict and Peace Building.
- To Understand different approaches and theories to peace and conflict studies.
- To learn the various skills and techniques as conflict responses in the society.
- To understand the nature of socio cultural conflicts based on ethnic, religious and gender.
- Students will understand, compare and evaluate theories and research on the causes of intergroup and international conflict and violence.
- Develop a critical understanding of how societies develop nonviolent means of basic social change, recover from violence, and prevent it from reoccurring in the future.

Unit-I: Conflict and its Concepts

a. Understanding Conflict

b. Conflict Resolution and Peace Building

c. Conflict Management and Conflict Transformation

Unit-II: Dimensions of Conflict

a. Economic/Resource Sharing Conflicts

b. Forms of conflicts: Ethnic, Religious and Gender

c. Territorial Conflict

Unit-III: Conflict Responses: Skills and Techniques-I

a. Negotiations: Trust Building

b. Mediation: Skill Building; Active Listening

c. Role of UNO and Civil Society in Peace Building

Unit-IV: Conflict Responses: Skills and Techniques-II

a. Track I, Track II & Multi Track Diplomacy

b. Gandhian Methods

C. Media, NGOs and Peace Building

Reading List:

Unit-I

Ashutosh Varshney, Ethnic Conflict and Civic Life: Hindus and Muslims in India (New Haven: Yale University Press, 2002).

Ballentine, Karen and Jake Sherman. 2003. The political economy of armed conflict: beyond greed and grievance. Boulder, Co.: Lynne Rienner Publishers

Cordell, Karl and Stefan Wolff. 2009. Ethnic conflict: causes, consequences, and responses. Cambridge; Malden, MA: Polity

Galtung, Johan. (1969). Violence, Peace, and Peace Research. Journal of Peace Research, 6:3, pp. 167-191.

O. Ramsbotham, T. Woodhouse and H. Miall, (2011) 'Understanding Contemporary Conflict',in Contemporary Conflict Resolution, (Third Edition), Cambridge: Polity Press, pp. 94-122.

W. Zartman, (1995) 'Dynamics and Constraints In Negotiations In Internal Conflicts', in William Zartman (ed.), Elusive Peace: Negotiating an End to Civil Wars, Washington: The Brookings Institute, pp. 3-29.

C. Mitchell, (2002) 'Beyond Resolution: What Does Conflict Transformation Actually Transform?', in Peace and Conflict Studies, 9:1, May, pp.1-23. 16

S. Ryan, (1990) 'Conflict Management and Conflict Resolution', in Terrorism and Political Violence, 2:1, pp. 54-71.

J. Lederach, (2003) The Little Book of a Conflict Transformation, London: Good Books.

I. Doucet, (1996) Thinking About Conflict, Resource Pack for Conflict Transformation: International Alert.

M. Lund, (2001) 'A Toolbox for Responding to Conflicts and Building Peace', in L. Reychler and T. Paffenholz, eds., Peace-Building: A Field Guide, Boulder: Lynne Rienner, pp. 16-20.

L. Schirch, (2004) The Little Book of Strategic Peacebuilding, London: Good Books.

Unit-II

P. Le Billon, (2009) 'Economic and Resource Causes of Conflicts', in J. Bercovitch, V. Kremenyuk and I. Zartman (eds.) The Sage Hand Book of Conflict Resolution, London: Sage Publications, pp. 210-224.

R. Rubenstein, (2003) 'Sources', in S. Cheldelin, D. Druckman and L. Fast (eds.) Conflict: From Analysis to Intervention, London: Continuum, pp.55-67.

S. Ayse Kadayifci-Orellana, (2009) 'Ethno-Religious Conflicts: Exploring the Role of Religion in Conflict Resolution', in J. Bercovitch, V. Kremenyuk and I. Zartman (eds.) The Sage Hand Book of Conflict Resolution, London: Sage Publications, pp. 264-284.

Unit-III

C. Webel and J. Galtung (eds.), (2007) The Handbook of Peace and Conflict Studies, London: Routledge.

Ethnic Conflicts, Palgrave Macmillan: New York, pp. 1-30.

H. Saunders, (1999) A Public Peace Process: Sustained Dialogue to Transform Racial and

J Bercovitch, V. Kremenyuk, and I. Zartman (eds.), (2009) The Sage Hand Book of Conflict

N. Behera, 'Forging New Solidarities: Non-official Dialogues', in M. Mekenkamp, P. Tongeren and H. Van De Veen (eds.), Searching For Peace In Central And South Asia, London: Lynne Rienner Publishers, pp. 210-236.

R. Wagner and D. Winter, (eds.), Peace, Conflict, and Violence: Peace Psychology forthe Resolution, London: Sage Publications.

Unit-IV

Banks, Michael and Mitchell Christopher (Eds), 1990, A Handbook on the Analytical Problem Solving Approach, Institute for Conflict Analysis and Resolution, George Mason University.

Bruce Bueno de Mesquita (1980), "Theories of International Conflict: An Analysis and an Appraisal," in Ted R Gurr ed., Handbook of Political Conflict: Theory and Research, New York, The Free Press

Gulrez, M. (2004) Conflict Transformation in West Asia, New Delhi, Uppal Publishing House.

H. Burgess and G. Burgess, (2010) Conducting Track II, Washington D.C: United States Institute of Peace.

S. Mason and M. Siegfried, (2010) Debriefing Mediators To Learn Their Experiences, Washington D.C: United States Institute of Peace.

I. Zartman and A. De Soto, (2010) Timing Mediation Initiatives, Washington D.C: United

States Institute of Peace. 17

A. Smith and D. Smock, (2010) Managing A Mediation Process, Washington D.C: United States Institute of Peace.

J. Davies and E. Kaufman (eds.), (2003) Second Track/Citizens' Diplomacy: Concepts and Techniques for Conflict Transformation, Rowman & Littlefield: Maryland.

J Bercovitch, V. Kremenyuk, and I. Zartman (eds.), (2009) The Sage Hand Book of Conflict Resolution, London: Sage Publications. M. Steger, (2001) ‘Peace building and Non-Violence: Gandhi’s Perspective on Power’, in D. Christie, R. Wagner and D. Winter, (eds.), Peace, Conflict, and Violence: Peace Psychology for the 21st Century Englewood Cliffs, New Jersey: Prentice-Hall.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-04a: Rural Local Governance: Theory & Practice (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Dr. Jintu Gohain, R. G. Baruah College, Guwahati, gohain89@gmail.com

Course Objectives:

- The course seeks to provide an introduction to the Rural Local Governance and its significance in contemporary times.
- This course encompasses local governance in its historical context. This course acquaints students with the Rural Local Institutions and their actual working.
- The course seeks to explain the various aspects of decentralization and democratic decentralization. It further encourages a study of rural local institutions in their mutual interaction and their interaction with the people.
- The course attempts to provide the students a comprehensive understanding on rural local finance.

Course Outcomes:

- This paper will help students understand the importance of grass root political institutions in empowering people.
- The students also gain knowledge about the important and significance of rural local governance.
- Student will learn the constitutional structure of the rural local bodies.
- Student will understand the inter relationship among the concepts of decentralization, democracy and participation.

Unit-I: Rural Local Governance: Concept and Evolution

a. Understanding Rural Local Governance
b. Rural Local Governance: Views of M.K. Gandhi, B.R. Ambedkar, R.M. Lohia, Vinoba Bhave, J. P. Narayan
c. Evolution and Important Committees: Balwant Rai Mehta Committee (1957), Ashok Mehta Committee (1978), L. M. Singvi Committee (1986)- 64th Constitutional Amendment Bill (1989)- 65th Constitutional Amendment Bill (1989)

Unit-II: Constitutional Perspectives of Rural Local Governance

a. 73rd Amendment Act: Major Features; 11th Schedule of the Constitution of India
b. Rural Local Governance in Tribal Areas: 6th Schedule of the Constitution of India
c. PESA (1996) : Key Provisions

Unit-III: Perspectives of Decentralization in Rural Local Governance

a. Democratic Decentralization: Key issues
b. Delegation and Devolution
c. Localization of Sustainable Development Goals: Challenges

Unit-IV: Rural Local Finance: Concept and Practice

a. Devolution of Funds to Panchayati Raj Institutions
b. Social Audit and Audit Online

c. e-Gram Swaraj

Reading List:

Unit-I

Chakrabarty, B. & Pandey, R.K, (2019), *Local Governance in India*, New Delhi, Sage

Das, N. 2006, *Bharator panchayati raj and Asamor swayatwa sashan*, Mritunjoy

Maheshwari, S.R. 2006 *Local Governance in India*, Lakshami Naraian Agarwal, Agra.

Maheswaari, S.R., *Local Govt. in India*, Lakshami Narain, Agra, 2010Mishra, S. N., Anil D.

Orient Black Swan, New Delhi, (2012)

P. deSouza, (2002) 'Decentralization and Local Government: The Second Wind of Democracy in India', in Z. Hasan, E. Sridharan and R. Sudarshan (eds.) *India's Living Constitution: Ideas,Practices and Controversies,* New Delhi: Permanent Black

Raghunandan, J. R: *Decentralization and local governments: The Indian Experience*,

Venkata Rao, V.: *A Hundred Years of Local Self Government in Assam*, Bani

Unit-II

Alam, M.2007*, Panchayati Raj in India,* National Book Trust, New Delhi

Baviskar, B.S and George Mathew (eds) 2009 *Inclusion and Exclusion in local governance*:

Field Studies from rural India, New Delhi, Sage

Gosh, B.K.2002, *The Assam Panchayat Act, Assam* Law House, Guwahati.

Joshi, R.P and Narwani, G.S,2002, *Panchayati Raj in India*, Rawat Publication Jaipur

Ray, B.Dutta,and Das, G. (Ed) *Dimensions of Rural Development in North East India,*

Akansha, New Delhi

Unit-III

Bidyut Chakrabarty, *Reinventing Public Administration: The Indian Experience*, Orient Longman, 2007

D. A. Rondinelli and S.Cheema, *Decentralisation and Development*, Beverly Hills: Sage Publishers, 1983

Dube, M.P. and Padalia, M. (Ed.) 2002, *Democratic Decentralization and Panchayati Raj in India,* Anamika Publishers, New Delhi

Gabriel Almond and Sidney Verba, *The Civic Culture*, Boston: Little Brown, 1965

Mishra & Shweta Mishra: Public Governance and Decentralisation, Mittal Publications, NewDelhi, 2003

M.P.Lester, *Political Participation- How and Why do People Get Involved in Politics* Chicago: McNally, 1965

N.G. Jayal, *Democracy and The State: Welfare, Secular and Development in Contemporary India*, Oxford : Oxford University Press, 1999.

Noorjahan Bava, *Development Policies and Administration in India*, Delhi: Uppal Publishers, 2001

Satyajit Singh and Pradeep K. Sharma [eds.] *Decentralisation: Institutions and Politics in Rural India*, OUP, 2007

Unit-IV

Atul Kohli (Ed.). *The Success of India's Democracy*, Cambridge: Cambridge University Press.

Bidyut Chakraborty and Rajendra Kumar Pandey, *Modern Indian Political Thought – Text and Context*, Sage, New Delhi, 2009.

M.Venkatarangaiya and M.Pattabhiram- *Local Government in India*, Allied Publishers-1969

SR Maheswari, *Local Government in India*, Lakshmi Narain Agarwal, 2008.

Mathur, Kuldeep: *Panchayatiraj*, Oxford, 2013

Sarmah, J. K. and Kalita Diganta: - *GRAMYA STHANIYO XAKHON,* Arun Prakashan, Guwahati, 2013

Niraja Gopal Jayal and others: *Local Governance in India – Decentralization and Beyond*, Oxford University Press, 2006.

Subrata K. Mitra. 2001. Making local government work: Local elites, panchayati raj and governance in India,

Ghosh, Buddhadeb &Girish Kumar: *State Politics and Panchayats in India*, New Delhi: Manohar Publishers, 2003

Sudhakar, V.: *New Panchayati Raj System: Local Self-Government Community Development* - Jaipur: Mangal Deep Publications, 2002.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-04b: Urban Local Governance: Theory and Practice (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

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Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Dr. Jintu Gohain, R. G. Baruah College, Guwahati, gohain89@gmail.com

Course Objectives:

- The objective of this course is to make students aware of the significance of governance in the context of urban development and management.
- This course is intended to equip students with a basic understanding of the constitutional structure related to the governance of cities and of the urban areas.
- It will enhance different theoretical understanding and debates like public participation in urban governance, human environment interaction and of right to the cities.

Course Outcomes:

- Have a basic understanding of the policies and institutions governing cities and urban areas.

- Have a basic knowledge of the constitutional structure of urban governance.
- Understand the concepts and different dimensions of urban governance highlighting the major debates in the contemporary times.
- Evaluate the importance of urban governance in the context of a globalising world, environment, administration and development.
- Equipping students with the skill to analyse good governance practices and initiatives of urban governance system.

Unit-I: Introduction to Urban Local Governance

a. Urbanization Trends in globalizing 21st Century
b. Sustainable Urban Development: Theory and Practice
c. Genesis of 74^{th} Amendment of the Constitution of India

Unit-II: Constitutional and Legal Structure of Urban Local Governance

d. Constitutional provisions of Urban Local Governance
e. Overview of legislations on Urban Local Bodies: Parliament and State Legislatures
f. Urban Policies and Schemes: Focus Areas

Unit-III: Development and Environmental Governance

a. Ecology conservation and environmental governance in urban areas
b. Human-Environment interaction
c. Smart Cities Mission, right to the city

Unit-IV: Good Governance Initiative and Practices

a. Urban Public Service Delivery
b. Country and Town Planning
c. Public Housing and Slum Development

Reading List:

Unit-I

Bardhan, P. & Dilip Mookherjee, Decentralization and Local Governance In Developing Countries: A Comparative Perspective, MIT Press, 2006

Chakrabarty, B. & Pandey, R.K, (2019), Local Governance in India, New Delhi, Sage Publications

Mishra & Shweta Mishra: Public Governance and Decentralisation, Mittal Publications, New Delhi, 2003

Maheshwari, S.R. 2006 Local Governance in India, Lakshami Naraian Agarwal, Agra

Maheswaari, S.R., Local Govt. in India, Lakshami Narain, Agra, 2010Mishra, S. N., Anil D.

M.P.Lester, Political Participation- How and Why do People Get Involved in Politics Chicago: McNally, 1965

P. DeSouza, (2002) 'Decentralization and Local Government: The Second Wind of Democracy in India', in Z. Hasan, E. Sridharan and R. Sudarshan (eds.) India's Living Constitution: Ideas,Practices and Controversies, New Delhi

Sachdeva, P. Local Government in India, Pearson Publishers, 2011

T.R. Raghunandan, Decentralization and Local Governments: The Indian Experience, Readings On the Economy, Polity and Society, Orient Blackswan, 2013

Unit-II

Alam, M.2007, Panchayati Raj in India, National Book Trust, New Delhi

Joshi, R.P and Narwani, G.S, 2002, Panchayati Raj in India, Rawat Publication Jaipur

Baviskar, B.S and George Mathew (eds) 2009 Inclusion and Exclusion in local governance: Field Studies from rural India, New Delhi, Sage

Bidyut Chakrabarty, Reinventing Public Administration: The Indian Experience, Orient Longman 2007

K.C. Sivaramakrishnan, Governing Megacities: Fractured Thinking, Fragmented Setup, Oxford University Press, 2014

Niraja Gopal Jayal and others: Local Governance in India – Decentralization and Beyond, Oxford University Press, 2006.

Noorjahan Bava, Development Policies and Administration in India, Delhi: Uppal Publishers, 2001

Parth J. Shah and Makarand Bokore, Ward Power-Decentralised Urban Governance, Centre for Civil Society, 2006

Reserve Bank of India, Municipal Finance in India: An Assessment, 2007

Subrata K. Mitra. Making local government work: Local elites, panchayati raj and governance in India, 2001

Unit-III

Diya Mehra, Protesting Publics in Indian Cities: the 2006 sealing drive and Delhi's traders, Economic and Political Weekly, 2012

Partha Mukhopadhyay, Unsmart Cities, Livemint, 2016

M.P. Ram Mohan and Anvita Dulluri, Constitutional mandate and judicial initiatives influencing Water, Sanitation and Hygiene (WASH) programmes in India, Journal of Water Sanitation and Hygiene for Development, 2017

Ministry of Housing and Urban Poverty Alleviation, Mission Document: National Urban Livelihoods Mission, Government of India (2013)

Gautam Bhan, "This is no longer the city I once knew": Evictions, the urban poor and the right to the city in millennial Delhi, Environment & Urbanisation, 2009

Amit Chandra and Rajul Jain, Property Rights of Street Vendors, Centre for Civil Society, 2015

B. C. Smith, Good Governance and Development, Palgrave, 2007

World Bank Report, Governance and Development, 1992

Ramachandra Guha, Environmentalism: A Global History, Longman Publishers, 1999

J.P. Evans, Environmental Governance, Routledge, 2012

Emilio F. Moran, Environmental Social Science: Human - Environment interactions and Sustainability, Wiley-Blackwell, 2010

Burns H Weston and David Bollier, Green Governance: Ecological Survival, Human Rights, and the Law of the Commons, Cambridge University Press, 2013

Unit-IV

B. Chakrabarty and M. Bhattacharya, (eds.) The Governance Discourse. New Delhi: Oxford University Press,1998

D. Crowther, Corporate Social Responsibility, Deep and Deep Publishers, 2008
Jayal, N. G. (1999), Democracy and the state: Welfare, Secularism, Development in Cotemporary India, Oxford University Press.

Jean Drèze and Amartya Sen, India, Economic Development and Social Opportunity, Oxford University Press, 1995
Jean Dreze and Amartya Sen, An Uncertain Glory: India and Its Contradictions, Princeton University Press, 2013
K. Lee and Mills, The Economic of Health in Developing Countries, Oxford University Press, 1983
Maxine Molyneux and Shahra Razavi , Gender, Justice, Development, and Rights , Oxford University Press, 2002
Partha Mukhopadhyay and Patrick Heller, State-produced inequality in an Indian city, 2015
Pushpa Sundar, Business & Community: The Story of Corporate Social Responsibility in India, New Delhi: Sage Publications, 2013

Sanjay K. Agarwal, Corporate Social Responsibility in India, Sage Publishers, 2008
Surendra Munshi and Biju Paul Abraham [eds.], Good Governance, Democratic Societies And Globalisation, Sage Publishers, 2004
United Nation Development Programme, Reconceptualising Governance, New York, 1997
Model State Affordable Housing Policy for Urban Areas, MHUPA, 2013
Maharashtra Slum Areas (Improvement, Clearance and Redevelopment) Act, 1971
National Urban Housing and Habitat Policy, 2007

COMMERCE & MANAGEMENT

Syllabus

Four Year Undergraduate Programme (FYUGP)

Gauhati University

Bachelor of Commerce (B.Com.)

Core Papers Common for all four specializations

a. Human Resource Management
b. Accounting
c. Marketing Management
d. Finance

Semester I

Course Name: **Business Organization and Management**

Existing based syllabus: UGCBCS
Course level: 100 to 199

Credit: **4**
Total Marks: **100**

Unit 1: Introduction: Nature and Purpose of Business, Factors to be considered for starting a business, Forms of Business Organization; Business formats- Brick & Mortar;Brick & Click; E-commerce; Franchising; Outsourcing Nature and Functions of Management (An overview); Managerial Competencies-concept.
16 Classes (20 Marks)

Unit 2: Business Environment: Meaning and layers of Business Environment- (micro/immediate, meso/intermediate, macro and international); Business ethics and social responsibility.
8 Classes (12 Marks)

Unit 3: Planning and Organizing: Strategic Planning (concepts), Decision-making- process and techniques; Organizing: -Formal and Informal Organizations, Centralization and Decentralization, Delegation, Factors affecting organizational design Organizational structures & Organograms – Divisional, Product, Matrix, Project and Virtual Organization.
12 Classes (20 Marks)

Unit 4: Directing and Controlling: Motivation- meaning, importance and factors affecting motivation, Leadership- meaning, importance, trait and leadership styles, Communication – New trends and directions (Role of IT and social media); Controlling–Principles of controlling; Measures of controlling, Relationship between planning and controlling.
12 Classes (24 Marks)

Unit 5: Contemporary Issues in Management: Business Process Reengineering (BPR), Learning Organization, Six Sigma, Supply Chain Management, Work-life Balance;Freelancing; Flexi-time and work from home; Co-sharing/co-working. 12 Classes (24 Marks)

Suggested Readings:

● Basu, C. (2017). Business Organisation and Management. McGraw Hill Education.New Delhi.
● Drucker, P. F. (1954). The Practice of Management. Newyork: Harper & Row.
● Kaul, V. K. (2012). Business Organisation Management. Pearson Education.
● Koontz, H., &Weihrich, H. (2012). Essentials of Management: An International and Leadership Perspective. Paperback.
● Laasch, O. (2022). Principles of Management, 2e, Sage Textbook

● Sherlekar, S. A. (2016). Modern Business Organisation and Management. Himalaya Publishing House

Objective:

The course aims to provide basic knowledge to the students about the organization and management of a business enterprise.

Learning outcome:

On successful completion of the paper students will be able to understand about organization structure and its process; develop knowledge and skills regarding management principles and functions required to run an organization.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Gauhati University, tilak@gauhati.ac.in

Semester I

Course Name: **Financial Accounting**

Existing based syllabus: UGCBCS
Course level: 100 to 199

Credit: **4**
Total Marks: **100**

Unit 1: Theoretical Framework (12 Classes) (20 Marks)

i. Accounting as an information system, the users of financial accounting information and their needs. Qualitative characteristics of accounting, information. Functions, advantages and limitations of accounting. Branches of accounting. Bases of accounting: cash basis and accrual basis.
ii. The nature of financial accounting principles : entity, money measurement, going concern, cost, realization, accruals, periodicity, consistency, prudence (conservatism), materiality and full disclosures.

iii. Accounting Standards: Concept, needs and objectives; procedure for issuing Accounting Standards in India. Salient features of First-Time Adoption of Indian Accounting Standard (Ind-AS) 101. Salient features of Indian Accounting Standards Ind AS 1, 2, 16 and AS 9. International Financial Reporting Standards (IFRS): - Need and procedures of Issue.

Unit 2: Measurement of Business Income (12 Classes) (20 Marks)

i. Measurement of business income-Net income, Application of accounting period, continuity doctrine and matching concept in the measurement of net income. Objectives of measurement.
ii. Capital and revenue expenditures and receipts
iii. Revenue recognition: Recognition of income and expenses as per AS 9.
iv. Inventory Valuation: Meaning and Significance.

Unit 3: Final Accounts (12 Classes) (20 Marks)

Preparation of financial statements of non-corporate business entities: Sole proprietorship and Partnership firms.

Unit 4: Hire-Purchase, Instalment Systems and Branches (12 Classes) (20 Marks)

i. **Accounting for Hire-Purchase and Instalment Systems:** Meaning, features, advantages and disadvantages of Hire Purchase and Instalment Systems, Rights of Hire Purchaser and Hire Vendor, Journal entries and preparation of ledger accounts excluding default and repossession.

ii. **Accounting for Branches:** Meaning, Needs and Objectives of Branch Accounting. Systems of dependent Branch Accounting and their Accounting Treatments (Only debtors system, stock and debtors system).

Unit 5: Computerised Accounting System (12 Classes) (20 Marks)

Computerised Accounting Systems: Meaning, components, and advantages, Difference between manual and computerised accounting, Various types of Accounting packages/software and their advantages and disadvantages; Tally 9 and its features, working on TALLY. Simple Practical Problems

Suggested Readings:

1. Robert N Anthony, David Hawkins, Kenneth A. Merchant, *Accounting: Text and Cases*. McGraw- Hill Education, 13th Ed. 2013.
2. Charles T. Horngren and Donna Philbrick, *Introduction to Financial Accounting,* Pearson Education.
3. J.R. Monga, *Financial Accounting: Concepts and Applications*. Mayur Paper Backs, New Delhi.
4. M.C.Shukla, T.S. Grewal and S.C.Gupta. *Advanced Accounts. Vol.-I. S.* Chand & Co., New Delhi.
5. B. B. Dam, H C Gautam and others, *Financial Accounting*, Gayetri Publications, Guwahati
6. K. R. Das & K. M. Sinha. *Financial Accounting*
7. S.N. Maheshwari, and. S. K. Maheshwari. *Financial Accounting*. Vikas Publishing House, New Delhi.
8. Deepak Sehgal. *Financial Accounting.* Vikas Publishing H House, New Delhi.
9. Bhushan Kumar Goyal and HN Tiwari, *Financial Accounting,* International Book House
10. Goldwin, Alderman and Sanyal, *Financial Accounting,* Cengage Learning.
11. Tulsian, P.C. *Financial Accounting,* Pearson Education.
12. *Compendium of Statements and Standards of Accounting*. The Institute of Chartered Accountants of India, New Delhi

Note: The latest edition of the text books should be used.

Course objective:

To provide students with a foundational understanding of financial accounting principles and practices used in preparing and presenting financial statements.

Learning outcome:

By the end of the course, students will be able to record, classify, and summarize financial transactions, prepare financial statements in accordance with accounting standards, and analyze basic financial information for decision-making purposes.

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Semester I

Course Name: **Indian Financial System**

Existing based syllabus: UGCBCS
Course level: 100 to 199

Credit: **4**
Total Marks: **100**

Unit 1: Introduction **(12 Classes)** **(20 Marks)**
Financial System-Meaning, Components of Financial system, Functions of Financial System, Financial System and Economic Development, Overview of Indian Financial System.

Unit 2: Financial markets **(12 Classes)** **(20 Marks)**
Financial Market- Classifications of Financial Markets; Money market- its constitutions, functions and significance; Capital Market- Primary and secondary market of capital market and its significance.

Unit 3: Financial Institutions **(12 Classes)** **(20 Marks)**
Banking Financial Institutions- Types of Banks, Functions of Banks, Structure of Indian Banking System; Non-Banking Financial institutions, types and structure; Mutual Funds, Insurance Companies and Pension Funds.

Unit 4: Financial Services **(12 Classes)** **(20 Marks)**
Meaning, features and importance, Types of Financial Services- Factoring, Leasing, Venture Capital, Consumer Finance and Housing Finance.

Unit 5: Regulatory Institutions **(12 Classes)** **(20 Marks)**
Reserve Bank of India- organization, objectives, Role and Functions; Securities and Exchange Board of India- Organization and objectives; Insurance Regulatory and Development Authority of India; Pension Fund Regulatory and Development Authority.

Suggested Readings:

1. The Indian Financial System by Bharati Pathak, Pearson Education.
2. Financial Institutions and Markets by L M Bhole, Tata MC Graw Hill.
3. Dynamics of Financial Markets and Institutions in India by R M Srivastava and Divya Nigam, Excel Books.
4. Indian Financial System by H R Machiraju, Vikas Publishing House.
5. The Indian Financial System and Development by Vasant Desai, Himalaya Publishing House.
6. Indian Financial System by P N Varshney and D K Mittal, Sultan Chand & Sons.

Objective:

To provide students the basic knowledge of Indian Financial System and its components, institutions and their functions.

Course Outcome:

The learning outcomes of the Indian financial system include understanding the diverse components and functions of the system, the role of regulatory bodies, the impact of policies on economic growth, and the development of analytical skills to evaluate and navigate financial markets effectively

No. of Contact Classes: 60

Course Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Semester II

Course Name: **Corporate Accounting**

Existing based syllabus: UGCBCS
Course level: 200 to 299

Credit: **4**
Total Marks: **100**

Unit 1: **Final Accounts** **(12 Classes)** **(20 Marks)**

Preparation of Final Accounts of a Joint Stock Company (as per Companies Act, 2013) with necessary adjustments.

Unit 2: Incentive Equity, Buy Back, and Valuation of shares and goodwill
(12 Classes) **(20 Marks)**

i. **Incentive Equity**: Right and Bonus Shares: Meaning, Advantages and Disadvantages, Provisions as per Companies Act, 2013 and their Accounting Treatment.
ii. **Buy back of shares**: Meaning, Provisions of Companies Act, 2013 and Accounting Treatment.
iii. **Valuation of shares and goodwill**: Meaning, provision of Companies Act on Valuation of Shares and Valuation of Goodwill, Concepts and calculation: simple problem only.

Unit 3: Internal Reconstruction of Companies **(12 Classes)** **(20 Marks)**

Concept and meaning of Internal Reconstruction, Different forms of Internal Reconstruction; Provisions as per Companies Act and Accounting treatment for Alteration of Share Capital and Reduction of Share Capital; Preparation of Balance Sheet after Internal Reconstruction.

Unit 4: Amalgamation of Companies: **(12 Classes)** **(20 Marks)**

Meaning and objectives; Provisions as per Accounting Standard 14; Amalgamation in the nature of Merger and Purchase; Consideration for Amalgamation; Accounting Treatment for Amalgamation and preparation of Balance Sheet after Amalgamation.

Unit 5: Accounts of Holding Company **(12 Classes)** **(20 Marks)**

Concept and meaning of different terms: holding company, subsidiary company, pre-acquisition profit/loss, post-acquisition profit/loss, minority interest; cost of control.
Meaning and needs for consolidation of financial statements as per AS 21.
Preparation of consolidated balance sheet of a holding company with one subsidiary.

Note:
1.The relevant Indian Accounting Standards in line with the IFRS for all the above topics should be covered.
2.Any revision of relevant Indian Accounting Standard would become applicable immediately.

Suggested Readings:

1. Hanif and Mukherjee**: *Corporate Accounting***
2. B. B. Dam, H C Gautam and others, *Corporate Accounting*, Gayetri Publications, Guwahati
3. K. R. Das & K. M. Sinha. ***Corporate Accounting***
4. M.C.Shukla, T.S. Grewal and S.C.Gupta. *Advanced Accounts. S.* Chand & Co., New Delhi.
5. S. N. Maheshwari Corporate Accounting -, Vikash Publishing House
6. S. Sehgal & D. Sehgal, Advanced Accounting Taxmann Publication
7. Modern Accounting by Hanif and Mukherjee, Tata McGrow Hill.
8. V. K. Saxena Advanced Accounting - Sultan Chand & sons.

Objective:

To help the students to acquire the conceptual knowledge of the corporate accounting and to learn the techniques of preparing the financial statements.

Course Outcome:

The learning outcomes of corporate accounting include the ability to analyse and interpret financial statements, apply accounting standards and principles to prepare accurate financial reports, and make informed financial decisions based on a thorough understanding of corporate financial performance

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Semester II

Course Name: **Principles and Practice of Management**

Existing based syllabus: UGCBCS
Course level: 200 to 299

Credit: **4**
Total Marks: **100**

Unit 1: Introduction: Meaning and importance of management; Coordination mechanisms in organisations; Management theories- classical, neo-classical and modern theory of management; Managerial functions; Mintzberg Managerial Role Model, Indian Ethos for Management: Value-Oriented Holistic Management. (12 Classes) (20 Marks)

Unit 2: Planning: Organisational objective setting; Decision-making environment (certainty, risk, uncertainty); Techniques for individual and group decision-making; Planning vis-à-vis Strategy-meaning,Business and Corporate Level Strategies. (12 Classes) (20 Marks)

Unit 3: Motivation: Motivation Theory: needs (including Maslow's theory), incentives, Equity and two-factor theory (Herzberg); McGregor Theory X and Theory,Goal Setting Theory, Reinforcement theory). (12 Classes) (20 Marks)

Unit 4: Leadership: Leadership Theory, Situational, Behavioural and Contemporary theories of Leadership), Likert's scale Theory, Blake &Mouton's Managerial Grid theory, Transactional Vs. Transformational Leadership. (12 Classes) (20 Marks)

Unit 5: Contemporary Issues in Management: Management challenges of the 21st Century; Factors reshaping and redesigning management purpose:-(Digitization and Automation of the work processes, Globalization Uncertainties, ethical and environmental issues), Values & Ethics - Case studies of renowned Indian Corporates. Workplace diversity, Democracy and Sociocracy in management and organisational structure (12 Classes) (20 Marks)

Suggested Readings:

● Drucker, P. F. (1954). The Practice of Management. Newyork: Harper & Row.
● Drucker, P. F. (1999). Management Challenges for the 21st Century. Harper Collins Publishers Inc.
● Chakraborty, S. K. (1997). Human Values for Managers. Wheeler Publishing
● Griffin. (2013). Management Principles and Application. Cengage.
● Koontz, H., &Weihrich, H. (2012). Essentials of Management: An International and Leadership Perspective. McGraw Hill Publications
● Laasch, O. (2022). Principles of Management, 2e, Sage Textbook
● Mitra, J. K. (2018). Principles of Management.Oxford University Press.
● Rao, V. S. P. (2020). Management Principles and Applications. Taxmann Publications.
● Sharlekar, S. A. (2010). Management (Value-Oriented Holistic Approach). Himalaya Publishing House. (Chapters 3 and 4)
● Tulsian, P. C., & Pandey, V. (2021). Business Organisation & Management. Pearson Education, India

Course Objective:
The objective of the course on principles and practice of management is to provide students with a comprehensive understanding of the fundamental principles, theories, and techniques of management.

Learning Outcomes:
By the end of the course, students will be able to apply management principles and theories in practical situations, demonstrate effective leadership skills, analyse and solve management problems, and make informed decisions to enhance organizational effectiveness

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University,
tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Semester II

Course Name: **Principles of Marketing**

Existing based syllabus: UGCB CS
Course level: 200 to 299

Credit: **4**
Total Marks: **100**

Unit 1: Introduction: Nature, scope and importance of marketing; Evolution of marketing; Selling vs Marketing; Marketing mix, Marketing environment: concept, importance, and components (Economic, Demographic, Technological, Natural, Socio-Cultural and Legal).
(12 Classes) (20 Marks)

Unit 2: Consumer Behaviour: Nature and Importance, Consumer buying decision process; Factors influencing consumer buying behaviour.
Market segmentation: concept, importance and bases; Target market selection; Positioning concept, importance and bases; Product differentiation vs. market segmentation.
(12 Classes) (20 Marks)

Unit 3: Product: Concept and importance, Product classifications; Concept of product mix; Branding, packaging and labeling; Product-Support Services; Product life-cycle; New Product Development Process; Consumer adoption process**.** (12 Classes) (20 Marks)

Unit 4: 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; Functions of middle man; Factors affecting choice of distribution channel; Wholesaling and retailing; Types of Retailers; e-tailing, Physical Distribution. (12 Classes) (20 Marks)

Unit 5: **Promotion**: Nature and importance of promotion; Communication process; Types of promotion: advertising, personal selling, public relations & sales promotion, and their distinctive characteristics; Promotion mix and factors affecting promotion mix decisions;
Recent developments in marketing: Social Marketing, online marketing, direct marketing, services marketing, green marketing, Rural marketing; Consumerism
(12 Classes) (20 Marks)

Suggested Readings:

1. Kotler, Philip, Gary Armstrong, Prafulla Agnihotri and Ehsanul Haque. *Principles of Marketing*. 13th edition. Pearson Education.
2. Michael, J. Etzel, Bruce J. Walker, William J Stanton and Ajay Pandit. *Marketing: Concepts and Cases.* (Special Indian Edition)., McGraw Hill Education.
3. William D. Perreault, and McCarthy, E. Jerome., *Basic Marketing*. Pearson Education.
4. Majaro, Simon. *The Essence of Marketing*. Pearson Education, New Delhi.
5. The Consumer Protection Act 1986.
6. Iacobucci and Kapoor, *Marketing Management: A South Asian Perspective*. Cengage Learning.
7. Dhruv Grewal and Michael Levy, *Marketing,* McGraw Hill Education.
8. Chhabra, T.N., and S. K. Grover. *Marketing Management.* Fourth Edition. Dhanpat Rai & Company.
9. Neeru Kapoor, *Principles of Marketing*, PHI Learning.
10. Rajendra Maheshwari, *Principles of Marketing*, International Book House.

Course Objective:

The objective of the course on principles of marketing is to provide students with a comprehensive understanding of the fundamental concepts, strategies, and techniques used in marketing.

Learning Outcomes:

By the end of the course, students will be able to analyse consumer behavior, develop marketing strategies, utilize marketing tools and techniques, and evaluate marketing campaigns to effectively target and engage customers in diverse market environments.

No. of contact Classes: 60

Course Designer: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

Major Papers

Specialization:

1. Human Resource Management
2. Accounting
3. Marketing Management
4. Finance

1. Specialization: Human Resource Management

Semester III

Course Name: **Human Resource Management** (Major 1)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit 1: Introduction

Human Resource Management: Concept, Activities and Functions, Concept of Human Capital, Role Status and competencies of HR Manager, HR Policies, HRM vs HRD. Emerging Challenges of Human Resource Management; Empowerment; Downsizing; Human Resource Information System and Human Resource Accounting. (12 Classes) (20 Marks)

Unit 2: Acquisition of Human Resource

Human Resource Planning- Quantitative and Qualitative dimensions; job analysis – job description and job specification; Recruitment- Process, Methods, Sources, Selection – Concept and process; test and interview; placement and induction (12 Classes) (20 Marks)

Unit 3: Training and Development

Concept and Importance; Identifying Training and Development Needs; Training Programmes, Types, Evaluating Training Effectiveness; Training Process Outsourcing; Management Development; Career Development, Managing employee well being and concept of work life balance and quality of work life. (12 Classes) (20 Marks)

Unit 4: Performance Appraisal

Nature, objectives and importance; Modern techniques and systems of performance appraisal; potential appraisal and employee counseling; transfers and promotions; Compensation: concept and policies; job evaluation; methods of wage payments and incentive plans; fringe benefits.
(12 Classes) (20 Marks)

Unit 5: Maintenance

Employee health and safety; employee welfare; social security; Employer-Employee relations- an overview; concept of redeployment, redundancy, attrition, VRS, downsizing, layoffs and retrenchment, ethics and HRM. (12 Classes) (20 Marks)

Suggested Readings:

1. Gary Dessler. *A Framework* for *Human Resource Management*. Pearson Education.
2. DeCenzo, D.A. and S.P. Robbins, *Personnel/Human Resource Management*, Pearson Education.
3. Bohlendar and Snell, *Principles of Human Resource Management,* Cengage Learning

4. Ivancevich, John M. *Human Resource Management*. McGraw Hill.
5. Wreather and Davis. *Human Resource Management*. Pearson Education.
6. Robert L. Mathis and John H. Jackson. *Human Resource Management*. Cengage Learning.
7. TN Chhabra, *Human Resource Management,* Dhanpat Rai & Co., Delhi
8. Biswajeet Patttanayak, *Human Resource Management, PHI Learning*
9. Neeru Kapoor*, Human Resource Management,* Taxmann Publication

Note: Latest edition of text books may be used.

Course objective:

To provide students with a comprehensive understanding of the principles and practices of managing human resources in organizations.

Learning outcome:

Students will be able to apply various HR strategies and techniques to effectively recruit, select, develop, and retain employees.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University, tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Course Name: **Entrepreneurship** (Major 2)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit 1: Introduction to Entrepreneurship
Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit 2: Entrepreneurship and Micro, Small and Medium Enterprises
Role of business houses and 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. (15 Lectures) (25 Marks)

Unit 3: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund.
(15 Lectures) (25 Marks)

Unit 4: 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 (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions
(15 Lectures) (25 Marks)

Suggested Readings:

1. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
2. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
3. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.
4. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
5. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
6. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
7. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
8. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
9. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
10. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course objective:

To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning outcome:

Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Business Laws** (Major 3)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit 1: The Indian Contract Act, 1872: General Principle of Law of Contract

Contact- meaning, characteristics and kinds

a) Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b) Void agreements
c) Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d) Contingent contracts
e) Quasi – contracts **(12 Classes) (20 Marks)**

Unit 2: The Indian Contract Act, 1872: Specific Contract

a) Contract of Indemnity and Guarantee
b) Contract of Bailment
c) Contract of Agency **(12 Classes) (20 Marks)**

Unit 3: The Sale of Goods Act, 1930

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) Performance of contract of sale
e) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit 4: Partnership Laws

A) The Partnership Act, 1932

a. Nature and Characteristics of Partnership
b. Registration of a Partnership Firms
c. Types of Partners
d. Rights and Duties of Partners
e. Implied Authority of a Partner
f. Incoming and outgoing Partners
g. Mode of Dissolution of Partnership

B) The Limited Liability Partnership Act, 2008

a) Salient Features of LLP
b) Differences between LLP and Partnership, LLP and Company
c) LLP Agreement,
d) Partners and Designated Partners
e) Incorporation Document
f) Incorporation by Registration
g) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit 5 (A): The Negotiable Instruments Act 1881

Meaning, Characteristics, and Types of Negotiable Instruments : Promissory Note, Bill of Exchange, Cheque

a) Holder and Holder in Due Course, Privileges of Holder in Due Course.
b) Negotiation: Types of Endorsements
c) Crossing of Cheque
d) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties. **(12 Classes) (20 Marks)**

Suggested Readings:

1. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
2. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
3. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
4. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
5. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
6. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
7. Sushma Arora, *Business Laws*, Taxmann Pulications.
8. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
9. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
10. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Course objective:

To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.

Course Outcome:

On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com
Department of Commerce, commerce@gauhati.ac.in

Semester IV

Course Name: **Fundamentals of Financial Management** (Major 4)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit 1: Introduction

Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities (12 Classes) (20 Marks)

Unit 2: Investment Decisions

The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit 3: Financing Decisions

Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit 4: Dividend Decisions

Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit 5: Working Capital Decisions

Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

1. In addition, the students will work on Spreadsheet for doing basic calculations in finance (Unit 2 and 3 above) and hence can be used for giving students subject related assignments for their internal assessment.

2. 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)

3. Latest edition of text books may be used.

Suggested Readings:

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education
5. Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6. Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.

7. Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.

Course Objective:

The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Course Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: **Labour Laws** (Major 5)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I: Introduction (15 Lecture) (25 Marks)

Meaning, classifications, history and development of Labour Legislations in India, Laws related working conditions.

- Factories Act 1948
-Shops and Establishment Act
- Contract Labour (Abolition and Regulation Act)
-Plantations Act
-Mines Act

Unit II: Legislations related to wages (15 Lecture) (25 Marks)

- Minimum Wages Act 1948
- Payment of Wages Act 1936
- Equal Remuneration Act

Unit III: Legislations related to Employment and Service Conditions (15 Lecture) (25 Marks)

- Industrial Disputes Act 1947
- Trade Unions Act 1926
- Industrial Employment (Standing Order) Act

Unit IV: Some aspects of agricultural labour, types of Unorganised Labour and statutory safeguard. (15 Lecture) (25 Marks)

Suggested Readings:

● Sharma, J.P., Simplified Approach to Labour Laws. Bharat Law House (P) Ltd.
● VenkatRatnam, C.S. Industrial Relations: Text and Cases, Oxford University Press, Delhi.
● Mamoria, Mamoria and Gankar (2010), Dynamics of Industrial Relations. Himalaya Publishing House, Delhi.
● MonappaArun (2012), Industrial Relations and Labor laws. Tata McGraw Hill Edition, New Delhi
● Monappa, A., Nambudiri, R., &Selvaraj P. (2012), Industrial Relations and Labour Laws. New Delhi: Tata McGraw Hill Education.
● Sinha, P.R.N., Sinha, InduBala and Shekhar (2017), SeemaPriyadarshini,,Industrial Relations, Trade Unions and Labour Legislation, Pearson Education,

Course objective:
To familiarize students with the legal framework governing employment relationships and labour rights.

Learning outcome:
Students will acquire a thorough understanding of labour laws and regulations, enabling them to interpret and apply legal provisions in the workplace.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Industrial Relations** (Major 6)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I: Introduction to Industrial Relations (15 Lecture) (25 Marks)

Background, evolution, approaches to Industrial Relations, History of Industrial Relation in India, Pre and Post Independence, Indicators of the State of Industrial Relations.

Unit II: Trade Unions (15 Lecture) (25 Marks)

Theoretical framework and foundations, characteristics, Managing India Trade Unions, New Role of trade unions in context of globalisation, IT, trade Negotiations and Collective Bargaining, Problems of Trade Unions.

Unit III: Industrial Disputes (15 Lecture) (25 Marks)

Nature & Causes, Industrial conflicts, grievances and handling, classification of Industrial Disputes. Dispute Resdution, workers Participation in Management Machinery.

Unit IV: Contemporary Issues in Industrial Resolution, Employee Participation in Labour Management, Labour Policy, economic policy and industrialisation. Industrial Relations and technological change India and International Labour Standards. (15 Lecture) (25 Marks)

Suggested Readings:

1. PK Padhi, Industrial Relations and Labour Law, PHI Learning
2. ArunMonappa, Industrial Relations and Labour Law, McGraw Hill Education
3. SC Srivastav, Industrial Relations and Labour Law, Vikas Publishing House
4. C.S VenkataRatnam, Industrial Relations, Oxford University Press
5. P.L. Malik's Handbook of Labour and Industrial Law, Vol 1 and 2, Eastern Book Company
6. JP Sharma, Simplified Approach to Labour Laws, Bharat Law House (P) Ltd

Course Objective:

To develop students' knowledge and understanding of the complex relationship between employers, employees, and trade unions in the workplace.

Learning Outcome:

Students will gain the ability to analyze and manage employment relationships, negotiate collective bargaining agreements, and handle workplace conflicts effectively.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University, tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Course Name: **Cost and Management Accounting** (Major 7)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I : Cost Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning of cost, costing and cost accounting; objectives and functions of cost accounting; costing as an aid to management; cost concepts and classification, Relationship between cost accounting and financial accounting; Cost accounting and Management Accounting; Methods and Techniques of costing; Concept of cost audit; Preparation of cost sheet.

Unit II : Accounting for Material, Labour and Overhead (12 Classes) (20 Marks)
Material control concept and techniques; E.O.Q. ABC Analysis and VED Analysis.
Labour cost control procedures; labour turnover; idle time and over time; methods of wage payment - time and piece rates.
Importance and classification of overhead; Factory administrative and selling overheads; allocation and apportionment of overhead; Absorption of overhead - under and over absorption. (Simple application)

Unit III: Management Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning and objectives of Management Accounting; Decision situation and Role of Management Accountant; Management accounting Techniques: Ratio analysis - Meaning ofRatio and Ratio analysis; uses, significance and limitations of Ratio analysis; Activity Ratios, Liquidity Ratios, Profitability Ratios and Solvency ratios;

Unit IV: Marginal Costing and Budget & Budgetary Control (12 Classes) (20 Marks)
Meaning of marginal costing, Assumptions of marginal costing, managerial applications of marginal costing, Advantages and disadvantages of marginal costing; Cost- Volume- Profit Analysis and Break Even analysis (simple Applications),.
Meaning of Budget and Budgetary control; Classification of budgets according to time, function and flexibility; Master budget, Preparation of Flexible Budget and Cash Budget; Performance Budget and Zero Based Budgeting

Unit V: Standard Costing and Variance Analysis (12 Classes) (20 Marks)
Meaning of Standard Cost & Standard Costing; Advantages of standard costing; Standard costing Vs. Budgetary control; Variance analysis; Classification and computation of variance (Simple application)

Suggested Readings:

1. Management and Cost Accounting - Shashi K. Gupta & R. K. Sharma, Kalyani Publishers.
2. Arora M. N. - Cost Accounting Principles & Practices; Vikas, New Delhi.
3. Jain S. P. & Narang K. L. - Cost Accounting; Kalyani, New Delhi.
4. Khan M. Y. & Jain P. K. - Management Accounting, Tata Mcgrow Hill.

Course Objective:

The objective of the Cost and Management Accounting course is to provide students with the knowledge and skills to effectively collect, analyze, and interpret financial and non-financial information for managerial decision-making and control within an organization.

Learning Outcomes:

1. Students will be able to apply cost accounting techniques to determine product costs, analyse cost behaviour, and make informed decisions regarding pricing, product mix, and cost control.
2. Students will develop the skills to design and implement management accounting systems, including budgeting, variance analysis, and performance measurement, to support planning, control, and decision-making processes in organizations.

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Gauhati University, prs@gauhati.ac.in

Semester V

Course Name: **Cost and Management Accounting** (Major 8)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**
Unit II: Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**
Unit III: Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**
Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**
Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, India's service revolution, 'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:

1. Mishra and Puri, Indian Economy, Himalaya Publishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective:

The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:

1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyse the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.

3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60

Course Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: **Strategic Human Resource Management** (Major 9)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit-I: Introduction **(15 Classes)** **(25 Marks)**
Strategic role of HRM, Planning and implementing strategic HR policies HR Strategies to increase organizational performance, Cultural diversity

Unit-II: Managing Strategic Organization **(15 Classes)** **(25 Marks)**
Managing Strategic Organizational renewal- Managing change and OD, instituting TQM Programmes, Creating Team based Organizations, HR and BPR (Business Process Reengineering), Flexible work arrangement.

Unit-III: Establishing Strategic Plans **(15 Classes)** **(25 Marks)**
Establishing Strategic Compensation Plans, Trends, Objectives and Approaches to international compensation **(15 Classes)** **(25 Marks)**

Unit-IV: HR in International Context:
Managing global HR- HR and the internalization of business, International recruitment at different levels, issues in staff selection and retention, Training, Development and maintaining international employees, Expatriate Training.

Suggested Readings:

1. **Personnel Management, Text and Cases**, Author: C. B. Mamoria and S. V. Gankar, Pub: Himalaya Publications
2. **Delivering Competitive Advantages** Author: Clive Morton, Andrew Newall, Jon Sparkes, Pub: Jaico Publishing House 1st edition.
3. **International HRM** – Managing People in International Context, Author: Dowling, Welch
4. **Selected Readings in HRD**- by Kuldee Singh, T.V. Rao, Baburaj Nair: Tata McGraw-Hill Publishing Company Limited
5. **Strategic Human Resource Management**- by William P. Athony, Pamella L. Perrewe, K. Michele Kacmar: Harcourt Brace Jovanovich College Publishing
6. Charles Greer, Strategic Human Resource Management, Pearson Education
7. Gary Dessler, Human Resource Management, PHI, New Delhi.

Course Objective:

The objective of the Strategic Human Resource Management course is to provide students with an understanding of how to align human resource practices with organizational strategy in order to enhance employee performance, engagement, and overall organizational effectiveness.

Learning Outcomes:

1. Students will gain knowledge of strategic HRM concepts and frameworks and be able to analyze how HR practices can contribute to achieving organizational goals and competitive advantage.
2. Students will develop the skills to design and implement HR strategies and policies that align with the organization's strategic objectives, including recruitment, selection, training and development, performance management, and employee retention.
3. Students will understand the importance of managing diversity and inclusion in the workplace and be able to develop strategies to create an inclusive and supportive organizational culture.

4. Students will learn to effectively manage employee engagement, motivation, and productivity through strategies such as employee involvement, reward systems, and work-life balance initiatives.
5. Students will be able to analyze and address HR challenges and issues related to globalization, technological advancements, and changing workforce dynamics, and develop strategies to adapt and thrive in a dynamic business environment.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Gauhati University, tilak@gauhati.ac.in

Course Name: **Labour Welfare and Social Security** (Major 10)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit I: Introduction- Labour Welfare & Labour Markets- Nature and characterises of Labour market in India, Labour productivity, Labour market policies, Socio- economic aspects affecting labour welfare, welfare benefits. **(15 Classes) (25 Marks)**

Unit II: Globalisation and Labour markets in India, Labour emigration and its impact, International Labour Organisation (ILO), objectives and Labour Welfare in India. **(15 Classes) (25 Marks)**

Unit III: Social Security

Meaning, objective, types of social security, Social assistance and social insurance, development of social security in India, Social security measures for industrial employees. International standards of social security. Quality of Work Life, Counselling **(15 Classes) (25 Marks)**

Unit IV: Social Security Legislations

Employees Provident Fund Act, Employees State Insurance Act, Workers Compensation Act 1923, Payment of Gratuity Act, Maturity Benefit Act, Unorganised workers Social Security Act 2008.
(15 Classes) (25 Marks)

Suggested Readings:

1. Kapoor, N.D., Elements of Industrial Law, Sultan Chand, New Delhi, 2020
2. Garg, Ajay, Labour Laws one should know, Nabhi Publication, New Delhi, 2020
3. Kumar H.L., Practical Guide to Employees' Provident Funds, Universal Law Publishing Co., New Delhi, 2020
4. Srivastava S C, Industrial Relations And Labour Laws, Vikas Publishing House, Noida
5. Kumar H.L., Labour Laws Everybody Should Know, Universal Law Publishing Co., New Delhi, 2020
6. Kumar H.L. , Practical Guide to Payment of Gratuity, Universal Law Publishing Co., New Delhi, 2020
7. Kumar H.L., Practical Guide to Labour Management, Universal Law Publishing Co., New Delhi, 2020
8. Kumar H.L., Compliances under Labour Law, Universal Law Publishing Co., New Delhi, 2020
9.Sarma A.M., Aspects of Labour Welfare and Social Security, Himalaya Publishing Hous, Mumbai, 2016
10. Subba Rao P, Labour Welfare And Social Security, Himalaya Publishing House, Mumbai, 2009
11. Parry Jonatha, Breman, Kapadia, The Worlds of Industrial Labour, Sage Publications, New Delhi,
12. Introduction to Social Security, ILO Office, Geneva,

Course Objective: To develop students' knowledge and awareness of the social security measures and welfare programs implemented for the welfare of workers.

Learning Outcome: Students will gain an understanding of the various social security schemes and labour welfare initiatives, enabling them to assess their impact and contribute to the well-being of employees.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Performance Management** (Major 11)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit I: Introduction **(15 Classes)** **(25 Marks)**
Meaning, concept and brief background of Performance Management, its importance, Place of PM in Human Resource Management; performance Management Framework- Process – Mid Cycle and End Cycle- Steps in Performance management

Unit II: Performance Management Planning **(15 Classes)** **(25 Marks)**
Organisations mission, strategy and goals, Goals Settling, Quality of goals, Employee Engagement through Performance Management System, Performance Planning process and employee performance.

Unit III: Performance Appraisal **(15 Classes)** **(25 Marks)**
Definitions, dimensions, objectives, advantages & disadvantages, characteristics, process limitation methods- traditional and modern, Performance assessment.

Unit IV: Contemporary Issues in PM **(15 Classes)** **(25 Marks)**
Linking Performance to compensating & Rewards and recognition, Creating PM Culture through HR Progress and practices.Competency Mapping, Competency Mapping & its Linkage with Career Development and Succession Planning,

Suggested Readings:

● Armstrong, M. & Baron, A. (2005), Performance management and development. Mumbai: Jaico Publishing House.
● Bhattacharyya, D. K. (2011), Performance management systems and strategies. India: Pearson Education.
● Chadha, P. (2003), Performance Management: It's About Performing Not Just Appraising. McMillan India Ltd.
● Kandula, S. R. Performance Management: Strategies, Interventions, Drivers PHI Lerarning
● Kohli(2008). Performance Management.Oxford University Press.
● Rao, T.V. (2004), Performance Management and Appraisal Systems: HR Tools for Global Competitiveness. Response Books: A division of Sage Publications.
● Shrinivas R. Kandula (2006), Performance Management: Strategies, Intervention & Drivers. Pearson.
● Soumendra, NarainBagchi (2013), Performance Management. Delhi: Cengage Learning India Pvt. Ltd.

Course Objective:

To equip students with the skills and knowledge needed to effectively manage employee performance and enhance organizational productivity.

Learning Outcome:

Students will be able to develop performance appraisal systems, set performance goals, provide constructive feedback, and design performance improvement plans.

No. of Contact Classes: 60

Name of the Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University, tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Semester VI

Course Name: **International Business** (Major 12)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: **(12 Classes) (20 Marks)**

a. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

b. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit II: **(12 Classes) (20 Marks)**

a. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

b. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit III: **(12 Classes) (20 Marks):**

a. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

b. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit IV: **(12 Classes) (20 Marks):**

a. Organisational structure for international business operations; International business negotiations.

b. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit V: **(12 Classes) (20 Marks)**

a. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

b. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

1. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
2. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
3. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
4. Sumati Varma, International Business, Pearson Education.
5. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
6. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
7. Bennett, Roger. International Business. Pearson Education.

8. Peng and Srivastav, Global Business, Cengage Learning

Course Objective:

To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning Outcome:

By the end of the course, students will be able to analyse and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Course Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: **Operations Research in Business** (Major 13)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: Introduction to Operation Research: Evolution of Operation Research, Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation Research. **(12 Classes) (20 Marks)**

Unit II: Linear Programming: Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control, concepts and benefits of inventory control, Different types of costs in inventory system, Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement, Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two**.** **(12 Classes) (20 Marks)**

Unit V: Project Management, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction, critical path analysis, Float of an Activity and Event, Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Suggested Readings:

1. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition, Taha H.A., Hall of India
2. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
3. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
4. Operations Research: Theory and Applications 4th Edition, J.K Sharma

Course Objective:

To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60

Course Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: **Technology in Human Resource Management** (Major 14)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: Introduction of Technology in HR evolution of technology in HR, its role, core of HR technologies: Artificial Intelligence (AI), Cloud Computing, Machine Learning(ML), Internet of things (IOT) , basic concept of E-HRM , Human Resource Information System (HRIS)
(15 Classes) (25 Marks)

Unit II. Transforming HR:HR roles and their technology needs, the changing HR landscape, transformation in HR functions, Enterprise resource Planning: Meaning and benefits, Role of ERP in HRM, Digital Transformation in HRM decision Making **(15 Classes) (25 Marks)**

Unit III: Human Resources Information System (HRIS)
Introduction to HRIS-Concept, Need, Purpose of Information Systems designed for HR, HR Metrics, HR Administration and HRIS, Disruptive Technologies and emerging trends in HRIS
(15 Classes) (25 Marks)

Unit IV: Current Trends in HR Technology Major Technology trends, Remote working and HR, Cloud based HR, Regulatory and Legal Issues regarding use of Technology.
(15 Classes) (25 Marks)

Suggested Readings:

● Marr, Bernard. Data-Driven HR: How to Use Analytics and Metrics to Drive Performance, Kogan Page, Limited, 2018. ProQuest Ebook Central.
● Roy Mac Leod (Ed.) New Technology and the workers Response, Sage Publications, New Delhi.
● Stacey Harris, Introduction to HR Technologies: Understand How to Use Technology to Improve Performance and Processes, 1st Edition (2021).
● Deborah Waddill, , Digital HR A Guide to Technology-Enabled Human Resources, Society for Human Resource Management
● Joshbersin (2021), HR Technology 2021: The Definitive Guide.

Course Objective:

To explore the role of technology in human resource management and develop an understanding of how technological advancements can enhance HR processes and practices.

Learning Outcome:

By the end of the course, students will be able to identify and evaluate various HR technologies, demonstrate proficiency in utilizing HR software and systems, and strategize the implementation of technology-driven solutions to improve HR functions such as recruitment, training, performance management, and employee engagement.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Gauhati University & Dr. Mahuya Deb, Gauhati University, tilak@gauhati.ac.in, mahuya8@gmail.com

Course Name: **Training and Development** (Major 15)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: Introduction- Training, Learning, Development, Importance and Need of Training; training in human resource management, benefits of training Integrating training with Performance Management Systems and Compensation. Strategic training **(15 Classes) (25 Marks)**

Unit II: Training Needs Assessment
Assessing the Need for training and the participants- identification of training needs Levels of training need assessment- Program designing and delivery. Use of technology; training evaluation, level of evaluation; evaluation models. **(15 Classes) (25 Marks)**

Unit III: Training Methods, Process, Learning
Learning theories and process, Learning Cycle, Designing effective training programs, training methods and Aids: -On the Job & Off the Job Training, Management Development:
Lecture Method, Role Play, In-basket Exercise, Simulation, Vestibule Training, Management Games, Case Study, Programmed Instruction, Sensitivity Training **(25 Classes) (30 Marks)**

Unit IV: Training and Development in India
Emerging pattern of training in India, Review on T&D Programmes in India.
(10 Classes) (20 Marks)

Suggested Readings:

● Chabbra, T.N.(2016). Human Resource Management: Concepts and Issues. DhanpatRai and Co. Publications.
● Durai, P.(2016). Human Resource Management (2nd ed.). New Delhi: Pearson Education.
● Graig, Robert L. and Bittel, Lester r. (Ed): Training and Development Hand Book, McGraw-Hill, New Delhi .
● ILO, Teaching and Training Methods for Management Development Hand Book, McGraw-Hill , New York .
● Mondy, A., Wayne and Martocchio, J. J. (2016). Human Resource Management (14th Ed.). Pearson Education Publications.
● Nadler, Leonard :Corporat Human Resource Development, Van Nostrand Reinhold, ASTD, New York .
● Rao, T.V: Human Resource Development, Sage Publications, New Delhi

Course objective:

To provide students with a comprehensive understanding of the theories, methods, and processes involved in employee training and development.

Learning outcome:

Students will gain the ability to analyze training needs, design effective training programs, and evaluate the impact of training on employee performance and organizational success.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

2. Specialization: Accounting

Semester III

Course Name: **Advanced Financial Accounting** (Major 1)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit I: Royalty **(12 Classes) (20 Marks)**
Royalty accounts: Meaning of Royalty, Minimum Rent and Short working. Accounting Treatment and preparation of Royalty Account including impact of Strikes & Lockouts, excluding Sub-lease.

Unit II: Departmental Accounts **(12 Classes) (20 Marks)**
Meaning and objectives; allocation of common expenses; System of preparation of departmental trading and profit and loss accounts ; inter-department transfer

Unit III: Accounting for Amalgamation and Dissolution of Partnership Firms (12 Classes) (20 Marks)
Accounting for Dissolution of Partnership Firm including insolvency of partners, Sale to a limited company and piecemeal distribution. Accounting for Amalgamation of Partnership Firms

Unit IV: Insurance Claims **(12 Classes) (20 Marks)**
Insurance policy for a business firm – Procedure for taking up Insurance Policy for loss stock and loss of profit; Meaning of Insurance claims, procedure to lodge insurance claim; Average clause and indemnity period. Procedure of ascertaining loss of stock and loss of profit; Ascertainment of claims against loss of stock and loss of profit.

Unit V: Government Accounting **(12 Classes) (20 Marks)**
Meaning, features and Objectives of Government Accounting; difference between Commercial Accounting and Government Accounting; General Principles of Government Accounting; Demand for Grant, Appropriation Accounts, Re-appropriation; System of financial administration and financial control in India; Accounts keeping of the Government; Classification of Accounts – Consolidated Fund, Contingency Fund and Public Accounts; Government Accounting Standards Advisory Board.

Suggested Readings:

1. Anthony, R., Hawkins, D., & Merchant, K. A. (2010). Accounting: Text and Cases. New York: McGraw-Hill Education.

2. Goyal, B. K., & Tiwari, H. N. (2019).Financial Accounting. New Delhi: Taxmann Publication.

3. Jain, S. P., & Narang, K. L. (2016).Advanced Accountancy. New Delhi: Kalyani Publishers.

4. Horngren, C. T., Sundem, G. L., Elliott, J. A., & Philbrick, D. (2013). Introduction to Financial Accounting. London: Pearson Education.

5. Maheshwari, S. N., Maheshwari, S. K., & Maheshwari, S. K. (2018).Financial Accounting. New Delhi: Vikas Publishing House Pvt. Ltd.

6. Monga, J. R. (2017). Financial Accounting: Concepts and Applications. New Delhi: Mayur

7. Godwin, N., Alderman, W., & Sanyal, D. (2016).Financial Accounting. Boston: Cengage Learning.

8. Shukla, M. C., Grewal, T. S., & Gupta, S. C. (2016).Advanced Accounts. Vol.-I. New Delhi: S. Chand Publishing.

9.Tulsian, P. C. (2007). Financial Accounting. New Delhi: Tata McGraw Hill Publishing Co. Ltd.

10. Dam, B. B., & Gautam, H. C. (2019).Advanced Accounting.Gayatri Publications, Guwahati.

Objective: The course aims to impart advanced knowledge on financial accounting applicable in business of special nature and on Government accounting system**.**

Learning Outcome: By the end of the course, students will be able to apply advanced financial accounting principles and techniques to analyze and interpret financial statements, make informed financial decisions, and comply with relevant accounting standards and regulations.

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: **Entrepreneurship** (Major 2)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit I: Introduction to Entrepreneurship
Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit II: Entrepreneurship and Micro, Small and Medium Enterprises
Role of business houses and 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. (15 Lectures) (25 Marks)

Unit III: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund. (15 Lectures) (25 Marks)

Unit IV: 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 (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions
(15 Lectures) (25 Marks)

Suggested Readings:

1. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
2. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
3. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.4.
4. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin
5. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
6. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
7. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
8. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
9. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
10. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course Objective:

To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning Outcome:

Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Business Laws** (Major 3)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit I: The Indian Contract Act, 1872: General Principle of Law of Contract
Contact- meaning, characteristics and kinds

a) Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b) Void agreements
c) Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d) Contingent contracts
e) Quasi – contracts **(12 Classes)** **(20 Marks)**

Unit II: The Indian Contract Act, 1872: Specific Contract

a) Contract of Indemnity and Guarantee
b) Contract of Bailment
c) Contract of Agency **(12 Classes)** **(20 Marks)**

Unit III: The Sale of Goods Act, 1930

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) Performance of contract of sale
e) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) **(20 Marks)**

Unit IV: Partnership Laws

A) The Partnership Act, 1932

a. Nature and Characteristics of Partnership
b. Registration of a Partnership Firms
c. Types of Partners
d. Rights and Duties of Partners
e. Implied Authority of a Partner
f. Incoming and outgoing Partners
g. Mode of Dissolution of Partnership

B) The Limited Liability Partnership Act, 2008

h) Salient Features of LLP
i) Differences between LLP and Partnership, LLP and Company
j) LLP Agreement,
k) Partners and Designated Partners
l) Incorporation Document
m) Incorporation by Registration
n) Partners and their Relationship **(12 Classes)** **(20 Marks)**

Unit V (A): The Negotiable Instruments Act 1881
Meaning, Characteristics, and Types of Negotiable Instruments: Promissory Note, Bill of Exchange, Cheque

a) Holder and Holder in Due Course, Privileges of Holder in Due Course.
b) Negotiation: Types of Endorsements
c) Crossing of Cheque
d) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties.

(12 Classes) **(20 Marks)**

Suggested Readings:

1. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
2. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
3. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
4. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
5. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
6. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
7. Sushma Arora, *Business Laws*, Taxmann Pulications.
8. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
9. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
10. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Course Objective:

To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.

Course Outcome:

On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Semester IV

Course Name: **Fundamentals of Financial Management** (Major 4)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I: Introduction
Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities
(12 Classes) (20 Marks)

Unit II: Investment Decisions
The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit III: Financing Decisions
Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit IV: Dividend Decisions
Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit V: Working Capital Decisions
Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

1. In addition the students will work on Spreadsheet for doing basic calculations in finance (Unit II and III above) and hence can be used for giving students subject related assignments for their internal assessment.

2. 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)

3. Latest edition of text books may be used.

Suggested Readings

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education

5.Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6.Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.
7.Rustagi, R.P. *Fundamentals of Financial Management*. Taxman Publication Pvt. Ltd.

Course Objectives:

The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Course Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Cost Accounting (Major 5)
Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS
Course Level: 400 to 499

CONTENTS:

Unit 1: Introduction (10 classes) (15 Marks)

Meaning, objectives and advantages of cost accounting; Difference between cost accounting and financial accounting; Cost concepts and classifications; Elements of cost and preparation of Cost Sheet; Installation of a costing system; Role of a cost accountant in an organisation

Unit 2: Elements of Cost: Material (10 classes) (20 Marks)

Material/inventory control techniques. Accounting and control of purchases, storage and issue of materials. Methods of pricing of materials issues — FIFO, LIFO, Simple Average, Weighted Average, Replacement, Standard Cost. Treatment of Material Losses, Stores ledger, EOQ, levels of Inventory

Unit 3: Elements of Cost: Labour: (10 classes) (15 Marks)

Accounting and Control of labour cost. Time keeping and time booking. Concept and treatment of idle time, over time, labour turnover and fringe benefits. Methods of wage payment and the Incentive schemes- Halsey, Rowan, Taylor's Differential piece wage.

