TURKU HANSDA LAPSA HEMRAM MAHAVIDYALAY

(A Govt. Aided General Degree College affiliated to Burdwan University and registered u/s 2(f) & 12(B) of UGC Act, 1956)

[Established in 2006 and Accredited 'B' by NAAC in 2016]

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Criterion 6 - Governance, Leadership and Management

6.1 Institutional Vision and Leadership

Documents: NEP Syllabus

BENGALI

The University of Burdwan

Syllabus for 3-Year Degree / 4-Year Honours

in

Bengali

under

Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020

with effect from 2023-24

SEMESTER WISE & COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

Semester I					
Course Type	Title of the Course	Credit (Theory + Tutorial)		Full Marks (Theory + Internal Assessment)	Lecture Hour
1.Major Course BENG1011	সাহিত্য : প্রাথমিক ধারণা	4 (3+1)		75 (60+15)	60
2. Minor Course BENG1021	সাহিত্য : প্রাথমিক ধারণা	4 (3+1)		75 (60+15)	60
3.Multi/ Interdisciplinary BENG1031	কবিতা, নাটক, গল্প, প্রবন্ধ	3 (2+1)		50 (40 +10)	45
4. AEC (L1-1 MIL) BENG1041	সাহিত্যের বোধ ও বিচার	2		50 (40 +10)	30
5. SEC BENG1051	ব্যাকরণ ও বানানশিক্ষা	3		50 (40 +10)	45
6.Common Value-Added Course	Environmental Science/ Education	4		100(60+20+20)	60
		20		400	

Semester II					
Course Type	Title of the Course	Credit (Theory + Tutorial)		Full Marks (Theory + Internal Assessment)	Lecture Hour
1.Major Course BENG2011	বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ	4 (3+1)		75 (60+15)	60
2.Minor Course BENG2021	বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ	4 (3+1)		75 (60+15)	60
3.Multi/ Interdisciplinary BENG2031	গল্প, উপন্যাস	3 (2+1)		50 (40 +10)	45
4. AEC (L2-1)	English ENGL2041	2		50 (40 +10)	30
5.SEC BENG2051	রচনাশক্তির নৈপুণ্য	3		50 (40 +10)	45
6. Common Value-Added Course CVA2061	Understanding India/Digital & Technological Solutions/Health & Wellness, Yoga Education, Sports & Fitness	4		100(60+20+20)	60
		20		400	
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.					
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years					

Semester I

1. Major Course: সাহিত্য : প্রাথমিক ধারণা

Course Title: সাহিত্য : প্রাথমিক ধারণা

Course Code: BENG1011

Course Credit: 4

Course Lecture Hour: 60

Objective of the Course: এই কোর্সের উদ্দেশ্য বাংলা সাহিত্যের প্রাথমিক ধারণা। সাহিত্যের বিভিন্ন সংরূপ ও তার গঠনের সঙ্গে শিক্ষার্থীরা পরিচিত হবে। এবং তারপর বিভিন্ন সংরূপের প্রতিনিধিত্বমূলক কিছু রচনা নিদর্শন হিসেবে পড়বে। কবিতা ও গদ্যের বিভিন্ন রূপের পরিচয় ও প্রাথমিক ধারণা এই কোর্সে দেওয়া হবে।

একক ১ – সাহিত্যের সংরূপ ও গঠন সংক্রান্ত প্রাথমিক ধারণা (সংজ্ঞা ও বৈশিষ্ট্য) (Lecture Hour: 15)

কবিতা, নাটক, উপন্যাস, ছোটোগল্প, প্রবন্ধ

একক ২ – কবিতা (Lecture Hour: 15)

১. সই কেবা শুনাইল শ্যাম নাম - চণ্ডীদাস
২. ওহে প্রাণনাথ গিরিবর হে, ভয়ে তনু কাঁপিছে আমার – রামপ্রসাদ সেন
৩. কবি – মধুসূদন দত্ত
৪. বলাকা – রবীন্দ্রনাথ ঠাকুর
৫. ঝর্ণা – সত্যেন্দ্রনাথ দত্ত
৬. কাণ্ডারী হুশিয়ার – নজরুল ইসলাম
৭. আবার আসিব ফিরে – জীবনানন্দ দাশ
৮. রানার - সুকান্ত ভট্টাচার্য
৯. বাবরের প্রার্থনা - শঙ্খ ঘোষ
১০. লগ্ন – নবনীতা দেবসেন

একক ৩: ছোটোগল্প (Lecture Hour: 15)

১. অতিথি – রবীন্দ্রনাথ ঠাকুর
২. নারী ও নাগিনী – তারাশঙ্কর বন্দ্যোপাধ্যায়
৩. তাজমহল – বনফুল
৪. জননী – বিমল কর

একক ৪: প্রবন্ধ (Lecture Hour: 15)

১. আমাদের ভাষা-সংকট – প্রমথ চৌধুরী
২. উপন্যাসের পূর্বসূচনা – শ্রীকুমার বন্দ্যোপাধ্যায়
৩. বাংলা কাব্যের গোড়ার কথা – হুমায়ুন কবীর
৪. রবীন্দ্রনাথ ও উত্তরসাধক – বুদ্ধদেব বসু

Outcome of the Course: এই কোর্সে শিক্ষার্থীরা সাহিত্যের বিভিন্ন সংরূপ ও তার গঠনের প্রাথমিক পরিচয় পেল। সংরূপগুলি তারা বাংলা সাহিত্যের বিভিন্ন নিদর্শন সহকারে বুঝতে শিখল।

2. Minor Course: সাহিত্য : প্রাথমিক ধারণা

Course Title: সাহিত্য : প্রাথমিক ধারণা

Course Code: BENG1021

Course Credit: 4

Course Lecture Hour: 60

Objective of the Course: এই কোর্সের উদ্দেশ্য বাংলা সাহিত্যের প্রাথমিক ধারণা। সাহিত্যের বিভিন্ন সংরূপ ও তার গঠনের সঙ্গে শিক্ষার্থীরা পরিচিত হবে। এবং তারপর বিভিন্ন

সংরূপের প্রতিনিধিত্বমূলক কিছু রচনা নিদর্শন হিসেবে পড়বে। কবিতা ও গদ্যের বিভিন্ন রূপের পরিচয় ও প্রাথমিক ধারণা এই কোর্সে দেওয়া হবে।

একক ১ – সাহিত্যের সংরূপ ও গঠন সংক্রান্ত প্রাথমিক ধারণা (সংজ্ঞা ও বৈশিষ্ট্য) (Lecture Hour: 15)

কবিতা, নাটক, উপন্যাস, ছোটোগল্প, প্রবন্ধ

একক ২: কবিতা (Lecture Hour: 15)

১. আত্ম-বিলাপ - মধুসূদন দত্ত

২. সোনার তরী – রবীন্দ্রনাথ ঠাকুর

৩. বনলতা সেন – জীবনানন্দ দাশ

৪. আমার কৈফিয়ৎ – নজরুল ইসলাম

একক ৩: ছোটোগল্প (Lecture Hour: 15)

১. রসময়ীর রসিকতা – প্রভাতকুমার মুখোপাধ্যায়

২. অভাগীর স্বর্গ – শরৎচন্দ্র চট্টোপাধ্যায়

৩. চিকিৎসা সঙ্কট – পরশুরাম

৪. মাদার ইন্ডিয়া - মহাশ্বেতা দেবী

একক ৪: প্রবন্ধ (Lecture Hour: 15)

১. বাংলার ব্রত – অবনীন্দ্রনাথ ঠাকুর

২. আমাদের ভাষা-সংকট – প্রমথ চৌধুরী

Outcome of the Course: এই কোর্সটি পড়ার পর বাংলা কবিতা, ছোটোগল্প ও প্রবন্ধের ধারার সঙ্গে শিক্ষার্থীদের প্রাথমিক পরিচয় ঘটল। এই সংরূপগুলির বিভিন্ন বিষয় ও গঠনের বিচিত্র রূপের সঙ্গে তাদের পরিচয়ের সূত্রপাত হল এই কোর্সের মাধ্যমে।

3. Multi/ Interdisciplinary Course - কবিতা, নাটক, গল্প, প্রবন্ধ

Course Title: কবিতা, নাটক, গল্প, প্রবন্ধ

Course Code: BENG1031

Course Credit: 3

Course Lecture Hour: 45

Objective of the Course: এই কোর্সের উদ্দেশ্য কবিতা, নাটক, গল্প এবং প্রবন্ধের মাধ্যমে বাংলা সাহিত্যের বিচিত্র রূপের একটি প্রাথমিক ও প্রতিনিধিত্বমূলক পরিচয় শিক্ষার্থীদের কাছে তুলে ধরা।

একক ১ : কবিতা (Lecture Hour: 15)

১. স্পর্শমণি – রবীন্দ্রনাথ ঠাকুর

২. কাস্তে – দিনেশ দাশ

৩. বাংলার মুখ আমি দেখিয়াছি – জীবনানন্দ দাশ

৪. যত দূরেই যাই - সুভাষ মুখোপাধ্যায়

একক ২: নাটক (Lecture Hour: 10)

লক্ষ্মণের শক্তিশেল – সুকুমার রায়

একক ৩: গল্প (Lecture Hour: 10)

নালক – অবনীন্দ্রনাথ ঠাকুর

তালনবমী – বিভূতিভূষণ বন্দ্যোপাধ্যায়

একক ৪: প্রবন্ধ (Lecture Hour -10)

বড়বাজার, বিড়াল – বঙ্কিমচন্দ্র চট্টোপাধ্যায়

Outcome of the Course: এই কোর্সের মাধ্যমে শিক্ষার্থীরা কবিতা, নাটক, গল্প এবং প্রবন্ধের মাধ্যমে বাংলা সাহিত্যের বিচিত্র রূপের একটি প্রাথমিক ও প্রতিনিধিত্বমূলক পরিচয় পেল।

4. AEC (L1-1 MIL) সাহিত্যের বোধ ও বিচার

Course Title: সাহিত্যের বোধ ও বিচার

Course Code: BENG1041

Course Credit: 2

Course Lecture Hour: 30

Objective of the Course: এই কোর্সের উদ্দেশ্য ভাষা এবং সাহিত্য বোধ ও সাহিত্য বিচারের প্রাথমিক ধারণা দেওয়া। কোনো সাহিত্যিক নিদর্শনকে শিক্ষার্থী তার বোধ ও বিচারশক্তি দিয়ে কীভাবে আয়ত্ত করতে পারে, সেটাই এই কোর্সে তাকে শেখানো হবে।

একক ১: ভাষা অংশ (Lecture Hour: 15)

ক. বোধপরীক্ষা: (নিম্নলিখিত পাঁচটি প্রবন্ধ পাঠ্য)

১. স্বদেশী সমাজ – রবীন্দ্রনাথ ঠাকুর

২. বাঙ্গালা ভাষা – স্বামী বিবেকানন্দ

৩. বই পড়া – প্রমথ চৌধুরী

৪. স্ত্রী জাতির অবনতি – বেগম রোকেয়া

৫. অপবিজ্ঞান – রাজশেখর বসু

একক ২: সাহিত্য অংশ (Lecture Hour: 15)

ক. কবিতার ভাবসৌন্দর্য বিশ্লেষণ

রবীন্দ্রনাথ ঠাকুরের নৈবেদ্য গ্রন্থের চারটি কবিতা পাঠ্য - (বৈরাগ্যসাধনে মুক্তি সে আমার নয়, শতাব্দীর সূর্য আজি, চিত্ত যেথা ভয়শূন্য, শক্তি দম্ভ স্বার্থ লোভ)

খ. ছোটোগল্পের শিল্পসার্থকতা বিচার

রবীন্দ্রনাথ ঠাকুরের গল্পগুচ্ছ থেকে তিনটি গল্প পাঠ্য – ছুটি, বলাই, মণিহারা

Outcome of the Course: এই কোর্স পড়ার পর শিক্ষার্থী সাহিত্যের বিষয় অনুধাবনের পাশাপাশি তার শিল্পসার্থকতা ও ভাবসৌন্দর্য বিশ্লেষণ করতে শিখল।

5. SEC ব্যাকরণ ও বানানশিক্ষা

Course Title: ব্যাকরণ ও বানানশিক্ষা
Course Code: BENG1051
Course Credit: 3
Course Lecture Hour: 45

Objective of the Course: এই কোর্সের উদ্দেশ্য শিক্ষার্থীকে বাংলা ভাষার গঠন সম্পর্কে অবহিত করা। বাংলা ব্যাকরণের বিভিন্ন উপাদান সম্পর্কে শিখে যাতে সে বাংলা বলা এবং লেখা উভয় ক্ষেত্রেই দক্ষতা লাভ করে, এই কোর্সে তারই চেষ্টা করা হবে।

একক ১ (Lecture Hour: 12)

ব্যাকরণ কাকে বলে? ব্যাকরণের গুরুত্ব, ব্যাকরণের প্রথাগত ও তুলনামূলক পদ্ধতি, ব্যাকরণ: উচ্চারণ ও লিখন

একক ২ (Lecture Hour: 11)

পদপরিচয়, সন্ধি, সমাস

একক ৩ (Lecture Hour: 11)

কারক, বিভক্তি, বাচ্য ও বাক্য পরিবর্তন

একক ৪ (Lecture Hour: 11)

বাংলা বানান, বিরামচিহ্নের ব্যবহার, রোমান হরফে লিপ্যন্তরীকরণ

Outcome of the Course: এই কোর্সটি পড়ার পর বাংলা ভাষার প্রয়োগগত দিক সম্পর্কে শিক্ষার্থী প্রাথমিক দক্ষতা লাভ করল।

পাঠ্যগ্রন্থ:

১. আধুনিক কবিতা সঞ্চয়ন (বর্ধমান বিশ্ববিদ্যালয় প্রকাশিত)

২. একালের গল্প (বর্ধমান বিশ্ববিদ্যালয় প্রকাশিত)

৩. প্রবন্ধ সংকলন (বর্ধমান বিশ্ববিদ্যালয় প্রকাশিত)

৪. মধুসূদন রচনাবলী (সাহিত্য সংসদ)

৫. কাব্যসঞ্চয়ন – সত্যেন্দ্রনাথ দত্ত

৬. সঞ্চিতা – নজরুল ইসলাম

৭. রূপসী বাংলা – জীবনানন্দ দাশ

৮. সুকান্ত সমগ্র – সুকান্ত ভট্টাচার্য

৯. নবনীতা দেবসেন রচনাবলী প্রথম খণ্ড – নবনীতা দেবসেন (দে'জ)

১০. গল্পগুচ্ছ – রবীন্দ্রনাথ ঠাকুর

১১. শ্রেষ্ঠ গল্প – তারাশঙ্কর বন্দ্যোপাধ্যায়

১২. শ্রেষ্ঠ গল্প – বনফুল

১৩. পঞ্চাশটি গল্প – বিমল কর (আনন্দ পাবলিশার্স)

১৪. শ্রেষ্ঠ গল্প – মহাশ্বেতা দেবী (দে'জ)

১৫. আবশ্যিক বাংলা - (বর্ধমান বিশ্ববিদ্যালয় প্রকাশিত)

১৬. পরশুরাম গল্পসমগ্র

১৭. সাহিত্য সন্দর্শন – শ্রীশচন্দ্র দাস

১৮. সাহিত্য ও সমালোচনার রূপরীতি – উজ্জ্বলকুমার মজুমদার

১৯. সাহিত্য : রূপ-বিচিত্রা – অপূর্বকুমার রায়

২০. সাহিত্যের রূপরীতি ও অন্যান্য প্রসঙ্গ- কুন্তল চট্টোপাধ্যায়

২১. বাংলা সাহিত্যের রূপরীতি- শুদ্ধসত্ত্ব বসু

২২. সাহিত্যকোষ : কথাসাহিত্য – অলোক রায়

২৩. সাহিত্যবিচার : তত্ত্ব ও প্রয়োগ – বিমলকুমার মুখোপাধ্যায়

২৪. A Glossary of Literary Terms – M.H. Abrams

২৫. বাংলা বানান বিধি – পরেশচন্দ্র মজুমদার

২৬. বাংলা বানান সংস্কার, সমস্যা ও সম্ভাবনা – পবিত্র সরকার

২৭. বিভূতিভূষণ বন্দোপাধ্যায় রচনাবলী নবম খণ্ড (মিত্র ও ঘোষ)

২৮. বাংলা উপন্যাসের কালান্তর – সরোজ বন্দ্যোপাধ্যায়

২৯. সাহিত্যে ছোটগল্প – নারায়ণ গঙ্গোপাধ্যায়

৩০. বাংলা ছোটগল্প - শিশিরকুমার দাশ

Semester II

1.Major Course বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ

Course Title: বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ

Course Code: BENG2011
Course Credit: 4
Course Lecture Hour: 60

Objective of the Course: এই কোর্সের উদ্দেশ্য হল বাংলা ভাষা ও সাহিত্যের প্রাগাধুনিক কালের ধারাবাহিক ইতিহাস সম্পর্কে শিক্ষার্থীদের অবহিত করা।এই কোর্সের মাধ্যমে শিক্ষার্থী বাংলা সাহিত্যের প্রাচীন ও মধ্য যুগের বাংলা সাহিত্য সম্পর্কে সামগ্রিক ধারণা লাভের পাশাপাশি প্রাচীন ও মধ্যযুগের বাংলা সাহিত্যের প্রধান প্রধান ধারা, প্রধান প্রধান কাব্য ও প্রতিনিধি স্থানীয় কবি/সাহিত্যিকদের পরিচয় লাভ করবে।

বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ

একক ১ (Lecture Hour: 15)

বাংলা সাহিত্যের ইতিহাসের যুগবিভাগ সংক্রান্ত ধারণা, প্রাচীন ও আদি-মধ্যযুগের বাংলা সাহিত্য (চর্যাগীতি, শ্রীকৃষ্ণকীর্তন), অনুসারী সাহিত্য (ভাগবত, রামায়ণ, মহাভারত)

একক ২ (Lecture Hour: 15)

চৈতন্যজীবনী ও বাংলা সাহিত্যে চৈতন্যপ্রভাব (বৃন্দাবনদাস, কৃষ্ণদাস কবিরাজ, জয়ানন্দ, লোচনদাস); বৈষ্ণব পদাবলি ও তার প্রধান প্রধান কবি (বিদ্যাপতি, চণ্ডীদাস, গোবিন্দদাস, জ্ঞানদাস, বলরামদাস)

একক ৩ (Lecture Hour: 15)

মনসামঙ্গল, চণ্ডীমঙ্গল ও ধর্মমঙ্গলের কাহিনিপরিচয় ও প্রধান প্রধান কবি (বিজয়গুপ্ত, নারায়ণদেব, কেতকাদাস ক্ষেমানন্দ, দ্বিজমাধব, মুকুন্দ চক্রবর্তী, রূপরাম চক্রবর্তী, ঘনরাম চক্রবর্তী), শিবায়ন (রামেশ্বর ভট্টাচার্য), ভারতচন্দ্রের কাব্যপরিচয় ও অন্নদামঙ্গল কাব্য

একক ৪ (Lecture Hour: 15)

প্রণয়োপাখ্যান (আলাওল, দৌলত কাজী), নাথধর্ম ও সাহিত্যের সংক্ষিপ্ত পরিচয়, ময়মনসিংহ গীতিকা, শক্তিসাধনা ও শাক্তসাহিত্য (রামপ্রসাদ, কমলাকান্ত), বাউলগান সম্পর্কিত ধারণা (লালনফকির)

Outcome of the Course: এই কোর্সটি পড়ার ফলে শিক্ষার্থী বাংলা সাহিত্যের প্রাচীন ও মধ্যযুগের লক্ষণ, বৈশিষ্ট্য, কবি ও কাব্য সম্পর্কে সামগ্রিক ধারণা লাভ করল।

2.Minor Course: বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ

Course Title: বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ

Course Code: BENG2021

Course Credit: 4

Course Lecture Hour: 60

Objective of the Course: এই কোর্সের উদ্দেশ্য হল বাংলা ভাষা ও সাহিত্যের প্রাগাধুনিক কালের ধারাবাহিক ইতিহাস সম্পর্কে শিক্ষার্থীদের অবহিত করা।এই কোর্সের মাধ্যমে শিক্ষার্থী বাংলা সাহিত্যের প্রাচীন ও মধ্য যুগের বাংলা সাহিত্য সম্পর্কে সামগ্রিক ধারণা লাভের পাশাপাশি প্রাচীন ও মধ্যযুগের বাংলা সাহিত্যের প্রধান প্রধান ধারা, প্রধান প্রধান কাব্য ও প্রতিনিধি স্থানীয় কবি/সাহিত্যিকদের পরিচয় লাভ করবে।

বাংলা সাহিত্যের ইতিহাস: প্রাচীন ও মধ্যযুগ

একক ১ (Lecture Hour: 15)

বাংলা সাহিত্যের ইতিহাসের যুগবিভাগ সংক্রান্ত ধারণা, প্রাচীন ও আদি-মধ্যযুগের বাংলা সাহিত্য (চর্যাগীতি, শ্রীকৃষ্ণকীর্তন), অনুসারী সাহিত্য (রামায়ণ, মহাভারত)

একক ২ (Lecture Hour: 15)

চৈতন্যজীবনী ও বাংলা সাহিত্যে চৈতন্যপ্রভাব (বৃন্দাবনদাস, কৃষ্ণদাস কবিরাজ); বৈষ্ণব পদাবলি ও তার প্রধান প্রধান কবি (বিদ্যাপতি, চণ্ডীদাস, গোবিন্দদাস, জ্ঞানদাস)

একক ৩ (Lecture Hour: 15)

মনসামঙ্গল, চণ্ডীমঙ্গল ও ধর্মমঙ্গলের কাহিনিপরিচয় ও প্রধান প্রধান কবি (বিজয়গুপ্ত, কেতকাদাস ক্ষেমানন্দ, মুকুন্দ চক্রবর্তী, ঘনরাম চক্রবর্তী), শিবায়ন (রামেশ্বর ভট্টাচার্য), ভারতচন্দ্রের কাব্যপরিচয় ও অন্নদামঙ্গল কাব্য

একক ৪ (Lecture Hour: 15)

প্রণয়োপাখ্যান (আলাওল, দৌলত কাজী), নাথধর্ম ও সাহিত্যের সংক্ষিপ্ত পরিচয়, ময়মনসিংহ গীতিকা, শক্তিসাধনা ও শাক্তসাহিত্য (রামপ্রসাদ, কমলাকান্ত),

Outcome of the Course: এই কোর্সটি পড়ার ফলে শিক্ষার্থী বাংলা সাহিত্যের প্রাচীন ও মধ্যযুগের লক্ষণ, বৈশিষ্ট্য, কবি ও কাব্য সম্পর্কে সামগ্রিক ধারণা লাভ করল।

3. Multi/ Interdisciplinary Course গল্প, উপন্যাস

Course Title: গল্প, উপন্যাস

Course Code: BENG2031

Course Credit: 3

Course Lecture Hour: 45

Objective of the Course: এই কোর্সের উদ্দেশ্য হল বাংলা ছাড়া অন্যান্য পাঠক্রম থেকে আগত শিক্ষার্থীদের বাংলা গল্প ও উপন্যাস পাঠের মাধ্যমে এই দুই সংরূপ সম্পর্কে প্রাথমিক ধারণা দেওয়া। একই সঙ্গে ছোটোদের ও বড়োদের জন্য লেখার জগতের ধরন সম্পর্কেও প্রাথমিক ধারণা দেওয়া।

একক ১: গল্প (Lecture Hour: 20)

১. নিশীথে – রবীন্দ্রনাথ ঠাকুর

২. শিল্পী – মানিক বন্দ্যোপাধ্যায়

৩. ফসিল – সুবোধ ঘোষ

৪. রস – নরেন্দ্রনাথ মিত্র

একক ২: উপন্যাস (Lecture Hour: 25)

১. চাঁদের পাহাড় – বিভূতিভূষণ বন্দ্যোপাধ্যায়

২. গান্ধর্বী – বাণী বসু

Outcome of the Course: এই কোর্সটি পড়ার ফলে শিক্ষার্থী বাংলা কথা সাহিত্যের দুই গুরুত্বপূর্ণ সংরূপ গল্প ও উপন্যাস পাঠের অভিজ্ঞতা লাভ করল । বিভিন্ন বিষয় অবলম্বনে লেখা গল্পগুলি থেকে বাংলা সাহিত্যের বিস্তার সম্পর্কে তার ধারণা হল।

5.SEC-2: রচনাশক্তির নৈপুণ্য

Course Title: রচনাশক্তির নৈপুণ্য

Course Code: BENG2051

Course Credit: 3

Course Lecture Hour: 45

Objective of the Course: এই কোর্সের উদ্দেশ্য হল শিক্ষার্থীদের রচনা শক্তির নৈপুণ্যের বিকাশ। পত্র লিখন,অনুবাদ,প্রুফ সংশোধন প্রভৃতি উল্লেখিত বিষয়গুলো শিখনের মধ্য দিয়ে শিক্ষার্থীদের লিখন নৈপুণ্যের প্রতিষ্ঠা ঘটবে।