Unit 4: Elements of Cost: Overheads (10 classes) (15 Marks)

Classification, allocation, apportionment and absorption of overheads; Under- and over-absorption; Calculation of Machine Hour Rate;

Treatments interest on capital, depreciation, packing expenses, bad debts, research and development expenses.

Unit 5: Methods of Costing (10 classes) (20 Marks)

Unit costing, Job costing, Contract costing, Process costing (including treatment of process losses, valuation of work in progress)**.**

Unit 6: Book Keeping in Cost Accounting (10 classes) (15 Marks)

Integral and non-integral systems; Reconciliation of cost and financial accounts.

Suggested Reading:

1. Charles T. Horngren, Srikant M. Datar, Madhav V. Rajan **, *Cost Accounting: A Managerial Emphasis*, Pearson Education.**
2. Drury, Colin. *Management and Cost Accounting.* Cengage Learning.
3. Jawahar Lal, *Cost Accounting*. McGraw Hill Education
4. Nigam, B.M. Lall and I.C. Jain. *Cost Accounting: Principles and Practice*. PHI Learning
5. Rajiv Goel, *Cost Accounting*. International Book House
6. Singh, Surender. *Cost Accounting,* Scholar Tech Press*,* New Delhi.
7. Jain, S.P. and K.L. Narang. *Cost Accounting: Principles and Methods*. Kalyani Publishers
8. Arora, M.N. *Cost Accounting – Principles and Practice.* Vikas Publishing House, New Delhi.
9. Maheshwari, S.N. and S.N. Mittal. *Cost Accounting: Theory and Problems*. Shri Mahavir Book Depot, New Delhi.
10. Iyengar, S.P. Cost Accounting. Sultan Chand & Sons
11. H.V. Jhamb, *Fundamentals of Cost Accounting,* Ane Books Pvt. Ltd.

Course objective: To equip students with the knowledge and skills necessary to analyze and control costs in order to support effective management decision-making.

Learning outcome: By the end of the course, students will be able to apply cost accounting techniques to determine product costs, calculate relevant cost information for decision-making, implement cost control measures, and evaluate performance within an organization.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: **Income Tax Law and Practice (Major 6)**
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit 1: Introduction (12 classes) (20 Marks)

Basic concepts: Income, agricultural income, person, assessee, assessment year, previous year, gross total income, total income.

Residential status; Scope of total income on the basis of residential status Exempted income under section 10

Unit 2: Computation of Income under different heads-1 (12 classes) (20 Marks)

Income from Salaries; Income from house property

Unit 3: Computation of Income under different heads-2 (12 classes) (20 Marks)

Profits and gains of business or profession; Capital gains; Income from other sources

Unit 4: Computation of Total Income and Tax Liability (12 classes) (20 Marks)

Income of other persons included in assessee's total income; Aggregation of income and set-off and carry forward of losses; Deductions from gross total income; Rebates and reliefs

Computation of total income of individuals and firms; Tax liability of an individual and a firm; Five leading cases decided by the Supreme Court

Unit 5: Preparation of Return of Income (12 classes) (20 Marks)

Filing of returns: Manually, On-line filing of Returns of Income & TDS; Provision & Procedures of Compulsory On-Line filing of returns for specified assesses, Permanent Account Number (PAN).

Note:

1. There shall be a practical examination of 20 Marks on E-filling of Income Tax Returns using a software utility tool. The student is required to fill appropriate Form and generate the XML file.

2. 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)

3. Latest edition of text books and Software may be used.

Suggested readings:

1. Singhania, Vinod K. and Monica Singhania. *Students' Guide to Income Tax, University Edition.* Taxmann Publications Pvt. Ltd., New Delhi.
2. Ahuja, Girish and Ravi Gupta. *Systematic Approach to Income Tax.* Bharat Law House, Delhi.

Journals

1. *Income Tax Reports*. Company Law Institute of India Pvt. Ltd., Chennai.
2. *Taxman*. Taxman Allied Services Pvt. Ltd., New Delhi.
3. *Current Tax Reporter*. Current Tax Reporter, Jodhpur.

Software

1. Vinod Kumar Singhania, *e-filing of Income Tax Returns and Computation of Tax*, Taxmann Publication Pvt. Ltd, New Delhi. Latest version
2. 'Excel Utility' available at *incometaxindiaefiling.gov.in*

Course objective: To provide students with a comprehensive understanding of income tax laws and regulations, as well as the practical application of tax planning and compliance.

Learning outcome: By the end of the course, students will be able to comprehend and apply income tax laws, prepare tax computations for individuals and businesses, and provide basic tax planning advice in compliance with relevant tax legislation.

No. of Contact Classes: 60

Designer Name: Prof. Bhaskarjyoti Bora, Dr. Upasana Borpujari, Gauhati University, bhaskarjb2001@yahoo.com, upasna.borpujari@gmail.com

Course Name: Advanced Corporate Accounting (Major 7)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit 1: (12 classes) (20 Marks)

(i) **Accounting Standards:**

Overview of Accounting Standards in India - Applicability, Interpretation, Scope and Compliance of Ind AS; International Financial Reporting Standards - Ind AS vs. IFRS; National and International Accounting Authorities; Adoption and Convergence of International Financial Reporting Standards (IFRS) in India.

(ii) **Corporate Annual Report**

Meaning, usefulness, statutory provisions, contents and disclosure of corporate information – mandatory and voluntary; Analysis with Case Study. E-filing of annual reports of companies and XBRL Filing with specific practical exercises.

Unit 2: Winding up of Companies (12 classes) (20 Marks)

Meaning and modes of winding up; Types of winding up; Procedures of winding up; Contributories; Preferential payments; Voluntary winding up; Preparation of Liquidator's Final Statement of Account; Preparation of Statement of Affairs.

Unit 3: Accounts of Banking Companies (12 classes) (20 Marks)

Statutory books to be maintained; Special features of Bank book keeping. Advances – its classification and provisions to be made against advances; Rebate on Bills Discounted, Income recognition; Preparation and presentation of Financial Statements of banking companies.

Unit 4: **Accounts of Insurance Companies** (12 classes) (20 Marks)

Books maintained by a life insurance companies and general insurance companies. Accounts of Life insurance company – Revenue Account and Profit and loss Account and ascertainment of profit under Life insurance business; preparation of Balance Sheet using appropriate software; Accounts of general insurance business – Revenue Account, Profit and Loss Account and Balance Sheet of insurance companies.

Unit 5: Investment Accounts (12 classes) (20 Marks)

Meaning of Investment Accounts; cum-interest, ex-interest, cum-dividend and ex-dividend. Accounting for fixed interest earning securities and variable earning securities, bonus shares and right shares.

Profit and Loss prior to incorporation: Meaning of profit or loss prior to incorporation; accounting `treatment of profit or loss prior to incorporation.

Suggested Readings:

1. Goyal, V. K., & Goyal**,** R. (2013). *Corporate Accounting*. New Delhi: Phi Learning.
2. Jain, S. P., & Narang, K. L. (2016). *Corporate Accounting*. New Delhi: Kalyani Publishers.
3. Goyal, B. K. (2019). *Fundamentals of Corporate Accounting*. New Delhi: Taxmann Publications.
4. Maheshwari, S. N., Maheshwari, S. K., & Maheshwari, S. K. (2009). *Corporate Accounting.* New Delhi: Vikas Publishing House Pvt. Ltd.
5. Monga, J. R. (2019). *Fundamentals of Corporate Accounting*. New Delhi: Scholar Tech Press.
6. Shukla, M. C., Grewal, T. S., & Gupta, S. C. (2016). *Advanced Accounts.* Vol.-I. New Delhi: S. Chand Publishing.
7. Mukherjee, A., & Hanif, M. (2005). *Corporate Accounting*. New Delhi: Tata McGraw Hill Education.
8. Sehgal, A. (2011). *Fundamentals of Corporate Accounting.* New Delhi: Taxmann Publications.

Course objective: To enhance students' knowledge and skills in handling complex accounting issues related to corporate entities, including advanced topics in financial reporting and analysis.

Learning outcome: By the end of the course, students will be able to apply advanced accounting principles and techniques to address complex corporate accounting issues, analyze financial statements for decision-making purposes, and interpret accounting standards relevant to corporate reporting.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: Indian Economy (Major 8)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**

Unit II:Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**

Unit III:Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**

Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**

Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, Indias's service revolution,'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:

1. Mishra and Puri, Indian Economy, Himalaya Paublishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective: The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:
1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyze the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.
3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,
No. of Contact Classes: 60
Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Management Accounting (Major 9)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit 1: Introduction (12 classes) (20 Marks)

Meaning, Objectives, Nature and Scope of management accounting, Difference between cost accounting and management accounting, Application of Cost concepts for managerial decision making; Concept of Cost control and Cost reduction, Cost management

Unit 2: Financial Statement Analysis: (12 classes) (20 Marks)

Meaning and objectives of Financial Statement Analysis; Techniques of Financial Statement analysis – Comparative Statement, Common-size Statement and Trend Analysis. Meaning of Accounting Ratio, Classification of Accounting Ratios; objectives of Ratio Analysis; Advantages and Limitations of Ratio Analysis; Precaution to be taken before using Ratios; Computation of various Ratios – Activity Ratios, Liquidity Ratios, Solvency and Leverage Ratios and Profitability Ratios;

Unit 3: Budgetary Control (12 classes) (20 Marks)

Budgeting and Budgetary Control: Concept of budget, budgeting and budgetary control, objectives, merits, and limitations. Budget administration. Functional budgets. Cash Budget. Fixed and flexible budgets. Preparation of Cash Budget **and** flexible budgets.

Unit 4: Standard Costing (12 classes) (20 Marks)

Standard Costing and Variance Analysis: Meaning of standard cost and standard costing, advantages, limitations and applications. Variance Analysis – material, labour, overheads and sales variances. Disposition of Variances.

Unit 5: Marginal Costing (12 classes) (20 Marks)

Absorption versus Variable Costing: Distinctive features and income determination. Cost-Volume-Profit Analysis, Profit / Volume ratio. Break-even analysis-algebraic and graphic methods. Angle of incidence, margin of safety

Suggested Reading:

1. Charles T. Horngren, Gary L. Sundem, Dave Burgstahler, Jeff O. Schatzberg**.** ***Introduction to Management Accounting*** , Pearson Education.
2. Anthony A. Atkinson, Robert S. Kaplan, Ella Mae Matsumura, S. Mark Young. *Management Accounting*. Dorling Kindersley(India) Pvt. Ltd.
3. Ronald W. Hilton and David E. Platt. *Managerial Accounting: Creating Value in a Global Business Environment,* Mc Graw Hill Education.
4. Singh, Surender. *Management Accounting,* Scholar Tech Press, New Delhi.
5. Goel, Rajiv, *Management Accounting*. International Book House,
6. Arora, M.N. *M a n a g e m e n A c c o u n t i n g* . Vikas Publishing House, New Delhi.
7. Maheshwari, S.N. and S.N. *M a n a g e m e n t Accounting*. Shree Mahavir Book Depot, New Delhi.
8. Singh, S. K. and Gupta Lovleen. *Management Accounting – Theory and Practice*. Pinnacle Publishing House.
9. Khan, M.Y. and Jain, P.K. *Management Accounting*. McGraw Hill Education
10. H.V. Jhamb, *Fundamentals of Management Accounting,* Ane Books Pvt. Ltd.

Course objective: To provide students with a comprehensive understanding of management accounting principles and techniques and their application in supporting managerial decision-making and control.

Learning outcome: By the end of the course, students will be able to apply management accounting tools and techniques to analyze and interpret financial and non-financial information, support strategic and operational decision-making, and assist in planning, budgeting, performance evaluation, and control within organizations.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: Fundamentals of Investment (Major 10)
Credit: 4
Total Marks: 100
***Common for two specialization namely (i) Accounting & (ii) Finance**
Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit 1: Basics of Investment (12 classes) (20 Marks)
Investment-Meaning, Purpose and Objectives, Investment and Speculation, Types of Investment-Commodities, Real Estate and Financial Assets, Security and Non-security form of investment, Investment Attitudes- Return, Risk, Liquidity, Tax Shelter, Convenience; Sources of Financial Information, Return and Risk - Concept and Computation.

Unit 2: Investment in Equities (12 classes) (20 Marks)
Investment in Equities- Advantages and disadvantages of investing in equities, Fundamental Analysis- Economic Analysis, Industry Analysis and Company Analysis; Technical Analysis- Tools of technical analysis- interpretation of charts and patterns; Valuation of Equity Shares, Investment in Mutual Funds.

Unit 3: Investment in Fixed Income Securities (12 classes) (20 Marks)
Bonds – Meaning, Features, Types of Bonds, Estimating Bond Yields, Bond Valuation, Types of Risk in bonds- Default risk, Credit ratings, Consideration for investing in a Bond.

Unit 4: Miscellaneous Investments (12 classes) (20 Marks)
Investment in Real Estate – Meaning, Reasons for Investing in Real Estates, Housing Finance in India; Investment in Gold and Silver– Reasons for investment in Gold and Silver; Investment in Mutual Funds – Benefits, Selection criteria, performance evaluation.

Unit 5: Portfolio Investment (12 classes) (20 Marks)
Portfolio – Meaning and Significance, Portfolio Management Process, Investment Decision Making Approaches- Fundamental approach, Psychological Approach, Academic Approach, Eclectic approach, Common mistakes in Investment Management

Suggested Readings:

1. Fundamentals of Investment Management, V K Bhalla, S.Chand
2. Investment Management, Rajiv Srivastav, Wiley.
3. Security Analysis and Portfolio Management, Kelvin, PHI
4. The Investment Game: Prasanna Chandra, Tata MCGrawHill
5. Investment Analysis and Portfolio Management, M Ranganatham and R Madhumathi, Pearson.

Course objective: To introduce students to the fundamental concepts, theories, and practices of investment analysis and portfolio management.

Learning outcome: By the end of the course, students will be able to analyze investment opportunities, construct and manage investment portfolios, evaluate risk and return trade-offs, and make informed investment decisions based on their understanding of financial markets and investment strategies.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Indirect Taxes (Major 11)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Contents:

Unit 1: Introduction: (12 classes) (20 Marks)

Meaning of Indirect Tax, History of Indirect Taxes in India; VAT – concepts and general principles,

Calculation of VAT on Alcohol and Petroleum Products.

Unit 2: Central Excise (12 classes) (20 Marks)

Central Excise Law in brief, Excisable goods, Manufacture and Manufacturer, Valuation of Excise-able amount regarding Alcohol and Petroleum Products.

Unit 3: Customs Law (12 classes) (20 Marks)

Basic concepts of customs law, Territorial waters, high seas, Types of custom duties – Basic, Countervailing & Anti- Dumping Duty, Safeguard Duty, Valuation, Customs Procedures, Import and Export Procedures, Baggage, Exemptions.

Unit 4: Structure of GST in India: (12 classes) (20 Marks)

The Central Goods and Services Tax Act, 2017 and The Assam Goods and Services Tax Act, 2017, History of GST in India, Meaning, Features and Advantages of GST.

Dual GST Model: CGST, SGST, UTGST, IGST, Taxes subsumed by GST, Commodities kept outside the scope of GST. Definition of important terms used in GST Act – concept of place of supply Adjudicating Authority, Agent, Aggregate Turnover, Agriculturist, Business, Business Vertical, Capital Goods, Casual Taxable Person, Goods, Input Tax, Inward Supply, Output Tax, Outward Supply, Place of Business, Services, Supplier.

GST Council and GST Network.

Unit 5: Registration, Levy and Collection of Tax under GST (12 classes) (20 Marks)

Concept of Tax Invoice under GST Section 31, Meaning, Eligibility and Conditions for taking Input Tax Credit; Threshold Limits for Registration, Persons liable for Registration, Persons not liable for Registration, Compulsory Registration in Certain Cases, Procedure for Registration, Deemed Registration; Rates structure of GST, Composition Scheme under GST, Assessment (only basic knowledge) Refunds.

Suggested Readings:

1. Singhania Vinod K. and Monica Singhania, *Students' Guide to Indirect Taxes,* Taxmann Publications Pvt. Ltd., Delhi.
2. V.S. Datey. *Indirect Tax Law and practice,* Taxmann Publications Pvt. Ltd., Delhi,
2. Sanjeev Kumar. *Systematic Approach to Indirect Tax*es,
3. S. S. Gupta. *Service Tax* -How to *meet your obligation* Taxmann Publications Pvt. Ltd., Delhi,
4. Grish Ahuja and Ravi Gupta, *Indirect Taxes*, Flair Publication Pvt Ltd

Course objective: To provide students with a comprehensive understanding of indirect taxes, with a focus on the Goods and Services Tax (GST) system.

Learning outcome: By the end of the course, students will be able to comprehend the principles and regulations of GST, effectively apply GST concepts to various business scenarios, navigate GST compliance requirements, and analyze the impact of GST on business operations and decision-making.

No. of Contact Classes: 60

Designer Name: Prof. Bhaskarjyoti Bora, Dr. Upasana Borpujari, Gauhati University, bhaskarjb2001@yahoo.com, upasna.borpujari@gmail.com

Course Name: International Business (Major 12)

6th Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: **(12 Classes) (20 Marks)**

c. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

d. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit –II **(12 Classes) (20 Marks)**

c. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

d. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit –III **(12 Classes) (20 Marks)**

c. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

d. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit –IV **(12 Classes) (20 Marks)**

c. Organisational structure for international business operations; International business negotiations.

d. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit –V **(12 Classes) (20 Marks)**

c. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

d. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

9. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
10. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
11. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
12. Sumati Varma, International Business, Pearson Education.
13. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
14. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
15. Bennett, Roger. International Business. Pearson Education.
16. Peng and Srivastav, Global Business, Cengage Learning

Course objective: To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning outcome: By the end of the course, students will be able to analyze and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Operations Research in Business (Major 13)

Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit I: Introduction to Operation Research: Evolution of Operation Research , Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation **Research.** **(12 Classes) (20 Marks)**

Unit II: Linear Programming : Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control , concepts and benefits of inventory control, Different types of costs in inventory system , Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement: Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two**.** **(12 Classes) (20 Marks)**

Unit V: : Project Management:, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction , critical path analysis, Float of an Activity and Event , Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Recommended books :

11. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition , Taha H.A., Hall of India
12. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
13. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
14. Operations Research : Theory and Applications 4^{th} Edition , J.K Sharma

Course objective: To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60
Name of the Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: Computerized Accounting (Major 14)

Credit: 4
Total Marks: 100
6th Semester

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit-1: Computerized Accounting: Using Generic Software (20 Classes) (25 Marks)
Taxation: TDS, VAT and Service Tax
Auditing in Computerized Accounting system: Statutory Audit, Voucher verification, Verification of related party transaction, CAAT: Various Tools

Unit-2: Designing Computerised Accounting System (25 Classes) (40 Marks)
Designing Computerised Accounting System using a DBMS Package Creating a voucher entry Form, Preparing ledgers with SQL, Form, and Report Preparing Trial Balance with SQL and Report

Unit-3: Designing Accounting Support System (15 Classes) (35 Marks)
Designing Supplier and customers System for Accounting using Form, Query, Module, and Report; Designing Payroll System for Accounting using Form, Query, Module, and Report

Note:

1. The General Purpose Software referred in this course will be notified by the University Departments every three years. If the specific features, referred in the detailed course above, is not available in that software, to that extent it will be deemed to have been modified.
2. There shall be a practical examination of 100 Marks (Practical-80 Marks, Viva-10 Marks and Work Book- 10 Marks) and duration of Examination shall be 3 Hrs.
3. Teaching arrangements need to be made in the computer Lab
4. There shall be Four Lectures per class and 4 Practical periods per batch to be taught in computer Lab.

Suggested Readings:
The suggested readings and guidelines shall be notified by the university department at least once in three years based on the selected software.

Course objective: To familiarize students with the use of computerized accounting systems and develop their skills in utilizing accounting software for efficient financial management.

Learning outcome: By the end of the course, students will be able to effectively operate computerized accounting software, perform various accounting tasks using computer applications, and utilize technology for accurate and timely financial reporting.

No. of Contact Classes: 60
Designer Name: Prof. Bhaskarjyoti Bora, Dr. Upasana Borpujari, Gauhati University, bhaskarjb2001@yahoo.com, upasna.borpujari@gmail.com

Course Name: Auditing & Assurance (Major 15)

Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

UNIT I: (12 classes) (20 Marks)
Auditing Concepts: Nature, Objective, and basic principles of auditing, limitations of auditing, classes of errors and frauds and auditor's duty threats; ethical principles and concept of auditor's independence, Relationship of auditing with other disciplines.

UNIT II: (12 classes) (20 Marks)
Internal control and internal check: elements of internal control, review and documentation, evaluation of internal control system, internal control questionnaire, internal control check list, tests of control, application of concept of materiality and audit risk, concept of internal audit, Internal control under computerized audit environment.

UNIT III: (12 classes) (20 Marks)
Audit sampling: Types of sampling, test checking, techniques of test check, sampling risk, audit sampling and sampling methods, compliance tests and substantive tests, auditing in depth. Analytical review procedure.

UNIT IV: (12 classes) (20 Marks)
Audit Procedure: Vouching; verification of Assets and liabilities.

UNIT V: (12 classes) (20 Marks)
Audit report; qualifications, disclaimers, adverse opinion, disclosures, auditor's reports and certificates, Audit attestation and certification.

Suggested Books:

1. Auditing and Assurance Standards issued by the ICAI, New Delhi.
2. Principles of Audit and Internal Auditing by Dhruba Dutachowdhury, New Central Book Agency P. Ltd. Kolkata-700009.
3. Principles and Practice of Auditing by R.G. Saxena, Himalaya Publishing House, Mumbai.
4. Contemporary Auditing by Kamal Gupta, Tata McGraw Hill Publishing Co. Ltd.
5. Nobes and Porker, Comparative International Accounting, Pearson Education, New Delhi.
6. International Accounting, by Saudagaram, Taxmann India, New Delhi.
7. Ainapure and Ainapure, Auditing and Assurance, PHI Learning Pvt. Ltd., New Delhi.
8. Auditing by S.K. Dutta Choudhury, New Central Book Agency, Kolkata.
9. Official Publication of ICAI, New Delhi.

Course objective: To introduce students to the principles and practices of auditing, including the role of auditors in ensuring the reliability and integrity of financial information.

Learning outcome: By the end of the course, students will be able to understand the audit process, evaluate internal control systems, perform audit procedures, and communicate audit findings and recommendations in accordance with auditing standards and regulations.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

3. Specialization: Marketing Management

Course Name: Advertising (Major 1)
3rd Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399

Unit 1: Introduction: **(12 classes) (20 Marks)**
Communication Process; Advertising as a tool of communication; Meaning, nature and importance of advertising; Types of advertising; Advertising objectives. Audience analysis; Setting of advertising budget:
Determinants and major methods

Unit 2: Media Decisions: **(12 classes) (20 Marks)**
Major media types - their characteristics, internet as an advertising media, merits and demerits; Factors influencing media choice; media selection, media scheduling, Advertising through the Internet-media devices

Unit 3: Message Development; **(12 classes) (20 Marks)**
Advertising appeals, Advertising copy and elements, Preparing ads for different media

Unit 4: Measuring Advertising Effectiveness: **(12 classes) (20 Marks)**
Evaluating communication and sales effects; Pre- and Post-testing techniques.

Unit 5: **(12 classes) (20 Marks)**

a) Advertising Agency: Role, types and selection of advertising agency.
b) Social, ethical and legal aspects of advertising in India.

Suggested Readings:

1. George E Belch, Michael A Belch, Keyoor Purani, *Advertising and Promotion : An Integrated Marketing Communications Perspective (SIE)*, McGraw Hill Education
2. S. Wats Dunn, and Arnold M. Barban. *Advertising: Its Role in Marketing*. Dryden Press
3. Burnett, Wells, and Moriatty. *Advertising: Principles and Practice*. 5th ed. Prentice Hall of India, New Delhi.
4. Batra, Myers and Aakers. *Advertising Management*. PHI Learning.
5. Terence A. Shimp. *Advertising and Promotion: An IMC Approach*. Cengage Learning.
6. Sharma, Kavita. *Advertising: Planning and Decision Making,* Taxmann Publications
7. Jaishree Jethwaney and Shruti Jain, *Advertising Management*, Oxford University Press, 2012
8. Chunawala and Sethia, *Advertising,* Himalaya Publishing House
9. Ruchi Gupta, *Advertising,* S. Chand & Co.
10. O'Guinn, *Advertising and Promotion: An Integrated Brand Approach,* Cengage Learning.

Course objective: To introduce students to the principles, theories, and practices of advertising and develop their understanding of effective advertising strategies and techniques.

Learning outcome: By the end of the course, students will be able to analyze target markets, develop creative advertising campaigns, utilize various advertising media channels, and evaluate the effectiveness of advertising efforts in achieving marketing communication objectives.
No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Gauhati University, angana.ght@gmail.com

.

Course Name: Entrepreneurship (Major 2)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399

Contents:

Unit 1: Introduction to Entrepreneurship

Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit 2: Entrepreneurship and Micro, Small and Medium Enterprises

Role of business houses and 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. (15 Lectures) (25 Marks)

Unit 3: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund. (15 Lectures) (25 Marks)

Unit 4: 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 (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions

(15 Lectures) (25 Marks)

Suggested Readings:

11. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
12. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
13. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.
14. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
15. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
16. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
17. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
18. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
19. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
20. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course objective: To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning outcome: Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: BUSINESS LAWS (Major 3)

Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399
Contents

Unit 1: The Indian Contract Act, 1872: General Principle of Law of Contract

Contact- meaning, characteristics and kinds

a. Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b. Void agreements
c. Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d. Contingent contracts
e. Quasi – contracts **(12 Classes) (20 Marks)**

Unit 2: The Indian Contract Act, 1872: Specific Contract

e) Contract of Indemnity and Guarantee
f) Contract of Bailment
g) Contract of Agency **(12 Classes) (20 Marks)**

Unit 3: The Sale of Goods Act, 1930

h) Contract of sale, meaning and difference between sale and agreement to sell.
i) Conditions and warranties
j) Transfer of ownership in goods including sale by a non-owner
k) Performance of contract of sale
l) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit 4: Partnership Laws

C) The Partnership Act, 1932

a. Nature and Characteristics of Partnership
b. Registration of a Partnership Firms
c. Types of Partners
d. Rights and Duties of Partners
e. Implied Authority of a Partner
f. Incoming and outgoing Partners
g. Mode of Dissolution of Partnership

D) The Limited Liability Partnership Act, 2008

m) Salient Features of LLP
n) Differences between LLP and Partnership, LLP and Company
o) LLP Agreement,
p) Partners and Designated Partners
q) Incorporation Document
r) Incorporation by Registration
s) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit 5 (A): The Negotiable Instruments Act 1881

Meaning, Characteristics, and Types of Negotiable Instruments : Promissory Note, Bill of Exchange, Cheque

t) Holder and Holder in Due Course, Privileges of Holder in Due Course.
u) Negotiation: Types of Endorsements
v) Crossing of Cheque
w) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties. **(12 Classes) (20 Marks)**

Suggested Readings:

1. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
2. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
3. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
4. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
5. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
6. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
7. Sushma Arora, *Business Laws*, Taxmann Pulications.

8. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
9. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
10. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Name of the Designer: Department of Commerce, commerce@gauhati.ac.in
Course objective: To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.
Course Outcome: On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60
Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: Fundamentals of Financial Management (Major 4)

4th Semester
Credit: 4
Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

CONTENTS

Unit 1: Introduction

Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities (12 Classes) (20 Marks)

Unit 2: Investment Decisions

The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit 3: Financing Decisions

Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit 4: Dividend Decisions

Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit 5: Working Capital Decisions

Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

4. In addition the students will work on Spreadsheet for doing basic calculations in finance (Unit 2 and 3 above) and hence can be used for giving students subject related assignments for their internal assessment.

5. 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)

6. Latest edition of text books may be used.

Suggested Readings

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education
5. Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6. Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.
7. Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.

Course Objective: The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Name of the Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Retail Management (Major 5)

Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit: I (15 classes) (25 Marks)

Retail Marketing- Characteristics, Importance of retailing, Traditional retail scene in India, Factors affecting high retail growth in India.

Three basic takes of retailing- Get customers into your stores, Convert them into customers, Operate as efficiently as possible. Role of Retailer, Retail Channel Management.

Unit: II (15 classes) (25 Marks)

Evolution of Retail in India, Wheel of Retailing & Retail Life Cycle. Theory and Evolutionary Theories- Direct Process Theory and Natural Selection Theory.

Globalisation of retailing, environmental analysis. Retailing- responding to demographic trends.

Unit: III (15 classes) (25 Marks)

Retail formats, Retail location and Site Decisions, Elements of store design and layout and Visual Merchandising.

Store Retailing- Development Stores, Supermarkets, Convenience Stores, Discount Stores, Catalogue Store, Malls, Types of malls, growth of Malls in India, Advertising & Sales Promotion in Retail.

Non- store retailing- Direct Marketing, Automatic Vending, Mail Order Business, Tele-Shopping, Mobile Retailing, and E- Marketing.

Unit: IV (15 classes) (25 Marks)

Concept of Tenant Mix-, Tenant mix plan, Issue considered in evolving tenan,

Market Logistics- Market logistics decisions-order processing, warehousing, inventory, transportation. Supply Chain Management in Retailing, Retail image.

Merchandise Planning, Category Management, Merchandise Buying, Online Retailing, Long tail retailing business models.

Suggested Books:

1. Retailing Management: Michel Leny & Barton A Weitz, Tata McGraw Hill.
2. Retail Management: Text & Cases: U.C. Malthur, I.K. International Publishing House Pvt. Ltd., New Delhi.
3. Retail Management: Suja Nair, Himalaya Publishing House.
4. Retail Management: Chetan Bajaj, Rajnish Tul & Nidhi Srivastava, Oxford University Press.

Retail Management: Gibson G. Vedamani, Pearson Education

Course objective: To provide students with an understanding of the retail industry and equip them with the knowledge and skills required to manage retail operations successfully.

Learning outcome: By the end of the course, students will be able to comprehend retail management principles, analyze retail strategies, design store layouts, and implement effective merchandising and customer service practices.

No. of Contact Classes: 60

Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Customer Relationship Management (Major 6)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit: I (15 classes) (25 Marks)
Introduction- Meaning of CRM, significance of CRM, Strategies for building relationship, Relationship based pricing schemes, Developing Total Care Programmes, Reasons for Losing Customers.

Unit: II (15 classes) (25 Marks)
Building Customer Relationship- Customer acquisition, Inputs and Requisites for effective acquisition, Customer interaction routes, Factors influencing customer interaction and customer relation process, Customer life Cycle and customer lifetime value.

Unit: III (15 classes) (25 Marks)
CRM Process- Objectives and benefits of CRM process, Implementation of CRM business transaction, Data Mining for CRM- some relevant issues, Changing pattern of e-CRM solutions in the future; Sales force automation (SFA).

Unit: IV (15 classes) (25 Marks)
Information Technology and Customer Relationship Management, CRM in services & support relevant of CRM for Hospitality Services; CRM in Banking and Financial Services; CRM in Insurance.

Suggested Books:

1. Barnes, J.G. (2001), Secrets of Customer Relationship Management: Its all about how you make them feel. University of Virginia: McGraw Hill.
2. Mckenna, R. (1993) Relationship Marketing: Successful Strategies for the age of the customers. Addison- Wesley Publishing Company.
3. Rai, A.K. Customer Relationship Management: Concepts and Cases, 2nd ed. PHI learning
4. Sheth, J.N., & Parvatiyar, A. (2013), Handbook of Relationship Marketing, London, UK, Sage Publications Ltd.

Course objective: To develop students' knowledge and skills in managing customer relationships and utilizing customer-centric strategies to enhance business performance.

Learning outcome: By the end of the course, students will be able to apply customer relationship management techniques, develop customer retention strategies, utilize customer data for personalized marketing, and enhance customer satisfaction and loyalty.

No. of Contact Classes: 60

Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Cost and Management Accounting (Major 7)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit - I : Cost Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning of cost, costing and cost accounting; objectives and functions of cost accounting; costing as an aid to management; cost concepts and classification, Relationship between cost accounting and financial accounting; Cost accounting and Management Accounting; Methods and Techniques of costing; Concept of cost audit; Preparation of cost sheet.

Unit - II : Accounting for Material, Labour and Overhead (12 Classes) (20 Marks)
Material control concept and techniques; E.O.Q. ABC Analysis and VED Analysis.
Labour cost control procedures; labour turnover; idle time and over time; methods of wage payment - time and piece rates.
Importance and classification of overhead; Factory administrative and selling overheads; allocation and apportionment of overhead; Absorption of overhead - under and over absorption. (Simple application)

Unit -III: Management Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning and objectives of Management Accounting; Decision situation and Role of Management Accountant; Management accounting Techniques: Ratio analysis - Meaning ofRatio and Ratio analysis; uses, significance and limitations of Ratio analysis; Activity Ratios, Liquidity Ratios, Profitability Ratios and Solvency ratios;

Unit - IV: Marginal Costing and Budget & Budgetary Control (12 Classes) (20 Marks)
Meaning of marginal costing, Assumptions of marginal costing, managerial applications of marginal costing, Advantages and disadvantages of marginal costing; Cost- Volume- Profit Analysis and Break Even analysis (simple Applications),.
Meaning of Budget and Budgetary control; Classification of budgets according to time, function and flexibility; Master budget, Preparation of Flexible Budget and Cash Budget; Performance Budget and Zero Based Budgeting

Unit - V: Standard Costing and Variance Analysis (12 Classes) (20 Marks)
Meaning of Standard Cost & Standard Costing; Advantages of standard costing; Standard costing Vs. Budgetary control; Variance analysis; Classification and computation of variance (Simple application)

Suggested readings:

1. Management and Cost Accounting - Shashi K. Gupta & R. K. Sharma, Kalyani Publishers.
2. Arora M. N. - Cost Accounting Principles & Practices; Vikas, New Delhi.
3. Jain S. P. & Narang K. L. - Cost Accounting; Kalyani, New Delhi.
4. Khan M. Y. & Jain P. K. - Management Accounting, Tata Mcgrow Hill.

Course Objective: The objective of the Cost and Management Accounting course is to provide students with the knowledge and skills to effectively collect, analyze, and interpret financial and non-financial information for managerial decision-making and control within an organization.
Learning Outcomes:
1. Students will be able to apply cost accounting techniques to determine product costs, analyze cost behavior, and make informed decisions regarding pricing, product mix, and cost control.
2. Students will develop the skills to design and implement management accounting systems, including budgeting, variance analysis, and performance measurement, to support planning, control, and decision-making processes in organizations.
No. of Contact Classes: 60
Name of the Designer: Prof. Prashanta Sharma, Gauhati University, prs@gauhati.ac.in

Course Name: Indian Economy (Major 8)
Credit: 4
Total Marks: 100

5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**

Unit II:Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**

Unit III:Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**

Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**

Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, Indias's service revolution,'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:

1. Mishra and Puri, Indian Economy, Himalaya Paublishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective: The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:

1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyze the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.
3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Consumer Behaviour (Major 9)

Credit: 4

Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Consumer Behaviour: Definition, Stages in the Buying Process; Importance of Market Segmentation in Consumer Behaviour; Participants in the Buying Process; Consumer Behaviour is interdisciplinary. (15 classes) (25 Marks)
Unit II: Factor influencing Consumer Behaviour: Social – Social Class, Culture: Sub-culture, cultural values, Personal; Personality, variety and novelty seeking, consumer motivation. (15 classes) (25 Marks)
Unit III: Consumer attitude: Source of attitude foundation, Tricomponent Attitude model, Reference group influence; types of reference groups; word of mouth and opinion leadership, characteristics of opinion leaders, the self and self image. (15 classes) (25 Marks)
Unit IV: Cross Cultural Analysis & Acculturation: Localisation vs. Standardisation, Diffusion and Adoption of innovation; Types of innovation, the adoption process. Consumer Research. (15 classes) (25 Marks)

Reading:

1. Consumer Behaviour, Indian Prespective Text & Cases Dr. S.L. Gupta, Susmita Pal.
2. Consumer Behaviour: The Indian Context (Concepts and Cases) S. Ramesh Kumar, Pearson.
3. Consumer Behaviour: Leon G. Schiffman, Joseph Wisenblit, S. Ramesh Kumar, Pearson.
4. Consumer Behaviour: Text & Cases, N.K. Sahni. Meenu Gupta, Kalyani.

Course objective: To explore the factors that influence consumer behavior and understand how consumer insights can be applied to marketing strategies.

Learning outcome: By the end of the course, students will be able to analyze consumer decision-making processes, interpret consumer behavior theories, evaluate market research data, and apply consumer behavior insights in developing effective marketing strategies.

No. of Contact Classes: 60

Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Personal Selling and Salesmanship (Major 10)
Credit: 4
Total Marks: 100

5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit 1: (15 classes) (25 Marks)
Introduction to Personal Selling: Nature and importance of personal selling, myths of selling, Difference between Personal Selling, Salesmanship and Sales Management, Characteristics of a good salesman, types of selling situations, types of salespersons, Career opportunities in selling, Measures for making selling an attractive career.

Unit- II (15 classes) (25 Marks)
Buying Motives: Concept of motivation, Maslow's theory of need hierarchy; Dynamic nature of motivation; Buying motives and their uses in personal selling

Unit- III (15 classes) (25 Marks)
Selling Process: Prospecting and qualifying; Pre-approach; Approach; Presentation and demonstration; handling of objections; Closing the sale; Post sales activities.

Unit- IV (15 classes) (25 Marks)
Sales Reports: reports and documents; sales manual, Order Book, Cash Memo; Tour Diary, Daily and Periodical Reports; Ethical aspects of Selling

Suggested Readings:

1. *Spiro,* Stanton, *and Rich, Management of the Sales force,* McGraw Hill.
2. Rusell, F. A. Beach and Richard H. Buskirk, *Selling: Principles and Practices,* McGraw Hill
3. Futrell, Charles, *Sales Management: Behaviour, Practices and Cases,* The Dryden Press.
4. Still, Richard R., Edward W. Cundiff and Norman A. P. Govoni, *Sales Management: Decision Strategies and Cases,* Prentice Hall of India Ltd., New Delhi,
5. Johnson, Kurtz and Schueing, *Sales Management,* McGraw Hill
6. Pedesson, Charles A. Wright, Milburn d. And Weitz, Barton A., *Selling: Principles and Methods,* Richard, Irvin
7. Kapoor Neeru, *Advertising and personal Selling,* Pinnacle, New Delhi.

Course objective: To develop students' understanding of personal selling techniques and salesmanship skills required to build relationships with customers and achieve sales objectives.

Learning outcome: By the end of the course, students will be able to demonstrate effective personal selling skills, develop sales presentations, apply sales techniques, and build long-term customer relationships.

No. of Contact Classes: 60

Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Brand Management (Major 11)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit: I (15 classes) (25 Marks)
Brand: Definition, Functions, Significance; Types of brands; Scope of Branding; Evolution of brands; Brand elements: name, logo, symbol.

Unit II (15 classes) (25 Marks)
Brand extension; Meaning, Types, Key factors in successful brand extension; brand identify; Brand associations; Brand image; Brand equity- meaning; brand personality.

Unit III (15 classes) (25 Marks)
Brand Positioning; Market segmentation and positioning; Strategies of brand positioning; Successful brand repositioning; The Brand Customer relationship.

Unit IV (15 classes) (25 Marks)
Brand Management Process; Importance of Brand planning; Retail branding in India- Significance, Positioning Strategies for retail brands; Global branding.

Suggested Books:

1. Dr. S.L. Gupta, Brand Management, Text and Cases, Himalaya Publishing House
2. Kevin Lane Keller, Strategic Brand Management, PHI/Pearson Education
3. Keller, Parasuraman, Jacob Strategic Brand Management, Building, Measuring and Managing Brand Equity Pearson Education.

Course objective: To provide students with a comprehensive understanding of brand management principles and strategies to create, maintain, and enhance brand equity.

Learning outcome: By the end of the course, students will be able to analyze brand positioning, develop brand identity, implement brand communication strategies, and apply brand management techniques to build strong and valuable brands.

No. of Contact Classes: 60

Designer Name: Dr. Angana Borah, Gauhati University, angana.ght@gmail.com

Course Name: International Business (Major 12)
6th Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: **(12 Classes) (20 Marks)**

e. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

f. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit –II **(12 Classes) (20 Marks)**

e. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

f. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit –III **(12 Classes) (20 Marks)**

e. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

f. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit –IV **(12 Classes) (20 Marks)**

e. Organisational structure for international business operations; International business negotiations.

f. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit –V **(12 Classes) (20 Marks)**

e. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

f. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

17. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
18. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
19. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
20. Sumati Varma, International Business, Pearson Education.
21. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
22. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
23. Bennett, Roger. International Business. Pearson Education.
24. Peng and Srivastav, Global Business, Cengage Learning

Course objective: To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning outcome: By the end of the course, students will be able to analyze and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Operations Research in Business (Major 13)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 600 to 699

Unit I: Introduction to Operation Research: Evolution of Operation Research , Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation **Research.** **(12 Classes) (20 Marks)**

Unit II: Linear Programming : Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control , concepts and benefits of inventory control, Different types of costs in inventory system , Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement: Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two**.** **(12 Classes) (20 Marks)**

Unit V: : Project Management:, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction , critical path analysis, Float of an Activity and Event , Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Recommended books :

15. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition , Taha H.A., Hall of India
16. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
17. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
18. Operations Research : Theory and Applications 4th Edition , J.K Sharma

Course objective: To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60

Name of the Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: **Consumer Affairs and Customer Care (Major 14)**
Credit: 4
Total Marks: 100
6th Semester

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: Conceptual Framework (12 classes) (20 Marks)

Consumer and Markets: Concept of Consumer, Nature of markets, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP) and Local Taxes, Fair Price, labeling and packaging

Experiencing and Voicing Dissatisfaction: Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Internal and External Complaint handling: Corporate Redress Systems and Public Redress Systems

Unit 2: The Consumer Protection Act, 1986 (CPA) (12 classes) (20 Marks)

Objectives and Basic Concepts: Consumer, goods, service, defect in goods, deficiency in service, spurious goods and services, unfair trade practice, restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels, Basic Consumer Rights; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA.

Unit 3: Grievance Redress Mechanism under the Consumer Protection Act, 1986: (12 classes) (20 Marks)

Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy to be be provided; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Seven Leading Cases decided under Consumer Protection Act: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity, Water, and Telecom Services; Education; Defective Product; Unfair Trade Practice.

Unit 4: Industry Regulators and Consumer Complaint Redress Mechanism (12 classes) (20 Marks)

i. Banking: RBI and Banking Ombudsman
ii. Insurance: IRDA and Insurance Ombudsman
iii. Telecommunication: TRAI
iv. Food Products: FSSAI (an overview)
v. Electricity Supply: Electricity Regulatory Commission
vi. Advertising: ASCI

Unit 5: Consumer Protection in India (12 classes) (20 Marks)

Consumer Movement in India:; Evolution of Consumer Movement in India. Formation of consumer organizations and their role in consumer protection, Recent developments in Consumer Protection in India, National Consumer Helpline, Citizens Charter, Product testing.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; ISO: An overview

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. *Consumer Affairs"* (2007) Delhi University Publication. 334 pp.
2. Aggarwal, V. K. (2003). *Consumer Protection: Law and Practice*. 5th ed. Bharat Law House, Delhi, or latest edition.
3. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.
4. Nader, Ralph (1973). *The Consumer and Corporate Accountability*. USA, Harcourt Brace Jovanovich, Inc.
5. Sharma, Deepa (2011).*Consumer Protection and Grievance-Redress in India: A Study of Insurance Industry* (LAP LAMBERT Academic Publishing GmbH & Co.KG, Saarbrucken, Germany. 263 pp.
6. Empowering Consumers e-book, www.consumeraffairs.nic.in
7. ebook, www.bis.org
8. *The Consumer Protection Act, 1986*

Articles

1. Verma, D. P. S. (2002). Developments in Consumer Protection in India. Journal of Consumer Policy. Vol. 25. No. pp 107 –123.
2. Verma, D.P.S. (2002). Regulating Misleading Advertisements, Legal Provisions and Institutional Framework. Vikalpa. Vol. 26. No. 2. pp. 51-57.
3. Ralph L. Day and Laird E. Landon, Jr. (1997). Towards a Theory of Consumer Complaining Behaviour. Ag Woodside, et al. (eds.). Consumer and Industrial Buying Behaviour. New York; North Holland pp. 425-37.
4. George, S. Day and A. Aaker (1970). A Guide to consumerism. Journal of Marketing. Vol. 34. pp 12-19.
5. Sharma, Deepa (2003).New measures for Consumer Protection in India. *The Indian Journal* of *Commerce.* Vol.56. No.4. pp. 96-106
6. Sharma, Deepa (2011).Consumer Grievance Redress by Insurance Ombudsman. *BIMAQUEST*.Vol.11. pp.29-47.

Periodicals

1. Consumer Protection Judgments (CPJ) (Relevant cases reported in various issues)
2. Recent issues of magazines: *Insight*, published by CERC, Ahmedabad '*Consumer Voice*', Published by VOICE Society , New Delhi.
3. *Upbhokta Jagran*, Ministry of Consumer Affairs, Govt, of India. New Delhi.

Websites: www.ncdrc.nic.in www.fcamin.nic.in www.consumeraffairs.nic.in www.iso.org.in www.bis.org www.ascionline.org.in www.trai.gov.in www.irda.gov.in www.derc.gov.in www.rbi.org.in

Course objective: To provide students with a comprehensive understanding of consumer affairs and customer care practices, focusing on effective management of customer relationships and resolution of consumer issues.
Learning outcome: By the end of the course, students will be able to comprehend consumer rights and protection, develop strategies for managing customer complaints and inquiries, implement customer care initiatives, and enhance overall customer satisfaction and loyalty

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Marketing of Services (Major 15)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 600 to 699

Unit: I (15 classes) (25 Marks)
Introduction; Service Sector, growth of services, state of services, nature and characteristics of services, challenges of intangibility, need for marketing.

Unit: II (15 classes) (25 Marks)
Service marketing mix; product, price, place, promotion; service distribution strategy,Franchising, participants, service process.

Unit: III (15 classes) (25 Marks)
Service system and customer behaviour; front office, back office operation system, service delivery system, need to know customer, customer as a decision maker.

Unit: IV (15 classes) (25 Marks)
Service decision process; need for new services, information search, service evaluation, pre and post purchase behaviour, Marketing of Health Services, Tourism, Insurance & Banking.

Suggested Books:
Services Marketing- K. Rama Mohana Rao, Pearson Education, New Delhi
Textbook of Marketing of Services: The Indian Experience- NimitChowdhary,Macmillan Publishers India
Service Marketing, Text & Cases, Harsh Verma, Pearson.
Service Marketing, People, Technology, Strategy- Lovelock, Wirtz, Chatterjee, Pearson.
Service Marketing, Integrating Customer Focus Across the firm, Zeithaml, Bitner,Gremler, Pandit.

Course objective: To provide students with a comprehensive understanding of the unique characteristics and challenges of marketing services and develop their ability to design and implement effective marketing strategies for service-based businesses.

Learning outcome: By the end of the course, students will be able to analyze service marketing environments, develop service marketing plans, apply service-specific marketing techniques, and effectively promote and manage service offerings to meet customer needs and preferences.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

4. Specialization: Finance
Course Name: Banking (Major 1)
Credit: 4
Total Marks: 100
3rd Semester

Existing based syllabus: UGCBCS

Course Level: 300 to 399

UNIT-I (12 classes) (20 Marks)

Introduction: Bank-Meaning and functions, Origin and development of banking in India, Types of banks, Structure of commercial banks in India - public and private sector banks, Scheduled and Non-scheduled Banks; E-Banking- meaning, different types of services and products like ATM, debit and credit cards, phone banking, internet banking, EFT-RTGS and NEFT.

UNIT-II (12 classes) (20 Marks)

Banker –customer relationship; Definition of banker and customer, general relationship, rights and obligations of a banker, Garnishee order. Banking Ombudsman Scheme.

Customers' account with the banker- fixed deposit account, savings account, current account-opening and operation of savings and current account, account facilities available for NRIs, KYC Guidelines

Special types bank customers – minor, illiterate persons, joint account, partnership account, Joint Stock Company.

UNIT-III (12 classes) (20 Marks)

Employment of bank funds; Liquid assets- significance of liquidity in banking, cash balance, statutory reserve in the RBI; Loans and advances- principles of sound lending, types of credit, cash credit system, overdraft, loan system; Pledge, hypothecation and mortgage, collateral security.

UNIT-IV (12 classes) (20 Marks)

Negotiable Instruments- Definition, features, types of negotiable instruments, holder and holder in due course, payment in due course; endorsements- meaning, kinds; crossing of cheque- types, significance, payment, collection of cheque, precautions, material alterations, statutory protection to paying and collecting banker.

UNIT-V (12 classes) (20 Marks)

Banking Regulation Act; requirements as to minimum paid-up capital and reserves, constitution of Board of Directors, loans and advances, licensing of banking companies, accounts and audit, powers of the RBI, Banking Sector Reforms and Governance: prudential norms relating to capital adequacy, income recognition, asset classification.

SUGGESTED READINGS:

1. D.M. Mithani and E. Gordon, Banking and Financial System, Himalaya Publishing House.
2. D. Muraleadharn, Modern Banking, Prentice Hall of India, New Delhi.
3. Indian Institute of Banking and Finance, Principles of Banking, Macmillan.
4. K. C. Sekhar and L.Sekhar, Banking Theory and Finance, Vikas Publishing House.
5. P.N. Varshney, Banking Law & Practice, Sultan Chand & Sons
6. S.N. Maheswari & S.K. Maheswari, Banking Law & Practice, Kalyani Publishers
7. S. Natarajan and R. Parameswaram, Indian Banking, Sultan Chand & Sons.

Course objective: To provide students with a comprehensive understanding of banking principles, practices, and operations in the context of the financial system.

Learning outcome: By the end of the course, students will be able to analyze banking functions, evaluate risk management strategies, and comprehend the regulatory framework governing banking operations.

No. of Contact Classes: 60

Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Entrepreneurship (Major 2)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 300 to 399

Contents:

Unit 1: Introduction to Entrepreneurship

Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit 2: Entrepreneurship and Micro, Small and Medium Enterprises

Role of business houses and 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. (15 Lectures) (25 Marks)

Unit 3: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund. (15 Lectures) (25 Marks)

Unit 4: 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 (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions

(15 Lectures) (25 Marks)

Suggested Readings:

21. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
22. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
23. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.
24. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
25. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
26. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
27. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
28. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
29. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
30. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course objective: To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning outcome: Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: BUSINESS LAWS (Major 3)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 300 to 399

Contents

Unit 1: The Indian Contract Act, 1872: General Principle of Law of Contract

Contact- meaning, characteristics and kinds

a. Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b. Void agreements
c. Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d. Contingent contracts
e. Quasi – contracts **(12 Classes) (20 Marks)**

Unit 2: The Indian Contract Act, 1872: Specific Contract

x) Contract of Indemnity and Guarantee
y) Contract of Bailment
z) Contract of Agency **(12 Classes) (20 Marks)**

Unit 3: The Sale of Goods Act, 1930

aa) Contract of sale, meaning and difference between sale and agreement to sell.
bb) Conditions and warranties
cc) Transfer of ownership in goods including sale by a non-owner
dd) Performance of contract of sale
ee) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit 4: Partnership Laws

E) The Partnership Act, 1932

a. Nature and Characteristics of Partnership
b. Registration of a Partnership Firms
c. Types of Partners
d. Rights and Duties of Partners
e. Implied Authority of a Partner
f. Incoming and outgoing Partners
g. Mode of Dissolution of Partnership

F) The Limited Liability Partnership Act, 2008

ff) Salient Features of LLP
gg) Differences between LLP and Partnership, LLP and Company
hh) LLP Agreement,
ii) Partners and Designated Partners
jj) Incorporation Document
kk) Incorporation by Registration
ll) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit 5 (A): The Negotiable Instruments Act 1881

Meaning, Characteristics, and Types of Negotiable Instruments : Promissory Note, Bill of Exchange, Cheque

mm) Holder and Holder in Due Course, Privileges of Holder in Due Course.
nn) Negotiation: Types of Endorsements
oo) Crossing of Cheque
pp) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties. **(12 Classes) (20 Marks)**

Suggested Readings:

11. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
12. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
13. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
14. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
15. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
16. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
17. Sushma Arora, *Business Laws*, Taxmann Pulications.
18. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
19. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
20. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Name of the Designer: Department of Commerce, commerce@gauhati.ac.in
Course objective: To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.
Course Outcome: On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60
Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: Fundamentals of Financial Management (Major 4)
4th Semester
Credit: 4
Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

CONTENTS

Unit 1: Introduction

Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities (12 Classes) (20 Marks)

Unit 2: Investment Decisions

The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit 3: Financing Decisions

Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit 4: Dividend Decisions

Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit 5: Working Capital Decisions

Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

7. In addition the students will work on Spreadsheet for doing basic calculations in finance (Unit 2 and 3 above) and hence can be used for giving students subject related assignments for their internal assessment.

8. 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)

9. Latest edition of text books may be used.

Suggested Readings

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education
5. Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6. Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.
7. Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.

Course Objective: The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Name of the Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Financial Market Operations (Major 5)
Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS

Course Level: 400 to 499

Unit 1: Financial Market Operations (15 Classes) (25 Marks)

Review of Financial System; Need for issue of financial instruments, Money Market and Constituents, their features and issue procedure; Debt Market Instruments- Bonds and Issuance of Bonds, Types of Bonds, Features of Bonds, Issue procedure; Equity Instruments- Types of equities, Pricing and Calculations, Listing and Issue procedure.

Unit 2: Stock Market Operations (12 Classes) (20 Marks)

Stock Market- Nature and Scope, Functions of Stock Market, History of Stock Exchanges in India- BSE, NSE and OTCEI, Trading Mechanism and Settlement, Brokers/Members- Qualifications, Duties and Responsibilities; Stock Indices and Usages; Depositories- their role and functions, NSDL and CSDL.

Unit 3: Derivatives Market Operations (15 Classes) (25 Marks)

Meaning, Types and Usages, OTC Derivatives- Forwards and Swaps, Exchange Traded Derivatives- Futures and Options, Functions of Derivative Exchanges, Major Derivative Exchanges, Trading Mechanism and settlement, Open Investment and Trading Volume.

Unit 4: Operation Management (10 Classes) (15 Marks)

Structure of Investment Company - Front Office, Middle Office, Back Office/Operations; Operations Relationship - Clients - external and internal, Retail Clients, Institutional Clients, Counterparties and Suppliers; Banks and other intermediaries, Market Regulators and Associations.

Unit 5: Data Management (08Classes) (15 Marks)

Data Management- Significance of Data Management, Reference data and Types of Reference Data, Approaches to Data Management, Data Processing, Data Requirements- Securities, Counterparties and Customers, Settlement Data, Data Storage.

Suggested Readings:

1. Indian Financial System , Bharati V Pathak, Pearson
2. Indian Financial System , V Desai, Himalaya Publishing House
3. Financial Institutions and Markets, L M Bhole, Tata Mc Graw Hill
4. Financial Market Operations, Keith Dickinson, Wiley.
5. Financial Market operations, I M Sahai, SBPD Publishing.
6. The Basics of Finance, P P Drake and F J Fabbozi, Wiley.

Course objective: To introduce students to the functioning of financial markets and the operations involved in trading securities and financial instruments.

Learning outcome: By the end of the course, students will be able to understand financial market structures, analyze trading mechanisms, and apply financial market operations concepts in investment decision-making.

No. of Contact Classes: 60

Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Insurance (Major 6)
Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS
Course Level: 400 to 499

UNIT-I: Introduction **(10 classes) (15 Marks)**

Definition & Nature of insurance; origin & development of insurance, history of insurance in India, kinds of insurance, principles of insurance, importance of insurance, insurance and wagering agreement.

UNIT-II; Life Insurance **(10 classes) (15 Marks)**

Definition of life insurance, features, benefits of life insurance, procedure for taking life insurance policy, kinds of life insurance policy, nomination, assignment and surrender value, revival of lapsed policy, settlement of claims at death and maturity, items of revenue heads in life insurance company.

UNIT-III; General Insurance **(10 classes) (20 Marks)**

Development of general insurance in India, Fire insurance- need, procedure of taking fire insurance policy, procedure of settlement of claims under fire insurance, double insurance, re-insurance; marine insurance- types of marine insurance policy, settlement of claims in marine insurance; miscellaneous insurance- motor insurance, personal accident insurance, livestock insurance, crop insurance, employees liabilities insurance, burglary insurance, preparation of revenue account of fire, land, marine insurance company.

UNIT-IV; Insurance Organizations **(10 classes) (15 Marks)**

Organizational structure- public sector insurance organizations in India, LICI, objectives and achievements, GIC- mission, organization, functions, private sector insurance organizations in India, insurance ombudsman.

UNIT-V; Insurance Intermediaries **(10 classes) (15 Marks)**

Insurance Agent; meaning, procedure for becoming and insurance agent, functions of an insurance agent, rights of an insurance agent, termination of an insurance agent, essentials for successful insurance salesman.

Surveyors and loss assessors, brokers, third party administrators, bank assurance.

UNIT-VI: Insurance legislation in India **(10 classes) (20 Marks)**

Brief history of insurance legislation in India, Insurance Act-1938, amendments, Life Insurance Corporation of India Act 1956, General Insurance Nationalizations Act- 1972, IRDA Act 1999, eligibility, registration and capital requirements of insurance companies, duties, powers and functions of the IRDA, operations of IRDA.

Suggested Books/Readings:

1. Principles of Insurance and Risk Management Alkamittal, S.l. Gupta, Sultan Chand & Sons.
2. Insurance and Risk Management, Dr. P.K. Gupta, Himalaya Publishing House.
3. Insurance Principles and Practice, M.N. Mishra, S.B. Mishra, S. Chand.
4. Introduction to Risk Management and Insurance Marks S. Dortman, Pearson Education.
5. Principles and Practice of Insurance M.Motihar, Sharda Pustal Bhawan, Allahabad**.**
6. Insurance –Principles and Practice –Indrajit Singh, Rakesh Katyal, Sanjay Arora –Kalyani Publishers.
7. Fundamentals of Insurance –Principles and Practice –Dr. S. Sikidar, Dr. P.K. Nath, Dr. G. Nath –Abhilekh, Guwahati.
8. Principles and Practice of Insurance –G.S. panda –Kalyani Publishers.
9. IRDA Act. 1999.
10. Principles & Practice of Insurance, Insurance Institute of India, Mumbai.

Course objective: To develop students' understanding of insurance principles, products, and risk management techniques.

Learning outcome: By the end of the course, students will be able to analyze insurance concepts, evaluate insurance products, and apply risk assessment and mitigation strategies in insurance-related scenarios.

No. of Contact Classes: 60

Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Cost and Management Accounting (Major 7)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 400 to 499

Unit - I : Cost Accounting: Preliminaries (12 Classes) (20 Marks)

Meaning of cost, costing and cost accounting; objectives and functions of cost accounting; costing as an aid to management; cost concepts and classification, Relationship between cost accounting and financial accounting; Cost accounting and Management Accounting; Methods and Techniques of costing; Concept of cost audit; Preparation of cost sheet.

Unit - II : Accounting for Material, Labour and Overhead (12 Classes) (20 Marks)

Material control concept and techniques; E.O.Q. ABC Analysis and VED Analysis.

Labour cost control procedures; labour turnover; idle time and over time; methods of wage payment - time and piece rates.

Importance and classification of overhead; Factory administrative and selling overheads; allocation and apportionment of overhead; Absorption of overhead - under and over absorption. (Simple application)

Unit -III: Management Accounting: Preliminaries (12 Classes) (20 Marks)

Meaning and objectives of Management Accounting; Decision situation and Role of Management Accountant; Management accounting Techniques: Ratio analysis - Meaning ofRatio and Ratio analysis; uses, significance and limitations of Ratio analysis; Activity Ratios, Liquidity Ratios, Profitability Ratios and Solvency ratios;

Unit - IV: Marginal Costing and Budget & Budgetary Control (12 Classes) (20 Marks)

Meaning of marginal costing, Assumptions of marginal costing, managerial applications of marginal costing, Advantages and disadvantages of marginal costing; Cost- Volume- Profit Analysis and Break Even analysis (simple Applications),.

Meaning of Budget and Budgetary control; Classification of budgets according to time, function and flexibility; Master budget, Preparation of Flexible Budget and Cash Budget; Performance Budget and Zero Based Budgeting

Unit - V: Standard Costing and Variance Analysis (12 Classes) (20 Marks)

Meaning of Standard Cost & Standard Costing; Advantages of standard costing; Standard costing Vs. Budgetary control; Variance analysis; Classification and computation of variance (Simple application)

Suggested readings:

1. Management and Cost Accounting - Shashi K. Gupta & R. K. Sharma, Kalyani Publishers.
2. Arora M. N. - Cost Accounting Principles & Practices; Vikas, New Delhi.
3. Jain S. P. & Narang K. L. - Cost Accounting; Kalyani, New Delhi.
4. Khan M. Y. & Jain P. K. - Management Accounting, Tata Mcgrow Hill.

Course Objective: The objective of the Cost and Management Accounting course is to provide students with the knowledge and skills to effectively collect, analyze, and interpret financial and non-financial information for managerial decision-making and control within an organization.

Learning Outcomes:

1. Students will be able to apply cost accounting techniques to determine product costs, analyze cost behavior, and make informed decisions regarding pricing, product mix, and cost control.
2. Students will develop the skills to design and implement management accounting systems, including budgeting, variance analysis, and performance measurement, to support planning, control, and decision-making processes in organizations.

No. of Contact Classes: 60

Name of the Designer: Prof. Prashanta Sharma, Gauhati University, prs@gauhati.ac.in

Course Name: Indian Economy (Major 8)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS

Course Level: 500 to 599

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**

Unit II:Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**

Unit III:Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**

Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**

Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, Indias's service revolution,'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:

1. Mishra and Puri, Indian Economy, Himalaya Paublishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective: The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:

1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyze the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.
3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Micro Finance (Major 9)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Micro Finance - Meaning and Concept, Nature and Scope, Objectives of micro finance, micro finance and micro credit, Evolution and characteristics of micro finance, Benefits of micro finance, Development of micro finance in India. (12 classes) (20 Marks)

Unit II: Micro finance Institutions- Structure of micro finance institutions, various models of micro finance institutions and their functions, sources of fund, credit delivery mechanism for micro credit, Non-financial services and MFIs. (12 classes) (20 Marks)

Unit III: Micro finance in India- Indian financial sector- financial inclusion, micro finance movement in India, demand for and supply of micro financial services, Role of NABARD for micro finance, Problems and Prospects of MF in India. (12 classes) (20 Marks)

Unit IV: Management of MFIs- Fund Management, Various types of risk in MFIs and their management, Performance Management- measurement of operational efficiency and productivity, Impact Assessment and Social Assessment of MFIs. (12 classes) (20 Marks)

Unit V: Legal and Regulatory Framework for Micro Finance, Need for Regulation of MF and MFIs, Various Laws governing MF activities in India, The Cooperative society Act., The RBI Act, The Banking Regulation Act, The Micro Finance Institutions (Development and Regulation) Bill 2012. (12 classes) (20 Marks)

Suggested Books:

1. Micro Finance: Perspectives and Operations, IIBF, Macmillan, 2009.
2. Micro Finance-Redefining the Future, V. Somnath, Excel Books.
3. Fundamentals of Micro Finance, D.Das and R Tiwari, Global Publishing House, Guwahati (India).
4. Understanding Micro Finance, D. Panda, Wiley India Pvt. Ltd., 2009.
5. The Economics of Microfinance, Armendr Z, Beatriz, Morduch and Jonathan, PHI.
6. Micro Finance: Impacts and Insight, Rajgopalan S and Nirali Parikh, ICFAI Press.

Course Objective: The objective of the microfinance course is to provide students with a comprehensive understanding of the principles, practices, and impact of microfinance in promoting financial inclusion and alleviating poverty.

Learning Outcomes: By the end of the course, students will be able to analyze the role of microfinance institutions, design and evaluate microfinance programs, understand the challenges and opportunities in microfinance operations, and apply innovative approaches to expand access to financial services for underserved populations.

No. of Contact Classes: 60

Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Financial Services (Major 10)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

UNIT I: (12 classes) (20 Marks)

Financial Services –meaning and nature- features –evolution –providers and users –classification – fund based financial services –non fund based financial services.

UNIT II: (12 classes) (20 Marks)
Leasing and Hire purchase –concept and evolution –features –types of leasing and Hire purchase – advantages –distinction between leasing and Hire purchase –leasing companies in India.

UNIT III: (12 classes) (20 Marks)
Merchant Banking meaning; nature and scope –functions –evolution of merchant banking and growth in India

UNIT IV: (12 classes) (20 Marks)
Mutual funds –meaning and characteristics; advantages –Forms of MF –Types –working mechanism of Mutual Funds

UNIT V: (12 classes) (20 Marks)
Innovations in financial services –venture capital; depository system, broking and portfolio management services.

Suggested Readings:

1. Financial Markets & Financial Services by Vasant Desai, Himalaya Publishing House.
2. Financial Services, M.Y. Khan, Tata McGraw Hill.
3. Bharati Pathak: Indian Financial System, Pearson Education, New Delhi.
4. L.M. Bhole: Financial Markets & Tata McGraw Hill, New Delhi.

Course objective: To familiarize students with various financial services and their role in facilitating financial intermediation and meeting customer needs.

Learning outcome: By the end of the course, students will be able to assess different financial services, understand customer requirements, and develop strategies for delivering effective financial solutions.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: International Business (Major 12)
6th Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: **(12 Classes) (20 Marks)**

g. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international

business; Modes of entry into international business.

h. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit –II **(12 Classes) (20 Marks)**

g. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

h. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit –III **(12 Classes) (20 Marks)**

g. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

h. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit –IV **(12 Classes) (20 Marks)**

g. Organisational structure for international business operations; International business negotiations.

h. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit –V **(12 Classes) (20 Marks)**

g. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

h. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

25. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
26. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
27. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
28. Sumati Varma, International Business, Pearson Education.
29. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
30. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
31. Bennett, Roger. International Business. Pearson Education.
32. Peng and Srivastav, Global Business, Cengage Learning

Course objective: To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning outcome: By the end of the course, students will be able to analyze and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Operations Research in Business (Major 13)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 600 to 699

Unit I: Introduction to Operation Research: Evolution of Operation Research , Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation **Research.** **(12 Classes) (20 Marks)**

Unit II: Linear Programming : Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control , concepts and benefits of inventory control, Different types of costs in inventory system , Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement: Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two**.** **(12 Classes) (20 Marks)**

Unit V: : Project Management:, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction , critical path analysis, Float of an Activity and Event , Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Recommended books :

19. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition , Taha H.A., Hall of India
20. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
21. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
22. Operations Research : Theory and Applications 4th Edition , J.K Sharma

Course objective: To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60

Name of the Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: Treasury & Risk Management (Major 14)
Credit: 4
Total Marks: 100
6th Semester

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: Overview of Financial Markets (15 Classes) (25 Marks)
Money Market- Instruments of Money Market, REPOS, Types of Interest Rate Quotations; Fixed Income Securities, Capital Market Securities; Derivative Market; Foreign Exchange Market- Nature and Scope, Structure of Foreign Exchange Market, Players in the Forex market, Spot and Forward mechanism, Swaps, outright deals and their operations.

Unit 2: Treasury Management (15 Classes) (25 Marks)
Meaning, Objectives, Significance, Functions and Scope of Treasury Management, Relationship between Treasury Management and Financial Management; Role and Responsibilities of Chief Finance Officer/Treasurer, Tools of Treasury Management; Internal Treasury, Risk Analysis- Interest Rate Risk, Value at Risk and Forex Risk; Integrated Treasury Managemnt- Cost Centre and Profit Centre.

Unit 3: Control and Regulation of Treasury Functions (15 Classes) (25 Marks)
Internal Control, Regulation, Supervision and Control of Treasury Operations, Internal and External Audit, Role of RBI, Role of IT in Treasury Management- Negotiated Dealing System, Trading Platforms/systems, Straight Through Process, Settlement and Custody, Accounting Valuation and Elimination of Exposures.

Unit 4: Risk Management (15 Classes) (25 Marks)
Meaning of Risk, Different types of Risks, Risk Management Process, Risk Measurement and Control- Risk calculation, Risk Exposure Analysis, Risk Management Techniques, Asset Liability Management; Risk Management in Banks.

Suggested Readings:

1. Treasury Management, Steve M. Bragg, Wiley.
2. Treasury and Risk Management in Banks, IIBF, Taxmann.
3. Fundamentals of Risk Management, Paul Hopkin, IRM
4. Risk Management in Banks, S Singh and Yogesh Singh, Excel Books.
5. Risk Management, IIBF, Macmillan.

Course objective: To equip students with the knowledge and skills necessary to manage treasury functions and mitigate financial risks within an organization.

Learning outcome: By the end of the course, students will be able to understand treasury management practices, assess financial risks, develop risk management strategies, and utilize financial instruments for hedging and risk mitigation.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Marketing of Services (Major 15)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit: I (15 classes) (25 Marks)
Introduction; Service Sector, growth of services, state of services, nature and characteristics of services, challenges of intangibility, need for marketing.

Unit: II (15 classes) (25 Marks)
Service marketing mix; product, price, place, promotion; service distribution strategy,Franchising, participants, service process.

Unit: III (15 classes) (25 Marks)
Service system and customer behaviour; front office, back office operation system, service delivery system, need to know customer, customer as a decision maker.

Unit: IV (15 classes) (25 Marks)
Service decision process; need for new services, information search, service evaluation, pre and post purchase behaviour, Marketing of Health Services, Tourism, Insurance & Banking.

Suggested Books:
Services Marketing- K. Rama Mohana Rao, Pearson Education, New Delhi
Textbook of Marketing of Services: The Indian Experience- NimitChowdhary,Macmillan Publishers India
Service Marketing, Text & Cases, Harsh Verma, Pearson.
Service Marketing, People, Technology, Strategy- Lovelock, Wirtz, Chatterjee, Pearson.
Service Marketing, Integrating Customer Focus Across the firm, Zeithaml, Bitner,Gremler, Pandit.

Course objective: To provide students with a comprehensive understanding of the unique characteristics and challenges of marketing services and develop their ability to design and implement effective marketing strategies for service-based businesses.

Learning outcome: By the end of the course, students will be able to analyze service marketing environments, develop service marketing plans, apply service-specific marketing techniques, and effectively promote and manage service offerings to meet customer needs and preferences.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

SCIENCE

Four-year Undergraduate Programme
Subject: Botany
Semester: First
Course Name: *Plant and Microbial Diversity*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Origin of life:** Theories of the Origin of Life, Concept of Kingdoms, and Tree of Life	3	4
Unit 2	**Bacteria and Viruses:** Bacteria: General features, cell structure, reproduction, conjugation, transformation, and transduction; introduction to Archaebacteria Viruses: General features, replication, reproduction (Lytic and Lysogenic life cycles), RNA virus (TMV), DNA virus (Cauliflower Mosaic Virus).	8	10
Unit 3	**Algae:** General features, cell structure, range of thallus structure, reproduction, and classification; a brief account on *Nostoc*, *Oedogonium*, and *Chara*	6	10
Unit 4	**Fungi & Lichens:** General features, distribution of fungi and its current status in the living world, reproduction, and classification (Anisworth, 1973); a brief account of *Mucor*, *Ascobolus*, and *Agaricus*; a brief account on lichens: structure, types, and economic importance	7	12
Unit 5	**Bryophytes and Pteridophytes:** Bryophytes: General features, adaptation to land habits, classification, and evolutionary trends; a brief account on *Marchantia* and *Polytrichum* Pteridophytes: General features, classification, reproduction, evolutionary trends (stellar evolution), and affinities; a brief account on *Lycopodium*, *Selaginella*, and *Pteris*	10	12
Unit 6	**Gymnosperms and Angiosperms:** Gymnosperms: General features, classification, reproduction, evolutionary trends, and affinities; a brief account on *Cycas*, and *Gnetum*	11	12

	Angiosperms: General features, Concept of an artificial, natural, and phylogenetic system of classification. Floral parts and inflorescence; Brief accounts on Lamiaceae and Orchidaceae		
PRACTICAL [Credit: 01]			
	1. Study of structure of TMV and Bacteriophage (electron micrographs/models). 2. Study of morphology of *Nostoc*, *Oedogonium*, *Chara* (Temporary preparation of slides). 3. Study of *Mucor*, *Ascobolus, Agaricus* (Temporary preparation of slides) 4. Study of vegetative and reproductive parts of *Marchantia* and *Polytrichum*(preparation of slides). 5. Study of *Lycopodium/ Selaginella* (morphology, strobilus, and spores), *Adiantum/ Pteris* (morphology). 6. Study of *Cycas*/ *Pinus* and *Gnetum* (morphology, leaf/ needle, megasporophyll and microsporophyll) 7. Study of leaf venations in dicots and monocots (at least two specimens each) 8. Study of different types of inflorescences and fruits.	30	40

Reading list:

1. Bhatnagar SP, Moitra A (1996) Gymnosperms. New Delhi, Delhi: New Age International (P) Ltd Publishers.
2. Campbell NA, Reece JB (2008) Biology, 8th edition, Pearson Benjamin Cummings, San Francisco.
3. Evert RF, Eichhorn SE (2012) Raven Biology of Plants, 8th edition, New York, NY: W.H. Freeman and Company.
4. Ingrouille M, Eddie B (2006) Plants: Evolution and Diversity. Cambridge University Press.
5. Kumar HD (1999) Introductory Phycology, 2nd edition. Delhi, Delhi: Affiliated East-West. Press Pvt. Ltd.
6. Parihar NS (1991) An Introduction to Embryophyta. Vol. II. Pteridophytes. Prayagraj: U.P.: Central Book Depot.
7. Pelczar MJ (2001) Microbiology, 5th edition. New Delhi, Delhi: Tata McGraw-Hill Co.
8. Puri P (1985) Bryophytes. New Delhi, Delhi, Atma Ram and Sons.
9. Sethi IK, Walia SK (2018) Text book of Fungi and Their Allies. 2nd Edition, Med tech Publishers, Delhi.
10. Singh G (2019) Plant Systematics: An Integrated Approach. 4th edition. CRC Press, Taylor and Francis Group.

11. Singh V, Pandey PC, Jain DK (2001) A Text Book of Botany. Meerut, UP: Rastogi and Co.
12. Tortora GJ, Funke BR, Case CL (2007) Microbiology. San Francisco, U.S.A: Pearson Benjamin Cummings.
13. Vashishta PC, Sinha AK, Kumar A (2010) Pteridophyta. New Delhi, Delhi: S. Chand & Co Ltd.
14. Webster J, Weber R (2007) Introduction to Fungi. Cambridge, Cambridge University Press.

Graduate Attributes

Course Objective:

This paper will explain the origin of life, the diversity of Bacteria, Viruses, Algae, Fungi & Lichen, Bryophytes, Pteridophytes, Gymnosperms, and Angiosperms on the planet, and how they may be related to each other. The emphasis will also be on the hands-on approach and laboratory techniques for identification of the plant and microbial groups using various morphological features.

Learning outcome:

On successful completion of the course, students will have:

1. Knowledge with the concept of different kingdoms and the theories behind how life began.
2. Basic understanding of the characteristics, distribution, classification, reproduction, and current status of various microbial and plant communities.
3. Good understanding of virus, algae, fungus, bryophyte, and pteridophyte cell structures, dicotyledonous and monocotyledonous leaf venation patterns, and inflorescence and fruit features.
4. Knowledge to identify various groups of organisms in the laboratory through morphological analysis.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Second
Course Name: *Cell Biology and Biomolecules*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to cell:** Cell as a unit of structure and function; Characteristics of prokaryotic and eukaryotic cells; Origin of eukaryotic cell (Endosymbiotic theory); Cytoskeleton, Cell division: Phases of eukaryotic cell cycle, mitosis and meiosis; Regulation of cell cycle.	8	12
Unit 2	**Cell wall and plasma membrane:** Chemistry, structure and function of Plant cell wall. Overview of membrane function; fluid mosaic model; Chemical composition of membranes; Membrane transport – Passive, active and facilitated transport.	6	12
Unit 3	**Cell organelles:** Nucleus: Structure-nuclear envelope, Organization of chromatin, Nucleolus, Ribosome, Chloroplast, Mitochondria, Peroxisomes, Endoplasmic Reticulum, Golgi Apparatus, and Lysosomes.	9	8
Unit 4	**Carbohydrates and Lipids:** Carbohydrates: Nomenclature and classification. Lipids: Definition and major classes of storage and structural lipids; Structure, properties and functions of Essential fatty acids.	9	8
Unit 5	**Aminoacids and Proteins:** Structure and classification of amino acids; Levels of protein structure (primary, secondary, tertiary, and quarternary); Protein denaturation and biological roles of proteins.	8	10
Unit 6	**Nucleic acids:** Structure of nitrogenous bases; Structure and function of nucleotides; Types of nucleic acids; Structure of A, B, Z types of DNA;	5	10

	Types of RNA.		
PRACTICAL [Credit: 01]			
1. Qualitative tests for carbohydrates, reducing sugars, non-reducing sugars, lipids and proteins. 2. Study of plant cell structure with the help of epidermal peel mount of Onion/ *Rhoeo*/ *Crinum*. 3. Demonstration of the phenomenon of protoplasmic streaming in *Hydrilla* and *Vallisnaria*leaf. 4. Counting the cells per unit volume with the help of haemocytometer. (Yeast/ pollen grains). 5. Cytochemical staining of: DNA- Feulgen and cell wall in the epidermal peel of onion using Periodic Schiff's (PAS) staining technique. 6. Study different stages of mitosis and meiosis.		30	40

Reading list:

1. Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H. Freeman and Company.
2. Campbell MK (2012) Biochemistry, 7th Edition. Published by Cengage Learning
3. Campbell PN, Smith AD (2011) Biochemistry Illustrated, 4th Edition, Published by Churchill Livingstone.
4. Cooper GM, Hausman RE (2009) The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
5. Hardin J, Becker G, Skliensmith LJ (2012) Becker's World of the Cell, Pearson EducationInc. U.S.A. 8th Edition.
6. Karp G (2010) Cell Biology, John Wiley & Sons, U.S.A. 6th Edition.
7. Nelson DL, Cox MM (2008) Lehninger Principles of Biochemistry, 5th Edition, W.H. Freeman and Company.
8. Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd Edition, W.H. Freeman.

Graduate Attributes

Course Objective:

This paper will explain biomolecules, the basic building blocks of living organisms, with a focus on their structural organization, molecule properties, biological roles, and functions. The emphasis will be on the relationship between the structure and function of various biomolecules at the chemical level with a biological perspective, as well as a hands-on approach and laboratory techniques.

Learning outcome:

On successful completion of the course, students will be:

1. Able to obtain knowledge of structure, classification, and physicochemical properties of biomolecules and enzymes.
2. Detailed knowledge of the structure, properties, and functions of a cell and its components.
3. Acquainted with practical knowledge of properties of cell and cell membranes, DNA staining techniques, and microscopy of the plant cell.
4. Able to identify various biomolecules in the laboratory by qualitative tests of biomolecules.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Third
Course Name: *Laboratory and Field Techniques in Plant Science*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Laboratorysafetyandgoodpractices:** General laboratory safety: dos and don'ts, lab safety measures, code of conduct in laboratory, safe handling of chemicals, glass apparatus, instruments, electrical appliances; First aid practices (acid spills, burns and other injuries), safety symbols, classes/ grades of chemicals, Laboratorywastemanagement: radioactive, hazardouschemicalsandbiologicalwastes.	8	8
Unit 2	**Handling and maintenanceofinstruments:** Weighingbalance,pipettesandmicropipettes,magnetic stirrer,autoclave,laminarairflow,pH and conductivity meter(calibrationanduse),Incubator (static and shaker),Luxmeter, hemocytometer, micrometer, spectrophotometer, Agarose gel electrophoresis unit, SDS PAGEunit,centrifuge,distillationunit.	8	12
Unit 3	**Measurementsandcalculations:** Units of measurements, conversion from one unit to another, Weighing,calculations:scientificnotations,powers,logarithmandfractions ; measurement of volumes ofliquids.	4	8
Unit 4	**Solutions and Buffers:** Preparation of solutions: stock solution, standard solution. Types of solutions: Normal, Molar, Molal, Percentage, ppm, ppb. Dilution and dilution factors, Acids, Bases, adjustment of pH, Buffers - phosphate, Tris- HCl and Citratebuffer.	6	8
Unit 5	**Microscopy and Culture Techniques:** Microscopes: working principles and types (Light and Electron microscopes), sampleandslidepreparation: fixation, staining, mounting, preservation(for light and electron microscopy). Basicculturemedia(NA, NB, PDA, MS), selective and differential media, Culturetechniques:plating(streak,spread&pour),serial dilution.	8	12

Unit 6	**Biostatistics, computingand field skills:** Datatypes-primaryandsecondary,methodsofdatacollection,sample and samplingmethods-meritsanddemerits;technicalandbiologicalreplicates; Tabulation and presentation of data, Descriptive statistics - Mean,Median,Mode, Variance,StandardDeviation,Standarderror,CoefficientofVariation, MS-Word,PowerPoint,Excel, concept on biologicaldatabases. Collection, Identification, Preparation and Preservation of Herbarium andMuseum specimens.	11	12
PRACTICAL [Credit: 01]			
1. Preparation of solutions- molar, molal, normal, percentage, stock solution and dilution 2. Measurement of pH of solutions using pH meter/ pH strip and preparation of buffers (Phosphate /citrate buffer) 3. Working with instruments - Centrifuge, autoclave, laminar air flow, hot air oven, incubator, light microscope, spectrophotometer/colorimeter, 4. Slide preparation and staining of plant materials. 5. Determination of cell/spore size using micrometer. 6. Preparation of PDA/NA medium for growth and maintenance of fungal/bacterial cultures. 7. Calculation of mean, mode, median, standard deviation using data set. 8. Drawing of tables, graphs and to carry out statistical calculation using MicrosoftExcel. 9. Preparation of herbarium specimen: Collection, processing, mounting, and labelling of plant specimen.	30	40

Reading list:

1. Bisen PS (2014) Laboratory Protocols in Applied Life Sciences, 1st Edition. CRC Press.
2. Danniel WW (1987) Biostatistics. New York, NY: John Wiley Sons.
3. Evert RF, Eichhorn SE, Perry JB (2012) Laboratory Topics in Botany. W.H. Freeman and Company.
4. Jones AM, Reed R, Weyers J (2016) Practical Skills in Biology, 6th Edition, Pearson
5. Mann SP (2016) Introductory Statistics, 9th edition. Hoboken NJ, John Wiley and Sons Inc.
6. Mesh MS, Kebede-Westhead E (2012) Essential Laboratory Skills for Biosciences. John Wiley & Sons, Ltd.

7. Mu P, Plummer DT (2001) Introduction to practical biochemistry. Tata McGraw- Hill Education.
8. Zar ZH (2010) Biostatistical Analysis, 5th Edition, Pearson Prentice Hall, New Jersey, USA.

Graduate Attributes

Course Objective:

This paper will provide basic knowledge and understanding of good laboratory practices, laboratory waste management, understanding hazards and risks to ensure a safe laboratory environment, measurements, units, and common mathematical calculations, sampling and data collection, and instrument operation and maintenance.

Learning outcome:

On successful completion of the course, students will be:

1. Able tolearnfundamentalskillsimportantforperforminglaboratoryandfieldexperiments.
2. Able to prepare,analysisofdataandinterpretationofresults.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: *Mycology and Phytopathology*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to Fungi:** General characteristics of fungi; hyphal forms; Cell and Cell wall composition; Nutrition; Origin of fungi; Classification of Fungi (Alexopoulos, 1962 & Ainsworth, 1973); General characteristics of Myxomycota and Eumycota; Symbiotic fungi (Lichen & Mycorrhiza): Structural organization and types.	10	10
Unit 2	**Lower Fungi: Mastigomycotina&Zygomycotina:** Characteristic features; Reproduction; Heterothallism; Life cycle with reference to *Synchytrium, Phytophthora* and *Mucor*	6	8
Unit 3	**Higher fungi: Ascomycotina&Basidiomycotina:** Characteristic features; Reproduction; Different fruiting bodies; Life cycle with reference to *Aspergillus, Peziza, Puccinia* and *Agaricus*	6	12
Unit 4	**Fungi Imperfecti: Deuteromycotina:** General characteristics; Thallus organization; Reproduction; Heterokaryosis & Parasexuality; Classification with special reference to *Alternaria* and *Colletotrichum*	5	8
Unit 5	**Phytopathology:** Concept of plant disease; Symptoms of plant diseases; Etiology and disease cycle; Host-pathogens interaction; Control of plant diseases and quarantine; Bacterial diseases - Citrus canker and angular leaf spot of cotton. Viral diseases - Tobacco Mosaic viruses, vein clearing. Fungal diseases - Early blight of potato, Black stem rust of wheat, White rust of crucifers	10	12
Unit 6	**Applied Mycology:** Role of fungi in biotechnology; food industry (Flavour & texture,	8	10

	Fermentation, Organic acids & Enzymes); Pharmaceutical (Secondary metabolites); Agriculture (Biofertilizers & Biological control); Mushroom cultivation; Medical mycology.		
PRACTICAL [Credit: 01]			
	1. Study of vegetative and reproductive structures of Mastigomycotina (*Phytophthora*) and Zygomycotina (*Mucor/Rhizopus*) by temporary mounts and through permanent slides. 2. Study of vegetative and reproductive structures of Ascomycotina (*Aspergillus* and *Penicillium*/*Peziza*) and Basidiomyctina (*Agaricus* and *Puccinia*) by temporary mounts and through permanent slides. 3. Study of vegetative and reproductive structures of Deuteromycotina (*Alternaria* and *Colletotrichum/ Fusarium*) by temporary mounts and through permanent slides; Study of thallus and reproductive structures of lichen and mycorrhiza through permanent slides/ photographs. 4. Study of symptoms of locally available plant diseases caused by fungi, bacteria, and virus by preparation of disease album and bottle specimens. 5. Applied mycology: Photographs/report onfungi used in medicine, fungi used as biological control agents, fungi used in industry, fungi causing human infections	30	40

Reading list:

1. Agrios GN (1997) Plant Pathology, 4thedition, Academic Press, U.K.
2. Alexopoulos CJ, Mims CW, Blackwell M (1996) Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4th edition.
3. GanguleeHC, KarAK. College Botany, Vol. II., New Central Book Agency, Kolkata.
4. Hait G (2022) A Textbook of Plant Pathology: Principles and Diseases. Global Net Publication, India.
5. HaitG, BhattacharyaK, GhoshAK (2011) Text Book of Botany, Vol. I & II., New Central Book Agency, Kolkata.
6. MitraJN, MitraD, ChowdhuryS. Studies in Botany. Vol. I., Moulik Library, Kolkata.
7. Pandey BP (2020) Plant Pathology - Pathogen and plant disease. S. Chand and Company Limited, New Delhi, India.
8. Sethi IK, Walia SK (2011) Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
9. Sharma PD (2011) Plant Pathology, Rastogi Publication, Meerut, India.
10. Webster J, Weber R (2007) Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.

Graduate Attributes

Course Objective:

This paper will explain the general characteristics and reproductive procedures of fungi from different groups such as Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, and Deuteromycotina. The paper will also focus on the basic idea of host-pathogen interaction during disease development, along with symptomology and the disease cycle of common fungal, bacterial, and viral diseases. Furthermore, the role of fungi in various biotechnological aspects, pharmaceutics, and agriculture will be highlighted.

Learning outcome:

On successful completion of the course, students will have:

1. Knowledge on general features of fungi and their classification
2. Knowledge on different classes of fungi, symbiotic fungi, and their characteristics
3. Knowledge on the application of fungi in different fields
4. Knowledge of plant pathogens and some important plant diseases
5. Practical knowledge on different classes of fungi based on their morphological and reproductive features
6. Practical knowledge on morphology, anatomical features of symbiotic fungi and locally available important plant pathogens.
7. Understanding biotechnological applications of fungi in industry, agriculture, and medicine.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: *Morphology and Anatomy of Angiosperms*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to Plant Morphology and Anatomy:** Morphology of inflorescence, stamens and carpel, fruit; Telome theory, phyllode theory; Role of morphology in plant classification. Plant anatomy: Application in systematics, forensics and pharmacognosy.	6	10
Unit 2	**Tissue and Tissue Systems:** Classification of tissues; Simple and complex tissue, Tissue systems, Pits and plasmodesmata; Wall ingrowths and transfer cells, Types of vascular bundles; Endodermis, exodermis and origin of lateral root. Hydathodes, cavities, lithocysts and laticifers; Ergastic substances.	7	8
Unit 3	**Structure and Development of Plant Body:** Internal organization of plant body: Development of plant body: Polarity, Cytodifferentiation and organogenesis during embryogenic development. Origin and development of leaves; Structure of dicot and monocot stem, root and leaf; Kranz anatomy.	5	8
Unit 4	**Apical meristems:** Concept of organization of shoot apex (Apical cell theory, Histogen theory, Tunica Corpus theory); Organization of root apex (Apical cell theory, Histogen theory, Korper-Kappe theory); Quiescent centre; Root cap.	11	14
Unit 5	**Vascular Cambium and Wood:** Structure, function and seasonal activity of cambium; Secondary growth in stem and root. Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses; Dendrochronology. Development and composition of periderm,	11	12

	rhytidome and lenticels.		
Unit 6	**Adaptive and Protective Systems:** Epidermis, cuticle, epicuticular waxes, trichomes (uni-and multicellular, glandular and nonglandular, two examples of each), stomata (classification); Adcrustation and incrustation; Anatomical adaptations of xerophytes and hydrophytes.	5	8
PRACTICAL [Credit: 01]			
1. Study of special types of inflorescences – Cyathium, Hypanthodium, Verticillaster, Hypanthium. 2. Study of special types of fruits- Spurious fruits (*Dillenia*); Aggregate fruits (Custard apple, *Michelia*, Periwinkles, *Polyalthia*); Multiple fruits (Pineapple, Jack fruits). 3. Study of anatomical details through permanent slides/temporary stain mounts / macerations / museum specimens with the help of suitable examples. 4. Apical meristem of root, shoot and vascular cambium (permanent slides/ photographs) 5. Epidermal system: cell types, stomata types; trichomes: non-glandular and glandular. 6. Root anatomy: monocot and dicot 7. Stem: monocot, dicot - primary and secondary growth; periderm; lenticels. 8. Leaf: isobilateral, dorsiventral, C4 leaves (Kranz anatomy). 9. Adaptive Anatomy: xerophytes, hydrophytes. 10. Secretory tissues: cavities, lithocysts and laticifers.		30	40

Reading list:

1. Dickison WC (2000) Integrative Plant Anatomy. Harcourt Academic Press, USA.
2. Evert RF (2006) Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc.
3. Fahn A (1974) Plant Anatomy. Pergmon Press, USA.
4. Mauseth JD (1988). Plant Anatomy. The Benjammin/Cummings Publisher, USA.

Graduate Attributes

Course Objective:

This paper will explain the detailed account on the morphological and anatomical features of Angiosperms.

Learning outcome:

1. Knowledge on morphology of angiosperms and developmental biology of plant body.
2. Knowledge on structural and anatomical organization of tissue system in plants and their classification.
3. Practical knowledge on inflorescences and fruits of angiosperms.
4. Practical knowledge on anatomical features of plant body parts.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: *Microbiology*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to microbial world:** History of development of Microbiology as a subject, Germ theory of diseases, Koch postulates, Major groups of microorganisms, Mode of nutrition and metabolic diversity in microbes, Growth and growth curves, Ecological importance of microorganisms.	6	6
Unit 2	**Viruses:** Characteristics of viruses, viroids and prions; Biomolecules and genetic materials of viruses; Baltimore system of classification; Morphological structure of TMV and Corona viruses; Life cycle and reproduction of bacteriophage; Replication of viral RNA and DNA; Viral diseases of common plants and animals	8	10
Unit 3	**Bacteria:** General characteristics of bacteria, shapes and sizes, ultra-cellular structure, major groups of bacteria with their general characteristics; Actinomycetes, Mycoplasma and Rickettsiae; growth and nutrition, reproduction – binary fission and endospore formation, horizontal gene transfer and genetic recombination in bacteria (conjugation, transformation and transduction). Examples of agriculturally and industrially important bacteria.	8	12
Unit 4	**Environmental Microbiology:** Microorganisms in different habitats: Air, soil and water; Soil microorganisms and their role in soil health; Role of microorganisms in biogeochemical cycles (C, N, P and S); Microorganisms in extreme environments (cold desert, hot water spring, marine water, hydrothermal vent, aquifers)	8	8
Unit 5	**Pathogenic microorganisms and Host Immunity:**	8	12

	Bacterial pathogens causing diseases in plants, animals and humans; fungal pathogens causing diseases in agriculturally important crops; host-pathogen interactions; pathogenesis; disease symptoms; host defence mechanisms; Host immunity - immune responses against pathogens; types of immunity; humoral and cell mediated immunity; hypersensitivity and autoimmunity; concept of Rh antigens.		
Unit 6	**Applied Microbiology:** Application of microorganisms in food industries for food fermentation and SCP production; in agriculture for biofertilizer, biopesticides, biocompost production; in pharmaceuticals for insulin and antibiotics production; in industries for alcohol and organic acid productions; citric acid and acetic acid; in genetic engineering for GMO development and other research purposes; in space and oil exploration and in pollution and waste management.	7	12
PRACTICAL [Credit: 01]			
1. Slide preparation and Gram staining of bacteria (urd bacteria, nodule bacteria) 2. Slide preparation and study of *Nostoc*, *Anabaena*, *Mucor*, *Rhizopus*, *Aspergillus*, *Penicillium*, *Colletotrichum*, *Cladosporium* 3. Pure culture isolation of soil bacteria/fungi through serial dilution plating and subsequent sub-culturing methods, population estimation by CFU and haemocytometer. 4. Measurement of microbial cells/spores with the help of micrometers or inbuilt software in microscopic camera**.** 5. Study on symptoms of plant viral diseases 6. Endospore staining of soil bacteria with malachite green 7. 7. Collection and study of diseases caused by virus, bacteria and fungi in crop plants		30	40

Reading list:

1. Aneja KR, Jain P, Aneza R (2021) A Textbook of Basic and Applied Microbiology. New Age International Publisher.

2. Aneja KR (2022) Experiments in Microbiology, Plant Pathology, Tissue Culture and Microbial Biotechnology. New Age International Publisher
3. Bhattacharya IK, Bhattacharya RN (2017) Fundamentals of Microbiology.
4. Pelczar MJ (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.
5. Sharma PD (2009) Microbiology. latest edition, Rastogi Publication, Meerut.
6. Singh RS (2017) Plant Diseases.
7. Wiley JM, Sherwood LM and Woolverton CJ (2013) Prescott's Microbiology. McGraw Hill International.

Graduate Attributes

Course Objective:

1. To give concise knowledge on basic microbiology
2. To give practical knowledge on handling of microorganisms
3. To inculcate knowledge on usefulness of microorganisms for sustainable development

Learning outcome:

1. Knowledge on microbial diversity and distribution in different habitats
2. Knowledge on ecological and economic importance of microorganisms in our day-to-day life
3. Knowledge on growth, reproduction and life cycles of viruses and microorganisms
4. Knowledge on genetic recombination of bacteria
5. Practical knowledge on microscopy, slide preparation, staining and morphological study of microorganisms
6. Knowledge on pathogenic microorganisms, host-pathogen interaction, and immunity
7. Practical knowledge on isolation and pure culture of bacteria/fungi from soil samples

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: *Plant Resources and Economic Botany*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Origin of Cultivated Plants:** Centres of Origin, their importance with reference to Vavilov's work. Introductions, domestication, and loss of crop genetic diversity; evolution of new crops/varieties, importance of germplasm diversity and conservation. Classification of plant resources on the basis of their uses.	6	8
Unit 2	**Food and Food Adjuncts:** Cereals and millets: Rice and wheat (origin, morphology, processing, post-harvest management & uses); Brief account of millets and their climatic and nutritional importance. Legumes: Origin, morphology, cultivation, uses and commercial importance of Chick pea, Pigeon pea and fodder legumes. Importance of legumes to man and ecosystem. Spices: Listing of important spices, their family and part used. Economic importance with special reference to Assam. Study of fennel, saffron, clove and black pepper. Beverages: Tea, Coffee (morphology, processing, cultivation, Types & uses).	12	14
Unit 3	**Plants and Plant Products of Industrial Value:** Oils and Fats: General description, classification, extraction, their uses and health implications groundnut, coconut, soybean, and mustard. Essential Oils: General account, extraction methods, comparison with fatty oils & their uses. Non edible oil yielding trees and importance as biofuel. Sugar and starches: Morphology, new varieties and processing of sugarcane, products and by-products	12	14

	of sugarcane industry. Potato: morphology, propagation, post-harvest management, uses of potato and starches. Natural Rubber**:** Para-rubber: tapping, processing and uses. Fibres: Classification based on the origin of fibres; Cotton, Coir and Jute (morphology, extraction and uses).		
Unit 4	**Drug-yielding plants:** Therapeutic and habit-forming drugs with special reference to C*inchona, Digitalis, Aloe vera* and *Cannabis*; Tobacco (Morphology, processing, uses and health hazards).	5	8
Unit 5	**Forest Products:** Forest and forest products. Timber and Non-Timber Forest Products (NTFP), Forest types of Assam and their conservation strategies; Community forestry.	5	8
Unit 6	**Ethnobotany Hours:**Definition, concept and scope; relevance of ethnobotany in the present context; Traditional knowledge and IPR.	5	8
PRACTICAL [Credit: 01]			
1. Cereals: Study of useful parts: Rice/Bean (habit sketch, study of paddy and grain, starch grain, micro-chemical test). 2. Legumes: Bean, (habit, fruit, seed structure, micro-chemical tests). 3. Beverages: Tea (plant specimen, tea leaves). 4. Oils and fats: Coconut and Mustard, Groundnut, 5. Rubber:Specimen, photograph/model of tapping, samples of rubber products. 6. Test for alkaloids: Neem, *Vinca rosea*. 7. Fibre-yielding plants: Cotton (specimen, whole mount of seed to show lint and fuzz; whole mount of fibre and test for cellulose), Jute (specimen, transverse section of stem, test for lignin).	30	40

Reading list:

1. Chrispeels MJ, Sadava DE (1994) Plants, Genes and Agriculture. Jones & Bartlett Publishers.
2. Gonsalves J (2010) Economic Botany and Ethnobotany. Mittal Publications, New Delhi, India.
3. Hill AF (1972) Economic Botany: A Textbook of Useful Plants and Plant Products. Tata McGraw-Hill, New Delhi, India.
4. Jain SK, Mudgal V (1999) A Hand Book of Ethnobotany. Bishen Singh Mahendra Pal Singh, Dehra Dun, India.
5. Kochhar SL (2012) Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
6. Samba Murty AVSS, Subramanyam NS (1989) A Textbook of Economic Botany. Wiley Eastern Limited, New Delhi.
7. Wickens GE (2001) Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
8. Wickens GE (2006) Economic Botany Principles and Practices, Springer India, New Delhi.

Graduate Attributes

Course Objective:

This paper will provide an understanding of major introduced plant species, concept of centre of origin and their importance, domestication of crops and loss of genetic diversity, evolution of new crops /varieties. This paper will also provide knowledge on germ plasm diversity, importance of ethnobotany and economic importance of various plants.

Learning outcome:

On successful completion of the course, students will:

1. Know the centre of origin, domestication, and loss of genetic diversity
2. Understand the evolution of new crops /varieties
3. Know about the germplasm diversity
4. Understand the economic values of various plant species.
5. Understand the importance of ethnobotany in the present context.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: *Genetics*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Mendelian genetics and its extension:** Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes; Probability and pedigree analysis; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant traits, Penetrance and Expressivity, Numericals; Polygenic inheritance.	13	14
Unit 2	**Extrachromosomal Inheritance:** Chloroplast mutation: Variegation in Four o'clock plant; Mitochondrial inheritance in yeast; Maternal effects-shell coiling in snail; Infective heredity-Kappa particles in *Paramecium*	4	6
Unit 3	**Linkage, crossing over and chromosome mapping:** Linkage and crossing over-Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Numerical based on gene mapping; Sex Linkage.	8	10
Unit 4	**Variation in chromosome number and structure:** Deletion, Duplication, Inversion, Translocation, Position effect, Euploidy and Aneuploidy.	6	8
Unit 5	**Fine structure of gene and Gene mutations:** Classical vs molecular concepts of gene; Ciston, Racon, Muton, rII locus; Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: ClB method. Role of Transposons in mutation. DNA repair mechanisms	10	12

Unit 6	**Unit 6. Population and Evolutionary Genetics:** Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection, mutation, genetic drift. Genetic variation and Speciation.	4	10
PRACTICAL [Credit: 01]			
1. Mendel's laws through seed ratios. 2. Chromosome mapping using point test cross data. 3. Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1,12:3:1, 9:3:4). 4. Permanent Slides showing Translocation Ring, Photograph showing Laggards and Inversion Bridge.		30	40

Reading list:

1. Gardner EJ, Simmons MJ, Snustad DP (2015) Principles of Genetics, John Wiley & sons, India. 8th edition.
2. Griffiths AJF, Wessler SR, Carroll SB, Doebley J (2010) Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
3. Klug WS, Cummings MR, Spencer CA (2012) Concepts of Genetics. Benjamin Cummings, U.S.A. 10th edition.
4. Snustad DP, Simmons MJ (2010) Principles of Genetics, John Wiley & Sons Inc., India. 5thedition.

Graduate Attributes

Course Objective:

To gain knowledgeonclassical and modern concepts of genetics.

Learning outcome:

1. Knowledge of Mendelian and non- Mendelian inheritance in organisms.
2. Knowledge of gene and chromosomal mutations
3. Knowledge of basic concepts of population and evolutionary genetics
4. Ability to work out problems related to Mendel's experiments, Chromosome mapping and gene interaction

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,

Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: *Molecular Biology*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Nucleic acids: Carriers of genetic information:** Historical perspective; DNA as the carrier of genetic information (Griffith's, Hershey & Chase, Avery, McLeod & McCarty, Fraenkel-Conrat's experiment.	3	4
Unit 2	**The Structures of DNA and RNA / Genetic Material:** DNA Structure: Miescher to Watson and Crick- historic perspective, DNA structure, Salient features of double helix, denaturation and renaturation, cot curves; Organization of DNA- Prokaryotes, Viruses, Eukaryotes. Organelle DNA - mitochondria and chloroplast DNA. The Nucleosome Chromatin structure- Euchromatin, Heterochromatin- Constitutive and Facultative heterochromatin.	8	12
Unit 3	**The replication of DNA, Central dogma and genetic code:** Chemistry of DNA synthesis (Kornberg's discovery); General principles – bidirectional, semi- conservative and semi discontinuous replication, RNA priming; Various models of DNA replication, including rolling circle, θ (theta) mode of replication, replication of linear ds-DNA; Enzymes involved in DNA replication. Key experiments establishing-The Central Dogma (Adaptor hypothesis and discovery of mRNA template), Genetic code (deciphering & salient features)	10	12
Unit 4	**Transcription:** Transcription in prokaryotes and eukaryotes. Principles of transcriptional regulation; Prokaryotes: Regulation of lactose metabolism and tryptophan synthesis in *E.coli*. Eukaryotes: transcription factors, heat shock proteins, steroids	10	12

	and peptide hormones; Gene silencing.		
Unit 5	**Processing and modification of RNA:** Split genes-concept of introns and exons, removal of introns, spliceosome machinery, splicing pathways, group I and group II intron splicing, alternative splicing eukaryotic mRNA processing (5' cap, 3' poly A tail); Ribozymes; RNA editing and mRNA transport.	7	10
Unit 6	**Translation:** Ribosome structure and assembly, mRNA; Charging of tRNA, aminoacyl tRNA synthetases; Various steps in protein synthesis, proteins involved in initiation, elongation and termination of polypeptides; Fidelity of translation; Inhibitors of protein synthesis; Post-translational modifications of proteins.	7	10
PRACTICAL [Credit: 01]			
1. DNA isolation from any plant material. 2. DNA estimation by diphenylamine reagent/UV Spectrophotometry (Demonstration). 3. Study of DNA replication mechanisms through photographs (Rolling circle, Theta replication and semi-discontinuous replication). 4. Study of structures of prokaryotic RNA polymerase and eukaryotic RNA polymerase II through photographs. 5. Study of the following through photographs: Assembly of Spliceosome machinery; Splicing mechanism in group I & group II introns; Ribozyme and Alternative splicing.		30	40

Reading list:

1. Griffiths AJF, Wessler SR, Carroll SB, Doebley J (2010) Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
2. Klug WS, Cummings MR, Spencer CA (2009) Concepts of Genetics. Benjamin Cummings. U.S.A. 9th edition.
3. Russell PJ (2010) iGenetics - A Molecular Approach. Benjamin Cummings, U.S.A. 3rd edition.
4. Snustad DP, Simmons MJ (2010) Principles of Genetics. John Wiley and Sons Inc., U.S.A. 5th edition.
5. Watson JD, Baker TA, Bell SP, Gann A, Levine M, Losick R (2007) Molecular Biology of the Gene, Pearson Benjamin Cummings, CSHL Press, New York, U.S.A. 6th edition.

Graduate Attributes

Course Objective:

To have detailed knowledge of DNA, RNA and central dogma of molecular biology

Learning outcome:

1. Knowledge of structure, organization, and replication mechanism of DNA
2. Detailed knowledge of central dogma, mechanism of transcription and processing of different types of RNA
3. Knowledge of genetic code, molecular mechanisms associated with various steps in protein synthesis and post translational modifications
4. Ability to isolate genomic DNA from plant samples

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: *Plant Ecology, Phytogeography and Climate Change*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Ecology and Ecosystem:** Ecology: Basic concepts, Levels of organization, Inter-relationships between the living world and the environment. Ecosystem: Structure, functions, and types, trophic organisation, food chains and food webs, ecological pyramids, homeostasis.	8	8
Unit 2	**Ecological Factors:** Climatic, Edaphic and Biotic Factors, Factorial interactions, Plant adaptation to environmental factors (light, temperature, wind, and fire); autotrophy, heterotrophy; symbiosis, commensalism, ammensalism, parasitism, parasitoidism. Aquatic ecology- concept.	8	8
Unit 3	**Population ecology:** Population characteristics, Growth curve, Lotka-Volterra model, population regulation, *r* and *k*-selection. Types of ecological speciation, Ecological equivalents.	7	12
Unit 4	**Plant communities:** Plant Community: Basic concept, types, characters (analytical and synthetic), Dynamics: succession – processes, types, models; climax concepts, Habitat and Niche: concept &types.	7	12
Unit 5	**Functional Ecology:** Principles and models of energy flow; Production and productivity; Ecological efficiencies; Ecological energetics; Biogeochemical cycles (C, N and P) and water cycle.	7	10
Unit 6	**Phytogeography and Climate Change:** Principles; Continental drift; Theory of tolerance; Endemism; Brief description of major terrestrial biomes (one each from tropical, temperate & tundra);	8	10

	Phytogeographical division of India;Vegetation types of NE India with special reference to Assam. Climate change: Basic concepts; global warming, causes and consequences (Rise in Sea levels, Glacier melting, Biodiversity Loss), Adaptation, Mitigation, Global and National Efforts, Concept on Sustainable Development, Sustainable Development Goals (SDGs).		
PRACTICAL [Credit: 01]			
1. Determination of minimal quadrat size and number for the study of herbaceous vegetation in the college campus by species area curve method (species to be listed). 2. Quantitative analysis of herbaceous vegetation for density and abundance in the college campus. 3. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law. 4. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter. 5. Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid field tests. 6. Determination of dissolved oxygen of water samples from polluted and unpolluted sources. a) Study of morphological adaptations of hydrophytes and xerophytes (four each). b) Study of biotic interactions of the following: Stem parasite, Root parasite, Epiphytes, Predation (Insectivorous plants). 7. Local field visit to nearby areas to familiarise students with various plant communities. 8. Soil respiration study in two agricultural systems to determine the CO_2 evolution.	30	40

Reading list:

1. Ambasht and Ambasht (2002) A text book of Plant Ecology. CBS publisher and Distributors.
2. Bhattacharya K, Ghosh AK, HaitG (2017) A Text Book of Botany. New Central Book Agency (P), Kolkata, India.
3. Bowmen WD, Hacker SD, Cain ML (2018) Ecology, Oxford University Press.
4. Deka U, Dutta T (2022) Plant Ecology and Phytogeography. Asian Humanitities Press, Guwahati, Assam.
5. KapurP, GovilSR (2000, 2007). Experimental Plant Ecology. CBS Publishers and Distributors, New Delhi (India).
6. Kormondy EJ (1996) Concepts of ecology. PHI Learning Pvt. Ltd., Delhi, India. 4th edition.
7. Misra R (1968, Reprinted in 2019). Ecology Workbook. Scientific Publishers (India), Jodhpur
8. OdumEP (2005) Fundamentals of ecology. Cengage Learning India Pvt. Ltd., New Delhi. 5th edition.
9. Raj M, Deka H (2022) Plant Ecology and Phytogeography. Ashok Book Stall, Guwahati, Assam.
10. Sharma PD (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
11. Smith TM, Smith RL (2015) Elements of ecology. Pearson publishers., London. 9th Edition
12. StilingPD (1996) Ecology: theories and applications (Vol. 4). Upper Saddle River: Prentice Hall.
13. Verma PS, Agarwal VK (2003) Environmental Biology-Principles of Ecology. S Chand & Company Ltd. Ramnagar, New delhi-110055.
14. Wilkinson DM (2007) Fundamental Processes in Ecology: An Earth Systems Approach. Oxford University Press. U.S.A.

Graduate Attributes

Course Objective:

This course will provide an understanding on ecology and ecosystems, biotic and abiotic interactions, ecosystem processes, terrestrial and aquatic environment, population and community interactions, plant distribution and effect of climate change on natural environment. Emphasis will be given on the hands-on approach, field, and laboratory techniques.

Learning outcome:

On successful completion of the course, students will:

1. Understand the concept of ecology, ecosystems, and importance of factors.
2. Understand the population, community, biodiversity, and conservation strategies.
3. Understand the concept of phytogeography, endemism, and floristic distributions.
4. Understand the science of climate change and sustainable developmentstrategies
5. Know the adaptation and mitigation against climate change-induced phenomena.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: *Plant Systematics*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Significance of Plant systematics:** Introduction to systematics; Plant identification, Classification, Nomenclature. Evidences from palynology, cytology, phytochemistry and molecular data. Functions and importance of Herbarium and botanical garden; Important herbaria and botanical gardens of the world and India; Virtual herbarium; Categories and taxonomic hierarchy; Concept of taxa (family, genus, species).	8	8
Unit 2	**Botanical nomenclature:** History, Principles and Rules (ICN); Ranks and names; Typification, Author citation, Effective and Valid publication, Rejection of names, Principle of priority and its limitations.	5	8
Unit 3	**Systems of classification:** Major contributions of Theophrastus, Bauhin, Tournefort, Linnaeus, Adanson, de Candolle, Bessey, Hutchinson, Takhtajan and Cronquist; Classification systems of Bentham and Hooker, Engler and Prantl, Takhtajan; Brief account of Angiosperm Phylogeny Group (APG) classification.	9	12
Unit 4	**Numerical taxonomy and cladistics:** OTUs, characters, character weighting and coding; Cluster analysis; Phenograms & Cladograms (definitions and differences).	6	8
Unit 5	**Phylogeny of Angiosperms:** Terms and concepts (primitive and advanced, homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly and clades). Origin and evolution of angiosperms; Co-evolution of angiosperms and animals; Methods of illustrating	6	10

	evolutionary relationship (phylogenetic tree, cladogram).		
Unit 6	**Angiospermic Families:** Detail study of the following families: Magnoliaceae, Fabaceae, Asteraceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Orchidaceae, Musaceae, Zingiberaceae, Poaceae.	11	14
PRACTICAL [Credit: 01]			
1. Study of vegetative and floral characters of locally available angiospermic plants belonging to the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Fabaceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Musaceae, Orchidaceae. 2. Field visits to familiarise students with vegetation of an area and identification of plant species / Visit to Academic or Research Institutions. 3. Mounting of properly dried and pressed specimens of at least 10 (ten) wild plant species with herbarium labels (to be submitted with the record book).	30	40

Reading list:

1. Jeffrey C (1982) An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge.
2. Judd WS, Campbell CS, Kellogg EA, Stevens PF (2002) Plant Systematics-A Phylogenetic Approach. Sinauer Associates Inc., U.S.A. 2nd edition.
3. Mitra JN (1988) An Introduction to Systematic Botany and Ecology. The World Press Private Ltd. Calcutta.
4. Mondal AK (2009) Advanced Plant Taxonomy. New Central Book Agency (P) Ltd.
5. Naik VN (1984) Taxonomy of Angiosperms. Tata Mc Graw-Hill.
6. Pandey BP (2018) A Textbook of Botany: Angiosperm. S. Chand Publishing, 7361, Ram Nagar, Qutab Road, New Delhi-110055.
7. Simpson MG (2006) Plant Systematics. Elsevier Academic Press.
8. Singh G (2012) Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.

Graduate Attributes

Course Objective:

This paper will provide an understanding of knowledge on plant systematics, basic understanding of plant identification, classification systems and plant nomenclature, significance of systematics in different fields/branches of botany, phylogenetic and evolutionary relationships of angiosperms. The paper will also focus on knowledge about

herbaria and botanical gardens in India and abroad and their significant role in plant identification.

Learning outcome:

On successful completion of the course, students will be:

1. Able to obtain knowledge on plant identification and classification systems, plant nomenclature.
2. Detailed knowledge of the phylogenetic and evolutionary relationships of angiosperms.
3. Able to obtain knowledge on various herbaria and botanical gardens in India and abroad, their role in plant systematics.
4. Acquainted with practical knowledge on vegetative and reproductive structures of angiosperms.
5. Acquainted students with practical knowledge on vegetation of an area.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: *Reproductive Biology of Angiosperm*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to reproductive biology of Angiosperms:** History (contributions of G.B. Amici, W. Hofmeister, E. Strasburger, S.G. Nawaschin, P. Maheshwari, B.M. Johri, W.A. Jensen, J. Heslop-Harrison) and scope.	4	4
Unit 2	**Reproductive development:** Induction of flowering; flower as a modified determinate shoot. Flower development: genetic and molecular aspects.	4	6
Unit 3	**Anther and pollen biology:** Anther wall: Structure and functions, microsporogenesis, callose deposition and its significance. Micro-gametogenesis; Pollen wall structure, MGU (male germ unit) structure; Palynology and scope (a brief account); NPC system; Pollen wall proteins; Pollen viability, storage and germination; Abnormal features: Pseudomonads, polyads, massulae, pollinia.	10	14
Unit 4	**Ovule:** Structure; Types; Special structures– endothelium, obturator, aril, caruncle and hypostase; Female gametophyte- megasporogenesis (monosporic, bisporic and tetrasporic) and megagametogenesis (details of *Polygonum* type); Organization and ultrastructure of mature embryo sac.	6	10
Unit 5	**Pollination and fertilization:** Pollination types and significance; adaptations; structure of stigma and style; path of pollen tube in pistil; double fertilization. Basic concept of Self incompatibility (interspecific, intraspecific, homomorphic, heteromorphic, GSI and SSI); Methods to overcome self- incompatibility: mixed pollination, bud	12	12

	pollination, stub pollination; Intra-ovarian and *in vitro* pollination; Modification of stigma surface, parasexual hybridization; Cybrids, *in vitro* fertilization.		
Unit 6	**Embryo, Endosperm and Seed:** Structure and types; General pattern of development of dicot and monocot embryo and endosperm; Suspensor: structure and functions; Embryo-endosperm relationship; Nutrition of embryo; Unusual features; Embryo development in *Paeonia*. Seed structure, importance, and dispersal mechanisms. Polyembryony and apomixis: Introduction; Classification; Causes and applications.	9	14
PRACTICAL [Credit: 01]			
1. **Anther:** Wall and its ontogeny; Tapetum (amoeboid and glandular); MMC, spore tetrads, uninucleate, bi-celled and dehisced anther stages through slides/micrographs, male germ unit (MGU) through photographs and schematic representation. 2. **Pollen grains:** Fresh and acetolyzed showing ornamentation and aperture, psuedomonads, polyads, pollinia (slides/photographs, fresh material), ultrastructure of pollen wall(micrograph); Pollen viability: Tetrazolium test for germination: Calculation of percentage germination in different media using hanging drop method. 3. **Ovule:** Types-anatropous, orthotropous, amphitropous/ campylotropous, circinotropous, unitegmic, bitegmic; Tenuinucellate and crassinucellate; Special structures: Endothelium, obturator, hypostase, caruncle and aril (permanent slides/specimens/photographs). 4. **Female gametophyte through permanent slides/ photographs:** Types, ultrastructure of mature egg apparatus. 5. Intra-ovarian pollination; Test tube pollination through photographs. 6. **Endosperm:** Dissections of developing seeds for endosperm with free-nuclear haustoria. 7. **Embryogenesis:** Study of development of dicot embryo through permanent slides; dissection of developing seeds for embryos at various developmental stages.	30	40

Reading list:

1. Bhattacharya M, Bhattacharya. (2012). A Textbook of Palynology: Basic and Applied. New Central Book Agency (P) Ltd. Guwahati.
2. Bhojwani SS, Bhatnagar SP (2011) The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition.
3. Johri BM (1984) Embryology of Angiosperms, Springer-Verlag, Netherlands.
4. Raghavan V (2000) Developmental Biology of Flowering plants, Springer, Netherlands.
5. Shivanna KR (2003) Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.

Graduate Attributes

Course Objective:

This paper will explain the detailed accounts on reproductive and developmental characteristics of Angiosperm.

Learning outcome:

1. Knowledge on detailed morphological andreproductive structures of angiosperm.
2. Knowledge on embryology and embryological abnormalities in angiosperms.
3. Practical knowledge on developmental biology of embryo and endosperms.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: *Plant Physiology*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Plant-water relations:** Water Potential and its components; Water absorption by roots: aquaporins; Pathway of water movement: symplast, apoplast, transmembrane pathways; Ascent of sap: Mechanisms, cohesion-tension theory, root pressure, guttation; Transpiration: Factors affecting transpiration, anti-transpirants, mechanism of stomatal movement.	5	8
Unit 2	**Mineral nutrition and nutrient uptake:** Criteria for essentiality of mineral elements, macro and micronutrients, nutrient solutions for plant growth experiments, roles of essential elements, mineral deficiency symptoms, chelating agents, Ion antagonism and toxicity. Soil as a nutrient reservoir; Transport of ions across cell membrane: Passive and active absorption, electrochemical gradient, facilitated diffusion, carrier systems, proton ATPase pump and ion flux, uniport, symport, antiport, co-transport.	10	10
Unit 3	**Translocation of organic solutes:** Phloem as the path of organic solute translocation: Experimental evidences, Mechanisms of solute transport, Pressure-Flow Model and Munch's hypothesis, Phloem loading and unloading, Source - sink relationship.	4	8
Unit 4	**Plant growth regulators (PGRs):** Discovery, chemical nature (basic structure), bioassay and physiological roles of Auxins, Gibberellins, Cytokinins, Abscisic acid, Ethylene, Brassinosteroids and Jasmonic acid; Synthetic PGRs; Application of PGRs in agriculture and horticulture.	10	14

Unit 5	**Physiology of flowering and seed dormancy:** Photoperiodism: SDPs and LDPs, flowering stimulus, florigen concept; Vernalization; Photoreceptors: Phytochrome, crytochrome and phototropin; Discovery, chemical nature, mechanism of action, role in photomorphogenesis, low energy responses (LER) and high irradiance responses (HIR); Seed dormancy: Significances, causes of dormancy, mechanisms to break dormancy.	8	12
Unit 6	**Plant stress physiology:** Abiotic and biotic stress: Plants' responses to drought, water logging, salinity, heavy metals, freezing, heat stress and pathogen attack. Oxidative stress: Generation of reactive oxygen species (ROS); Effect of ROS on metabolism; ROS detoxification mechanisms in plants; Stress mitigation strategies (Enzymatic and non-enzymatic).	8	8
PRACTICAL [Credit: 01]			
1. Determination of osmotic potential of plant cell sap by the method of plasmolysis. 2. Determination of water potential of given tissue (e.g., potato tuber) by weight method. 3. Study of the effect of sunlight on the rate of transpiration in excised twig/leaf. 4. Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of mesophyte/ xerophyte. 5. Effect of carbon dioxide concentration on the rate of photosynthesis. 6. To study the effect of different concentrations of IAA on Gram/Pea/Moong root (IAA Bioassay). 7. Determination of seed germination percentage in different physical conditions (Demonstration) 8. To demonstrate water stress by application of PEG/ water withdrawal in germinating seeds /growing plants (Demonstration) 9. Fruit ripening/Rooting from cuttings (Demonstration).		30	40

Reading list:

1. Bajracharya D (1999) Experiments in Plant Physiology-A Laboratory Manual. Narosa Publishing House, New Delhi.
2. Bhatla SC, Lal MA (2018) Plant Physiology, Development and Metabolism. Springer Nature Singapore Pte Ltd.

3. Devlin RM (2017) Outline of Plant Physiology. Medtech: Scientific International Pvt. Ltd.
4. Devlin RM, Witham FH, Blaydes DF (2017) Devlin's Exercises in Plant Physiology. Medtech: Scientific international Pvt. Ltd.
5. Hopkins WG, Huner A (2008) Introduction to Plant Physiology (4th edition). John Wiley and Sons. U.S.A.
6. Kochhar SL, Gujral SK (2021) Plant Physiology: Theory and Applications (2nd edition). Cambridge University Press.
7. Malik CP, Srivastava (2015) Text Book of Plant Physiology. Kalyani Publishers, New Delhi.
8. Salisbury FB, Ross CW (2004) Plant Physiology (4th edition). Cengage Learning India Pvt. Ltd., New Delhi, India.
9. Taiz L, Zeiger E, MØller IM, Murphy A (2015) Plant Physiology and Development (6th edition). Sinauer Associates Inc. USA.

Graduate Attributes

Course Objective:

Students will be able to learn the plant and water relation and thus will be able to elucidate the crucial role of water in diverse physiological functions of plants, by studying this paper. The paper will also highlight the importance of mineral elements in plant physiology and various mechanisms applied to uptake mineral elements by plants. It will provide the basic idea of pathways and mechanisms of translocation of organic solutes synthesised in plant. Furthermore, this paper will explain the role and mechanisms of action of various plant growth regulators as well as physiology of flowering and dormancy of seeds. Additionally, the paper will also focus on the different abiotic and biotic stresses encountered by the plants in their environment as well as various stress mitigation strategies employed by plants to overcome the effects of stress.

Learning outcome:

1. Knowledge on mechanisms of water, minerals, and nutrient absorption of plants
2. Knowledge on roles of plant hormones and mechanism of flowering in plants
3. Practical knowledge on effects of growth regulators on plant parts
4. Practical knowledge on determination of osmotic and water potential

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: *Plant Metabolism and Biochemistry*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Concepts of metabolism:** Introduction, anabolic and catabolic pathways, regulation of metabolism, role of regulatory enzymes; classification, nomenclature, and importance of enzyme; Concept of coenzyme, apoenzyme and prosthetic group; Enzyme inhibition (allosteric, covalent modulation); Isozymes.	6	8
Unit 2	**Carbon assimilation:** Role of photosynthetic pigments (chlorophylls and accessory pigments), antenna molecules and reaction centers, photochemical reactions, photosynthetic electron transport, PSI, PSII, Q-cycle, CO_2 reduction: C3, C4-pathways, Crassulacean acid metabolism; Photorespiration.	8	12
Unit 3	**Carbon oxidation and ATP Synthesis:** Glycolysis and its regulation, oxidative decarboxylation of pyruvate, TCA cycle and regulation, amphibolic role, anaplerotic reactions, mitochondrial electron transport, oxidative phosphorylation, cyanide-resistant respiration, pentose phosphate pathway; Factors affecting respiration; ATP synthesis: substrate level phosphorylation, chemiosmotic mechanism, ATP synthase, Boyer's conformational model, Racker's experiment, Jagendorf'sexperiment, role of uncouplers.	10	12
Unit 4	**Carbohydrate, Lipid and Nitrogen metabolism:** Synthesis and catabolism of sucrose, starch and cellulose, Synthesis and breakdown of triglycerides, β-oxidation, glyoxylate cycle, gluconeogenesis and its role in mobilisation of lipids during seed germination, α-oxidation. Nitrogen assimilation: biological nitrogen fixation (examples of legumes and non-legumes), biochemistry of nitrogen	12	14

	fixation, ammonia assimilation and transamination.		
Unit 5	**Mechanisms of Signal Transduction:** Receptor-ligand interactions, Second messenger concept, Calcium-calmodulin, MAP kinase cascade, two-component system.	5	8
Unit 6	**Secondary Metabolites:** Shikimate Pathway: Role in biosynthesis of secondary metabolites; Biosynthesis and physiological roles of terpenes, phenols and nitrogenous compounds.	4	6
PRACTICAL [Credit: 01]			
1. Chemical separation of photosynthetic pigments by solvent method/paper chromatography 2. Estimation of sugar content by DNSA method 3. Determination of titratable acid number (TAN) in plant materials 4. Quantification of chlorophyll a, b and total chlorophyll and determination of chlorophyll a/b ratio 5. Estimation of phenol/tannin/flavonoid by colorimetric method 6. Estimation of protein in plant sample by Lowry's method/Biuret method 7. Separation of amino acids by paper chromatography 8. Demonstration of Thin layer chromatography (TLC)/Column chromatography 9. To compare the rate of respiration by Ganong's respirometer in different parts of plant (Demonstration)		30	40

Reading list:

1. Cox MM, Nelson DL (2017) Principles of Biochemistry (7th Edition). WH Freeman & Co., Newyork.
2. Goodwin TW, Mercer EI (2005) Introduction to Plant Biochemistry. CBS Publishers and Distributors Pvt. Ltd., New Delhi.
3. Jain J L, Jain S, Jain N (2016) Fundamentals of Biochemistry (7th edition). S Chand & Co. PVT. Ltd., New Delhi, India;
4. Palmer T, Bonner P (2008) Enzymes: Biochemistry, Biotechnology, Clinical Chemistry. East West Press Pvt. Ltd., New Delhi;
5. Plummer D (2017) An Introduction to Practical Biochemistry (3rd edition). McGraw Hill Education, New Delhi, India
6. Sadasivam A, Manickam S (2022) Biochemical Methods (4th edition). New Age International Pvt. Ltd.
7. Satyanarayana U, Chakrapani U (2021) Biochemistry (6th edition). Elsevier;
8. Voet D, Voet JG, Pratt CW (2018) Principles of Biochemistry (5th edition). J Wiley & Sons, Singapore Pte. Ltd.

Graduate Attributes

Course Objective:

Students will be acquainted with the elaborate concept of plant metabolism and biochemical pathways, by studying this paper. The paper will highlight the carbon assimilation pathways as well as carbon oxidation and ATP synthesis mechanisms in plant body. It will provide the detailed idea of pathways and mechanisms of carbohydrate, lipid, and nitrogen metabolism in plants. Furthermore, this paper will explain the various aspects and cascades of signal transduction mechanism. Additionally, the paper will also focus on the biosynthesis and physiological roles of secondary metabolites in plants.

Learning outcome:

1. Knowledge in basic understanding of plant metabolism and their regulation
2. Knowledge in concepts of carbon assimilation, oxidation, ATP synthesis
3. Knowledge in basic concepts of carbohydrate, Lipid and Nitrogen metabolism
4. Knowledge in basic concepts of signal transduction
5. Practical knowledge in separation of pigments, estimation of sugars, rate of respiration.
6. Ability to perform experiments on chromatographic techniques, spectrophotometric analysis.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: *Applied Plant Biology*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Plant Tissue Culture:** Historical perspective; Composition of media; Nutrient and hormone requirements (role of vitamins and hormones); Totipotency; Organogenesis; Embryogenesis (somatic and zygotic); Protoplast isolation, culture and fusion.	8	10
Unit 2	**Application of tissue culture:** Micropropagation, androgenesis, virus elimination, secondary metabolite production, haploids, triploids and hybrids; Cryopreservation; Germplasm conservation.	4	6
Unit 3	**Recombinant DNA technology:** Restriction Endonucleases (History, Types I-IV, biological role and application); Restriction Mapping (Linear and Circular); Cloning Vectors: Prokaryotic (pUC 18 and pUC19, pBR322, Ti plasmid, BAC); Lambda phage, M13 phagemid, Cosmid, Shuttle vector; Eukaryotic Vectors (YAC).	8	10
Unit 4	**Gene Cloning:** Recombinant DNA, Bacterial Transformation and selection of recombinant clones, PCR- mediated gene cloning; Gene Construct; construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by genetic selection; complementation, colony hybridization; PCR	9	12
Unit 5	**Methods of gene transfer:** *Agrobacterium*-mediated, Direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment; Selection of transgenics - selectable marker and reporter genes (Luciferase, GUS, GFP).	6	10

Unit 6	**Applications of genetic engineering:** Pest resistant (Bt-cotton); herbicide resistant plants (Round Up Ready soybean); Transgenic crops with improved quality traits (FlavrSavr tomato, Golden rice); Improved horticultural varieties (Moondust carnations); Role of transgenics in bioremediation (Superbug).	10	12
PRACTICAL [Credit: 01]			
1. (a) Preparation of MS medium. (b) Demonstration of *in vitro* sterilization and inoculation methods using leaf and nodal explants of any plant species. 2. Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs. 3. Isolation of protoplasts. 4. Construction of restriction map of circular and linear DNA from the data provided. 5. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment. 6. Study of steps of genetic engineering for production of Bt cotton, Golden rice, FlavrSavr tomato through photographs. 7. Isolation of plasmid DNA. 8. Restriction digestion and gel electrophoresis of plasmid DNA.		30	40

Reading list:

1. Bhojwani SS, Bhatnagar SP (2011) The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
2. Bhojwani SS, Razdan MK (1996) Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Ganguli P (2001) Intellectual Property Rights: Unleashing the Knowledge Economy. New Delhi: Tata McGraw-Hill Pub.
4. Glick BR, Pasternak JJ (2003) Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
5. Kuhse H (2010) Bioethics: An Anthology. Malden, MA: Blackwell.
6. Snustad DP, Simmons MJ (2010) Principles of Genetics. John Wiley and Sons, U.K.
7. Stewart CNJr (2008) Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

Graduate Attributes

Course Objective:

To gain knowledge on plant tissue culture, recombinant DNA technology and applications of genetic engineering techniques.

Learning outcome:

1. Knowledge of various methods of Plant tissue culture and their application
2. Knowledge of gene cloning, recombinant DNA technology and various methods of gene transfer in plants
3. Knowledge of the application of genetic engineering techniques for agriculture.
4. Ability to demonstrate tissue culture technique; isolate plasmid DNA and to carry out DNA manipulation using restriction enzymes

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

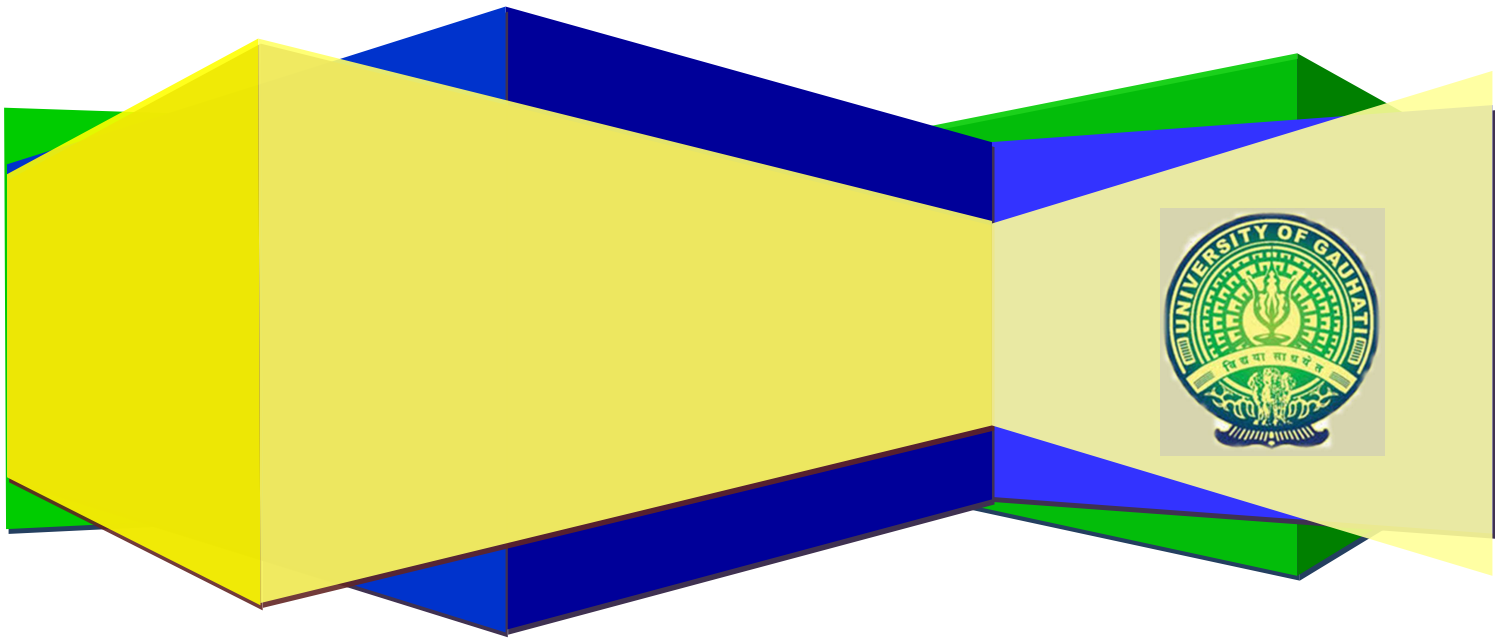
No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Gauhati University

Syllabus for FYUGP
B.Sc. Chemistry



Syllabus for B.Sc. FYUGP
Chemistry

Gauhati University

Guwahati::Assam

NEP –FYUGP
Course Distribution
Department of Chemistry
Gauhati University

Department /Centre	Subject / Discipline	Course Title	Semester	Credit	Paper Type
Chemistry	Chemistry	Chemistry I	Semester 1	4	Compulsory
Chemistry	Chemistry	Chemistry II	Semester 2	4	Compulsory
Chemistry	Chemistry	Chemistry III	Semester 3	4	Compulsory
Chemistry	Chemistry	Inorganic Chemistry - I	Semester 4	4	Compulsory
Chemistry	Chemistry	Organic Chemistry - I	Semester 4	4	Compulsory
Chemistry	Chemistry	Theoretical Chemistry	Semester 4	4	Compulsory/Elective
Chemistry	Chemistry	Magnetic Resonance Spectroscopy and Analytical Technqiues	Semester 4	4	Compulsory/Elective
Chemistry	Chemistry	Inorganic Chemistry-II	Semester 5	4	Compulsory/Elective
Chemistry	Chemistry	Organic Chemistry-II	Semester 5	4	Compulsory/Elective
Chemistry	Chemistry	Reaction Dynamics	Semester 5	4	Compulsory/Elective
Chemistry	Chemistry	Light-Matter Interaction	Semester 5	4	Compulsory
Chemistry	Chemistry	Inorganic Chemistry - III	Semester 6	4	Compulsory/Elective
Chemistry	Chemistry	Organic Chemistry - III	Semester 6	4	Compulsory/Elective
Chemistry	Chemistry	Equllibria and Electrochemistry	Semester 6	4	Compulsory/Elective
Chemistry	Chemistry	Industrial Chemistry	Semester 6	4	Compulsory

Prerequisites:

- For Major in Chemistry a student must pass in Chemistry and Mathematics at XII level.
- For Minor in Chemistry a student must pass in Chemistry at XII level.