একক ১: পত্র, প্রতিবেদন ও অনুচ্ছেদ রচনা (Lecture Hour: 15)

ক. ব্যক্তিগত ব্যবহারিক প্রাতিষ্ঠানিক পত্রলিখন

খ. সংবাদপত্রে প্রকাশের উপযোগী প্রতিবেদন রচনা

গ. অনুচ্ছেদ রচনা

একক ২: ভাবার্থ ও ভাবসম্প্রসারণ (Lecture Hour: 10)

একক ৩: পরিভাষা ও প্রুফ সংশোধন (Lecture Hour: 10)

একক ৪: অনুবাদ (Lecture Hour: 10)

ক. ইংরেজি থেকে বাংলা অনুবাদ

খ. বাংলা থেকে ইংরেজি অনুবাদ

Outcome of the Course: এই কোর্সটি পড়ার ফলে শিক্ষার্থী উল্লেখিত বেশ কয়েকটি বিষয়ে অধীত বিদ্যার প্রয়োগ সার্থকতা লাভ করবে।

সাহায্যকারী গ্রন্থ:

১. বাঙ্গালা সাহিত্যের ইতিহাস - সুকুমার সেন
২. বাংলা সাহিত্যের ইতিবৃত্ত – অসিতকুমার বন্দ্যোপাধ্যায়
৩. বাঙলা সাহিত্যের রূপরেখা – গোপাল হালদার
৪. বাংলা সাহিত্যের ইতিকথা – ভূদেব চৌধুরী

ENGLISH

The University of Burdwan

Syllabus for 3-Year Degree / 4-Year Honours
in
English
under
Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020
with effect from 2023-24

SEMESTER WISE & COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

Semester	Course Type with Code	Level	Course Title	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
I	Major/DS Course (Core) Code: ENGL1011	100-199	Introduction to Poetry and Prose	4	3	1	0	75	60	0	15
	Minor Course Code: ENGL1021	100-199	Poems, Essays and Short Stories, Rhetoric and Prosody	4	3	1	0	75	60	0	15
	Interdisciplinary Course Code: ENGL1031		Communication Skills	3	2	1	0	50	40	0	10
	Ability Enhancement Course [L_1-1 MIL] Code:		Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equivalent Course from SWAYAM /Any other UGC recognized platform	2	2	0	0	50	40	0	10
	Skill Enhancement Course Code: ENGL1051		English Grammar and Vocabulary	3	2	1	0	50	40	0	10
	Common Value Added (CVA) Course Code: CVA1061		Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			**20**				**400**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
II	Major/DS Course (Core) Code: ENGL2011	100-199	Plays, Novels, and Literary Terms	4	3	1	0	75	60	0	15
	Minor Course Code: ENGL2021	100-199	Plays and Novels	4	3	1	0	75	60	0	15
	Interdisciplinary Course Code: ENGL2031		Technical Writing	3	2	1	0	50	40	0	10
	Ability Enhancement Course [L_2-1] Code: ENGL2041		Functional English	2	2	0	0	50	40	0	10
	Skill Enhancement Course Code: ENGL2051		Creative Writing	3	2	1	0	50	40	0	10
	Common Value Added (CVA) Course Code: CVA2061		Understanding India/Digital & Technological Solutions/Health &Wellness,Yoga Education, Sports & Fitness	4	3/3	1/0	0/1	100	80/60	0/20	20
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, for those who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**20**				**400**			

SEMESTER I

MAJOR COURSE

ENGL1011: Introduction to Poetry and Prose
[4 Cr, Full Marks: 75 (Theory: 60 + IA: 15), LH: 60 hrs]

COURSE OBJECTIVE:

The objective of this course is to introduce students to major literary forms and encourage an appreciation of the various thematic and stylistic aspects of these forms. Students will also be introduced to various genres and sub-genres of poetry, drama and fiction. The course also introduces students to a range of simple but significant poems, essays and short stories. Moreover, the course also offers a component on rhetoric and prosody in order to enable students to better understand the elements of stylein English composition, particularly in poetry.The primary objective of the course is to acquaint students with major literary forms and some seminal but short literary texts, and to encourage them to develop strategies of critical reading.

Literary Forms:(LH: 10)

Poetry, Drama, Fiction

Poems: (LH: 20)

Sidney: Sonnet No. 1 (from *Astrophel and Stella*)
Shakespeare Sonnet No. 29
John Donne: “Go and Catch a Falling Star”
John Milton: “On His Blindness”
William Wordsworth: “The Solitary Reaper”
John Keats: “Bright Star”
Lord Byron: “She Walks in Beauty”
Elizabeth Barrett Browning: “How Do I Love Thee”
W.B. Yeats: “The Wild Swans atCoole”
Wilfred Owen: “Anthem for Doomed Youth”

Essays and Short Stories:(LH: 20)

Francis Bacon: “Of Studies”
Addison: “Mischiefs of Party Spirit”
Charles Lamb: “Old China”
Somerset Maugham: “The Lotus Eater”
Arthur Conan Doyle: “The Speckled Band”
O’ Henry: “The Last Leaf”

Rhetoric and Prosody (LH: 10)

COURSE OUTCOME:

It is desired that the course will inculcate in students a love for literature and an appreciation of the nuanced texture and stylistic elements of literary texts.

MINOR COURSE

ENGL1021: Poems, Essays and Short Stories, Rhetoric and Prosody
[4 Cr, Full Marks: 75 (Theory: 60 + IA: 15), LH: 60 hrs]

COURSE OBJECTIVE:

The objective of this Minor course is to acquaint students with a few English literary texts, which, despite their brevity, are among the finest works of their kind. The two short stories are by Indian authors whose writing is integral to the canon of Indian writing in English. The idea is to introduce and develop the awareness that today the implications of the term 'English literature' extend into former colonies of the Empire such as India.

Poems:(LH: 16)

William Shakespeare: Sonnet 116
William Wordsworth: "A Slumber did my Spirit Seal"
P. B. Shelley: "One Word is Too Often Profaned"
Rupert Brooke – "Soldier"

Essays and Short Stories:(LH: 32)

Charles Lamb – "Dream Children"
Bernard Shaw: "Spoken English and Broken English"
Ruskin Bond: "The Night Train at Deoli"
R. K. Narayan: "Out of Business"

Rhetoric and Prosody(LH: 12)

COURSE OUTCOME:

It is expected that students choosing this Minor course will learn to develop skills necessary for critical appreciation of literary texts.

INTERDISCIPLINARY COURSE

ENGL1031: Communication Skills
[3 Cr, Full Marks: 50 (Theory: 40 + IA: 10), LH: 45 hrs]

COURSE OBJECTIVES:

The course aims to enable students to develop and improve skills for the effective use of English in communication. Students will be taught the skills of listening to and comprehending spoken English; the essentials of using English in speech on a variety of occasions; and the skills of writing English for diverse purposes.

Introduction to Communication Skills

Listening(LH: 10)
listening to casual conversations; listening to lectures; listening to instructions; listening to theatrical or movie dialogues; listening to news bulletins

Speaking(LH: 10)
speaking during casual conversations; speaking to a gathering; delivering a formal speech; offering instructions / advice; speaking as a presenter on television and radio; speaking during group discussions; speaking while facing an interview board

Reading(LH: 10)
reading for pleasure; reading for examinations; reading for research; reading in a group; reading newspapers

Writing(LH: 15)
writing formal letters; writing emails; writing messages on social media; writing for popular magazines; report writing for newspapers; feature writing for newspapers; writing a resume, writing applications for jobs, writing memos

COURSE OUTCOME:

Students opting for this interdisciplinary course are expected to develop skills of communication in English so that they may display adequate language competence with regard to English whenever occasions demand.

SKILL ENHANCEMENT COURSE

ENGL1051: English Grammar and Vocabulary
[3 Cr, Full Marks: 50 (Theory: 40 + IA: 10), LH: 45 hrs]

COURSE OBJECTIVE:

The objective of this course is to establish for students the importance of grammar, and acquaint them with a few major approaches to grammar. The course also revisits aspects of English grammar that many students might have learnt at some earlier stage, with the intention of encouraging fresh perspectives on usage. Enhancement of vocabulary also features among the course objectives.

Introducing Grammar(LH: 15)
What is grammar (the philosophy of grammar)?
The importance of grammar
Different approaches to grammar (traditional approach, communicative approach, transformational generative grammar)
Grammar in speech and writing

Use and Application of Grammar(LH: 15)
Use of correct preposition
Subject-verb agreement
Use of upper and lower case
Use of auxiliaries
Question Tags
Use of Punctuation
Use of countable and uncountable Nouns

Sentences(LH: 5)
Correction of errors
Rewriting of sentences

Idioms and Vocabulary(LH: 10)
Use of Idioms
Vocabulary (basic synonyms and antonyms)
Vocabulary for specific purposes-trades and professions

COURSE OUTCOME:

It is believed that the course will help students develop fresh perspectives on grammar and the skills necessary for correct English usage.

SEMESTER II

MAJOR COURSE

ENGL2011: Plays, Novels, and Literary Terms
[4 Cr, Full Marks: 75 (Theory: 60 + IA: 15), LH: 60 hrs]

COURSE OBJECTIVE:

The primary objective of this Major course is to encourage a close critical studyofkey thematic elements and stylistic features in select plays and novels, without studying these texts in their literary, political and socio-cultural contexts. The course is also designed to acquaint students with some of the terms related to poetry, drama and fiction which they may encounter in the later semesters during their study of literary texts.

Plays:(LH: 20)
George Bernard Shaw: *Major Barbara*
J. M. Synge: *Riders to the Sea*

Novels:(LH: 30)
R. K. Narayan: *The Guide*
Thomas Hardy: *The Mayor of Casterbridge*

Literary Terms(LH: 10)

Literary terms related to poetry:
heroic couplet, image, symbol, caesura, blank verse, *carpe diem*

Literary terms related to drama:
soliloquy and aside, hamartia and hubris, conflict, comic relief, protagonist and antagonist, Freytag's Pyramid

Literary terms related to fiction:
story and plot, round character and flat character, point of view, stream-of-consciousness, foil, author and narrator

COURSE OUTCOME:

The course will equip students with the intellectual apparatus required to face the challenges of reading and interpreting literary texts. The acquaintance with some of the most frequently encountered literary terms will help them in the course of such reading and interpretation.

MINOR COURSE

ENGL2021: Plays and Novels
[4 Cr, Full Marks: 75 (Theory: 60 + IA: 15), LH: 60 hrs]

COURSE OBJECTIVE:

The objective of this Minor course is to encourage students to recognize key thematic elements and stylistic features in select plays and novels, without studying these texts in their literary, political and socio-cultural contexts.

George Bernard Shaw: *Arms and the Man* (LH: 16)
J. B. Priestley: *An Inspector Calls* (LH: 14)
Ernest Hemingway: *The Old Man and the Sea*(LH: 12)
R. K. Narayan: *Swami and Friends* (LH: 18)

COURSE OUTCOME:

The course will prepare students for a meaningful critical appreciation of plays and novels, and develop an understanding of how plays and novels employ different methods of telling stories.

INTERDISCIPLINARY COURSE

ENGL2031: Technical Writing
[3 Cr, Full Marks: 50 (Theory: 40 + IA: 10), LH: 45 hrs]

COURSE OBJECTIVE:

Technical writing is a necessary requirement in many professions, and this course is designed to make students aware ofthe various forms of such writing. The objective is to equip students to face the challenges of technical writing in professional life.

Introducing Technical Writing(LH: 15)
What is technical writing?
Difference between technical writing and other forms of writing
Roles and responsibilities of technical writers
Qualities and qualifications of technical writers

Forms and Styles of Technical Writing(LH: 30)
Styles in technical writing
Forms of discourse, audience analysis, persuasion
Grammar in technical writing, revising a written document
Clarity, precision, coherence and logic in technical writing
Collecting notes, writing summaries and drafts, writing minutes and resolutions of meeting
Designing and reviewing documents
Document formats, differences between hard and soft copy versions
Web content writing
Collaborative writing
Professional Ethics, plagiarism, and copyright

COURSE OUTCOME:

It is expected that students emerging from this course will be capable of handling the demands and challenges of technical writing in the course of their professional careers in government and private sectors as well as in transactions of business.

ABILITY ENHANCEMENT COURSE

ENGL2041: Functional English
[2 Cr, Full Marks: 50 (Theory: 40 + IA: 10), LH: 30 hrs]

COURSE OBJECTIVE:

The importance of functional English at the present moment cannot be over-emphasized. Recognizing this importance, the course seeks to acquaint students with the various uses of English in today's world, with particular focus on developing one's conversational and writing skills together with the ability to comprehend English speech and writing.

What is functional English? (LH: 1)
Aims and objectives of functional English (LH: 1)
Functional English and formal English/ literary English (LH: 1)
Types and modes of Communication (LH: 1)
Language of communication (LH: 1)
Conversational skills (LH: 1)
Verbal and Non-verbal communication(LH: 1)
Personal, social and business communication (LH: 1)
Understanding English language films, songs, documentaries, news bulletins, sports commentaries (LH: 4)
Comprehension skills (LH: 2)
Paraphrasing difficult passages (LH: 2)
Analysis and Interpretation (LH: 1)
Writing for classified advertisements (LH: 2)
Using idioms and phrases (LH: 2)
One-word substitution (LH: 1)
Figures of speech: simile, metaphor, irony, personification, hyperbole (LH: 3)
Reading online content (LH: 1)
George Bernard Shaw: "Spoken English and Broken English" (LH: 4)

COURSE OUTCOME:

Besides developing the student's ability to comprehend the English that one hears and reads, the course will also enhance the student's skills at using English in speech and in various forms of writing. Thus, the course shall fulfil to a large extent an intensely felt need in today's professional world.

SKILL ENHANCEMENT COURSE

ENGL2051: Creative Writing
[3 Cr, Full Marks: 50 (Theory: 40 + IA: 10), LH: 45 hrs]

COURSE OBJECTIVE:

This course seeks to make students conversant with various forms, principles and processes of creative writing, and, by doing so, encourage them to critically appreciate and practise such writing.

Introducing Creative Writing(LH: 5)
What is creative writing?
Types of writing: expository, descriptive, persuasive,narrative

Writing as Craft(LH: 11)
The craft of writing: characteristics of good writing
L. A. Hill: *Principles of Good Writing* (selections)

Poems(LH: 12)
Poetry: figurative language, imagery, sensory details, rhyme, repetition
William Wordsworth: "Daffodils"

Short Stories(LH: 12)
Short story: theme, point of view, character, setting, plot
O'Henry: "The Gift of the Magi"

Identification, with reasons, of the type and stylistic features of an unseen literary passage (LH: 5)

COURSE OUTCOME:

Students studying this course will emerge from it with an awareness of what constitutes creative writing in its various forms. In addition to that, students may feel encouraged to try their hand at creative writing themselves.

RECOMMENDED READING

(please note that several of the books listed below are reprints)

SEMESTER I

MAJOR COURSE

ENGL1011: Introduction to Poetry and Prose

- J. A. Cuddon, *Dictionary of Literary Terms and Literary Theory* (Penguin, 2015).
- M. H. Abrams and Geoffrey Galt Harpham, *A Glossary of Literary Terms* (Cengage India, 2015).
- William Henry Hudson, *An Introduction to the Study of Literature* (Maple Press, 2012; Rupa, 2015).
- R. J. Rees, *English Literature: An Introduction for Foreign Readers* (Anubhav Publishers, 1972).
- Babette Deutsch, *Poetry Handbook: A Dictionary of Terms*, 4th ed. (Harper Resource, 2009).
- Mary Oliver, *Poetry Handbook: A Prose Guide to Understanding and Writing Poetry* (Ecco, 1994).
- Allardyce Nicoll, *The Theory of Drama* (Benjamin Blom, 1966; Daoba House, 1998).
- E. M. Forster, *Aspects of the Novel* (Penguin, 2007).
- Francis Turner Palgrave, *Golden Treasury* (Oxford University Press, 1997).
- Margaret Ferguson, Tim Kendall and Mary Jo Salter (eds.), *The Norton Anthology of Poetry*, 6th ed. (W. W. Norton, 2018).
- David Norbrook and H. R. Woudhuysen (eds.), *The Penguin Book of Renaissance Verse* (Penguin, 1993).
- James Schiffer. *Shakespeare's Sonnets: Critical Essays* (Routledge, 1999).
- Helen Gardner, *The Metaphysical Poets* (Penguin, 1985).
- Jonathan Wordsworth (ed.), Penguin Book of Romantic Poetry (Penguin, 2005).
- David Wright (ed.), *English Romantic Verse* (Penguin, 1973).
- George Walter (ed.), *The Penguin Book of First World War Poetry* (Penguin, 2007).
- Tim Kendall (ed.), *Poetry of the First World War: An Anthology* (Oxford University Press, 2014).
- Sukanta Chaudhuri, *Bacon's Essays: A Selection* (Generic, 2015).
- Emrys Williams, *A Book of English Essays* (Penguin, 2000).
- Michael Thorpe, *Modern Prose: Stories, Essays and Sketches* (Oxford University Press, 1997).
- Sir Arthur Conan Doyle, *The Adventures of Sherlock Holmes* (Dover Publications, 2009).
- Bose and Sterling, *Elements of English Rhetoric and Prosody* (Chuckervertty and Chatterjee, 2021).

MINOR COURSE

ENGL1021: Poems, Essays and Short Stories, Rhetoric and Prosody

- J. A. Cuddon, *Dictionary of Literary Terms and Literary Theory* (Penguin, 2015).
- M. H. Abrams and Geoffrey Galt Harpham, *A Glossary of Literary Terms* (Cengage India, 2015).
- Chris Baldick, *The Oxford Dictionary of Literary Terms* (Oxford University Press, 2008).
- John McRae and Ronald Carter, *The Routledge History of Literature in English: Britain and Ireland* (Routledge, 2016)
- William Henry Hudson, *An Introduction to the Study of Literature* (Maple Press, 2012; Rupa, 2015).
- Ian Ousby, *The Wordsworth Companion to Literature in English* (Wordsworth Reference,1994).
- Francis Turner Palgrave, *Golden Treasury* (Oxford University Press, 1997).
- Mary Oliver, *Poetry Handbook: A Prose Guide to Understanding and Writing Poetry* (Ecco, 1994).
- Margaret Ferguson, Tim Kendall and Mary Jo Salter (eds.), *The Norton Anthology of Poetry*, 6th ed. (W. W. Norton, 2018).
- David Norbrook and H. R. Woudhuysen (eds.), *The Penguin Book of Renaissance Verse* (Penguin, 1993).
- David Wright (ed.), *English Romantic Verse* (Penguin, 1973).
- Jonathan Wordsworth (ed.), *Penguin Book of Romantic Poetry* (Penguin, 2005).
- Tim Kendall (ed.), *Poetry of the First World War: An Anthology* (Oxford University Press, 2014).
- George Walter (ed.), *The Penguin Book of First World War Poetry* (Penguin, 2007).
- Emrys Williams, *A Book of English Essays* (Penguin, 2000).
- Michael Thorpe, *Modern Prose: Stories, Essays and Sketches* (Oxford University Press, 1997).
- Bose and Sterling, *Elements of English Rhetoric and Prosody* (Chuckervertty and Chatterjee, 2021).

INTERDISCIPLINARY COURSE

ENGL1031: Communication Skills

- Sanjay Kumar, *Communication Skills* (Oxford University Press, 2015).
- Gill Hasson, *Brilliant Communication Skills* (Pearson, 2014).
- John Adair, *Effec*tive *Communication* (Pan MacMillan, 2011).
- Konar Nira, *Communication Skills for Professionals* (PHI, 2011).
- Aruna Koneru, *English Language Skills* (McGraw Hill Education, 2011).
- Gopala Swamy Ramesh, *The Ace of Soft Skills: Attitude, Communication and Etiquette for Success* (Pearson, 2013).
- Stephen P. Robbins, *Organizational Behaviour* (Pearson, 2018).
- Barun K Mitra, *Personality Development and Soft Skills* (Oxford University Press, 2016).

SKILL ENHANCEMENT COURSE

ENGL1051: English Grammar and Vocabulary

- Martin Hewings, *Advanced English Grammar* (Cambridge University Press, 1999).
- D. S. Paul, *Advanced English Grammar* (Goodwill, 2022).
- Rodney Huddleston, *A Student's Introduction to English Grammar*. (Cambridge University Press, 2021).
- J. Thomson, *Practical English Grammar* (Oxford University Press, 1997).
- George Yule, *Oxford Practice Grammar* (Oxford University Press, 2019).
- Daphne M. Gulland, *The Penguin Dictionary of English Idioms* (Penguin, 2001).
- Martin Hewings, *Grammar and Vocabulary ─ for Advanced* (Cambridge University Press, 2015).
- Donald Watson, *Advanced Vocabulary in Context* (Cambridge University Press, 2010).
- Michael McCarthy, *English Vocabulary in Use* (Cambridge University Press, 2017).

SEMESTER II

MAJOR COURSE

ENGL2011: Plays, Novels, and Literary Terms

- HendersonArchibald, *George Bernard Shaw*: *His Life and Works* (Hurst and Blackett, 1911).
- S.C. Sengupta, *The Art of Bernard Shaw*(N.M. Publisher,1971).
- G. B. Shaw, *Major Barbara*. Ed.A.C. Ward(Longmans, 1958).
- C.B. Purdom, *A Guide to the Plays of Bernard Shaw*(Routledge, 2023).
- Harold, Bloom, (ed.), George Bernard Shaw's *Major Barbara*(Chelsea House Publishers, 1988).
- J. M. Synge, *Riders to the Sea and The Playboy of the Western World*. Ed. R. K. Kaul (Oxford University Press, 2003.
- Nicholas Grene, *Synge: A Critical Study of the Plays* (Macmillan, 1975).
- T.R. Henn (ed.), *The Plays and Poems of J.M.Synge.*(Methuen, 1968).
- Robert, Hogan and James Kilroy (eds.), *The Abbey Theatre: The Years of Synge, 1905-1909*(The Dolmen Press, 1978).
- Percival Presland Howe, *J.M. Synge: A Critical Study* (Palala Press, 2016).
- Robin Skelton, *The Writings of J.M.Synge* (Bobbs Merrill, 1971).
- John MillingtonSynge, *The Aran Islands*. Edited with an introduction by Tim Robinson(Penguin, 1992).
- Alan Price, *Synge and Anglo-Irish Drama* (Methuen, 1961).
- Lionel P. Johnson, *The Art of Thomas Hardy*(Legare Street Press, 2022).
- Arthur Sydney McDollrall,*Thomas Hardy: A Critical Study*(Faber and Faber, 1931).
- Perry Meisel, *Thomas Hardy: The Return of the Repressed ─ A Study of the MajorFiction*(Yale University Press, 1972).

- Richard L. Purdy, *Thomas Hardy: A Bibliographical Study*(Oxford University Press, 1954)
- R. K. Narayan, *The Guide* (Indian Thought Publications, 2010.
- Krishna Sen, *Critical Essays on R.K. Narayan'sThe Guide*(Orient Longman, 2004).
- Nandini Bhattacharya, *R. K. Narayan's The Guide: New Critical Perspectives* (Worldview Publications, 2004.).
- Bhagwat S Goyal (ed.),*R.K. Narayan: A Critical Spectrum* (Shalabh Book House, 1983).
- Alan L.McLeod, *R.K.Narayan: Critical Perspectives* (Sterling Publishers, 1994).
- William Walsh, *R.K. Narayan: A Critical Appreciation*(University of Chicago Press, 1982).
- M.H. Abrams & Geoffrey Galt Harpham, *A Handbook of Literary Terms*(Cengage Learning, 2015).
- J.A. Cuddon, *A Dictionary of Literary Terms and Literary Theory*(Penguin, 2015).
- Martin Gray, *A Dictionary of Literary Terms*(Pearson Education, 1992).