Semester-I: Chemistry I (3L- 0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course aims at giving students insight into the fundamental aspects of atoms, ions and molecules in terms of their electronic structure and reactivity. Structure and bonding in/of these are to be dealt with basic quantum chemistry treatment. Further, periodic classification of elements to illustrate the changes in properties along the periods and groups to be emphasized upon. Properties of the gases and liquids are to be introduced.

Accompanying laboratory course is designed to introduce students to various laboratory apparatus, preparation of standard solutions, measurement of physical properties, and laboratory safety.

ii. ***Learning outcome:***

On successful completion, students would have clear understanding of the concepts related to atomic and molecular structure, chemical bonding, periodicity and states of matter. Students will be able to work in a chemical laboratory following standard safety protocols.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Sonit Kumar Gogoi, Gauhati University, skgogoi@gauhati.ac.in

2) Dr. Dhriti Mahanta, Gauhati University, mdhriti@gauhati.ac.in

Semester-I: Chemistry I (3L- 0T-1P)

Unit	Content	Contact Hours
Unit I: Atomic structure	Historical development on structure of atom; Bohr's model, H-atom spectrum; black body radiation; photoelectric effect (qualitative treatment only); The dual behaviour and uncertainty. Quantum mechanical approach to atomic structure: concept of wave function, well behaved function, operator, normalised and orthogonal wave function, Schrodinger wave equation, eigenfunction, Significance of Ψ and Ψ^2, Particle in a 1-D box; Schrodinger equation of hydrogen atom (no derivation), radial and angular wave functions for hydrogen atom, probability distribution, quantum numbers, Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations.	8
Unit II: Periodicity and chemical behaviour	Effective nuclear charge; Slater's Rule; covalent and ionic radii, ionization energies, electronegativity (various scales), electron affinities	3
Unit III: Chemical bonding I (ionic interaction)	General characteristics of ionic compounds; lattice and solvation energy; Born Lande equation; Kapustinski equation, Madelung constant, Born Haber cycle for lattice energy calculation	4
Unit IV: Structure of organic molecules	Nature of bonding: hybridisation of atomic orbitals (qualitative VB and MO approach); effect of hybridization on bond properties.	4
Unit V: Stereochemistry of organic molecules	Representation of organic molecules in 2D and 3D (Fischer, Newman and Sawhorse projection formulae and their interconversions); geometrical isomerism (cis-trans, syn-anti, E/Z notations); concept of chirality (enantiomers and diastereomers); configuration and conformation, barriers to rotation, conformational analysis (ethane, butane, cyclohexane)	8
Unit VI: Electronic effects in organic molecules	Concept of electrophiles and nucleophiles; inductive effects; resonance, conjugation and delocalisation.	3

Unit VII: Gaseous state	Causes of deviation from ideal gas behaviour, compressibility factor, Z, and its variation with pressure and temperature for different gases. State variables and equation of states for real gases; van der Waals equation of state, its derivation and application in explaining real gas behaviour. Reasons and examples of failure of van der Waal equation of state and interpretation of van der Waals pressure-volume isotherm. Critical state and phenomena, mathematical definition and interpretation of critical point, relation between critical constants and van der Waals constants: along with their thermodynamic interpretation. Introduction to virial equation and virial coefficients, derivation of Boyle temperature.	8
Unit VIII: Liquid state	Qualitative treatment of the structure of the liquid state. Physical properties of liquids: vapour pressure, surface tension coefficient of viscosity, and their determination. Temperature variation of viscosity of liquids and comparison with that of gases. Effect of addition of various solutes on surface tension and viscosity. Explanation of cleansing action of detergents (micelle formation and critical micelle concentration).	7

Laboratory Course I	1. Introduction to laboratory apparatus and safety measures in laboratory, 2. Calibration of apparatus (volumetric flask, thermometer, melting point apparatus etc.) **Group A** (a) Preparation of normal and molar solution, for example KCl, $Na_2C_2O_4$, HCl, H_2SO_4 etc. (Verification by conductometric measurement). (b) Determination of solubility of a given salt at different temperature and plot solubility curve. (c) Determination of water of crystallisation of hydrated salt by ignition and weighing. **Group B** (a) Determination of the melting points of organic compounds (here, the student is required to learn about thermometer calibration before performing the experiment). (b) Effect of impurities on the melting point – mixed melting point of two unknown organic compounds. (c) Purification of organic compounds by crystallization using the following solvents: (a) water, (b) alcohol, (c) alcohol-water mixture. **Group C** (a) Evaluating the compressibility factor using standard packages such as Excel/Origin/Python/Fortran. (b) Simulating an ideal gas using programming. (c) Simulation of a real gas using programming. (d) To determine the partial molar volume of ethanol-water mixture at a given composition. (e) Determine the surface tension of a given liquid at room temperature using stalagmometer by drop number method. (f) Determine the surface tension of a given liquid by means of stalagmometer using drop weight method. (g) Determine the composition of a given mixture by surface tension method. (h) Study the variation of surface tension of detergent solutions with concentration. (*Students are required to perform Exp. 1, 2 and a minimum of two experiments from each group*)	30

Text Book /Reference Book	1. University Chemistry, P. Siska, O. K. Medhi, 2nd edition, Pearson Education 2. General and Inorganic Chemistry, R.P. Sarkar (part 1) 3rd edition, NCBA 3. Concise Inorganic Chemistry, J. D. Lee, 5th Edition, Pearson Education 4. Inorganic Chemistry (Principles of Structure and Reactivity), J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, 5th edition, Pearson Education 5. Principles of Physical Chemistry, Puri, Sharma, Pathania, 48th Edition, Vishal Publishing Com. 6. Atkins Physical Chemistry, Atkins, de Paula and Keeler, 11th Edition, Oxford University Press. 7. Stereochemistry of Organic Compounds, D. Nasipuri, 4th Edition. 8. Reaction Mechanism in Organic Chemistry, S. M. Mukherji, S. P. Singh,3rd Edition. 9. Organic Reactions and their Mechanisms, P. S. Kalsi, 5th Edition. Solomons' Organic Chemistry, T. W. G. Solomons, C. B. Fryhle, S. A. Snyder.

Semester-II: Chemistry II (3L- 0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course extends the concepts of chemical bonding and introduces to coordination chemistry. The students will be familiarized with the organic reactive intermediates. Elementary concepts of acidity, basicity and thermodynamics are to be deliberated. Laboratory experiments relevant to the topics in the theory are included for the students to appreciate the concepts and to hone the experimental skills.

ii. ***Learning outcome:***

Students shall understand and apply the concepts of chemical bonding, coordination chemistry, acids and bases and the reactive intermediates. They shall also understand the chemistry from a thermodynamic point of view. Students will acquire preliminary training on quantitative analysis, synthesis of coordination compounds, qualitative analysis of organic compounds and measurement of a few basic thermodynamic parameters.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Prof. Anup Kumar Talukdar, Gauhati University, aktalukdar@gauhati.ac.in

2) Dr. Arabinda Baruah, Gauhati University, arb@gauhati.ac.in

Semester-II: Chemistry-II (3L- 0T-1P)

Unit I: Chemical bonding II (covalent bond and chemical forces)	Valence bond theory (Heitler-London approach), energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Bent's rule, resonance and resonance energy, molecular orbital theory (MOT). Molecular orbital diagrams of homonuclear (N_2, O_2) and heteronuclear diatomic (CO, NO, CN^-), bonding in BeF_2 and HCl (idea of s-p mixing and orbital interaction). Valence shell electron pair repulsion theory (VSEPR). Covalent character in ionic compounds, polarising power and polarizability. Fajan's rules and consequences of polarisation. Ionic character in covalent compounds: Bond moment and dipole moment. Percentage ionic character from dipole moment and electronegativity difference. Weak chemical forces (van der Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interactions, instantaneous dipole-induced dipole interactions and hydrogen bonding) and their effects on melting and boiling points, solubility and hydration energy.	10
Unit II: Coordination chemistry-I (structure and isomerism)	Introduction to coordination complexes (Werner theory, types of ligands) IUPAC nomenclature, isomerism in coordination complexes, stereochemistry of complexes with coordination numbers 4, 5, and 6. Berry pseudorotation.	5
Unit III: Reactive intermediates in organic reactions	Formation, structure and stability of reactive intermediates: carbocations, carbanions, radicals, carbenes, nitrenes, benzyne (brief mechanistic perspective using concepts of substitution, addition, elimination and rearrangements reactions).	12
Unit IV: Acidity, basicity, and pK_a	The definition of pK_a; Lewis acids and bases; organic acids and bases (factors affecting relative strength); substituents affect the pK_a (carbon acids).	3

Unit V: Thermodynamics	Mathematical treatment: exact and inexact differentials, partial derivatives, Euler's reciprocity, cyclic rules. Intensive and extensive variables. Isolated, closed and open systems. Cyclic, reversible and irreversible processes. Zeroth law of thermodynamics. First law of thermodynamics, concept of heat (q) and work (w), internal energy(U) and enthalpy (H) in differential forms: their molecular interpretation. Calculation of w, q, ΔU and ΔH for expansion of ideal gas under isothermal and adiabatic conditions for reversible and irreversible processes. Derivation of Joule-Thomson coefficient and inversion temperature. Application of first law of thermodynamics: standard state, standard enthalpy changes of physical and chemical transformations: fusion, sublimation, vaporization, solution, dilution, neutralization, ionization. Bond-dissociation energy Kirchhoff's equation, relation between ΔH and ΔU of a reaction. Difference between enthalpy and standard enthalpy. Second law of thermodynamics, entropy (S) as a state function, molecular interpretation of entropy. Residual Entropy. Free energy: Gibbs function (G) and Helmholtz function (A) and their molecular interpretation. Difference between free energy and standard free energy. Gibbs-Helmholtz equation, criteria for thermodynamic equilibrium and spontaneity of a process. Maxwell's Relations and their physical significance.	15

Laboratory Course II	1. Preparation of buffer solution and measurement of pH using pH-meter (acetic acid-sodium acetate buffer) **Group A:** (a) Determination of total hardness of water by titration against standardised EDTA solution. (b) Synthesis of coordination compounds i) Potassium tris(oxalato)chromate(III), ii) $[Ni(DMG)_2]$ **Group B:** (a) Qualitative organic analysis for N, S and halogenin a given organic compounds. (b) Detection of presence of unsaturation and aromaticity in an organic sample. (c) Identify acidic functional groups of a given organic sample (Acetic acid, Lactic acid, Tartaric acid and Phthalic acid) and determine the pKa by titrametric methods. **Group C:** (a) Determination of heat capacity of a calorimeter and enthalpy of neutralisation (eg. hydrochloric acid with sodium hydroxide). (b) Determine the enthalpy of solution of oxalic acid from solubility measurements. (c) Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization). (d) Calculation of ionization enthalpy of ethanoic acid. (e) Determination of enthalpy of hydration of copper sulphate. (*Students are required to perform Exp. 1 and minimum of two from each group*)	30
Text Book /Reference Book	1. General and Inorganic Chemistry, R.P. Sarkar (part 1) 3rd edition, NCBA 2. Concise Coordination Chemistry, R. Gopalan, V. Ramalingam, 1st edition, Vikash Publishing House 3. Inorganic Chemistry (Principles of Structure and Reactivity), J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, 5th edition, Pearson Education 4. Principles of Physical Chemistry, Puri, Sharma, Pathania, 48th edition, Vishal Publishing Com. 5. Atkins Physical Chemistry, Atkins, de Paula and Keeler, 11th edition, Oxford University Press. 6. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, Michael B. Smith 7th edition (Wiley). 7. Organic Chemistry, G. M. Loudon, 4th edition. 8. Mechanism and Theory in Organic Chemistry, Sachin Kumar Ghosh, New Central Book Agency.	

Semester-III: Chemistry III (3L- 0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course extends the concepts of acids/bases and coordination chemistry as well as gives introductions to the redox reactions, ideal solutions and colligative properties. Further, the course is intended to apprise students about different classes of organic compounds, such as halogenated hydrocarbons, alcohols, phenols, thiols, epoxides and carbonyls.

Through the accompanying laboratory experiments on volumetric analysis, identification and preparation of derivatives and determination of physical properties of liquids, this course intends to make students learn about the qualitative and quantitative aspects of the analysis.

ii. ***Learning outcome:***

On successful completion of the course students will have significant knowledge of acids/bases as well as an overview of bonding in coordination compounds, principles of redox chemistry, solutions and their properties. Students will also be able to describe and classify organic compounds in terms of their functional groups and reactivity. Further experiments on acid/base and redox titrations will enable the students to consolidate their skills on quantitative analysis. In addition, qualitative analysis of organic compounds having common functional groups will give the students an idea about functional groups and their reactivities. Physical chemistry experiments will introduce the students to physical property measurements and kinetics of chemical reactions.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Sanfaori Brahma, Gauhati University, sanfaori@gauhati.ac.in

2) Dr. Tridib Kumar Goswami, Gauhati University, tridib@gauhati.ac.in

Semester III: Chemistry-III (3 L-0 T-1 P)

Unit	Content	Contact Hrs
Unit I: Acid and Bases	Acid-base concepts, measure of acid and base strength, proton affinity, acidity and basicity of binary hydrogen compounds, inductive effect and strength of oxyacids, acidity of aqua ions, steric effect, proton sponge, solvation and acid base strength, non-aqueous solvents and acid base strength, levelling effect, superacids and superbases. Hard and soft acids and bases (HSAB), application of HSAB principle and symbiosis.	7
Unit II: Oxidation and reduction -I	Reduction potentials: Redox half-reactions, standard potentials and spontaneity, trends in standard potentials, the electrochemical series, Nernst equation (Influence of pH and concentration on electrode potential). Principles of redox titration and choice of redox indicators.	4
Unit III: Coordination chemistry-II	Valence bond theory (VBT), inner and outer orbital complexes, electroneutrality principle and back bonding, effects of hybridization in metal ligand bond strength and stability of complexes, choice of metal d-orbital(s) in hybridization in different coordination geometries, magnetic properties of complexes, drawback of VBT.	4
Unit IV: Aromaticity	Concepts of aromatic, anti-aromatic and non-aromatic compounds (including examples of cyclic carbocations, carbanions and heterocyclic compounds); Hückel's rule.	3
Unit V: Hydrocarbons and halogenated compounds	Methods of preparation, properties and relative reactivity of alkyl and aryl halides; Selectivity in electrophilic and nucleophilic substitution reactions (S_NAr), Preparation and reactions of diazonium salts; Benzyne mechanism.	4
Unit VI: Alcohols, phenols, thiols and related compounds	Preparation, properties and relative reactivity of 1°, 2°, and 3°-alcohols, ethers, epoxides (preparation and reactions with alcohols, ammonia derivatives and $LiAlH_4$). Thiols and sulfides; phenols (preparation, properties and reactivity; Reimer-Tiemann and Kolbe's-Schmidt Reactions)	4
Unit VII: Carbonyl compounds	Structure, reactivity and preparation; oxidations and reductions (Jones reagent, PCC and PDC, Oppenauer, Clemmensen, Wolff-Kishner, $NaBH_4$, $LiAlH_4$, MPV), Baeyer Villiger oxidation.	4

Unit VIII: Solution	Vapour pressure of solution. Ideal solutions, ideally diluted solutions and colligative properties. Raoult's law & Henry's Law. Thermodynamic derivation of colligative properties of solution (using chemical potentials) and their inter-relationships. Abnormal colligative properties.	7
Unit IX: Partial molar quantities	Fugacity, activity coefficients and concept of chemical potential: Gibbs Duhem equation and Duhem-Margules equation: their use and application, Enthalpy, free energy and entropy of mixing, excess thermodynamic functions.	8
Laboratory Course III	**Group A** (a) Acid-base titration: estimation of carbonate, bicarbonate and hydroxide. (b) Redox titration: estimation of Fe(II) using standardised $KMnO_4$ solution. (c) Determination of water of crystallisation of Mohr Salt using standardised $KMnO_4$ solution. (d) Estimation of Fe(II) with $K_2Cr_2O_7$ using internal indicator (diphenylamine). **Group B** (a) Identification of functional groups in a given organic sample: Simple functional groups such as alcohols, phenols, amines, nitro, carbonyl and carboxylic acid groups. (b) Prepare derivatives of a given organic sample containing single functional group (i.e. alcohols, phenols, amines, nitro, carbonyl and carboxylic acid group). **Group C** (a) Determine the surface tension of a given solution at room temperature using a stalagmometer. (b) Determine the viscosity of a liquid at a given concentration at laboratory temperature, by viscometer. (c) Determine the composition of a given liquid mixture by viscosity method. (d) Study the variation of viscosity of sucrose solution with the concentration of the solute. (e) Compare the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methylacetate. (*Students need to perform at least three experiments from Group A and C. Group B is compulsory.*)	30

Text/ Reference Books:	1. General and Inorganic Chemistry, R.P. Sarkar (part 1), 3rd edition, NCBA. 2. Concise Coordination Chemistry, R. Gopalan, V. Ramalingam, 1st edition, Vikash Publishing House. 3. Inorganic Chemistry (Principles of Structure and Reactivity), J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, 5th edition, Pearson Education. 4. Principles of Physical Chemistry, Puri, Sharma, Pathania, 48th edition, Vishal Publishing House. 5. Atkins Physical Chemistry, Atkins, de Paula and Keeler, 11th edition, Oxford University Press. 6. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, Michael B. Smith 7th edition (Wiley). 7. Organic Chemistry, Volume 1, I. L. Finar, 5th edition. 8. Organic Chemistry, L. G. Wade Jr., Maya Shankar Singh, 6th edition. 9. Organic Chemistry, P. Y. Bruice, 8th edition, Pearson Eduacation.	

Semester –IV: Inorganic Chemistry-I (3L -0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course aims at giving an introduction to molecular symmetry, *d*-block chemistry, metallurgy, lanthanides, actinides and nuclear chemistry while extending the concepts of coordination and redox chemistry.

Qualitative inorganic analysis is included to give students practical experience on applications of inorganic chemistry. Students should learn how differential reactivity under different conditions of pH can be used to identify variety of ions in a complex mixture.

ii. ***Learning outcome:***

On successful completion the students will be able to assign the point groups of molecules, explain bonding in coordination compounds, explain their various properties in terms of CFSE and predict reactivity.

Students will have an overview of the metallurgical and nuclear processes as well as the chemistry of *d* and *f*-block elements.

Students in general will learn the use of concepts like solubility product, common ion effect, pH etc. in the analysis of ions. They will also appreciate how a clever design of reactions makes it possible to identify the components in a mixture.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Saitanya Bharadwaj, Pragjyotish College, saitanya.iitg@gmail.com

2) Dr. Sonit Kumar Gogoi, Gauhati University, skgogoi@gauhati.ac.in

Semester –IV, Inorganic Chemistry-I (3L -0T-1P)

Unit	Content	Contact Hours
Unit I: Introduction to molecular symmetry	Symmetry elements and operations, molecular point groups, symmetry elements present in C_{2v}, C_{3v}, T_d and O_h point group (pictorial representation), introductory idea of character tables, Mulliken symbols.	6
Unit II: d-block Chemistry	Chemistry of first row transition elements (Ti-Cu) in various oxidation states as halides and oxides, comparison of the first, second and third transition series elements.	8
Unit III Coordination chemistry III	Crystal Field Theory (CFT) (qualitative treatment): d-orbital splitting in tetrahedral, square planar, trigonal bipyramidal, square pyramidal and octahedral geometries, calculation of CFSE, thermodynamic and structural aspect of orbital splitting, pairing energies (contribution of exchange and coulomb energy), factors affecting the magnitude of 10 Dq (Δ_o, Δ_t), spectrochemical series, tetragonal distortions from octahedral geometry and Jahn-Teller theorem. Limitations of CFT (nephelauxetic effect and EPR evidences), Elementary idea on ligand field theory, molecular orbital theory (MOT) with special reference to sigma bonded octahedral and tetrahedral complexes (qualitative treatment only), pi bonding in octahedral complexes. Metal-metal quadruple bond in $[Re_2Cl_8]^{2-}$.	10
Unit IV: Metallurgy	Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agents. Electrolytic reduction, methods of purification of metals: electrolytic Kroll process, Parting process, van Arkel-de Boer process and Mond's process, Zone refining.	5
Unit V: Oxidation and reduction -II	Redox stability: reaction with water, oxidation by atmospheric oxygen, disproportionation and comproportionation, the influence of complexation, relation between solubility and standard potential. Diagrammatic representation of potential data (Latimer diagram, Frost diagram, Pourbaix diagram).	6
Unit VI: Lanthanoids and Actinoids	Lanthanoids: electronic configuration, oxidation states, colour, spectral and magnetic properties, lanthanide contraction, separation of lanthanides (ion-exchange method only). Coordination chemistry of lanthanides. Actinoids: electronic configuration, oxidation states, magnetic properties, comparison with lanthanides.	6

Unit VII: Nuclear Chemistry	Stability of nucleus and radioactive decay processes, Fermi theory, half-lives, auger effect, Mass defect, Nuclear reactions – notations, comparison with chemical reaction: Types of nuclear reactions. Applications of radioisotopes in age determination.	4
Laboratory: Inorganic Qualitative Analysis	Qualitative analysis of mixtures containing four cations and anions. Emphasis should be given to the understanding of reactions. The following radicals are suggested: CO_3^{2-} , NO_2^-, S^{2-}, SO_3^{2-}, $S_2O_3^{2-}$, CH_3COO^-, F^-, Cl^-, Br^-, I^-, NO_3^-, BO_3^{3-}, $C_2O_4^{2-}$, PO_4^{3-}, NH_4^+, K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+} Mixtures should preferably contain one interfering anion, or insoluble component ($BaSO_4$, $SrSO_4$, $PbSO_4$, CaF_2 or Al_2O_3) or combination of anions such as CO_3^{2-} and SO_3^{2-}, NO_2^- and NO_3^-, Cl^- and Br^-, Cl^- and I^-, Br^- and I^-, NO_3^- and Br^-, NO_3^- and I^-. Spot tests should be done whenever possible.	30
Text Books/ Reference Books	1. Inorganic Chemistry, G.L. Meissler and D. A. Tarr, 5th edition, Pearson. 2. Inorganic Chemistry, P. Atkins, Overtone Rourke, Weller and Armstrong 5th edition, Oxford. 3. Principles of Inorganic Chemistry, 7th edition, Puri, Sharma, Kalia, Vishal Publishing Co. 4. Inorganic Chemistry (Principles of Structure and Reactivity), J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, 5th edition, Pearson Education. 5. Advanced Inorganic Chemistry, F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Murillo, Manfred Bochmann, Wiley. 6. Vogel's Qualitative Inorganic Analysis, 7th Edition, G. Svehla, B Sivasankar, Pearson.	

Semester-IV: Organic Chemistry I (3 L- 0 T- 1 P)

Graduate Attributes

i. ***Course Objective:***

The objective of this course is to illustrate the structure and reactivity of organic compounds containing carboxylic acid/derivatives, nitrogen-based functional groups as well as heterocyclic compounds. Students will apply these basic concepts towards the understanding of amino acids, peptides/proteins and alkaloids.

Experiments are designed to familiarize the students with organic synthesis and purification.

ii. ***Learning outcome:***

On successful completion students will be able to explain and correlate the structure and reactivity of oxygen and nitrogen containing organic molecules having relevance to bioorganic systems. Students will be able to perform simple organic transformations and purifications following conventional/green pathways.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Prof. Rupam Jyoti Sarma, Gauhati University, rjs@gauhati.ac.in

2) Dr. Ranjit Thakuria, Gauhati University, ranjit.thakuria@gauhati.ac.in

Semester-IV: Organic Chemistry I (3 L- 0 T- 1 P)

Unit	Content	Contact Hours
Unit I: Carboxylic acids and their derivatives	Preparation, properties and reactions of carboxylic acids: reactions of dicarboxylic acids, hydroxy acids and unsaturated acids: succinic/phthalic, lactic, malic, tartaric, citric, maleic and fumaric acids. Preparation and reactions of acid chlorides, anhydrides, esters and amides; comparison of nucleophilic sustitution at acyl group: mechanism of acidic and alkaline hydrolysis of esters; Claisen condensation, Dieckmann and Reformatsky reactions.	10
Unit II: Nitrogen containing functional groups	Preparation and properties of amines: effect of substituent and solvent on basicity; Gabriel phthalimide synthesis, Carbylamine reaction, Mannich reaction, Hofmann-elimination reaction; distinction between 1°, 2°and 3° amines with Hinsberg reagent and nitrous acid. Diazonium Salts: preparation and their synthetic applications. General methods for preparation of nitro compounds, nitriles and isonitriles and important reactions.	8
Unit III: Amino acids, peptides and proteins	*α*-Amino acids (synthesis and reactions); zwitterions, p*K*a values, isoelectric point and electrophoresis; structure of the peptide bond; primary, secondary and tertiary structures of proteins; intramolecular interactions in protein binding site; mechanism of enzyme action (acid–base catalysis); enolization reactions; thioesters; enzyme inhibitors; determination of peptide sequence.	7
Unit IV: Heterocyclic compounds	Classification and nomenclature (5-numbered and 6-membered rings with one heteroatom); synthesis and reactions of furan, pyrrole, thiophene, pyridine and indoles: selected name reactions (Paal-Knorr synthesis, Knorr synthesis, Hantzsch synthesis, Fischer indole synthesis, Madelung synthesis)	7
Unit V: Alkaloids	Natural occurrence, general structural features, isolation and their physiological action; Hoffmann's exhaustive methylation, Emde's modification, structure elucidation of nicotine; medicinal importance of nicotine, hygrine, quinine, morphine and cocaine.	6
Unit VI: Organic spectroscopy	Introduction to UV-visible and infrared spectroscopy in structure elucidation of organic compounds; relation between absorption spectroscopy and molecules containing conjugated C=C and C=O groups; analysis of compounds containing alkenes, alkynes and carbonyl compounds using infrared spectroscopy (conceptual aspects).	7

Laboratory Course	1. Organic preparations (any two from each): benzoylation of organic compounds: amines (aniline, toluidines, anisidine) and phenols (phenol, *β*-naphthol, salicylic acid) by the following methods: (i) Using conventional method. (ii) Using green chemical approach. 2. Organic preparations (any three): (i) Bromination of acetanilide by conventional methods. (ii) Nitration of salicylic acid using ceric ammonium (green chemistry approach). (iii) Selective reduction of *m*-dinitrobenzene to *m*-nitroaniline (iv) Oxidation of ethanol/ isopropanol (iodoform reaction). (v) Aldol condensation using either conventional or green method. (vi) Benzil-Benzilic acid rearrangement. 3. Chromatography: (a) Separation of a mixture of two amino acids by ascending paper chromatography; (b) Separation of a mixture of *o*- and *p*-nitrophenol or *o*- and *p*-nitroaniline by thin layer chromatography (TLC).	30
Recommended books	1. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, Michael B. Smith 7th Edition. 2. Organic Chemistry, Jonathan Clayden, Nick Greeves, Stuart Warren, 2nd Edition. 3. Principles of Organic Synthesis, R. O. C. Norman, J. M. Coxon, 3rd Edition. 4. Organic Chemistry, P. Y. Bruice, 8th Edition. 5. Organic Chemistry, Volume 2, I. L. Finar, 5th Edition. 6. Organic Chemistry, P. Y. Bruice, 8th Edition. 7. Organic Spectroscopy, 3rd Edition, William Kemp. 8. Introduction to Spectroscopy, D. L. Pavia, G. M. Lampman, G. S. Kriz, 4th Edition. 9. B. S. Furniss, A. J. Hannaford, P. W. G. Smith, Vogel's Textbook of Practical Organic Chemistry, Pearson, 2012. 10. V. K. Ahluwalia, S. Dhingra, Comprehensive Practical Organic Chemistry, University Press. 11. F. G. Mann, B. C. Saunders, Practical Organic Chemistry, 3rd Edition Longman, 1978.	

Semester-IV: Theoretical Chemistry (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

The aim of this course is to introduce the students to the important areas of quantum chemistry. Laboratory experiments are designed to give the students an insight into the different programming languages such as BASIC, FORTRAN, Python and their applications in calculation of physical properties.

ii. ***Learning outcome:***

Students shall understand the fundamentals of atomic structure and its relation to quantum mechanics. They will be able to formulate the basic structural properties of atoms in terms of mathematical theories. Students shall be able to plot, and program equations related to simple chemical systems using computers.

Students shall be solving chemical problems using complex mathematics. This will develop a critical thinking ability to treat simple systems.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Himangshu Prabal Goswami, Gauhati University, hpg@gauhati.ac.in

2) Dr. Dhruba Jyoti Kalita, Gauhati University, dhrubajyoti.kalita@gauhati.ac.in

Semester IV - Theoretical Chemistry (3L-0T-1P)

Unit	**Content**	**Contact Hrs**
Unit I: Quantum Theory	Planck's Quantization of energy and Hydrogen Line spectrum. Postulates of quantum mechanics and their physical interpretation, wavefunctions and quantum mechanical operators. Born interpretation. Well behaved wavefunctions and commutation relations. Orthonormality and physical meaning of expanding a wavefunction in orthonormal basis. Hermitian Operators and Real Eigenvalues, Eigenvectors: their physical significance. Particle in a 1-D box (complete solution with orthonormalization) and relation to conjugated polyenes. Heisenberg Uncertainty Principle from expectation values of 1 D box, extension to two and three-dimensional boxes. Qualitative idea of tunneling. Rotational Motion and Energy: Schrödinger equation of a rigid rotator and brief discussion of its results (solution not required). Quantization of rotational energy levels. Vibrational Motion: Schrödinger equation of a linear harmonic oscillator and brief discussion of its results (solution not required). Quantization of vibrational energy levels. Interpretation of zero-point energy. Hamiltonian for 1 electron H-atom, its wavefunctions (only explanation, no derivation) and its relation to atomic orbitals. Constructing Radial and Angular Distribution Curves from H-like wave functions. Quantum mechanical idea of chemical bond formation: Heitler-London's Valence bond theory. Atomic Units. Good quantum numbers for multi-electron systems and Atomic Term Symbols. LS and j-j coupling schemes.	**37**
Unit II: Molecular Properties	Intermolecular forces and potentials. Polarizability of atoms and molecules, dielectric constant and polarisation, molar polarisation for polar and non-polar molecules. Clausius- Mosotti equation (with derivation) and Debye equations: their applications.	**8**
Laboratory experiments (Minimum of seven experiments to be done)	1. Writing and plotting basic expressions and corresponding graphs (eg. Maxwell-Boltzmann distribution law, radial and angular distribution functions for H-atom etc.) using any spreadsheet software such as MSExcel/LibreOffice etc or simple programming language (GWBasic, FORTRAN, python etc) 2. Plotting the wavefunction and the energy expressions for particle in a box for n =1,2 and 3 using any spreadsheet software such as MSExcel/LibreOffice etc or simple programming language (GWBasic, FORTRAN, python etc). 3. Numerical evaluation of the the expectation values of position and square of momentum for particle in a 1 D box using the definition of the wavefunction and expectation value using any spreadsheet software such as MSExcel/LibreOffice etc or simple programming language (GWBasic, FORTRAN, python etc). 4. Plotting simple one-dimensional intermolecular potential energies (eg. harmonic, anharmonic, Lennard-Jones potential etc)	**30**

	using any spreadsheet software such as MSExcel/LibreOffice etc or simple programming language (GWBasic, FORTRAN, python etc) and interpreting the potentials. 5. Numerical solution of the 1D Schrodinger equation for particle in a box using any spreadsheet software such as MSExcel/LibreOffice etc or simple programming language (GWBasic, FORTRAN, python etc). 6. Numerical solution of the 1D Schrodinger equation for particle in a box (with constant nonzero potential, V) using any spreadsheet software such as MSExcel/LibreOffice etc or simple programming language (GWBasic, FORTRAN, python etc) and understand the role of V on the energy and wavefunction. 7. Geometry optimization (energy minimization): Making input file through selection of simple calculation method (e.g., STO/GTO, Hartree Fock or Density Functional Theory), basis set, specifying charge and multiplicity using any quantum chemistry software. 8. Frequency calculation: Locating results in output file, displaying calculated properties through molecular viewing software such as Avogadro, MacMolPlt, VMD, GaussView. 9. Calculation of the energy of the H-like atoms (H, He+ etc) using the simple theoretical methods and simple basis sets Tabulate the energy (in Hartree) and number of basis functions for each calculation. 10. Comparison of energy results with the exact value and discussing the effect of the number of basis functions and the discussion of the effect of increasing nuclear charge on the energy. 11. Performing optimization of simple organic molecules (like malonaldehyde) and obtain energy, dipole moment, charge on various atoms and important geometrical parameters such as bond length, bond angle, etc. 12. Perform geometry optimizations (energy minimizations) to calculate the energy of various conformations of molecules (e. g. butane, and predict the most stable conformation. 13. 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. 14. Evaluation of band structure of simple solid state materials and identifying the Fermi level using any quantum chemistry software (like quantum espresso) and analyzing the results. ****** Other experiments may be introduced from time to time.	

Textbooks:

1. Molecular Quantum Mechanics, Atkins and Friedman, 5th Edition, Oxford University Press
2. Quantum Chemistry, McQuarrie, Viva Student Edition, Viva Press

Reference Books:

1. Introductory Quantum Chemistry, AK Chandra, McGraw Hill Education (2017)
2. Introduction to Quantum Mechanics, DJ Griffiths and DF Schroeter, 3rd Edition, Cambridge University Press (2018)
3. Modern Quantum Chemistry, A Szabo and NS Ostlund, Dover Publications (1996)

4. How to use Excel in Analytical Chemistry and General Scientific data Analysis, R Levie, Cambridge University Press
5. Molecular Modelling Principles and Applications, A R Leach, Longman Publishers
6. https://github.com/weisscharlej/SciCompforChemists.

Semester-IV: Magnetic Resonance Spectroscopy and Analytical Techniques (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

Students are expected to learn about the different spectroscopic, chromatographic, electroanalytical, diffraction techniques and their applications. Relevant laboratory experiments are included to familiarize students to analytical instruments and data analysis.

ii. ***Learning outcome::***

Students shall learn about spectroscopy and how chemical compounds are identified and separated using contemporary methods and instruments.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Tridib Kumar Goswami, Gauhati University, tridib@gauhati.ac.in

2) Dr. Nilamoni Nath, Gauhati University, nnath@gauhati.ac.in

3) Dr. Himangshu Prabal Goswami, Gauhati University, hpg@gauhati.ac.in

Semester-IV: Magnetic Resonance Spectroscopy and Analytical Techniques (3L-0T-1P)

Unit	Content	Contact Hrs
Unit I: NMR spectroscopy	Nuclear spin quantum number, effect of magnetic field on the nuclear spin, Zeeman effect and nuclear magneton, and Larmor precision. Radiowaves and principles of NMR spectroscopy. Chemical shift and factors affecting it. Factors affecting intensity and spectral width. NMR peak area integration relative peak positions of organic functional groups eg. alkyl halides, olefins, alkynes, aldehyde, substituted benzenes (toluene, anisole, nitrobenzenes, halobenzene, chloronitrobenzene), first order coupling (splitting of the signals: ordinary ethanol, bromoehane, dibromoehanes), Spin-spin coupling and high resolution spectra, interpretation of PMR spectra of simple organic molecules such as methanol, ethanol, acetaldehyde, acetic acid and aromatic protons.	12
Unit II: ESR spectroscopy	Electron spin resonance and hyperfine splitting. g value and hyperfine constant, Bohr magneton, electron Zeeman splitting, electron nuclear hyperfine splitting, illustration using simple examples like H atom, methyl radical etc.	5
Unit III: Mass spectrometry	Ionization techniques (electron impact, chemical ionization), making liquids and solids into ions (electrospray, electrical discharge, laser desorption, fast atom bombardment), separation of ions on basis of mass to charge ratio, interpretation of the mass spectrum, base peak and molecular ion peak. Fragmentation patterns of common organic molecules along with McLafferty rearrangement. Determination of empirical chemical formula from molecular ion peak and isotopic distribution.	8
Unit IV: Separation techniques	Introduction to chromatography and its techniques, TLC, column chromatography, GC and HPLC.	5
Unit V: Electroanalytical techniques	Conductance measurements; EMF and cell reactions. Conductivity, equivalent, molar conductivity and their variation with dilution for weak and strong electrolytes. Conductometric titrations (only acid-base and acid base mixtures). Types of electrodes, standard electrode potential, cell reactions and salt bridges glass electrodes and others, concentration cells with transference and without transference, liquid junction potential and salt bridge, pH determination using hydrogen electrode and quinhydrone electrode, potentiometric titrations-qualitative treatment (acid- base, acid mixture and base and oxidation-reduction only). Zeta potential.	10
Unit VI: Diffraction	Packing of solids and how solids diffract (reflection view and scattering view) Bragg's Law, Miller indices and	5

	reciprocal lattices. Laws of crystallography. Basics of X-ray diffraction (powder and single crystal).	
Laboratory Course	1. Determination of cell constant of a conductivity cell. 2. Determine the equivalent conductance of a strong electrolyte (e.g. NaCl) at various concentrations and verify the Onsager equation. 3. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid. 4. Perform the following conductometric titrations: (a) Strong acid vs. strong base (b) Weak acid vs. strong base (c) Mixture of strong acid and weak acid vs. strong base (d) Strong acid vs. weak base 4. Perform the following potentiometric titrations: (a) Strong acid vs. strong base (b) Weak acid vs. strong base (c) Dibasic acid vs. strong base (d) Potassium dichromate vs. Mohr's salt 5. Determination of basicity/proticity of a polyprotic acid by the thermochemical method in terms of the changes of temperatures observed in the graph of temperature versus time for different additions of a base. Also calculate the enthalpy of neutralization of the first step 6. Structure elucidation from simple proton NMR spectrum, MS. 7. Separation of organic compounds using TLC, column chromatography.	30
Recommended books	1. Organic Spectroscopy, 3rd Edition, William Kemp. 2. NMR Spectroscopy, 2nd Edition, Harald Günther 3. Physical Methods in Inorganic Chemistry, Russel S. Drago. 4. Introduction to Spectroscopy, D. L. Pavia, G. M. Lampman, G. S. Kriz, 4th Edition. 5. Electroanalytical methods, Bard and Faulkner. 6. Atkins Physical Chemistry, Atkins, de Paula and Keeler, 11th Edition. 7. B. S. Furniss, A. J. Hannaford, P. W. G. Smith, Vogel's Textbook of Practical Organic Chemistry, Pearson, 2012. 8. V. K. Ahluwalia, S. Dhingra, Comprehensive Practical Organic Chemistry, University Press. 9. F. G. Mann, B. C. Saunders, Practical Organic Chemistry, 3rd Edition Longman, 1978.	

Semester –V: Inorganic Chemistry II (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course focuses on further extending the concepts of coordination chemistry along with the chemistry of main group elements, noble gases and introduction to organometallics. Intermediate level quantitative analysis of metal ions is included to give a hands-on experience to the students.

ii. ***Learning outcome:***

Students shall learn about electronic and magnetic properties of coordination complexes. They shall understand the preparation, structure and properties compounds of main group elements and noble gases. Students will also learn about organometallic compounds, comprehend their bonding, stability and reactivity. The laboratory experiments shall enable the learners to separate and estimate individual ions in multicomponent systems.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Apurba Kalita, B Barooah College, apurbakalitabbc@gmail.com

2) Dr. Sanchay Jyoti Bora, Pandu College, sanchay.bora@gmail.com

3) Dr. Sonit Kumar Gogoi, Gauhati University, skgogoi@gauhati.ac.in

Semester –V: Inorganic Chemistry II (3L-0T-1P)

Unit	Content	Contact Hrs
Unit I: Coordination Chemistry IV	Electronic spectra and magnetism of coordination compounds: microstates, free ion term symbols and their splitting in tetrahedral and octahedral fields, Racah parameters, selection rules and relaxation mechanisms (vibronic coupling and spin orbit coupling), Orgel diagrams and prediction of spectral transitions, Jahn-Teller effect on electronic spectra, charge-transfer spectra, calculation of spin only and orbital contribution to magnetic moments. Spin crossover.	12
Unit II: Main Group elements	Relative stability of different oxidation states, inert pair effect, diagonal relationship, and anomalous behaviour of main group elements. a) Preparation and properties of ortho and para hydrogen. b) Preparation, structure and properties of borane (bonding in diborane, brief idea of styx number, Wade's rule), boric acid, borax, borazine, phosphazine, S_4N_4. c) Preparation and properties of oxides, superoxides, peroxides, hydrides, hydroxides, halides and carbonates of alkali and alkaline earth metals. Reactions of alkali and alkaline earth metals with liquid ammonia. d) Allotropes of carbon, phosphorus, and sulphur. e) Oxides and oxoacids of nitrogen, phosphorus, sulphur, and chlorine. f) Interhalogen compounds, polyhalides, pseudo halogen g) Hydrates, clathrates and inclusion compounds. h) Preparation, structure and properties of silicates, aluminosilicates.	15
Unit III:Noble Gases	Occurrence and uses, rationalisation 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). Molecular shapes of noble gas compounds (VSEPR theory).	6

Unit IV: Organometallics I	Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands, 18 electron rule. Metal carbonyls: electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni. Pi -acceptor behaviour of CO (MO diagram of CO to be discussed), synergic bonding effect and use of IR data to explain the extent of back bonding. Zeise's salt: preparation and structure, evidence of synergic effect and comparison of synergic effect with that in carbonyls.	12
Laboratory: Inorganic quantitative analysis	1. Estimation by volumetric method of any two of the following: a. Fe(III)- By standard $KMnO_4$ solution b. Fe(III) – By standard $K_2Cr_2O_7$ solution c. Cu(II) – By Iodometric method. 2. Estimation of Ni(II) by gravimetric method. 3. Separation and estimation of individual ions in two-component systems of a. Cu and Fe b. Fe and Ca c. Ca and Mg d. Cu and Ni and e. Cl^- and SO_4^{2-}.	30
Text/ reference Books	1. Inorganic Chemistry (Principles of Structure and Reactivity), J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, 5th edition, Pearson Education. 2. Principles of Inorganic Chemistry, 7th edition, Puri, Sharma, Kalia, Vishal Publishing Co. 3. Concepts and Models of Inorganic Chemistry, 3rd edition, Bodie Douglas, Darl Mcdaniel, John Alexander, Wiley. 4. Advanced Inorganic Chemistry, F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Murillo, Manfred Bochmann, Wiley. 5. Vogel's Quantitative Chemical Analysis 6th edition, J. Mendham, R. C. Denney, J. D. Barnes, M. Thomas, B. Sivsankar, Pearson.	

Semester-V: Organic Chemistry II (3 L- 0 T- 1 P)

Graduate Attributes

i. ***Course Objective:***

This course aims at introducing students to stereo-chemical aspects of organic reactions and their mechanisms. Students will also learn the chemical aspects of carbohydrates and terpenoids.

Familiarize the students with qualitative analysis of carbohydrates and small organic compounds with functional groups. Further, to teach students methods for identifying functional groups using IR spectroscopy.

ii. ***Learning outcome:***

Students will be able to predict and recognize reactivity of organic molecules by their functional groups, and utilize this understanding for the construction of complex molecules.

Learners will be able to qualitatively analyse organic molecules and identify the functional groups by interpreting the IR spectra.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Prof. Rupam Jyoti Sarma, Gauhati University, rjs@gauhati.ac.in

2) Dr. Diganta Choudhury, B Barooah College, digantachoudhury2008@gmail.com

Semester-V: Organic Chemistry II (3 L- 0 T- 1 P)

Unit	Content	Contact Hours
Unit I: Formation of carbon-carbon and carbon-heteroatom bonds	Wurtz Reaction, Wurtz-Fittig reaction, Simmons-Smith reaction; Free radical substitutions; Saytzeff and Hofmann eliminations; reagents of phosphorus, sulfur and boranes; stereospecific and stereoselective reactions; stereoselective reactions of alkenes: epoxidation reaction using mCPBA.	10
Unit II: Reactions of active methylene compounds	Active methylene compounds (keto-enol tautomerism): preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.	8
Unit III: Reactions of enolates and enamines	Formation and stability of enolates and enamines; alkylation of enolates and enamines; aldol reaction: aldol and benzoin condensation; Claisen reaction, Claisen-Schmidt reaction, Knoevenagel condensation, Perkin reaction; Cannizzaro reaction, Wittig reaction, Favorskii reaction, Beckmann rearrangement, Benzil-Benzilic acid rearrangement; addition reactions of unsaturated carbonyl compounds; Michael addition, Wolff rearrangement.	8
Unit IV: Nucleophilic reactions on the C=O groups	Nucleophilic attack at the carbonyl group (geometrical aspects); concept of prochirality; stereoselective additions to carbonyl groups: Crams rule, Felkin-Anh model.	4
Unit V: Carbohydrate chemistry	Classification of monosaccharides; absolute configuration of glucose and fructose, epimers and anomers; mutarotation; determination of ring size of glucose and fructose; conformations of glucose (Fischer, Haworth and stereoscopic projections); interconversions of aldoses and ketoses; Killiani Fischer synthesis and Ruff degradation; disaccharides: structure elucidation of maltose, lactose and sucrose. Polysaccharides -structures of starch, cellulose and glycogen.	9
Unit VI: Terpenes	Occurrence of terpenes; structure and classification of terpenes, isoprene rule; synthesis of citral, neral and α-terpineol; biosynthesis of limonene, pinene, carvone (*via* isopentenyl pyrophosphate).	6

Lab Course	1. Qualitative analysis of carbohydrates: aldoses and ketoses, reducing and non-reducing sugars. 2. (a) Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, phenols, amines, nitro, carboxylic acids and carbonyl compounds). (b) Interpretation of infrared (IR) spectra of simple organic compounds. *The student is required to learn about identification of functional groups of simple organic compounds by interpreting the IR spectra. The spectra may be recorded and/or provided to the students from literature.*	30
Recommended books	1. Organic Chemistry, Jonathan Clayden, Nick Greeves, Stuart Warren, 2nd Edition. 2. Principles of Organic Synthesis, R. O. C. Norman, J. M. Coxon, 3rd Edition. 3. Advanced Organic Chemistry, R. Bruckner. 4. Organic Chemistry, G. M. Loudon, 4th Edition. 5. Organic Chemistry, R. T. Morrison, R. N. Boyd, S. K. Bhattacharjee, 7th Edition. 6. Organic Chemistry, Volume 2, I. L. Finar, 5th Edition. 7. B. S. Furniss, A. J. Hannaford, P. W. G. Smith, Vogel's Textbook of Practical Organic Chemistry, Pearson, 2012. 8. V. K. Ahluwalia, S. Dhingra, Comprehensive Practical Organic Chemistry, University Press. 9. F. G. Mann, B. C. Saunders, Practical Organic Chemistry, 3rd Edition Longman, 1978.	

Semester-V: Reaction Dynamics (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

The aim of this course is to teach students reaction dynamics with emphasis on order and molecularity of reactions, rate laws and rate equations, equilibrium and steady states, collision theory etc.

ii. ***Learning outcome***

Students shall learn how to mathematically model chemical reactions and evaluate the necessary rates of chemical reactions. They shall also be able to comprehend enzyme action in human physiology. Students hall be able to visualize complex reaction mechanisms via mathematical modeling and develop an analytical thinking ability.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. **Particulars of Course Designer (Name, Institution, email id):**

1) Dr. Dhriti Mahanta, Gauhati University, mdhriti@gauhati.ac.in

2) Dr. Dhruba Jyoti Kalita, Gauhati University, dhrubajyoti.kalita@gauhati.ac.in

Semester V – Reaction Dynamics (3L-0T-1P)

Unit	**Content**	**Contact Hrs**
Unit I: Kinetics I	Order and molecularity of reactions. Rate laws and rate equations for zero, first and second order reactions (2A→P, A+B→ P): their derivations, graphical representations and examples. Expressing the rate laws in terms of volume and pressure of reactants. Experimental determination of order of reactions (half-life method and initial rate method). Temperature dependence of reaction rate, energy of activation (its connection to Gibbs free energy). Arrhenius equation, energy of activation. Pre-exponential Factor and failure of Arrhenius Equation.	9
Unit II: Kinetics II	Difference between equilibrium and steady state. Limiting reagents, rate-determining step and steady-state approximation – explanation with suitable examples (eg. dissociation of HBr and acetaldehyde). Opposing reactions, consecutive reactions and parallel reactions (with examples and explanation of kinetic and thermodynamic control of products; all steps first order). Idea on explosive reactions. Enzyme catalysis: Derivation of Michaelis-Menten equation and interpretation of Lineweaver-Burk Plots. Eadie- Hofstee plot. Turn-over number. Oscillating reactions.	14
Unit III: Reaction Dynamics	Collision theory (detailed treatment). Modeling the Preexponential factor. Sphere of influence and collision cross section, Equivalence between Arrhenius and Collision theory. Failure of Collision theory. Physical interpretation of reaction co-ordinates and potential energy surfaces. Activated complex theory (detailed treatment). Thermodyamic formulation and derivation of Eyring equation. Evaluation of Arrhenius pre-exponential factor from transition state theory. Common examples where transition states have been experimentally identified or predicted. Chemically and Diffusion controlled reactions with examples. Primary and secondary salt effects with examples. Derivation of Bronsted-Bjerrum Equation and its graphical representation. Lindemann and Hinshelwood theory of unimolecular reaction and graphical representation.	22

Laboratory experiments	1. Determine the rate constant of the acid catalyzed hydrolysis of methyl acetate. 2. Determine the rate constant of saponification of ethyl acetate. 3. Determine the activation energy of the hydrolysis of methyl acetate catalyzed by hydrochloric acid. 4. Verify the Freundlich isotherm for the adsorption of oxalic acid on activated charcoal. 5. Verify the Langmuir isotherm for the adsorption of acetic acid on activated charcoal. Determine the critical micelle concentration of a surface-active agent by surface tension measurements. 6. Study the kinetics of the Iodide-persulphate reaction by Initial rate method. 7. Theory and computer aided linear curve-fitting techniques (eg. first order kinetics using least squares) and evaluation of errors and standard deviations.	30

Text Books:

1. Atkins' Physical Chemistry, Atkins, de Paula and Keeler
2. Chemical Kinetics and Reaction Dynamics, Paul L. Houston

Reference books:

1. A Textbook of Physical Chemistry, K. L. Kapoor, Volume V, Macmillan
2. Principles of Physical Chemistry, Puri, Sharma, Pathania, 48th edition, Vishal Publication.
3. Physical Chemistry: P C Rakshit
4. Physical Chemistry: A Molecular Approach by McQuarrie and Simon
5. Chemical Kinetics by Kaith J Laidler, McGraw-Hill

Semester-V: Light-Matter Interaction (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

This paper is focused on fundamental theory and application of photochemistry and various spectroscopic techniques such as rotational, vibrational, electronic and Raman spectroscopy. The accompanying laboratory course aims to introduce the students to various computational/experimental tools.

ii. ***Learning outcome:***

Students shall learn about the theory of photochemistry, spectroscopy and their application in chemistry. They shall use the knowledge gained from the quantum theories to identify unknown chemical compounds using modern techniques. The experiments performed in the laboratory course shall enable the learners to analyze/estimate various analytes using different techniques.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Himangshu Prabal Goswami, Gauhati University, hpg@gauhati.ac.in

2) Dr. Dhriti Mahanta, Gauhati University, mdhriti@gauhati.ac.in

Semester V – Light-Matter Interaction (3L-0T-1P)

Unit	Content	Contact Hrs
Unit I: Photochemistry:	Laws of photochemistry: Grotthus-Draper law, Stark-Einstein law of photochemical equivalence. Beer-Lambert law (for solids and liquids) and limitations. Quantum yield and its measurement for photochemical processes. Actinometry. Photostationary state. Photosensitized reactions (with examples). Jablonski diagrams: internal conversion, intersystem crossing, fluorescence and phosphorescence. Frank Condon principle. Primary and secondary processes in photochemical reactions.	10
Unit II: 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. Absorption cross section and Einstein's coefficients. Difference between atomic and molecular spectra. Born- Oppenheimer approximation. Separation of molecular energies into translational, rotational, vibrational and electronic degrees of freedom. Factors affecting intensities and width of spectral lines. Microwave (pure rotational) spectra of diatomic molecules. Selection rules and transition dipole moment. Structural information derived from rotational spectroscopy. IR Spectroscopy: Selection rules, IR spectra of diatomic molecules and organic compounds having functional groups. Structural information derived from vibrational spectra. Vibrations of polyatomic molecules. Group frequencies. Effect of hydrogen bonding (inter and intramolecular) and substitution on vibrational frequencies. Electronic Spectroscopy: electronic excited states and selection rules. Free electron model and its application to electronic spectra of polyenes. Vibronic and spin orbit coupling. Colour and constitution, chromophores, auxochromes, bathochromic and hypsochromic shifts. Woodward-Fieser rules. Qualitative treatment of Raman effect. Elements of rotational Raman spectra Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference. Rule of mutual exclusion.	35

Laboratory (minimum of seven to be performed)	1. Calculation of the rotational constant for simple diatomic systems (eg. N_2, F_2, O_2) via quantum chemistry softwares. 2. Calculation of the optimum bond length by hand (theoretical) from the rotational constant via the rigid rotor approximation for a diatomic molecule. 3. To perform a series of single point calculations above and below equilibrium bond distance to generate a potential energy surface (PES) followed by a frequency calculation on the optimized geometry. Use of the resulting fundamental frequency to calculate the force constant of the bond. 4. Simulating the IR spectra of simple nonlinear molecules (eg. water, ammonia, boron trifluoride etc) using quantum chemistry software and assign the spectra to the corresponding vibrational modes. 5. To study the 200-500 nm absorbance spectra of $KMnO_4$ and $K_2Cr_2O_7$ (in dil. H_2SO_4) and determine the λ_{max} values. Calculate the energies of the two transitions in different units (J molecule^{-1}, kJ mol^{-1}, cm^{-1}, eV). 6. Study the pH-dependence of the UV-Vis spectrum (200-500 nm) of $K_2Cr_2O_7$. 7. Record the 200-350 nm UV spectra of organic compounds (eg. acetone, acetaldehyde, 2-propanol, acetic acid) and interprete the spectra. Compare these experimental results with associated theoretical rules. 8. Complete spectral analysis of the given (or recorded) vibration-rotation spectrum of HCl (g). 9. Verify Lambert-Beer's law and determine the concentration of $CuSO_4$/$KMnO_4$/$K_2Cr_2O_7$ in a solution of unknown concentration 10. Determine the concentrations of $KMnO_4$ and $K_2Cr_2O_7$ in a mixture. 11. Study the kinetics of iodination of propanone in acidic medium. 12. Determine the amount of iron present in a sample using 1,10-phenathroline. 13. Determine the dissociation constant of an indicator (phenolphthalein). 14. Study the kinetics of interaction of crystal violet/ phenolphthalein with sodium hydroxide.	30

Text Books:

1. Fundamentals of Molecular Spectroscopy, C N Banwell, 4th Edition, McGraw-Hill
2. Atkins Physical Chemistry, P Atkins, J Paula and J Keeler, 11th Edition, Oxford University Press. 2018

Reference Books:

1. Introduction to Spectroscopy, DL Pavia, GL Lampman, GS Kriz and J R Vyvyan, 5th Edition, Cengage India Private Limited, 2015
2. Introduction to Molecular Spectroscopy: GM Barrow, McGraw Hill, 1992.
3. Basic Atomic and Molecular Spectroscopy, Vol 11, J M Hollas, Royal Society of Chemistry, 2002.
4. Symmetry and Spectroscopy: an introduction to vibrational and electronic spectroscopy, DC Harris and M D Bertolucci, 1989, Dover Publications
5. Molecular Spectroscopy, JL McHale, 2nd Edition, CRC Press
6. Atomic and Molecular Spectroscopy: Basic Concepts and Applications. Rita Kakkar, 2nd Edition, S Chand Publishing

Semester-VI: Inorganic Chemistry III (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course aims at giving students the introduction to inorganic reaction mechanisms and bioinorganic chemistry. Moreover, this course emphasizes on organometallic chemistry with reference to transition metal-π bound complexes, metal-carbenes and organometallic catalysis. The laboratory course intends to introduce students to preparation and characterization of coordination complexes and double salts.

ii. ***Learning outcome:***

Students shall understand the mechanisms of inorganic reactions and the role of metal ions in biological processes and therapeutic activities. They will be acquainted with the synthesis, structure and reactivity of various organometallic compounds, and their application in organometallic catalysis. Furthermore, the students will understand the importance of organometallic catalysis in the synthesis of industrially important compounds. The laboratory experiments will enable the learners to synthesize metal complexes and double salts and their characterization by various analytical techniques.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Sanfaori Brahma, Gauhati University, sanfaori@gauhati.ac.in

2) Dr. Apurba Kalita, B Barooah College, apurbakalitabbc@gmail.com

Semester VI- Inorganic Chemistry III **(3L-0T-1P)**

Unit	**Content**	**Contact Hrs**
Unit I Coordination Chemistry-V	Introduction to inorganic reaction mechanisms. Stepwise and overall formation constants, the chelate effect, thermodynamic and kinetic stability of complexes, chelate effect and its applications in analytical chemistry and biology. Substitution reactions in octahedral complexes, factors affecting the substitution reaction, effect of acid and bases on substitution reaction of octahedral complexes. Substitution reaction of square planar complexes, trans-effect, theories of trans effect, trans effect in synthesis of square planar complexes. Electron transfer reactions (elementary ideas only)	15
Unit II Organometallics II	Metal alkenes, alkynes and allyls: synthesis, structure, bonding and reactivity. Metal carbene: synthesis, structure, bonding and reactivity Ferrocene: preparation and reactions (acetylation, alkylation, metallation, Mannich condensation). Structure and aromaticity. Comparison of aromaticity and reactivity with that of benzene Fundamentals of organometallic reactions: oxidative addition, reductive elimination, insertion and β-hydride elimination reaction. Transition metals in catalysis. Study of the industrial processes and their mechanism: alkene hydrogenation (Wilkinson's Catalyst), hydroformylation (Co catalysts), Wacker Process, synthetic gasoline (Fischer Tropsch reaction), Monsanto acetic acid process.	15
Unit III Bioinorganic Chemistry	Essential and trace metals in biology. Effect of deficiency of essential metal ions. Toxic effect of metal ions (Fe, Cu, Hg, Pb, Cd and As), chelate therapy, cisplatin as anticancer drug. Storage and transport of iron, active transport of ions (sodium -potassium pump) Active site structure and function of haemoglobin (cooperativity and Bohr effect), myoglobin, hemocyanin, hemerythrin, rubredoxin, ferredoxin (Fe_2S_2, Fe_4S_4), cytochrome P450, superoxide dismutase, carbonic anhydrase and carboxypeptidase, nitrogenase enzyme, vitamin B_{12}	15

Laboratory: Inorganic Preparation	Following compounds should be prepared and tested for the presence of ions qualitatively. IR and UV-Visible spectra of these complexes should be recorded, interpreted and discussed. i) Preparation of Mohr's Salt, chrome alum and potash alum ii) Cis and trans $K[Cr(C_2O_4)_2.(H_2O)_2]$ Potassium dioxalatodiaquachromate (III) iii) Potassium tris(oxalato)ferrate(III) iv) Vanadyl bis(acetylacetonate) v) Cu-thiourea complex vi) Acetylation of ferrocene and purification of mono and bis derivatives by column chromatography.	30
Text/ Reference Books	1. Inorganic Chemistry (Principles of Structure and Reactivity), J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, 5th edition, Pearson Education. 2. Principles of Inorganic Chemistry, 7th edition, Puri, Sharma, Kalia, Vishal Publishing Co. 3. Bioinorganic Chemistry, Bertini, Gray, Lippard and Valentine, University Science Books. 4. The Organometallic Chemistry of the transition Metals, Robert H. Cratbtree, 4th edition, Wiley 5. Inorganic syntheses, series, Wiley.	

Semester-VI: Organic Chemistry III (3 L- 0 T- 1 P)

Graduate Attributes

i. ***Course Objective:***

This course aims at introducing the students to photo-chemical and pericyclic organic reactions. The learners shall be able to understand the chemistry of polynuclear aromatic hydrocarbons, organometallic compounds and their reactions.

Experiments are aimed at introducing the students to natural product extraction, photochemical organic transformations and estimation of organic compounds.

ii. ***Learning outcome:***

Students will be able to recognize and explain the mechanisms of photochemical and pericyclic reactions and apply mechanistic concepts to predict the outcome of synthetic reactions. Students will be introduced to the preparation, structure and reactivity of polyaromatic hydrocarbons and organometallic compounds.

Students will develop the skill set to extract important organic components from natural samples, estimate organic compounds and perform photochemical conversion.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Prof. Rupam Jyoti Sarma, Gauhati University, rjs@gauhati.ac.in

2) Dr. Ranjit Thakuria, Gauhati University, ranjit.thakuria@gauhati.ac.in

Semester-VI: Organic Chemistry III (3 L- 0 T- 1 P)

Unit	Content	Contact Hours
Unit I: Photochemistry	Electron excitation in organic molecules (alkenes and carbonyl compounds); fate of electronically excited molecules; singlet and triplet states; photoreduction of carbonyl compounds; photoaddition of alkenes to carbonyl compounds (Paterno-Buchi reaction); photoaddition of alkeñes to aromatic compounds; photorearrangement (cis-trans isomerization, intramolecular cyclization of dienes); photochemical fragmentation (photolysis of carbonyl compounds: Norrish type I and type II reactions).	10
Unit II: Pericyclic reactions	Cycloadditions: general description of the Diels-Alder reaction; frontier orbital description of [4+2] cycloadditions; regioselectivity in Diels-Alder reactions; Woodward-Hoffmann description of the Diels-Alder reaction; photochemical [2+2] cycloadditions; thermal [2+2] cycloadditions. Sigmatropic reactions: conditions for sigmatropic reactions, orbital descriptions of [3,3]-sigmatropic rearrangements; Cope rearrangement Electrocyclic reactions: conditions for [4π+2] and [4π] electrocyclic reactions; conrotatory and disrotatory reactions.	15
Unit III: Polynuclear hydrocarbons	Preparation, structure and reactions of naphthalene, phenanthrene and anthracene.	5
Unit IV: Organometallic chemistry	General introduction to preparation, structure and reactivity of organolithium, organomagnesium (Schlenk equilibrium), organocopper, organozinc, organoaluminum, and organoboron reagents; general methods of preparation: deprotonation, metal-halogen exchange, transmetallation; directed metallation.	15
Laboratory Course	1. Extraction of D-limonene from orange peel by the conventional method/ using liquid CO_2 prepared form dry ice. 2. Extraction of caffeine from commercially available tea leaves. 3. Photoreduction of benzophenone to benzopinacol in the presence of sunlight/UV irradiation. 4. Organic estimations (any three): (i) Estimation of glycine by Sorenson's formalin method. (ii) Study of the titration curve of glycine (by pH metric methods). (iii) Determination of Iodine number of vegetable oil or a fat. (iv) Saponification value of vegetable oil or a fat. (v) Estimation of glucose by titrimetric methods.	30

Recommended books	1. Foundations of Photochemistry, K. K. Rohatgi-Mukherjee, 3rd Edition. 2. Principles of Organic Synthesis, R. O. C. Norman, J. M. Coxon, 3rd Edition. 3. Mechanism and Theory in Organic Chemistry, T. H. Lowry, K. S. Richardson. 4. Pericyclic Reactions, Vinod Kumar, S. P. Singh. 5. Organic Chemistry, Volume 1, I. L. Finar, 5th Edition. 6. Organic Chemistry, Jonathan Clayden, Nick Greeves, Stuart Warren, 2nd Edition. 7. Modern Methods of Organic Synthesis, W. Carruthers, I. Coldham, 4th Edition. 8. B. S. Furniss, A. J. Hannaford, P. W. G. Smith, Vogel's Textbook of Practical Organic Chemistry, Pearson, 2012. 9. V. K. Ahluwalia, S. Dhingra, Comprehensive Practical Organic Chemistry, University Press. 10. F. G. Mann, B. C. Saunders, Practical Organic Chemistry, 3rd Edition Longman, 1978.

Semester-VI: Equilibria and Electrochemistry (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

The aim of this course is to introduce students to primarily two areas of physical chemistry- equilibria and electrochemistry. Discussion of equilibria encompasses- chemical, ionic and phase equilibria. The learners are expected to learn various laws of electrochemistry, measurements of conductance, applications of electrolysis in industry, electrochemical cells etc. The accompanying laboratory course is designed to introduce students to various experiments using pHmetry, conductometry, calorimetry etc.

ii. ***Learning outcome:***

Students shall understand how dynamic equilibrium works in chemical reactions. They shall be introduced to ionics, phases and electrochemical systems.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Debajyoti Mahanta, Gauhati University, debam@gauhati.ac.in

2) Dr. Sanjib Deuri, M C College, Barpeta, s_deuri@yahoo.com

Semester VI – Equilibria and Electrochemistry (3L-0T-1P)

Unit	**Content**	**Contact Hrs**
Unit I: Chemical Equilibria	Equilibrium of homogeneous and heterogeneous systems. Law of mass action, derivation of expression of equilibrium constants; temperature, pressure and concentration dependence of equilibrium constants (K_P, K_C, K_X), their applications. Le Chatelier's principle of dynamic equilibrium and its applications.	**5**
Unit II: Ionic Equilibria	Introduction to ionic equilibrium. Ionic product. Common ion effect: its application. Acid-base equilibria. Dissociation constants of mono and dibasic acids. pH scale, pH of very dilute and very concentrated solutions. Concept of strengths of solutions (molarity, normality and molality, difference between mass of a substance and amount of a substance). Calculation of strengths of acid and basic mixtures. pH titration curves of acid mixtures, salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions and derivation of Henderson-Hasselbalch equation (for mono and dibasic acids). Solubility and solubility product of sparingly soluble salts – applications of solubility product principle with special reference to inorganic group separation. Explanation of inorganic group separation table using Le Chatelier's principle, solubility product and common ion effect.	**10**
Unit III: Phase Equilibria	Definitions of phase, component and degrees of freedom. Gibb's phase rule and its derivations. Clausius-Clapeyron equation and its applications to solid-liquid, liquid-vapour and solid-vapour equilibria, phase diagram for one component systems, with applications. Phase diagrams for systems of solid-liquid equilibria involving eutectic, congruent and incongruent melting points, solid solutions. Fractional distillation of binary miscible liquids (ideal and nonideal), azeotropes, lever rule, partial miscibility of liquids, CST, miscible pairs, steam distillation. Nernst distribution law. Solvent extraction.	**15**
Unit IV: Electrochemistry	Conductivity, equivalent and molar conductivity and their properties; Kohlrausch law; Debye-Huckel Theory, Debye-Huckel Limiting Law , Debye Hückel Onsager equation (no derivation required); Ionic velocities, mobilities, transference numbers and its experimental determination using Hittorf and moving boundary methods; Applications of conductance measurement; Quantitative aspects of Faraday's laws of electrolysis, applications of electrolysis in metallurgy and industry; Electrolytic and galvanic cells, Electromotive force of a cell, Nernst equation; Standard	**15**

	electrode potential, Electrochemical series; Concentration cells with and without transference; Applications of EMF measurements including potentiometric titrations. Electrochemistry behind standard Pb Batteries and rechargeable Li-ion batteries.	
Laboratory experiments (a minimum of seven experiments to be performed)	1. pH metric titration of strong acid vs. strong base, 2. pH metric titration of weak acid vs. strong base. 3. Determination of dissociation constant of a weak acid. 4. Determination of critical solution temperature and composition of the phenol-water system and to study the effect of impurities on it. 5. Determine the transition temperature of a salt hydrate. 6. Construction of phase diagram (freezing point curve) using ignition tube method for two- component simple eutectic system. 7. Construction of phase diagram (freezing point curve) using ignition tube method for two- component congruently melting compound forming system. 8. Study the distribution of iodine between water and kerosene/carbon tetrachloride. 9. Determine the association factor of benzoic acid in benzene by distribution of benzoic acid between water and benzene. 10. Determine the vapour pressure of water at different temperatures and hence evaluate the enthalpy of vaporization of water. 11. Determine the partition coefficient of ammonia between water and chloroform and also determine the formula of copper-ammonia complex. 12. Study of the solubility of benzoic acid in water and determination of ΔH. ** Other experiments may also be introduced.	**30**

Textbooks:

1. Atkins Physical Chemistry, P Atkins, J de Paula and J Keeler, 11th Edition, Oxford University Press.
2. Principles of Physical Chemistry, Puri, Sharma, Pathania, 48th Edition, Vishal Publishing Com.