MINOR COURSE

ENGL2021: Plays and Novels

- G. B. Shaw, *Arms and the Man.*Ed. A. C. Ward (Orient BlackSwan, 2011).
- Archibald,Henderson, *George Bernard Shaw*: *His Life and Works* (Hurst and Blackett, 1911).
- C.B. Purdom, *A Guide to the Plays of Bernard Shaw*(Routledge, 2023).
- S.C. Sengupta, *The Art of Bernard Shaw* (N.M. Publisher,1971).
- John Braine, *J. B. Priestley* (Barnes & Noble, 1979).
- VincentBrome, *J.B. Priestley* (Hamish Hamilton, 1988).
- J.B. Priestley, *Inspector Calls and Other Plays* (Penguin Classics, 2000).
- Harold, Bloom (ed.),*Modern Critical Interpretations: Ernest Hemingway* (Chelsea House Press, 1999).
- MalcolmBradbury, *The Modern American Novel*(Oxford University Press, 1992).
- GerryBrenner, *The Old Man and the Sea:Story of a Common Man*(TwaynePublishers, 1991).
- ScottDonaldson (ed.),*The Cambridge Companion to Ernest Hemingway*(Cambridge University Press, 1996).
- Joseph M. Flora, *Ernest Hemingway: A Study of the Short Fiction*(Twayne Publishers, 1989).
- Lisa Tyler, *Student Companion to Ernest Hemingway*(Greenwood Press, 2001).
- Harold Bloom (ed.),*The Old Man and the Sea* (Viva Books 2007).
- Carlos Baker, *Hemingway:The Writer as Artist* (Princeton University Press, 1956).
- Alan L. McLeod, *R.K.Narayan: Critical Perspectives* (Sterling Publishers, 1994).
- R. K. Narayan, *Swami and Friends*(Indian Thought Publications, 1998).
- WilliamWalsh, *R.K. Narayan: A Critical Appreciation* (University of Chicago Press, 1982).
- Harish Raizada, *R.K.Narayan: A Critical Study of his Works* (Young Asia Publications, 1969).

INTERDISCIPLINARY COURSE

ENGL2031: Technical Writing

- Sharon Gerson and Steven Gerson, *Technical Communication: Process and Product*(Pearson Education, 2014).
- Karl Owen Thompson, *Technical Exposition: A Textbook on the Application of Exposition to Technical Writing* (Legare Street Press, 2022).
- Adrian Wallwork, *User Guides, Manuals, and Technical Writing: A Guide to Professional English* (Springer, 2014).
- Joan Ramirez,*The Write Rules: Technical Writing/Presentation and English as a SecondLanguage Guide* (Joan Regen, 2020)
- N.P. Sudharshana, C. Savitha, *English for Technical Communication* (Cambridge, 2017).
- Tsze Sun Li, *Practical English Writing in Technical Communication*(Universal Publishers, 2013)
- Lewis Lansford, *Tech Talk* (Oxford University Press, 2009).
- Gerald J. Alred, Walter E. Oliu and Charles T. Brusaw, *Handbook of Technical Writing* (Bedford, 2019).
- Janet Mizrahi,*Web Content: A Writer's Guide* (Business Expert Press, 2013).
- Lynda Felder,*Writingfor the Web: Creating Compelling Web Content Using Words, Pictures and Sounds*(New Riders, 2011).

ABILITY ENHANCEMENT COURSE (AEC)

AEC2041: Functional English

- Graham Lock, *Functional English Grammar: An Introduction for Second Language Learners* (Cambridge University Press, 1996).
- Bikram K Das, *Functional Grammar and Spoken and Written Communication in English: Student-friendly Edition*(Orient Blackswan, 2006).
- Ramzi Marrouchi, *Functional English for Potential Achievers* (Scholars' Press, 2020).
- Caroline Coffin, Ann Hewings and Kieran O'Halloran (eds.), *Applying English Grammar: Functional and Corpus Approaches* (Routledge, 2014).
- Cortland L. Bovee and John V. Thill, *Business Communication Essentials* (Pearson Prentice Hall, 2010).
- Vathana Fenn, R. Brindha and P. Suganya, *English Workbook: Business English and Functional English* (Cengage Learning India, 2016).
- MatthukuttyM. Monippally, *Business Communication: From Principles to Practice* (McGraw Hill, 2013).
- Girish Jain and Manzoor Moideen,*Decoding Communication: A Complete Handbook for Effective Communication* (Notion Press, 2021).
- Ben Francis and Dilys Parkinson, *Oxford Idioms: Dictionary for Learnersof English* (Oxford, 2006).
- T. Sriraman (ed.), *Macmillan College Prose* (Laxmi Publications, 2015).

SKILL ENHANCEMENT COURSE (SEC)

ENGL2051: Creative Writing

- Anjana Neira Dev et al, *Creative Writing: A Beginner's Manual* (Pearson, 2009).
- Margaret A. Boden, *The Creative Mind: Myths and Mechanisms* (Routledge, 2004).
- David Morley, *The Cambridge Introduction to CreativeWriting*(Cambridge University Press 2007).
- Linda Anderson (ed.), *Creative Writing: A Workbook with Readings* (Routledge, 2006).
- Paul Mills, *The Routledge Creative WritingCoursebook* (Routledge, 2006).
- Ailsa Cox, *Writing Short Stories* (Routledge, 2005).
- M. Zama, *Prose for Our Times* (Orient Longman, 2004).
- Mary Kinzie, *A Poet's Guide to Writing Poetry* (Chicago University Press, 1999).
- David Lodge, *The Practice of Writing* (Penguin, 1997).
- Willaim Packard, *The Art of Poetry Writing* (St. Martin's Press, 1992).
- O Henry, *The Gift of the Magi and Other Short Stories* (Dover Thrift, 2000).
- William Wordsworth, '*Daffodils' and Other Poems* (Michael O'Mara, 2016).

SANSKRIT

The University of Burdwan

Syllabus for 3-Year Degree / 4-Year Honours in (Sanskrit) under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020 with effect from 2023-24

SEMESTER WISE & COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

Semester	Course Type with Code	Level	Course Title	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
I	Major/DS Course (Core) Code: SANS1011	100-199	Kāvya Literature	4	3	1	0	75	60	0	15
	Minor Course Code: SANS1021	100-199	Kāvya Literature	4	3	1	0	75	60	0	15
	Multi/Inter disciplinary Code: SANS1031		Fundamentals of Grammar and its applications	3	2	1	0	50	40	0	10
	Ability Enhancement Course (AEC) [L_1-1 MIL] Code: SANS 1041		Language Skill	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC) Code: SANS1051		General Grammar	3	2	1	0	50	40	0	10
	Common Value Added (CVA) Course Code: CVA1061		Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			**20**				**400**			

Semester	**Course Type with Code**	**Level**	**Name of the Course**	**Credit**	**Lect.**	**Tuto.**	**Pract./Viva-voce**	**Full Marks**	**Distribution of Marks**		
									Theory	**Pract./ Viva-voce**	**Internal Assessment**
II	Major/DS Course (Core) Code: SANS2011	100-199	Sanskrit Drama	4	3	1	0	75	60	0	15
	Minor Course Code: SANS2021	100-199	Sanskrit Drama	4	3	1	0	75	60	0	15
	Multi/Interdisciplinary Code: SANS2031		Self Management in the Gita	3	2	1	0	50	40	0	10
	Ability Enhancement Course (AEC)[L_2-1] Code: ENGL2041		English or Equvlnt. Course from SWAYAM/ /Any other UGC-recognized platform	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC) Code: SANS2051		Critical survey of Sanskrit Literature	3	2	1	0	50	40	0	10
	Common Value Added (CVA) Course Code: CVA2061		Understanding India/Digital & Technological Solutions/Health & Wellness, Yoga Education, Sports & Fitness	4	3/3	1/0	0/1	100	80/60	0/20	20
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											

	Total			**20**				**400**			

Detailed Course structure of B. A. in Sanskrit Programme (NEP- 2020)

SEMESTER-I

Title of the Course: Kāvya Literature
Course Code: SANS1011
Type of the Course: Major/ DS Course (Core)
Total Credits: 04 (3-1-0)
Distribution of Marks: 60 (Theory) + 15 (Internal)

COURSE OBJECTIVES:

- Students will have to go through the Sanskrit literature
- Students will require to recite Sanskrit verses with proper accent, correct pronunciation.

Section	**Topic**	**Classes**			**Allotted Marks**
		Lecture	**Tutorial**	**Total**	
A	**The History of Classical Sanskrit Literature:** Rāmāyaṇa, Mahābhārata, Aśvaghoṣa, Kālidāsa, Bhāravi, Māgha, Bhaṭṭi, Śrīharṣa.	**11**	**4**	**15**	**20**
B	**Raghuvaṃśam**, Canto- XIV (Verses 31 - 87)	**15**	**5**	**20**	**20**
C	**Kirātārjunīyam**, Canto - I	**19**	**6**	**25**	**20**

LEARNING OUTCOMES:

- Students will have the knowledge of Indian culture and society reflected in the Sanskrit Kāvyas of different great Sanskrit poets.
- They will have the knowledge of poetic excellence reflected in Sanskrit Literature.

SUGGESTED READINGS:

- **Saṃskṛta Sāhityer Itihāsa** by Dhirendranath Bandyopadhyay, Paschimbanga Rajya Pustak Parsat.
- **Saṃskṛta Sāhityer Itibṛtta** by Gopendu Mukhopadhyay, United Book Agency.
- **A history of Sanskrit literature** by S.K. Dey & S. N. Dasgupta, The University of Calcutta.
- **A History of Indian literature** by M. Winternitz, The University of Calcutta.
- **A Concise History of Sanskrit literature** by Gourinath Sastri., MLBD.
- **History of classical Sanskrit literature** by M. Krishnamachariar, MLBD.
- **Saṃskṛta Vāṅmayasya Itihāsa** by Dhirendranath Bandyopadhyay, Sanskrit Pustak Bhandar.
- **Saṃskṛta Sāhitya kā Itihāsa** (in Hindi) by Vacaspati Gairola, Chowkhamba, Vidya Bhawan .
- **Raghuvaṃśam of Kalidasa (Canto -14)** by Anil Ch. Basu (Ed.), Sanskrit Book Depot.
- **Raghuvaṃśam of Kalidasa (Canto -14)** by Tulsidas Mukhopadhyay (Ed.), Sanskrit Book Depot.
- **Raghuvaṃśam of Kalidasa (Canto -14)** by Ashok Kumar Bandyopadhyay (Ed.), Sadesh.
- **Raghuvaṃśam (**Whole**)** by Gurunath Vidyanidhi (Ed.), Sanskrit Book Depot.
- **Raghuvaṁśam (**Whole**)** by Sri Krishnamani Tripathi (Ed.), Chaukhamba Surbharati Prakashan.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by Anil Ch. Basu (Ed.), Sanskrit Book Depot.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by Mahadev Chandra (Ed.). Sanskrit Book Depot.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by Ashok Kumar Bandyopadhyay(Ed.), Balaram Prakashani.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by M. R. Kale, MLBD.

SEMESTER-I

Title of the Course: Kāvya Literature
Course Code: SANS1021
Type of the Course: Minor Course
Total Credits: 04 (3-1-0)
Distribution of Marks: 60 (Theory) + 15 (Internal)

COURSE OBJECTIVES:

- Students will have to go through the Sanskrit literature
- Students will require to recite Sanskrit verses with proper accent, correct pronunciation.

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**The History of Classical Sanskrit Literature:** Rāmāyaṇa, Mahābhārata, Aśvaghoṣa, Kālidāsa, Bhāravi, Māgha, Bhaṭṭi, Śrīharṣa.	**11**	**4**	**15**	**20**
B	**Raghuvaṃśam**, Canto- XIV (Verses 31 - 87)	**15**	**5**	**20**	**20**
C	**Kirātārjunīyam**, Canto - I	**19**	**6**	**25**	**20**

LEARNING OUTCOMES:

- Students will have the knowledge of Indian culture and society reflected in the Sanskrit Kāvyas of different great Sanskrit poets.
- They will have the knowledge of poetic excellence reflected in Sanskrit Literature.

SUGGESTED READINGS:

- **Saṃskṛta Sāhityer Itihāsa** by Dhirendranath Bandyopadhyay, Paschimbanga Rajya Pustak Parsat.
- **Saṃskṛta Sāhityer Itibṛtta** by Gopendu Mukhopadhyay, United Book Agency.
- **A history of Sanskrit literature** by S.K. Dey & S. N. Dasgupta, The University of Calcutta.
- **A History of Indian literature** by M. Winternitz, The University of Calcutta.
- **A Concise History of Sanskrit literature** by Gourinath Sastri. MLBD

- **History of classical Sanskrit literature** by M. Krishnamachariar, MLBD.
- **Saṃskṛta Vāṅmayasya Itihāsa** by Dhirendranath Bandyopadhyay, Sanskrit Pustak Bhandar.
- **Saṃskṛta Sāhitya kā Itihāsa** (in Hindi) by Vacaspati Gairola, Chowkhamba, Vidya Bhawan .
- **Raghuvaṃśam of Kalidasa (Canto -14)** by Anil Ch. Basu (Ed.), Sanskrit Book Depot.
- **Raghuvaṃśam of Kalidasa (Canto -14)** by Tulsidas Mukhopadhyay (Ed.), Sanskrit Book Depot.
- **Raghuvaṃśam of Kalidasa (Canto -14)** by Ashok Kumar Bandyopadhyay (Ed.), Sadesh.
- **Raghuvaṃśam (**Whole**)** by Gurunath Vidyanidhi (Ed.), Sanskrit Book Depot.
- **Raghuvaṁśam (**Whole**)** by Sri Krishnamani Tripathi (Ed.), Chaukhamba Surbharati Prakashan.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by Anil Ch. Basu (Ed.), Sanskrit Book Depot.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by Mahadev Chandra (Ed.). Sanskrit Book Depot.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by Ashok Kumar Bandyopadhyay(Ed.), Balaram Prakashani.
- **Kirātārjunīyam of Bhāravi (Canto-1)** by M. R. Kale, MLBD.

SEMESTER-I

Title of the Course: Fundamentals of Grammar and its applications
Course Code: SANS1031
Type of the Course: Multi/Interdisciplinary
Total Credits: 03 (2-1-0)
Distribution of Marks: 40 (Theory) + 10 (Internal)

COURSE OBJECTIVES:

- Students will communicate with Sanskrit Language as per requirement or demand.

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**i. Declensions:** All a- kārānta, i- kārānta, u- kārānta, ṛ- kārānta, ā- kārānta, ī- kārānta, ū- kārānta, as-bhāgānta words, vanij, samrāj , All Pronouns & Numericals. **ii. Conjugations:** bhū, paṭh, gaṃ, dṛś, sev, labh, pac, vṛt, kṛ, dā, śru, jñā- (laṭ, loṭ, laṅ, liṅ & lṛṭ) (Marks – 20)	**7**	**3**	**10**	**10**
B	**Basic Idea of Sandhi**	**6**	**3**	**9**	**5**
C	**Pratyayas :** Taddhita (apatyārthaka and Matvarthiya), Kṛdanta–tavya/tabyat, anīyar, yat, ṇyat, kyap, śatṛ, śānac, kta and ktavatu, ktva, lyap, tumun, ṇamul Strī-pratyaya, Pratyayānta- sannanta, yaṅanta, ṇijanta, yaṅluṅanta, nāmadhātu.	**9**	**3**	**12**	**10**
D	**Selected Stories :** i. Brahmadatta- karkaṭa- kathā (Aparīkṣitakāraka) from Pañcatantra. ii. Hāsavidyakathā from Puruṣaparikṣā iii.Śudrakavīravarakathā from Vetālapañcaviṃśati.	**8**	**6**	**14**	**15**

LEARNING OUTCOMES:

- Students will be able to read, write and understand the Sanskrit Language.

SUGGESTED READINGS:

- **Pāṇinīyam (A higher Sanskrit Grammar**) by P.C Lahiri & H. Shastri, The Dhaka Students' Library.
- **Pāṇinīya Śabdaśāstra** by Satyanarayan Chakraborty, Sanskrit Pustak Bhandar.
- **Bṛhacchabdakusumākaraḥ** by Harekanta Mishra, Chaukhamba Sanskrit pratisthan.
- **Bṛhad'dhātukusumākaraḥ** by Harekanta Mishra, Chaukhamba Sanskrit pratisthan.
- **Bṛhat Anuvāda Candrikā** by Chakradhar Nautiyal, MLBD
- **Aṣṭādhyāyī of Pāṇini** by Śrīś Candra Vasu, MLBD.
- **Vaiyākaraṇa Siddhānta Kaumudī (Stri Pratyaya Prakaraṇa)** by Tapan Shankar Bhattacharya, Sanskrit Book Depot.
- **Pratyayaḥ** by Bishwaranjan Panda, Sanskrit Book Depot.
- **Kṛtya Prakaraṇa** by Dr. Satyabati Bandyopadhyaya, Sadesh.
- **Kṛt Pratyaya Vimarśaḥ** by Dr. Satyabati Bandyopadhyaya, Sadesh.
- **Kṛt Pratyaya Viśleṣaṇa** by Dr. Gopabandhu Mishra, Chaukhamba Vidya bhavan
- **Puruṣaparīkṣā** of Vidyapati with Hindi Tika Chandrakanth Pathak, Khemraj Shrikrishna das Academy, Mumbai.
- **Vetālapañcaviṃśati** - Translated by Vidyasagara, Ananda Publishers.
- **Selected tales from Vetālapañcaviṃśati** by Dr. S. N Shastri & Prof. H.V . Kocher, Bharati Prakashana Mandira, Delhi. **https://ia601508.us.archive.org/4/items/in.ernet.dli.2015.326726/2015.326726.Vetala-Pancha.pdf**
- **Pañcatantra** edited by Guru Prasad Shastri & Sitaram Shastri, Chaukhamba Surbharati Prakashan.
- **Pañcatantra** edited by M. R. Kale, MLBD.

SEMESTER-I

Title of the Course: Language Skill
Course Code: SANS1041
Type of the Course: Ability Enhancement Course (AEC)
Total Credits: 02 (2-0-0)
Distribution of Marks: 40 (Theory) + 10 (Internal)

COURSE OBJECTIVES:

- Student will have to translate the Sanskrit verses which have no translation.
- Student will have to communicate with Sanskrit language as per requirement or demand.

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	Translation - English to Sanskrit & Sanskrit to Modern Indian Languages (MIL).	**10**	**0**	**10**	**20**
B	Comprehension Test	**10**	**0**	**10**	**10**
C	Sanskrit Paragraph Writing	**10**	**0**	**10**	**10**

LEARNING OUTCOMES:

- Students will be able to read and understand Sanskrit Texts.
- make sentences in Sanskrit
- develop the ideas about grammatical structure of sentences and appraise the poetical compositions in Sanskrit.
- develop the power of speaking in Sanskrit

SUGGESTED READINGS:

- **Helps to the Study of Sanskrit** by J.N. Shastri , Sanskrit Book Depot.
- **Pāṇinīyam (A higher Sanskrit Grammar)** by P.C Lahiri & H. Shastri, The Dhaka Students' Library.
- **Pāṇinīya Śabdaśāstra by** Satyanarayan Chakraborty, Sanskrit Pustak Bhandar.
- **Saṃskṛta Bhāṣā Paricaya** by Jyotibhushan Chaki, Paschimbanga Rajya Pustak Parsat.
- **Saṃskṛta Nibandhāvalī** by Ramji Upadhyay. Chaukhamba Vidya Bhawan.
- **Saṃskṛta Nibandhamālā** by Smt. Sumita Basu, Sanskrit Pustak Bhandar**.**

- **Saṃskṛta Racanā** by V.S Apte/ Dr. Umesh Chandra Pandeya- Chaukhamba Vidya Bhawan.
- **Saṃskṛta Racanāñjali** by Tarashankar Chakraborty, Sanskrit book depot.
- **Saṃskṛta Vyākaraṇa O Anubāda Śikṣā** by Vishwa Ranjan panda, Sanskrit Book Depot.
- **The Students Sanskrit – English Dictionary** by V.S Apte, MLBD.

SEMESTER-I

Title of the Course: General Grammar
Course Code: SANS1051
Type of the Course: Skill Enhancement Course (SEC)
Total Credits: 03 (2-1-0)
Distribution of Marks: 40 (Theory) + 10 (Internal)

COURSE OBJECTIVES:

- Students will communicate with Sanskrit Language as per requirement or demand.

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**i. Declensions:** All a- kārānta, i- kārānta, u- kārānta, ṛ- kārānta, ā- kārānta, ī- kārānta, ū- kārānta, as-bhāgānta words, vanij, samrāj , All Pronouns & Numericals. **ii. Conjugations:** bhū, paṭh, gaṃ, dṛś, sev, labh, pac, vṛt, kṛ, dā, śru, jñā- (laṭ, loṭ, laṅ, liṅ & lṛṭ) (Marks – 20)	**6**	**4**	**10**	**10**
B	**Sandhi:** AC- Sandhi & Hal- Sandhi as in Laghusiddhānta Kaumudi	**18**	**7**	**25**	**20**
C	**Pratyayas :** Taddhita (apatyārthaka and Matvarthiya), Kṛdanta–tavya/tabyat, anīyar, yat, ṇyat, kyap, śatṛ, śānac, kta and ktavatu, ktva, lyap, tumun, ṇamul Strī-pratyaya, Pratyayānta- sannanta, yaṅanta, ṇijanta, yaṅluṅanta, nāmadhātu.	**6**	**4**	**10**	**10**

LEARNING OUTCOMES:

- Students will be able to read, write and understand the Sanskrit Language.

SUGGESTED READINGS:

- **Pāṇinīyam (A higher Sanskrit Grammar**) by P.C Lahiri & H. Shastri, The Dhaka Students' Library.
- **Pāṇinīya Śabdaśāstra** by Satyanarayan Chakraborty, Sanskrit Pustak Bhandar.
- **Bṛhacchabdakusumākaraḥ** by Harekanta Mishra, Chaukhamba Sanskrit pratisthan.
- **Bṛhad'dhātukusumākaraḥ** by Harekanta Mishra, Chaukhamba Sanskrit pratisthan.
- **Aṣṭādhyāyī of Pāṇini** by Śrīś Candra Vasu, MLBD.
- **Laghu Sidhhānta Kaumudī** by Prof. Tapan Shankar Bhattacharya (Ed.), Sanskrit Book Depot.
- **Laghu Sidhhānta Kaumudī** by Arun Kumar Mondal, Laxmi Press, Bolpur.
- **Laghu Sidhhānta Kaumudī** by Vipadbhanjan Pal (Ed.)
- **Vaiyākaraṇa Siddhānta Kaumudī (Stri Pratyaya Prakaraṇa)** by Prof. Tapan Shankar Bhattacharya, Sanskrit Book Depot.
- **Pratyayaḥ** by Bishwaranjan Panda, Sanskrit Book Depot.
- **Kṛtya Prakaraṇa** by Dr. Satyabati Bandyopadhyaya, Sadesh.
- **Kṛt Pratyaya Vimarśaḥ** by Dr. Satyabati Bandyopadhyaya, Sadesh.
- **Kṛt Pratyaya Viśleṣaṇa** by Dr. Gopabandhu Mishra, Chaukhamba Vidya Bhwan.

Detailed Course structure of B. A. in Sanskrit Programme (NEP- 2020)

SEMESTER-II

Title of the Course: Sanskrit Drama
Course Code: SANS2011
Type of the Course: Major/ DS Course (Core)
Total Credits: 04 (3-1-0)
Distribution of Marks: 60 (Theory) + 15 (Internal)

COURSE OBJECTIVES:

- Students will require to analyse the creations of great dramatist like Bhāsa, Aśvaghoṣa, Kālidāsa, Śūdraka, Viśākhadatta, Śrīharṣa, Bhavabhūti, Bhaṭṭanārāyaṇa etc.
- Students will have to analyse the inner message of the drama Abhijñānaśakuntalam. .

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**History of Sanskrit Literature (Drama) -** Bhāsa, Aśvaghoṣa, Kālidāsa, Śūdraka, Viśākhadatta, Harṣadeva, Bhavabhūti, Bhaṭṭanārāyaṇa, Rājśekhara, Murāri,Jayadeva, Śrikṛṣṇa Miśra)	**13**	**7**	**20**	**20**
B	**Abhijñānaśakuntalam**	**32**	**8**	**40**	**40**

LEARNING OUTCOMES:

- Students will acquire basic knowledge of Sanskrit Literature.
- The dramatists like Bhāsa, Aśvaghoṣa, Kālidāsa, Śūdraka, Viśākhadatta, Śrīharṣa, Bhavabhūti, Bhaṭṭanārāyaṇa etc. will be known to the students and their creations will be highlighted.
- They will be able to know the philosophical outlook of Kalidasa through the drama Abhijñānaśakuntalam**.**
- They will be able to gain different knowledge regarding the then society and culture. have the knowledge of poetic excellence reflected in Sanskrit Literature.

SUGGESTED READINGS:

- **Saṃskṛtasāhityetihāsa** by Ramchandra Mishra, Chowkhamba Vidyabhawan.
- **Saṃskṛta Sāhityer Itihāsa** by Dhirendranath Bandyopadhyay, Paschimbanga Rajya Pustak Parsat.
- **Saṃskṛta Sāhityer Itibṛtta** by Gopendu Mukhopadhyay, United Book Agency.
- **A history of Sanskrit literature** by S.K. Dey & S. N. Dasgupta, The University of Calcutta.
- **A History of Indian literature** by M. Winternitz, The University of Calcutta.
- **A Concise History of Sanskrit literature** by Gourinath Sastri. MLBD.
- **History of classical Sanskrit literature** by M. Krishnamachariar, MLBD.
- **Saṃskṛta Vāṅmayasya Itihāsa** by Dhirendranath Bandyopadhyay, Sanskrit Pustak Bhandar.
- **Saṃskṛta Sāhitya kā Itihāsa** (in Hindi) by Vacaspati Gairola, Chowkhamba, Vidya Bhawan .
- **Abhijñānaśakuntalam of Kālidāsa** by Anil Chandra Bose (Ed.), Sanskrit Book Depot.
- **Abhijñānaśakuntalam of Kālidāsa** edited by Satya Narayana Chakraborty, Sanskrit Pustak Bhandar.
- **Abhijñānaśakuntalam of Kālidāsa** edited by R. M. Bose, Modern Book agency Pvt. Limited.
- **The Abhijñānaśakuntalam of Kālidāsa** edited by M. R. Kale, MLBD.
- **Śakuntalātattva** by Chandranath Basu, Sanskrit Pustak Bhandar.

SEMESTER-II

Title of the Course: Sanskrit Drama
Course Code: SANS2021
Type of the Course: Minor Course
Total Credits: 04 (3-1-0)
Distribution of Marks: 60 (Theory) + 15 (Internal)

COURSE OBJECTIVES:

- Students will require to analyse the creations of great dramatist like Bhāsa, Aśvaghoṣa, Kālidāsa, Śūdraka, Viśākhadatta, Śrīharṣa, Bhavabhūti, Bhaṭṭanārāyaṇa etc.
- Students will have to analyse the inner message of the drama Abhijñānaśakuntalam. .

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**History of Sanskrit Literature (Drama) -** Bhāsa, Aśvaghoṣa, Kālidāsa, Śūdraka, Viśākhadatta, Harṣadeva, Bhavabhūti, Bhaṭṭanārāyaṇa, Rājśekhara, Murāri,Jayadeva, Śrikṛṣṇa Miśra)	**13**	**7**	**20**	**20**
B	**Abhijñānaśakuntalam**	**32**	**8**	**40**	**40**

LEARNING OUTCOMES:

- Students will acquire basic knowledge of Sanskrit Literature.
- The dramatists like Bhāsa, Aśvaghoṣa, Kālidāsa, Śūdraka, Viśākhadatta, Śrīharṣa, Bhavabhūti, Bhaṭṭanārāyaṇa etc. will be known to the students and their creations will be highlighted.
- They will be able to know the philosophical outlook of Kalidasa through the drama Abhijñānaśakuntalam**.**
- They will be able to gain different knowledge regarding the then society and culture. have the knowledge of poetic excellence reflected in Sanskrit Literature.

SUGGESTED READINGS:

- **Saṃskṛtasāhityetihāsa** by Ramchandra Mishra, Chowkhamba Vidyabhawan.
- **Saṃskṛta Sāhityer Itihāsa** by Dhirendranath Bandyopadhyay, Paschimbanga Rajya Pustak Parsat.
- **Saṃskṛta Sāhityer Itivṛtta** by Gopendu Mukhopadhyay, United Book Agency.
- **A History of Sanskrit literature** by S.K. Dey & S. N. Dasgupta, The University of Calcutta.
- **A History of Indian literature** by M. Winternitz, The University of Calcutta.
- **A Concise History of Sanskrit literature** by Gourinath Sastri.
- **History of classical Sanskrit literature** by M. Krishnamachariar, MLBD.
- **Saṃskṛta Vāṅmayasya Itihāsa** by Dhirendranath Bandyopadhyay, Sanskrit Pustak Bhandar.
- **Saṃskṛta Sāhitya kā Itihāsa** (in Hindi) by Vacaspati Gairola, Chowkhamba, Vidya Bhawan .
- **Abhijñānaśakuntalam of Kālidāsa** by Anil Chandra Bose (Ed.), Sanskrit Book Depot.
- **Abhijñānaśakuntalam of Kālidāsa** edited by Satya Narayana Chakraborty, Sanskrit Pustak Bhandar.
- **Abhijñānaśakuntalam of Kālidāsa** edited by R. M. Bose, Modern Book agency Pvt. Limited.
- **The Abhijñānaśakuntalam of Kālidāsa** edited by M. R. Kale, MLBD.
- **Śakuntalātattva** by Chandranath Basu, Sanskrit Pustak Bhandar.

SEMESTER-II

Title of the Course: Self Management in the Gitā
Course Code: SANS2031
Type of the Course: Multi/ Interdisciplinary
Total Credits: 03 (2-1-0)
Distribution of Marks: 40 (Theory) + 10 (Internal)

COURSE OBJECTIVES:

- Students will be able to prepare a project work on Śrīmadbhagavadgitā.
- Students will demonstrate their understanding by participating in group discussion on Śrīmadbhagavadgitā.

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**Śrīmadbhagavadgitā -** 3rd Chapter	**15**	**5**	**20**	**20**
B	**Śrīmadbhagavadgitā -** 4th Chapter	**20**	**5**	**25**	**20**

LEARNING OUTCOMES:

- Students will achieve the core message of the Śrīmadbhagavadgitā.
- They will understand the theory of applied vedānta as reflected in the Śrīmadbhagavadgitā.

SUGGESTED READINGS:

- **Śrīmadbhagabadgītā - 3rd & 4thChapter** edited by
  -Anil Baran Roy, Sri Aurobindo Pathamandir, Kolkata.
  -Swami Ramsukh Das, Gita Press, Gorakhpur.
  -Jaydayal Goyendka, Gita Press, Gorakhpur.
  -Mahamahopadhyaya Pramathanath Tarkabhusan, Dev Sahitya Kutir pvt. Ltd.
  -Swami Suhitananda, Udbodhan Karyalaya.
  -Madanmohan Agarwal, Chaukhamba Sanskrit Pratisthan.
  -Vasudev Laxman Shastri Pansikar, Chaukhamba Sanskrit Pratisthan.
- **Gītar Bhūmikā** by Shri Arabinda, Shri Arabinda Ashram, Pondicherry.
- **Gītānuvacana** by Anirban, Assam Bangiya Saraswatmath.

SEMESTER-II

Title of the Course: Critical Survey of Sanskrit Literature
Course Code: SANS2051
Type of the Course: Skill Enhancement Course
Total Credits: 03 (2-1-0)
Distribution of Marks: 40 (Theory) + 10 (Internal)

COURSE OBJECTIVES:

- Students will have to understand the Indian Society and Culture through the Vedic Literature and the Purāṇa.
- Students will have to know the causes of the origin of different types of grammar.
- They will have to recognize the ancient grammarians and their creations.
- They will have to acquire knowledge of different philosophical thoughts.

Section	Topic	Classes			Allotted Marks
		Lecture	Tutorial	Total	
A	**Vaidika Sāhitya** (General structure of Vedic literature, Different theories on the age of the Vedas, Dialogue hymns of the Ṛgveda, Brāhmana literature, Āranyaka literature, Fundamental doctrines of the Upaniṣads, Six Vedaṅgas).	**10**	**5**	**15**	**10**
B	**Purāṇa** (Definition of Purāṇa, Contents, Mahāpurāṇa, Upapurāṇa)	**6**	**4**	**10**	**10**
C	**History of Sanskrit Grammar** (Pre - Pāṇinian Grammar, Pāṇini, Kātyāyana, Patañjali, , Vāmana- Jayāditya, Bhattoji Dīkṣita, Nāgesa Bhaṭṭa, Kalāpa Vyākaraṇa, Cāndra Vyākaraṇa, Jainendra Vyākaraṇa, Sāraswata Vyākaraṇa, Mugdhabodha Vyākaraṇa, Bhartṛhari.	**7**	**3**	**10**	**10**
D	**History of Indian Philosophy** (General Introduction to Āstika and Nāstika Philosophy)	**7**	**3**	**10**	**10**

LEARNING OUTCOMES:

- Students will be able to understand the culture and society reflected in the Vedic Literature and also in the Purāṇas.
- They will be able to know the origin of different types of grammar.
- They will be able to understand the philosophical thoughts of different sections of Philosophy.

SUGGESTED READINGS:

- **Veder Paricaya,** Yogiraj Basu, K L Pharma. Ltd.
- **Vaidika Sāhityer Rūparekhā** by Smt. Shanti Bandyopadhyaya, Sanskrit Pustak Bhandar.
- **Vedamīmāṁsā (3 parts) by** Anirban, Sanskrit College.
- **Vaidika Sāhitya kā Itihāsaḥ (in Hindi)** by Prof. Parashnath Dwivedi, Chaukhamba Surbharati Prakashan.
- **Vaidika Sāhitya aur Saṁskṛti (in Hindi)** by Baladev Upadhyaya, Sharada Mandir, Kashi.
- **Saṃskṛta Sāhityer Itihāsa** by Dhirendranath Bandyopadhyay, Paschimbanga Rajya Pustak Parsat.
- **Saṃskṛta Sāhityer Itihāsa** by Devkumar Das, Sadesh.
- **Saṃskṛta Sāhitya kā Itihāsa** by Baladev Upadhyaya,Sharada Mandir, Kashi.
- **Saṃskṛta Sāhityer Itibṛtta** by Gopendu Mukhopadhyay, United Book Agency.
- **Veder Debatā o Kṛṣṭikāla** by Yogeshchandra Roy Vidyanidhi, Sanskrit book depot.
- **Saṃskṛta Vāṅmayasya Itihāsa** by Dhirendranath Bandyopadhyay, Sanskrit Pustak Bhandar.
- **Purāṇaprabeśa** by Girindra Shekhar Basu, Vivekananda Book Centre.
- **Purāna Parikramā o Prabandha** by Uday Chandra Bandopadhyay, Sanskrit book depot.
- **Purāṇa Vimarśaḥ** by Baladev Upadhyaya,Chaukhamba Vidyabhavan.
- **Purāṇa Paryālocanam** by Dr. Shrikrishna Moni Tripathi, Chaukhamba Surbharati Prakashan.
- **Śabdaśāstrer Itihāsa** by Kalijiban Devsharma, Ramkrishna Mission Institute of Culture, Golpark.
- **SaṃskṛtaVyākaraṇaśāstrerItihāsa**byAmiya Kumar Bhattacharya, Sanskrit Pustak Bhandar.
- **Vyākaraṇa Darśaner Itihāsa** by Gurupada Haldar, Sanskrit Pustak Bhandar.
- **Vyākaraṇaśāstretihāsaḥ** by Lokmoni Dahal, Bhartiya Vidya Prakashan.
- **Vyākaraṇaśāstretihāsaḥ** by Brahmananda Tripathi. Chaukhamba Surabharati Prakashan.

- **Saṃskṛta Vyākaraṇaśāstra kā Itihāsa (in Hindi)** by Pandit Yudhishthir Mimamsaka, Bhartiya Prachya Vidya Prakashan.
- **Systems of Sanskrit Grammar** by S.K Belvalkar, Bhartiya Vidya Prakashan.
- **Pāṇini, Kātyāyana and Patañjali** by K Madhav Krishna Sharma, Shri Lal Bahadur Shastri Rashtriy Sanskrit Vidyapeeth.
- **Bhāratīya Darśana** by Samarendra Bhattacharya, Bengal Book Syndicate.
- **Bhāratīya Darśana** by Debabrata Sen , Paschimbanga Rajya Pustak Parsat.
- **Bhāratīya Darśaner Rūparekhā** by Dr. Amit Bhattacharya-Sanskrit Book Depot.
- **Bhāratīya Darśana** by Nirodbaran Chakraborty, The Dhaka Students'Library.
- **Bhāratīya Darśana Samagra** by Acharya Jyoti Sengupta, Sanskrit Book Depot.
- **History of Indian Philosophy** by Surendranath Dasgupta, Rupa Publication.

SANTALI

THE UNIVERSITY OF BURDWAN

Syllabus for 3-Year Degree/4-Year Honors

In

SANTALI

Under Curriculum and Credit Framework for Undergraduate Programs(CCFUP) as per NEP, 2020

w.e.f. 2023-24

Semester wise and Course wise Credit and Marks Distribution Structure under CCFUP as per NEP, 2020

SEMESTER-I

COURSE STRUCTURE						
Course Type with Code	**Name of the course**	**Credit**	**Full Marks**	**Theory**	**Practical**	**Internal**
Major/DS Course (Core) SANT1011	History of Santali Literature	4 L-T-P 3-1-0	75	60	0	15
Minor Course SANT 1021	History of Santali Language & Literature	4 L-T-P 3-1-0	75	60	0	15
Multidisciplinary Course SANT1031	Basic Santali Grammar	3 L-T-P 2-1-0	50	40	0	10
Ability Enhancement Course (L_1-1 MIL) SANT 1041	Santali Communication	2 L-T-P 2-0-0	50	40	0	10
Skill Enhancement Course (SEC) SANT 1051	Art of Translation	3 L-T-P 2-1-0	50	40	0	10
Value Added(VA) Course CVA1061	Environmental Science/ Education	4 L-T-P 3-0-1	100	60	20	20
Total		**20**	**400**			

SEMESTER-II

COURSE STRUCTURE						
Course Type with Code	**Name of the course**	**Credit**	**Full Marks**	**Theory**	**Practical**	**Internal**
Major/DS Course (Core) SANT2011	Origin & Development of Santali Language	4 L-T-P 3-1-0	75	60	0	15
Minor Course SANT 2021	Santali Folk Literature and Culture	4 L-T-P 3-1-0	75	60	0	15
Multidisciplinary Course SANT2031	Santali Literature	3 L-T-P 2-1-0	50	40	0	10
Ability Enhancement Course (L_2-1 MIL) ENGL 2041	Functional English	2 L-T-P 2-0-0	50	40	0	10
Skill Enhancement Course (SEC) SANT 2051	Writing Skill	3 L-T-P 2-1-0	50	40	0	10
Value Added(VA) Course CVA2061	Understanding India/Digital & Technological Solutions/ Health & Wellness/ Yoga Education/ Sports & Fitness	4 L-T-P 3/3-1/0-0/1	100	80/60	0/20	20
Total		**20**	**400**			

Semester-I

Course title: History of Santali Literature

Credit: 4

Full Marks: 75=(60+15)

Course Code: Major/DS Course (Core) SANT1011

Course Objective: The syllabus for Major (Core) Course 1 (MC1) under the NEP 2020 is structured to provide students with a comprehensive idea about the development of Santali literature over the ages. It traces the path of the growth of Santali literature from the period of its ancient era.

Course Outcome: The completion of the course is supposed to benefit the students in the following ways:

1. It offers a comprehensive understanding of social and intellectual climate of santal society.
2. The course offers extensive insight into the history of Santali Ancient literature, while laying special emphasis on various literary movements, genres and writers that are held to be the representatives of their times.
3. It helps the students to evaluate the way sociocultural and historical phenomena influence the literary production of a particular period.
4. The students are also offered an in-depth understanding on the growth of the Santali Ancient literature.

Unit wise Lecture hour's distribution

Topic	**ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱱᱟᱜᱟᱢ (History of Santali Literature)**				
Unites	**Marks**	**L**	**T**	**P**	**HRS**
Unit-I	15	13	2	0	15
Unit-II	15	13	2	0	15
Unit-III	15	13	2	0	15
Unit-IV	15	13	2	0	15
Total credit= 4	**Total Marks = 60**	**52**	**8**		**60**

Course Contents: ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱱᱟᱜᱟᱢ (History of Santali Literature)

Unit: I i) ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱡᱚᱱᱚᱢ (Origin)

ii) ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱵᱟᱲᱦᱟᱹᱣ (Development)

iii) ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱦᱟᱹᱴᱤᱧ (Classification)

iv) ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଲେଖକମାନେ. ଏବଂ ଲେଖୁଥିବା. ବହି(Important Authors)

Unit: II i) ᱡᱩᱛᱩᱢᱟᱱ ᱯᱩᱛᱷᱤ ᱠᱚ (Important Books)

ii) ᱯᱟᱛᱷᱟᱢ ᱠᱚ(Magazines & Journals)

Unit:III i) ᱢᱤᱥᱚᱱ ᱟᱨ ᱢᱤᱥᱚᱱᱟᱨᱤ ᱥᱟᱦᱮᱵᱽ ᱠᱚ(Mission & Missionaries)

ii) ᱥᱟᱹᱶᱦᱮᱫᱨᱮ ᱥᱟᱱᱛᱟᱞ ᱦᱩᱞ(Rebellion) ᱨᱮᱭᱟᱜ ᱚᱪᱥᱚᱲ(Impact)

Unit: IV i) ᱥᱟᱱᱛᱟᱞᱤ ᱥᱟᱹᱶᱦᱮᱫ ᱨᱮᱭᱟᱜ ᱥᱮᱫᱟᱭ ᱡᱩᱜᱽ, ᱛᱟᱞᱟ ᱡᱩᱜᱽ, ᱟᱨ ᱱᱟᱦᱟᱜ ᱡᱩᱜᱽᱨᱮ ᱥᱟᱹᱶᱛᱟ, ᱞᱟᱠᱪᱟᱨ ᱟᱹᱨᱤᱪᱟᱹᱞᱤ, ᱫᱷᱚᱨᱚᱢ, ᱠᱟᱹᱢᱤᱨᱤᱭᱟᱹᱨᱤ ᱟᱨ ᱨᱟᱡᱽᱨᱤᱭᱟᱹᱨᱤ ᱨᱮᱭᱟᱜ ᱚᱪᱥᱚᱲ(Ancient,Mediaval and Modern period socio-culture, religion, economical and political impact on Santali literature)

Reference Books:

1. Saontali Sahityer Itihas – Porimol Hembrom
2. Saontali Bhasha o Sahityer Itihas –Dhirendranath Baskey
3. Horko ren Mare Hapramko reyak Katha –(Saprao) Rev. L.O. Skrefsrud
4. Kherwal Bansha Dhorom Puthi – Majhi Ramdas Tudu (reska)
5. Folk Tales- Rev. P.O. Boding
6. Santari saohed reyak Omonom ar Hara – Dr. K.C. Tudu
7. Hor Ror ar Saohed reyak Nagam – S. Hansda
8. Santari Saohed reyak Nagam– Dr. D. Besra
9. Santari Saohed reyak Nagam – Laxman Chandra Murmu
10. Santari Hor Saohed-Dr. K.C. Tudu

Course title: History of Santali Language & Literature **Credit: 4**

Full Marks: 75=(60+15)

Course code: Minor Course SANT 1021

Course Objective: The syllabus for Minor Elective Course 1 (MEC1) under the NEP 2020 is structured to provide students with a comprehensive idea about the development of Santali language and literature over the ages. It traces the path of the growth of Santali literature from the period of its ancient, mediaeval, to the present era.

Course Outcome: The completion of the course is supposed to benefit the students in the following ways:

1. It offers a comprehensive understanding of social and intellectual climate of santal society.
2. The course offers extensive insight into the history of Santali literature, while laying special emphasis on various literary movements, genres and writers that are held to be the representatives of their times.
3. It helps the students to evaluate the way socio-cultural and historical phenomena influence the literary production of a particular period.
4. The students are also offered an in-depth understanding on the growth of the Santali literature.

Unit wise Lecture hour's distribution

Topic	ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹ.ᱨᱥᱤ ᱟᱨ ᱥᱟᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱤᱛᱤᱦᱟᱹᱥ (History of Santali Language & Literature)				
Unites	**Marks**	**L**	**T**	**P**	**HRS**
Unit-I	15	13	2	0	15
Unit-II	15	13	2	0	15
Unit-III	15	13	2	0	15
Unit-IV	15	13	2	0	15
Total credit= 4	**Total Marks = 60**	**52**	**8**		**60**

Course Contents: ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹ.ᱨᱥᱤ ᱟᱨ ᱥᱟᱦᱤᱛ ᱨᱮᱭᱟᱜ ᱤᱛᱤᱦᱟᱹᱥ (History of Santali Language & Literature)

Unit: I i)i)ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ

ᱡᱚᱱᱚᱢ(Origin)

ii) ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱞᱟᱦᱟᱱᱛᱤ(Development)

iii) ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱦᱟᱹᱴᱤᱧ(Classification)

Unit: II i)ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଲେଖକମାନେ. ଲେଖୁଥିବା. ତଥ(Important Authors)

ii) ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ପୁସ୍ତକ(Important Books)

Unit: III i) ପତ୍ରପତ୍ରିକା ତଥ (Magazines & Journals)

Unit: IV . i) ᱢᱤᱥᱚᱱ ᱟᱨ ᱢᱤᱥᱚᱱᱟᱨᱤ ᱥᱟᱶᱛᱮ ᱠᱚ(Mission & Missionaries)

ii) ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱚᱢᱚᱱ(Origin)

iii) ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱵᱛᱱᱟᱹᱣ(Development)

Reference Books:

1. Saontali Sahityer Itihas – Porimol Hembrom
2. Saontali Bhasha o Sahityer Itihas –Dhirendranath Baskey
3. Horko ren Mare Hapramko reyak Katha –(Saprao) Rev. L.O. Skrefsrud
4. Kherwal Bansha Dhorom Puthi – Majhi Ramdas Tudu (reska)
5. Santal Hul reyak 150 Bachar – (Patham) PachimBangla, jun, 2005.
6. Santari saohed reyak Omonom ar Hara – Dr. K.C. Tudu
7. Hor Ror ar Saohed reyak Nagam – S. Hansda
8. Santari Saohed reyak Nagam– Dr. D. Besra
9. Santari Saohed reyak Nagam – Laxman Chandra Murmu
10. Santali Bhasha Bigyan ka ek Adhyaon-Dr. K.C. Tudu
11. An Introduction to the Santali Language – Rev. J. Phillips

Course title: Basic Santali Grammar **Credit: 3**

Full Marks: 50=(40+10)

Course code: Multidisciplinary Course SANT1031

Course Objective: The syllabus for Interdisciplinary Course 1 under the NEP 2020 is structured to provide students with a comprehensive idea about the Structure of Santali Grammar. It increases their grammar skill. Students will understand the effective communication skill in Santali language. .

Course Outcome: The completion of the course is supposed to benefit the students in the followingways:

1.It offers a comprehensive understanding of Santali grammar.

2.Students will learn correct grammar skill In a professional context.

3.It helps the students to make sentence in Santali Language.

4.The students are also offered an in-depth understanding on the structure of the Santali grammar.

Unit wise Lecture hour's distribution

Topic	**ᱥᱟᱱᱛᱟᱲᱤ ᱨᱚᱱᱚᱲ(ᱵᱮᱠᱚᱨᱚᱱ) (Basic Santali Grammar)**				
Unites	**Marks**	**L=2 credits**	**T=1 credit**	**P=0 credit**	**HRS**
Unit-I	15	13	2	0	15
Unit-II	15	13	2	0	15
Unit-III	10	9	1	0	10
Unit-IV	10	9	1	0	10
Total credit= 3	**Total Marks = 60**	**44**	**6**	**0**	**50**

Course Contents:ᱥᱟᱱᱛᱟᱲᱤ ᱨᱚᱱᱚᱲ(ᱵᱮᱠᱚᱨᱚᱱ) (Basic Santali Grammar)

Unit: I i)ᱨᱚᱱᱚᱲ ᱚᱠᱟ ᱠᱚ ᱢᱮᱛᱟᱜ-ᱟ (Definition of Grammar).

ii)ᱨᱟᱦᱟ ᱟᱲᱟᱝ ᱟᱨ ᱠᱮᱪᱮᱫ ᱟᱲᱟᱝ

(Vowel and Consonant).

ii) ᱟᱲᱟᱝ ᱟᱨ ᱪᱤᱠᱤ (Sound and letter)

Unit: II i)ᱟ.ᱲᱟ. ᱨᱮᱭᱟᱜ ᱫᱟ.ᱨᱤᱥ (Parts of speech).

vi) [illegible] (Tense).

Unit: III i) [illegible]

(Person).

ii) [illegible]

(Number).

Unit-IV i) [illegible] (Gender)

ii) [illegible] (Case)

iii) [illegible]

(Affix)

iv) [illegible] (Synonyms & Antonyms)

Reference Books:

1. Ronor– Pandit Raghunath Murmu
2. Nahak Santari Ronor – Sadhan Kumar Mandi
3. A grammar of the Santali Language – By Rev. L.O. Skrefsrud
4. Materials for Santali Grammar (Part-I &II) – Rev. P.O. Bodding
5. An Introduction to the Santali Language – Rev. J. Phillips
6. Santari Parsi Unurum – Dr. K.C. Tudu
7. Santari Ronor – (Edited)CILL
8. A Santali Grammar for Beginners- Rev. P.O. Bodding
9. Hor Ror reyak Bekaran-R. Rosenlund

Course title: [illegible] (Santali Communication) Credit:2

Full Marks: 50=(40+10)

Course code: Ability Enhancement Course (L_1-1 MIL) SANT 1041

Course Objective: The syllabus for Ability Enhancement Compulsory Course 1 (AECC1) under the NEP 2020 is structured to provide the knowledge where students will learn the grammatical form of Santali and use of this form in pacific communicative context. Students will develop their reading writing and communicative skill in Santali language.