Reference Books:

1. Physical Chemistry: RS Berry, SA Rice and J Ross, 2nd Edition, Oxford University Press.
2. Physical Chemistry, P C Rakshit, Enlarged Seventh Edition, Sarat Book House.
3. Modern Electrochemistry, J O'M Bockris and AKN Reddy, Volume I: Ionics, Second Edition, Springer

Semester-VI: Industrial Chemistry (3L-0T-1P)

Graduate Attributes

i. ***Course Objective:***

This course provides an introduction to the various industrial gases and inorganic chemicals, their manufacturing processes, applications, storage and the hazards of handling them. The students are also expected to learn the synthetic processes, properties and the utility of the industrially important inorganic materials.

ii. ***Learning outcome:***

Students shall acquire knowledge of industrially important chemical processes. They shall know the extraction processes and the chemistry of firecrackers, ceramics, glass and cements.

No. of Required Classes: 45 (Theory) + 30 (Practical)

No. of Contact Classes: 45 (Theory) + 30 (Practical)

No. of Non-Contact Classes:

iii. ***Particulars of Course Designer*** (Name, Institution, email id):

1) Dr. Akhtar Hussain, Handique Girls College, akhtariisc@gmail.com

2) Dr. Sonit Kumar Gogoi, Gauhati University, skgogoi@gauhati.ac.in

Semester VI: Industrial Chemistry (3L-0T-1P)

Units	Content	Contact Hrs
Unit I: Industrial Gases and Common Inorganic Chemicals	**Industrial Gases:** large scale production, uses, storage and hazards in handling of the following gases: hydrogen, oxygen, nitrogen, chlorine, argon, helium, acetylene, phosgene. **Inorganic Chemicals:** manufacture, application and hazards in handling the following chemicals: hydrochloric acid, nitric acid, sulphuric acid, caustic soda, bleaching powder, hydrogen peroxide, potash alum, and potassium permanganate.	**9**
Unit II: Silicate Industries	**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, borosilicate glass, armoured glass, coloured glass, photosensitive glass. **Ceramics:** important clays and feldspar, ceramic, their types and manufacture. High technology ceramics and their applications, semiconducting oxides. **Cements:** classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.	**8**
Unit III: Fertilizers	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.	**6**
Unit IV: Surface Coatings	Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings. Paints and pigments-formulation, composition and related properties. Pigments, toners and lake pigments, fillers, thinners, enamels, emulsifying agents. Special paints (heat retardant, fire retardant, eco-friendly and plastic paint), dyes, wax polishing, water and oil paints, additives, metallic coatings (electrolytic and electroless), metal spraying and anodizing.	**8**
Unit V: Alloys	Classification of alloys, ferrous and non-ferrous alloys, specific properties of elements in alloys. Manufacture composition and properties of different types of steels (stainless steel, Ni-steel, Cr-steel). Brass, bronze and Cu-Ni alloy.	**6**

Unit VI: Catalysis	Catalysts and their industrial applications, deactivation or regeneration of catalysts. Phase transfer catalysts, application of zeolites as catalysts.	**4**
Unit VII: Pyrotechnics and Propellants	Firecrackers- composition and effect. Fire extinguishers-types and use. Car airbag chemistry. Introduction to rocket propellants.	**4**
Laboratory	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).	**30**
Text Books and Reference Books	1. Industrial Chemistry, Vol-I, E. Stocchi, Ellis Horwood Ltd. UK. 2. Industrial Chemistry-I & Industrial Chemistry-II, B. K. Sharma, Krishna's Educational Publishers. 3. Riegel's Handbook of Industrial Chemistry, J. A. Kent, CBS Publishers. 4. R. Gopalan, D. Venkappayya, S. Nagarajan, Engineering Chemistry, Vikas Publications. 5. Engineering Chemistry, B. K. Sharma, Goel Publishing House.	

FOUR YEAR UNDERGRADUATE PROGRAMME

SUBJECT: MATHEMATICS

SEMESTER-I
Classical Algebra
Total Marks: 100 (Theory 80, Internal Assessment 20)
No. of Credits: 4

Base syllabus: MAT-HG-2016/MAT-RC-2016: Algebra (UG CBCS)

Course Level: 100-199

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Mathematics in 10+2 or equivalent standard.

Course Objectives: The primary objective of this course is to introduce the basic tools of complex numbers, theory of equations, matrices and matrix method of solution of homogeneous linear equations up to four variables.

Course Learning Outcomes: This course will enable the students to:

- Employ De Moivre's theorem in a number of applications to solve numerical problems.
- Learn the basic concepts of exponential, logarithmic and hyperbolic functions of complex numbers.
- Learn how to find the nature of the roots of a given polynomial equation by Descartes' rule , also learn about symmetric functions of the roots for cubic and biquadratic equations.
- Learn how to solve cubic and biquadratic equations.
- Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Finding inverse and rank of a matrix.

Unit 1:

Polar representation of complex number, De Moivre's theorem (both integral and rational index), Roots of complex numbers, n^{th} roots of unity, Application of De Moivre's Theorem, Exponential and logarithmic functions of complex numbers, Hyperbolic functions.

[1] Chapter 2 (Sections 2.7-2.13, 2.16)

(No. of classes: 20, Marks: 25)

Unit 2:

Algebraic equations: Deduction from Fundamental Theorem of Classical Algebra, Descartes' rule of signs, relation between roots and coefficients of a polynomial equation of degree n,

symmetric functions of roots, Transformation of equations, Cardon's method of solution of a cubic equation, Euler's method of solution of a biquadratic equation.

[1] Chapter 5; Theorem 5.1.1, Theorem 5.2.1, Section 5.3 - 5.6, 5.11,5.12.

(No. of classes: 20, Marks: 30)

Unit 3:

Matrix Algebra, Addition, Transposition, Symmetry, Multiplication of matrices and their properties, Matrix inversion and properties, Row Echelon form and Rank of a matrix, Reduced row Echelon form, Consistency of linear systems, Solutions of system of homogeneous linear equations with number of equations and unknowns up to four.

[2] Chapter 3 (Sections 3.2, 3.5, and 3.7) Chapter 2 (Sections 2.1 to 2.4)

(No. of classes: 20, Marks: 25)

Text Books:

1. Mappa, S.K., Higher Algebra (Classical), Revised 8th Edition, 2011, Levant Books.

2. Meyer, Carl D. (2000). Matrix Analysis and Applied Linear Algebra. Society for Industrial and Applied Mathematics (Siam).

Reference Books:

1. Dickson, Leonard Eugene (2009). First Course in The Theory of Equations. The Project Gutenberg eBook (http://www.gutenberg.org/ebooks/29785)

2. Gilbert, William J., & Vanstone, Scott A. (1993). Classical Algebra (3rd ed.). Waterloo Mathematics Foundation, Canada.

3. Titu Andreescu and Dorin Andrica, Complex Numbers from A to Z, Birkhauser,2006.

Course Designers: 1. Dr. Hemen Dutta. Dept.of Mathematics, Gauhati University.

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SEMESTER-II

Calculus

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HG-1016/ MAT-RC-1016: Calculus (UG CBCS)
Course Level: 100-199
No. of Contact classes: 60
No. of Non-Contact classes: 0
Prerequisites: Class XII Level Mathematics

Course Objectives: Calculus is referred as 'Mathematics of change' and is concerned with describing the precise way in which changes in one variable relate to the changes in another. Through this course, students can understand the quantitative change in the behaviour of the variables and apply them on the problems related to the environment.

Course Learning Outcomes: The students who take this course will be able to:

- Understand continuity and differentiability in terms of limits.
- Describe asymptotic behavior in terms of limits involving infinity.
- Understand the importance of mean value theorems.

Unit 1: Limits and continuity of a function including different approaches, Properties of continuous functions including Intermediate value theorem.

[1] Chapter 1

(No. of classes: 15, Marks: 20)

Unit 2: (a) Differentiability, Successive differentiation, Leibnitz theorem, Recursion formulae for higher derivatives.

(b) Reduction formulae, derivations and illustrations of reduction formulae of the type $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$, $\int \sec^n x\, dx$, $\int (\log x)^n\, dx$, $\int \sin^n x \cos^m x\, dx$.

[2] Chapter 5(for part (a))

[3] Chapter 4 (4.1-4.6) (only for part (b))

(No. of classes: 15, Marks: 20)

Unit 3: Rolle's theorem, Lagrange's mean value theorem with geometrical interpretations and simple applications, Maclaurin and Taylor polynomials and their sigma notations. Taylor's formula with remainder, Introduction to Maclaurin and Taylor series.

[1] Chapter 9 (Sections 9.8 and 9.9 (without 'convergence' part))

[2] Chapter 6

(No. of classes: 15, Marks: 20)

Unit 4: Functions of two or more variables, Partial differentiation up to second order, Euler's theorem on homogeneous functions

[1] Chapter 13 (Sections 13.1 and 13.3)

[2] Chapter 10(10.81)

(No. of classes: 15, Marks: 20)

Text books:

[1] Anton, Howard, Bivens, Irl, & Davis, Stephen (2013). Calculus (10th ed.). John Wiley & Sons Singapore Pte. Ltd. Reprint (2016) by Wiley India Pvt. Ltd. Delhi

[2] Shanti Narayan and P.K. Mittal, Differential Calculus, S. Chand, 2005

[3] Shanti Narayan and P.K. Mittal, Integral Calculus, S. Chand, 2007.

Reference book:

[1] Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). Thomas' Calculus (13^{th} ed). Pearson Education, Delhi. Indian Reprint 2017.

Course Designers:

1. Dr. Debasish Bhattacharjee, Department of Mathematics, Gauhati University,
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Phone No.: 9435348748, Email ID: anjanabs72@gmail.com

SEMESTER-III

Ordinary Differential Equations

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HG-3016/MAT-RC-3016: Differential Equations (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII Mathematics

Course Objectives: The main objective of this course is to introduce the students to the exciting world of differential equations and their solutions methods.

Course Learning Outcomes: The course will enable the students to:

- Learn basics of 1^{st} order ordinary differential equations and 2^{nd} order linear differential equations
- Learn different techniques for solving the differential equations

Unit 1: **First Order Ordinary Differential Equations**

Classification of differential equations; their origin and application. Solutions. First order exact differential equation. Integrating factors, Rules to find an integrating factor.

[1] Chapter 1(Sections 1.1and 1.2) Chapter 2 (Sections 2.1, 2.2 and 2.4)

Linear equations and Bernoulli equations. Basic theory of higher order linear differential equations. Solving differential equation by reducing its order. Wronskian and its properties.

[1] Chapter 2 (Section 2.3), Chapter 4 (Sections 4.1 and 4.6)

(No. of classes: 30, Marks: 40)

Unit 2: Second Order Linear Differential Equations

Linear homogenous equations with constant coefficients. Linear non- homogenous equations; the method of undetermined coefficients, the method of Variation of Parameters. The Cauchy-Euler equations.

[1] Chapter 4 (Sections 4.2, 4.3, 4.4 and 4.5)

(No. of classes: 30, Marks: 40)

Text Book:

[1] Ross, Shepley L. (1984). Differential Equations (3^{rd} Ed.), John Wiley & Sons,Inc.

Reference Book:

1.Kreyszig, Erwin (2011). Advanced Engineering Mathematics(10^{th} ed.).John Wiley & Sons, Inc. Wiley India Edition 2015.

Course Designers:

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SEMESTER-IV

Paper-I

Real analysis

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HG-4016/ MAT-RC-4016: Real Analysis (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics

Course Objective: The course will develop a deep and rigorous understanding of real line R andof defining terms to prove the results about convergence and divergence of sequences and series of real numbers. These concepts have wide range of applications in real life scenario.

Course Learning Out comes: This course will enable the students to:

- Understand many properties of the real line *R*, including completeness and Archimedean properties.
- Learn to define sequences in terms of functions from *N* to a subset of *R*.
- Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
- Apply limit comparison tests for convergence, the ratio, root, Raabe's, integral tests for convergence of an infinite series of real numbers.
- Alternating series and absolute convergence of an infinite series of real numbers.

UNIT 1: Algebraic and order properties of R, absolute value and real line, bounded sets, supremum and infimum, completeness property of R, the Archimedean property, the density theorem, intervals, nested interval theorem, uncountability of R.

[1] Chapter 2

(No of classes: 10, Marks: 15)

UNIT 2: Real sequences, limit of a sequence, convergent sequence, bounded sequence, limit theorems, monotone sequences, monotone convergence theorem, subsequences, monotone subsequence theorem, Bolzano Weierstrass theorem for sequences, Cauchy sequences, Cauchy's convergence criterion, properties of divergence sequences.

[1] Chapter 3

(No of classes: 25, Marks: 30)

UNIT 3: Infinite series, convergence and divergence of infinite series, Cauchy criterion, Tests for convergence: comparison test, limit comparison test, ratio test, root test, integral test, Raabes's test, Absolute convergence, rearrangement theorem, alternating series, Leibniz test, conditional (non-absolute) convergence.

[1] Chapter 3: Section: 3.7, Chapter 9: Sections: 9.1-9.3.

(No of classes: 25, Marks: 35)

Text Book:

1. R.G. Bartle and D.R. Sherbert, *Introduction to Real Analysis*, 3rd Ed., John Wiley and Sons, 2002.

Reference Books:

1. Gerald G. Bilodeau, Paul R. Thie, G.E. Keough, *An Introduction to Analysis,* Jones &Bartlett, Second Edition, 2010.
2. A. Kumar and S. Kumaresan, *Basic Course in Real Analysis*, CRC Press, 2014.
3. K.A. Ross, *Elementary Analysis*: *The Theory of Calculus*, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

Course Designers: 1. Prof. Bipan Hazarika, Department of Mathematics, Gauhati University
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SEMESTER-IV

Paper-II

Complex Analysis (with practical)

Total Marks: 100

(Theory: 60, Practical 20, Internal Assessment: 20)

No. of Credits: 4 (Theory 3, Practical 1)

Base syllabus: MAT-HC-5016: Complex Analysis (including practical)

Course Level: 200-299

No. of Contact classes: 75 (15×3+30×1)

No. of Non-Contact classes: 0

Prerequisites: Knowledge on

- complex number system as the extension of real number system
- Algebra of complex numbers.
- Properties of complex number.
- Modulus, argument and geometrical representation of complex numbers

Course Objectives: The main objective of this course is to develop a deep understanding of the complex plane together with various related concepts. These concepts have wide applicability in different aspects.

Course Learning Outcomes: The completion of the course will enable the students to:

- Learn the significance of differentiability of complex functions leading to the understanding of Cauchy−Riemannequations.
- Learn some elementary functions and valuate the contour integrals.
- Understand the role of Cauchy−Goursat theorem and the Cauchy integral formula

UNIT 1: Functions of complex variable, mappings, limits, theorems on limits, limits involving point at infinity, continuity. Derivatives, rules for differentiation, Cauchy-Riemann equations, sufficient conditions for differentiability, polar co-ordinates.

[1]: Chapter 2 (Section 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,23,24)

(No. of classes: 10, Marks: 15)

UNIT 2: Analytic functions, examples of analytic functions, harmonic function. The exponential function, Logarithmic function, examples, branches and derivatives of logarithms,some identities involving logarithms, the power function. trigonometric function, zeros and singularities of trigonometric functions derivatives of functions, definite integrals of functions.

[1]: Chapter 2 (Sections 25, 26,27), Chapter 3 (Sections 30, 31,32,33,34, 35,36,37,38), Chapter 4 (Section 41,42)

(No. of classes: 15, Marks: 15)

UNIT 3: Contours, Contour integrals and its examples, upper bounds for moduli of contour integrals, antiderivatives, proof of antiderivative theorem.

[1]: Chapter 4 (Section 43, 44, 45,47, 48, 49)

(No. of classes: 10, Marks: 15)

UNIT 4: Cauchy-Goursat theorem, simply connected domains, multiply connected domains, Cauchy integral formula, extension of Cauchy integral formula, Liouville's theorem and the fundamental theorem of algebra.

[1]: Chapter 4 (Sections 50, 52, 53,54, 55, 58)

(No. of classes: 10, Marks: 15)

LAB WORK TO BE PERFORMED ON A COMPUTER

(MODELING OF THE FOLLOWING PROBLEMS USING MATLAB/ MATHEMATICA/ MAPLE etc.)

1. Declaring a complex number and graphical representation. e.g. $Z_1 = 3 + 4i$, $Z_2 = 4 - 7i$

2. Program to discuss the algebra of complex numbers, e.g.,

$Z_1 = 3 + 4i$, $Z_2 = 4 - 7i$, then find $Z_1 + Z_2$, $Z_1 - Z_2$, $Z_1 * Z_2$ and Z_1 / Z_2

3. To find conjugate, modulus and phase angle of an array of complex numbers.

e.g. $Z = [2+ 3i, 4-2i, 6+11i, 2-5i]$

4. To compute the integral over a straight line path between the two specified end points.

e. g., $\oint \mathrm{Sin} z \, dz$, along the contour C which is a straight line path from -1+ i to 2 - i.

5. To perform contour integration., e.g.,

(i) $\oint (z^2 - 2z + 1) dz$ along the Contour C given by $x = y^2 + 1; -2 \leq y \leq 2$.

(ii) $\oint (z^3 + 2z^2 + 1) dz$ along the contour C given by $x^2 + y^2 = 1$, which can be parameterized by $x = \cos(t), y = \sin(t)$ for $0 \leq y \leq 2\pi$.

6. To plot the complex functions and analyze the graph. e.g.,

$f(z) = z, iz, z^2, z^3, e^z$ and $(z^4-1)^{1/4}$, etc

(No. of practical classes: 30, Marks: 20)

Text Book:

1. James Ward Brown and Ruel V. Churchill, Complex Variables and Applications (Ninth Edition), McGraw-Hill Indian Edition, 2021.

Reference Book:

1. Joseph Bak and Donald J. Newman, *Complex analysis* (2nd Edition), Undergraduate Texts in Mathematics,Springer-Verlag New York, Inc., New York, 1997.

2. M.R. Spiegel, *Complex Variables*. Schaum's Outlines series, McGraw Hill Education, 2017

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SEMESTER-IV

Paper-III

Analytical Geometry

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4 (Each unit carries equal credit)

Base syllabus: MAT-HG-1026: Analytical Geometry (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII Mathematics

Course Objectives: The primary objective of this course is to introduce some basic tools of two-dimensional and three-dimensional coordinate systems and also to familiarise the use of Vector Algebra in Coordinate Geometry.

Course Learning Outcomes: This course will enable the students to:

- transform coordinate systems
- learn about pair of straight lines
- have a clear understanding of the conic sections and related properties
- recognise three dimensional surfaces represented by equations of the second degree
- learn two different systems of coordinates which are very useful to define the position of a point in space
- acquire basic concepts of Vector Algebra and understand the use of geometric view of vectors in Coordinate Geometry.

UNIT 1: Transformation of coordinates, invariants under orthogonal transformations, pair of straight lines.

[1] Chapter 1 (Section 1.3), Chapter 2, Chapter 3

(No. of classes: 15, Marks: 20)

UNIT 2: Parabola, parametric coordinates, tangent and normal, ellipse and its conjugate diameters with properties, hyperbola and its asymptotes, General conics: tangent, condition of tangency, pole and polar, centre of a conic, equation of pair of tangents, reduction to standard forms, central conics, equation of the axes, and length of the axes, polar equation of a conic, tangent and normal, and properties.

[1] Chapters 4, 5, 6, 7, 9 (upto Section 9.43)

(No. of classes: 15, Marks: 20)

UNIT 3: Quadric surfaces: Sphere, Cylinder and Cone. Cylindrical and spherical polar coordinates.

[1] Chapter 6 (Section 6.1 – 6.3), Chapter 12

(No. of classes: 15, Marks: 20)

UNIT 4: Rectangular coordinates in 3-space, Vector viewed geometrically, Vectors in coordinates system, Vectors determined by length and angle, Dot product, Cross product and their geometrical properties, Triple product, Parametric equations of lines in 2-space and 3-space.

[2] Chapter 11 (Section 11.1 - 11.5)

(No. of classes: 15, Marks: 20)

Text Books:

1. R.M. Khan, Analytical Geometry of two and three dimensions and Vector Analysis. New Central Book Agency, 2012.

2. Anton, Howard, Bivens, Irl, & Davis, Stephen (2013), Calculus (10^{th} ed.). John Wiley & Sons, Singapore Reprint (2016) by Wiley India Pvt. Ltd., Delhi.

Reference Book:

1. R.J.T. Bell, Coordinate Solid Geometry, Macmillan, 1983.

2. E.H. Askwith, The Analytical Geometry of the Conic Sections, Nabu Press (27 February 2012)

3. B. Das, Analytical Geometry and Vector Analysis, Orient Book Company, Kolkata -700007

Course Designers:

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SEMESTER-IV

Paper-IV

Number Theory

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HE-5016: Number Theory (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Mathematics in senior secondary school or equivalent standard.

Course Objectives:

The primary objective of this course is to develop students' understanding of integers, with a focus on their properties and representations, as well as their understanding of number theoretic analysis.

Course Learning Outcomes: On successful completion of the course students will be able to:

- Explain division algorithm, Euclid's algorithms and greatest common divisor.
- Explain the concepts of congruences, linear congruences .
- Explore the Chinese Remainder theorem to solve simultaneous linear congruences.
- Explain Fermat's theorem and Wilson's theorem.
- Solve a range of problems in number theory
- Apply mathematical ideas and concepts within the context of number theory.
- Communicate number theoretic techniques to a mathematical audience.

Unit 1: Well-Ordering Principle of integers, Archimedian property, First principle of finite induction, Second principle of finite induction, The division algorithm of integers, The greatest common divisor, The Euclidean algorithm, The Diophantine equation $ax + by = c$, Fundamental Theorem of Arithmetic, The sieve of Eratosthenes, The Goldbach Conjecture.

[1] Chapter 1 (Sections 1.1), Chapter2 (sections 2.2 -- 2.5), Chapter3.

(No of classes:20, Marks:25)

Unit 2: Congruence modulo of a fixed positive integer, Basic properties of congruences, Binary and decimal representation of integers, Linear congruences, Chinese Remainder Theorem, Fermat's Little Theorem, pseudoprimes, Wilson's Theorem.

[1] Chapter 4 (Sections 4.2-4.4) Chapter5 (Sections: 5.2, 5.3).

(No of classes: 20, Marks: 25)

Unit 3: Number Theoretic Functions: The sum and number of divisors of a positive integer, Multiplicative functions, Mobius function, The Mobius inversion Formula, The greatest integer function, Euler's Phi-Function, Euler's Theorem, Properties of Euler's Phi function.

[1] Chapter 6 (Sections 6.1-6.3), Chapter 7 (Sections 7..2 to 7.4) .

(No of classes:20, Marks:30)

Text Books:

1. David M. Burton, *Elementary Number Theory*, 7th Edition, McGraw Hill Education (India) private limited. 2012.

Reference Books:

1. G.A. Jones and J. Mary Jones, *Elementary Number Theory*. Undergraduate Mathematics Series (SUMS) , 2005.

2. Neville Robinns, *Beginning Number Theory*. 2nd Ed., Narosa Publishing House Pvt. Ltd. Delhi-2007

3. K.C. Chowdhury, *A First Course in Number Theory*, Asian Books Publications- 2012.

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SEMESTER-V

Paper-I

Abstract Algebra

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HC-3026: Group Theory-I (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Mathematics in senior secondary school or equivalent standard.

Course Objectives: The primary objective of this course is to introduce abstract mathematical objects, viz. groups, rings and fields and study their properties. It is also focussed to study the consequences of these mathematical structures.

Course Learning Outcomes: On successful completion of the course students will be able to:

- Recognize the mathematical objects called group, ring and fields.
- Link the fundamental concepts of groups and symmetries of geometrical objects.
- Explain the significance of the notion of Permutation groups, cosets, cyclic groups, normal subgroups, factor groups.
- Analyse consequences of Lagrange's theorem and Fermat's Little theorem.
- Describe structure preserving mappings between groups and their consequences.
- Describe the fundamental concepts in ring theory such as of the subrings, integral domains, ideals, factor rings and fields.

Unit 1: Definition and examples of groups, Elementary properties of groups, Symmetries of a square, Dihedral groups, order of a group, Order of an element in a group, Subgroups, Subgroup Tests, Subgroup generated by an element of a group, Centre of a group, Centralizer of an element in a group, Cyclic groups, Properties of cyclic groups, Fundamental theorem of cyclic groups.

[1] Chapter 1 to Chapter 4.

(No. of classes: 15, Marks: 20)

Unit 2: Permutations, Permutation group, Properties of permutations, Even and odd permutations, Alternating groups, Cosets, Properties of cosets, Lagrange's Theorem, Fermat's Little Theorem, Normal subgroups, Factor groups.

[1] Chapter 5 (up to theorem 5.7), Chapter 7 (up to theorem 7.2), Chapter 9 (up to theorem 9.2)

(No. of classes: 15, Marks: 20)

Unit 3: Isomorphism of groups, Cayley's Theorem, Properties of isomorphism, Group homomorphism, Kernal of a group homomorphism, Properties of group homomorphism, First isomorphism Theorem of groups.

[1] Chapter 6 (up to theorem 6.3), Chapter 10 (up to theorem 10.4).

(No. of classes: 15, Marks: 20)

Unit 4: Rings, Examples of rings, Properties of rings, Subrings, Zero-Divisors in a ring, Integral domains, Fields, Characteristic of a ring, Ideals, Ideal Test, Factor rings, Prime ideals and maximal ideals of a ring.

[1] Chapter 12 to Chapter 14.

(No. of classes: 15, Marks: 20)

Text Books:

1. Gallian Joseph A., *Contemporary Abstract Algebra* (8th Edition) , Cengage Learning India Private limited, Delhi, Fourth impression, 2015.

Online link: https://ict.iitk.ac.in/wp-content/uploads/CS203-Mathematics-for-Computer-Science-III-Gallian.pdf

Reference Books:

1. David S. Dummit and Richard M. Foote, *Abstract Algebra* (2nd Edition) , John Wiley and Sons (Asia) Pvt. Ltd. , Singapore, 2003.

2. John B. Fraleigh, *A First course in Abstract Algebra*, 7th Edition, Pearson, 2002.

3. G. Santhanam. *Algebra,* Narosa Publishing House, 2017.

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SEMESTER-V

Paper-II

Multivariate Calculus

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

(Each unit carries equal credits)

(Use of Scientific calculator is allowed)

Base syllabus: MAT-HC-4016: Multivariate Calculus (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Knowledge on the following topics:

- Functions of single variable, limit, continuity, differentiability and extrema of single variable functions.
- Knowledge of Integration
- Vector valued functions, dot and cross product of vectors.

Course Objectives: To understand the extension of the studies of single variable differential and integral calculus to functions of two or more independent variables. Also, the emphasis will be on the use of Computer Algebra Systems by which these concepts may be analyzed and visualized to have a better understanding. This course will facilitate to becomeaware of applications of multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.

Course Learning Outcomes: This course will enable the students to:

- Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.
- Understand the maximization and minimization of multivariable functions subject to the given constraints on variables.
- Learn about inter-relationship amongst the line integral, double and triple integral formulations.
- Familiarize with Green's, Stokes' and Gauss divergence theorems

UNIT 1: Functions of several variables, Level curves and surfaces, Limits and continuity, Partial differentiation, Higher order partial derivative, Chain rule, Directional derivatives, The gradient, Maximal property of the gradient.

[1] Chapter 11 [(Sections 11.1, 11.2, 11.3, 11.5, Section 11.6 (upto page 592)]

(No. of classes: 15, Marks: 20)

UNIT 2: Extrema of functions of two variables, Method of Lagrange multipliers, Constrained optimization problems; Definition of vector field, Divergence and curl.
[1] Chapter 11 [Section 11.7 (up to page 605), Section 11.8 (pages 610-614)], Chapter13 (Section 13.1)
(No. of classes: 15, Marks: 20)

UNIT 3: Double integration over rectangular and nonrectangular regions, Double integrals in polar coordinates, Triple integral over a parallelepiped and solid regions, Volume by triple integrals.
[1] Chapter 12 (Sections 12.1-12.4)
(No. of classes: 15, Marks: 20)

UNIT 4: Line integrals, Applications of line integrals**:** Mass and Work, Fundamental theorem for line integrals, Conservative vector fields, Green's theorem, Area as a line integral; Surface integrals, Stokes' theorem, The Gauss divergence theorem.
[1] Chapter 13 [(Sections 13.2, 13.3), Section 13.4 (pages 712 to 716), Section 13.5 (pages 723 to 726) Section 13.6 (pages 733 to 737), Section 13.7 (pages 742 to 745)]
(No. of classes: 15, Marks: 20)

Text book:

[1] Strauss, Monty J.,Bradley, Gerald L.,& Smith, Karl J.(2007). *Calculus* (3rd ed.).Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Indian Reprint 2011

Reference Books:

1. Marsden, J.E., Tromba, A., & Weinstein,A.(2004).*Basic Multivariable Calculus*.Springer (SIE). First Indian Reprint.
2. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005.
3. James Stewart, Multivariable Calculus, Concepts and Contexts, 2nd Ed., Brooks /Cole, Thomson Learning, USA,2001.

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SEMESTER-V

Paper-III

Theory of Real Functions

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HC-3016: Theory of Real Functions (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics

Course Objective: The primary objective of this course is to study limit point of set and limit of a function. The discussion on continuous functions and differentiability with some related theorems will also be focused in this course.

Course Learning Outcomes: This course will enable the students to:

- Have a rigorous understanding of the concept of limit of a function.
- Learn about continuity and uniform continuity of functions defined on intervals.
- Understand geometrical properties of continuous functions on closed and bounded intervals.
- Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.
- Know about applications of mean value theorems and Taylor's theorem

UNIT 1: Cluster point or limit point of a set, limits of a function (ε-δ approach), sequential criterion for limits, divergence criteria, limit theorems, one sided limits, infinite limits and limits at infinity.

[1] Chapter 4

(No. of classes: 15, Marks: 20)

UNIT 2: Continuous functions, sequential criterion for continuity and discontinuity, algebra of continuous functions, continuous functions on intervals, maximum-minimum theorem, intermediate value theorem, location of roots theorem, preservation of intervals theorem, uniform continuity, uniform continuity theorem, monotone and inverse functions.

[1] Chapter 5 (5.1 to 5.6)

(No. of classes: 15, Marks: 30)

UNIT 3: Differentiability of a function at a point and in an interval, Caratheodory's theorem, chain rule, derivative of inverse function, Rolle's theorem, mean value theorem, Darboux's theorem, Cauchy mean value theorem, Taylor's theorem and applications to inequalities, Taylor's series expansions of exponential and trigonometric functions, ln(1+x), 1/(ax+b) and $(1+x)^n$.

[1] Chapter 6, and Taylor series as in Section 6.4.

(No. of classes: 30, Marks: 30)

Text Book:

1. R.G. Bartle and D.R. Sherbert, *Introduction to Real Analysis*, 3rd Ed., John Wiley and Sons, 2002.

Reference Books:

1. Ajit Kumar and S. Kumaresan, *A Basic Course in Real Analysis*, CRC Press, Indian Ed. 2014.
2. K.A. Ross, *Elementary Analysis: The Theory of Calculus*, Springer, 2004.
3. Mattuck, *Introduction to Analysis*, Prentice Hall, 1999.
4. S.R.Ghorpade and B.V.Limaye, *A Course in Calculus and Real Analysis*, Springer, 2006.

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SEMESTER-V

Paper-IV

Numerical Analysis (with practical)

Total Marks: 100

(Theory: 60, Practical 20, Internal Assessment: 20)

No. of Credits: 4 (Theory 3, Practical 1)

(Use of Scientific calculator is allowed)

Base syllabus: MAT-HG-4026: Numerical Analysis (UG CBCS)

Course Level: 300-399

No. of Contact classes: 75 (15×3+30×1)

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics, Knowledge on computer software and programming

Course Objectives: To comprehend various computational techniques to find approximate value for possible root(s) of non-algebraic equations, to find the approximate solutions of system of linear equations and Quadratic equations.

Course Learning Outcomes: The course will enable the students to:

- Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of asystem of linear equations, up to a certain given level of precision.
- Know about iterative and non-iterative methods to solve system of linear equations
- Know interpolation techniques to compute the values for a tabulated function at points not in the table.
- Integrate a definite integral that cannot be done analytically
- Find numerical differentiation of functional values
- Solve differential equations that cannot be solved by analytical methods

Unit 1: Gaussian elimination method (with row pivoting), Gauss-Jordan method; Iterative methods**:** Jacobi method, Gauss-Seidel method; Interpolation**:** Lagrange form, Newton form, Finite difference operators, Gregory-Newton forward and backward difference interpolations, Piecewise polynomial interpolation (Linear and Quadratic).

[1] Chapter 3(Sections 3.1, and3.2),Chapter 6(Sections 6.1,and 6.2) Chapter 8(Section8.1, Section8.3 (8.3.1, and8.3.2)

[2] Chapter 3(Sections 3.2, and 3.4) Chapter 4(Section 4.2) Chapter 4(Sections 4.3,and 4.4)

[1]Chapter 18 (Sections18.1to18.3)

(No. of classes: 20, Marks: 30)

Unit 2: Numerical differentiation**:** First and second order derivatives; Numerical integration**:** Trapezoid rule, Simpson's rule; Extrapolation methods**:** Richardson extrapolation, Romberg integration; Ordinary differential equation**:** Euler's method, Modified Euler's methods **(**Heun and Mid-point).

[2] Chapter 11 [Sections 11.1(11.1.1,11.1.2,11.1.4), and11.2(11.2.1,11.2.2,11.2.4)]

[1] Chapter 22 (Sections22.1, and 22.2,22.3)

(No. of classes: 25, Marks: 30)

***Practical / Lab work to be performed on a computer*:**

Use of computer aided software (CAS), for example *Matlab/Mathematica/Maple* etc., for developing the following numerical programs:

(i) Lagrange's interpolation method

(ii) Newton's interpolation method

(iii) To calculate forward and backward differences

(iv) Trapezoidal rule

(v) Simpson's rule

Note: For any of the CAS *Matlab/Mathematica/Maple* etc., 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.

(No. of practical classes: 30, Marks: 20)

Text Books:

[1] Chapra, Steven C.(2018).*Applied Numerical Methods with* MATLAB *for Engineers and* Scientists (4^{th} ed.) Mc Graw-Hill Education.

[2] Fausett, Laurene V. (2009). *Applied Numerical Analysis Using* MATLAB. Pearson. India

[3] Jain, M.K., Iyengar, S.R.K., & Jain R.K.(2012). *Numerical Methods for Scientific and Engineering Computation* (6^{th} ed.). New Age International Publishers. Delhi.

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SEMESTER-VI

Paper-I

Linear Algebra

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HC-5026: Linear Algebra (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites for the paper: Senior Secondary School Mathematics or equivalent

Course Objectives: The objective of this course is to introduce the students with the fundamental theory of linear spaces and also emphasizes the application of techniques using the adjoint of linear operator and minimal solutions to systems of linear equations.

Course Learning Outcomes: This course will enable the students to:

- Learn about linear spaces and their general properties, linear dependence and linear independence of vectors, bases and dimensions of vector spaces
- Basic concepts of linear transformations, dimension theorem, matrix representations of linear transformations, and the change of coordinate matrix.
- Compute the characteristic polynomial, eigenvalues, eigenvectors and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.
- Compute inner products and determine orthogonality on vector spaces including Gram-Schmidt orthogonalization to obtain orthonormal basis.

Unit 1: Definition and examples of vector spaces, general properties of vector spaces, Definition and examples of subspaces, subspace criterions and algebra of subspaces, null space and column space of a matrix, Linear transformations, Kernel and range of a linear transformation.

[1]: Chapter 4 (Sections 4.1-4.2), [2] : Chapter 4

(No. of classes: 15, Marks: 20)

Unit 2:, Linear combinations of vectors, linearly dependent and independent sets, bases of vector spaces, coordinate systems, dimension of a vector space, ranks, change of basis.

[1]: Chapter 4 (Sections 4.3-4.7), [2] : Chapter 5

(No. of classes: 15, Marks: 20)

Unit 3: Eigenvectors and eigenvalues of a matrix, The Characteristic equation, Diagonalization, eigenvector of a linear transformation, Complex eigenvalues. Invariant subspaces and Cayley-Hamilton Theorem.

[1]: Chapter 5 (Sections 5.1-5.5), [2]: Chapter 9, [3]: Chapter 5 (Sections 5.4)

(No. of classes: 15, Marks: 20)

Unit 4: Inner products, Length and orthogonality, orthogonal sets, orthogonal projections, The Gram-Schmidt process, Inner product spaces.

[1]: Chapter 6 (Sections 6.1-6.4, 6.7), [2]: Chapter 12

(No. of classes: 15, Marks: 20)

Text Books:

1. David C. Lay, *Linear Algebra and its Applications*, 3rd Edition, Pearson Education, Asia, Indian Reprint, 2007
2. Seymour Lipschutz, *Theory and Problems of Linear Algebra*, Schaum's Outline Series, McGraw-Hill Book Company, Singapore
3. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, *Linear Algebra*, 4th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2004.

Reference Books:

1. S. Kumaresan, *Linear Algebra- A Geometric Approach*, Prentice Hall of India, 2017
2. Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007
3. G. Schay, Introduction to Linear Algebra, Narosa, 1997

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SEMESTER-VI

Paper-II

Partial Differential Equations (with practical)

Total Marks: 100

(Theory: 60, Practical 20, Internal Assessment: 20)

No. of Credits: 4 (Theory 3, Practical 1)

Base syllabus: MAT-HC-6026: Partial Differential Equations (including practical) (UG CBCS)

Course Level: 300-399

No. of Contact classes: 75 (15×3+30×1)

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics, Knowledge on computer software

Course Objectives: The main objectives of this course are to teach students to form and solve partial differential equations and use them in solving some physical problems.

Course Learning Outcomes: The course will enable the students to:

- Formulate, classify and transform first order PDEs into canonical form.
- Learn about method of characteristics and separation of variables to solve first order PDE's.
- Classify and solve second order linear PDEs.
- Learn about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations.
- Apply the method of separation of variables for solving many well-known second-order PDEs.

Unit 1: Introduction, Classification, Construction of first order partial differential equations (PDE). Cauchy's problem for first order equations, linear equations of the first order, Integral surfaces passing through a given curve, Nonlinear partial differential equations of the first order, Cauchy's method of characteristics, Charpit's method. Solutions satisfying given conditions, Jacobi's method.
[1] Chapter 2 (Sections 2.1 to 2.3), [2] Chapter 2 (Section 3, 4,5, 7,8,10,12, 13)
(No. of classes: 15, Marks: 20)

Unit 2: Canonical form of first order PDE, Method of separation of variables for first order PDE.
[1] Chapter 2 (Sections 2.6 and 2.7)
(No. of classes: 15, Marks: 20)

Unit 3: Reduction to canonical forms, Equations with constant coefficients, General solution.
[1] Chapter 4 (Sections 4.1 to 4.5), [2] Chapter 3 (Sections 4, 5)
(No. of classes: 15, Marks: 20)

Practical /Lab work to be performed in a Computer Lab:
Modelling of the following similar problems using Mathematica /MATLAB/ Maple/ Maxima/ Scilab etc.

1. Solution of Cauchy problem for first order PDE.
2. Plotting the characteristics for the first order PDE.
3. Plot the integral surfaces of a given first order PDE with initial data.

4. Solution of wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ for any two of the following associated conditions:

(a) $u(x,0) = \phi(x);\ u(x,0) = \psi(x), x \in R; t > 0$

(b) $u(x,0) = \phi(x);\ u_t(x,0) = \psi(x);\ \ u(0,t) = 0, x > 0; t > 0$

(c) $u(x,0) = \phi(x);\ u_t(x,0) = \psi(x);\ \ u_x(0,t) = 0, x > 0; t > 0$

(d) $u(x,0) = \phi(x);\ u_t(x,0) = \psi(x);\ \ u(0,t) = 0, u(l,t) = 0; x > 0; t > 0$

5. Solving systems of ordinary differential equations.

6. Solution of one-Dimensional heat equation $u_t = k\, u_{xx}$, for a homogeneous rod of length l.

That is - solve the IBVP:

$$u_t = k\, u_{xx}, \qquad 0 < x < l, \qquad t > 0$$
$$u(0,t) = 0, \qquad u(l,t) = 0, \qquad t \geq 0$$
$$u(0,t) = f(x), \ \ 0 \leq x \leq l$$

(No. of practical classes: 30, Marks: 20)

Text Book:

1. Tyn Myint-U and Lokenath Debnath**,** *Linear Partial Differential Equation for Scientists and Engineers*, Springer, Indian reprint, 2006.
2. Sneddon, I. N. (2006). *Elements of Partial Differential Equations*, Dover Publications. Indian Reprint.

Reference Book:

1. Stavroulakis, Ioannis P &Tersian, Stepan A. (2004). *Partial Differential Equations*: *An Introduction with Mathematica and* MAPLE (2nd ed.). World Scientific.
2. M. D. Raisinghania, Advanced Differential Equations, S. Chand & Company LTD.

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SEMESTER-VI

Paper-III

Metric Spaces

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HC-6016: Riemann Integration and Metric Spaces (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites for the paper: Senior Secondary School Mathematics or equivalent

Course Objectives: Up to this stage, students do study the concepts of analysis which evidently rely on the notion of distance. In this course, the objective is to develop the usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences.

Course Learning Outcomes: The course will enable the students to:

- Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces.
- Analyse how a theory advances from a particular frame to a general frame.
- Appreciate the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting.
- Learn about the two important topological properties of metric spaces, namely connectedness and compactness.

UNIT 1: Definition and examples of Metric spaces, sequences in metric spaces, Cauchy sequences, complete metric spaces. Open and closed balls, neighbourhood, open set, interior of a set. Limit point of a set, closed set, diameter of a set, Cantor's theorem. Subspaces, dense sets, separable spaces.

[1] Chapter 1, Sections: 1.1-1.4, Chapter 2, Sections: 2.1, 2.2, 2.3.12 - 2.3.16

(No. of classes: 15, Marks: 20)

UNIT 2: Continuity: Continuous mappings, sequential criterion and other characterizations of continuity. Uniform continuity. Homeomorphism, Equivalent metrics, Isometry. Contraction mappings.

[1] Chapter 3, Sections 3.1, 3.4, 3.5, 3.7 (upto 3.7.2)

(No. of classes: 15, Marks: 20)

UNIT 3: Connected metric spaces: Connectedness, connected subsets of real numbers, connectedness and continuous mappings, components. Compact metric spaces: bounded sets and compactness, other characterisations of compactness, continuous functions on compact spaces.

[1] Chapter 4, Sections 4.1, Chapter 5, Sections 5.1, 5.2, 5.3

(No. of classes: 30, Marks: 40)

Text Book:

1. Satish Shirali & Harikishan L. Vasudeva, Metric Spaces, Springer Verlag London (2006) (First Indian Reprint2009)

Reference Books:

1. S. Kumaresan, Topology of Metric Spaces, 2nd Ed., Narosa Publishing House, 2011.
2. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 2004.
3. Micheal O. Searcoid, Metric Spaces, Springer Publication, 2007

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SEMESTER-VI

Paper-IV

Mechanics

Total Marks: 100

(Theory: 80, Internal Assessment: 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HE-5026: Mechanics (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics

Course Objectives: The course aims at understanding the various concepts of physical quantities and the related motion of bodies under the action of forces.

Course Learning Outcomes: The course will enable the students to:

- Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions.
- Understand the theory behind friction and center of gravity.
- Know about conservation of mechanical energy and work-energy equations.

- Learn about translational and rotational motion of rigid bodies.

UNIT1: Composition and resolution of forces, Parallelogram of forces, Triangle of forces, Converse of triangle of forces, Lami's Theorem, Parallel forces, Moment of a force about a point and an axis. Couple, Resultant of a system of forces. Equilibrium of coplanar forces. Friction, C.G of an arc, plane area, surface of revolution, solid of revolution.
[3] Chapter I-X
(No. of classes: 30, Marks: 40)

UNIT 2: Velocities and acceleration along radial and transverse directions and along tangential and normal directions, motion in a straight line under variable acceleration, simple harmonic motion and elastic string. Newton's law of motion. Work, Energy and momentum, Conservative forces-Potential energy, Impulsive forces, Motion in resisting medium.

[1] Chapter I Sections 1.1, 1.2,1.3, Chapter –2 Sections 2.1,2.2, Chapter 3 Sections 3.1.3.2, Chapter 4 Sections 4.1, Chapter 5Sections5.1,5.3,Chapter 6Sections6.1,6.3.
[2] Chapter 3(Sections:3.1,3.2,3.3,3.4).
(No. of classes: 30, Marks: 40)

Text Books:

1. S.L. Loney, An elementary treatise on the dynamics of a particle and of rigid bodies, Surjeet publications
2. F.Chorlton,TextbookofDynamics,CBS,Publications2nd Edition,1985
3. B.C. Das & B. N. Mukherjee, Statics, U. N. Dhur & Sons Pvt. Ltd.

Reference books:

1. M.R.Spiegel, Theoretical Mechanics, Schaum Series 2010.

Course Designers:

1. Dr. U. J. Das, Dept. of Mathematics, Gauhati University
Phone No. 9436222171, Email ID: utpaljyotidas@gauhati.ac.in
2. Dr. Anjana Bhattacharya, Dept of Mathematics, B. Barooah College.
Phone No.: 9435348748, Email ID: anjanabs72@gmail.com

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Four-year Undergraduate Programme

Subject: Physics
Semester: First
Course Name: Mathematical Physics and Mechanics
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY101
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Part A: Mathematical Physics			
Unit I- Vector Calculus	Scalar and vector fields. Derivatives of vector functions (physical examples-velocity, centripetal acceleration of a point in circular motion). Directional derivative. Gradient of a scalar field (example of Newton's gravitational force as gradient of a scalar potential). Gradient as normal vector to a surface. Divergence and curl of a vector field- solenoidal and irrotational vector fields. Laplacian operator (physical problems –Laplacian of gravitational potential, divergence of central force). Vector identities. Vector integration- Line integral (physical example- work done by a force, path dependence/independence and concept of conservative force). Surface and volume integrals. Concept of vector flux. Gauss's divergence theorem and Stokes's theorem (statement only).	8	Credit - 1
Unit– II: Curvilinear coordinates	Introduction to curvilinear coordinates. Orthogonal curvilinear coordinates. Examples of spherical, cylindrical and plane polar coordinates. Line element- transformation from Cartesian to curvilinear coordinates (spherical and cylindrical). Gradient, divergence and curl in spherical and cylindrical coordinates.	5	
Unit-III: Dirac delta function	Definition and properties of Dirac delta function. Representation of delta function by Gaussian function, rectangular function and Laplacian of 1/r . 3-Dimensional delta function.	2	
Part B – Mechanics			

Unit 1- Reference frames	Inertial frames. Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications.	4	Credit - 2
Unit –II: Gravitation and central force motion	Motion under central force. Two-body problem and its reduction to one body problem. Kepler's laws, Gravitational potential and fields due to spherical body. Gauss's law and Poisson's equation for gravitational field.	7	
Unit –III: Conservation laws	Dynamics of a system of particles. Centre of mass. Principle of conservation of momentum. Torque. Impulse. Elastic and inelastic collisions between particles. Centre of mass and laboratory frames.	4	
Unit–IV: Dynamics of rigid bodies	Rigid body motion. Rotational motion. Moment of inertia of rectangular lamina, disc, cylindrical and spherical bodies. Kinetic energy of rotation. Motion involving both translation and rotation.	6	
Unit–V: Work and energy	Work and kinetic energy theorem. Conservative and non-conservative forces. Potential energy. Force as gradient of potential energy. Work and potential energy. Work done by non-conservative forces.	3	
Unit –VI: Oscillations	Oscillation - differential equation of simple harmonic motion and its solution. Total energy of oscillation.	2	
Unit –VII: Properties of matter	Relation between elastic constants. Twisting torque on a cylinder or wire. Cantilever. Kinematics of moving fluids: Poiseuille's equation for flow of a liquid through a capillary tube.	4	
Laboratory			
	<u>At least four from the following:</u> 1. To study the motion of spring and calculate (a) spring constant and (b) rigidity modulus. 2. To determine the moment of inertia of a cylinder about two different axes of symmetry by torsional oscillation method.		Credit-1

	3. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's method). 4. To determine the Young's modulus of the material of a wire by Searle's apparatus. 5. To determine the modulus of rigidity of a wire (static method). 6. To determine the value of g using bar pendulum. 7. To determine the value of g using Kater's pendulum. 8. To determine the height of a building using a sextant. 9. To determine g and velocity for a freely falling body using digital timing technique.		

Reading list

1. Essential Mathematical Methods for the Physical Sciences; K.F. Riley and M.P. Hobson, Cambridge University Press.
2. Advanced Engineering Mathematics; E. Kreyszic, John Wiley & Sons (New York).
3. Mathematical Methods for Physicists; G. B. Arfken, H. J. Weber and F.E. Harris, Elsevier.
4. Mathematical Physics-I, K. K Pathak and S. Parasher, Vishal Publication, Jalandhar (Delhi).
5. Theoretical Mechanics, M. R. Spiegel, Tata McGraw Hill.
6. Mechanics; D. S. Mathur, S. Chand & Company Limited.
7. An Introduction to Mechanics, D. Kleppner and R. J. Kolenkow, Tata McGraw-Hill.
8. Mechanics, Berkeley Physics, vol.1, C. Kittel, W. Knight, et.al., Tata McGraw-Hill.
9. Physics, R. Resnick, D. Halliday and J. Walker, John Wiley & Sons.
10. Analytical Mechanics, G. R. Fowles and G. L. Cassiday, Cengage Learning.

Graduate Attributes

i. Course Objective

This course introduces mathematical physics and mechanics. The basic objectives of the course are

- *to introduce essential primary concepts in mathematical physics such as calculus of vectors, curvilinear coordinates and Dirac delta function which are required for developing insight of the theories of physics,*
- *to introduce the concepts of dynamics of particles, energy, oscillation and basic properties of matter which will equip students with the tools required for applying the concepts of physics in practical problems and*
- *to train the students with concept visualisation through some laboratory practices.*

ii. Learning outcome

On successful completion of the course, students will be able to understand the calculus of vectors and concept of curved spaces which play central roles in developing insight of the theories of physics. They will learn the powerful method of computation through Dirac delta function which often appears in complex problems of physics. Students will be able to understand and apply the concepts of dynamics of particles, energy, oscillation and basic properties of matter in various problems of physics, technology and engineering. They will be trained in concept realisation through laboratory practices.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Sanjeev Kalita**, Gauhati University, sanjeev@gauhati.ac.in
2) **Dr. Krishna Kingkar Pathak**, Arya Vidyapeeth College, kkingkar@gmail.com
3) **Dr. Samrat Dey**, Pragjyotish College, samratdgr8@gmail.com

Subject: Physics
Semester: Two
Course Name: Mathematical Physics & Electricity and Magnetism
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY151
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Part A: Mathematical Physics (Theory)			
Unit 1- Differential equations	First and second order ordinary differential equations (ODE). Homogeneous and inhomogeneous differential equations. Solutions of first order ODE – integrating factors (physical examples – radioactive decay, Newton's law of cooling, particle falling under gravity through a resistive medium). Concept of initial/boundary conditions. Solutions of second order ODE with constant coefficients - complementary function and particular integral (physical examples- simple harmonic oscillation, forced vibration). Wronskian- definition and its use to check linear independence of 2nd order homogeneous linear differential equation. Partial differential equations (PDE) (physical examples – wave equation, diffusion equation, Laplace and Poisson equation – introduction only). Exact and inexact differentials. Concept of variable separation in a PDE.	10	Credit - 1
Unit– II: Matrices	Properties of matrices. Determinant and rank. Transpose and complex conjugate of matrices. Hermitian and anti-Hermitian matrices. Unitary and orthogonal matrices. Representation of linear homogeneous and inhomogeneous equations through matrix equation. Inverse of a matrix. Eigen values and eigen-vectors. Cayley-Hamilton Theorem (statement only), Diagonalization of simple matrices.	5	
Part B – Electricity and Magnetism (Theory)			
Unit I: Electric field	Electrostatic field, electric flux. Gauss's law. Application of Gauss's law to charge distributions with planar, spherical and	13	Credit - 2

and electric potential	cylindrical symmetries. Conservative nature of electrostatic field. Electrostatic potential. Electrostatic energy of a system of charges. Electrostatic boundary conditions. Laplace's and Poisson's equations. Uniqueness theorem. Application of Laplace's equation involving planar, spherical and cylindrical symmetries. Potential and electric field of a dipole. Force and torque on a dipole. Capacitance of a system of charged conductors. Parallel plate capacitor. Capacitance on an isolated conductor.		
Unit –II: Dielectric properties of matter	Electric field in matter. Polarisation, polarisation charges. Electrical susceptibility and dielectric constant. Capacitor (parallel plate, spherical and cylindrical) filled with dielectric. Displacement vector, $\vec{D}$. Relation between $\vec{E}$, $\vec{P}$ and $\vec{D}$. Gauss's law in dielectrics.	4	
Unit –III: Magnetic field	Magnetic force on a point charge, definition and properties of magnetic field $\vec{B}$. Curl and divergence. Vector potential, $\vec{A}$. Magnetic scaler potential. Magnetic force on (i) a current carrying wire and (ii) between two elements. Torque on a current loop in a uniform magnetic field. Biot-Savart's law and its simple application: straight wire and circular loop. Current loop as a magnetic dipole and its dipole moment (analogy with electric dipole). Ampere's circuital law and its application to (i) solenoid and (ii) torus.	6	
Unit–IV: Magnetic properties of matter	Magnetization vector, $\vec{M}$. Magnetic intensity, $\vec{H}$. Magnetic susceptibility and permeability. Relation between $\vec{B}$, $\vec{H}$ and $\vec{M}$. Ferromagnetism. B-H curve and hysteresis.	2	
Unit–V: Electrical circuits	AC circuits: Kirchhoff's laws for AC circuits. Complex reactance and inductance. Series LCR circuits and parallel LCR circuits: (i) phasor diagram, (ii) resonance, (iii) power dissipation, (iv) quality factor, and (v) band width. Ideal constant-voltage and constant-current sources. Thevenin theorem and Norton theorem (only statements and solving of related problems).	5	
Laboratory			
	<u>At least four from the following:</u>		Credit-1

	1. Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, (d) Capacitances, and (e) Checking electrical fuses. 2. To study the characteristics of a series RC circuit. 3. To determine an unknown Low Resistance using Potentiometer. 4. To determine an unknown Low Resistance using Carey Foster's Bridge. 5. To compare capacitances using De' Sauty's bridge. 6. Measurement of field strength $\vec{B}$ and its variation in a solenoid (determine $\frac{dB}{dx}$). 7. To verify the Thevenin and Norton Theorems. 8. To verify the superposition and maximum power transfer theorems. 9. To determine the self-inductance of a coil by Anderson's bridge. 10. To study the 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. 11. To study the response curve of a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q. 12. Measurement of charge and current sensitivity and CDR of Ballistic Galvanometer. 13. Determine a high resistance by leakage method using Ballistic Galvanometer. 14. To determine the self-inductance of a coil by Rayleigh's method.		

	15. To determine the mutual inductance of two coils by the Absolute method.		

Reading list

[1] Essential Mathematical Methods for the Physical Sciences; K. F. Riley and M. P. Hobson, Cambridge University Press.
[2] Advanced Engineering Mathematics; E. Kreyszic, John Wiley & Sons (New York)
[3] Mathematical Methods for Physicists; G. B. Arfken, H. J. Weber and F.E. Harris, Elsevier
[4] Mathematical Physics, H. K. Dass and Dr. Rama Verma, S. Chand Publication.
[5] Mathematical Physics-I; Krishna K. Pathak and Sangeeta Prasher, Vishal Publishing Co, Jalalandhar (Delhi).
[6] Introduction to Electrodynamics, D. J. Griffiths.
[7] Electricity and Magnetism [With electromagnetic theory and special theory of relativity], D. Chattopadhyay and P. C. Rakshit, 2013, New Central Book Agency (P) Limited.
[8] Electricity, Magnetism and Electromagnetic Theory, S. Mahajan and S. R. Choudhury, 2012, Tata Mcgraw.
[9] Schaum's outline of Theory and Problems of Electromagnetics, J. A. Edminister.
[10] Electromagnetics, B. B. Laud, New Age International Publishers.
[11] Feynman Lectures Vol. 2, R. P. Feynman, R. B. Leighton, M. Sands, 2008, Pearson Education.
[12] Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
[13] Elements of Electromagnetics, M. N. O. Sadiku, 2008. Pearson Education.
[14] Electricity and Magnetism, J. W. Fewkes and J. Yarwood, Vol. I, 1991, Oxford Univ. Press.

Graduate Attributes

i. Course Objective

- *To introduce the methods of solving differential equations.*
- *To introduce various concepts of matrix algebra.*
- *Electric field from vector calculus point of view and use of potential formulation to solve electrostatic problems.*
- *Magnetic fields of current carrying conductors, torus, solenoids etc. Study magnetic properties of matter.*
- *Study and analysis of AC circuits like LCR, and use of network theorems in electrical circuits.*

ii. Learning outcome

After the successful completion of the course, students will be able to understand methods of solving various differential equations appearing in physics. It will give an idea of how to study evolution of a physical system. Through matrix algebra students will be able to compute various matrix operations which are required for solving physical problems. They will be able to understand electric field and magnetic fields in matter, dielectric properties of matter, magnetic properties of matter, application of Kirchhoff's law in different circuits, and application of network theorem in different circuits. The students will also get accustomed to using multimeters and potentiometers, and they will be able to determine some of the important physical quantities related to electricity and magnetism for a better understanding of the topic.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1. **Dr. Manos P. C. Kalita**, Gauhati University, mpckalita@gauhati.ac.in
2. **Dr. Chabin Thakuria**, Tihu College, chabinthakuria@gmail.com
3. **Dr. Bhaskar J. Hazarika**, Pandu College, bh53033@gmail.com
4. **Dr. Krishna Kinkar Pathak**, Arya Vidyapeeth College, kkingkar@gmail.com

Subject: Physics
Semester: Three
Course Name: Waves and Optics
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY201
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Wave and Optics (Theory)			
Unit I: Superposition of harmonic oscillations	Superposition of waves: Linearity and Superposition principle, Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats), Lissajous figures and their use.	4	Credit - 3
Unit– II: Wave motion	Waves: Progressive (Travelling) Waves, wave equation, plane wave and spherical wave, Longitudinal and Transverse Waves, dispersion, group velocity, phase velocity, Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave.	4	
Unit –III: Velocity of waves	Velocity of Waves: Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound. Laplace's Correction.	4	
Unit–IV: Superposition of two harmonic waves	Superposition of Two Harmonic Waves: Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Plucked and Struck Strings. Melde's Experiment. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes.	9	
Unit–V: Wave optics	Wave optics: Electromagnetic nature of light, definition and properties of wave front. Huygens principle. Temporal and Spatial coherence.	4	
Unit–VI: Interference	Division of wave front and amplitude, intensity distribution in an interference pattern, Young's	8	

	double slit experiment, Fresnel's Biprism. Phase change on reflection: Stokes' treatment, Interference in Thin Films: parallel and wedge-shaped films, Newton's Rings: Measurement of wavelength and refractive index, Michelson interferometer.		
Unit–VII: Diffraction	Fresnel and Fraunhofer diffraction. Fresnel's Half-Period Zones for Plane Wave. Fresnel diffraction pattern of a straight edge and at a circular aperture. Fraunhofer diffraction: Single slit. Double slit. Diffraction grating. Resolving power of grating.	7	
Unit–VIII: Polarization	Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Production and analysis of circularly and elliptically polarized light.		
Laboratory			
	<u>At least four from the following:</u> 1. To determine the frequency of an electric tuning fork by Melde's experiment and verify λ^2-T law. 2. Study of Lissajous Figure of two different waves using CRO and find out the unknown frequency of an electrical signal. 3. Familiarization with: Schuster's focusing, determination of angle of prism. 4. To determine refractive index of the Material of a prism using sodium source. 5. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source. 6. To determine wavelength of sodium light using Fresnel Biprism. 7. To determine wavelength of sodium light using Newton's Rings.		Credit-1

	8. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film. 9. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating. 10. To determine dispersive power and resolving power of a plane diffraction grating.		

Reading list

[1] Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.

[2] The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.

[3] Vibrations and Waves in Physics, 2nd edition, I. G. Main, 1984, Cambridge University Press.

[4] A Textbook of Sound, 3rd Edition, A. B. Wood, 1955, Bell & Sons.

[5] The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.

[6] Fundamentals of Optics, F. A. Jenkins and H.E. White, 1981, McGraw-Hill

[7] Principles of Optics, Max Born and Emil Wolf, 7th Edn., 1999, Pergamon Press.

[8] Optics, Ajoy Ghatak, 2008, Tata McGraw Hill

[9] Principles of Optics, B. K. Mathur and T. P. Pandya, 1981, Tata McGraw-Hill International.

[10] Fundamental of Optics, A. Kumar, H. R. Gulati and D. R. Khanna, 2011, R. Chand Publications.

Graduate Attributes

i. Course Objective

- *To learn the superposition of harmonic waves and oscillations, different types of wave motions, formation of standing waves and velocity of waves in media.*
- *To learn optical phenomena such as interference, diffraction and polarization in terms of the wave model*
- *To learn the principles and applications of optical instruments like biprism, interferometer and diffraction grating etc.*
- *To learn hand on experiments with prism, biprism, spectrometer, Newton's ring apparatus, grating, CRO, sodium and mercury light sources etc.*

ii. Learning outcome

On successful completion of the course students will:

1. understand Simple Harmonic Oscillation and superposition principle.

2. understand the classical wave equation in transvers and longitudinal waves and solutions of few physical systems on its basis.

3. understand the concept of normal modes in transvers and longitudinal waves

4. understand the interference as superposition of waves from coherent sources and also understand the basic principle of Young's double slit experiment, Fresnel's Biprism, Newton's Rings, Michelson interferometer etc.

5. understand the basic concept of diffraction, Fresnel and Fraunhofer diffraction from a slit.

6. understand the concept of polarisation of light, the production and detection of polarized light.

7. understand working principle of prism, biprism, spectrometer, Newton's ring apparatus, grating, CRO, sodium and mercury light sources etc.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Simanta Hazarika**, Gauhati University, simanta@gauhati.ac.in
2) **Dr. Hemen Kakati**, Nalbari College, hementeach@gmail.com
3) **Dr. Arup Jyoti Choudhury**, Guwahati College, arupjchoudhury@gmail.com

Subject: Physics
Semester: Four
Course Name: Classical Mechanics
Existing Base Syllabus: Mechanics of semester I
Course Level: PHY251
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Unit I: Mechanics of point particles- the Lagrangian approach	Review of Newtonian mechanics; system of particles; constrained motion – types of constraints; concept of degrees of freedom; generalised coordinates and velocities; principle of virtual work and D'Alembert's principle and associated problems; Lagrange's (Euler-Lagrange, EL) equation; physical problems (construction of EL equations only) – simple and compound pendulums, two vibrating particles of equal mass attached to springs, Lagrange's equations for a particle in spherical and cylindrical coordinate systems, falling body in uniform gravitational field.	14	Credit - 4
Unit– II: Mechanics of point particles – the Hamiltonian approach	Generalised momenta; Legendre transformation; Hamilton's canonical equations; Hamiltonian from the Lagrangian; conservation of energy and momentum; physical problems – Hamiltonian for simple pendulum, particle moving in central force field (gravitational potential).	6	
Unit –III: Small oscillation	Minimum of potential energy and concept of stable equilibrium; expansion of potential energy around a minimum; kinetic and potential energy matrices; equation of motion of small oscillation.	5	
Unit–IV: Special theory of relativity	Inadequacy of Galilean transformation; postulates of special relativity; Lorentz transformation; simultaneity and order of events; length contraction and time dilation; relativistic addition of velocities; variation of mass with velocity and mass-energy equivalence. Lorentz transformation as a rotation in spacetime; relation between proper time and coordinate time; relativistic kinematics: energy-momentum relation.	15	

Unit–V: Fluid dynamics	Definition of a fluid; idea fluids; density and pressure of a fluid; velocity of a fluid element and its time derivative; mass conservation and equation of continuity; incompressible fluid; Euler's equation of fluid dynamics; Navier-Stokes equation (introduction only).	5	

Reading list

(1) Classical Mechanics, H. Goldstein, C.P. Poole and J.L. Safko (Pearson Education)
(2) Theoretical Mechanics, M. R. Spiegel (McGraw Hill Book Company)
(3) Classical Mechanics, P.S. Joag and N.C Rana (McGraw Hill Book Company)
(4) Mathematical Physics, B. S. Rajput (Pragati Prakashan)
(5) Classical Mechanics, T.W.B. Kibble and F.H. Berkshire (Imperial College Press)
(6) Mechanics: Courses in Theoretical Physics (Vol. 1), L.D. Landau and E.M. Lifshitz (Butterworth-Heinemann) (3rd Edn.)
(7) Classical Mechanics: With introduction to non-linear oscillations and chaos, V.B. Bhatia (Narosa Publishing House)

Graduate Attributes

i. Course Objective

The basic objectives of the course are

- *to introduce the laws of classical dynamics*
- *to train students in solving problems of motion of particles, systems of particles and fluids and*
- *to introduce relativity and hence the idea of how space and time play role in dynamics of matter.*

ii. Learning outcome

On successful completion of the course students will be able to apply the laws of classical dynamics to physical problems of motion of particles, systems of particles and fluids in various fields of physics and natural science as a whole. They will also get the exposure of the idea of how space and time play role in dynamics of matter.