Course Outcome: The completion of the course is supposed to benefit the students in the followingways:

1. It will heighten students awareness of correct usage of Santali grammar in writing and speaking.

2. Students will improve their speaking ability in Santali both in terms of fluency and comprehensibility.

3. Students will improve their reading fluency skills through extensive reading.

4. Students will strengthen their ability to write essays and summaries using the process approach.

Unit wise Lecture hour's distribution

Topic	[illegible] [illegible] (Santali Communication)				
Unites	**Marks**	**L=2 credits**	**T=0 credit**	**P=0 credit**	**HRS**
Unit-I	10	10	0	0	10
Unit-II	10	10	0	0	10
Unit-III	10	10	0	0	10
Unit-IV	10	10	0	0	10
Total credit= 2	**Total Marks = 40**	**40**	**0**	**0**	**40**

Course Contents: [illegible] [illegible] (Santali Communication)

Unit-I i)ᱥᱟᱱᱛᱟᱲᱤ ᱛᱮ ᱨᱚᱲ(Verbal and Non-verbal communication).

ii)ᱥᱟᱱᱛᱟᱲᱤ ᱟᱲᱟᱝ(Santali sound).

iii)Word(ᱟᱹᱲᱟᱹ)

iv)Sentence (ᱟᱹᱭᱟᱹᱛ)

v)ᱚᱲᱥᱚᱝᱟᱱ ᱥᱟᱱᱛᱟᱲᱤ ᱨᱚᱲ (Effective Santali communication)

vi)ᱥᱟᱱᱛᱟᱲᱤ ᱛᱮ ᱨᱚᱲ-ᱨᱚᱦᱚᱲ (Dialogue).

vii) Close reading

Comprehension.

Reference Books:

1. Saontali Sahityer Itihas – Porimol Hembrom
2. Saontali Bhasha o Sahityer Itihas –Dhirendranath Baskey
3. Horko ren Mare Hapramko reyak Katha –(Saprao) Rev. L.O. Skrefsrud
4. Kherwal Bansha Dhorom Puthi – Majhi Ramdas Tudu (reska)
5. Santal Hul reyak 150 Bachar – (Patham) PachimBangla, Jun, 2005.
6. Santari saohed reyak Omonom ar Hara – Dr. K.C. Tudu
7. Hor Ror ar Saohed reyak Nagam – S. Hansda
8. Santari Saohed reyak Nagam– Dr. D. Besra
9. Santari Saohed reyak Nagam – Laxman Chandra Murmu
10. Santali Bhasha Bigyan ka ek Adhyaon-Dr. K.C. Tudu
11. An Introduction to the Santali Language – Rev. J. Phillips

Course title: ᱛᱚᱨᱡᱚᱢᱟ ᱠᱚᱞᱟ (Art of Translation) **Credit: 3**

Full Marks: 50=(40+10)

Course code: Skill Enhancement Course (SEC) SANT 1051

Course Objective: The syllabus for Skill Enhancement Course 1 (SEC1) under the NEP 2020 is structured to provide idea about Translation as well as Training in translation techniques. It introduces the concept and application of translation in practice.

Course Outcome: The completion of the course is supposed to benefit the students in the followingways:

1. Students will be able to develop the translation skills.
2. Concept of translation will be clear.
3. Opportunities for work will be expend in the field.

Unit wise Lecture hour's distribution

Topic	**ᱛᱚᱨᱡᱚᱢᱟ ᱠᱚᱞᱟ (**Art of Translation**)**				
Unites	**Marks**	**L=2 credits**	**T=1 credit**	**P=0 credit**	**HRS**
Unit-I	10	10	0	0	10
Unit-II	10	10	0	0	10
Unit-III	10	10	0	0	10
Unit-IV	10	10	0	0	10
Total credit= 3	**Total Marks = 40**	**40**	**0**	**0**	**40**

Course Contents: [illegible] **(Art of Translation)**

Unit: I i)[illegible]

(Definition of Translation).

ii)[illegible]

[illegible](Exercise in Different type /models of Translation) [illegible]

a) Semantic/Literal translation.

Unit: II b)Free/sense/Literary translation

Unit: III c)Functional/communicative translation.

v) Technical/Official.

Unit: IV i)Tran creations.

ii)Audio-Visual translation.

Reference Books:

1.Baker, Mona, in other words: A Course book on Translation, Routledge, 2001.

Semester-II

Course title: Origin & Development of Santali Language **Credit: 4**

Full Marks: 75=(60+15)

Course code: Major/DS Course (Core) SANT2011

Course Objective: The syllabus for Major (Core) Course 2 (MC2) under the NEP 2020 is structured to provide students with a comprehensive idea about the development of Santali language over the ages. It traces the path of the growth of Santali language from the period of its ancient, mediaeval, to the present era. The students are also offered an in-depth understanding on the growth of the Santali language under the influence of various other languages including English, Bengali, Hindi, Oria and Sanskrit, besides being mentored in the structural nitty-gritties of the language.

Course Outcome: The completion of the course is supposed to benefit the students in the following ways:

1. The course offers extensive insight into the history of Santali language, while laying special

emphasis on language movements, Ol-chiki scripts invention and linguist that are held to be the representatives of their times.

3. It helps the students to evaluate the way socio-cultural and historical phenomena influence the Santali language of a particular period.

4. The students are also offered an in-depth understanding on the development of the Santali language.

Unit wise Lecture hour's distribution

Topic	ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱵᱟᱲᱦᱟᱣ ᱟᱨ ᱡᱚᱱᱚᱢ.ᱜ (Origin & Development of Santali Language)				
Unites	**Marks**	**L**	**T**	**P**	**HRS**
Unit-I	15	13	2	0	15
Unit-II	15	13	2	0	15
Unit-III	15	13	2	0	15
Unit-IV	15	13	2	0	15
Total credit= 4	**Total Marks = 60**	**52**	**8**		**60**

Course Contents:ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱡᱚᱱᱚᱢ ᱟᱨ ᱩᱛᱱᱟᱹᱣ (Origin & Development of Santali Language)

Unit: I i)ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱡᱚᱱᱚᱢ(Origin).

ii)ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱩᱛᱱᱟᱹᱣ(Development).

Unit: II i) ᱥᱟᱱᱛᱟᱲᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱢᱩᱞ ᱜᱩᱱᱟᱜᱩᱱ (characteristics)

ii) ᱚᱞ-ᱪᱤᱠᱤ ᱛᱮᱭᱟᱨ (Ol-chiki scripts invention)

Unit: III i) ᱥᱟᱱᱛᱟᱞᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱯᱟᱥᱱᱟᱣ (Scope of Santali Language)

ii)ᱮᱴᱟᱜ ᱚᱥᱴᱨᱤᱠ ᱯᱟᱹᱨᱥᱤᱠᱚ ᱥᱟᱸᱣ ᱥᱟᱱᱛᱟᱞᱤ ᱯᱟᱹᱨᱥᱤ ᱨᱮᱭᱟᱜ ᱥᱟᱹᱜᱟᱹᱭ(Relationship of santali to others Austric Languages as like Ho, Mundari etc.)

Unit: IV i)ᱯᱟᱹᱨᱥᱤ ᱞᱟᱲᱟᱣᱱᱟ (Language movement).

Reference Books:

1.Saontali Sahityer Itihas – Porimol Hembrom

2.Saontali Bhasha o Sahityer Itihas –Dhirendranath Baskey

3.Horko ren Mare Hapramko reyak Katha –(Saprao) Rev. L.O. Skrefsrud

4.Kherwal Bansha Dhorom Puthi – Majhi Ramdas Tudu (reska)

5.Santal Hul reyak 150 Bachar – (Patham) PachimBangla, jun, 2005.

6.Santari saohed reyak Omonom ar Hara – Dr. K.C. Tudu

7.Hor Ror ar Saohed reyak Nagam – S. Hansda

8.Santari Saohed reyak Nagam– Dr. D. Besra

9.Santari Saohed reyak Nagam – Laxman Chandra Murmu

10. Santali Bhasha Bigyan ka ek Adhyaon-Dr. K.C. Tudu

11.An Introduction to the Santali Language – Rev. J. Phillips

Course title: Santali Folk Literature and Culture **Credit: 4**

Full Marks: 75=(60+15)

Course code: Minor Course SANT 2021

Course Objective: The syllabus for Minor Course 2 (MC2) under the NEP 2020 is structured to provide students with a comprehensive idea about the Folk life, culture and society in the context of folk literature. Students will acquire knowledge about Santal society and how it has developed as well as changes occur from hunter-gatherer societies to early modern societies.

Course Outcome: The completion of the course is supposed to benefit the students in the followingways:

1. Students will inform about the life and lifestyle through literature.
2. It helps the students to understand about folk art, folk life etc..
3. Students explain and prove the truth of folklore, oral tradition, and oral literature.

Unit wise Lecture hour's distribution

Topic	**ᱥᱟᱱᱛᱟᱲᱤ ᱞᱚᱠ ᱥᱟᱹᱦᱤᱛ ᱟᱨ ᱟ.ᱡᱟᱜᱟ.ᱛ (Santali Folk Literature and Culture)**				
Unites	**Marks**	**L**	**T**	**P**	**HRS**
Unit-I	15	13	2	0	15
Unit-II	15	13	2	0	15
Unit-III	15	13	2	0	15

Unit-IV	15	13	2	0	15
Total credit= 4	**Total Marks = 60**	**52**	**8**		**60**

Course Contents: ᱥᱟᱱᱛᱟᱲᱤ ᱦᱚᱲ ᱥᱟᱦᱤᱛᱭ ᱟᱨ ᱟ.ᱥᱤᱛᱷᱟ.ᱨᱤ (Santali Folk Literature and Culture)

Unit: I i)ᱥᱟᱱᱛᱟᱲᱤ ᱦᱚᱲ ᱥᱟᱦᱤᱛᱭ ᱨᱮᱭᱟᱜ ᱯᱟ.ᱨᱤᱥᱤ (Definition of Folk Literature).

ii)ᱥᱟᱱᱛᱟᱲᱤ ᱦᱚᱲ ᱥᱟᱦᱤᱛᱭ ᱨᱮᱭᱟᱜ ᱦᱟ.ᱛᱟᱞ (Classification of Folk Literature).

Unit-II i)ᱥᱟᱱᱛᱟᱲ ᱟ.ᱥᱤᱛᱷᱟ.ᱨᱤ (Santal Culture)

(Chatiyar,Bapla, Bhandan)

Unit-III i)ᱥᱮᱨᱮᱧ, ᱦᱚᱲ ᱠᱟ.ᱦᱱᱤ, ᱞᱟ.ᱲᱵᱟᱭ, ᱞᱟᱠᱷᱮᱨ ᱟᱨ ᱡᱷᱟ.ᱨᱱᱤ(Songs, Folk tales, Rhyme, Bankher & Jharni)

Unit-IV i) ᱠᱷᱩᱰᱩᱢ, ᱵᱮᱲᱮᱱᱛᱟ ᱟᱨ ᱞᱩᱴᱤᱱᱛᱟ ᱠᱟᱛᱷᱟ, ᱞᱟᱦᱟ, ᱵᱟᱝᱥᱟᱨ, ᱥᱚᱦᱨᱟᱭ,ᱠᱟᱨᱟᱢ(Riddles, Proverbs, Phrases, Festivals)

Reference Books:

1.Saontali Sahityer Itihas – Porimol Hembrom

2.Saontali Bhasha o Sahityer Itihas –Dhirendranath Baskey

3.Horko ren Mare Hapramko reyak Katha –(Saprao) Rev. L.O. Skrefsrud

4.Kherwal Bansha Dhorom Puthi – Majhi Ramdas Tudu (reska)

5.Jaher Bonga Santarko – Rameswar Murmu

6.Kherwal Bansha Santar Serwa – Lusaram Murmu

7.Kherwal Aribandi– Dr. K.C. Tudu

8.Hor Ror ar Saohed reyak Nagam – S. Hansda

9.Baha Porob ar Hor samaj – Dhirendranath Baskey

10.Kudum-Dhirendronath Baskey

11.Men katha ar Bhenta Katha- Siron Murmu

12.Santari Men Katha ar Bhenta Katha- Dhirendronath Baske

Course title: Santali Literature

Credit: 3

Full Marks: 50=(40+10)

Course code: Multidisciplinary Course SANT2031

Course Objective: The syllabus for Interdisciplinary Course 2 under the NEP 2020 is structured to provide students the basic knowledge about Santali literature. An attempt is made to see and understand literary culture and life in the context of selected readings.

Course Outcome: The completion of the course is supposed to benefit the students in the following ways:

1. It offers a basic understanding of social and intellectual climate of santal society.
2. Students are able to explain and formulate of the importance of Santali literature performance.
3. Students will know the basic concept of Santali literature.

Unit wise Lecture hour's distribution

Topic	**ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛ (Santali Literature)**				
Unites	**Marks**	**L=2 credits**	**T=1 credit**	**P=0 credit**	**HRS**
Unit-I	15	13	2	0	15
Unit-II	15	13	2	0	15
Unit-III	10	9	1	0	10

Unit-IV	10	9	1	0	10
Total credit= 3	**Total Marks = 60**	**44**	**6**	**0**	**50**

Course Contents: ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱹᱦᱤᱛᱭ (Santali Literature)

Unit-I i)ᱥᱟᱦᱤᱛᱭ ᱨᱮᱭᱟᱜ ᱯᱟᱹᱭᱟᱨᱤ(Definition of Literature).

ii)ᱥᱟᱱᱛᱟᱲᱤ ᱨᱚᱲ ᱥᱟᱦᱤᱛᱭ (Santali Oral Literature).

Unit-II i)ᱥᱟᱱᱛᱟᱲᱤ ᱥᱟᱦᱤᱛᱭ ᱨᱮᱭᱟᱜ ᱦᱟᱹᱴᱤᱧ (Classification)

Unit-III i)ᱥᱟᱱᱛᱟᱲᱤ ᱚᱞ ᱥᱟᱦᱤᱛᱭ (Santali written Literature).

Unit-IV i) ᱢᱚᱞᱚᱝ (ᱦᱩᱰᱤᱧ ᱠᱟᱹᱦᱤᱱᱤ)-ᱱᱤᱨᱚᱧᱡᱚᱱ ᱦᱟᱸᱥᱫᱟ (Molong(Huding kahini)-Niranjan Hansda)

ii)ᱦᱚᱨᱨᱮ ᱦᱮᱥᱟᱜ (ᱚᱱᱚᱦᱮ) – ᱥᱟᱹᱫᱷᱩᱨᱟᱢᱪᱟᱸᱫ ᱢᱩᱨᱢᱩ (Horre hesak(onorhe)-Sadhuramchand Murmu)

iii) ᱡᱤᱭᱚᱱ ᱫᱚᱨᱥᱚᱱ(ᱚᱱᱚᱲᱦᱮ)- ᱴᱷᱟᱠᱩᱨ ᱯᱨᱚᱥᱟᱫ ᱢᱩᱨᱢᱩ (Jiyon Darsan(onorhe)-Thakur Prasad Murmu)

Reference Books:

1.Saontali Sahityer Itihas – Porimol Hembrom

2.Saontali Bhasha o Sahityer Itihas –Dhirendranath Baske

3. Hor ror ar saohed reyak Nagam – S. Hansda

4.Sisirjon rar – Thakur Prasad Murmu

5.Ol Doho Onorhe - Sadhuram Murmu

6.Horko ren Mare Hapramko reyak Katha –(Saprao) Rev. L.O. Skrefsrud

7.Kherwal Bansha Dhorom Puthi – Majhi Ramdas Tudu (reska)

Course title: ᱯᱤᱱᱦᱚᱞ ᱫᱩᱦᱩᱞᱟ (Writing Skill) **Credit: 3**

Full Marks: 50=(40+10)

Course code: Skill Enhancement Course (SEC) SANT 2051

Course Objective: The syllabus for Skill Enhancement Course 1 (SEC1) under the NEP 2020 is structured to provide ideas about Report Writing and Designing Advertisement. Students will gain knowledge about the Writing, Editing and Proof-Reading techniques. It introduce the concept and application of Practical Writing.

Course Outcome: The completion of the course is supposed to benefit the students in the followingways:

1. Students will be able to develop the writing skills.
2. Students will be introduced with Employable Communicative Skill.
3. Opportunities for work will be expend in the field.

Unit wise Lecture hour's distribution

Topic	ᱯᱟᱲᱦᱮᱞ ᱥᱮᱲᱦᱮᱚᱫ (Writing Skill)				
Unites	**Marks**	**L=2 credits**	**T=1 credit**	**P=0 credit**	**HRS**
Unit-I	10	10	0	0	10
Unit-II	10	10	0	0	10
Unit-III	10	10	0	0	10
Unit-IV	10	10	0	0	10
Total credit= 3	**Total Marks = 40**	**40**	**0**	**0**	**40**

Course Contents: ᱯᱟᱲᱦᱮᱞ ᱥᱮᱲᱦᱮᱚᱫ (Writing Skill)

Unit: I i) Documenting

Unit: II i) Report Writing

Unit: III i)Making Notes

Unit: IV i) Letter Writing

Reference Books:

1. Baker, Mona, in other words: A Course book on Translation, Routledge, 2001.

2. [illegible]

HISTORY

The University of Burdwan

SYLLABUS FOR 3-YEAR DEGREE/4-YEAR MAJOR

IN

HISTORY

UNDER CURRICULUM AND CREDIT FRAMEWORK FOR UNDERGRADUATE PROGRAMMES (CCFUP) AS PER NEP, 2020

WITH EFFECT FROM 2023-24

DEPARTMENT OF HISTORY▪THE UNIVERSITY OF BURDWAN

NAAC ACCREDITED 'A' GRADE UNIVERSITY

GOLAPBAG CAMPUS▪PURBA BARDHAMAN-713104 ▪WEST BENGAL▪INDIA

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COURSE STRUCTURE UNDER CCFUP (AS PER NEP 2020) FOR B.A. IN HISTORY

Semester-wise Distribution of Credits and Marks (SEM-I)

SEMESTER	COURSE TYPE	COURSE NAME	CREDIT	MARKS				DISTRIBUTION OF CREDIT			LECT HOURS
				IA	ESE (TH)	ESE (PR)	TOTAL	LECT	TUTO	PR	
I	MAJOR/DS COURSE Course Code: HIST 1011	THE IDEA OF BHARAT/ HISTORY OF INDIA (FROM EARLIEST TIMES TO 6th CENTURY B.C.E)	4	15	60	0	75	3	1	0	60
	MINOR COURSE # Course Code: HIST 1021	ANCIENT INDIAN HISTORY (FROM PRE-HISTORY TO 550 C.E.)	4	15	60	0	75	3	1	0	60
	MULTIDISCIPLINARY COURSE# Course Code: HIST 1031	HISTORY OF INDIA (1757-1857)	3	10	40	0	50	2	1	0	45
	ABILITY ENHANCEMENT COURSE(AEC)	$L_1$1-MIL ARABIC/ BENGALI/ HINDI/ SANSKRIT/ SANTALI/ URDU OR EQUVLNT. COURSE FROM SWAYAM OR UGC RECOGNIZED OTHERS	2	10	40	0	50	2	0	0	40
	SKILL ENHANCEMENT COURSE (SEC) Course Code: HIST 1051	UNDERSTANDING INDIAN HERITAGE	3	10	40	0	50	2	1	0	45
	VALUE ADDED COURSE(VAC)	ENVIRONMENTAL SCIENCE/EDUCATION	4	20	60	20	100	3	1	1	60
	TOTAL		20				400				

** IA- INTERNAL ASSESSMENENT, ESE-END SEMESTER EXAMINATION, TUTO-TUTORIAL, LECT- LECTURE, TH-THEOR, PR- PRACTICAL #

STUDENTS OPTED HISTORY AS MAJOR SUBJECT (4 YR HONS. COURSE/ 3YR DEGREE COURSE) WILL STUDY ANY DISCIPLINE OTHER THAN HISTORY AS SPECIFIED BY THE UNIVERSITY/AS PER NEP STRUCTURE IN THEIR MINOR AND MULTIDISCIPLINARY COURSES.

COURSE STRUCTURE UNDER CCFUP (AS PER NEP 2020) FOR B.A. IN HISTORY

Semester-wise Distribution of Credits and Marks (SEM-II)

SEMESTER	COURSE TYPE	COURSE NAME	CREDIT	MARKS				DISTRIBUTION OF CREDIT			LECT HOURS
				IA	ESE (TH)	ESE (PR)	TOTAL	LECT	TUTO	PR	
II	MAJOR/DS COURSE Course Code: HIST 2011	HISTORY OF ANCIENT WORLD CIVILIZATION	4	15	60	0	75	3	1	0	60
	MINOR COURSE # Course Code: HIST 2021	HISTORY OF INDIA (550 CE to 1206 CE)	4	15	60	0	75	3	1	0	60
	MULTIDISCIPLINARY COURSE# Course Code: HIST 2031	HISTORY OF INDIA (1858-1947)	3	10	40	0	50	2	1	0	45
	ABILITY ENHANCEMENT COURSE(AEC)	$L_2$1- ENGLISH OR EQUVLNT. COURSE FROM SWAYAM OR UGC RECOGNIZED OTHERS $L_2$1- ENGLISH OR EQUVLNT. COURSE FROM SWAYAM OR	2	10	40	0	50	2	0	0	40
	SKILL ENHANCEMENT COURSE (SEC) Course Code: HIST 2051	ARCHIVES AND MUSEUMS	3	10	40	0	50	2	1	0	45
	VALUE ADDED COURSE(VAC)	TO BE DECIDED BY THE UNIVERSITY	4	20	60	20	100	3	1	1	60
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
	TOTAL		20				400				

** IA- INTERNAL ASSESSMENENT, ESE-END SEMESTER EXAMINATION, TUTO-TUTORIAL, LECT- LECTURE, TH-THEOR, PR- PRACTICAL

STUDENTS OPTED HISTORY AS MAJOR SUBJECT (4 YR HONS. COURSE/ 3YR DEGREE COURSE) WILL STUDY ANY DISCIPLINE OTHER THAN HISTORY AS SPECIFIED BY THE UNIVERSITY/AS PER NEP STRUCTURE IN THEIR MINOR AND MULTIDISCIPLINARY COURSES.

SEMESTER-WISE MODULES FOR THE FOUR YEAR UNDERGRADUATE PROGRAM (B.A.) IN HISTORY (MAJOR) AS PER NEP 2020

THE UNIVERSITY OF BURDWAN

SEM	MAJOR/ HONS COURSE	MINOR COURSE	MULTIDISCIPLINARY COURSE	ABILITY ENHANCEMENT COURSE (AEC)	SKILL ENCASHMENT COURSE (SEC)	VALUE ADDED COURSE (VAC)	TOTAL
1	PAPER 1 THE IDEA OF BHARAT OR HISTORY OF INDIA (FROM EARLIEST TIMES TO 6TH CENTURY B.C.E. F.M. 75	ANCIENT INDIAN HISTORY (FROM PRE HISTORY TO 550 CE) F.M. 75 FOR [STUDENTS WHO HAVE MAJOR SUBJECT OTHER THAN HISTORY]	HISTORY OF INDIA(1757-1857) F.M. 50 [FOR STUDENTS WHO HAVE MAJOR SUBJECT OTHER THAN HISTORY]	$L_1$1-MIL ARABIC/ BENGALI/ HINDI/ SANSKRIT/ SANTALI/ URDU OR EQUVLNT. COURSE FROM SWAYAM OR UGC RECOGNIZED OTHERS F.M. 50	UNDERSTANDING INDIAN HERITAGE F.M. 50	ENVS F.M. 100	400
2	PAPER 2 HISTORY OF ANCIENT WORLD CIVILIZATION F.M. 75	HISTORY OF INDIA (550 CE TO 1206 CE) F.M. 75 [FOR STUDENTS WHO HAVE MAJOR SUBJECT OTHER THAN HISTORY]	HISTORY OF INDIA (1858 C E-1947 C E) F.M. 50 [FOR STUDENTS WHO HAVE MAJOR SUBJECT OTHER THAN HISTORY]	$L_2$1- ENGLISH OR EQUVLNT. COURSE FROM SWAYAM OR UGC RECOGNIZED OTHERS F.M. 50	ARCHIVES AND MUSEUMS F.M. 50	TO BE DECIDED BY THE UNIVERSITY	400

[SKILL BASED VOCATIONAL COURSE (ADDL. 4 CR) DURING SUMMER TERM FOR 8 WEEKS, WHO WILL EXIT THE PROGRAMME AFTER SECURING 40 CR.]

Semester-I

CURRICULUM & CREDIT FRAMEWORK

FOR

UG Programme in History

Subject: History (Major)

Paper 1 -The Idea of Bharat

Learning Outcome: *Through this course, students will get to know about the lifestyle, culture, religion and language of ancient India. They will be able to find various types of events in the past life of ancient India. They will also acquire the knowledge of changing socio-cultural scenarios of India.*

Unit	Topic	LH
Unit 1	• Concept of India or Bharat • Indian concept of time, space, scope and sources	12
Unit 2	• Heritage of Indian Civilization: The glory of Indian Literature- Veda, Vedanta, Upanishads, Epics, Puran • Salient features of Indian Art and Culture • Educational system	12
Unit 3	• Indian perception of Dharma and Darshan • The concept of Vasudhaiva Kutambakam: Man, Family & Society	12
Unit 4	• Science and Technology in Ancient India, Environmental conservation, Health consciousness- yoga and naturopathy, Indian numerical system and Mathematics	12
Unit 5	• Indian Economic thoughts • Concept of land, forest and agriculture • Industry, Trade & Commerce	12

Suggested Readings:

A.L. Basham- The Wonder that was India
A.S. Altekar- Education in Ancient India.
Faith Robertson Elliott - Gender Family and Society
G. Arrhenius – Evolution for Space
R.K. Mookherjee – The Fundamental Unity of India
Radha Kumud Mookherjee- Indian Education System.
Srinivas , M.N- Social Change in Modern India.
Will Durant- The Story of Civilization
Singh Y- Modernization of Indian Tradition.
Sinha Gaurab: Prajithasik o Vaidik Jug er Bharat

OR

Subject: History (Major)

Paper 1 –History of India (From Earliest times up to 6th Century BCE)

Learning Outcome: *Through this course, students will get to know about the lifestyle, culture, religion and language of ancient India. They will be able to find various types of events in the past life of ancient India. They will also acquire the knowledge of changing socio-cultural scenarios of India.*

Unit	Topic	LH
Unit 1	• Meaning of History • Origin of the name Bharat • Concept of India or Bharat Fundamental unity of India • Indian concept of time, space, scope and sources	12
Unit 2	• A broad survey of Paleolithic, Mesolithic and Neolithic cultures	12
Unit 3	• Harrappan Civilization: Origin, extent, main features, Religion, Relationship with other civilizations of the world, decline	12
Unit 4	• Vedic and Later Vedic Age: Coming of the Aryans and Aryan debate Vedic economy, polity, society and religion, Science and technology, Environmental conservation, Health consciousness- yoga and naturopathy, Indian numerical system and Mathematics • Evolution of language • Indian economic thoughts • Concept of land, forest and agriculture • Industry, Trade & Commerce	12
Unit 5	• Religious protest movement- Jainisim and Buddhism	12

Suggested Readings:-

A.L. Basham- The Wonder that was India
A.S. Altekar- Education in Ancient India.
Faith Robertson Elliott - Gender Family and Society
G. Arrhenius – Evolution for Space
R.K. Mookherjee – The Fundamental Unity of India
Radha Kumud Mookherjee- Indian Education System.
Srinivas , M.N- Social Change in Modern India.
Will Durant- The Story of Civilization
Singh Y- Modernization of Indian Tradition.
Sinha Gaurab: Prajithasik o Vaidik Jug er Bharat
Carr, E.H. What is History
History and Culture of the Indian People, Vol-I & II, Bharatiya Vidya Bhavana
Chattopadhyay, Bhaskar, Bharater Artha-Samajik O Rashtriya Byabostha: Prachin Jug
Chattopadhyay, Bhaskar, Bharater Sanskriti: Prachin Jug

Semester-I

CURRICULUM & CREDIT FRAME WORK

FOR

UG Programme in History

Subject: History (Minor)

Paper 1 – Ancient Indian History up to 550 CE

Learning Outcome: *The course aims to provide the fundamental knowledge of different aspects of Ancient Indian History.*

Unit	*Topic*	*LH*
Unit 1	*Sources and approaches of Ancient Indian History*	*12*
Unit 2	*Harappan Civilization: origin, extent, features and decline*	*12*
Unit 3	*Vedic Civilization: Vedic economy, polity, society and religion. Religious protest Movements- Jainism and Buddhism*	*12*
Unit 4	*Rise of an Empire centered on Magadha: Sixteen Mahajanpadas Emergence of Mauryan Empire- Chandragupta, Ashoka, administration and fall of the Maurayas*	*12*
Unit 5	*Post Mauyan period: Satvahana, Kushanas, Indo-Roman trade Age of the Guptas: Development of the Gupta Empire, Art, Literature and Administration*	*12*

Suggested Readings:

Altekar. A.S. – Education in Ancient India
Agrawal, D.P. – The The Archaeology of India
Basham, A.L. – The Wonder that was India
Chakraborty, D.K. – Archaeology of Ancient Indian Cities
Jha, D. N. - Ancient India in Historical Outline
Sharma, R.S- India's Ancient Past
Thapar, Romila-Ashoka and the Decline of the Mauryas
Thapar, Romila-History of Early India.
Tripathy, R.S- History of Ancient India.
Smith, V.A – Early History of India
Mookherjee, R.K- The Fundamental Unity of India
Mookherjee, Radha Kumud- Indian Education System
Majumdar, R.C – Ancient India

CURRICULUM & CREDIT FRAME WORK

FOR

UG Programme in History

Subject: History (Multi/ Interdisciplinary Course)

Paper 1 – History of India (1757 to 1857)

Learning Outcome: The main objective of this course is to know the history of how the English East India Company became the ruler of India. This course aims to reassess how they ruled our country for one hundred years. Furthermore, it also seeks to revisit the history of how native Indians revolted against them.

Unit	Topic	LH
Unit 1	Rise of the English East India Company: Battle of Plassey, Buxar and Grant of Dewani.	09
Unit 2	Regional States: Anglo-Maratha relations, Anglo- Mysore relations, Anglo- Sikh relations	09
Unit 3	Economic Policy: Drain of Wealth, Deindustrialization, Permanent Settlement and its impact	09
Unit 4	Socio Religious Reform Movement- Rammohan Roy, Young Bengal, Vidyasagar	09
Unit 5	Peasant and Tribal revolts : Wahabi Movement, Santal Movement 1857 Revolt: causes and consequences and nature	09

Suggested Reading:

Desai, A.R.–Peasant Struggle in India

Bagchi, Amiya- Private Investments in India

Chandra Bipan, Panikar K.N, Mukherjee Mridula, Mahajan Sucheta and Mukherjee Aditya – India's Struggle for Independence

Chandra, Bipan- Rise and Growth of Economic Nationalism in India

Dutt, R.P- India Today

Bandyapadhyay, Sekhar – From Plassey to Partition

SKILL ENHANCEMENT COURSE

Paper-I/Sem-I History

Understanding Indian Heritage

Learning Outcome: *Students will get to understand the different facets of Indian heritage and their significance. They also understand about the legal and institutional frameworks for heritage protection in India as the challenges facing it.*

UNIT- I: Defining Heritage (Lecture Hours: 10)

Meaning of 'antiquity', 'archaeological site', 'tangible heritage', 'intangible heritage' and 'art treasure'

UNIT- II: Constitution of Heritage in Colonial India and Evolution of Heritage Legislation (Lecture Hours: 10)

Institutionalization and commodification of Indian Heritage: Collections, exhibitions, museums and monumentalization-Case study of the Great Exhibition, London; Indian Museum, Kolkata; Conventions and Acts—national Heritage-related government departments, museums, regulatory bodies etc. Conservation Initiatives in India to protect the endangered heritage sites, Laws for Antiquities in India

UNIT- III: Tourism: Promoting Indian Heritage (Lecture Hours: 12)

Viewing Heritage Sites, The relationship between tourism and heritage, Guide Books and Travel literature as a tool for heritage marketing, Eco-Tourism in India-Commercializing nature, Exhibiting culture-Heritage Walks and Tours, palaces, heritage festivals

UNIT- IV: UNESCO World Heritage Sites in India: Selected Case Studies (Lecture Hours: 13)

Ajanta, Ellora & Elephanta Caves, Agra Fort, Taj Mahal, Fatehpur Sikri, Red Fort Complex, Qutb Minar and its Monuments, Khajuraho Group of Monuments, Group of Monuments at Hampi, Group of Monuments at Mahabalipuram, Sun Temple, Konârak, Great Living Chola Temples, The Jantar Mantar, Jaipur, Sundarbans National Park, Mountain Railways of India, Visva-Bharati, Santiniketan, Archaeological Site of Nalanda Mahavihara at Nalanda, Bihar

Suggested Readings:

David Lowenthal, Possessed By The Past: The Heritage Crusade and The Spoils of History, Cambridge, 2010 Layton, R. P. Stone and J. Thomas, Destruction and Conservation of Cultural Property. London: Rutledge, 2001
Lahiri, N, Marshaling the Past - Ancient India and its Modern Histories. Ranikhet: Permanent Black. 2012, Chapters 4 and 5.
S.S. Biswas, Protecting the Cultural Heritage (National Legislations and International Conventions). New Delhi: INTACH, 1999.
Acts, Charters and Conventions are available on the UNESCO and ASI websites (www.unesco.org; www.asi.nic.in)
Suman Mukherjee, Journeys in to the Past: Historical and Heritage Tourism in Bengal, New Delhi, New Academic Publishers, 2018
Sinha, Gaurab & Chakraborty, Saptarshi, Aitihya Adhyan, Kolkata, Ashadip, 2021.

Semester-II

CURRICULUM & CREDIT FRAMEWORK

FOR

UG Programme in History

Subject: History (Major)

Paper 2 – History of Ancient World Civilization

Learning Outcome: *Through this course students will acquire knowledge about the evolution of human society and transformation of ancient civilizations like Mesopotamia, Egypt, China, Greece, Roman and early Medieval Europe. They are acquiring knowledge about the origin, features, nature and class composition of various societies. They can compare to each and other among the several societies of the world.*

Unit	*Topic*	*LH*
Unit 1	*History of Early World Civilization: Egypt* *Egyptian Civilization: Political development, Economy, Art, Architecture, Religion and Society*	*12*
Unit 2	*History of Early World Civilization: Mesopotamia* *Mesopotamia Civilization: Sumerian, Babylonian, Assyrian and Akkadian: Polity, Society, Economy, Religion, Architecture, Administration and Education*	*12*
Unit 3	*History of Early World civilization: China* *Chinese civilization : Polity, Economy, Society, Science and Technology and Culture*	*12*
Unit 4	*History of Early World civilization: Persian* *Persian Civilization : Political, Social and Economic condition*	*12*
Unit 5	*Classical Greece:* *Age of Homer: Evolution of Classical Greece* *Athens, Sparta* *Greece : Persian War and the Peloponnesian War* *The Periclean Age in Greece, Growth of State and Society, Economy, Art, Culture, Literature, Drama, Sports and Philosophy*	*12*

Suggested Readings:

Childe, VG – What Happened in History
Durrant, Will- Our Oriental Heritage: the Story of Civilization
Shaoyi Bai- An Outline History of China
Trigger – Ancient Egypt : A Social History
Swain J.E – A History of World Civilization
Frankfort Henri- The Birth of Civilization in the Near East.
Trever A. Albert – History of Ancient Civilization
Wells, H.G – The Outline of History.
Mukherjee, Suman: Prachin Visva: Samajik Gathan, Sanskritik Vinyas o Arthanitik Chalchitra (Bangla), Bookpost Publication, Kolkata, 2021

Semester-II

CURRICULUM & CREDIT FRAMEWORK

FOR

UG Programme in History

Subject: HISTORY (Minor)

Paper – II: HISTORY OF INDIA (From 550 C.E to 1206 C.E)

Learning Outcome: *From this course students will learn and analyse about the transition from historic centuries upto the Early Medieval india. They will be able to delineate changes in the realm of polity and culture; Puranic religion; the growth of vernacular languages and newer forms of art and architecture.*

UNIT	*TOPIC*	*LH*
Unit 1	***Emergence of New Powers and the Age of Decentralisation :*** *Decline of the Gupta Power and the emergence of new powers in the 2nd half of the 6th Century C.E* *Pushyabhuti Dynasty and Kanyakubja – State, Society and Culture during the period of Harsha.* *Maukharis of Kanauj* *Sasanka, the King of Gauda – Political achievements and administration.*	*12*
Unit 2	***Decentralisation and emergence Regional Powers:*** *North-Western India: Dynasties of Kashmir – Arab invasion of Sindh – Shahi dynasty of Punjab – Their Political and Cultural achievements.* *North-Eastern India : Anarchy in Bengal after Sasanka – The Palas – The Senas – Dynasties of Kalinga – their Political and Cultural achievements*	*12*
Unit 3	***Emergence of Regional Powers in Central and Northern India :*** *Origin of the Rajputs : Various theories – Pratiharas – Gahadavalas – Chahamana – Chandella – Kalachuri – Paramara – their political and cultural achievements*	*12*
Unit 4	***Regional Powers of the Deccan and South India :*** *Chalukyas of Vatapi – Origin – History – Art and Architecture* *Rashtrakutas of Manyakheta – History – interference in North Indian politics – Religion – Art and architecture* *Pallavas of Kanchi – History – Art and Architecture* *Cholas of Tanjore – History – Administration – Art and Architecture*	*12*
Unit 5	***Decline of Rajputs and north India until 1206 CE:*** *Tripartite Struggle* *Fall of Rajput Power and the coming of the Arabs and Turks* ***Culture of Pre-Medieval India*** *Society and Religion till 12th century* *Architecture, Sculpture and paintings till 1206 CE*	*12*

Suggested Readings:

R.C.Majumdar, H.C.Raychaudhuri, K.K.Datta , An Advanced History of India
R.C.Majumdar and A.D Pusalkar (ed.), The History of Indian People, Vol V & VI
K.A.Nilkanta Sastri, History of South India (From Pre-historic times to the Fall of Vijaynagar), OUP, 1955
A.K.Majumdar, A Concise History of Ancient India, Vol I (1977) and Vol.II(1980),Delhi
B.D.Chattopadhyaya, The Making of Early Medieval India, Delhi, 1994
R.S.Sharma, Early Medieval Indian Society – A study in Feudalisation, Calcutta, 2001
Romila Thapar, A History of India, Vol I, Harmondsworth, 1974
Upinder Singh, A History of Early Medieval India, From Stone Age to Early Medieval India
রণবীর চক্রবর্তী, *প্রাচীন ভারতের অর্থনৈতিক ইতিহাসের সন্ধানে*
Chattopadhyay, Rupasree: Gourio Sanskriti Bikha

Semester-II

CURRICULUM & CREDIT FRAMEWORK

FOR

UG Programme in History

Subject: History (Multi/ Interdisciplinary Course)

Paper 2 – History of India (1858-1947)

***Learning outcome**: Through this course students will know about the various positive and negative aspects of British rule. Who knows the history of how the British followed the policy of partition and destroyed the dream of a united India of the freedom fighters of India.*

Unit	*Topic*	*LH*
Unit 1	*The aftermath of 1857: The Indigo rebellion, Aligarh Movement*	*09*
Unit 2	*The early phase of Indian National Movement – Birth of Indian National Congress, Congress activity, Swadeshi Movement, Morle Minto reforms*	*09*
Unit 3	*The Gandhi Era- Khilafat and Non-Cooperation Movement, Poona Pact, Civil Disobedience Movement, Quit India Movement.*	*09*
Unit 4	*Towards Freedom : 1935 Govt. Act, role of leftist movement, Subhas Bose and INA, Cripps Mission, Cabinet Mission*	*09*
Unit 5	*Communal Politics : Birth of Muslim League, Demand for Pakistan, rise of Hindu Mahasabha* *Partition of India- Causes and Effects*	*09*

Suggested Readings:

Sumit Sarkar- Modern India 1885-1947
K. K. Dutta – Social History of Modern India
A.R. Desai- Social background of Indian Nationalism
Tara Chand – History of Freedom Movement in India Vol 3
Penderal Moon- Divide and Quit
S.R. Mehrotra - The emergence of Indian National Congress
Bipan Chandra and Others- Freedom Struggle
Anita Indar Singh- the Partition of India
Sekhar Bandyopadhyay- From Plassey to Partition and After
Ram Chandra Pradhan – Raj to Swaraj

Semester-II

CURRICULUM & CREDIT FRAMEWORK

FOR

UG Programme in History

SKILL ENHANCEMENT COURSE

Paper-II/Sem-II

Archives and Museums

***Learning outcome**: Students will learn how to maintain documentary, visual and material remains of the past either in house or Institutions. It helps them to understand the importance and significance of such institutions to build the history of India.*

UNIT I (Lecture Hours: 10)

I. Definition of Archives and allied terms like Manuscripts, Documents, Records, Library.

II. Physical forms of Archival Materials like Clay tablets, Stone inscriptions, Metal Plates, Palm leaves and Paper records, Photographs, Cartographic Records Film, Video tapes and other electronic records.

UNIT II (Lecture Hours: 10)

I. Types of Archives.

II. History of Archives.

III. History of Setting up of Archives in India with some specific example like National Archives, New Delhi and any regional example of the local archive.

UNIT III (Lecture Hours:12)

I. Definition of Museum.

II. Aims, Functions, History of Museum.

III. History of setting up Museum in India with special reference to Indian Museum, Calcutta, National Museum.

UNIT IV (Lecture Hours: 13)

I. Types of Museum and Emergence of New Museums and allied institutions.

II. Material Collection, Conservation, Preservation and their policies, ethics and procedure.

III. Museum and Society: Exhibitions, Public Relation.

Suggested Readings:

Saloni Mathur : India by Design : Colonial History and Cultural Display, University of California, 2007.
Sengupta, S. : Experiencing History Through Archives, Delhi : Munshiram Manoharlal, 2004.
Guha, Thakurta, Tapati : Monuments, Objects, Histories : Institution of Art in ColonialIndia, New York, 2004.
Kathpalia, Y.P.: Conservation and Restoration of Archive Materials, UNESCO, 1973.
Choudhary, R.D.: Museums of India and their maladies, Calcutta: Agam Kala, 1988.
Nair, S.M.: Bio-Deterioration of Museum Materials, 2011.
Agrawal, O.P.: Essentials of Conservation and Museology, Delhi, 2007.
Guha-Thakurta, Tapti: The Making of a New Modern Indian Art : Aesthetics and Nationalism in Bengal, 1850-1920, Cambridge University Press, 1992.
Mitter, Partha: Indian Art, Oxford History of Art Series, Oxford University Press, 2001.
Ray Niharranjana: An Approach to Indian Art, Calcutta, 1970.
Basu, Purnendu; Records and Archives, What are they, National Archieve of India, 1960, Vol II, No. 29.

GEOGRAPHY

THE UNIVERSITY OF BURDWAN

Syllabus for 3-Year Degree/4-Year Honours
in
Geography
Under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020
With effect from 2023-24

24.07.23
Prof. Biswaranjan Mishra
Head
Department of Geography
The University of Burdwan
Golapbag, Purba Bardhaman-713104 (W.B)

SEMESTER WISE AND COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

SEM	COURSE TYPE	COURSE NAME	CREDIT	MARKS				DISTRIBUTION OF CREDIT		
				IA	ESE (TH)	ESE (PR)	TOTAL	LECT	TUTO	PR
I	**MAJOR/DS COURSE CODE: GEOG 1011**	GEOTECTONICS AND GEOMORPHOLOGY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MINOR COURSE CODE:GEOG 1021	GEOTECTONICS AND GEOMORPHOLOGY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MULTIDISCIPLINARY COURSE CODE: GEOG 1031	PHYSICAL GEOGRAPHY	**3**	**10**	**40**	**0**	**50**	**2**	**1**	**0**
	ABILITY ENHANCEMENT COURSE(AEC) CODE: AEC1041	Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equiv. Course from SWAYAM /Any other UGC recognized platform	**2**	**10**	**40**	**0**	**50**	**2**	**0**	**0**
	SKILL ENHANCEMENT COURSE (SEC) CODE: GEOG 1051	COMPUTER BASICS AND COMPUTER APPLICATIONS	**3**	**10**	**0**	**40**	**50**	**0**	**0**	**3**
	VALUE ADDED COURSE(VAC) CODE: CVA1061	ENVIRONMENTAL SCIENCE/ EDUCATION	**4**	**20**	**60**	**20**	**100**	**3**	**1**	**1**
	TOTAL		**20**				**400**			
II	**MAJOR/DS COURSE CODE: GEOG 2012**	POPULATION AND SETTLEMENT GEOGRAPHY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MINOR COURSE CODE:GEOG 2022	POPULATION AND SETTLEMENT GEOGRAPHY	**4**	**15**	**60**	**0**	**75**	**3**	**1**	**0**
	MULTIDISCIPLINARY COURSE CODE: GEOG 2032	HUMAN GEOGRAPHY	**3**	**10**	**40**	**0**	**50**	**2**	**1**	**0**
	ABILITY ENHANCEMENT COURSE(AEC) CODE: AEC2041	English or Equiv. Course from SWAYAM/ /Any other UGC-recognized platform	**2**	**10**	**40**	**0**	**50**	**2**	**0**	**0**
	SKILL ENHANCEMENT COURSE (SEC) CODE: GEOG 2052	FIELD TECHNIQUES	**3**	**10**	**40**	**0**	**50**	**2**	**1**	**0**
	VALUE ADDED COURSE(VAC) CODE: CVA 2061	Understanding India/Digital & Tech. Solutions/Health & Wellness, Yoga Edu, Sports & Fitness	**4**	**20**	**80/60**	**0/20**	**100**	**3/3**	**1/0**	**0/1**
	Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.									
	TOTAL		**20**				**400**			

GEOGRAPHY (MAJOR)
SEMESTER I
COURSE 1 (CODE: GEOG 1011)

COURSE TITLE: GEOTECTONICS AND GEOMORPHOLOGY **Credits: 4**

Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To instil fundamental knowledge about the different aspects of Physical Geography, especially Geotectonics and Geomorphology with the objective to educate them regarding the characteristics of different Earth surface processes and landforms.

Learning Outcome: ● Students shall gather ideas about structure of the Earth and the causes for the different tectonic activities over the Earth. They also get opportunity to learn about different exogenic processes and resultant landforms.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Physical Geography or Earth Sciences.

UNIT I: Concepts in Geotectonic

Lecture hours (30 hrs)

1. Earth's crust and interior: Internal structure with seismological evidences 5
2. Theories of Isostasy: Airy & Pratt 4
3. Continental Drift: Evidences, criticism and importance 5
4. Sea floor spreading: Process, evidences (Palaeomagnetism) 5
5. Plate Tectonics: Mechanism of movements, vulcanism, genesis of earthquake and Mountain building 6
6. Folds and Faults: Origin and classification 5

UNIT II: Fundamentals of Geomorphology

Lecture hours (30Hrs)

1. Fundamental principles of Geomorphology 4
2. Denudational processes and resultant landforms : Weathering and Mass movement 5
3. Theories of landscape evolution: Davis, Penck, and Hack 6
4. Slope development: Theories of King and Wood 4
5. Processes and landforms: Fluvial and Coastal 6
6. Drainage development on Uniclinal and folded structure 5

Suggested Readings: Geotectonics and Geomorphology

1. Bloom, A. L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey

2. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey

3. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington

4. Duff, D. (1993): Holmes': *Principles of Physical Geology*, Stanley Thornes, Cheltenham

5. Erickson, J. (2001): *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York

6. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London

7. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction,* Oxford University Press, Oxford

8. Holmes, A. (1978): *Principles of Physical Geology*, Van Nostrand Rheinhold, New York

9. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York

10. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata

11. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford

12. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London

13. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford

14. Siddhartha, K. (2001): *The Earth's Dynamic Surface*, Kisalaya Publications, New Delhi

15. Singh, S. (2000): *Geomorphology*, Prayag Pustak Bhavan, Allahabad

16. Strahler, A.H. and Strahler A.N. (1992): *Modern Physical Geography*, John Wiley & Sons, New York

17. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London

18. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester

19. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston

20. Thornbury, W. D. (I960): *Principles of Geomorphology*, John Wiley & Sons, New York

21. Wooldridge, S.W. and Morgan, R.S. (1937): *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London

22. Young, A. (1972): *Slopes,* Oliver and Boyd, Edinburg

SEMESTER II
GEOGRAPHY (MAJOR)
COURSE II (CODE: GEOG 2012)

COURSE TITLE: POPULATION AND SETTLEMENT GEOGRAPHY **Credits: 4**
Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To inculcate fundamental knowledge about Population Geography and basic concepts in Settlement Geography.

Learning Outcome: ● Students shall gather ideas about the dynamics of population and its different measures and also about the different types & patterns of settlement. The course will help them to gather ideas about fundamental concepts in Urban Geography.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Population studies or in Urban Geography.