Theory Credit: 04 (Four)

Practical Credit: 0 (Zero)

No. of Required Classes: 60 (45 Theory; 15 Tutorials)

No. of Contact Classes: 60

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Sanjeev Kalita,** Gauhati University, sanjeev@gauhati.ac.in
2) **Dr. Samrat Dey,** Pragjyotish College, samratdgr8@gmail.com
3) **Dr. Mausumi Bhuyan,** Rangiya College, moubhuyan83@gmail.com

Subject: Physics
Semester: Four
Course Name: Quantum Mechanics I
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY252
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Origin of Quantum Theory	Failure of classical theories, Explanation of Black body radiation, Photoelectric effect, Compton effect, different evidences in support of quantum theory, particle nature of radiation, Bohr's correspondence principle.	3	Credit - 3
Unit– II: Dynamical Variables as Operators and Uncertainty Principle	Dynamical variables as operators, definition of an operator, different types of operators and their properties, position, energy and momentum operator; commutation relations; introduction to Hilbert space, Dirac notation, eigenvalue and eigenfunctions; expectation value of an operator e.g. position, momentum operator etc, orthonormality condition, Ehrenfest's theorem. Simultaneous measurement and uncertainty principle; general statement of Heisenberg's uncertainty principle(for any two non commutating operators), different uncertainty relations involving canonical pair of variables; particle trajectory and fuzziness, applications of the position momentum uncertainty principle, application of energy time uncertainty principle to virtual particles and range of an interaction.	10	
Unit –III: Matter Wave and Wave-Particle Duality	Wave particle duality and de Broglie wavelength, particle as a wave or matter wave, wave description of particles by wave packets; phase and group velocity, wave function, wave amplitude, probability; Experimental verification of matter wave, Davisson and Germer experiment; linearity and superposition principle, two slit experiments with electrons and photons; Uncertainty	8	

	principle from wave packet description, Gaussian wave packet and its wave function.		
Unit–IV: Schrödinger Equation and it's applications	Time dependent Schrödinger Equation, Time independent Schrödinger Equation; Physical interpretation and properties of wave function, continuity of a wave function, boundary conditions and emergence of discrete and continuous energy levels; probabilities and normalisation in three and one dimension; equation of continuity, current density in both three and one dimension. Hamiltonian, stationary states and energy eigenvalues; expansion of an arbitrary wave function as a linear combination of energy eigenfunctions; General solution of the time dependent Schrödinger equation in terms of linear combinations of stationary states, discrete and continuous spectrum, wave function of a free particle, spread of Gaussian wave function in one dimension, Fourier transforms and momentum space wave function. Applications of Time independent Schrödinger Equation in different problems like : (i) particle in a one dimensional infinite potential well (quantum dot as an example) (ii) particle in a one dimensional finite square potential well (iii) barrier penetration problems – potential step and rectangular potential barrier (tunnel effect) (iv) linear harmonic oscillator (v) spherically symmetric potential for hydrogen atom- radial solution, spherical harmonics, angular momentum operator and different quantum numbers, radial distribution function and shapes of the probability densities for ground & first excited states; degeneracy of states : s, p, d states.	24	
Laboratory			
	<u>At least four from the following:</u> 1. Measurement of Planck's constant using black body radiation and photo-detector.		Credit-1

	2. Photo-electric effect: Photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light. 3. To determine work function of material of filament of directly heated vacuum diode. 4. To determine the Planck's constant using LEDs of at least 4 different colours. 5. To determine the wavelength of H_α emission line of hydrogen atom. 6. To determine the ionisation potential of mercury. 7. To determine the absorption lines in the rotational spectrum of iodine vapour. 8. To determine the value of e/m by (a) magnetic focusing or (b) bar magnet. 9. To setup the Millikan's oil drop apparatus and determine the charge of an electron. 10. To show the tunnelling effect in tunnel diode using I-V characteristics. 11. To determine the wavelength of laser source using diffraction from single slit. 12. To determine the wavelength of laser source using diffraction from double slits. 13. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating.		

Reading list

1. N. Zettili, Quantum Mechanics, John Wiley & Sons (2001).
2. J. J. Sakurai and J. Napolitano, Modern Quantum Mechanics, Cambridge Univ. Press, 2020.
3. Y. R.Waghmare, Fundamentals of Quantum Mechanics, Wheeler publishing (2014).

4. P. A. M. Dirac, Principles of Quantum Mechanics, Oxford University Press (1981).
5. B. H. Bransden and C. J. Joachain, Quantum Mechanics, Pearson Education 2nd Ed. (2004).
6. K. Gottfried and T-M Yan, Quantum Mechanics: Fundamentals,2nd Ed., Springer (2003).
7. R. Shankar, Principles of Quantum Mechanics, Springer (India) (2008).
8. D. J. Griffiths, Introduction to Quantum Mechanics, Pearson Education (2005).
9. L. Schiff, Quantum Mechanics, Mcgraw-Hill (1968).
10. A. K. Ghatak and S. Lokanathan, Quantum Mechanics: Theory and Applications, Springer (2002).
11. A. Bieser, Concepts of Modern Physics, McGraw Hill (2002).
12. Arno Bohm, Quantum Mechanics: Foundations and Applications, 3rd Edition, Springer (1993).
13. H. C. Verma, Quantum Mechanics, TBS publications (2019).
14. P M Mathews and K. Venkatesan, A Text book of Quantum Mechanics, 2nd Edition, McGraw Hill (2010).

Graduate Attributes

i. Course Objective

- *To learn about the inadequacies of classical mechanics, the origin and need of quantum mechanics, historical developments in quantum mechanics.*
- *Dual nature of radiation & matter, description of matter wave through wave packet.*
- *Probabilistic nature and wave function, Schrödinger equation, the uncertainty principle, stationary and non-stationary states.*
- *Applications of Schrödinger equation in different cases like infinite and finite potential well, tunneling effect, linear harmonic oscillator and H-atom.*
- *Formulation of quantum mechanics in terms of operators.*

ii. Learning outcome

On successful completion of the course students will be able to learn physical and mathematical fundamentals of Quantum physics, and various topics in it. These concepts are used in various branches of physics, like condensed matter physics, lasers, quantum statistics, atomic and molecular physics, particle physics, astrophysics and optics etc.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Prof Kalpana Bora,** Gauhati University**,** kalpana@gauhati.ac.in
2) **Dr. Bhaskar Jyoti Hazarika,** Pandu College, bh53033@gmail.com
3) **Dr Arup Jyoti Choudhury,** Guwahati College, arupjchoudhury@gmail.com

Subject: Physics
Semester: Four
Course Name: Analog Electronics
Existing Base Syllabus: HS Physics
Course Level: PHY253
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Semiconductor Diodes	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.	7	Credit - 3
Unit II: Two-terminal Devices and their Applications	Rectifier Diode: Half- wave Rectifiers. Centre-tapped and Bridge type Full-wave Rectifiers. Calculation of Ripple Factor and Rectification Efficiency. C-filter. Zener Diode and Voltage Regulation. Power supply without filter circuit and with C-filter circuit. Principle LEDs, Photodiode, and Solar Cell (Basic concept).	5	
Unit III: Bipolar Junction Transistors	n-p-n and p-n-p Transistors. Characteristics of CB, CE, and CC Configurations. Current gains α and β. Relations between α and β. Load line analysis of Transistors. DC Load line and Q-point. Physical Mechanism of Current Flow. Active, Cut-off, and Saturation Regions.	5	
Unit IV: Amplifiers	Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias. Transistor as a 2-port Network. h-parameter. Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage, and Power Gains. Classification of Class A, B & C Amplifiers. Differential amplifiers.	7	
Unit V: Coupled Amplifier	Two-stage RC-coupled amplifier and its frequency response.	2	

Unit VI: Feedback in Amplifiers	Effects of Positive and Negative Feedback on Input Impedance. Output Impedance. Gain. Stability. Distortion and Noise	4	
Unit VII: Sinusoidal Oscillators	Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator. Determination of Frequency. Colpitt's oscillator.	5	
Unit VIII: Operational Amplifiers (Black Box approach)	Characteristics of an Ideal and Practical Op-Amp (IC 741). Open-loop and Closed-loop Gain. Frequency Response. CMRR. Slew Rate and Concept of Virtual Ground.	3	
Unit IX: Applications of Op-Amps	Inverting and non-inverting amplifiers. Adder. Subtractor. Differentiator. Integrator. Log and Anti Log amplifier. Zero crossing detector. Wein bridge oscillator. Comparator.	4	
Unit X: Introduction to CRO (Lectures 03)	Block Diagram of CRO. Electron Gun, Deflection System, and Time Base. Deflection Sensitivity. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.	3	
Laboratory			
	<u>At least four from the following:</u> 1. To study V-I characteristics of PN junction diode, and light emitting diode. 2. To study the V-I characteristics of a Zener diode and its use as a voltage regulator. 3. Study of V-I and power curves of solar cells, and find maximum power point and efficiency. 4. To study the characteristics of a Bipolar Junction Transistor in CE configuration. 5. To study the various biasing configurations of BJT for normal Class A operation. 6. To design a CE transistor amplifier of a given gain (mid-gain) using voltage divider bias.		Credit-1

	7. To study the frequency response of voltage gain of an RC-coupled transistor amplifier. 8. Using an Op-amp, design a Wien bridge oscillator for a given frequency. 9. To design a phase shift oscillator of given specifications using BJT. 10. To design and study Colpitt's oscillator. 11. To design an inverting amplifier using Op-amp for the DC voltage of a given gain. 12. To design inverting amplifier using Op-amp and study its frequency response. 13. To design a non-inverting amplifier using Op-amp and study its frequency response. 14. To study the zero-crossing detector and comparator. 15. To add two DC voltages using Op-amp in inverting and non-inverting modes. 16. To design a precision Differential amplifier of given I/O specification using Op-amp. 17. To investigate the use of an Op-amp as an Integrator. 18. To investigate the use of an Op-amp as a Differentiator. 19. To measure (a) Voltage, and (b) Time period of a periodic waveform using CRO. Construct a series LR circuit. Display the two waveforms on the CRO and measure the phase differences between the voltages across R and L. 20. To test a Diode and Transistor using a Multimeter. Draw the forward bias characteristic of the diode. Using only the base-emitter junction of the transistor draw a characteristic curve and show that it behaves as a forward-biased diode.		

	Note: All students will have to do an electronic project on the circuits, for example, the power supply, the AM detector, etc. to get acquainted.		

Reading list

1. Integrated Electronics, J. Millman and C. C. Halkias, 1991, Tata Mc-Graw Hill.
2. Electronics: Fundamentals and Applications, J. D. Ryder, 2004, Prentice Hall.
3. Solid State Electronic Devices, B. G. Streetman & S. K. Banerjee, 6th Edn.,2009, PHI Learning
4. Electronic Devices & circuits, S. Salivahanan & N. S. Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill
5. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall
6. Microelectronic circuits, A. S. Sedra, K.C. Smith, A. N. Chandorkar, 2014, 6th Edn., Oxford University Press.
7. Electronic circuits: Handbook of design & applications, U. Tietze, C. Schenk,2008, Springer
8. Semiconductor Devices: Physics and Technology, S. M. Sze, 2nd Ed., 2002, Wiley India
9. Microelectronic Circuits, M. H. Rashid, 2nd Edition, Cengage Learning
10. Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India
11. Electronics Fundamentals and Applications, D. Chattopadhyay and P. C. Rakshit, 17th Ed, 2023, New Age International Publishers

Graduate Attributes

i. Course Objective

- To introduce students to analog electronics with hands-on practice on implementing some of these in hardware.
- To make the students understand the physics of semiconductor p-n junction and application in devices like diodes, rectifiers, etc.
- To understand the working of bipolar junction transistors, biasing, stabilization circuits, and various applications like amplifiers, oscillators, etc. together with feedback.
- To know the basics of Operational Amplifiers and applications.

- To understand the basics of the use of CRO in measurements with hands-on experience with some applications

ii. Learning outcome

On successful completion of the course, students will be able to understand the physics of semiconductor p-n junction and devices such as rectifier diodes, Zener diode, photodiode, etc.; they will understand the basics of bipolar junction transistors, transistor biasing, and stabilization circuits; the concept of feedback in amplifiers and the oscillator circuits. Students will also have an understanding of operational amplifiers and their applications.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Prof. Banty Tiru, Gauhati University,** btiru@gauhati.ac.in
2) **Dr. Shakeel Zaman, Handique Girls College,** shakeelzamal@gmail.com
3) **Dr. Sumanta Borthakur, B. Borooah College,** bortmontu1@gmail.com

Subject: Physics
Semester: Four
Course Name: Mathematical Physics
Existing Base Syllabus: HS Mathematics
Course Level: PHY254
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Partial Differential Equations	Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Wave equation and its solution for vibrational modes of a stretched string, rectangular and circular membranes.	10	Credit - 3
Unit II: Fourier Series	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. Application to square and triangular waves.	7	
Unit III: Complex Analysis	Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity. Integration of functions with complex variable. Cauchy's Integral theorem and Cauchy's Integral formula. Simply and multiply connected regions. Laurent and Taylor's series expansions. Residue Theorem with application.	17	
Unit IV: Tensor Algebra	Introduction to tensor, Transformation of co-ordinates, Einstein's summation convention. Contravariant, covariant and mixed tensors. Symmetric and antisymmetric tensors, Kronecker delta, LeviCivita tensor. Quotient law of tensors. Rules of combination of tensors: addition, subtraction, outer multiplication, contraction and inner multiplication.	6	
Unit V: Introduction to Probability	Independent random variables: Probability distribution functions; binomial, Gaussian and Poisson, with examples. Mean and variance.	5	
Laboratory			

	<u>At least four from the following:</u> 1. Solve the differential equations $\frac{dy}{dx} = e^x$ with $y = 0$ for $x = 0$ $\frac{dy}{dx} + e^{-x}y = x^2$ $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = -y$ $\frac{d^2y}{dx^2} + e^{-x}\frac{dy}{dx} = -y$ 2. Perform the multiplication of two 3×3 matrices. 3. Compute the eigenvalues and eigenvectors of the following matrices. $\begin{bmatrix} 4 & 3 & 7 \\ 1 & 2 & 7 \\ 2 & 0 & 4 \end{bmatrix}, \begin{bmatrix} 1 & -i & 3+4i \\ i & 2 & 4 \\ 3-4i & 4 & 3 \end{bmatrix}, \begin{bmatrix} 2 & -i & 2i \\ i & 4 & 3 \\ -2i & 3 & 5 \end{bmatrix}$ 4. Using random number compute the areas of circle, square, volume of sphere and value of pi (π). 5. Evaluate trigonometric functions e.g. *sinθ; cosθ; tanθ* etc. using Interpolation by Newton Gregory Forward and Backward difference formula. 6. Find the solution of Partial Differential Equations: (a) Wave equation (b) Heat equation. 7. Evaluate the integral *I*,where, $I = \frac{1}{\sqrt{2\pi\sigma^2}} \int exp\left[\frac{(x-2)^2}{2\sigma^2}\right](x+3)dx$ for $\sigma = 1.0, 0.1, 0.01$ and show that $I \to 5$ 8. Compute the *n*th roots of unity for *n* = 2, 3, and 4. 9. Find the two square roots of 5 + 12*i*.		Credit-1

Reading list

1. Mathematical Physics; H K Dass and R Verma, S Chand and Company limited.
2. Mathematical methods for Physics and Engineering; K. F Riley, M. P Hobson, S.J Bence, Cambridge University Press.
3. Graduate Mathematical Physics (With Mathematica Supplement); J J Kelly, Willey-VCH VerlagGmbH and Co. KGaA.
4. Mathematical Methods for Physicists; G. B. Arfken, H. J. Weber and F.E. Harris, Elsevier.
5. Ordinary and Partial Differential equations; M. D Raisinghania, S. Chand and Company Ltd.
6. Complex Variables; M R Spiegel,S Lipschutz, J J Schiller and D Spellman, Schaum's Outline Series, McGraw Hill Education.
7. Complex variables Demystified (A self-teaching guide); D McMahan, McGraw Hill Education.
8. A Student's Guide to vectors and Tensors; D A Fleisch, Cambridge University Press.
9. Vector analysis and an introduction to Tensor analysis; S Lipschutz, D Spellman, M R Spiegel, Schaum's Outline Series, McGraw Hill Education.
10. Tensors and applications with Scilab Programs; N D Soni, I.K International Publishing House Pvt. Limited.
11. Probability and Statistics; M R Spiegel, J J Schiller and R A Srinivasan, Schaum's Outline Series, McGraw Hill Education.

Graduate Attributes

i. Course Objective

- To solve partial differential equations using separation of variables, including Laplace's equation and the wave equation.
- To apply Fourier series expansion to represent periodic functions using sine and cosine functions.
- To understand complex analysis principles, including analytic functions, integration and residue theorem.
- To develop proficiency in tensor algebra, covering transformations, contravariant and covariant tensors and tensor algebra.
- To gain a preliminary knowledge to probability theory, focusing on independent random variables, probability distributions, and mean and variance calculations.

ii. Learning outcome

On successful completion of the course, the students will be equipped with the techniques related to solving partial differential equations using separation of variables method, application of Fourier series analysis, solving complex integrations, dealing with tensors and probability distributions which are relevant while dealing with wave mechanics, electrodynamics, quantum mechanics, theory of relativity and experimental physics.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Subhankar Roy**, Gauhati University, subhankar@gauhati.ac.in
2) **Dr. Abhijit Das**, Gauhati University, abhijitdas@gauhati.ac.in
3) **Dr. Chabin Thakuria**, Tihu College, chabinthakuria@gmail.com

Subject: Physics
Semester: Five
Course Name: Atomic and Molecular Physics
Existing Base Syllabus: HS Physics and/ or Chemistry
Course Level: PHY-301
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Atom Model:	The Bohr model of the hydrogen-like atom, Sommerfeld Relativistic Atom Model: Elliptical orbits, explanation of fine structure of H alpha line in Balmer series of hydrogen atom. Limitation of Sommerfeld atom model. Orbital magnetic dipole moment: Bohr Magneton, Gyromagnetic Ratio, Larmor precession, Space Quantization, Electron Spin, quantum numbers associated with vector atom model, spin-orbit interaction, Coupling Schemes: L-S Coupling and j-j Coupling, Spectroscopic term and their notation, Stern-Gerlach experiment and its conclusion. Normal and Anomalous Zeeman Effect. Paschen Back and Stark Effect (Qualitative Discussion only).	20	Credit - 4
Unit II: X-rays:	Ionizing Power, X-ray Diffraction, Bragg's Law, X-ray Spectra: Continuous and characteristic X-rays Mosley's law, Compton effect.	8	
Unit III: Multi electron atoms:	Hund's rule, Periodic table: Pauli's exclusion principle, explanation of the periodic classification of the elements, Building up or Aufbau Principle, Broad features of Alkali atom (Na etc.) spectra and its explanation	10	
Unit IV: Molecular Spectra	Rotational Energy levels, Selection Rules and Pure Rotational Spectra of a diatomic Molecule. Vibrational Energy Levels, Selection Rules and Vibration Spectra of a diatomic Molecule. Rotation-Vibration Energy Levels, Selection Rules and Rotation-Vibration Spectra. Determination of Internuclear Distance.	15	
Unit V: Raman Effect	Quantum Theory of Raman Effect. Characteristics of Raman Lines. Stoke's and Anti-Stoke's Lines. Complimentary Character of Raman and infrared Spectra.	7	

Reading list

1. Introduction to Atomic spectra, H. E. White, Tata McGraw Hill (1934)
2. Atomic and Molecular Spectra, Raj Kumar
3. Concepts of Modern Physics, Arthur Beiser (McGraw-Hill Book Company, 1987)
4. Atomic physics, J. B. Rajam & foreword by Louis De Broglie (S. Chand & Co., 2007)
5. Physics of Atoms and Molecules, B. H. Bransden and C. J. Joachein.
   Fundamentals of Molecular Spectroscopy, C. N. Banwell and E. M. McCash

Graduate Attributes

i. Course Objective

- To learn the development of atom models.
- To learn the origin of atomic spectra and their modifications under different physical conditions.
- To learn the basics of molecular spectra for diatomic molecule and a few applications.

ii. Learning outcome

Students will be ability to describe the atomic spectra of one and two valance electron atoms and will also understand the change in behavior of atoms and corresponding modification of their spectra in external applied electric and magnetic field. They will understand the basic principle of pure rotational, vibrational, Rotation-Vibration and Raman spectra of molecules and their few applications.

Theory Credit: 04 (Four)

Practical Credit: 0 (Zero)

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Simanta Hazarika**, Gauhati University, simanta@gauhati.ac.in
2) **Dr. Hemen Kakati**, Nalbari College, hementeach@gmail.com
3) **Dr. Arup Jyoti Choudhury**, Guwahati College, arupjchoudhury@gmail.com

Subject: Physics
Semester: Five
Course Name: Condensed Matter Physics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY302
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Crystal Structure and Bonding in solids	Amorphous, crystalline and polycrystalline materials, lattice translation vectors, unit cell, types of crystal lattice, Bravais Lattice, Miller Indices, inter planer spacing. Ionic, covalent, metallic, van-der-Waal and hydrogen bondings, cohesive energy of ionic crystal, Madelung constant.	9	Credit - 3
Unit II: Elementary Lattice Dynamics	Basic idea of lattice vibration and phonon. Dulong and Petit's Law. Einstein and Debye theories of specific heat of solids, T^3 law.	4	
Unit III: Dielectric and Ferroelectric Properties of Materials	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. Piezoelectric effect, pyroelectric effect, ferroelectric effect, electrostrictive effect, Curie-Weiss Law.	10	
Unit IV: Transport properties of materials	Free electron theory of metals, electrical and thermal conductivity of metals, Wiedemann-Franz law, drawback of classical theory and modification with quantum theory, preliminary idea of band theory, band gap, conductor, semiconductor (*p* and *n* type) and insulator,	9	

	conductivity of semiconductor, mobility, measurement of conductivity (2-probe & 4-probe resistivity measurement method), Hall Effect (Qualitative idea).		
Unit V: Nanophysics and soft matter	Basic idea about nanomaterials, thin film physics and soft matter.	3	
Unit VI: Magnetic Properties of Matter	Dia, para, ferri, ferro and anti ferromagnetic materials, classical Langevin Theory of dia and paramagnetism, Curie's law, Weiss' theory of ferromagnetic domains, discussion of B − H Curve, hysteresis and energy Loss.	7	
Unit VII: Superconductivity	Basic idea of superconductivity, critical temperature, critical magnetic field, Meissner effect. Type I and type II Super-conductors, isotope effect.	3	
Laboratory			
	<u>At least four from the following:</u> 1. Indexing of powder X-Ray diffraction data of cubic crystalline materials and determination of lattice parameters including inter planner spacing (XRD data needs to arrange by the department). 2. Measurement of susceptibility of a paramagnetic solution (Quinck's Tube Method). 3. To measure the magnetic susceptibility of solids. 4. To determine the Coupling Coefficient of a piezoelectric crystal. 5. To measure the Dielectric Constant of a dielectric materials with frequency. 6. To study the *P-E* Hysteresis loop of a Ferroelectric Crystal. 7. To draw the B − H curve of Fe		Credit-1

	using Solenoid & determine energy loss from Hysteresis. 8. To measure the variation of resistivity of a semiconductor with temperature by four-probe method and to determine its band gap. 9. To determine the Hall coefficient of a semiconductor sample.		

Reading list

1. Introduction to Solid State Physics, C Kittel
2. Lattice Dynamics, A K Ghatak and L S Kothari
3. Solid State Physics, A J Dekker.
4. Introductory Solid State Physics, H P Myers.
5. Solid State Physics, N W Ashcroft and N D Mermin
6. Magnetism in solids, D H Martin
7. Physics of Magnetism, S Chikazumi.
8. Solid State Physics, S O Pillai
9. Introduction to Nanotechnology, C. P. Poole, J. F. J. Owens

Graduate Attributes

i. Course Objective

- To provide the elementary idea about crystal structure, bonding and lattice dynamics in solids.
- To make the students understand the concepts of transport properties, dielectric properties, ferroelectric properties and magnetic properties in solids.
- To familiarise the students with nanomaterials, thin film, soft matter and superconductivity.

ii. Learning outcome

On successful completion of the course students will be able to acquire the basic knowledge of crystal structure, bonding in solids and elementary idea lattice dynamics of materials, dielectric, ferroelectric and magnetic properties of solids, the physics of

electrons in solids, basic idea about nanomaterials, thin film and soft matter and understand the basic concept in superconductivity.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Sulochana Deb**, Gauhati University, debsulochana@gauhati.ac.in
2) **Dr. Lavita Sharma** Jagiroad College, lavitasarma02@gmail.com
3) **Dr. Shyamolima**, Darrang College, Shyamoli_ma@yahoo.co.in

Subject: Physics
Semester: Five
Course Name: Heat and Thermodynamics
Existing Base Syllabus: HS Physics, Chemistry.
Course Level: PHY303
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Distribution of Velocities and Molecular Collisions	Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (No proof required). Mean Free Path. Collision Probability. Transport Phenomenon in Ideal Gases: (1) Viscosity, and (2) Thermal Conductivity. Brownian Motion (qualitative idea only).	9	Credit - 3
Unit II: 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. Vapor 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. Joule- Thomson Porous Plug Experiment. Joule- Thomson Effect, Joule-Kelvin coefficient for Ideal and Van der Waal Gases. Temperature of Inversion.	8	
Unit III: Principles of Thermodynamics	Thermodynamic preliminaries: Extensive and intensive properties, Thermodynamic Variables, Thermodynamic Equilibrium, P-V indicator diagram. Work done in terms of P and V, Zeroth Law of Thermodynamics & Concept of Temperature, Internal energy and First Law of Thermodynamics, Applications	16	

	of First Law: General Relation between C_P and C_V. Reversible and Irreversible process with examples. Heat & work, state function, Conversion of heat into work and vice versa, Work Done during Isothermal and Adiabatic Processes, Heat Engines, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence, Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.		
Unit IV: Entropy	Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy. Entropy of a perfect gas. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Entropy Changes in Reversible and Irreversible Processes. Principle of Increase of Entropy. Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics.	6	
Unit V: Thermodynamic Potentials and Thermodynamic Relations (Lectures 06)	Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy, Surface Films and Variation of Surface Tension with Temperature, Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) Clausius Clapeyron equation, (2) Values of *Cp*-*Cv*, (3) TdS Equations, (4) Energy equations, (5) Change of Temperature during Adiabatic Process.	6	
Laboratory			
	<u>At least four from the following:</u> 1. To determine mechanical equivalent of heat, J, by Callender and Barne's constant flow method 2. To determine the mechanical equivalent		Credit-1

	of heat, J using calorimeter 3. To determine specific heat of a liquid using calorimeter 4. To determine the coefficient of thermal conductivity of Cu by Searle's Apparatus. 5. To determine the coefficient of thermal conductivity of an insulator by Lee and Charlton's disc method. 6. To determine the temperature coefficient of resistance by Platinum Resistance Thermometer (PRT). 7. To study the variation of thermo-emf of a thermocouple with difference of temperature of its two junctions. 8. To determine the change of entropy of universe for an AC circuit consists of a thermally insulated resistor. 9. To calibrate a thermocouple to measure temperature in a specified range using (1) Null method, (2) Direct measurement using OPAMP and to determine neutral temperature.		

Reading list

1. Heat and Thermodynamics, M. Zemansky, R. Dittman, McGraw-Hill Education, 2017.
2. A Treatise on Heat, Meghnad Saha and B. N. Srivastava, Indian Press, 1973.
3. Thermal Physics: Kinetic Theory, Thermodynamics and Statistical Mechanics, S. C. Garg, R. M. Bansal and C. K. Ghosh, Tata McGraw Hill Education Pvt Ltd, 2013.
4. Thermodynamics, Kinetic Theory and Statistical Thermodynamics, F. W. Sears & G. L. Salinger, Narosa Publishing House, 1998.
5. Thermal and Statistical Physics, R. B. Singh, New Academic Science, 2011.
6. Theory and Experiment on Thermal physics, P K. Chakrabarti, New Central Book Agency (P) Ltd, 2011.

Graduate Attributes

i. Course Objective

- To understand principles of thermodynamics
- To provide concepts of thermodynamic functions
- To address the basic framework of kinetic theory of gases

ii. Learning outcome

Upon completion of this course, students will be able to learn thermal properties of gas molecules and their collisions. With this course, students will acquire knowledge of thermodynamics with practical insights into thermal physics, which will help them to understand real world situations.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Bimal Kumar Sarma**, Gauhati University, bimal@gauhati.ac.in
2) **Dr. Krishna Kingkar Pathak** , Arya Bidyapeeth College, kkingkar@gmail.com
3) **Dr. Diganta Sarma**, B. Borooah College, sarma.diganta@gmail.com

Subject: Physics
Semester: Five
Course Name: Electromagnetic Theory
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY304
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Maxwell's equations	Maxwell's equations, Displacement Current, Vector and Scaler Potentials, Gauge Transformations: Coulomb and Lorentz Gauge, Boundary Conditions at Interface between Different Media, Poynting Theorem and Poynting Vector.	9	Credit - 3
Unit II: EM Wave Propagation in Unbounded Media	Plane EM Waves through Vacuum and Isotropic Dielectric Medium, Transverse Nature of Plane EM Waves, Refractive Index and Dielectric Constant, Propagation though Conducting Media, Relaxation Time, Skin Depth. Wave Propagation through Dilute Plasma (Basic Concepts).	9	
Unit III: EM wave in Bounded Media	Reflection and Refraction of Plane EM Waves at Plane Interface between two Dielectric Media – Laws of Reflection and Refraction, Fresnel's Formula for Perpendicular Polarization Case, Brewster's Law, Reflection and Transmission Co-efficient, Waveguides: Basic Concepts and Propagation of EM Waves in a Rectangular Waveguide.	9	
Unit IV: Polarization of Electromagnetic Waves	Description of Linear, Circular and Elliptical Polarization, Propagation of EM Waves in Anisotropic Media, Symmetric Nature of Dielectric Tensor, Fresnel's Formula, Uniaxial and Biaxial Crystals, Light Propagation in Uniaxial Crystal, Double Refraction, Polarization by Double Refraction, Nicol Prism; Ordinary & Extraordinary Refractive Indices, Production & Detection of Plane, Circularly and Elliptically Polarized Light; Phase Retardation Plates: Quarter-Wave and Half-Wave Plates, Babinet	11	

	Compensator and its Uses, Analysis of Polarized Light.		
Unit V: Rotary Polarization	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 Polarimeter.	4	
Unit VI: Optical Fibres	Numerical Aperture, Step and Graded Indices (Definitions Only), Single and Multiple Mode Fibres (Concept and Definition Only)	3	
Laboratory			
	<u>At least four from the following:</u> 1. To verify the law of Malus for plane polarised light. 2. To determine the specific rotation of sugar solution using Polarimeter. 3. To analyze elliptically polarised light by using Babinet's compensator. 4. To study dependence of radiation on angle for a simple Dipole antenna. 5. To determine the wavelength and velocity of ultrasonic waves in a liquid (Kerosene Oil, Xylene etc.) by studying the diffraction through ultrasonic grating. 6. To study the reflection and refraction of microwaves. 7. To study polarization and double slit interference in microwaves. 8. To determine the refractive index of liquid by total internal reflection using Wollaston's air-film. 9. To determine the refractive index of (1) glass and (2) a liquid by total internal reflection using a Gaussian eyepiece. 10. To study the polarisation of light by reflection and determine the polarizing angle for air-glass interface. 11. To verify the Stefan's law of radiation and to determine Stefan's constant. 12. To determine the Boltzmann constant using V-I characteristic of pn junction diode.		Credit-1

Reading list

1. Introduction to Electrodynamics, D. J. Griffiths.
2. Electromagnetics, B. B. Laud, New Age International Publishers.
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. Feynman Lectures Vol. 2, R. P. Feynman, R. B. Leighton, M. Sands, 2008, Pearson Education.
6. Fundamentals of Electromagnetics, M. A. W. Miah, 1982, Tata McGraw Hill.
7. Electromagnetic Field Theory, R. S. Kshetrimayun, 2012, McGraw Hill.
8. Engineering Electromagnetic, Willian H. Hayt, 2012, McGraw Hill.
9. Electricity and Magnetism [With electromagnetic theory and special theory of relativity], D. Chattopadhyay and P. C. Rakshit, 2013, New Central Book Agency (P) Limited.

Graduate Attributes

i. Course Objective

- To lay the foundation of electromagnetism through Maxwell's equations.
- Behaviour of electromagnetic waves as it propagates through vacuum and other media.
- Various effects that occur as electromagnetic waves propagate from one medium to another medium.
- Basic concepts of waveguides and fibre optics.
- Various aspects of electromagnetic wave polarisation

ii. Learning outcome

After the successful completion of the course, students will acquire the concepts of Maxwell's equations, propagation of electromagnetic (EM) waves in different homogeneous-isotropic as well as anisotropic unbounded and bounded media, production and detection of different types of polarized EM waves, general information of waveguides and fibre optics.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Dr. Manos Pratim Chakrapani Kalita, Gauhati University, mpckalita@gauhati.ac.in
2) Dr. Rudra Kumar Das, Jagiroad College, das1.rudra@gmail.com
3) Dr. Arup Deka, Darrang College, arupkrdeka280@gmail.com

Subject: Physics
Semester: Six
Course Name: NUCLEAR & PARTICLE PHYSICS
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY351
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Basic Properties of Nuclei	Constituents of a nucleus: proton-electron hypothesis -Thompson atom model, failure of proton-electron hypothesis, discovery of neutrons, Rutherford gold foil experiment (qualitative) and atom model- mass, radius, volume, matter density of nuclei and their units. Binding energy, binding energy per nucleon, stability of a nucleus- neutron to proton ratio, stability line, stability limit against beta decays.	8	Credit - 4
Unit II: Radioactivity and Radioactive Laws	Types of Radioactivity – alpha, beta, and gamma decay. Laws of radioactive decay, disintegration constant, half-life and mean life. Activity of a radioactive source, units of radioactivity. Alpha decay: range, ionization and stopping power, range-energy relation, Geiger-Nuttall law, Fine structure of alpha energy spectrum. Beta decays: types of beta decays, essential conditions of beta decays, beta ray spectra, end point energy, Pauli's neutrino hypothesis. Gamma decay: origin of gamma radiation, its property, attenuation of gamma radiation in matter	10	
Unit III: Nuclear Instrumentation	Detectors: Interaction of Radiation with Matter: Energy loss by a charged particle due to ionization (Bethe- Block formula), energy loss of electrons, Cerenkov radiation. Interaction of photon with matter – Photoelectric effect, Compton effect, and Pair production. Gas filled detectors: Ionization chamber,	10	

	proportional counter, and GM counter – construction and working principle. Charged particle accelerators: Need of charged particle accelerators, Linear accelerator (LINAC) – Construction and working principle.		
Unit IV: Fission and Fusion	Energy consideration in Nuclear Reaction, Mass defect and Q-value of a nuclear reaction, Einstein's mass-energy equivalence principle and generation of nuclear energy. Nuclear Fission: Spontaneous and induced fission – definition and examples, Fission chain reactions and nuclear reactor: peaceful use of fission energy. Fusion and thermonuclear reactions: Energy production in stars (brief qualitative discussions).	10	
Unit V: Elementary Particles	Classification of elementary particles and their quantum numbers, conservation laws, Allowed and forbidden reactions, Types of interactions – strong, electro-magnetic and weak interactions.	7	

Reading list

1. Basic ideas and concepts in Nuclear Physics: An introductory approach by K Heyde, third edition, IOP Publication, 1999. 87
2. Nuclear Physics by S N Ghoshal, First edition, S. Chand Publication, 2010.
3. Introductory Nuclear Physics by K S Krane, Wiley-India Publication, 2008.
4. Nuclear Physics: principles and applications by J Lilley, Wiley Publication, 2006.
5. Radiation detection and measurement, G F Knoll, John Wiley & Sons, 2010.
6. Schaum's Outline of Modern Physics, McGraw-Hill, 1999.
7. Concept of Modern Physics by Arthur Beiser, McGraw Hill Education, 2009.
8. Nuclear Radiation Detector by S S Kapoor and V S Ramamurthy , 1st edition, New Age international publisher.

Graduate Attributes

i. Course Objective

- basic knowledge about the nucleus and other subatomic particles and their properties.
- knowledge about the radioactive disintegration of a nucleus and the laws of radioactive decays
- Knowledge on basic nuclear instrumentation and experimental techniques of nuclear physics.
- Basic knowledge of particle physics.

ii. Learning outcome

On successful completion of the course, the students shall be able to understand the structure and properties of a nucleus. They will also know about the properties of strong nuclear force that keeps the nuclei bound. They will learn about the radioactive decays and various laws of radioactive disintegration. Students will have adequate knowledge on the construction and working principles of particle accelerators and detectors. Moreover, students will be introduced to the world of particle physics – types and interactions. The acquired knowledge can be applied in the areas of nuclear medicine, medical physics, archaeology, geology and other interdisciplinary fields of Physics and Chemistry. It will enhance the special skills required for these fields.

Theory Credit: 04 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Prof. Buddhadeb Bhattacharjee, Gauhati University, buddha@gauhati.ac.in
2) Dr. Mausumi Bhuyan, Rangiya College, moubhuyan83@gmail.com
3) Dr. Krishna Kingkar Pathak, Arya Vidyapeeth College, kkingkar@gmail.com

Subject: Physics
Semester: Six
Course Name: Digital Electronics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY352
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Integrated Circuits (qualitative treatment only)	Active & Passive Components. Discrete components. Wafer. Chip. Advantages and drawbacks of ICs. The scale of integration: SSI, MSI, LSI, and VLSI (basic idea and definitions only). Classification of ICs. Examples of Linear and Digital ICs.	3	Credit - 3
Unit II: Digital Circuits	Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion. BCD, Octal, and Hexadecimal numbers. AND, OR, and NOT Gates (realization using Diodes and Transistor). NAND and NOR Gates as Universal Gates. XOR and XNOR Gates	10	
Unit III: Boolean Algebra	Unit III: (Lectures 10) De Morgan's Theorems. Boolean Laws. Simplification of Logic Circuit using Boolean Algebra. Fundamental Products. The idea of Minterms and Maxterms. Conversion of a Truth table into Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map.	10	
Unit IV: Arithmetic Circuits	Binary Addition. Binary Subtraction using 2's Complement. Half and Full Adders. Half & Full Subtractors, 4-bit binary Adder/Subtractor.	5	
Unit V: Timers: IC 555	Timers: IC 555 (Lectures 03) Block diagram and applications: Astable multivibrator and Monostable multivibrator.	3	
Unit VI: Sequential Circuits	(Lectures 04) SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race-around conditions in JK Flip-Flop. M/S JK Flip-Flop.	4	

Unit VII: 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).	4	
Unit VIII: Computer Organization	Input/output Devices. Data storage (the idea of RAM and ROM). Computer memory. Memory organization & addressing.	6	
Laboratory			
	At least four from the following:		Credit 1
	1. To design a switch (NOT gate) using (i) a PNP transistor and (ii) an NPN transistor. 2. To verify and design AND, OR, NOT, and XOR gates using NAND gates. 3. To design a combinational logic system for a specified Truth Table. 4. To convert a Boolean expression into a logic circuit and design it using logic gate ICs. 5. To design a Half Adder and Full Adder 6. To design a 4-bit binary Adder. 7. To design Half Subtractor and Full Subtractor 8. To design Adder-Subtractor using Full Adder IC. 9. To design an astable multivibrator of given specifications using 555 Timer. 10. To design a monostable multivibrator of given specifications using 555 Timer. 11. To build a D flip-flop circuit using NAND gates. 12. To build a JK flip-flop circuit using NAND gates. 13. To build JK Master-slave flip-flop using flip-flop ICs. 14. To make a 4-bit Shift Register (serial and parallel) using D-type/JK Flip-Flop ICs. 15. To build SR flip-flop circuit using NAND gates		

Reading list

1. Digital Principles and Applications, A. P. Malvino, D. P. Leach and Saha, 7th Ed., 2011, Tata McGraw
2. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
3. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
4. Digital Electronics G. K. Kharate ,2010, Oxford University Press
5. Digital Systems: Principles & Applications, R. J. Tocci, N. S. Widmer, 2001, PHI Learning

6. Logic circuit design, Shimon P. Vingron, 2012, Springer.
7. Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
8. Digital Electronics, S. K. Mandal, 2010, 1st edition, McGraw Hill
9. Electronics Fundamentals and Applications, D. Chattopadhyay and P. C. Rakshit, 17th Ed, 2023, New Age International Publisher

Graduate Attributes

i. Course Objective

- To introduce the students to the basics of digital electronics and applications with handson experience in implementing some hardware.
- To help students develop a digital logic and apply it to solve real-life problems
- To analyze, design and implement various combinational and sequential logic circuits
- To classify different semiconductor memories.

ii. Learning outcome

After successful completion of the course student will be able to develop, implement and analyze digital logic circuits and apply them to solve real-life problems and classify different semiconductor memories

Theory Credit: 04 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Prof. Banty Tiru, Gauhati University, btiru@gauhati.ac.in
2) Dr. Shakeel Zaman, Handique Girls College, shakeelzamal@gmail.com
3) Dr. Sumanta Borthakur, B. Borooah College, bortmontu1@gmail.com

Subject: Physics
Semester: Six
Course Name: Astronomy and Astrophysics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY353
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit –I: Fundamentals of astronomy	Basic components of the universe – stars, planets and galaxies; celestial sphere and celestial coordinates system - altitude-azimuth (Alt-Az) and right ascension-declination (RA-DEC); Introduction to constellations through sky observation and Stellarium; concept of time – universal time, solar and mean solar time, sidereal time, local sidereal time, Julian day; flux and luminosity of celestial objects; stellar magnitude scale – apparent and absolute magnitude; measurement of stellar distances – trigonometric parallax; introduction to HIPPARCOS and GAIA.	8	Credit - 4
Unit- II: Astronomical techniques	Telescopes –size and light gathering power; resolving power; different types of optical telescopes (reflecting and refracting); space telescopes; concept of virtual observatory; virtual observatory tools in astronomy – SIMBAD, Aladin; SDSS, AAVSO, Sky-View; introduction to photometry; CCD –an introduction; spectroscopy and polarimetry.	7	
Unit – III: Stellar astrophysics	Star formation from interstellar medium (introduction only); properties of stars – mass, luminosity, radius and effective surface temperature; mass-luminosity, mass-radius and luminosity-radiustemperature relation; variable stars-cepheids; star clusters – open and globular, their ages (introduction only). Gravity and thermodynamics – hydrostatic equilibrium of stars; virial theorem; internal temperature and pressure of stars; spectral classification –	13	

	HR diagram; stellar evolution- idea of nucleosynthesis in main sequence phase- pp and CNO cycle; evolution of Sun-like stars off the main sequence -red giants and white dwarfs- Chandrasekhar mass limit (introduction only); evolution of massive stars – neutron stars and black holes (introduction only).		
Unit-IV: The solar system	(Lectures 5) The Sun; properties of photosphere, chromospheres and corona; Formation of the solar system – Kant-Laplace nebular hypothesis; asteroid belt and meteorites; Distances and atmospheres of planets; Pluto and dwarf planets; comets – Kuiper belt and Oort cloud; extra-solar planets – transit method of detection (introduction only).	5	
Unit- V: Galaxies and cosmology	(Lectures 12) The Milky Way-shape, size and its components; classification of galaxies –Hubble's tuning fork diagram; types – spirals, elliptical and lenticular; difference between spirals and ellipticals. Large scale structure of the universe – galaxies, clusters, superclusters, filaments, walls and voids; Cosmological Principle; Hubble's law; Newtonian cosmology and derivation of Friedman equation; closed and oscillating universe, flat and open universe; the Hot Big Bang model; Cosmic Microwave Background (CMB); steady state universe (introduction only); flat rotation curves in galaxies and evidence of dark matter; dark energy (introduction only).	12	

Reading list

1. Astrophysics for physicists, A. Rai Choudhuri, Cambridge University Press.
2. An introduction to the theory of stellar structure and evolution, D. Prialnik, Cambridge University Press.
3. Astrophysics- Stars and galaxies, K. D. Abhyankar, Tata McGraw Hill Pub.
4. Textbook of astronomy and astrophysics with elements of cosmology, V. B. Bhatia, Narosa Pub.
5. Astronomy Methods - A Physical Approach to Astronomical Observations, Hale Bradt, Cambridge University Press.
6. Introduction to astrophysics, H.L. Duorah and K. Duorah, Mani Manik Prakash (Guwahati) Digital Principles and Applications, A. P. Malvino, D. P. Leach and Saha, 7th Ed., 2011, Tata McGraw
7. The physical universe – An introduction to astronomy, F. H. Shu, University of Science Books.

8. The structure of the universe, J.V. Narlikar, Oxford University Press.
9. Introduction to cosmology, B. Ryden, Cambridge University Press

Graduate Attributes

i. Course Objective

- To introduce the students with fundamental concepts and observational techniques in astronomy including virtual observatory tools,
- to introduce them with physical processes occurring inside the celestial objects and
- to introduce the physical concepts required for the study of recent frontiers in astrophysics.

ii. Learning outcome

On successful completion of this course students will be able to understand the fundamental concepts in astronomy. They will be able to apply physics of celestial objects in understanding the universe. They will be equipped with the skills required for (i) observational astronomy (ii) virtual observatory tools and (iii) physical concepts of recent frontiers in astrophysics.

Theory Credit: 04 (Three)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Dr. Biman Jyoti Medhi, Gauhati University, biman@gauhati.ac.in
2) Dr. Sanjeev Kalita, Gauhati University, sanjeev@gauhati.ac.in
3) Dr. Pratima Dutta, Dimoria College, pratimadta2019@gmail.com,

Subject: Physics
Semester: Six
Course Name: Statistical Mechanics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY354
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Classical Statistics	Microstate and macrostate, distributions of particles in compartments, principle of equal a priori probability. Phase space, volume of phase space. Elementary concept of ensembles, Types of ensembles. Ergodic hypothesis. Entropy and thermodynamic probability, Stirling's approximation, Maxwell-Boltzmann distribution function, Partition functions. Gibbs Paradox, Sackur Tetrode equation, Law of Equipartition of Energy (with proof) — Applications to specific heat and its limitations. Thermodynamic parameters (internal energy, entropy, free energy, enthalpy) using partition functions.	15	Credit - 4
Unit II: Classical and Quantum Theory of Radiation	Properties of thermal radiation. Blackbody radiation. Spectral distribution of Blackbody radiation, Kirchhoff's law. Stefan-Boltzmann law: Thermodynamic proof. Radiation pressure (for Normal and diffused case). Wien's Displacement law. Wien's Distribution Law. Saha's ionization formula. Rayleigh-Jean's Law (with proof). Ultraviolet catastrophe. Need of quantum statistics. Planck's quantum postulates. Planck's law of blackbody radiation: Experimental verification. Deduction of (1) Wien's Distribution Law, (2) RayleighJeans Law, (3) Stefan- Boltzmann Law, (4) Wien's Displacement law from Planck's black body radiation formula	12	

Unit III: Bose-Einstein Statistics	Bose-Einstein (BE) distribution, Pressure of a Bose gas, Bose Einstein Condensation (qualitative description only), Properties of liquid Helium (qualitative discussion only), Radiation as a photon gas and Bose's derivation of Planck's blackbody radiation formula, Thermodynamic functions of photon gas – energy, entropy, and free energy	8	
Unit IV: Fermi-Dirac Statistics	Fermi-Dirac (FD) distribution, FD function and Fermi Energy, Degenerate Fermi gas, strongly degenerate case (qualitative discussion only), Thermodynamic functions - energy and pressure of a completely degenerate Fermi gas, Heat capacity at low temperature, Free electron gas in metals and electronic specific heat, Relativistic Fermi gas, thermodynamics of white dwarf star (qualitative discussion only).	10	

Reading list

1. Statistical Mechanics, R K Pathria and P D Beale, Elsevier Science, 2021.
2. Statistical Physics, F. Reif, McGraw-Hill Education India, 2008.
3. Statistical and Thermal Physics, S. Lokanathan and R. S. Gambhir, PHI Learning, 1991.
4. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, Springer, 2009.
5. An Introduction to Statistical Mechanics & Thermodynamics, R. H. Swendsen, Oxford University Press, 2012.
6. A Primer of Statistical Mechanics, R. B. Singh, New Age International Publishers, 2006.

Graduate Attributes

i. Course Objective

- To provide basic concepts of statistical mechanics
- Describing various thermodynamical phenomena using probability theory
- To learn classical and quantum statistics

ii. Learning outcome

Upon completion of the course, students will get accustomed to the microscopic origin of thermodynamic processes. After successful completion of the course, students will be able to perceive classical and quantum pictures of physical and chemical events

Theory Credit: 04 (Three)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Bimal Kumar Sarma**, Gauhati University, bimal@gauhati.ac.in
2) **Dr. Krishna Kingkar Pathak** , Arya Bidyapeeth College, kkingkar@gmail.com
3) **Dr. Diganta Sarma**, B. Borooah College, sarma.diganta@gmail.com

Syllabi for

Four Years' Undergraduate Program (FYGP)
in Zoology

under

Gauhati University

As per instructions of the NEP Implementation Committee, Gauhati University, the syllabicover02 (Two) CORE and 04(Four) COMPULSORY Major papers and 15 (Fifteen) DISCIPLINE SPECIFIC (DSE) major papers to be offered by the Department

Prepared by-

Department of Zoology
Gauhati University

Structure of Four Years Undergraduate Programme (FYGP) in Zoology under Gauhati University
Subject: Zoology
Stream: Science
In all courses:
Theory credit: **3**/Practical credit: **1**
No. of contact hours in each theory paper: **45**
No. of contact hours in each practical paper: **30**
Existing base syllabi: **CBCS Syllabi ,2016, GU**

Semester	Course Name	Paper Code*	Credit
I	**Core A1**: Diversity of Non-chordates	CORE	3
	Practical	**ZOO-1011**	1
II	**Core A2**: Diversity of Chordates	CORE	3
	Practical	**ZOO-1021**	1
III	**Compulsory:** Principles of Genetics	MAJOR	3
	Practical	**ZOO-2011**	1
IV (Any three DSE papers)	**Compulsory:** Animal Taxonomy, Systematics & Biostatistics	MAJOR	3
	Practical	**ZOO-2021**	1
	DSE 1-Animal Physiology & Endocrinology	MAJOR	3
	Practical	**ZOO-2022**	1
	DSE 2- Principles of Ecology & Evolution	MAJOR	3
	Practical	**ZOO-2023**	1
	DSE 3- Comparative Anatomy of Vertebrates	MAJOR	3
	Practical	**ZOO-2024**	1
	DSE 4- Animal Behaviour and Chronobiology	MAJOR	3
	Practical	**ZOO-2025**	1
	DSE 5- Parasitology	MAJOR	3
	Practical	**ZOO-2026**	1
V (Any Three DSE papers)	**Compulsory:**Fundamentals of Biochemistry	MAJOR	3
	Practical	**ZOO-3011**	1
	DSE 6- Biochemistry of metabolic processes & regulation	MAJOR	3
	Practical	**ZOO-3012**	1
	DSE 7- Entomology & Fisheries	MAJOR	3
	Practical	**ZOO-3013**	1
	DSE 8- Immunology	MAJOR	3
	Practical	**ZOO-3014**	1
	DSE 9- Reproductive Biology	MAJOR	3
	Practical	**ZOO-3015**	1
	DSE 10- Molecular Biology	MAJOR	3
	Practical	**ZOO-3016**	1
VI (Any Three DSE papers)	**Compulsory:**Cell Biology	MAJOR	3
	Practical	**ZOO-3021**	1
	DSE 11- Developmental Biology	MAJOR	3
	Practical	**ZOO-3022**	1
	DSE 12- Wildlife Conservation & Management	MAJOR	3
	Practical	**ZOO-3023**	1
	DSE 13- Computational Biology	MAJOR	3
	Practical	**ZOO-3024**	1
	DSE 14- Advanced Entomology	MAJOR	3
	Practical	**ZOO-3025**	1
	DSE 15- Animal Cell Culture & Genetic Engineering	MAJOR	3
	Practical	**ZOO-3026**	1

*The paper code should be read as follows-ZOO-Zoology; 10-Year I; 20-Year II; 30-Year III; 1-Odd semester;2-Even semester; Last Digit-Serial Number; ZOO-1011 stands for Zoology first year, odd semester, first paper

CORE A1
DIVERSITY OF NON-CHORDATES
Code: ZOO-1011
Credit: 3 (T) + 1 (P)

Course Objectives:

1. The course would provide an insight to the learner about the existence of different life forms ontheEarth,andappreciatethediversityofanimallife.
2. Itwillhelpthestudenttounderstandthefeatures of Kingdom Animalia and systematic organization of the animals based on theirevolutionaryrelationships,structuralandfunctionalaffinities.
3. Thecoursewillalsomakethestudents aware about the characteristic morphological and anatomical features of diverseanimals;economic,ecologicalandmedicalsignificanceofvariousanimalsin humanlife;andwillcreateinterestamongthemtoexploretheanimaldiversityinnature.

Learning Outcomes:

Uponcompletionofthecourse,studentsshouldbeableto:

1. Learn about the importance of systematics, taxonomy and structural organization ofanimals.
2. Understand evolutionary history and relationships of different non-chordates throughfunctionalandstructuralaffinities.
3. Critically analyze the organization, complexity and characteristic features of non-chordatesmakingthemfamiliarizewiththemorphologyandanatomyofrepresentativesofvariousanimalphyla.
4. Comprehendtheeconomicimportanceofnon-chordates,theirinteractionwiththeenvironmentandroleintheecosystem.
5. Enhancecollaborativelearningandcommunicationskillsthroughpracticalsessions,teamwork,groupdiscussions,assignmentsandprojects.

CORE A1
DIVERSITY OF NON-CHORDATES
Code: ZOO-1011
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit1: GeneralcharacteristicsandClassificationup toclasses of Protista, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nemathelminthes.	7
Unit2: Evolution of coelom and metamerism GeneralcharacteristicsandClassificationup toclasses of Annelida,	8

Arthropoda, Mollusca and Echinodermata.	
Unit 3: LocomotionandReproductioninProtista Evolution of symmetryandsegmentationof Metazoa Canalsystemandspiculesin sponges Polymorphism inCnidaria Corals andcoralreef formation Parasiticadaptationsinhelminths- *Fasciola hepatica* and *Wuchereriabancrofti* Excretion in Annelida Vision and respiration in Arthropoda Evolutionary significance of Onychophora Torsion and detorsion in Gastropoda Water vascular system of Echinodermata	30

DIVERSITY OF NON-CHORDATES

PRACTICAL	**Hours**
1. Study of the whole mount of *Euglena*, *Amoeba* and *Paramecium* collected from different water sources. 2. Study of minimum of two representatives (specimen/slide/model) of each phylum of non-chordates. 3. Study of larval forms of Arthropoda/Echinodermata 4. T.S. through pharynx, gizzard and typhlosolar intestine of earthworm. 5. Tosubmit aProjectReportonlife cycle of helminth parasite by students	30

Suggested Readings:

1. Ruppert, E.E. and Barnes, R.D. (2006). Invertebrate Zoology, 8th Edition. Holt Saunders International Edition.
2. Pechenik, J. (2015). Biology of the Invertebrates. 7th Edition, McGraw Hill
3. Schierwater, B. & DeSalle, R. (2021). Invertebrate Zoology: A Tree of Life Approach. 1st edition, CRC Press
4. Jordan, K. and P. S. Verma (2019). Invertebrate Zoology, S. Chand and Co. Ltd.
5. Kotpal, R. L. (2020). Modern text book of Zoology, Invertebrates,12th Edition, Rastogi Publications

CORE A2
DIVERSITY OF CHORDATES
Code: ZOO-1021
Credit: 3 (T) + 1 (P)

Course Objectives:

The course is designed with an aim to provide scope and historical background of chordates. Itwillimpartknowledgeregardingbasicconceptsoforiginofchordatesandmakethestudentsunderstand the characteristics and classification of animals with notochord. The exclusivephenomenainchordateslikebitingmechanisminsnakes,flightadaptationsinbirdsetc. willbe explained. The adequate explanation to the students regarding various mechanisms involvedin thriving survival of the animals within their geographic realms will create interest amongstudents

Learning Outcomes:

Uponcompletionofthecourse,thestudentswillbeableto:

1. Understanddifferentclassesofchordates,leveloforganizationandevolutionaryrelationshipbetweendifferentsubphylaandclasses,withinandoutsidethephylum.
2. Studyaboutdiversityinanimalsmakingstudentsunderstandabouttheirdistinguishingfeatures.
3. AppreciatesimilaritiesanddifferencesinlifefunctionsamongvariousgroupsofanimalsinPhylumChordata.
4. Comprehendthecirculatory,nervousandskeletalsystemofchordates.
5. Know about the habit and habitat of chordates in marine, freshwater and terrestrialecosystems.

CORE A2
DIVERSITY OF CHORDATES
Code: ZOO-1021
Credit: 3 (T) + 1 (P)

THEORY	Hours
Unit 1: Origin of Chordates-Dipleurula concept and Echinoderm theory Generalcharacteristicsandoutlineclassification	8
Unit2: Generalcharacteristicsof Hemichordata, Urochordata and Cephalochordata Study of larval forms of protochordates.	7
Unit3: Advanced features of vertebrate over protochordata	30

Overviewofaxialandappendicularskeleton,Jawsuspensorium, Visceral arches Generalcharacteristicsandclassificationof cyclostomesupto class General characteristics of Chondrichthyes and Osteichthyes, classification uptoorder. Origin of Tetrapoda Generalcharacteristicsandclassificationof Amphibia, Reptilia, Aves and Mammaliaupto order Migration in Fishes; Parental care in Amphibia; Biting mechanism in snakes; Archaeopteryx as a connecting link; Flight adaptation in birds; Affinities in Prototheria.	

DIVERSITY OF CHORDATES

PRACTICAL	**Hours**
1. Study of museum specimens/ Models -Protochordata (*Balanoglossus, Herdmania, Amphioxus*), Agnatha (*Petromyzon, Myxine*), Fishes (*Scoliodon, Torpedo, Mystus, Heteropneustes, Labeo, Hippocampus, Tetraodon*), Amphibia (*Ichthyophis, Necturus, Bufo, Hyla*), Reptilia (*Chelone, Hemidactylus, Varanus, Chamaeleon, Bungarus, Naja*), Aves (ten different species of birds commonly found in Assam), Mammalia (Bat, common primates, common ungulates, Gangetic River Dolphin). 2. Study of T.S. of *Amphioxus* through pharyngeal, intestinal and caudal regions. 3. Identification key of venomous and non-venomous snakes. 4. PowerPoint presentation on the study of any two vertebrates from two different classes by students.	30

Suggested Readings:

1. Young, J. Z. (2004).The Life of Vertebrates. 3rd Edition. Oxford University press.
2. Pough F. H. & Janis, C. M. (2018). Vertebrate Life. 10th Edition, Sinauer Associates
3. Verma, P. S. & Jordan, E. L. (2013). Chordate Zoology. 14th edition, S. Chand
4. Kotpal, R. L. (2019). Modern text book of zoology: Vertebrates (Z-3). 5th edition, Rastogi Publications

MAJOR
COMPULSORY
PRINCIPLES OF GENETICS
Code: ZOO-2011
Credit: 3 (T) + 1 (P)

Course Objectives:

Human beings had been applying the principles of genetics by engaging in selective breeding of domesticated animals for many centuries. However, it was only with the work of Mendel and advent of 20th century, that basic principles of the science of genetics were formulated. In about a century of its existence, this field has generated tremendous amount of knowledge through observational and experimental research. The information amassed in the last century has laid the foundation for more discoveries in this important field of life science. This course aims to provide an overview of genetics starting from the work of Mendel to the current understanding of various phenomena like gene mapping, sex determination and mutations. The course will help in building sound fundamental knowledge of the principles of genetics, to be used as a stepping stone for higher studies and research in this field.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Understand the basic principles of inheritance.
2. Analyze Mendelian Law and gene interactions leading to development of analytical skills and critical thinking enabling the students to present the conclusion of their findings in a scientific manner.
3. Know the mechanisms of mutations, the causative agents and the harmful impact of various chemicals and drugs being used in day-to-day life.
4. Gain knowledge on genetic and environmental basis of sex determination.

MAJOR 1
PRINCIPLES OF GENETICS
Code: ZOO-2011
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Principles of inheritance, Incomplete dominance and co-dominance; Multiple alleles; Lethal alleles, penetrance and expressivity; Epistasis; Pleiotropy; Sex-linked, sex-influenced and sex-limited characters inheritance and concept of gene. Linkage and crossing over, Cytological basis of crossing over, Recombination frequency as a measure of linkage intensity; Two factor and three factor crosses; Linkage map; coefficient of coincidence and Interference; Gene mapping by Somatic cell hybridization.	15
Unit 2: Gene mutations; Chromosomal aberrations – Deletion, duplication, inversion, translocation, aneuploidy and polyploidy; Induced versus spontaneous	20

mutations; Backward and forward mutations; Suppressor mutations; Molecular basis of mutations in relation to UV light and chemical mutagens; Detection of mutations in *Drosophila*: CLB method, attached *X* method.

Unit 3:	10
Basis of sex determination: Genetic and environmental; Sex determination in *Drosophila* and human; Mechanism of dosage compensation. Comparison of nuclear and extra nuclear inheritance; Organelle inheritance: Antibiotic resistance in *Chlamydomonas*, Mitochondrial mutations in *Saccharomyces* and human disorders, Infective heredity in *Paramecium*. Maternal effects: Shell coiling in *Limnaea*, pigmentations in *Ephestia*. Polygenic inheritance and Transgressive variation	

PRINCIPLES OF GENETICS

Practical	**Hours**
1. To study Mendelian laws and gene interactions and their verification by Chi-square analyses using seeds/beads/*Drosophila*. 2. Study of linkage maps based on data from *Drosophila* crosses. 3. Identification of various mutant types of *Drosophila*(through culture/photomicrograph) 4. Study of human karyotype (normal and abnormal) using photomicrograph. 5. Preparation of polytene chromosomes from *Chironomus/Drosophila* larvae. 6. Preparation of metaphase chromosome from fish/mammal.	30

Suggested Readings:

1. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. 8thEdition. Wiley India.
2. Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. 5thEdition. John Wiley and Sons Inc
3. Klug, W.S., Cummings, M.R., Spencer, C.A. (2020). Concepts of Genetics. 10thEdition. Benjamin Cummings.
4. Russell, P. J. (2009). Genetics- A Molecular Approach. 3rdEdition. Benjamin Cummings.
5. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. 9thEdition. W. H. Freeman and Co.
6. Tamarin R. H. (2017). Principles of Genetics. Tata McGraw Hill Edition.
7. Brown, T. A. (2023). Genomes 5. 5th edition, CRC Press

MAJOR
COMPULSORY
ANIMAL TAXONOMY, SYSTEMATICS & BIOSTATISTICS
Code: ZOO-2021
Credit: 3 (T) + 1 (P)

Learning Objectives:

1. To introduce and familiarize the basic concepts of animal systematics
2. To inculcate the importance of taxonomy and nomenclature in biology
3. To provide a framework on understanding interrelationship among taxa
4. To impart knowledge on the theory and practice of phylogeny

Learning Outcomes:

The students will be able to

1. Understand the general principles of taxonomy and systematics
2. Explain the importance of Zoological nomenclature and its rules
3. Understand the importance of systematics in biology and comprehend the taxonomic categories and explain the concept of species
4. Acquire basic knowledge of phylogeny and understand important terminologies to represent phylogenies

MAJOR
COMPULSORY
ANIMAL TAXONOMY, SYSTEMATICS & BIOSTATISTICS
Code: ZOO-2021
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Animal Taxonomy andSystematics; Taxon and Phenon; Chemotaxonomy and cytotaxonomy and concept of molecular taxonomy Taxonomic categories; concepts of species – typological, nominalistic, biological and evolutionary Taxonomic keys – various types; dichotomous nature of keys Taxonomic characters – morphological, behavioural, ecological, and geographical Zoological Nomenclature – International Code of Zoological Nomenclature (ICZN), Principles, functions, and importance of the Code of nomenclature; principle of priority, homonymy and synonymy, principle of typification and use of types for specimens	30

Unit 2:
Characters (ancestral vs. derived), homology and analogy, parallelism and convergence, monophyly, polyphyly, paraphyly; representing phylogenies – Rooted and unrooted phylogenetic trees; clades; Cladograms and Phenograms

Unit 3: 15

Concept, Importance and Application of Biostatistics
Collection and Classification of statistical data, Frequency distribution, Types of presentation of statistical data
Measures of central tendency - Mathematical average, Average of position
Measures of Partition values
Measures of Dispersion - Range, Quartile deviation, Mean deviation, Standard deviation, Co-efficient of Variation, Standard errors
Testing of Hypothesis; Confidence Intervals; Chi-square test, student's t-test, Analysis of variance.

ANIMAL TAXONOMY, SYSTEMATICS & BIOSTATISTICS

PRACTICAL	Hours
1. To identify and distinguish species of insects/fishes/amphibians/reptiles/birds of NE India using appropriate taxonomic keys. 2. Morphometry and meristic study of insect and fish. 3. Preparation and study of skeleton of fish. 4. Preparation, mounting and stuffing of Indian Major Carps. 5. Graphical representation of statistical data with the help of computer (e.g., MS-Excel). 6. Calculation of two-sample t-test for a given set of data. 7. Calculation of F value (ANOVA) for a given set of data. 8. Calculation of Karl Pearson's Coefficient of Correlation for a given set of data. 9. Field visit to any Natural History Museum/Zoo and scientific report preparation and submission.	30

Suggested Readings:

1. Kapoor, V.C. (2019). Theory and Practice of Animal Taxonomy, 8th Edition, Oxford & IBH Publishing.
2. Simpson, G.G. (2012). Principles of Animal Taxonomy, Scientific Publishers (Indian Edition)
3. Mayr, E. (2022). Principles of Systematic Zoology, United Book Prints (Indian Edition)
4. Wiley, E. O. & Lieberman, B. S. (2011). Phylogenetics: Theory and Practice of Phylogenetic Systematics, Wiley Blackwell
5. Zar, J. H. (1999). Biostatistical Analysis, IV Edition, Pearson Education Inc and Dorling Kindersley Publishing Inc.USA.

6. Antonisamy, B., Christopher S. & Samuel, P. P. (2010). Biostatistics: Principles and Practice. Tata McGraw Hill Education Private Limited, India.
Pagana,M.&Gavreau, K.(2000).Principles of Biostatistics, Duxberry Press, USA

DSE-1
ANIMAL PHYSIOLOGY AND ENDOCRINOLOGY
Code: ZOO-2022
Credit: 3 (T) + 1 (P)

Learning Objectives:

1. This course will offer an overview on the functioning of the animal body.
2. It will help students to understand the fundamentals of animal physiology and histological structures.
3. They will understand the concept of homeostasis in response to changes to the outside environment.
4. They will be provided with practical knowledge on investigating the physiological questions, collecting, analysing and interpreting experimental data and applying them in day-to-day life.
5. Further, the students will be encouraged to pursue further studies in physiology and other related courses.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Understand the principles of normal biological function of the animal body.
2. Understand basic animal physiology and correlate it with the various histological structures.
3. Understand the homeostasis in animals in response to changes in their external environment.
4. Perform practical related to animal physiology.

DSE-2
ANIMAL PHYSIOLOGY AND ENDOCRINOLOGY
Code: ZOO-2023
Credit: 3 (T) + 1 (P)

THEORY	Hours
Unit 1: Structure and Function of Epithelial, Connective, Muscular tissues, Characteristics of Muscles, Mechanism of Muscle Stimulation and Contraction Neurons Structure of neurons, Nerve Impulse, physiology of nerve impulse conduction and Propagation, Neuro - Muscular Junction and neurotransmitter in smooth muscle and cardiac muscle. Anatomy of digestive system in mammals, digestive enzymes, digestion and absorption of food stuff.	15

Unit 2: Respiratory Organs in Different Animals, Transport of Oxygen and Carbon dioxide, Respiratory Pigments, Types and structure of heart, Concepts of Neurogenic and Myogenic Hearts, Cardiac cycle, ECG patterns in Mammals, Homeostasis and Blood Clot Formation, Functions of Kidney, Types of Nitrogenous Wastes in Different Animal Groups and their Excretion Urea production – Hans Krebs and Kurt Henseleit cycle, Urine Formation.	15
Unit 3: Endocrine glands of invertebrates and vertebrates, Structure and function of insects' neuroendocrine glands, Hypothalamus and pituitary structures, hormones and its functions. Hypothalamus-hypophyseal blood vessel. Thyroid and parathyroid gland structure in mammal. Endocrine pancreas structure and function Structural Organizations of Adrenals, Functions of Cortical and Medullary Hormones and mechanism of action. Male and female gonads in mammal structure and function.	15

ANIMAL PHYSIOLOGY AND ENDOCRINOLOGY

PRACTICAL	**Hours**
1. Preparation squamous epithelium and striated muscle fibres. 2. Preparation of blood smear and staining techniques 3. Haemoglobin estimation using Sahli's haemoglobinometer. 4. Dissection of insect neuroendocrine system in cockroach 5. Dissect and display of pituitary glands and gonads of fish. 6. Histological study using fish tissues-method of collection, preparation for microtome 7. Examination and detailed study of permanent histological sections of lungs, stomach, duodenum, liver, kidney, pancreas, adrenal, pituitary, thyroid, parathyroid. 8. Study of placoid, cycloid and ctenoid scales through permanent slides/photographs 9. Study of disarticulated skeleton of Frog, Fowl, Rabbit	30

Suggested Readings:

1. Tortora, G.J. and Derrickson, B.H. (2012). Principles of Anatomy and Physiology.XIIIth Edition, John Wiley and Sons, Inc.
2. Hill, R. (2021) Animal Physiology. Sinauer Associates Inc; 5th edition.
3. Widmaier E, Raff H and Strang K. (2013). Vander's Human Physiology: The Mechanism

of Body Functions. XIIIth Edition, McGraw-Hill Education.
4. Guyton, A.C. and Hall, J.E. (2011) Textbook of Medical Physiology. XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company.
5. Kesar, S. and Vashisht, N. (2007) Experimental Physiology. Heritage Publishers.
6. Prakash, G. (2012) Lab Manual on Blood Analysis and Medical Diagnostics. S. Chand and Company Ltd
7. Cinnamon, V., Regan J., Russo A.F. (2022) Seelay's Anatomy and Physiology. McGraw Hill Education.

DSE 2
PRINCIPLES OF ECOLOGY & EVOLUTION
Code: ZOO-2023
Credit: 3 (T) + 1 (P)

Course Objectives:

The primary aim of the syllabus is to sensitize the students about the role and importance of nature and ecosystem functioning. The study of Ecology also provides the knowledge about the judicious use of existing ecological resources for sustainable development. Ecology is the only branch of science which explain the ways and means of surviving with nature for mutual benefit. Study of ecology will provide students opportunity to understand its practical aspects and helps them to solve many current ecological issues such as global warming, habitat degradation, habitat loss, desertification and pollution etc. The field training experiences will also enable students to understand the ecosystem functioning and ecology processes in a better way.

Learning Outcomes:

After completion of the course, students will be able to learn about the:

1. Understanding of key concepts in ecology with emphasis on historical perspective, role of physical factors and concept of limiting factors etc.
2. Figure out the population characteristics, population dynamics, growth models and interactions.
3. Recognize the community characteristics, ecosystem development and climax theories.
4. Know about the types of ecosystems, food chains, food webs, energy models, and ecological efficiencies.
5. Apply the basic principles of ecology in wildlife conservation and management.
6. Instill scientific quantitative skills, evaluate experimental design, read graphs, and analyse and use information available in scientific literature.

DSE 2
PRINCIPLES OF ECOLOGY & EVOLUTION
Code: ZOO-2023
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit1: Basic concept of ecology and ecosystem, Autecology, Synecology, Level of organization, Study of physical factors, Laws of limiting factors, Structural	12

components of Ecosystem, Functional attributes of Ecosystem-Trophic structure, food chain, food web, Energy flow, Ecological Pyramids, Ecological Efficiencies; Types of Ecosystems with examples.

Unit2: Definition, Unitary and Modular populations, Population attributes-Abundance, Density, Natality and Mortality, Life table and survivorship curve, Dispersion, Dispersal, Age distribution, Sex ratio, Biotic potential and Environmental resistance, Population growth form-Exponential and Logistic; Population regulation-density dependent and independent factors. Population interactions, Gauss's principle; Definition of community, Community characteristics, Community structure, Ecological succession and types, Theories pertaining to climax community Ecotone and Edge effect.	17
Unit3: Theoriesof origin of life – Chemogenesis,Biogenesis, Experimental evidences Evolutionary theories: Lamarkism, Darwinism and Neo-Darwinism Paleontological evidences of evolution, Geological timescale Natural selection – concept of fitness, selection coefficient, kin selection, sexual selection Population genetics –Concept of speciationand Hardy-Weinberg Law (statement and derivation), concept of gene flow, Natura selection and survival of the fittest – sources of variations and role in evolution, Genetic Drift (Founder's and Bottleneck effect), Role of migration and mutation in changing allelic frequencies Evolution of man	16

PRINCIPLES OF ECOLOGY & EVOLUTION

PRACTICAL	**Hours**
1. Study of life tables and plotting of survivorship curves of different types from thehypothetical/realdataprovided	30
2. Determination of population density by quadratmethod and calculation of Shannon-Weinerdiversityindex in a natural/hypothetical community.	
3. Study of an aquatic ecosystem: the method of phytoplankton and zooplankton collection and identification, measurement of temperature, turbidity, determination of pH, and dissolved oxygencontent(Winkler'smethod),freeCO_2 determination in aquatic environment.	
4. Studyoffossilsfrommodels/pictures	
5. Studyofhomologyandanalogyfromsuitable specimens (insects, birds and mammals)	
6. StudyandverificationofHardy-Weinberg Law byChi-square analysis	
7. Preparation and submission of scientific reportonavisittoNationalPark/BiodiversityPark/Wildlifesanctuary/any other important ecosystems.	

Suggested Readings:

1. Colinvaux, P.A. (1973). Ecology. 2nd Edition. John Wiley and Sons Inc.
2. Krebs, C. J. (2001). Ecology. 6th Edition. Benjamin Cummings.
3. Odum, E.P. (2008). Fundamentals of Ecology. Indian Edition. Brooks/Cole
4. Smith, R. L., Smith, T.M. (2000). Ecology and field biology Harper and Row publisher
5. Ricklefs, R.E. (2000). Ecology. V Edition. Chiron Pres
6. Hall B.K. & Hallgrimsson B. (2013). Strickberger's Evolution. 5th Edition, Jones and Bartlett Publishers, Inc.
7. Futuyama, D. J. (2017). Evolution. 4th Edition, Sinauer Associates
8. Ridley, M. (2020). Evolution. 2nd edition (South Asia Edition), Oxford University Press.

DSE-3
COMPARATIVEANATOMYOF VERTEBRATES
Code: ZOO-2024
Credit: 3 (T) + 1 (P)

Learning Objectives:

This course aims to provide the undergraduate students a thorough knowledge of structuraldetails and comparativeaccount of thedifferent organ systems ofthebody from lower tohighervertebrates,andprotochordates,thusenablingthemtoappreciatetheincrediblevertebratediversity.Thecoursefurnishesanunderstandingofevolutionarybasisofmorphologicalandanatomicaldifferencesaswellassimilaritiesthatoccuramongvertebrates. Ithelps students propose possiblehomology between structures, and understandhow they evolved as the vertebrates dwelled different habitats. The structural modifications ofdigestive, circulatory, respiratory and skeletal system relate to the distribution of animals intheirdifferentcomfortzonesofhabitatandecologicalniches.Theunderstandingofanatomical details of organ systems of mammals like rat and mice aims to gives the basicinformationfortheiruseinresearchindifferentbranchesofZoology.

Learning Outcomes:

Uponcompletionofthecourse,studentsshouldbeableto:

1. Explaincomparativeaccountofthedifferentvertebratesystems and understand thepatternofvertebrateevolution,organization.
2. Learn the comparative account of integument, skeletal components, their functions andmodificationsindifferentvertebrates.
3. Understandtheevolutionofbrain,senseorgansandexcretoryorganstoacomplex,highlyevolvedforms;
4. Learn to analyse and critically evaluate the structure and functions of vertebrate systems,which helps them to discern the developmental, functional and evolutionary history ofvertebratespecies.

DSE-3
COMPARATIVEANATOMYOF VERTEBRATES
Code: ZOO-2024

Credit: 3 (T) + 1 (P)	
THEORY	**Hours**
Unit1: IntegumentarySystem-Structure,functionsandderivatives. SkeletalSystem- Overviewofaxialandappendicularskeleton,Jawsuspensorium, Visceral arches. Digestivetrack-Alimentary canals and associated glands in vertebrates, dentition in mammals.	15
Unit 2: RespiratorySystem-Skin,gills,lungsandairsacs;Accessoryrespiratoryorgans in vertebrates. Circulatory System-Generalplanofcirculation,comparative anatomyofheartandaorticarches. UrinogenitalSystem-Succession of kidney, Evolution of urinogenital duct	20
Unit 3: NervousSystem-Comparativeaccountofbrain, Autonomicnervoussystem,Spinalcord, Cranialnervesinmammals. SenseOrgans-Classificationofreceptors; Briefaccountofvisualandauditoryreceptorsinman	10

COMPARATIVEANATOMYOF VERTEBRATES	
PRACTICAL	**Hours**
1. Study of types scales in fishes (which is available) and preparation ofpermanentslides. 2. Study of disarticulatedskeletonofFrog/Fowl/Rabbit 3. Study of carapaceplastronand skull ofturtle/tortoise (which is available). 4. Study of mammalian and avianskulls:Oneherbivorousandonecarnivorousanimal 5. Preparation and submission of report on comparative study of internal and external anatomical structure of any vertebrate (excluding IUCN Red listed or scheduled species of W(P)A, 1972).	30

Suggested Readings:

1. Kardong, K.V. (2005) Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education
2. Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies
3. Hilderbrand, M and Gaslow, G.E. Analysis of Vertebrate Structure, John Wiley and Sons
4. Walter, H.E. and Sayles, L.P. Biology of Vertebrates, Khosla Publishing House

DSE-4

ANIMAL BEHAVIOUR AND CHRONOBIOLOGY

Code: ZOO-2025

Credit: 3 (T) + 1 (P)

Course objectives

1. To create a knowledge base on concepts of animal behaviour
2. To inculcate scientific enquiry on animal cognition and its application in conservation and welfare of animals
3. To develop skills on methods of studying animal behaviour
4. To offer a basic understanding of the subject of chronobiology
5. To highlight the adaptive significance of biological timekeeping in animals

Learning Outcomes:

After the completion of this course, the students will be able to

1. Acquire a comprehensive understanding of the behaviour of animals and gain knowledge on profiles of behavioural biologists and their contributions to the field of animal behaviour.
2. Understand and analyse the causes and patterns of behaviour.
3. Understand the social nature of animals and communication among individuals of animal societiesand utilise scientific methods of studying animal behaviour.
4. Understand basic terms and concepts of chronobiology and comprehend the significance of biological rhythms.

DSE-4

ANIMAL BEHAVIOUR AND CHRONOBIOLOGY

Code: ZOO-2025

Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Origin and history of ethology Patterns of behaviour - instinct vs. learned behaviour; Animal orientation- Taxis vs. Kinesis; Navigation;	20

Proximate and ultimate causes of behaviour Methods of studying behaviour.	
Unit 2: Animal Communication-Dance Language in honey bees; Eusocial organization - honey bee, termite, and ant; Schooling behaviour in fishes; Social behaviour in monkeys.	10
Unit 3: Historical developments; biological oscillations - concept of average, amplitude, phase and period. Biological timekeeping-adaptive significance and importance; Concept of biological rhythms-Circadian, circalunar/infradian and circannual rhythms with example in animal models/humans Phenomenon of bird migration Concept of biological clock: functions in animal systems Concept of zeitgebers; photoperiodand Concept clock genes,sleep-wake cycle.	15

ANIMAL BEHAVIOUR AND CHRONOBIOLOGY

Practical	**Hours**
1. To study nest and nesting habits of birds/social insects 2. To study geotaxis behaviour in earthworm. 3. To study scan and focal animal sampling in waterbirds/mammals. 4. To study circadian functions in human with special reference to body temperature. 5. To study behavioural activities of animals in home/backyard/locally available wild/domestic animals and prepare a short report.	30

Suggested Readings:

1. Manning, A. & Dawkins, M. S. (2012). An Introduction to Animal Behaviour. Cambridge University Press, 6th edition.
2. Barnard, C. (2003). Animal Behaviour: Mechanism, Development, Function and Evolution. Pearson, 1st edition.
3. Lehner, P. N. (1996). Handbook of Ethological Methods. Cambridge University Press, 2nd edition
4. Kumar, V. (2017). Biological Timekeeping: Clocks, Rhythms and Behaviour. Springer, 1st edition

DSE 5
PARASITOLOGY
Code: ZOO-2026
Credit: 3 (T) + 1 (P)

Course Objectives:

To skill the students to visualize, appreciate and understand the diversity of parasites in the animal kingdom.
To make the students aware about the possible scopes of the subject including research and applied aspects
To diagnose medical parasites correctly, understand their life cycle and effective control
To use some of parasites as possible biocontrol agents

Learning Outcomes:

After completion of the course the students will be able to:

1. Understand the variation among parasites, parasitic invasion with special reference to medical and agricultural aspects.
2. Help to know the stages of the life cycle of parasites and their respective infective stages.
3. Develop skills and realize significance of diagnosis of parasitic attack and treatment of host.
4. Mapping of the parasites available in regional/national importance/zoonotic diseases

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DSE 5
PARASITOLOGY
Code: ZOO-2026
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Brief introduction of Parasitism; Parasite, Parasitoid and Vectors; Host-parasite relationship; types of parasites and hosts; evolution of parasitism Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Trypanosoma gambiense, Leishmania donovani*and*Plasmodium*	12

Unit 2: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Schistosoma haematobium, Taenia solium*and *Hymenolepis nana.* Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity of *Ascaris lumbricoides*, *Ancylostoma duodenale*, *Wuchereriabancrofti*and *Trichinella spiralis*	21
Unit 3: External parasites in domesticated animals with examples (cattle, goat, sheep, buffalo and dogs), control of ticks, mites, *Pediculus humanus*(Head and Body louse),*Xenopsylla cheopis*and *Cimex lectularius* A brief account of parasitic vertebrates – Candiru and Vampire bat	12

PARASITOLOGY

Practical	**Hours**
1. Study of life stages of *Entamoeba histolytica*, *Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani*and *Plasmodium vivax* through permanent slides/photographs. 2. Study of adult and life stages of *Fasciolopsishaepatica, Schistosoma haematobium, Taenia solium*and *Hymenolepis nana* through permanent slides/photographs. 3. Study of adult and life stages of *Ascaris lumbricoides, Ancylostoma duodenale, Wuchereriabancrofti*and *Trichinella spiralis* through permanent slides 4. Study and preparation of scientific report of any two common protozoan/ helminth/ arthropod parasites 5. Study of *Pediculus humanus*(Head louse and Body louse), *Xenopsylla cheopis*and *Cimex lectularius* through permanent slides/ photographs. 6. Study of nematode/cestode parasites from fish or intestine of poultry birds/pigs. 7. Submission of at least two arthropod parasites.	30

Suggested readings:

1. Chernin, J. (2000). Parasitology. Taylor & Francis Group.
2. Arora, D. R and Arora, B. B. (2018) Medical Parasitology. 5th Edition, CBS Publications and Distributors Pvt Ltd
3. Noble, E.R. and Noble, G.A. (1982) Parasitology: The Biology of Animal Parasites. 5th Edition, Lea &Febiger
4. Ahmed, N., Dawson, M., Smith, C. and Wood, Ed. (2007) Biology of Disease. Taylor and Francis Group
5. Taylor, M. A., Coop, R. L., & Wall, R. L. (2016). Veterinary Parasitology. 4th edition, Wiley Blackwell
6. Loker, E. S. &Hofkin, B. V. (2015). Parasitology – A conceptual approach. Taylor & Francis Group

MAJOR
COMPULSORY
FUNDAMENTALS OF BIOCHEMISTRY
Code: ZOO-3011
Credit: 3 (T) + 1 (P)

Learning Objectives:
This course offers a basic insight about the biomolecules, its structure and function. Further the students will be provided with practical knowledge which can be applied to understand the chemistry of the biomolecules. It will also encourage students to pursue core biochemistry related fields as well as multi-disciplinary subject for better understanding of biochemistry in research.

Learning Outcomes:
Upon completion of this course, students will be able to understand the basic principle, structure and function of biomolecules like carbohydrates, proteins and nucleic acids. They will also be able to understand the role of these molecules in the functioning of animal systems. The students will learn about the characteristics, kinetics, regulation and inhibition of enzymes-the biological catalysts and as such will have a brief overview of the biochemical system of the body. Additionally, they will also gain practical knowledge about the different functional groups present in these molecules.

MAJOR
COMPULSORY
FUNDAMENTALS OF BIOCHEMISTRY
Code: ZOO-3011
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit1: Carbohydrates: Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides and Glycoconjugates Lipids: Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Tri-acylglycerols, Phospholipids, Glycolipids, Steroids	15
Unit 2: Amino acids: Structure, Classification and General properties of α- amino acids; Physiological importance of essential and non-essential α- amino acids. Proteins: Bonds stabilizing protein structure; Levels of organization in proteins; Denaturation; Introduction to simple and conjugate proteins.	15

Nucleic Acids: Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids Cot Curves: Base pairing, Denaturation and Renaturation of DNA. Types of DNA and RNA, Complementarity of DNA**.**	
Unit 3:	15
Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes; Mechanism of enzyme action; Enzyme kinetics; Factors affecting rate of enzyme-catalyzed reactions; Derivation of Michaelis-Menten equation, Concept of Km and Vmax, Regulation of enzyme action and Different types of Enzyme Inhibition (Competitive, Non-competitive and Uncompetitive Inhibition).	

FUNDAMENTALS OF BIOCHEMISTRY

Practical	**Hours**
1. Qualitative tests of functional groups in carbohydrates, proteins and lipids.	30
2. To determine the iodine number of given oil/fat.	
3. Estimation of a reducing sugar in a given sample.	
4. To find the pKa value of acetic acid.	
5. To study the activity of Salivary Amylase and Determination of Amylase Number.	
6. To study the absorption spectrum of proteins and DNA.	
7. Demonstration of proteins separation by SDS-PAGE.	

Suggested Readings:

1. Cox, M.M and Nelson, D.L. (2008). Lehninger's Principles of Biochemistry, V Edition, W.H. Freeman and Co., NewYork.
2. Berg,J.M.,Tymoczko,J.L.andStryer,L.(2007).Biochemistry,VIEdition,
3. W.H. Freeman and Co., New York. Murray,R.K.,Bender,D.A.,Botham,K.M.,Kennelly,P.J.,Rodwell.
4. V.W.and Well, P.A. (2009). Harper's Illustrated Biochemistry, XXVIII Edition, International Edition, The McGraw- Hill CompaniesInc.
5. Hames, B.D. and Hooper, N.M. (2000). Instant Notes in Biochemistry, II Edition, BIOS Scientific Publishers Ltd.,U.K.
6. Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M. and Losick, R. (2008). Molecular Biology of the Gene, VI Edition, Cold Spring Harbor Lab. Press, PearsonPub.
7. Das M, Dutta A and Kalita A (2022). Advanced Biochemistry. Kalyani Publications.

DSE 6
BIOCHEMISTRY OF METABOLIC PROCESSES AND REGULATION
Code: ZOO-3012
Credit: 3 (T) + 1 (P)

Course Objectives:

1. This course will give the students a brief overview of both catabolic and anabolic processes.
2. It will give them a better understanding of the various reactions involved in the process of carbohydrate, protein and lipid metabolism.
3. It will help in understanding the process of energy production in our body by the mitochondrial respiratory chain.
4. Give them practical knowledge on the various methods and assays used to understand the metabolic processes.
5. Encourage them to take up further studies on understanding the metabolic processes of the body.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Understand the principles of catabolic and anabolic processes.
2. Understand carbohydrate, protein and lipid metabolism and correlate it practical observations.
3. Understand the process of energy production in the body.
4. Perform practicals related to metabolic processes.

DSE 6
BIOCHEMISTRY OF METABOLIC PROCESSES AND REGULATION
Code: ZOO-3012
Credit: 3 (T) + 1 (P)

THEORY	Hours
Unit 1: Catabolism vs. Anabolism, ATP as "Energy Currency of cell"; coupled	15

reactions; Use of reducing equivalents and cofactors.

Unit 2: Sequence of reactions and regulation of glycolysis, Citric acid cycle, Phosphate pentose pathway, Gluconeogenesis, Glycogenolysis and Glycogenesis Redox systems; Mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System	20
Unit 3: β-oxidation and omega-oxidation of saturated fatty acids with even and odd number of carbon atoms; Ketogenesis Catabolism of amino acids: Transamination, Deamination, Urea cycle.	10

BIOCHEMISTRY OF METABOLIC PROCESSES AND REGULATION

Practical	Hours
1. Estimation of total protein in given solutions by Lowry'smethod.	30
2. Extraction of lipids from insect.	
3. Spectrophotometric analysis of lipids using Sulpho-Phospho-Vaniline.	
4. Detection of SGOT and SGPT in serum/tissue	
5. To perform the Acid and Alkaline phosphatase assay from serum/tissue.	
6. Determination of Urea in Urine sample.	

Suggested Readings:

1. Cox, M.M and Nelson, D.L. (2008). Lehninger Principles of Biochemistry, V Edition, W.H. Freeman and Co., NewYork.
2. Berg,J.M.,Tymoczko,J.L.andStryer,L.(2007).Biochemistry,VIEdition, W.H. Freeman and Co., New York.
3. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). Harper's Illustrated Biochemistry, XXVIII Edition, International Edition, The McGraw-Hill CompaniesInc.
4. Hames, B.D. and Hooper, N.M. (2000). Instant Notes in Biochemistry, II Edition, BIOS Scientific Publishers Ltd.,U.K.

DSE 7
ENTOMOLOGY AND FISHERIES
Code: ZOO-3013
Credit: 3 (T) + 1 (P)

Course objectives:

Insects are the most successful group of organisms on earth with some unique attributes. These diverse group of organisms alone comprises 80% of all animal species with 450 million years of existential history. They dominantly occupy all the spheres of earth except deep sea. The course will give an overview of diverse insects' species and their basis of classification, morphological structures and some beneficial and harmful role of insects.

1. To provide practical and academic skills in identifying important freshwater fish groups of northeast India
2. To provide basic concepts on the biology of fishes
3. To create a knowledge base on fisheries resources of India
4. To inculcate the scope and importance of aquaculture and fisheries in research as well as applied aspects

Learning Outcomes:

Upon completion of the course, the students will be able to:

1. Identify different insects and classify them based on their morphological characters
2. Get an idea about diversity and causes of success of insects on earth
3. Familiar with the best body design in simpler form
4. Get concept on the common vectors of human diseases and common phytophagous pests
5. Identify and characterize economically important freshwater fishes of NE India
6. Acquire basic knowledge on morphology and physiology of fishes
7. Compare and contrast capture fisheries resources of India
8. Understand the utility and application of different fishing gears
9. Understand the rules and regulations governing Indian capture fisheries
10. Gain knowledge on the impact of climate change on fisheries
11. Understand methods and types of culture fisheries
12. Demonstrate the induced breeding of Indian Major Carps including collection and preservation of fish pituitary gland, and broodstock and hatchery management
13. Acquire practical knowledge on the role soil and water quality in aquaculture
14. Identify the importance of fish as a model organism in research

DSE 7
ENTOMOLOGY AND FISHERIES
Code: ZOO-3013
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: General Features of Insects, Classification of insects up to orders, causes of success of insects on earth, role of insects in pollination, Basic concept on collection, preservation and culture techniques of insects General Morphology of insects -compound Eyes, antennae, Mouth parts and legs. Structure of integument. Molting and metamorphosis. Insects as Vectors & Pest: Insects as mechanical and biological vectors of pathogens and parasites, Common insect vectors (Aedes, Culex, Anopheles, Phlebotomus, Musca domestica), Insects as plant pests.	23
Unit 2: Introduction to fish - General description of a fish; Account of systematic classification of freshwater teleosts of NE India (up to Order) Morphology and Physiology - Types of fins and their modifications; Locomotion in fishes; Types of Scales; Structure and functions of Gills, basic mechanism of gas exchange; Swim Bladder - types, role in Respiration and buoyancy; Osmoregulation in Elasmobranchs; Electric organs	09
Unit 3: **Capture Fisheries** - Inland Capture Fisheries resources of India; marine fisheries; Fishing crafts and Gears; Application of remote sensing and GIS in fisheries; Fisheries rules and regulations; Climate change and its impact on fisheries; Fishery by-products **Culture fisheries** - Extensive, semi-intensive and intensive culture of fish; Pen and cage culture; Polyculture; Composite fish culture; Brood stock management; Induced breeding of Indian Major Carps; Management of hatcheries; Role of soil and water quality in aquaculture **Fish in research** - Transgenic fish, Zebrafish as a model organism in research	13

ENTOMOLOGY AND FISHERIES

Practical	Hours
1. Study of different types of mouth parts/ antenna of insects through slides/specimens.	30
2. Study of insect vectors through permanent slides or photographs or model: *Aedes, Culex, Anopheles*, *Pediculus*, *Cimex*, *Phlebotomus* (sand fly), and *Musca domestica* (house fly).	
3. Preparation of project report on any one vector and diseases transmitted by the vector (*Aedes/Culex/Anopheles*/ lice/ bed bug, sand fly/ house fly).	
4. Identification of insects belonging to different orders, common insect pest of paddy, tea, stored grain, citrus and sugarcane.	
5. Classification and characterization of commercially important food and ornamental fishes of NE India.	
6. Study of different types of indigenous/locally available fishing gears.	
7. Estimation and interpretation of pH of pond soil; dissolved oxygen (D.O.) and free carbon dioxide (fCO_2) in pond water.	
8. Dissection and display of Pituitary Gland of Indian Major Carp.	
9. Demonstration of induced breeding of IMCs (video)	

Suggested Readings:

1. Pradhan, S. (1969). Insect Pests of Crops. National Book Trust, India Book House.
2. Atwal, A.S. (1993) Agricultural pest of India and South East Asia. Kalyani Pub., New Delhi.
3. Chapman, R. F. The Insects: Structure and Function. Cambridge University Press, UK
4. S. Hill. (2005) Agricultural Insect pests of the tropics and their management, Cambridge University press.
5. Pedigo L. P. (2002). Entomology and Pest Management, Prentice Hall Publication
6. Tembhare, D.B. Modern Entomology
7. David, B.V. and Ananthakrishnan (2004). General and Applied Entomology.
8. Bone, Q. & Moore, R. H. (2008). Biology of Fishes. 3rd edition, Taylor & Francis
9. Evans, D. H., Claiborne, J. B. & Curie, S. (2014). The Physiology of Fishes. 4th edition, CRC Press
10. Handbook of Fisheries and Aquaculture (2013). Published by the Indian Council of Agricultural Research, New Delhi
11. Khanna, S. S. & Singh, H. R. (2014). Textbook of Fish Biology and Fisheries. 3rd edition, Narendra Publishing House
12. Jayaram, K. C. (2010). The Freshwater Fishes of the Indian Region. 2nd edition, Narendra Publishing House
13. Vishwanath, W. (2021). Freshwater Fishes of the Eastern Himalayas. 1st edition, Elsevier

DSE 8
IMMUNOLOGY
Code: ZOO-3014
Credit: 3 (T) + 1 (P)

Learning Objectives:

1. This course will give the students a brief overview on the cells and organs of the immune system.
2. It will give them a better understanding about antigens, antibodies and their use as tools for research.
3. It will help in better understanding the functioning of the immune system and the role of vaccines in preventing diseases.
4. Give them practical knowledge on the immune system and its functioning in mammals.
5. Encourage them to take up further studies on the topics related to immunology.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Understand about the various cells and organs of the immune system.
2. Understand the concepts of antigens, antibodies and their interactions.
3. Gain knowledge on the functioning of the immune system and the role of vaccines in preventing diseases.
4. Perform practicals related to immunology and its functioning in mammals.

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DSE 8
IMMUNOLOGY
Code: ZOO-3014
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Introduction to basic concepts of immunology; components of immune system; principles of innate and adaptive immune system. Haematopoiesis, Cells of immune system and organs (primary and secondary lymphoid organs) of the immune system	15
Unit 2: Basic properties of antigens, B and T cell epitopes, haptens and adjuvants. Structure, classes and function of antibodies, monoclonal antibodies, antigen antibody interactions as tools for research and diagnosis	20
Unit 3: Structure and functions of MHC, exogenous and endogenous pathways of antigen presentation and processing, basic properties and functions of cytokines, Complement system: Components and pathways. General introduction to vaccines, various types of vaccines.	10

IMMUNOLOGY

Practical	**Hours**
1. Histological study of spleen, thymus and lymph nodes through slides/ photographs. 2. Preparation of stained blood film to study various types of blood cells. 3. ABO blood group and Rh factor determination. 4. Demonstration of- a) ELISA; b) Immunoelectrophoresis 5. Isolation of lymphocytes from blood.	30

Suggested Readings:

1. Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006). Immunology, VI Edition. W.H. Freeman and Company.
2. David, M., Jonathan, B., David, R. B. and Ivan R. (2006). Immunology, VII Edition, Mosby, Elsevier Publication.
3. Abbas, K. Abul and Lechtman H. Andrew (2003.) Cellular and Molecular Immunology. V Edition. Saunders Publication.

DSE 9
REPRODUCTIVE BIOLOGY
Code: ZOO-3015
Credit: 3 (T) + 1 (P)

Course Objectives:

1. This course will give the students a brief overview on the reproductive endocrinology of mammals.
2. It will give them a better understanding about the functional anatomy of the male reproductive system and the various hormones and processes involved in it.
3. It will help in better understanding the functional anatomy of the female reproductive system and the various hormones and processes involved in it.
4. Give them practical knowledge on the reproductive biology of mammals.
5. Encourage them to take up further studies on the topics related to reproductive biology.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Understand about the process of reproductive endocrinology in mammals.
2. Understand the functional anatomy of male and female reproductive systems in mammals.
3. Gain knowledge on the various hormones involved in the process of reproduction

and also the roles that they perform in the body.

4. Perform practicals related to understanding the reproductive biology in mammals.

DSE 9
REPRODUCTIVE BIOLOGY
Code: ZOO-3015
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Gonadal hormones and mechanism of hormone action, steroids, glycoprotein hormones and prostaglandins, hypothalamo–hypophyseal–gonadal axis, regulation of gonadotrophin secretion in male and female; Reproductive System: Development and differentiation of gonads, genital ducts, external genitalia, mechanism of sex differentiation.	15
Unit 2: Outline and histological study of male reproductive system in rat and human; Testis: Cellular functions, germ cell, system cell renewal Spermatogenesis: kinetics and hormonal regulation; Androgen synthesis and metabolism; Epididymal function and sperm maturation; Accessory glands functions; Sperm transportation in male tract	20
Unit 3: Outline and histological of female reproductive system in rat and human; Ovary: folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis and secretion of ovarian hormones; Reproductive cycles (rat and human) and their regulation, changes in the female tract; Fertilization, implantation and pregnancy in mammals	10

REPRODUCTIVE BIOLOGY
Credit: 3 (T) + 1 (P)

Practical	**Hours**
1. Study of estrous cycle in rat/mice. 2. Study of histological sections from photomicrographs/ permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems. 3. Study of histological sections from photomicrographs/ permanent slides of sections of ovary, fallopian tube, uterus (proliferative and secretory	30

stages), cervix and vagina.

4. Total sperm count and determination of sperm motility in mammal

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Suggested Readings:

1. Austin,C.R.and Short,R.V. ReproductioninMammals. Cambridge University Press.
2. Degroot,L.J.andJameson,J.L. (eds).Endocrinology. W.B. Saunders and Company.
3. Knobil,E.etal.(eds).ThePhysiology of Reproduction. Raven Press Ltd.
4. Hatcher, R.A. et al. The Essentials of Contraceptive Technology. Population Information Programme.
5. Johnson, M.H. (2018). Essential Reproduction, Wiley-Blackwell, 8th Edition
6. Zarrow, M. (1964). Experimental Endocrinology-A source book of basic techniques, Elsevier, 1st Edition

DSE 10
MOLECULAR BIOLOGY
Code: ZOO-3016
Credit: 3 (T) + 1 (P)

Course Objectives:

1. Students will learn about different types of nucleic acids, their structures and mechanism of DNA replication.
2. The students will learn about the mechanism of transcription and translation and processing of RNA in both prokaryotes and eukaryotes.
3. Students will be able to learn about the mechanism of transcriptional regulation and importance of RNA interference technology
4. Students will learn about different types of DNA damage and their repair mechanism.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Students will able to appreciate how structure of DNA was discovered and how their structures are influenced by both internal and external factors.
2. Students will also able to understand why DNA synthesis is always occurs in 5'-3' direction. The students will also understand how processing of RNA protects and regulate theie translation.

3. Students will understand the basic of interaction of different polymerase with the nucleic acids and how their functions are enhanced or suppressed by different cofactors.
4. Students will understand what factors causes damages to the DNA and how cellular repair mechanism prevent and repair such damage to DNA.

DSE 10
MOLECULAR BIOLOGY
Code: ZOO-3016
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Nucleic Acids: Structure and types of DNA and RNA, Watson and Crick model of DNA. DNA Replication: Enzymes used in DNA Replication, DNA Replication in prokaryotes and eukaryotes, mechanism of DNA replication, Semi-conservative, bidirectional and semi-discontinuous replication, Telomere and replication of telomeres	15
Unit 2: Transcription: RNA polymerase structure and transcriptional Unit, mechanism of transcription in prokaryotes and eukaryotes Post Transcriptional Modifications and Processing of Eukaryotic RNA: Split genes: concept of introns and exons, splicing mechanism and alternative splicing Translation: Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Mechanism of translation, Inhibitors of protein synthesis	15
Unit 3: Regulation of gene expression: Operon concept, Transcription regulation in prokaryotes (lac operon and tryptophan operon) Transcription regulation in eukaryotes: Activators, repressors, enhancers, silencer elements; Gene silencing and Genetic imprinting. DNA Damage and Repair Mechanisms RNA interference	15

MOLECULAR BIOLOGY

Practical	**Hours**
1. Study of Polytene chromosomes from Chironomous / Drosophila larvae **2.** Preparation of metaphase chromosome from the bone marrow of mice **3.** Quantitative estimation DNA using colorimeter (Diphenylamine reagent)	30

4. Quantitative estimation of RNA using Orcinol reaction
5. Isolation of DNA from tissues and qualitative analysis by agarose gel electrophoresis.
6. Study and interpretation of electron micrographs/ photograph showing: DNA replication, Transcription and Split genes

Suggested Readings:

1. Cooper, G. M. (2018). 8th Edition. The cell: A molecular approach. Massachusetts, USA: Sinauer Associates. ISBN-13:978-1605357072
2. Alberts, B et al. (2014). 6th edition. Molecular Biology of the Cell. W. W. Norton & Company. ISBN-13 : 978-0815345244
3. Lodish H et al. (2003). 5th Revised edition. Molecular Cell Biology. W.H.Freeman& Co Ltd; ISBN13 : 978-0716743668
4. Karp, G. (2019). 9th Edition. Cell and molecular biology: New Jersey, USA: Wiley Publishers. ISBN-978—1-119-59816-9
5. Brown, T. A. (2020). 8thEdition. Gene cloning and DNA analysis: An introduction. New York, USA: John Wiley and Sons, ISBN-13: 978-1119640783.

MAJOR
COMPUSORY
CELL BIOLOGY
Code: ZOO-3021
Credit: 3 (T) + 1 (P)

Course Objectives:

1. Structure and functions of various cellular compartments and organelles
2. Cell growth, cell-division and cell-cycle control mechanisms.
3. Cell to cell communication and mechanism of signal transduction across the cellular target.
4. Cell death and mechanism

Learning Outcomes:

Uponcompletionofthecourse,studentsshouldtobeableto:

1. Students will learn about different cell types.
2. Students will acquire knowledge about the composition of cells and cellular compartments and detail study about the functioning of these organelles.
3. Students will acquire knowledge about cellular energetic and concept of protein sorting
4. Students will learn about the different level of DNA packaging within the cells and also learn about different types of chromosomes.

5. Students will learn about the growth and cellular division, communication among different cells and mode of cellular homeostasis by apoptosis and necrosis.

MAJOR
COMPULSORY
CELL BIOLOGY
Code: ZOO-3021
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1 **Over view of Cells**: Prokaryotic and Eukaryotic cells, Virus, Viroids, Mycoplasma, Prions. **Plasma Membrane:** Various models of plasma membrane structure, Transport across membranes: Active and Passive transport, facilitated transport, Types of transporters **Cell junctions:** Structure and functions of Tight junctions, Desmosomes, Gap junctions **Endomembrane System**: Structure and Functions of Endoplasmic Reticulum, Golgi Apparatus and Lysosomes	15
Unit 2 **Mitochondria:** Structure, Semi-autonomous nature, Endosymbiotic hypothesis, Mitochondrial Respiratory Chain, Chemi-osmotic hypothesis **Peroxisomes:** Structure and functions **Cytoskeleton**: Structure and Functions of Microtubules, Microfilaments and Intermediate filaments, Cillia and flagella **Nucleus**: Structure of Nucleus (Nuclear envelope, Nuclear pore complex, Nucleolus)	15
Unit 3 **Chromosomes:** Giant chromosome (Polytene and lampbrush), Types of eukaryotic chromosomes based on centromeres, Euchromatin and Hetrochromatin, DNA packaging within the nucleus (nucleosome model) **Cell Division**: Mitosis, Meiosis, Cell cycle and its regulation **Cell to Cell communications:** Types of signalling molecules, Cell surface receptors and its types, second messengers, Mechanism of signal transductions of peptide and steroid hormones. **Cell Deaths:** Necrosis and apoptosis, significance of apoptosis in cellular homeostasis, Mechanism of apoptosis	15

CELL BIOLOGY

Practical	**Hours**
1. Preparation of temporary stained squash of onion root tip to study various stages of mitosis	30

2. Study of various stages of meiosis in testis (Grasshopper/Cockroaches/Mice/Rat).
3. Preparation of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.
4. Preparation of permanent slide of blood and study of different types of blood cells
5. Preparation of histological slides from tissues as liver, Lung, Stomach, Intestine, Kidney, Pancreas, Testes and Ovary.
6. Preparation of permanent slide for cytochemical demonstration of
    a. DNA by Feulgen reaction
    b. Mucopolysaccharides and Glycogen by PAS reaction
    c. Proteins by Mercuro bromophenol blue/FastGreen
    d. Lipid by Sudan black B

Suggested Readings:

1. Cooper, G. M. (2018). 8th Edition. The cell: A molecular approach. Massachusetts, USA: Sinauer Associates. ISBN-13:978-1605357072
2. Alberts, B et al. (2014). 6th edition. Molecular Biology of the Cell. W. W. Norton & Company. ISBN-13 : 978-0815345244
3. Lodish H et al. (2003). 5th Revised edition. Molecular Cell Biology. W.H.Freeman& Co Ltd; ISBN13 : 978-0716743668
4. Hardin, J. Bertoni, G. P. Kleinsmith, L.J. and Becker, W.M. (2016). 9th Edition. The world of the cell. San Francisco, USA: Benjamin Cummings Publishers, ISBN-13: 978 -0321934925.
5. Karp, G. (2019). 9th Edition. Cell and molecular biology: New Jersey, USA: Wiley Publishers. ISBN-978—1-119-59816-9

DSE 11
DEVELOPMENTAL BIOLOGY
Code: ZOO-3022
Credit: 3 (T) + 1 (P)

Course Objectives:

1. Students will be given an exposure to gametogenesis and different types of fertilization.
2. Students will learn about the course of development after fertilization and development of different organs.
3. Students will learn about the post embryonic development, metamorphosis and teratogenesis.

Students will learn about in vitro fertilization.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. The students will be able to understand about the role of mitosis and meiosis cell division, cellular differentiation during gametogenesis.
2. The students will be able to understand how fertilization happens and the factors that affect fertilization event.
3. The students will be given exposure to understand the basic embryonic development and organogenesis.
4. The students will be able to understand the role different hormones and of cellular

signalling during development through metamorphosis and teratogenesis.

5. The students will learn and appreciate the importance of IVF, amniocentesis and embryonic stem cells.

DSE 11
DEVELOPMENTAL BIOLOGY
Code: ZOO-3022
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Spermatogenesis and Oogenesis Type of animal eggs, egg membrane and vitellogenesis, Fertilization**:** External and internal fertilization**,** sperm-egg interactions, biochemical events, post-fertilizations events. Parthenogenesis: Natural haploid, diploid and cyclic parthenogenesis. Artificial stimulus for parthenogenesis and its significance.	15
Unit 2: Planes and patterns of cleavage; Types of Blastula; Embryonic induction and Organizer, Fate map construction in frog and chick. Organogenesis:Development of heart and eye in vertebrates Development of chick embryo up to three germ layer formation. Extra embryonic membranes in bird and mammal.	15
Unit 3: **Placenta:** Types, function and physiology **Metamorphosis: types of metamorphosis, metamorphic changes**, hormonal regulations of metamorphosis in insects and amphibians. **Teratogenesis:** Teratogenic agents and their effects on embryonic development In vitro fertilization, Embryonic Stem cell (ESC), Amniocentesis.	15

DEVELOPMENTAL BIOLOGY

Practical	**Hours**
1. Collection and study of different type of eggs 2. Examination of gametes of frog/rat/mice: Sperm and ova through permanent slides or photomicrographs. 3. Study of developmental stages of Frog: Whole mounts and sections through permanent slides of cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole external and internal gill stages. 4. Study of developmental stages of Chick embryo: Whole mounts of chick through permanent slides (Hamburger and Hamilton Stages): Stage 3 (Intermediate Streak, 13 hours), Stage 4 (Definitive Streak, 18 hours), Stage 5 (Head Process, 21 hours), Stage 7 (24 hours), Stage 8	30

(28 hours), Stage10 (33 hours), Stage 11 (40 hours), Stage 13 (48 hours), Stage 19 (72 hours) and Stage 24 (96 hours) of incubation
5. Study of different types of placenta: Histological sections through permanent slides or photomicrographs.

Suggested Readings:

1. Gilbert, Scott F. *Developmental Biology*. 7th ed. Sunderland, MA: Sinauer Associates, 2003. ISBN: 9780878932580.
2. Wolpert, Lewis. *Principles of Development.* 2nd ed. New York, NY: Oxford University Press, 2001. ISBN: 9780198792918.
3. Kalthoff, Klaus. *Analysis of Biological Development*. 2nd ed. Boston, MA: McGraw-Hill, 2001. ISBN: 0071180788.
4. Slack, J. M. W. *Essential Developmental Biology*. Malden, MA: Blackwell Science, 2001. ISBN: 9780632052332.
5. Bier, Ethan. *The Coiled Spring: How Life Begins*. Plainview, NY: Cold Spring Harbor Laboratory Press, 2000. ISBN 9780879695637.
6. Gerhart, John, and Marc Kirschner. *Cells, Embryos, and Evolution: Toward a Cellular and Developmental Understanding of Phenotypic Variation and Evolutionary Adaptability*. Malden, MA: Blackwell Science, 1997. ISBN: 9780865425743.
7. Russo, V. E. A., et al., eds. *Development: Genetics, Epigenetics, and Environmental Regulation*. New York, NY: Springer, 1999. ISBN: 9783540627548.
8. Arias, Alfonso Martinez, and Alison Stewart. *Molecular Principles of Animal Development.* New York, NY: Oxford University Press, 2002. ISBN: 9780198792840.
9. Rao, Mahendra S., and Marcus Jacobson, eds. *Developmental Neurobiology*. 4th ed. New York, NY: Springer-Verlag, 2005. ISBN: 9780306483301.

DSE 12
WILDLIFE CONSERVATION AND MANAGEMENT
Code: ZOO-3023
Credit: 3 (T) + 1 (P)

Course Objectives:

The Discipline Specific Paper on Wildlife Conservation and Management is designed to acquaint students with varied aspects of wildlife conservation, including its importance, major threats, and management of their habitats and populations. The emphasis will be on developing interest and invoking a sense of responsibility among students toward wildlife conservation. The course also explores different techniques, perspectives, and approaches to both identify and achieve wildlife management goals. This course will motivate students to pursue careers in the field of wildlife conservation and management.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Become aware of the importance of wildlife in general, and its conservation and management in particular.
2. Comprehend the application of the principles of ecology and animal behaviour to formulate strategies for the management of wildlife populations and their

habitats.

3. Understand the management practices required to achieve a healthy ecosystem for wildlife populations along with an emphasis on conservation and restoration.
4. Know the key factors for the loss of wildlife and important strategies for their in-situ and ex-situ conservation.
5. Recognize the techniques for estimation, remote sensing, and Global Position Tracking for wildlife.
6. Gain knowledge about wildlife diseases and quarantine policies.
7. Know about the Protected Area Networks in India, Ecotourism, Ecology of perturbation, and Climax persistence.
8. Perform critical thinking, literature review; scientific writing as well as presentations; and participation in citizen science initiatives with reference to wildlife

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MAJOR 12
WILDLIFE CONSERVATION AND MANAGEMENT
Code: ZOO-3023
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Concepts of wildlife, wildlife definition, wildlife conservation, history of wildlife, and conservation ethics. Values and importance of wildlife; Causes of depletion of wildlife in India; Wildlife habitat ecology and its management; Biological and ecological basis of wildlife management. Conservation vs. preservation, Wildlife population survey	13
Unit 2: Concepts pertaining to wildlife population, density, types of density, natality, mortality sex ratio and age structure, population growth patterns and concept of carrying capacity; Habitat management of wildlife in a forested and aquatic ecosystem, the definition of wildlife cover and cover characteristics. Wildlife habitat succession and management; Restoration of degraded habitats, Concepts of GIS and Remote sensing and their utility in wildlife habitat management.	16
Unit 3: Concepts of protected areas, wildlife protected areas in India; Protected area network, National Parks, Sanctuaries, Man and Biosphere Reserve, Ecological	16

sensitive zones, Conservation reserves, Community reserves, Secret Groves. Concepts of elephant and tiger reserves, Ramsar sites; Recent challenges of the management of Tiger reserves and Ramsar sites. Concepts and management of renewable natural resources and wildlife's welfare factors.

WILDLIFE CONSERVATION AND MANAGEMENT

Practical	Hours
1. Identification of flora (Common plant species associated with wildlife) and fauna (Mammals, Birds, Herpetofauna, and Butterflies)	30
2. Demonstration and applicability of basic equipment needed for wildlife studies (Compass, Range finder, GPS, Camera Traps).	
3. Demonstrations of field study techniques: line transect and quadrate sampling.	
4. Importance of indirect evidences in wildlife survey and its identification [Animal Footprints (Pugmark & hoof mark), Animal Droppings (Scat, Dung, Pellet), Other animal signs, Antlers, Nests of birds]	
Animal trail survey or trail monitoring, use of plaster of Paris for wildlife survey (for the indirect survey).	

Suggested Readings

1. Caughly, G. and Sinclair, A. R. E. (1994). Wildlife Ecology and Management. Blackwell Scientific Publications, 1-334pp.
2. Shekhar, S. Kolipaka, (2014). A Field Guide to Tracks & Signs of Indian Wildlife. 1-385pp.
3. Sinclair, A.R. E., John M. Frysell, and Graeme Caughley (2006). Wildlife Ecology, Conservation, and Management, Blackwell Publishing, 1-463, pp.
4. Raj, M. (2012). Wildlife Ecology and Management (With special reference to Northeast India). Assam Book Depot, Panbazar, Guwahati-1, 1-294pp.
5. Berwick S. H. and Saharia, V. B. (1995). Development of International principles of Wildlife Research and Management (Asian and American approaches). Oxford University Press, Delhi, Bombay, Madras. 1-481. pp.
6. Vivek Menon, (2014). Indian mammals, A Field Guide; Hachetta Book Publishing India Pvt. Ltd.4th and 5th Floor Corporate centre, Plot No. 94, Sector 44, Gurgoan, 122001, India.
7. Hunter M. L., Gibbs, J. B. and Sterling, E. J. (2008). Problem-Solving Conservation Biology and Wildlife Management: Exercise for class, Field and laboratory, Blackwell Publishing.
8. Southerland, W. J. (2000). The conservation handbook: Research management and Policy. Blackwell Sciences.
9. Bookhout, T. A. (1996). Research and management techniques for wildlife and habitats, 5th edition. The Wildlife Society, Allen Press.
10. Woodroffe, R., Thirgood, S. and Rabinowitz, A. (2005). People and Wildlife, Conflict or Co-existence? Cambridge University.

DSE 13
COMPUTATIONAL BIOLOGY
Code: ZOO-3024
Credit: 3 (T) + 1 (P)

Course Objectives:

Bioinformatics is the science of storing, extracting, analyzing, interpreting and using information. This course is designed for students interested in molecular biology, genetics, information technology and computer science. It helps in the analysis of organism geneme, development of new algorithm, study of structural and functional relationship and molecular evolution.

Learning Outcomes:

The course helps to understand the basic principles of biology, computer science and mathematics. Existing software effectively helps students to extract information from

large databases and to use this information to solve biological problems. It also provides an understanding of the intersection of life and information science, the core of shared concepts, language of structure and function relationship, gene expression, phylogenetic analysis through database.

DSE 13
COMPUTATIONAL BIOLOGY
Code: ZOO-3024
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit I: Introduction to Bioinformatics and Biological Databases Importance, Goal, Scope; Genomics, Transcriptomics, Systems Biology, Functional Genomics, Metabolomics, Molecular Phylogeny; Applications and Limitations of Bioinformatics, Introduction to biological databases; Primary, secondary and composite databases; Nucleic acid databases (GenBank, DDBJ, EMBL and NDB); Protein databases (PIR, SWISS-PROT, TrEMBL, PDB); Metabolic pathway database (KEGG, EcoCyc, and MetaCyc); Small molecule databases (PubChem, Drug Bank, ZINC, CSD)	15
Unit 2: Sequence submission tools (BankIt, Sequin, Webin); Sequence file format (flat file, FASTA, GCG, EMBL, Clustal, Phylip, Swiss-Prot); Sequence annotation; Data retrieval systems (SRS, Entrez)	15
Unit 3: Basic Concepts of Sequence Alignment and Applications of Bioinformatics Scoring Matrices (PAM, BLOSUM), Methods of Alignment (Dot matrix, Dynamic Programming, BLAST and FASTA); Local and global alignment, pair wise and multiple sequence alignments; Similarity, identity and homology of sequences. Structural Bioinformatics (3-D protein, PDB), Drug discovery method (Basic concepts)	15

COMPUTATIONAL BIOLOGY

Practical	**Hours**
1. Retrieval of sequence data from Entrez, gene expression from GEO, structural data of protein using PDB, motif information of protein using Prosite. **2.** Primer Designing **3.** Perform pair-wise alignment of sequences (BLAST) and interpret the output. **4.** Perform multiple sequence alignment using MEGA **5.** Phylogenetic analysis using PHYLIP (rooted and unrooted).	30

Suggested Readings:

1. Ghosh Z and Mallick B. (2008). Bioinformatics:
2. Principles and Applications, Oxford UniversityPress.
3. Pevsner J. (2009). Bioinformatics and Functional Genomics, II Edition, Wiley Blackwell.
4. Zvelebil,MarketaandBaumO.Jeremy(2008).Understanding Bioinformatics, Garland Science, Taylor and Francis Group,USA.

DSE 14
ADVANCE ENTOMOLOGY
Code: ZOO-3025
Credit: 3 (T) + 1 (P)

Learning Objectives:

Insects are the most diverse and successful group of organisms inhabiting almost all spheres on earth. Learning of physiological system of insects gives an overview of how their bodies organize, function and work. This study also bears economic and toxicological importance as understanding the internal body system and mechanism only helps to tackle any insects and insects related measures. Insect pests are the common occurrence of crops, household etc. Therefore, learning pest, common pest of crops and pest control strategies help to develop an overall idea about insect pests, their damages and rational control strategies. Moreover, insects play tremendous beneficial role in ecosystem and to human being. Another learning objective is to introduce the most common beneficial insects and their products used by human being in diverse field.

Learning Outcomes:

After completion of the course, the students will be able to:

1. Understand the basic physiological systems of Insects
2. Develop basic concept on pest and pest control strategies.

3. Develop concept on common insect pest of crops and stored grains
4. Develop idea on life history of the beneficial insects
5. Get knowledge on the diverse applications of insect products.
6. Get practical knowledge on visiting insect rearing field & preparing report/ studying and collecting and identifying common insects or pests/ physiological and anatomical structures performing dissections.

DSE 14
ADVANCE ENTOMOLOGY
Code: ZOO-3025
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Physiological systems of insects- Digestive System, Excretory System, Circulatory System, Respiratory System, Reproductive System, and Nervous system	30
Unit 2: Definition of pest, types of pests according to damage (sub economic, occasional, perennial), concept of economic injury level, economic threshold level, pest resurgence, secondary pest outbreak, cultural control, biological control of pest, pheromonal control of pest. Life history and control of following plant pests: Agricultural pests (*Papilio demoleus, Leucinodesorbonalis, Spodoptera litura*); Stored grain pests (*Callosobruchus chinensis, Sitophilus oryzae*), Tea pest (*Helopeltistheivora, Buzurasuppressaria*), Paddy pest (*Dicladispaarmigera, Leptocorisa* sp.), Host-plant selection by phytophagous insects	08
Unit 3: Life history of two silk producing insects in North East India. Life history of lac insects. Applications of lac, silk and honey.	07

ADVANCE ENTOMOLOGY

Practical	**Hours**
1. Collection, preservation, identification of common phytophagous pest	30
2. Submission of life cycle of silkworm/ lac insects	
3. Dissection of digestive and nervous system of cockroach/ grasshopper	
4. Study on biological agents- (identification, classification and	

significance): pathogens, parasites, predators

5. Visit to field and prepare a report (agriculture/ sericulture/ apiculture/ lac culture field)

Suggested Readings:

1. Pradhan, S. (1969). Insect Pests of Crops. National Book Trust, India Book House.
2. Atwal, A.S. (1993) Agricultural pest of India and South East Asia. Kalyani Pub., New Delhi.
3. Chapman, R. F. The Insects: Structure and Function. Cambridge University Press, UK
4. Dennis, S. Hill. (2005) Agricultural Insect pests of the tropics and their management, Cambridge University press.
5. Pedigo L. P. (2002). Entomology and Pest Management, Prentice Hall Publication
6. Tembhare, D.B. Modern Entomology, Himalaya Publishing House.
7. David, B.V. and Ananthakrishnan (2004). General and Applied Entomology. McGraw Hill India.
8. Ghosh, M.R. (1995). Concepts of Insect Control. New Age International Limited, New Delhi.
9. Srivastava, K.P. (1996) A Textbook of Applied Entomology. Kalyani Publisher.
10. Nation, J.L. (2008). Insect Physiology and Biochemistry. CRC Press, New York

DSE 15
ANIMAL CELL CULTURE AND GENETIC ENGINEERING
Code: ZOO-3026
Credit: 3 (T) + 1 (P)

Course Objectives:

1. The students will be given an idea of in vitro animal cell culture techniques and their utilization in modern biological research.
2. The students will be given exposure to frequently used modern biological techniques.
3. The students will learnt the basic concept of genetic engineering and their utilization.

Learning Outcomes:

Upon completion of the course, students will be able to:

1. Learn about basic cell culture techniques and key concepts that are used in isolation and culture of animal cells.
2. Develop basic understanding of the modern robust techniques with wide applications

(such as PCR, DNA sequencing, DNA fingerprinting, DNA microarrray and blotting techniques.

3. The student will be able to understand the importance of gene cloning in biotechnology and utilization of different cloning vectors such as plasmids and bacteriophages.
4. Understand the importance of construction of genomic libraries and their specialized screening methods to identify gene of interest.

DSE 15
ANIMAL CELL CULTURE AND GENETIC ENGINEERING
Code: ZOO-3026
Credit: 3 (T) + 1 (P)

THEORY	**Hours**
Unit 1: Basic requirement of animal cell culture, cell culture media Basic techniques of cell culture, Development of primary cell cultures: cell separation, harvesting and maintenance of cell lines; Transformation and differentiation of cell cultures, Types of cell culture: monolayer, suspension, Measurement of viability and parameters of growth. Cell culture Bioassays: Cell proliferation assays	15
Unit 2: Polymerase Chain Reaction DNA sequencing: Sanger's method, Next generation sequencing Southern, Northern and Western blotting DNA Finger Printing and DNA microarray,	15
Unit 3: Basic concept of gene cloning, Restriction enzymes and DNA modifying enzymes. Cloning vectors: Plasmids, Lambda Bacteriophage, M13, YAC and Expression vectors (characteristics). Cell Transformation techniques: Calcium chloride method, electroporation and biolistic method. Construction of genomic and cDNA libraries and screening by colony and plaque hybridization	15

ANIMAL CELL CULTURE AND GENETIC ENGINEERING

Practical	**Hours**
1. Genomic DNA isolation from *E. coli* ***2.*** Plasmid DNA isolation (pUC 18/19) from *E. coli* **3.** Demonstration of Restriction digestion of Plasmid/Lambda DNA. **4.** To demonstrate following techniques: (Optional) Southern/	30

Northern/Western blotting (Any one) PCR DNA fingerprinting DNA Sequencing (Sanger's Method)

5. Project report on animal cell culture OR on a visit to any biotechnology Institute

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Suggested Readings:

1. Freshney, R. Ian Culture of Animal Cells: A Manual of Basic Technique, 4th Edition ISBN 13: 9780471348894
2. Leslie Wilson, Paul Matsudaira, (1998), Animal Cell Culture Methods, eBook ISBN: 9780080859552
3. Cooper, G. M. (2018). 8th Edition. The cell: A molecular approach. Massachusetts, USA: Sinauer Associates. ISBN-13:978-1605357072
4. Alberts, B et al. (2014). 6th edition. Molecular Biology of the Cell. W. W. Norton & Company. ISBN-13 : 978-0815345244
5. Lodish H et al. (2003). 5th Revised edition. Molecular Cell Biology. W.H.Freeman& Co Ltd; ISBN13 : 978-0716743668
6. Karp, G. (2019). 9th Edition. Cell and molecular biology: New Jersey, USA: Wiley Publishers. ISBN-978—1-119-59816-9
7. Brown, T. A. (2020). 8thEdition. Gene cloning and DNA analysis: An introduction. New York, USA: John Wiley and Sons, ISBN-13: 978-1119640783.
8. Cantor, C. R. and Smith, C. L. (2004). 1st Edition. Genomics: The science and technology behind the human genome project. New York, USA: John Wiley and Sons. ISBN-13: 978-0471461869.
9. Old, R. W. and Primrose, S. B. (1994). 7th Edition. Principles of Gene Manipulation: an Introduction to Genetic Engineering. Boston: Wiley. ISBN-13: 978-0632037124.
10. Joseph Sambrook, E.F. Fritsch, T. Maniatis. (1989). 2nd Edition. Molecular Cloning: A Laboratory Manual. New York, USA: Cold Spring Harbor Laboratory. Press ISBN- 978-0879693732.
11. Glick, B. R. and Patten, C. L. (2022). 6thEdition. Molecular Biotechnology: Principles and Applications of Recombinant DNA. USA: ASM press, ISBN-13: 978-1683673668.
12. Primrose, S. B. and Twyman, R. B. (2014). 7th Edition. Principles of Gene Manipulation and Genomics. New York, USA: John Wiley and Sons. ISBN-13: 978-1118653883.
13. Green, M. R. and Sambrook, J. (2012). 4th Edition. Molecular Cloning: A Laboratory Manual (three-volume set). New York, USA: Cold Spring Harbor Laboratory Press ISBN-13: 978- 1936113422

TECHNOLOGY

NEP 2020 Syllabus

B.Sc. in Computer Science (Major-Minor)

Paper Name: COMPUTER FUNDAMENTALS AND PROGRAMMING

1. **Learning Outcome:**
   - At the end of the course, students will be able to:
   - Understand the basics of Computer and programming
   - Adopt algorithmic approach to solve problems using pseudocode and flowcharts
   - Understand and write programs in C to implement conditions, loops, functions and other
   - programming constructs
   - Work on arrays, strings and basic file operations in C
2. **Prerequisite:** NIL
3. **Semester: 1**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   a) Theory: 45 hrs
   b) Practical: 30 hrs
   c) Non Contact: 5 hrs

8. List of reference books:

a) B.S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", Mcgraw-Hill, 2007.
b) B. Kernighan, D. Ritchie, "The C Programming Language", Second Edition, Prentice Hall, 1988
c) E. Balaguruswami, "Programming in ANSI C", 2nd Ed., Tata McGraw Hill, 2004.
d) V. Rajaraman, "Fundamentals of Computer", 4th Ed., PHI, 2006
e) R. Thareja, "Computer Fundamentals & Programming in C", Oxford University Press, 2013.

8. Detailed Syllabus:

Unit 1: Computer Fundamentals (9 Lectures)

Introduction to computer hardware, software– application and system software. Operating systems. Major components of a Digital Computer – ALU and CU, Memory – primary and secondary memory. Storage devices – magnetic storage devices, optical storage devices, Input devices– mouse, keyboard, touch-screen, scanner etc., output devices – CRT/LCD/LED monitors, printers etc. Number systems – binary, octal, hexadecimal, BCD. Conversion between two number systems. Signed magnitude, 1's complement and 2's complement representation. Character encodings – ASCII, EBCDIC, Unicode. Basic overview of networks and the Internet, WWW.

Unit 2: Programming Basics (4 Lectures)

Introduction to programming languages. Low-level and high-level language and their characteristics. Compiler vs. interpreter. IDE. Bugs and its types. Algorithms, pseudocodes and flowcharts. Overview of the C programming language. Structure of a C program.

Unit 3: Datatypes and Operators (5 Lectures)

Basic data types in C - integers, floats, doubles, characters, and void. Size and range of values of data types. Variables. Declaring variables. Operators and expressions, Input and output statements – getchar(), getc(), getch(), putchar(), putc(), puts(), scanf(), printf(), format specifiers. Typecasting. Operators in C – binary and unary operators. Arithmetic, assignment, logical, comparison, bitwise and conditional operators. Order of precedence of operators. Associativity of operators. Expressions and statements in C. L-value and R-value. Basic syntax and semantics for expressions and statements.

Unit 4: Control Structures and Functions (8 Lectures)

Control structures in C. Decision making with if, if-else, switch statements. Nested conditions. Looping with while, do-while, and for statement. Break and continue statements. Nested loops. Introduction to functions. Function prototypes and arguments. Defining and calling functions in C. Return values and types. Formal and actual parameter. Call by value, Call by reference. Introduction to recursion. Writing recursive functions in C. Importance of main() function, return type of main() function.

Unit 5: Arrays and Strings (5 Lectures)

Introduction to arrays. Declaration and initialization of arrays. Accessing array elements. Multidimensional arrays. Introduction to strings. Declaration and initialization of strings. String input and output in C. String manipulation functions in C – strlen(), strcpy(), strcat(), strcmp().

Unit 6: Pointers and Memory Allocation (6 Lectures)

Introduction to Pointers. Pointer declaration and initialization. Pointers and addresses. Pointers and arrays. Pointers and functions. Review of call by reference. Pointer arithmetic. Passing an array using pointer in function call. Introduction to dynamic memory allocation. Allocation and deallocation of memory using malloc(), calloc(), and free() functions.

Unit 7: Structure and Union (4 Lectures)

Introduction to structures. Declaration and initialization of structures. Accessing structure members. Nested structures and arrays of structures. Unions in C. Declaration and initialization of unions. Accessing union members. Differences between structures and unions. Typedef.

Unit 8: File Handling and Preprocessor Directives (4 Lectures)

Introduction to file handling in C. Opening and closing files – fopen(), fclose(). Modes of opening a file. Binary files and text files. Reading and writing files – fgetc(), fgets(), fread(), fputc(), fputs(), fwrite(). File pointers. Error handling in file operations. Preprocessor directives in C - #define, #include, #ifdef, #ifndef, and #endif directives. Using preprocessor directives to define constants and macros. Header files.

List of Practical

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment.)

1. Write a program in C to print "Hello World"
2. Write a program to take input of two numbers and print their sum, product, difference.
3. Write a program to find the smallest or greatest of three numbers given as input.
4. Write a program to print the sum and product of digits of an integer.
5. Write a program to print a triangle of stars as follows (take number of lines from user):

```
*
***
*****
*******
*********
```

6. Write a program to reverse a number.
7. Write a program to compute the sum of the first n terms of the following series
   S = 1+1/2+1/3+1/4+……
8. Write a program to compute the sum of the first n terms of the following series
   S =1-2+3-4+5……
9. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
10. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
11. Write a program to compute the factors of a given number.
12. Write a program to display Fibonacci series (i) using recursion, (ii) using iteration
13. Write a program to calculate Factorial of a number (i) using recursion, (ii) using iteration
14. Write a program in which a function is passed address of two variables and then alter its contents.
15. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
16. Write a program to create an array with inputs from the user and print the same.
17. Write a program to perform following actions on an array entered by the user:
    a) Print the even-valued elements
    b) Print the odd-valued elements
    c) Calculate and print the sum and average of the elements of array
    d) Print the maximum and minimum element of array
    e) Remove the duplicates from the array
    f) Print the array in reverse order

    The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

18. Write a program to take a matrix from the user and print the transpose of the same.
19. Write a program to take two matrices from the user and find the sum and product of both.
20. Write a program to perform following operations on strings:
    a) Convert all lowercase characters to uppercase
    b) Convert all uppercase characters to lowercase
    c) Calculate number of vowels in the string
    d) Reverse the string
    e) Concatenate two strings without using strcat() function.
    f) Concatenate two strings using strcat() function.
    g) Compare two strings using strcmp()
    h) Copy one string to another using strcpy()
21. Write a program that swaps two numbers using pointers.
22. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
23. Write a function to accept two arrays as argument and returns their sum as an array.
24. Write a program to use a macro to swap two numbers.
25. Write a program to implement struct in C. Create a structure of Student with RNo, Name and other credentials with proper datatype and print the same.
26. Write a program to implement union in C. Create a structure of Person with Pid, Name and other credentials with proper datatype and print the same.
27. Write a C program that opens a file for reading and displays the contents of the file in binary mode and text mode.
28. Write a C program that opens a file for reading and displays the contents of the file character by character and line by line on the screen.
29. Write a C program to open a file and count the number of characters and lines in the file.
30. Write a C program that opens a file in append mode and allows the user to add text to the end of the file.

Particulars of Course Designer:

Name : Risheraj Baruah
Contact No. : +91 8486942427
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Paper Name: COMPUTER ORGANIZATION

1. **Learning Outcome:**
   - Student will able to learn about the structure, function and characteristics of computer systems.
   - Student will understand the design of the various functional units and components of computers.
   - Student will identify the elements of modern instructions sets and their impact on processor design.
   - Student will able to learn about the function of each element of a memory hierarchy.
   - Student will able to learn about identify and compare different methods for computer I/O.
   - Student will able to learn about basics of assembly language.
   -
2. **Prerequisite:** NIL
3. **Semester: 2**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 4
7. **Practical Credit:** 0
8. **Number of required hours:**
   a) Theory: 60 hrs
   b) Practical: 0 hrs
   c) Non Contact: 5 hrs

8. List of reference books:

f) M.Morris Mano, *Computer System Architecture*, PHI publication.
g) Hamachar, Vranesic and Zaky, *Computer Architecture*.
h) William Stallings, *Computer Organization and Architecture*; Pearson.
i) Ramesh Gaonkar, *Microprocessor Architecture, Programming, and Applications with the 8085*, 5th Edition.

8. Detailed Syllabus:

UNIT 1: Introduction (4 Lectures)

Definitions of Computer Organization and Architecture, History of computer architecture, Basic functional blocks of a computer: CPU, memory, Input-output subsystems, Control unit, Types of register- general purpose registers, special purpose registers, index registers.

UNIT 2: Data Representation (8 Lectures)

Number system, Complements, Representation of signed numbers, Subtraction of unsigned numbers, Fixed-Point representation- Integer representation, Arithmetic addition, Arithmetic subtraction, Overflow, Decimal Fixed-Point representation, Floating-Point representation, Other Binary Codes- Gray Code etc.

UNIT 3: Register Transfer and Micro-operation (8 Lectures)

Introduction to Register Transfer Language, Register transfer, Bus and Memory transfers, Arithmetic micro-operation- Binary adder, Binary adder-subtractor, Binary incrementer, Arithmetic circuit, Logic micro-operation, Shift micro-operation, Arithmetic logic shift unit.

UNIT4: Processing Unit (10 Lectures)

Instruction codes, Computer registers, General register organization, Register stack, Memory stack, Computer instructions, Data path in a CPU, Operations of a control unit, Hardwired control unit, Micro-programmed control unit, Instruction cycle, Operands, Addressing modes, Instruction format- Three-address instructions, Two-address instructions, One-address instructions, Zero-address instructions, Data transfer and manipulation- Data transfer instructions, Data manipulation instructions, Arithmetic instructions, Logical and Bit manipulation instructions, Shift instructions, Program Control-Status bit conditions, Conditional branch instructions, Subroutine call and return, Instruction execution cycle, CISC and RISC architectures.