UNIT I: Population Geography

Lecture hours (30Hrs)

1. Development of Population Geography; Relation between Population Geography and Demography 4
2. Determinants of Population Dynamics: Fertility, Mortality and Migration 4
3. Measures of Fertility and Mortality 5
4. Migration: Theories, Causes and Types 5
5. Theories of population growth: Malthus and Marx; Demographic Transition Theory (Thompson and Notestein) 6
6. Population Composition (Age-Sex; Occupational Structure); Population policies (India and Sweden). 6

UNIT II: Settlement Geography

Lecture hours (30Hrs)

1. Development of Settlement Geography 4
2. Characteristics of Rural Settlement: Site, Situation, types and Pattern 5
3. Morphology of rural Settlements 4
4. Urban Settlements: Census Definition, Urban Agglomeration; Urban sprawl, Rural-urban Continuum, Rurban and Periurban 5
5. Urban Morphology: Classical Models of Burgess, Hoyt, Harris and Ullman 6
6. Central place theory and Hierarchy of settlements; Urban primacy 6

Suggested Readings: Social & Cultural Geography

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Beaujeu- Garnier, J. (1966) Geography of Population. London: Longman.
3. Bhende, A.S. and Kanitkar, T. (2015) Principles of Population Studies. Mumbai: Himalaya Publishing House.
4. Casino, V.J.D., Jr., (2009): *Social Geography*: A Critical Introduction, Wiley-Blackwell, Chichester.
5. Chandana, R.C. (2021) Geography of Population – Concept, Determinants and World Pattern. New Delhi: Kalyani Publishers.
6. Clarke, J.I. (1972): Population Geography, Pergamon Press, Oxford.
7. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press, Oxford and London.
8. Dubey. S.C. (1991): *Indian Society*, National Book Trust, New Delhi.
9. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles.
10. Ghosh, S. (1998) Settlement Geography. Kolkata: Orient Longman Ltd.
11. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London.
12. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi.
13. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
14. Mandal, R.B. (2001) Introduction to Rural Settlements. New Delhi: Concept Publishing Company.
15. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto.
16. Ramachandran, R. (2010) Urbanisation and Urban Systems of India. New Delhi: Oxford University Press.
17. Roy, D. (2015) Population Geography. Kolkata: Books & Allied (P) Ltd.
18. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.
19. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi.
20. Singh, R.Y. (1994) Geography of Settlement. Jaipur: Rawat Publications, Jaipur.
21. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London .
22. Tiwari, R.C. (2020) Settlement Geography – Rural and Urban Settlement. Allahabad: Pravalika Publications.
23. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.

GEOGRAPHY (MINOR)
SEMESTER- I
COURSE 1 (CODE: GEOG 1021)

COURSE TITLE: GEOTECTONICS AND GEOMORPHOLOGY **Credits: 4**

Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To instil fundamental knowledge about the different aspects of Physical Geography, especially Geotectonics and Geomorphology with the objective to educate them regarding the characteristics of different Earth surface processes and landforms.

Learning Outcome: ● Students shall gather ideas about structure of the Earth and the causes for the different tectonic activities over the Earth. They also get opportunity to learn about different exogenic processes and resultant landforms.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Physical Geography or Earth Sciences.

UNIT I: Concepts in Geotectonic

Lecture hours (30 hrs)

1. Earth's crust and interior: Internal structure with seismological evidences 5
2. Theories of Isostasy: Airy & Pratt 4
3. Continental Drift: Evidences, criticism and importance 5
4. Sea floor spreading: Process, evidences (Palaeomagnetism) 5
5. Plate Tectonics: Mechanism of movements, vulcanism, genesis of earthquake and Mountain building 6
6. Folds and Faults: Origin and classification 5

UNIT II: Fundamentals of Geomorphology

Lecture hours (30Hrs)

1. Fundamental principles of Geomorphology 4
2. Denudational processes and resultant landforms : Weathering and Mass movement 5
3. Theories of landscape evolution: Davis, Penck, and Hack 6
4. Slope development: Theories of King and Wood 4
5. Processes and landforms: Fluvial and Coastal 6
6. Drainage development on Uniclinal and folded structure 5

Suggested Readings: Geotectonics and Geomorphology

1. Bloom, A. L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey

2. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey

3. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington

4. Duff, D. (1993): Holmes': *Principles of Physical Geology*, Stanley Thornes, Cheltenham

5. Erickson, J. (2001): *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York

6. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London

7. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction,* Oxford University Press, Oxford

8. Holmes, A. (1978): *Principles of Physical Geology*, Van Nostrand Rheinhold, New York

9. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York

10. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata

11. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford

12. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London

13. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford

14. Siddhartha, K. (2001): *The Earth's Dynamic Surface*, Kisalaya Publications, New Delhi

15. Singh, S. (2000): *Geomorphology*, Prayag Pustak Bhavan, Allahabad

16. Strahler, A.H. and Strahler A.N. (1992): *Modern Physical Geography*, John Wiley & Sons, New York

17. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London

18. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester

19. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston

20. Thornbury, W. D. (I960): *Principles of Geomorphology*, John Wiley & Sons, New York

21. Wooldridge, S.W. and Morgan, R.S. (1937): *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London

22. Young, A. (1972): *Slopes,* Oliver and Boyd, Edinburg

GEOGRAPHY (MINOR)
SEMESTER- II
COURSE 1I (CODE: GEOG 2022)

COURSE TITLE: POPULATION AND SETTLEMENT GEOGRAPHY **Credits: 4**
Lecture hours: 60

Total Marks: 75 Course Evaluation: Semester Examination (60 marks) and Internal Assessment (15 Marks)

Course Objective: ● To inculcate fundamental knowledge about Population Geography and basic concepts in Settlement Geography.

Learning Outcome: ● Students shall gather ideas about the dynamics of population and its different measures and also about the different types & patterns of settlement. The course will help them to gather ideas about fundamental concepts in Urban Geography.

Professional Skill Development: ● This knowledge will help to provide a foundation for the further studies in Population studies or in Urban Geography.

UNIT I: Population Geography

Lecture hours (30Hrs)

1. Development of Population Geography; Relation between Population Geography and Demography 4
2. Determinants of Population Dynamics: Fertility, Mortality and Migration 4
3. Measures of Fertility and Mortality 5
4. Migration: Theories, Causes and Types 5
5. Theories of population growth: Malthus and Marx; Demographic Transition Theory (Thompson and Notestein) 6
6. Population Composition (Age-Sex; Occupational Structure); Population policies (India and Sweden). 6

UNIT II: Settlement Geography

Lecture hours (30Hrs)

1. Development of Settlement Geography 4
2. Characteristics of Rural Settlement: Site, Situation, types and Pattern 5
3. Morphology of rural Settlements 4
4. Urban Settlements: Census Definition, Urban Agglomeration; Urban sprawl, Rural-urban Continuum, Rurban and Periurban 5
5. Urban Morphology: Classical Models of Burgess, Hoyt, Harris and Ullman 6
6. Central place theory and Hierarchy of settlements; Urban primacy 6

Suggested Readings: Social & Cultural Geography

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Beaujeu- Garnier, J. (1966) Geography of Population. London: Longman.
3. Bhende, A.S. and Kanitkar, T. (2015) Principles of Population Studies. Mumbai: Himalaya Publishing House.
4. Casino, V.J.D., Jr., (2009): *Social Geography*: A Critical Introduction, Wiley-Blackwell, Chichester.
5. Chandana, R.C. (2021) Geography of Population – Concept, Determinants and World Pattern. New Delhi: Kalyani Publishers.
6. Clarke, J.I. (1972): Population Geography, Pergamon Press, Oxford.
7. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press, Oxford and London.
8. Dubey. S.C. (1991): *Indian Society*, National Book Trust, New Delhi.
9. Eyles, J. (ed.) (1986): *Social Geography in International Perspective*, Rowman and Littlefield, New Jersey and Los Angeles.
10. Ghosh, S. (1998) Settlement Geography. Kolkata: Orient Longman Ltd.
11. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London.
12. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi.
13. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
14. Mandal, R.B. (2001) Introduction to Rural Settlements. New Delhi: Concept Publishing Company.
15. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto.
16. Ramachandran, R. (2010) Urbanisation and Urban Systems of India. New Delhi: Oxford University Press.
17. Roy, D. (2015) Population Geography. Kolkata: Books & Allied (P) Ltd.
18. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.
19. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi.
20. Singh, R.Y. (1994) Geography of Settlement. Jaipur: Rawat Publications, Jaipur.
21. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London.
22. Tiwari, R.C. (2020) Settlement Geography – Rural and Urban Settlement. Allahabad: Pravalika Publications.
23. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.

GEOGRAPHY
MULTIDISCIPLINARY COURSES (MDC)
SEMESTER I
COURSE: 1 (CODE: GEOG 1031)

COURSE TITLE: PHYSICAL GEOGRAPHY (Theory) **Credits: 3**
Lecture hours: 45

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10Marks)

Objectives of the Course: Students can acquire knowledge and develop an understanding of concepts, processes and methods of Physical Geography. Students may develop an interest in Geography through this course. Students can familiarize themselves with key concepts, terminology and core principles of Geography.

Learning Outcomes:

Students can apply the knowledge of the principles of Physical Geography in explaining the causes and consequences of natural hazards and suggest ways of coping with them through sustainable development. They will understand and analyze physical environments and utilize such knowledge in reflecting on issues on nature.

Professional Skill Development:

The acquired knowledge is beneficial to providing for future studies in geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Internal Structure of Earth	5
2. Geomorphic Processes: Weathering and Erosion	6
3. Processes and Landforms : Fluvial, Glacial and Aeolian	8
4. Composition and Structure of Atmosphere	6
5. Insolation, Heat Budget, Horizontal and Vertical Distribution of Temperature	6
6. Hydrological Cycle	4
7. Soil forming factors; Types of soil: Zonal, Azonal and Intrazonal	6
8. Classification of Natural Vegetation	4

Suggested Readings :

1. Barry,R. G, Chorley R. J. 2009 Atmosphere Weather and Climate. 9th Ed, Routledge.
2. Conserva H. T., 2004: Illustrated Dictionary of Physical Geography, Author House, USA.
3. Daji, J. A., Kadam, J.R., Patil, N.D. 1996 A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.
4. Gabler R.E., Petersen J.F. and Trapasso, L.M., 2007: Essentials of Physical Geography (8thEdition), Thompson, Brooks/Cole, USA.
5. Garrett. N., 2000: Advanced Geography, Oxford University Press.
6. Goudie, A., 1984: The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.
7. Hamblin, W.K. 1995: Earth's Dynamic System, Prentice Hall, N.J.
8. HusainM.2002: Fundamentals of Physical Geography, Rawat Publications, and Jaipur.
9. Lal, D. S. 2012. Climatology. Sharda Pustak Bhawan.
10. Monkhouse, F.J.2009: Principles of Physical Geography, Platinum Publishers, Kolkata.
11. Strahler A.N. and Strahler A.H., 2008: Modern Physical Geography, John Wiley & Sons, New York.

GEOGRAPHY
MULTIDISCIPLINARY COURSES (MDC)
SEMESTER II
COURSE: 2 (CODE: GEOG 2032)

COURSE TITLE: HUMAN GEOGRAPHY (Theory) **Credits: 3**

Lecture hours: 45

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10 Marks)

Objectives of the Course: Students can acquire knowledge and develop an understanding of concepts, processes and methods of Human Geography. Students may develop an interest in Human Geography through this course. Students can familiarize themselves with key concepts, terminology and core principles of Human Geography. They can easily recognize and understand the processes and patterns of the spatial arrangement of the natural features as well as human aspects and phenomena on the earth's surface.

Learning Outcomes: Students achieve knowledge about major themes of human geography. They can develop an idea about space and society and build an idea about population growth and distribution of population. This module helps to recognize about population –resource relationship. They will understand and analyze the inter-relationship between physical and human environments and utilize such knowledge in reflecting on issues related to society.

Professional Skill Development: The acquired knowledge is beneficial to providing for future studies in Geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Population: Distribution, Density and Growth	6
2. Types of population migration	5
3. Economic Activities: Primary, Secondary and Tertiary	6
4. Types and Patterns of Rural Settlements	6
5. Definition and Types of Urban Settlements	6
6. Major Ethnic groups of the World	6
7. Cultural Diffusion	5
8. Indicators of Human Development	5

Suggested Readings:

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Chandna, R.C.(2010) Population Geography, Kalyani Publisher.
3. Clarke, J.I. (1972): Population Geography, Pergamon Press, Oxford.
4. Daniel,P.A. and Hopkinson, M.F.(1989)The Geography of Settlement, Oliver & Boyd, London.
5. Johnston R; Gregory D, PrattG. etal. (2008)The Dictionary of Human Geography, Blackwell Publication.
6. Jordan-Bychkovetal. (2006)The Human Mosaic: A Thematic Introduction to Cultural Geography. W.H. Freemanand Company, NewYork.
7. Ghosh,S. (2015) Introduction to settlement geography. Orient Black Swan Private Ltd., Kolkata.
8. Ghosh, S. (1998) Settlement Geography. Kolkata: Orient Longman Ltd.
9. Hussain, Majid(2012) Manav Bhugol. Rawat Publications ,Jaipur
10. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.

GEOGRAPHY

SKILL ENHANCEMENT COURSE (SEC)
SEMESTER I
COURSE: 1 (CODE: GEOG 1051)

COURSE TITLE: COMPUTER BASICS AND COMPUTER APPLICATIONS (Practical) Credits: 3

Lecture hours: 90

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10 marks)

Objectives: This is an initiative to develop the basics of computer applications to students so that they can apply it to solve the geographical problems through statistical methods. From this course students can learn the significance of computer applications in geographical studies.

Learning Outcomes: Students shall know about fundamentals of computer applications. They can develop an idea about computer basics and acquire skill to solve the statistics. They will be able to identify correlations of different variables and can establish solution of research problems through statistical procedure with the help of computer application.

Professional Skill Development: The acquired knowledge is beneficial to providing for future studies in Geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Numbering Systems; Binary Arithmetic	10
2. Data Computation, Storing and Formatting in Spreadsheets: Computation of Rank, Mean, Median, Mode, Standard Deviation,	25
3. Moving Averages, Derivation of Correlation, Covariance and regression; Selection of technique and interpretation.	25
4. Preparation of annoted diagrams and its interpretation: Scatter diagram and Histogram	20
5. Internet surfing: generation and extraction of information	10

(Sub unit 2, 3, 4 will be done by using MS Excel)

Suggested Readings:

1. Bartee, Thomas C. (1977): Digital Computer Fundamental; McGraw Hill.
2. Chauhan, S.; Chauhan, A. and Gupta, K. (2006): Fundamental of Computer; Firewall Media.
3. Flake, L.J.; McClintock, C.E. and Turner, S. (1989): Fundamental of Computer Education; Wordsworth Pub. Co.
4. Leon, A. and Leon, M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.
5. Malvino, A.P. and Leach, D.P. (1981): Digital Principles and Applications; Tata Mc Graw Hill.
6. Mano, Moris M. and Kime, Charles R. (2004): Logic and Computer Design Fundamental; Prentice Hall. Rajaraman, V.(2003):Fundamentals of Computer, Prentice Hall Publisher
7. Sarkar, A. and Gupta, S.K (2002): Elements of computer Science, S Chand and Company, New Delhi Blissmer (1996):Working with MSWord; Houghton Mifflin Co.
8. Johnson, Steve (2007): Microsoft PowerPoint 2007; Pearson Paravia Bruno.
9. Leon, A .and Leon, M. (1999): Introduction to Computer, USB Publishers' Distributors Ltd.
10. Leon, A. and Leon, M.(1999):A beginners Guide to Computers, Vikas

10. Rajaraman, V. (2008): Computer Primer; Prentice Hall of India Pvt. Ltd.
11. Sarkar, A. and Gupta, S .K (2002) Elements of computer Science, S Chand and Company, New Delhi
12. Shepard, Aaron (2007): Perfect Pages; Shepard Publications. Tyson,
13. Herbert L. (2007): Microsoft Word 2007 Bible; John Wiley.
14. Walkenbach, John (2007): Excel 2007 Bible; John Wiley

GEOGRAPHY

SKILL ENHANCEMENT COURSE (SEC)
SEMESTER II
COURSE: 2 (CODE: GEOG 2052)

COURSE TITLE: FIELD SURVEY TECHNIQUES (Theory) **Credits: 3**

Lecture hours-45

Total Marks: 50 Course Evaluation: Semester Examination (40 marks) and Internal Assessment (10marks)

Objectives: This is an initiative to develop the basic concept of field technique to students so that they can apply it to solve the geographical problems in the field. From this course students can learn the significance of field techniques in geographical studies, understand the meaning of field and identifying the case study.

Learning Outcomes: Students shall know about different types of field techniques. They can develop an idea about research problems and acquire observation power through field experience in future they will be able to identify the socio environmental problems of a locality. They will be capable to develop communication skill and interaction power.

Professional Skill Development: The acquired knowledge is beneficial to providing for future studies in geography. This obtained knowledge will definitely providing basic inputs in skill development which will place the students in their professional life in the near future.

	Lecture hours
1. Fieldwork in Geographical studies – Role and significance, Selection of study area and objectives, Pre-field preparations, Ethics of fieldwork	10
2. Preparation of Survey Schedule and Questionnaires (open, closed, structured, non-structured)	8
3. Interview with special reference to focused group discussions	7
4. Field techniques and tools: Landscape survey using transects and quadrants, constructing a sketch, photo and video recording	10
5. Collection of samples. Preparation of inventory from field data. Post-field tasks	10

Suggested Readings:

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications
2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi
3. Evans M., 1988: “Participant Observation: The Researcher as Research Tool” in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
4. Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publs. Co., New Delhi
5. Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
6. Special Issue on “Doing Fieldwork” The Geographical Review 91:1-2 (2001).
7. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/ Kothari, C. R. and Garg, G., 2018, Research Methodology, Methods and Techniques, New Age International Publication, New Delhi

24.07.23

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PHILOSOPHY

The University of Burdwan

Syllabus for 3-year degree/4-YearHonours

in

Philosophy

Under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020

To be in effect from 2023-24

SEMESTER-WISE & COURSE -WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

Semester	Course Type with Code	Level	Course Title	Credit	Lect.	Tuto	Pract. /Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract. / Viva-voce	Internal Assessment
I	Major/DS Course (Core) Code: PHIL1011	100-199	**Outlines of Philosophy: Indian and Western—I**	4	3	1	0	75	60	00	15
	Minor Course Code: PHIL1021	100-199	**Philosophy : Indian and Western—I**	4	3	1	0	75	60	00	15
	Multi/Inter disciplinary Code: PHIL 1031		**Value Education in Indian Tradition —I : Swami Vivekananda and Sri Aurobindo**	3	2	1	0	50	40	00	10
	Ability Enhancement Course (AEC) [L_1-1 MIL] Code: AEC1041		Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equivalent. Course from SWAYAM /Any other UGC recognized platform	2	2	0	0	50	40	00	10
	Skill Enhancement Course (SEC) Code: PHIL1051		**Philosophy of Human Rights**	3	2	1	0	50	40	00	10
	Common Value Added (CVA) Course Code: CVA1061		Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			**20**				**400**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./Viva-voce	Internal Assessment
II	Major/DS Course (Core) Code: PHIL2011	100-199	**Outlines of Philosophy: Indian and Western—II**	4	3	1	0	75	60	00	15
	Minor Course Code: PHIL2021	100-199	**Philosophy: Indian and Western---II**	4	3	1	0	75	60	00	15
	Multi/Interdisciplinary Code: PHIL2031		**Value Education in Indian Tradition (II) : Rabindranath Tagore, S. Radhakrishnan and Md. Iqbal**	3	2	1	0	50	40	00	10
	Ability Enhancement Course (AEC)[L_2-1] Code: AEC2041		English or Equivalent. Course from SWAYAM/ /Any other UGC-recognized platform	2	2	0	0	50	40	00	10
	Skill Enhancement Course (SEC) Code: PHIL2051		**Environmental Ethics**	3	2	1	0	50	40	00	10
	Common Value Added (CVA) Course Code: CVA2061		Understanding India/Digital & Technological Solutions/Health & Wellness, Yoga Education, Sports & Fitness	4	3/3	1/0	0/1	100	80/60	0/20	20
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**20**				**400**			

Syllabus in details

Semester-I

Major/DS Course (Core)

Code: PHIL1011

Outlines of Philosophy: Indian and Western—I

Module-I

Detailed Introduction: General Features of Indian Philosophy, Basic concepts of the Vedic and the Upaniṣadic world-views

Module-II

Cārvāka:*pramāṇatattva*, *jaḍavāda* and *dehātmavāda*

Jainism: *anekāntavāda*, *syādvāda* and *nayavāda*, Theory of self and liberation, Nature of substance: Relation between Substance, Attributes & Modes

Buddhism: Four Noble Truths, *pratītyasamutpādavāda*, *kṣaṇabhaṅgavāda*, *nairātmyavāda*, Four Major Schools of Buddhism

Module-III

The Pre-Socratic Period : Ionian School, Parmenides, Heraclitus , Zeno

Plato : Theory of Knowledge, Theory of Ideas

Module-IV

Aristotle : Refutation of Plato's Theory of Ideas, Theory of Substance, Form and Matter, Theory of Causation

Recommended Texts :

- M. Hiriyanna: Outlines of Indian Philosophy
- Sāyana Mādhavācārya : *Sarvadarśanasaṁgraha*
- S. C. Chatterjee & D. M. Dutta : *An Introduction to Indian Philosophy*
- Haridas Bandyaopadhyay: *Bhāratīya Darśaner Marmakathā*
- F. Copleston : *A History of Philosophy* [Vols. I, IV, V, & VII]
- W. T. Stace : *A Critical History of Greek Philosophy*

References :

- C. D. Sharma : *A Critical Survey of Indian Philosophy*
- J. N. Mohanty : Classical Indian Philosophy
- Satyajyoti Chakraborty (ed. & Bengali. tr.): *Sarvadarśanasaṁgraha*
- Niradbaran Chakraborty :*Bhāratīya Darśan*
- Deepak Kumar Bagchi : *Bhāratīya Darśan*
- Debabrata Sen : *Bhāratīya Darśan*
- Pradyot Kumar Mandal : *Bhāratīya Darśan*
- Panchanan Shastri : *Cārvak Darśan*
- Ramkrishna Bhattacharya : *Cārvāk Carcā*
- Shailendra Brahmachari : *Abhidhamma Darpan*
- Panchanan Shastri : *Bauddha Darśan*
- Satindra Chandra Nyāyācārya *: Jaina Darśaner Digdarśan*
- Srikanta Samanta : *Bhāratīya Darśanśastrer Ruprekhā*
- B. Russell : *A History of Western Philosophy*
- Y. Masih : *A Critical History of Western Philosophy*
- R. Falckenberg : *History of Modern Philosophy*
- Anders Wedberg : *A History of Philosophy*, Vols.-I & II
- Tom Sorell & G. A. J. Rogers (ed.): *Analytic Philosophy and History of Philosophy*
- Niradbaran Chakraborty : *Pāścātya Darśaner Itihās* (Plato, Aristotle)
- Sushanta Chakraborty *: Pāścātya Darśaner Itihās*
- Chandrodaya Bhattacharya : *Pāścātya Darśaner Itihās*
- Tarak Chandra Das : *Pāścātya Darśaner Itihās,* Vols.-I, II & III
- Shyamal Kumar Mukhopadhyay : *Socratiser Bicār o Mṛtyu* (Darśan O Samāj Trust, 1996)
- Sardar Fajlul Karim : *Plator Saṁlāp* (Bengali Tr. of Plato's Dialogues), Dhaka Bangla Academy

Minor Course

Code: PHIL1021

Philosophy: Indian and Western—I

Module-I

Introduction: General features of Indian Philosophy

Cārvāka : *pramāṇatattva*, *jaḍavāda* and *dehātmavāda*

Module : II

Jainism : *anekāntavāda*, *syādvāda* and *nayavāda*

Buddhism: Four noble truths, *pratītyasamutpādavāda*, *kṣaṇabhaṅgavāda, nairātmyavāda*

Module- III

Metaphysics : Nature of Metaphysics, Elimination of Metaphysics

Realism : Naïve Realism, Scientific Realism, Representative Realism

Idealism: Subjective Idealism, Objective Idealism

Module-IV

Substance : Views of Descartes, Spinoza, Locke and Berkeley

Relation between Mind and Body : Interactionism and Parallelism

Recommended Texts :

- S. C. Chatterjee & D. M. Dutta: *An Introduction to Indian Philosophy*
- C. D. Sharma : *A Critical Survey of Indian Philosophy*
- Haridas Bandyaopadhyay : *Bhāratīya DarśanerMarmakathā*
- Falkenberg : *History of Western Philosophy*
- J. Hospers: *Philosophical Analysis*
- Sibapada Chakraborty : *General Philosophy*