UNIT 5: Memory Organization (10 Lectures)

Semiconductor memories, Memory cells - SRAM and DRAM cells, Concept of hierarchical memory organization, Interleaved memories, Cache memory unit - Concept of cache memory, Mapping methods, Organization of a cache memory unit, Cache replacement policies, Write policy, Concept of virtual memory.

UNIT 6: I/O Organization (10 Lectures)

Access of I/O devices, I/O ports, I/O control mechanisms - Program controlled I/O, Interrupt driven I/O, DMA controlled I/O, Interrupts: Types of interrupts, Enabling and disabling interrupts, Handling interrupts.

UNIT 7: Basics of Microprocessor and Assembly Language (10 Lectures)

Introduction to microprocessors, 8085 Microprocessor and its operation, 8085 instruction sets, Addressing modes in 8085, Classifications of instructions and addressing mode, Assembly language programming basics, Assembling, Executing and debugging the programs, Developing counters and Time delay routines, Interfacing concepts.

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Object Oriented Programming using C++

1. **Learning Outcomes:** After successful completion of this course, students will be able to:
   - Differentiate between Structured programming and Object-Oriented Programming.
   - Learn the concept of objects and develop the ability of imagining real life concepts as objects and derive their properties and functions to operate these objects.
   - Develop programs using different object- oriented programming features such as data bstraction, polymorphism, inheritance, exception handling etc.

2. **Prerequisites: NIL**
3. **Semester: 3**
4. **Course Type:** Compulsory
5. **Course Level:** 200-299
6. **Theory Credit:** 3
7. **Practical Credit: 1**
8. **No of required hours:**
   a) Theory: 45 hrs
   b) Practical: 30 hrs
   c) Non Contact: 5 hrs

List of Reference Books:

a) M. T. Somashekara, D. S. Guru et-al; *Object-Oriented Programming with C++, 2nd Edition*, PHI,2012.
b) Bjarne Stroustrup, The *C++ Programming Language, Special Edition,* Pearson Education, 2004.
c) Deitel&Deitel, *C++ How to program,* Pearson Education Asia, 6th Edition, 2008
d) Schildt Herbert, *The Complete Reference C++,* Tata McGraw Hill, 4th Edition, 2003.

9. **Contents of Syllabus:**

A. Theory

UNIT 1: Introduction to object-oriented programming (3 Lectures)

Basic Concepts of Object-Oriented Programming and design, Benefits and applications of OOP.

UNIT 2: Introduction to C++ (6 lectures)

Structure of a Simple C++ program, Output operator,Input operator, Cascading of I/O operators, Tokens- keyword, identifiers, constants, strings andoperators. Basic data types, User defined data types, Dynamic initialization of variables, Referencevariables, Operators in C++, Scope resolution operator & applications, Member dereferencingoperators, Memory Management operators, new

and delete, Control Structures-simple if, if else,nested if, switch, while do, break and continue statements, Introduction to Functions-FunctionPrototyping, Call-by-reference, Return by reference, Inline functions, Default arguments, Constarguments.

UNIT 3: Classes and objects (11 Lectures)

Introduction - Defining a class; class versus structures, creating objects, accessing class members, defining member functions- outside the class definition and inside the class definition, outside functions as inline. Nesting of member functions, private member functions, memoryallocation for objects. Array-declaring an array, accessing elements of an array, array of objects. Friendly functions. Basic Concepts of constructors and destructors with examples. Defaultconstructor, Parameterized constructor, Multiple constructors in a class. Constructor with defaultarguments, Copy constructor. Dynamic initialization of objects. Dynamic constructors and destructors.

UNIT 4: Function and operator overloading (10 Lectures)

Concept of Overloading. Function Overloading: Functions with different sets of parameters, default and constant parameters, Rules for overloading operators, defining operator overloading. Overloading unary operators -prefix and postfix operators. Overloading Binaryoperators and relational operators. Overloading using friend functions.

UNIT 5: Inheritance (12 Lectures)

Concept of Inheritance -defining derived classes. Types of inheritances, Making a private memberinheritable, multilevel inheritance, multiple inheritance, Hierarchical inheritance, Hybridinheritance, Virtual base classes, Abstract classes, Constructors in derived classes, nesting ofclasses, polymorphism-Compile time and Runtime polymorphism, Pointers to objects, "this" pointer,Pointer to derived classes, Virtual functions, Rules for virtual functions, Pure virtual functions.

UNIT 6: Exception Handling (3 lectures)

Examples of exceptions and handling exceptions using try, catch and throw statements.

B. Practicals

Following Practical / Lab works to be performed preferably in Linux Environment

1. Define a class named "triangle" to represent a triangle using the lengths of the three sides. Write a constructor to initialize objects of this class, given the lengths of the sides. Also write member functions to check

   (a) if a triangle is isosceles

   (b) if a triangle is equilateral

   Write a main function to test your functions.

2. Define a structure "employee" with the following specifications.

   empno : integer

   ename : 20 characters

   basic, hra, da : float

   calculate() : a function to compute net pay as basic+hra+da with float return type.

getdata() : a function to read values for *empno*, ename, basic, hra, da.

dispdata() : a function to display all the data on the screen

Write a main program to test the program.

3. Define a class "circle" to represent circles. Add a data member radius to store the radius of acircle. Write member functions *area*() and *perimeter*() to compute the area and perimeter of acircle.

4. Define a class "complex" with two data members "real" and "imag" to represent real and imaginaryparts of a complex number. Write member functions

rpart() : to return the real part of a complex number

ipart() : to return the imaginary part of a complex number

add() : to add two complex numbers.

mul() : to multiply two complex numbers.

Write constructors with zero, one and two arguments to initialize objects.

5. Define a class "point" with two data members "*xordinate*" and "*yordinate*" to represent all points in the two-dimensional plane by storing their x co-ordinate and y co-ordinate values. Write member functions

dist() : to return the distance of the point from the origin.

slope(): to return the slope of the line obtained by joining this point with the origin.

Write constructors with zero, one and two arguments to initialize objects. Also write a friend function to compute the distance between two points.

6. Define a class "string" with the following data members char *p; int size; and write member functions to do the following (without using library function) and using dynamic memory allocation.

- Length of the string
- Compare two strings
- Copy one string to another
- Reverse the string

Write suitable constructors and destructors. Also write a copy constructor for the class.

7. For the class "complex" defined in 4 above, overload the <<, >>, + and * operators in the usual sense. Also overload the unary – operator.

8. Define a class "time" to store time as hour, minute and second, all being integer values. Write member functions to display time in standard formats. Also overload the ++ and – operators to increase and decrease a given time by one second where the minute and hour values will have to be updated whenever necessary.

9. Define a class to store matrices. Write suitable friend functions to add and multiply two matrices.

10. Write a class-based program implementing static members.

11. Define a class student with the following specification:

rollno : integer sname : 20 characters

Derive two classes *artst* and *scst*. The class artst will represent students belonging to arts stream and the class scst will represent students belonging to science stream. The *artst* class will have additional data members ph, hs, en and as to store marks obtained by a student in three subjects Philosophy, History, English and Assamese. The class scst will have additional data member *sph*, *ch*, *ma* and *en* to store marks obtained in *Physics*, *Chemistry*, *Mathematics* and *English*.
Write the following member functions in the classes artst and scst; ctotal() : a function to calculate the total marks obtained by a student; *takedata*() : a function to accept values of the data members and showdata() : a function to display the marks sheet of a student .

12. Define an abstract base class printer. Derive three classes laser-printer, line-printer and inkjet-printer. The derived classes will have data members to store the features of that particular printer. Write pure virtual function display() in the base class and redefine it in the derived classes.

13. Define a abstract base class figure and add to it pure virtual functions

display() : to display a figure
get() : to input parameters of the figure
area() : to compute the area of a figure
perimeter() : to compute the perimeter of a figure.

Derive three classes circle, rectangle and triangle from it. A circle is to be represented by its radius, rectangle by its length and breadth and triangle by the lengths of its sides. Write a main function and write necessary statements to achieve run time polymorphism.
14. Write an interactive program to compute square root of a number. The input value must be tested for validity. If it is negative, the user defined function *my_sqrt*() should raise an exception.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Data Structure

1. **Learning Outcomes**: At the end of the course, students will be able to:
    - Understand and apply the fundamental data structures and algorithms – such as arrays, linked lists, stacks, queues, trees, sorting and searching algorithms using C programming language.
    - Analyze the time and space complexity of different algorithms and choose the appropriate algorithm for a given problem.
    - Develop efficient algorithms to solve various computational problems by utilizing data structures and algorithms covered in the course.

2. **Prerequisites**: NIL

3. Semester: 4

4. Course Type: Elective

5. Course Level: 200-299

6. Theory Credit: 3

7. Practical Credit: 1

8. No of required hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Reference Books:

e) Weiss, Mark Allen. "Data Structures and Algorithm Analysis in C". 3rd ed., Pearson, 2012
f) Sedgewick, Robert. "Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms". 3rd ed., Addison-Wesley Professional, 2002.
g) Goodrich, Michael T., and Roberto Tamassia. "Data Structures and Algorithms in C". 2nd ed., Wiley, 2011.
h) Gilberg, Richard F., and Behrouz A. Forouzan. "Data Structures: A Pseudocode Approach with C". Narosa Publishing House, 2009.

10. Contents of Syllabus:

A. Theory

Unit 1: Data Structures Overview and Arrays (8 Lectures)

Concepts of Data Types, Abstract Data Type, Data Structure, Fundamental and Derived Data Types. Importance of data structures. Array as a data structure (characteristics, advantages, disadvantages). Representation of arrays – single and multidimensional. Address calculation of array element using column and row major ordering. Address translation functions for one & two dimensional arrays. Insertion and deletion in arrays. Use of arrays for large number representation.

Unit 2: Linked Lists (9 Lectures)

Initialization and implementation of structures. Structure and pointers. Self referential structure. Introduction to linked lists. Singly linked list, doubly linked list, circular linked list. Operations on lists – creation, insertion, deletion, traversal, merging and splitting.

Unit 3: Stacks and Queues **(9 Lectures)**

Definition of Stack and Queue. Representation of stacks and queues using arrays and linked lists. Stack operations – push, pop. Queue operation – enqueue, dequeue. Circular Queue, Priority Queue, Conversion of infix arithmetic expression containing arithmetic operators and parenthesis to postfix and prefix expression. Evaluation of postfix expression.

Unit 4: Binary Trees **(8 Lectures)**

Definition of Trees – General tree and Binary tree. Basic terminologies – parent, child, height, depth, leaf, node, internal nodes, external nodes. Brief concept of Forest, ordered trees, strictly binary tree, complete binary tree. Representation of trees using arrays and linked lists. Binary tree traversal methods – pre-order, in-order, post-order. Recursive and non-recursive algorithms for traversal methods. Binary search trees. Operation on BST – creation, insertion and deletion of a node. Definition and characteristics of threaded binary trees. Min heap and Max heap.

Unit 5: Searching and Sorting **(6 Lectures)**

Linear and binary search. Indexed search. Hashing. Hash Functions – division method, mid square method, folding. Conflict resolution – linear and quadratic probe. Sorting algorithms – Insertion sort, Selection sort, Bubble sort, Merge sort, Quick sort, Counting sort, Heap sort. In-place sorting and stable sorting.

Unit 6: Analysis of Algorithm and Complexity **(5 Lectures)**

Complexity measures of an algorithm – Time and space complexity. Average case and worst case analysis. Asymptotic notation as a measure of algorithm complexity, O and θ notations. Analysis of sorting algorithms and Searching algorithms in terms of time and space complexity in best, average and worst case.

Time and Space complexity of algorithms, average case and worst case analysis, asymptotic notation as a measure of algorithm complexity, Θ and O notation. Analysis of sorting algorithms- Selection sort, Bubble sort, Insertion sort, Heap sort, Quick sort and analysis of searching algorithms – linear search and binary search.

List of Practical

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment using C programming language.)

31. Write a program to declare an array and initialize the values according to the user. Now ask the user for a number n and return the n^{th} element from the array.
32. Write a program to implement array initialized with the numbers divisible by three up to 30. Write a function which accepts the array and return the positions of the even numbers in the array.
33. Implement linked list in a program by writing functions for the following:
    a. Create a singly linked list of n nodes
    b. Count the number of nodes in the list
    c. Print the values of all the nodes
    d. Add a node at first, last and k^{th} position in the linked list

e. Delete a node from first, last and k^{th} position
f. Search for an element in the list. If found, return the position of the node. If not found, return a negative value.

34. Write a program to implement doubly linked list.
35. Write a function to concatenate two linked lists.
36. Write a program to take a number k and split the linked list after k^{th} position.
37. Write a program to merge two sorted linked lists.
38. Write a program to implement list of lists.
39. Write a program to implement stack using array. Use push and pop operations on the array representation of the stack. Check whether the stack is full or empty.
40. Write a program to implement stack using linked list. Use push and pop operations on the stack by inserting nodes and deleting nodes from the linked list. Also check if the stack is full or empty.
41. Write a program to evaluate a simple postfix expression using stack.
42. Write a program to convert a decimal number into binary number using stack.
43. Write a program to implement queue using array. Add new elements to the queue and remove elements from the queue represented by array. Check whether the queue is full or empty.
44. Write a program to implement queue using linked list. Add new elements to the queue and remove elements from the queue represented by linked list. Also check whether the queue is full or empty.
45. Implement binary search and linear search algorithms on arrays.
46. Implement binary search tree using array by writing a program to:
    a. Create a binary search tree using array
    b. Print the prefix notation of the BST
    c. Print the infix notation of the BST
    d. Print the postfix notation of the BST
    e. Search for an element in the BST
47. Implement binary search tree using linked list by writing a program to:
    a. Create a binary search tree using linked list
    b. Print the prefix notation of the BST
    c. Print the infix notation of the BST
    d. Print the postfix notation of the BST
    e. Search for an element in the BST
48. Implement following sorting algorithms:
    Bubble sort, Insertion sort , Selection sort, Counting sort

Particulars of Course Designer:

Name : Risheraj Baruah
Contact No. : +91 8486942427
Email id : rishirajbaruah@gauhati.ac.in

Paper Name: Database Management System

1. **Learning Outcome:**
   On successful completion of this course, the student should be able to:
   - Learn database concepts and its architectural components.
   - Describe different data models used for designing a database.
   - To create a database using relational models and entity relationships concepts
   - Normalize a database into various normal forms
   - Design SQL queries to handle a relational database.
2. **Prerequisite:** NIL
3. **Semester: 4**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   a) Theory: 45 hrs
   b) Practical: 30 hrs
   c) Non Contact: 5 hrs

8. List of reference books:

a) Dr. Satinder Bal Gupta and Aditya Mittal, *Introduction to Database Management System*¸ University Science Press
b) A. Silberschatz, H.F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill
c) R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education
d) Dr. Rajive Chopra, *Database Management System (DBMS): A Practical Approach*, S. Chand Publication

8. Detailed Syllabus:

UNIT-1: **Introduction to Database Management Systems** **(5 Lectures)**

Basic Definition and Concepts: *Data, Information, Meta Data, Data Dictionary, Database, Fields*, *Records* and *Files*. Definition of Database Management System (DBMS), Primary Functions of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: *End users or naive users*, *Online users*, *Application Programmers*, *Database Administrator*(*DBA*), Responsibilities of DBA.

UNIT 2: Database Management System Architecture **(6 Lectures)**

Definition of *Schemas*, *sub-schema* and *Instances*. Data Independence: *Physical Data Independence* and *Logical data Independence*. Three-tier architecture of DBMS, Advantages of three-level Architecture, basic concept of data model, Characteristics of

Data Models, Types of Data models: *Record Based Data Models*, *Object Based Data Model* and *Physical Data Models*. Relational Data Model, Types of database Systems: *Single-user* database systems, *Multiuser* database systems, *Centralized* database systems, *Distributed* database systems and *Client/Server* database systems.

UNIT 3: E-R Modeling (8 Lectures)

Basic Concepts: *Entity*, *Attributes*, *Entity Sets*, *Domain*. Types of attributes: *Simple and Composite Attributes*, *Single Valued and Multi-valued Attributes*, *Derived Attributes and Stored Attributes*. Types Of Entity Sets*: Strong Entity Sets* and *Weak Entity Sets.* Concept of Relationship and Relationship sets, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to Many, Various Symbols used in ER Diagram, Mapping constraints: *Mapping Cardinalities (Cardinality Ratios)* and *Participation Constraints*. Definition of Key, Types of Keys: *Super Key*, *Candidate Key, Primary Key, Alternate Key* and *Foreign Key*. Symbols used in E-R diagrams, Conversion of an ER and Diagram in to Relational Tables

UNIT4: Relational Model and Relational Algebra (7 Lectures)

Definition of Relation, Data Structure of Relational Database: *Relation*, *Tuples*, *Attributes Domain, Degree* and *Cardinality.* Integrity Constraints, Domain Constraints, Key Constraints, Advantages and Disadvantages of Relational Model, Relational, Definition of Relational algebra, Operations in Relational Algebra: *Selection*, *Projection, Division, Rename, Union, Intersection, Set Difference, Natural-join operation, Outer join, Inner Join, Cartesian Product* and *Assignment operation*. Aggregate Functions and Operations: *Average, Maximum, Minimum, Sum* and *Count*.

UNIT 5: Functional Dependency and Normalization (8 Lectures)

Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: *Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency*, Armstrong's Axiom, Closure of a set of Functional Dependency, Closure of an Attribute, Definition of Canonical Cover, Algorithm to find the canonical cover of a FD set, Anomalies in relational database*: Insertion*, *Deletion* and *Update* anomalies, Concepts of Normalization, Benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce–Codd Normal Form (BCNF)

UNIT 6: Transaction and Concurrency Control (4 Lectures)

Definition of Transaction, ACID Properties of transaction, Transaction States, Definition of Concurrency Control, Need of Concurrency Control, The Lost Update Problem, The Uncommitted Dependency Problem, The Inconsistent Analysis Problem, Serializability: *View Serializability* and *Conflict Serializability*

UNIT 7: SQL Queries (7 Lectures)

Database Languages (Data Definition Languages, Data Manipulation Languages), Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: *Create Database, Create Table*, *Drop Table*, *Alter Table*. SQL Constraints: *Primary Key, Foreign Key, Not Null, Unique, Check, Defaul,*. Data Manipulation Language (DML) commands: *Insert Into*, Delete, *Select*, *Update*. SQL clauses: *Where, Order By, Having, Group By* and *Like*. SQL join operations: *Inner Join, Left Outer Join, Right Outer Join* and *Full Join*. SQL aggregate functions: *sum(), count(), max(), min()* and *avg()*

Lab Contents:

Practical / Lab work to be performed:

- Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE/TABLE
- Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands
- Implementing following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT
- Handling following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDER BY, HAVING, IN, BETWEEN, LIKE
- Working with following aggregate functions in MySQL DBMS: COUNT, AVG, MAX, MIN and SUM
- Working with transaction processing command in MySQL DBMS: START TRANSACTION, COMMIT and ROLLBACK Statements, SET autocommit

Particulars of course designer:

Name : Dwipen Laskar
Contact No : +916000795681
Email-id : laskardwipen@gauhati.ac.in

Paper Name: Mathematical Foundation of Computer Science

1. Learning Outcome: After successful completion of this course, students will be able to:

- Learn the concepts of set, relation, and function from Computer Science point of view.
- Understand the basic idea of counting and use it in counting under various constraints.
- Understand graphs and its different representations in Computers. How to model real life problems using graphs. Learn a few basic graph traversal algorithms.
- Understand Mathematical Logic from algorithmic point of view.

2. Prerequisities: Nil
3. Semester: 4
4. Course Type: Elective
5. Course Level: 200-299
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Elements of Discrete mathematics*, C.L. Liu , D.P. Mahopatra; 2nd Edition , Tata McGraw Hill, 1985,
b) **Discrete Mathematics and Its Applications**, Kenneth Rosen, Sixth Edition ,McGraw Hill 2006.
c) *Introduction to Algorithms*, T.H. Coremen, C.E. Leiserson, R. L. Rivest; 3rd edition Prentice Hall of India, 2009.
d) *Discrete Mathematics and Graph Theory*; Grimaldi, 5th Edition; 2019, Pearson.

10. Contents of Syllabus:

A. Theory

UNIT 1: (16 Lectures)

Sets, Relations and Functions

Sets: definition of set, cardinality of sets, finite, countable and infinite sets. Operations on sets, Venn diagram. Principle of inclusion and exclusion and their applications on simple problems. Multisets.

Relations: Definition and properties of binary relations, closures of relations, equivalence relations, equivalence classes and partitions, n-ary relations and representation of n-ary relations as tables. Partial ordering relations and lattices,

Functions: Definition of function**,** one-to-one and onto, principles of mathematical induction. Concave and convex functions.

UNIT 2: Combinatorics (15 lectures)

Basic of counting principles, principle of inclusion-exclusion, application of inclusion and exclusion, Mathematical Induction. Pigeonhole principle, generalized Pigeonhole principle and its application, permutations and combinations, circular permutations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects

UNIT 3: Growth of Functions (5 Lectures)

Asymptotic behavior of functions, Asymptotic Notations - Big-O and Theta. Summation formulas and properties, Bounding Summations.

UNIT 4: Graph Theory (12 Lectures)

Basic Definition of graph, Directed, Undirected and Weighted Graphs. Representation of graphs in Computers – Adjacency Matrix and Adjacency Lists. Degree of vertices – indegree and outdegree. Paths, Cycles and Acyclic graphs. Simple operations on graphs and amount of computations required for each operation. Connected graph, Tree and Forest. Bipartite graph, Algorithms on graph traversals- Breadth first search, Depth first search.

UNIT 5: Mathematical Logic (12 Lectures)

Connectives, truth tables, Tautologies and Contradictions, Equivalence and Implications, NAND and NOR, Normal forms- CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional Calculus, Predicate calculus (only introduction), predicates and quantifiers.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Operating System

1. **Learning Outcomes**: After successful completion of this course, students will be able to:
    - Learning Outcomes: After completing this course, students will have understanding of the internal structure and usage of various components related to an operating system.

2. **Prerequisites**: NIL

3. Semester: 4

4. Course Type: Elective

5. Course Level: 200-299

6. Theory Credit: 3

7. Practical Credit: 1

8. No of required hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Reference Books:

i) Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley
j) Modern Operating Systems, Andrew S. Tanenbaum, Prentice-Hall Of India Pvt. Limited

10. Contents of Syllabus:

A. Theory

Unit I: Introduction (7 hrs)

Application vs system software, operating system as system software, operating structure structure, types of operating systems: batch operating system, multiprogramming operating system, multi tasking operating system, distributed operating system, real time operating system, multi user operating system, major functions of operating system: Process Management, Process Synchronization, Memory Management, CPU Scheduling, File Management, I/O Management, Security, virtualization, cloud computing, open source operating system, history of operating system, the shell, system call, system boot

Unit II: Process and threads (10 hrs)

Process, process states: new, running, waiting, ready and terminated, Process Control Block (PCB), information stored in PCB, scheduling queue: job queue, ready queue and device queue, schedulers: long term schedulers, medium term scheduler and long term scheduler, swapping, degree of multiprogramming, I/O-bound and CPU-bound processes, context switching, inter-process communication: shared memory systems and message passing systems, socket, remote procedure call, threads, user threads, kernel threads, multi threading models: Many-to-One Model, One-to-One Model, Many-to-Many Model, CPU scheduling, Scheduling Criteria, scheduling algorithms: First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling

Unit III: Process synchronization (8 hrs)

Race condition, critical section problem, Peterson's algorithm, Bakery algorithm, synchronization hardware: locking, synchronization software tools: mutex lock, semaphore (counting and binary), semaphore implementation, classic synchronization problems: bounded buffer problem, the readers –writers Problem, the dining-philosophers problem, monitor, synchronization in windows, synchronization in Linux

Unit IV: Deadlock (10 hrs)

Deadlock, operations of a process performs while using a resource: Request. Use and Release, physical and logical resources, Necessary conditions: mutual exclusion, hold & wait, no preemption and circular wait, resource allocation graph, deadlock prevention: definition, preventing mutual exclusion, preventing hold & wait, preventing no preemption and preventing circular wait, deadlock avoidance: definition, safe state, safe sequence, resource allocation graph based algorithm and Banker's algorithm, deadlock detection: definition, wait-for graph, algorithm to detect deadlock for single instance resources, algorithm to detect deadlock for multiple instance resources and recovery from deadlock: process termination and resource preemption

Unit V: Memory Management (10 hrs)

Memory hierarchy, base register, limit register, address binding, logical and physical address spaces, memory management unit, relocation register, swapping, contiguous memory allocation: definition, memory protection, fixed partition scheme, variable partition scheme, first-fit, best-fit & worst-fit allocation strategies, non-contiguous memory allocation: simple paging and simple segmentation, internal and external fragmentation, TLB, virtual memory, demand paging, page fault, locality of reference principle, performance of demand paging, page replacement algorithms: FIFO, Optimal and LRU, allocation of frames: equal allocation and proportional allocation, global and local page replacement algorithms, thrashing

Practicals:

- Basic linux commands: pwd, ls, cd, mkdir, rmdir, rm, touch, man, cp, mv, locate, head, tail Advanced commands: echo, cat, sudo, df, tar, apt-get, chmod, hostname, useradd, passwd, groupadd, grep, sed, uniq, wc, od, gzip, gunzip, find, date, cal, clear, top, ps, kill
- Shell scripting in linux: shell, types of shell, shell script, echo command, shell variables,
- special variables ($$, $0, $n, $#, $?, $!), array, assignment operator (=), equality operator (==), not equality operator (!=), arithmetic operators (+,-, *, /, %), comparison operators (-eq, -neq, -gt, -lt, - ge, -le), logical operators (!,-o, -a), if...else statement, case...esac statement, while loop, for loop, break statement, continue statement, shell functions 7 classes
- Using system calls in C program in linux: fork(), exec(), exit(), getpid(), mkdir(), rmdir() etc.

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533

E-mail id: hasin@gauhati.ac.in

Paper Name: Computer Networks

1. Learning Outcome: After completing this course, students

- Student will able to learn about the general principles of data communication.
- Student will able to learn about how computer networks are organized with the concept of layered approach.
- Student will able to learn about how signals are used to transfer data between nodes.
- Student will able to learn about how packets in the Internet are delivered.
- Student will able to learn about how routing protocols work.
- Student will able to learn about functions of transport layer
- Student will able to learn about functions of application layer

2. Prerequisites: NIL

3. Semester: 5

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) B. A. Forouzan: *Data Communications and Networking*, Fourth edition, THM, 2007.
b) A. S. Tanenbaum: *Computer Networks*, Fourth edition, PHI , 2002.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction to Computer Networks (5 Lectures)

Data communication system and its components, Definition of network, Types of network, Network topologies, Network protocol, Layered network architecture, Overview of OSI reference model, Overview of TCP/IP protocol suite.

UNIT 2: Physical Layer Communication (10 Lectures)

Analog and digital signal, Definition of bandwidth, Maximum data rate of a channel, Line encoding schemes, Transmission modes, Modulation techniques, Multiplexing techniques- FDM and TDM, Transmission media-Guided and Unguided, Switching techniques- Circuit switching, Packet switching, Connectionless datagram switching, Connection-oriented virtual circuit switching.

UNIT 3: Data Link Layer Functions and Protocol (10 Lectures)

Definition of Framing, Framing methods, Error detection techniques, Error correction techniques, Flow control mechanisms- Simplex protocol, Stop and Wait ARQ, Go-Back-N ARQ, Point to Point protocol.

UNIT 4: Multiple Access Protocol and Networks (5 Lectures)

Basics of ALOHA protocols, Basics of CSMA/CD protocols, Ethernet LANS, Connecting LAN and back-bone networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways

UNIT 5: Networks Layer Functions and Protocols (8 Lectures)

Connection oriented vs Connectionless services, Definition of Routing, Routing algorithms, IP protocol, IP addresses, ARP, RARP

UNIT 6: Transport Layer Functions and Protocols (4 Lectures)

Transport services, TCP vs UDP protocol, TCP connection establishment- Three way handshakes, TCP connection release

UNIT 7: Overview of Application Layer Protocols (3 Lectures)

Overview of DNS, Overview of WWW, URL, Email architecture, HTTP protocol

B. Practical / Lab work to be performed (15 Practical Classes)

- Implement the data link layer farming methods such as Bit Stuffing.
- Study of different types of Network cables.
- Study of network IP.
- Connect the computers in Local Area Network.
- Study of basic network command and Network configuration commands.
- Configure a Network topology using packet tracer software.
- Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
- Simulate and implement Stop and Wait protocol for noisy channel.
- Simulate and implement Go-Back-N sliding window protocol.
- Simulate and implement Selective Repeat sliding window protocol.
- Simulate and implement Dijkstra Algorithm for shortest path routing.
- Simulate and implement Distance vector routing algorithm

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Java Programming

1. Learning Outcome: After completing this course, students will be

- Familiar with the core concepts of java programming and classes of swing package.

2. Prerequisites: NIL

3. Semester: 5

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Java: The Complete Reference*, Herbert Schildt, McGrawHill
b) *Java How to Program,* Paul Deitel, Harvey Deitel, Pearson

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

Unit I: Introduction (3 hrs)

High level language, compiled and interpreted languages, history of java programming language, compilation of java code, bytecode, java interpreter, javac and java command, path environmental variable, Java IDE, features of java programming language: simple, object oriented, robust, architecture neutral and interpreted

Unit II: Data types, operators and control statements (12 hrs)

Java as strongly typed language, primitive data types, integer data types: byte, short, int and long, floating point data types: float and double, character data type, boolean data type, literals: integer literals, floating-point literals, boolean literals, character literals and string literals, declaring a variable, dynamic Initialization, the scope and lifetime of variables, type-casting in java, one dimensional array, multi dimensional array, arithmetic operators: the basic arithmetic operators, the modulus operator, arithmetic compound assignment operators, increment operator and decrement operator, bitwise operators, relational operators, short circuit logical operator, the assignment operator, branching statements: if-else and switch-case statements, looping statements: while, do-while, for and for-each statements, jump statements: break and continue

Unit III: Object oriented features of java (10 hrs)

Defining a class, member variable and member methods, access specifiers: default, private and public, declaring objects, assigning object reference variables, constructors, parameterized constructors, the this keyword, garbage collection, the finalize( ) method, overloading methods, overloading constructor, static keyword, final keyword, command line arguments in java, inheritance, super class and sub class, protected access specifier, super keyword, constructor call in multilevel inheritance, method overriding, dynamic method dispatch, abstract class, interfaces, type wrappers

Unit IV: String handling and packages (5 hrs)

String class, String constructors, String length, special string operations: string literals, string concatenation, string concatenation with other data types, string conversion and toString( ), character extraction: charAt( ), getChars( ), string Comparison: equals( ) and equalsIgnoreCase(), regionMatches( ), startsWith( ) and endsWith( ), equals( ) Versus ==, compareTo( ), searching strings, data conversion using valueOf( ), StringBuffer, StringBuffer constructors, length( ) and capacity( ), ensureCapacity( ), setLength( ), charAt( ) and setCharAt( ), getChars( ), package, defining a package, CLASSPATH, importing packages

Unit V: Exception handling and I/O (5 hrs)

Exception-handling, exception types, uncaught exceptions, try and catch block, multiple catch blocks, nested try statements, throw, throws, finally, java's built-in exceptions, creating own exception classes, java I/O classes, reading console input, writing console output, reading and writing files

Unit VI: Swing package and database connectivity (10 hrs)

Swing package, simple GUI-Based Input/Output with JoptionPane, Jframe, JLabel, JTextField, Jbutton, handling event in a Jframe object, layout managers: BorderLayout, FlowLayout, GridLayout, CardLayout, GridBagLayout, JtoggleButton, JCheckBox, JRadioButton, Jlist, JcomboBox, JDBC, JDBC driver, connectivity steps, connectivity with MySQL, DriverManager class, Connection class, Statement class, ResultSet class, PreparedStatement class

(b) Practical

- Java programs to demonstrate the use of data types and operators
- Java input through Scanner class and JOptionPane class
- Java programs to demonstrate the use of control statements.
- Java programs to demonstrate the use of classes, objects, visibility modes, constructors and destructor.
- Java programs to demonstrate the use of inheritance and polymorphism.
- Java programs to demonstrate the use of polymorphism.
- Java programs to handle strings,Java programs implementing exception handling.
- Demonstrating the use and creation of packages in java.
- Java program with JFrame, JTextfield and JButton with event handling
- Using JLabel, JTextArea and JPasswordField in java with event handling
- Working with layout managers in JFrame
- Using JCheckBox, JRadioButton and JComboBox in a JFrame

- Connecting JFrame components to a DBMS

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533
E-mail id: hasin@gauhati.ac.in

Paper Name: Python Programming

1. Learning Outcome: After completing this course, students

- Know about fundamentals of Python Programming and Problem Solving.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

c) *Core Python Programming*, R. Nageswara Rao, Dreamtech Press.
d) *Python: The Complete Reference*, Martin C. Brown, McGraw Hill Education.
e) http://docs.python.org/3/tutorial/index.html

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction to Python Programming (8 hrs)
Introduction, Installation of Python Interpreter, Python Shell, Code Indentation, Identifiers and Keywords, Literals, Strings, Operators (Arithmetic, Relational, Logical, Assignment, Ternary, Bitwise, Increment and Decrement Operators), Input and output statements, Output Formatting.

Unit 2: Control Statements and Functions (8 hrs)
Branching, Looping, Conditional Statement, Exit Functions, Break, Continue, Pass, Defining Functions, Default Arguments. Scope of Functions, Function Documentation, Lambda Functions & Map.

Unit 3: Python Data Structures (6 hrs)
List (List, Nested List, List as Matrix), Tuple, Set, Dictionary.

Unit 4: Exception Handing (4 hrs)
Errors, Exception Handling with try, Multiple Exception Handling, Writing own Exception.

Unit 5: File Handling (6 hrs)

Understanding read function, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Programming using file operations, Reading config files, Writing log files in python.

Unit 6: OOP in Python

Creating Classes in Python, Instance Methods, Inheritance, Polymorphism, Exception Classes and Custom Exceptions.

Unit 7: Introduction to Libraries in Python (6 hrs)

NumPy, Matplotlib, OpenCV, Tkinter.

Unit 8: Python SQL Database Access (7 hrs)

Introduction to database driven program, Database Connection, Database Operations: INSERT, READ, UPDATE, DELETE, COMMIT AND ROLLBACK.

(b) Practical

- Introduction to Python console, operators, input and output statements.
- Python control statements and functions
- Data Structures in python
- Exception Handling
- File Handling
- Object Oriented Python programming
- Introduction to libraries (NumPy, Matplotlib, OpenCV)
- Python SQL Database Connection and database operations

Particulars of course designer:

Name: Dr. Sanjib Kr Kalita
Contact No.: 8812051150
E-mail id: sanjib959@gauhati.ac.in

Paper Name: Software Engineering

1. Learning Outcome: On successful completion of this course, the student should be able to:

- Determine the primary problems that impact all software development processes.
- Choose relevant software development processes models, methodologies, and strategies for managing a specific software development process, and justify the choices
- Implement different software estimation metrics such as cost, effort size, staffing etc.
- Describe various software design approaches and various coding and testing strategies used in software engineering principles
- Know about software reliability and how to calculate software maintenance cost.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

c) Rajib Mall: *Fundamentals of Software Engineering*; PHI Learning Pvt. Ltd.
d) Roger S. Pressman: *Software Engineering: A practitioner's Approach*; McGraw Hill.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction (4 Lectures)

Definition of Software Engineering, differentiation between Computer Science, Software Engineering and System Engineering, Program V/s software product, Exploratory style and modern style of software development, need of software engineering, characteristics of good software product

Unit 2: Software Development Life Cycle models (7 Lectures)

Definition of software development Life cycle (SDLC) models, Various life cycle modes: Classical Waterfall model, Iterative Waterfall model, Prototyping model, Evolutionary (Incremental) model, Spiral model, Agile Model, Agile V/s traditional SDLC Models, SCRUM model, Advantages and disadvantages of each of these SDLC models.

Unit 3: Requirement Analysis and Specification (7 Lectures)

What is Requirement Analysis and Gathering, Concept and Importance of Feasibility Study in Software design, Types of Feasibility: *Technical*, *Economical* and *Operational* feasibility, Software Requirement Specification (SRS) document, Components of an SRS (Software Requirement Specification): Functional and Non-Functional Component, Properties of a good SRS, Different users of SRS, Techniques to represent Complex Logic in SRS: Decision Tree and Decision Table.

Unit 4: Software Project Management (15 Lectures)

Basic idea of Software Project Management, Job Responsibilities of a Software Project Manager, Need of SPMP (Software Project Management Plan) document, Contents of SPMP, Need of Software documentation, Internal and External documentation, Software size estimation using Lines of Code (LOC), Merits and Demerits of LOC metric, Function Point Metric, 3D Function Point metrics, Project Estimation Techniques: *Empirical estimation* and *Heuristics estimation* techniques. Empirical estimation techniques: *Delphi Cost Estimation* and *Delphi Cost Estimation.* Heuristic Estimation Techniques: *Basic COCOMO model* and *Intermediate COCOMO model.* Project Scheduling: *Work break down structure, Activity Networks* and *Critical Path Method.* Project Team structure: *Chief Programmer team* and *Democratic team* structure.

Unit 5: Software Design principles and Methodology (12 Lectures)

Top down and bottom up approach, External Design, Architectural Design and Detailed design, Concept of Cohesion in software design, Classification of Cohesions, Basic concept of Coupling, Classification of Couplings, Introduction to software Analysis and Software Design (SA/SD), Introduction to Data Flow Diagram, Symbols used in DFD, Context Diagram in DFD, Advantages and Disadvantages of DFDs., Balanced DFD, Structured Design: *Transaction Analysis* and *Transform Analysis.* Need of Object Oriented Design and Analysis, UML (Unified Modeling Language), different views of UML, Various UML Diagrams: *Use Case diagram, Class Diagram, Object Diagram*, *Sequence Diagram* and *Collaboration diagram.*

Unit 6: Coding and Testing (9 Lectures)

Goals of coding, Code Review techniques: Code Walkthrough, Code Inspection, Definition of Test cases, test suits, negative testing and positive testing. Different levels of software testing: *unit testing*, *Integration Testing*, *System Testing* and *acceptance testing*. Differentiation between Verification and Validation, Black box testing approaches: *Equivalent Class Partitioning* and *Boundary Value Analysis*, White Box testing approaches: *Statement Coverage*, *Branch Coverage, Condition* Coverage and Path *Coverage. Approach*, MaCabe's Cyclomatic Complexity, Basic idea of various system testing approaches: *Smoke testing, Stress testing, Volume testing* and *Compatibility testing*

Unit 7: Software Reliability and Maintenance (6 Lectures)

What is reliability? Reliability metrics of Software Products: ROCOF, MTTF, MTTR, MTBF, POFOD and availability. ISO 9000 Certification, need of ISO Certification, How to get ISO 9000 certification, Definition of Software Maintenance, Types of Software maintenance: *Corrective, Adaptive* and *Perfective* maintenance, Estimation of Software Maintenance Cost.

Particulars of course designer:

Name : Dwipen Laskar
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Paper Name: Web Technologies

1. Learning Outcome: At the end of the course, students will be able to:

- Understand the basic concept of web applications and web services.
- Design basic well-structured web page using HTML and CSS
- Develop the ability to implement interactive elements and dynamic content using basic JavaScript
- Develop a foundational understanding of server-side scripting using PHP

2. Prerequisities: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

e) Jackson J.C. (2007). *Web Technologies: A Computer Science Perspective*. Pearson.
f) Duckett, J. (2011). *HTML and CSS: Design and Build Websites*. John Wiley & Sons.
g) Robbins, J. N. (2018). *A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*. O'Reilly Media.
h) Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide.* O'Reilly Media.
i) Haverbeke, M. (2018). *Eloquent JavaScript*. No Starch Press.
j) Welling, L., & Thomson, L. (2016). *PHP and MySQL Web Development* (5th ed.). Addison-Wesley Professional.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction to Web Technologies (8 Lectures)

Concepts of the Internet and the World Wide Web (WWW), Overview of web browsers and their functionalities. Client-Server Architecture in Web Applications. Communication Protocols – HTTP, HTTPS, FTP. Working of DNS. Brief concepts of port, URL, cache and cookies. Web Content Accessibility Guidelines. Privacy concerns and data protection regulations, GDPR. Introduction to Web Hosting and control panels.

Unit 2: Front End Development using HTML (10 Lectures)

Website and Webpage. Basic concept of Markup Language. Introduction to HTML. Basic HTML structure. Text formatting Tags – headings, paragraph, line break, horizontal rule. Link and Navigation – anchor tags. Lists - ordered, unordered, definition list. Image and multimedia tags. Tables in HTML. Forms and Input types – text, email, password, radio, select, checkbox, textarea, date, url, submit, button. Semantic HTML. Sectioning elements – header, nav, main, section, article, aside, footer.

Unit 3: Front End Design using CSS (9 Lectures)

Introduction to CSS. CSS syntax and rule structure. Inline, Internal and External CSS. CSS selectors – element, class, ID, attribute. Combinators – descendant, child, adjacent sibling, general sibling. Understanding the CSS Box Model – content, padding, border, margin. CSS colours and backgrounds – background-color, background-image, background-repeat. CSS typography – font properties, text properties.

Unit 4: Client-Side Scripting with JavaScript (10 Lectures)

JavaScript as a high-level interpreted language. JavaScript code execution in web browsers – JavaScript execution context. JavaScript syntax and datatypes. JavaScript variables – var, let, const. Assignment and scope of JavaScript variables. Operators in JavaScript – arithmetic, comparison, logical, assignment. Conditional Statements. Looping Structures. Function declaration and Invocation in JavaScript. Introduction to the Document Object Model. Accessing HTML elements in DOM – by id, by tag name, by class name, query selectors. Manipulating DOM elements – create, add, append, remove. InnerText vs InnerHTML. Manipulating CSS styles using DOM. Event handling and delegation with the DOM using JavaScript. Client-side form validation using JavaScript. Handling form validation and processing data.

Unit 5: Server-Side Programming with PHP (8 Lectures)

Introduction to PHP and role in Web development. PHP syntax and variables. Basic PHP functions – Built-in PHP functions, string manipulation functions, mathematical functions, date and time functions. PHP forms and form handling. Form submission methods – GET and POST. Handling form data with PHP. Uploading files with PHP. Introduction to the tech-stack. Role of Apache, PHP, MySQL etc. Introduction to Databases and SQL. Connecting to databases with PHP. Executing SQL queries with PHP. Retrieving, inserting, updating and deleting data from databases using PHP.

B. List of Practical

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a basic HTML webpage structure with a heading, paragraph, and an image.
2. Build a navigation menu using an unordered list (<ul>) with clickable links.
3. Implement a form with input fields for name, email, and a submit button.
4. Create a table with multiple rows and columns to display tabular data.
5. Design an image gallery using HTML and CSS with proper padding and border.

6. Embed a YouTube video on a webpage using the <iframe> tag.
7. Implement an ordered list (<ol>) to display a step-by-step tutorial or instructions.
8. Create a dropdown select menu (<select>) with multiple options.
9. Use HTML5 semantic tags (such as <header>, <nav>, <section>, <article>, <footer>) to structure and organize content on a webpage.
10. Build a registration form with fields for name, email, password, date of birth, address and other such fields with a submit button. Include appropriate input types, labels and placeholders.
11. Style a heading element with a custom font, colour and background.
12. Apply different background colors to alternate rows in a table.
13. Implement a hover effect on a button that changes its background colour or adds a solid border.
14. Style a form input field with custom border, padding, and background color.
15. Implement a CSS tooltip that displays additional information when hovering over an element.
16. Build a simple JavaScript calculator that can perform basic arithmetic operations.
17. Create a button that, when clicked, appends a new paragraph element with a specific text content to an existing div element.
18. Implement a function that changes the innerText of a paragraph element to display a random number between 1 and 10 every time a button is clicked.
19. Build a form with input fields for name and email. When the form is submitted, use innerHTML to display a confirmation message with the entered name and email on the webpage.
20. Build a form with input fields for email, password and confirm password. When the form is submitted, use an alert to display a success message if the password and confirm password values matches, otherwise show an error alert. Use JavaScript for the validation.
21. Create a list of items. Add a click event listener to each item so that when clicked, the background color of the clicked item changes.
22. Write a PHP script to display the current date and time on a webpage.
23. Write a PHP script to connect to a MySQL database and fetch data from a table.
24. Create a registration form with fields for username, email, and password. Implement server-side validation to check for duplicate usernames or invalid email formats. Store the user registration data in a MySQL database. Provide feedback to the user upon successful registration or display appropriate error messages.
25. Design a webpage that displays a list of notices retrieved from a MySQL database. Implement functionality to add new notices to the database using a form. Allow users to view and delete individual notices. Apply appropriate styling to the notices and ensure proper validation and sanitization of user input.

Particulars of Course Designer:

Name : Risheraj Baruah
Contact No. : +91 8486942427 Email id : rishirajbaruah@gauhati.ac.in

Paper Name: Artificial Intelligence

1. Learning Outcome:

After completing this course, students will know the fundamentals of artificial intelligence (AI), identify problems where artificial intelligence techniques are applicable and able to apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Rich & Knight, Artificial Intelligence* – Tata McGraw Hill, 2nd edition, 1991.
b) *Russell & Norvig, Artificial Intelligence*-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
c) *W.F. Clocksin and Mellish, Programming in PROLOG,* Narosa Publishing House, 3rd edition, 2001.
d) *DAN.W. Patterson, Introduction to A.I and Expert Systems* – PHI, 2007.
e) *Ivan Bratko, Prolog Programming for Artificial Intelligence*, Addison-Wesley, Pearson Education, 3rd edition, 2000.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (4 Hours)

Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

UNIT 2: Problem Solving and Searching Techniques (16 Hours)

Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

UNIT 3: Knowledge Representation (14 Hours)

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs. Programming in Logic (PROLOG)

UNIT 4: Dealing with Uncertainty and Inconsistencies (6 Hours)

Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

UNIT 5: Understanding Natural Languages (5 Hours)

Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

Practical:

- Write a prolog program to calculate the sum of two numbers.
- Write a prolog program to find the maximum of two numbers.
- Write a prolog program to calculate the factorial of a given number.
- Write a prolog program to calculate the nth Fibonacci number.
- Write a prolog program, insert_nth(item, n, into_list, result) that asserts that result is the list into_list with item inserted as the nth element into every list at all levels.
- Write a Prolog program to remove the nth item from a list.
- Write a Prolog program, remove nth (Before, After) that asserts the After list is the Before list with the removal of every nth item from every list at all levels.
- Write a Prolog program to implement append for two lists.
- Write a Prolog program to implement palindrome (List).
- Write a Prolog program to implement max(X,Y,Max) so that Max is the greater of two numbers X and Y.
- Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List.
- Write a Prolog program to implement sumlist(List,Sum) so that Sum is the sum of a given list of numbers List.
- Write a Prolog program to implement two predicates evenlength(List) and oddlength (List) so that they are true if their argument is a list of even or odd length respectively.
- Write a Prolog program to implement reverse (List, Reversed List) that reverses lists.
- Write a Prolog program to implement maxlist (List, Max) so that Max is the greatest number in the list of numbers List using cut predicate.
- Write a Prolog program to implement GCD of two numbers.
- Write a prolog program that implements Semantic Networks/Frame Structures.

Particulars of course designer:

Name: Dr. Diganta Kumar Pathak
Contact No.: 9707737222
E-mail id: digantakumarpathak@gauhati.ac.in

Paper Name: Automata Theory and Languages

1. Learning Outcome: After completing this course, students

- Understand the Mathematical model of a finite state machine. Know deterministic and non-deterministic versions of Finite automata.
- Grasp the mathematical concepts of languages and grammar.
- Know Pushdown Automata and the associated grammar/language.
- Know the properties of Regular languages and Context free languages.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Compulsory

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

f) *An introduction to Formal Languages and Automata*, Peter Linz,Narosa.
g) *Introduction to Automata Theory, Languages and Computation*, Hopcroft, Motwani and Ullman, Pearson.
h) Theory of Computer Science (Automata, Languages and Computation), K. L. P. Mishra, N. Chandrasekaran; P. H.I.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Finite Automata (10 Lectures)

DFA, NFA, NFA with empty-moves, Equivalence of DFA and NFA, Reduction of the number of states in finite automata.

UNIT 2: Regular Languages and Regular Grammar (12 Lectures)

Concept of languages and grammar, Regular expressions, Connection between regular expressions and regular languages, Regular grammars, Right and Left-Linear Grammars, Equivalence between Regularlanguages and Regular grammars.

UNIT 3: Properties of Regular Languages (13 Lectures)

Closure under simple set operations- union, intersection, concatenation, complementation and star closure, Decision algorithms for emptiness, finiteness and infiniteness, equality, Proof of non-regularity using Pigeonhole principle and using pumping lemma for regular languages.

UNIT 4: Context Free languages (15 Lectures)

Context-free grammars, leftmost and rightmost derivations, derivation trees, Parsing and Ambiguity ingrammars and languages, Simplification of Context free Grammars- removing useless productions,empty-productions and unit-productions. Normal forms- Chomsky and Greibach normal forms, Pumping Lemma for CFL, Using Pumping Lemma to show that certain languages are not Context free

UNIT 5: Pushdown Automata (10 Lectures)

Definition and language accepted (acceptance by empty stack and final state and their equivalence), Pushdown Automata and Context free languages. Deterministic PDA and Deterministic Context free Languages.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Cloud Computing

1. Learning Outcome:
After completing this course, students will know about cloud computing environment, it need and applications.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Cloud Computing: Principles and Paradigms*, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley,2011

b) *Enterprise Cloud Computing - Technology*, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010

c) *Cloud Computing Bible*, Barrie Sosinsky, Wiley-India, 2010

d) *Cloud Security: A Comprehensive Guide to Secure Cloud Computing*, Ronald L. Krutz, Russell Dean Vines, Wiley- India,2010

e) *Cloud computing,* Ashish Bhatnagar, KATSON Books.

f) *NPTEL :Cloud computing*, By Prof. Soumya Kanti Ghosh, IIT Kharagpur

9. Contents of Syllabus:

A. Theory

Detailed Syllabus:

Unit 1: Introduction to Cloud Computing (10 Lectures)

Introduction, Definition, basic concepts and terminology, characteristics, goals and benefits, risks and challenges, historical developments, clouds types, Role of networks in cloud computing, Virtualization Technology, Enterprise knowledge clouds, Cloud Computing(NIST Model), Client server Architecture, Client server model vs. Cloud model.

Unit 2: Cloud Computing Architecture (10 Lectures)

Introduction, Cloud Computing stack, Service models(XaaS) : Infrastructure as a Services(IaaS), Platform as a service(PaaS), Software as a Service(SaaS), Application of XaaS, Deployment Models, Microsoft Azure vs Amazon EC2

Unit 3: Service Management in Cloud Computing (10 Lectures)

Service Level Agreements(SLAs), SLA contents, Web Service SLA, Difference between Cloud

SLA and Web service SLA, Types of SLA, Service level objectives, Service level management, Considerations for SLA, SLA requirements, Cloud properties: Economic viewpoint

Unit 4: Data Management in Cloud Computing (10 Lectures)

Introduction: Relational database, Google File system, BigTable, MapReduce, Data Storage Techniques, Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large scale data processing, Parallel database.

Unit 5: Cloud Security (10 Lectures)

Security – Basic components, Security attacks, Infrastructure Security, Data Security and Storage, Identity and Access Management, Access control, Trust, Reputation, Risk.

Unit 6: Case Study on Open Source and Commercial clouds (10 Lectures)

OpenStack, OpenStack Capability, OpenStack History, OpenStack Architecture, OpenStack components, Meghamala(IITKGP), Google Cloud Platform, Microsoft Azure

Particulars of course designer:

Name: Dr. Sanjib Kr Kalita
Contact No.: 8812051150
E-mail id: sanjib959@gauhati.ac.in

Paper Name: Complier Design

1. Learning Outcome:

a) Use compiler construction tools and describes the Functionality of each stage of compilation process
b) Construct Grammars for Natural Languages and find the Syntactical Errors/Semantic errors during the compilations using parsing techniques
c) Analyze different representations of intermediate code.
d) Construct new compiler for new languages.
e) Participate in GATE, PGECET and other competitive examinations

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
5. Theory Credit: 4
6. Practical Credit: 0
7. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

8. List of Books:

a) *Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman* (2007), *Compilers:Principles, Techniques and Tools*, 2nd edition, Pearson Education, New Delhi, India.
b) Alfred V. Aho, Jeffrey D. Ullman (2001), *Principles of compiler design*, Indian student edition, Pearson Education, New Delhi, India.
c) *Kenneth C. Louden (1997), Compiler Construction– Principles and Practice*, 1st edition, PWS Publishing.
d) *K. L. P Mishra, N. Chandrashekaran (2003*), *Theory of computer science- Automata Languages and computation*, 2nd edition, Prentice Hall of India, New Delhi, India.
e) *Andrew W. Appel (2004*), *Modern Compiler Implementation C*, Cambridge University Press, UK.
f) *John R. Levine, Tony Mason, Doug Brown*, *Lex & Yacc*, O'reilly

9. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction to Compiler (12 Lectures)

Definition of compiler, Phases of a compiler, Lexical analysis, Role of lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specification of tokens-strings and languages, operations on languages, regular expressions, regular definitions, Recognition of tokens, Lexical analyzer generator- Lex, Finite automata, From Regular expressions to automata.

UNIT 2: Syntax Analysis (16 Lectures)

Parsing, Role of parser, Context free grammar, Parse tree and derivations, Ambiguity, Eliminating ambiguity from dangling-else grammar, Elimination of left recursion, Left factoring,
Top Down Parsing- Recursive descent parser, Predictive parser- LL(1) Grammar, construction of predictive parsing table.

Bottom Up Parsing- Reductions, Handle pruning, Shift-Reduce parsing, Conflicts during shift-reduce parsing, LR Parser-Items, Kernel items, Non-kernel items, closure of Item Sets, The function GOTO, LR (0) automaton, Construction of SLR parsing table, Basics of LALR parser, Automatic parser generator-YACC.

UNIT 3: Syntax Directed Translation (12 Lectures)

Syntax directed definition- inherited and synthesized attributes, evaluating an SDD at the nodes of a parse tree, Evaluation orders of SDD's- dependency graphs, ordering the evaluation of attributes, S-attributed and L-attributed definitions, Applications of syntax-directed translation- construction of syntax trees, the structure of a Type, Syntax directed translation schemes- postfix translation schemes, SDT's with actions inside productions, eliminating left recursion from SDT's, Variants of syntax trees- directed acyclic graphs (DAG) for expressions, The value-number method for constructing DAG's, Three address code- Quadruples, Triples and Indirect triples, Static single-assignment form, Types and Declarations, Translation of expressions, Type Checking, Basics of Control flow, Basics of Backpatching.

UNIT 4: Run Time Environments (10 Lectures)

Storage organization, Stack allocation of space, Access to non-local data on Stack, Basics of Heap management, Basics of garbage collection

UNIT 5: Code Generation and optimization (10 Lectures)

Machine dependent code generation, Issues in design of code generator, The target language, Addresses in the target code, Basic blocks and flow graphs, Optimization of basic blocks- the DAG representation of Basic blocks, Finding local common sub-expression, dead code elimination, A simple code generator, Basics of Peephole optimization, The Principal Sources of Optimization, Introduction to Data-Flow Analysis.

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Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Computer Graphics

1. Learning Outcome:

After completing this course, students will know about basic elements of Computer Graphics, fundamental of Computer graphics algorithms along with basic mathematical foundations of computer graphics.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) D. Hearn, M. Baker: Computer Graphics, Prentice Hall of India 2008.
b) J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
c) D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
d) D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill, 2nd edition 1989.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (2 Hours)

Basic elements of Computer Graphics, Applications of Computer Graphics

UNIT 2: Graphics Hardware (5 Hours)

Input Devices: Keyboard, Mouse, Trackball & Space ball, Joystick, Data Glove, Digitizers, Image Scanners, Touch panels, Light Pens systems. Output display devices: Refresh CRT, Raster-Scan display and Random-scan display technique, Color display techniques-Beam penetration method and Shadow-mask method, Direct view storage tubes, Emissive & Non-emissive flat-panel, Displays-Plasma panels, LED and LCD monitor, Three-dimensional viewing devices and Virtual-Reality systems Display processor: Raster-scan systems, Random-scan systems

UNIT 3: Fundamental Techniques in Graphics (20 Hours)

Line-drawing algorithms:DDA algorithm and Bresenham's Line drawing Algorithm, Midpoint Algorithm for Circle and Ellipse Generation, Curve generation. Attributes for output primitives: Area-filling Algorithms - Scan-line Polygon-fill, 2-D Geometric Transformations: Basic transformations-translation, Rotation and Scaling Matrix representations and Homogeneous Co-ordinate representations, Composite transformations among translation, Rotation and Scaling, 2-D viewing: Definition, Viewing transformation pipeline, Window-to-viewport Co-ordinate transformation.

2-D Clipping: Concept and Algorithm: Point clipping, Line clipping - Cohen-Sutherland algorithm, Area clipping, Text clipping, Polygon clipping. 3-D concepts: Display methods-Parallel projection, perspective projection 3-D geometric transformations: Transformation, Translation, Rotation and Scaling around axes, 3-D Viewing Projections – Parallel and Perspective.

UNIT 4: Geometric Modelling (8 Hours)

Representing curves and surface, Bezier curves and surfaces – Definition of Bezier curve and its properties, Algorithms for Bezier curves and surfaces, Hermite curve

UNIT 5: Visible Surface determination (5 Hours)

Definition, approaches for visible surface detection, object-space methods- Back-Face Detection, Image space methods: Depth Buffer Methods, A Buffer Method, Scan Line Method, Depth-Sorting Method

UNIT 6: Surface rendering (5 Hours)

Definition and importance, light sources, Basic illumination models-Ambient light, Diffuse reflection, Specula reflector and Phong model

Practical:

- Write a program to implement DDA algorithm for line drawing.
- Write a program to implement Bresenham's line drawing algorithm.
- Write a program to implement mid-point circle drawing algorithm.
- Write a program to clip a line using Cohen-Sutherland line clipping algorithm.
- Write a program to clip a polygon using Sutherland Hodgeman algorithm.
- Write a program to apply 2D translation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D rotation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D scaling on a 2D object (use homogenous coordinates).
- Write a program to apply 2D reflection of a 2D object (use homogenous coordinates).
- Write a program to apply 2D shear operation on a 2D object (use homogenous coordinates).
- Write a program to apply 3D translation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D rotation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D scaling on a 3D object (use homogenous coordinates).
- Write a program to apply 3D reflection of a 3D object (use homogenous coordinates).
- Write a program to apply 3D shear operation on a 3D object (use homogenous coordinates).
- Write a program to draw Hermite/Bezier curve.

Particulars of course designer:

Name: Dr. Diganta Kumar Pathak
Contact No.: 9707737222
E-mail id: digantakumarpathak@gauhati.ac.in

Paper Name: Data Mining and Warehousing

1. Learning Outcome:

f) Understanding the process of Knowledge Discovery in Databases.
g) Understand the functionality of the various data warehousing component.
h) Characterize the kinds of patterns that can be discovered by association rule mining.
i) Analysis of different types of data by clustering and classification.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) A.K. Puzari, *Data Mining Techniques*, University Press.
b) J. Han, J. Pie and M. Kamber, *Data Mining: Concepts and Techniques*, Morgan Kaufmann.
c) P. Tan, M. Steinbach and V. Kumar, *Introduction to Data Mining*, Pearson Education (LPE).
d) G. K. Gupta, *Introduction to Data Mining with Case Studies*, PHI.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

UNIT 1: Overview (4 Lectures)

What is Data Mining?, Knowledge Discovery in Databases (KDD) vs. Data Mining, Types of Data, Basic Data Mining Tasks, Predictive and Descriptive data mining techniques, Supervised and Unsupervised learning techniques, Basics of Pre-processing methods- Data Cleaning, Data Integration and Transformation, Data Reduction, Data Visualization.

UNIT 2: Data Warehousing (6 Lectures)

What is Data Warehouse? Multidimensional Data Model, Data Cube, Basic Components of Multidimensional Data Model, OLAP Operations- Slicing, Dicing, Drilling, Drill-Up, Drill-Down, Drill-Within, Drill-Across, Pivot(Rotate), Schema of Warehouse, Data Warehouse Architecture, Metadata.

UNIT 3: Association Rule Mining (12 Lectures)

What is Market Basket Data?, k-Itemset, Support of an Itemset, Frequent Itemsets, Infrequent Itemsets, Maximal Frequent Itemsets, Closed Frequent Itemsets, Association Rules, Confidence of a Rule, Problem of Mining Association Rules, Algorithm for Mining Frequent Itemsets- Apriori Algorithm, Pincer-Search Algorithm, DIC (Dynamic Itemset Counting) Algorithm, Steps of Mining Association Rules.

UNIT 4: Clustering (12 Lectures)

What is Clustering, Partitional vs Hierarchical Clustering, Types of Data in Clustering, Distance Measures used in Clustering- Euclidean Distance, Manhattan Distance, Similarity Measures used in Clustering- Cosine Similarity, Jacquard Coefficient, Partitional Clustering Methods- K-Means, K-Mediods, PAM, CLARA, CLARANS, Density Based Clustering Methods- DBSCAN, Introduction to Hierarchical Clustering.

UNIT 5: Classification (8 Lectures)

What is Classification? Issues Regarding Classification, K-Nearest Neighbor Classifiers, Bayesian classification, Introduction to Decision Tree.

UNIT 6: Recent Trends and Techniques used in Data Mining (3 Lectures)

Basic Concepts of- Web Mining, Spatial Data Mining, Temporal Data Mining, Big Data Mining, Concept of Neural Network, Genetic Algorithm.

Practical / Lab work to be performed

- Implement ***any one*** from the following-
  - Write a computer program to implement A priori algorithm to mine all frequent itemsets from a transactional dataset. Use hashing to store the item sets in the level wise generation of candidate sets.
  - Write a computer program to implement the Pincer Search algorithm.
  - Write a computer program to implement the DIC (Dynamic Item set) algorithm.
- Implement ***any four*** from the following-
  - Write computer program to implement the K-Means algorithm using different distance measures stated in the syllabus.
  - Write computer program to implement the PAM algorithm using different similarity measures stated in the syllabus.
  - Write a computer program to implement the CLARA algorithm.
  - Write a computer program to implement the CLARANS algorithm.
  - Write a computer program to implement the DBSCAN algorithm.
  - Write a computer program to implement the K-NN algorithm.

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773 Email: queensarathi@gmail.com

Paper Name: Design and Analysis of Algorithms

1. Learning Outcome:

After successful completion of this course, students will:

- know how to analyze algorithms.
- learn the different algorithm design techniques.
- be acquainted with the advanced sorting and searching algorithms and their complexities.
- know graph representation techniques together with traversal algorithms.
- know why tree balancing is required and how to achieve this.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Introduction to Algorithms*, Cormen. T. H., Leiserson C. E. and Rivest. R. L., 3rd edition (2010)Tata-McgrawHill Publishers.
b) *Fundamentals of Computer Algorithms*; Horowitz and Sahani; (2nd Edition), Galgotia.
c) *Design and Analysis of Computer Algorithms*; Aho.A, Hopcroft J.E. and Ullman J.D.; (2011), PearsonEducation.
d) *Introduction to the Design and Analysis of Algorithms*, Levitin, 3/e 2017, Pearson Education.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (6 Hours)

Analysisof Algorithms – worst case and average case analysis; Time and space complexity of algorithms; Asymptotic notations O and θ. Proving correctness of algorithms.

UNIT 2: Algorithm Design Techniques (10 Hours)

Iterative techniques, Divide and Conquer, Dynamic Programming, GreedyAlgorithms. Applications of these techniques in problems like sorting, searching, matrix multiplication, LCS (Longest Common Sequence) problem, Knap-sack problem.

UNIT 3: Sorting and Searching Techniques (20 Hours)

Elementary sorting techniques–Bubble Sort, Insertion Sort, Merge Sort, AdvancedSorting techniques - Heap Sort, Quick Sort, Sorting in Linear Time - Bucket Sort,Radix Sort and Counting Sort, Searching Techniques, Medians & Order Statistics,complexity analysis of all the techniques.

UNIT 4: Balanced Trees **(9 Hours)**

Tree balancing, Height of a Red-Black tree, Rotations - Left Rotations, Right Rotations, Insertion and
Deletion in Red-Black trees.

UNIT 5: Graph Algorithms **(9 Hours)**

Representations of Graphs; Adjacency Matrix and Adjacency Lists. Simple operations like computing degree, indegree, outdegree of vertices using the representation techniques and computing work done in all cases. Graph traversal algorithms–Breadth First Search, Depth First Search and their Applications.

UNIT 6: String Processing **(6 Hours)**

String Matching, KMP Technique.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Graph Theory

1. Learning Outcome:

- After completing this course, students will have understanding of graph theoretic concepts, problems and associated algorithmic solutions.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

e) *Introduction to Graph Theory*, Douglas B. West, Pearson
f) *Introduction to Graph Theory*, Robin J. Wilson, Pearson Education Limited
g) *Graph Theory with Applications to Engineering and Computer Science*, Narasingh Deo, PHI

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

Unit I: Introduction **5 hrs**

Graph, directed and undirected graph, weighted and unweighted graph, simple and multigraph, degree, in degree and out degree, Handshaking theorem, complete graph, bipartite graph, cut set, cut vertices, graph representations: incidence matrix, adjacency matrix and adjacency list, BFS traversal and DFS traversals on a graph using stack and queue data structures, isomorphism, homomorphism

Unit II: Connectivity, paths and cycle **15 hrs**

Walk, path and cycle, connected graphs, disconnected graphs, components, Hamiltonian path, Hamiltonian cycle, Hamiltonian graphs, Dirac's theorem, Eulerian path, Eulerian cycle, Euler graphs, Fleuri's algorithm, 2-connected graphs, connectivity and digraph, k-connected and k-edge connected graphs, application of Menger's theorem, Shortest path problem, variations of shortest path problem: single source shortest path problem, single pair shortest path problem and all pairs shortest path problem, Dijkstra's algorithm, Bellman Ford algorithm, Floyd Warshall's algorithm, Johnson's algorithm

Unit III: Tree **12 hrs**

Tree, forest, properties of tree, spanning tree, spanning forest, counting trees, Cayley's theorem, matrix-tree theorem, minimum spanning tree, Kruskal's algorithm, Prim's algorithm, disjoint spanning trees, graph decomposition, graceful labeling, graceful graph, binary tree, binary search tree, AVL tree, multiway search tree, B tree, B+ tree

Unit IV: Matching and coloring **13 hrs**

Matching, bipartite matching, maximum bipartite matching, Ford Fulkerson's algorithm for finding maximal bipartite matching, perfect bipartite matching, non-bipartite matching, maximal non-bipartite matching, largest maximal matching, perfect non-bipartite matching, Hall's Marriage theorem, vertex cover, vertex cover and matching, independent sets, dominating sets, atable matching, Hungarian algorithm, introduction to Edmonds Blossom shrinking algorithm, vertex coloring, k-colorable graph, chromatic number, Brook's theorem, clique number, map coloring problem

Unit V: Digraph **7 hrs**

Digraph, simple digraph, connected and strongly connected digraph, orientable graph, Eulerian digraph, Hamiltonian digraph, tournament, Markov chains, Flow networks, residual graph, augmenting path, Ford Fulkerson's algorithm

Unit VI: Classical problems **8 hrs**

Travelling Salesman Problem, variants of Travelling Salesman Problem, Chinese Postman Problem, variants of Chinese Postman Problem, the minimum connector problem, Huffman coding and Huffman tree, Konisgsberg bridge problem, three utilities problem

Particulars of course designer:

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