References :

- M. Hiriyanna : *Outlines of Indian Philosophy*
- J. N. Mohanty : *Classical Indian Philosophy*

- Margaret Chatterjee : *Philosophical Enquiries*
- Niradbaran Chakraborty :*Bhāratīya Darśan*
- Panchanan Shastri :*Cārvāka Darśan*
- Panchanan Shastri : *Bauddha Darśan*
- Niradbaran Chakraborty : *Bhāratīya Darśan*
- Deepak Kumar Bagchi : *Bhāratīya Darśan*
- DebabrataSen : *Bhāratīya Darśan*
- Sibapada Chakraborty : *An Introduction to General Philosophy*
- Ramchandra Pal :*Darśan Parichaya*
- Rama Prasad Das & Sibapada Chakraborty : *Pāścātya Darśaner Rūprekhā*
- Niradbaran Chakraborty : *Pāścātya Darśaner Bhūmikā*

Multi/Inter disciplinary

Code: PHIL 1031

Value Education in Indian Tradition—I: Swami Vivekananda and Sri Aurobindo

Module-I

Swami Vivekananda

Practical Vedānta—Nature of God, Man and the World

Module-II

Swami Vivekananda

karma yoga, *jñāna yoga*, *bhakti yoga* and *rāja yoga*

Module-III

Sri Aurobindo

Integral yoga, Integral education and *Niṣkāma karma*

Recommended Texts :

- B. K. Lal : *Contemporary Indian Philosophy*
- D. M. Dutta : *Chief Currents of Contemporary Philosophy*
- Binay Gopal Roy : *Contemporary Indian Philosophers*
- Swami Vivekananda : *Complete Works of Swami Vivekananda*
- S. K. Maitra : *An Introduction to the Philosophy of Sri Aurobindo*

References:

- R. N. Sharma: *Contemporary Indian Philosophy*
- Sunil Roy : *Sri Aurobinder Darsan Manthane*
- Nikhilesh Bandopadhyaya : *Bingsashatabdir Bharatiya Darsan*
- Saikat Bandyopadhyay: *Bingsashatabdir Bharatiya Darśan*
- Nirmalya Narayan Chakraborti : *Bingsashatābdite Bhāratiya Darsancarchā*

Skill Enhancement

Course (SEC)

Code: PHIL 1051

Philosophy of Human Rights

Module-I

Definition and nature of Human Rights

Origin and historical development of Human Rights during ancient, medieval, modern and contemporary period

Module-II

Natural Rights tradition: Thomas Hobbes, John Locke and Thomas Paine,

Some Reactions to Natural Rights tradition: Jeremy Bentham, Edmund Burke

Contemporary perspective: Joel Feinberg, Thomas Hill Green, Rex Martin and Margaret MacDonald

Module-III

Indian Constitution: Preamble, Fundamental Rights and Duties

Fundamental Rightsvis-à-vis Human Rights

Recommended Texts:

- Patrick Hayden (ed.): *The Philosophy of Human Rights*
- Morton E. Winston (ed.): *The Philosophy of Human Rights*
- Jeremy Waldron (ed.): *Theories of Rights*
- P. M. Bakshi : *The Constitution of India*

References:

- Ashwani Peetush and Jay Drydyk: *Human Rights: India and West*,
- James Nickel: *Making Sense of Human Rights*
- Henry Shue : *Basic Rights: Subsistence, Affluence and U. S. Foreign Policy*, Gary, B. Herbert: *Philosophical History of Human rights,*

- Michael Freeden : *Rights*, Worldview Publications
- Lynn Hunt: *Inventing Human Rights*: A History
- Jack Donnelly: *Universal Human rights in Theory and Practice*
- Benulal Dhar : *The Philosophical Understanding of Human Rights*
- William A. Edmundson : An Introductionto Rights
- Carl Wellman : *The Moral Dimensions of Human Rights*
- Benulal Dhar : *Manabadhikar Ki Ebong Kena*
- J. K. Das: *Human Rights Law and Practice*
- Durga Das Basu :*Introductionto the Constitution of India*
- Justice Ruma Paul & M.P Jain: *Indian Constitutional Law*
- L.K.Thakur: *Comparative International Human Rights*
- Anadi Kumar Mahapatra: *Bharater Sasanbyabastha O Rajnitee*

Semester-II

Major/DS Course (Core)

Code: PHIL2011

Outlines of Philosophy : Indian and Western—II

Module-I

Nyāya–Vaiśeṣika: Nyāya Epistemology : *pratyakṣa*, *anumāna*, *upamāna* and *śabda*; Vaiśeṣika Metaphysics : *saptapadārtha*, *paramāṇuvāda*

Module-II

Sāṁkhya and Yoga: *satkāryavāda, pañcaviṁśatitattva, tattvapariṇāma*, *prakṛti* and its *guṇas*, notion of *puruṣa*, *bahupuruṣavāda, citta, cittabhūmi, cittavṛtti, cittavṛttinirodha* and *īśvara*

Module-III

Descartes : Method of Doubt, *Cogito Ergo Sum*, Criterion of Truth, Classification of Ideas, Interactionism, Substance

Module-IV

Spinoza : The Doctrine of Substance, Attributes and Modes, Parallelism, Degrees of Knowledge, Determinism and Freedom

Leibniz : Monadology and Pre-established Harmony, Truths of Reason and Truths of Fact, Theory of Knowledge

Recommended Texts :

- M. Hiriyanna: *Outlines of Indian Philosophy*
- Sāyana Mādhavācārya : *Sarvadarśanasaṁgraha*
- S. C. Chatterjee& D. M. Dutta : *An Introduction to Indian Philosophy*
- Haridas Bandyaopadhyay : *Bhāratīya Darśaner Marmakathā*
- F. Copleston : *A History of Philosophy* [Vols. I, IV, V, & VII]
- W. T. Stace :*A Critical History of Greek Philosophy*

References :

- C. D. Sharma : *A Critical Survey of Indian Philosophy*
- J. N. Mohanti : Classical Indian Philosophy
- Satyajyoti Chakraborty (ed. & Bengali. tr.): *Sarvadarśanasaṁgraha*
- Niradbaran Chakraborty : *Bhāratīya Darśan*
- Deepak Kumar Bagchi :*Bhāratīya Darśan*
- Debabrata Sen :*Bhāratīya Darśan*
- Pradyot Kumar Mandal :*Bhāratīya Darśan*
- Karuna Bhattacharya : *Nyaya-Vaiśeṣik Darśan*
- Kanakprabha Bandyopadhyay :*Sāṁkhyapātañjala darśan*
- Tarakishor Sharma Choudhury :*Pātañjaladarśan*
- Gobindagopal Mukhopadhyay :*Yoger Kathā : Patañjalir Dṛṣṭite*
- Purnachandra Vedanta Chunchu :*Pātañjal Darśan*
- Rajat Bhattacharya : *Sāṁkhyakārikā*o*Sāṁkhyatattvakaumudi*
- Srikanta Samanta : *Bharatiya Darśansāstrer Ruprekha*
- B. Russell : *A History of Western Philosophy*
- Y. Masih : *A CriticalHistory of Western Philosophy*
- R. Falckenberg : *History of Modern Philosophy*
- Anders Wedberg : *A History of Philosophy*, Vol.-I & II

- Tom Sorell & G. A. J. Rogers (ed.): *Analytic Philosophy and History of Philosophy*
- Niradbaran Chakraborty : *Pāścātya DarśanerItihās* (Plato, Aristotle)
- Sushanta Chakraborty*: PāścātyaDarśanerItihās*
- Chandroday Bhattacharya: *Pāścātya Darśaner Itihās*
- Tarak Chandra Das :*Pāścātya Darśaner Itihās,* (Vol.-I, II & III)

Minor Course

Code: PHIL 2021

Philosophy: Indian and Western—II

Module-I

Nyāya–Vaiśeṣika : *pramāṇas (pratyakṣa*, *anumāna*, *upamāna* and *śabda*), *saptapadārtha*

Sāṁkhya: Concepts of *puruṣa* and *prakṛti, satkāryavāda*, *pariṇāmavāda*

Yoga :*cittavṛttinirodha, aṣṭāṅgayoga*

Module-II

Mīmāṁsā: *pramāṇas*

AdvaitaVedānta: *Brahman*, *jīva*, *jagat*

Module-III

Critical theory of Kant

Theories of Causation : Regularity theory and Entailment theory

Module-IV

Theories of Evolution

Recommended Texts:

- M. Hiriyanna: Outlines of Indian Philosophy
- SāyanaMādhavācārya :*Sarvadarśanasaṁgraha*
- S. C. Chatterjee& D. M. Dutta :*An Introduction to Indian Philosophy*
- Haridas Bandyaopadhyay :*Bhāratīya Darśaner Marmakathā*
- F. Copleston : *A History of Philosophy*

- Hospers: Philosophical Analysis
- Falkenberg : History of Western Philosophy
- Sibapada Chakraborty : General Philosophy

References :

- C. D. Sharma : *A Critical Survey of Indian Philosophy*
- J. N. Mohanty : Classical Indian Philosophy
- Margaret Chatterjee: Philosophical Enquiries
- SatyajyotiChakraborty (ed. & Bengali. tr.): *Sarvadarśanasaṁgraha*
- NiradbaranChakraborty :*BhāratīyaDarśan*
- Deepak Kumar Bagchi :*BhāratīyaDarśan*
- DebabrataSen :*BhāratīyaDarśan*
- Pradyot Kumar Mandal :*BhāratīyaDarśan*
- Karuna Bhattacharya :*Nyaya-VaiśeṣikDarśan*
- KanakprabhaBandyopadhyay :*Sāṁkhyapātañjaladarśan*
- Tarakishor Sharma Choudhury :*Pātañjaladarśan*
- GobindagopalMukhopadhyay :*YogerKathā : PatañjalirDṛṣṭite*
- Purnachandra Vedanta Chunchu :*PātañjalDarśan*
- Rajat Bhattacharya :*Sāṁkhyakārikā*O*Sāṁkhyatattvakaumudi*
- SrikantaSamanta: *BharatiyaDarsansastrerRuprekha*
- B. Russell :*A History of Western Philosophy*
- Y. Masih :*A CriticalHistory of Western Philosophy*
- Anders Wedberg :*A History of Philosophy*, Vol.-I & II
- Tom Sorell& G. A. J. Rogers (ed.): *Analytic Philosophy and History of Philosophy*
- NiradbaranChakraborty :*PāścātyaDarśanerItihās* (Plato, Aristotle)
- SushantaChakraborty*: PāścātyaDarśanerItihās*
- Chandroday Bhattacharya: *PāścātyaDarśanerItihās*

- Tarak Chandra Das : *PāścātyaDarśanerItihās*
- Ramchandra Pal :*Darśan Parichaya*
- Rama Prasad Das & Sibapada Chakraborty : *PāścātyaDarśanerRūprekhā*

Multi/Interdisciplinary

Code: PHIL2031

Value Education in Indian Tradition-II : Rabindranath Tagore, S. Radhakrishnan and MdIqbal

Module-I

Rabindranath Tagore : Nature of Religion, Problem of Evil, Surplus in man

Module-II

S. Radhakrishnan: Nature of Religious Experience, Nature of Intuitive Apprehension, Secularism

Module III

Md. Iqbal : Nature of the Self, Nature of the World, Nature of God

Recommended Texts :

- B. K. Lal : *Contemporary Indian Philosophy*
- D. M. Dutta : *Chief Currents of Contemporary Philosophy*
- Binay Gopal Roy : *Contemporary Indian Philosophers*
- S. Radhakrishnan: "The Need for Religion" in *Religion and Society*

References:

- R.N. Sharma: *Contemporary Indian Philosophy*
- Nikhilesh Bandopadhyaya: *Bingsashatabdir Bharatiya Darsan*
- Saikat Bandyopadhyay : *Bingsashatabdir Bharatiya Darśan*
- Nirmalya Narayan Chakraborti : *Bingsashatabdite Bharatiya Darsancarcha*

Skill Enhancement Course (SEC)

Code: PHIL 2051

Environmental Ethics

Module-I

Nature & Scope of Environmental Ethics, Intrinsic and Instrumental Values

Module-II

Anthropocentricism, Non-Anthropocentricism

Module-III

Tagore's Understanding of Nature

Recommended Texts:

- Peter Singer: *Practical Ethics*
- R. Attfield: *The Ethics of Environmental Concern*
- I. Barbour: *Western Man and Environmental Ethics*
- R. Elliot : *Environmental Ethics*
- Rabindra Nath Thakur: "*Tapoban*" in *Santiniketan* - (Pratham Khanda)
- Rabindra Nath Thakur: *Raktakarabi*

References:

- Kaliprasanna Das: Pribesh Darsan (Manabkendrikatabad o Priposhok Unnyan)
- Dikshit Gupta: *Nitishastra*
- Santosh Kumar Pal: Samakalin Pribesh-Nitishastrer Ruprekha
- Samrendra Bhattacharya: *Byabaharik Nitibidya*
- Sanjeeb Ghosh o Peeyushkanti Ghosh: *Nitibidya* (*Tattva o Prayog)*

POL. SCI.

The University of Burdwan

Syllabus for 3-Year Degree/4-Year Hons. in Political Science

Under new

National Education Policy, 2020

CURRICULUM & CREDIT FRAMEWORK for Under-graduate Programme (CCFUP)

as per

NEP, 2020

w.e.f. 2023-2024

BURDWAN UNIVERSITY
BURDWAN
WEST BENGAL

COURSE STRUCTURE

SEMESTER- 1

POLITICAL SCIENCE						
Course Type with CODE	**Name of the course**	**Credit**	**Full Marks**	**Theory**	**Practical**	**Internal**
Major/DS Course (Core) Code: POLS 1011	**Western Political Thought**	4	75	60	0	15
Minor Course Code: POLS 1021	**Political Theory**	4	75	60	0	15
Multidisciplinary/ Interdisciplinary Course Code: POLS 1031	**Introducing Political Science**	3	50	40	0	10
Ability Enhancement Course (L1-1 MIL) Code: AEC 1041	**L1-1 MIL**	2	50	40	0	10
Skill Enhancement Course (SEC) Code: POLS 1051	**Human Rights Education**	3	50	40	0	10
Common Value Added (CVA) Code: CVA 1061	**Environmental Science/Education**	4	100	80	0	20
Total		20	400			

SEMESTER – I

MAJOR/DS COURSE (Core)

WESTERN POLITICAL THOUGHT

(4 credits)

Code: POLS 1011

1) **Ancient Greek Political Thought: Basic Features;**
   Plato: Justice;
   Aristotle: State;
2) **Medieval Political Thought: Main features;**
3) **Machiavelli and the Renaissance: Concept of Power and Secularization of Politics;**
4) **Hobbes: Sovereignty; Locke: Founder of Liberalism; Rousseau: General Will;**
5) **Hegel: State;**
6) **Marx and Engels: Dialectical and Historical Materialism;**
7) **J.S. Mill: Concept of Liberty.**

Suggested Readings

1. G. H. Sabine, *A History of Political Theory* (USA: Wadsworth Publishing Co Inc,)
2. A.K. Mukhopadhyay, *Western Political Thought : From Plato to Marx* (Kolkata: K.P. Bagchi)
3. S. Mukherjee and S. Ramaswamy, *A History of Political Thought*, (New Delhi: PHI)
4. Brian R. Nelson, *Western Political Thought: From Socrates to the Age of Ideology*, (Delhi:Pearson)
5. Shefali Jha, *Western Political Thought* (Delhi: Pearson)
6. শোভনলাল দত্তগুপ্ত, *পাশ্চাত্য রাষ্ট্রভাবনা,* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
7. নির্মলকান্তি মজুমদার, *অ্যারিস্টটলের পলিটিক্স,* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ কলকাতা

MINOR COURSE (Core)

POLITICAL THEORY

(4 Credits)

Code: POLS 1021

1. Meaning of Political Theory;

Different Approaches: (a) Traditional

(b) Behavioural and Post-Behavioural

(c) Marxist

2. Concept of Sovereignty: (a) Monistic (b) Pluralist;

3. Rights, Liberty and Equality: Meaning and their Inter-relationships;

4. Liberalism and Neo-Liberalism: Basic Features;

5. Theories of State: (a) Idealist (b) Liberal (c) Marxist (d) Gandhian.

Suggested Readings

1. R. Bhargava and A. Acharya eds. *Political Theory*, Delhi: Longman, 2008
2. O. P. Gauba. *Introduction to Political Theory*, New Delhi: Macmillan, 2011
3. J. C. Johari. *Contemporary Political Theory*, New Delhi: Advent Books
4. S. Ramaswamy. *Political Theory: Ideas and Concept*, New Delhi: Macmillan
5. A. Heywood, *Key concepts in Politics*, Palgrave Study Guide, 2000
6. A. Heywood, *Political Ideologies: An Introduction*, Palgrave Macmillan, 2007
7. S.P. Verma. *Modern Political Theory*, New Delhi: Vikash
8. শোভনলাল দত্তগুপ্ত, *মার্কসীয় রাষ্ট্রচিন্তা* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
9. চৈতালি বসু, *রাজনীতিশাস্ত্র ও অভিজ্ঞতাবাদী রাষ্ট্র তত্ত্ব*, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
10. কৃত্তপ্রিয় ঘোষ, *রাষ্ট্রতত্ত্ব* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
11. শোভনলাল দত্তগুপ্ত, *রাষ্ট্রভাবনার তত্ত্বানুসন্ধান*, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
12. রাজশ্রী বসু, *নারীবাদ*, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
13. সি. ই. এম. জোড, *আধুনিক রাষ্ট্রীয় মতবাদের ভূমিকা*, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা

MULTIDISCIPLINARY COURSE/INTERDISCIPLINARY COURSE(MDS/IDS)

Introducing Political Science

Credit:3

Code: POLS 1031

1. **Political Science: Definition, Nature & Scope;**
2. **Different approaches to the study of Political Science:**
   - **i) Traditional Approach;**
   - **ii) Behavioural Approach;**
3. **Origin of the State:**
   - **i) Divine Origin theory;**
   - **ii) Theory of Force;**
   - **iii) Social Contract Theory;**
   - **iv) Evolutionary Theory.**
4. **Sovereignty: Monistic & Pluralist;**
5. **Rights, Liberty & Equality: Meaning and Inter-relationship;**
6. **Theories of the State:**
   - **i) Idealist;**
   - **ii) Liberal**
   - **iii) Marxist**
   - **iv) Gandhian.**

Suggested Readings

1. R. Bhargava and A. Acharya eds. *Political Theory,* Delhi: Longman, 2008
2. O. P. Gauba. *Introduction to Political Theory*, New Delhi: Macmillan, 2011
3. J. C. Johari. *Contemporary Political Theory*, New Delhi: Advent Books
4. S. Ramaswamy. *Political Theory: Ideas and Concept,* New Delhi: Macmillan
5. A. Heywood, *Key concepts in Politics*, Palgrave Study Guide, 2000
6. A. Heywood, *Political Ideologies: An Introduction*, Palgrave Macmillan, 2007
7. S.P. Verma. *Modern Political Theory* (New Delhi: Vikash)
8. শোভনলাল দত্তগুপ্ত, *মার্কসীয় রাষ্ট্রচিন্তা* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
9. চৈতালি বসু, *রাজনীতিশাস্ত্র ও অভিজ্ঞতাবাদী রাষ্ট্র তত্ত্ব,* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা

10. কৃত্তপ্রিয় ঘোষ, *রাষ্ট্রতত্ত্ব* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
11. রাষ্ট্রভাবনার তত্ত্বানুসন্ধান শোভনলাল দত্ত গুপ্ত পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ কলকাতা
12. রাজশ্রী বসু, *নারীবাদ* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
13. সি. ই. এম. জোড, *আধুনিক রাষ্ট্রীয় মতবাদের ভূমিকা,* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা

Skill Enhancement Course (SEC)

HUMAN RIGHTS EDUCATION

(3 Credits)

Code: POLS 1051

1. **Meaning of Human Rights; Evolution of the concept of Human Rights;**
2. **Indian Constitution and the protection of Human Rights;**
3. **National Human Rights Commission: Composition and Functions;**
4. **Human Rights Movements in India: Basic Features;**
5. **Human Rights, Terrorism and Counter-terrorism: Interrelationships**

SUGGESTED READINGS

1. Baxi, Upendra, *The Future of Human Rights* (New Delhi: Oxford)
2. Priyam, Menon and Banerjee, *Human Rights, Gender and the Environment* (New Delhi: Pearson)
3. Donnely, Jack, *Universal Human Rights in Theory and Practice* (CornnelUniversity Press)
4. Clapham, Andrew, *Human Rights: A very short introduction* (Oxford)
5. Narayan, S, *Human Rights Dynamics in India,* (Kalpaz Publications)

SEMESTER- 2

COURSE STRUCTURE

POLITICAL SCIENCE						
Course Type & Code	**Name of the course**	**Credit**	**Full Marks**	**Theory**	**Practical**	**Internal**
Major/DS Course (Core) **Code: POLS 2011**	Political Theory	4	75	60	0	15
Minor Course **Code: POLS 2021**	Indian Government and Politics	4	75	60	0	15
Multidisciplinary/ Interd Course **Code: POLS 2031**	Introducing Indian Constitution	3	50	40	0	10
Ability Enhancement Course (L2-1 Eng) **Code: AEC 2041**	L2-1 Eng.	2	50	40	0	10
Skill Enhancement Course (SEC) **Code: POLS 2051**	Legislative Support	3	50	40	0	10
Common Value Added (CVA) **Code: CVA 2061**	Environmental Science/Education	4	100	80	0	20
Total		20	400			

SEMESTER-2

MAJOR/DS COURSE (Core)

Political Theory

(Credit: 4)

Code: POLS 2011

1. **Meaning of Politics and Political Theory; Meaningand Significance of Political Theory;**

2. **Different Approaches:**

   (a) Traditional

   (b) Behavioural and Post-Behavioural

   (c) Marxist;

3. **Concept of Sovereignty:**

   (a) Monistic

   (b) Pluralist

   (c) Popular;

4. **Rights, Liberty and Equality: Meaning and their Inter-relationship;**

5. **Theory of Justice: Rawls;**

6. **Ideology – Meaning and Variants:**

   1. **Liberalism and Neo-Liberalism**
   2. **Socialism**
   3. **Fascism**
   4. **Feminism**

7. **Theories of the State:** **(a) Idealist**

   (b) Liberal

   (c) Marxist

   (d) Gandhian.

Suggested Readings

1. R. Bhargava and A. Acharya eds. *Political Theory*, Delhi: Longman, 2008
2. O. P. Gauba. *Introduction to Political Theory*, New Delhi: Macmillan, 2011
3. J. C. Johari. *Contemporary Political Theory*, New Delhi: Advent Books
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7. S.P. Verma. *Modern Political Theory* (New Delhi: Vikash)
8. শোভনলাল দত্তগুপ্ত, *মার্কসীয় রাষ্ট্রচিন্তা* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
9. চৈতালি বসু, *রাজনীতিশাস্ত্র ও অভিজ্ঞতাবাদী রাষ্ট্র তত্ত্ব*, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
10. কৃত্তপ্রিয় ঘোষ, *রাষ্ট্রতত্ত্ব* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
11. রাষ্ট্রভাবনার তত্ত্বানুসন্ধান শোভনলাল দত্ত গুপ্ত পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ কলকাতা
12. রাজশ্রী বসু, *নারীবাদ* পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা
13. সি. ই. এম. জোড, *আধুনিক রাষ্ট্রীয় মতবাদের ভূমিকা*, পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, কলকাতা

MINOR COURSE

Indian Government & Politics

Credit: 4

Code: POLS 2021

1. a. The Constituent Assembly: its Composition and Role

b. Preamble and its Significance

2. (a) Fundamental Rights and Duties (b) Directive Principles of State Policy

3. Nature of Indian Federalism: Centre-States relations – Legislative, Administrative and Financial

4. Union Legislature: Lok Sabha and RajyaSabha – Composition and Functions; the Speaker; State Legislature: Composition; Composition & Functions of Bidhansabha

5. Union & State Executive: President and Prime Minister: Powers and functions; Governor and Chief Minister: Powers and function

6. Judiciary: Supreme Court and High Courts – Composition and Functions;

7. Party System in India: Features and Trends; Coalition Governments

8. Electoral Process: Election Commission – Composition and Functions; Electoral Reforms

Suggested Readings:

1. Basu, D. D, *Introduction to the Constitution of India* (Nagpur: Lexis Nexis)
2. Kashyap, S. C., *Our Constitution* (New Delhi: National Book Trust)
3. Kashyap, S.C., *Our Political System* (New Delhi: National Book Trust)
4. Hiregowder, G. C. et al., *The Indian Constitution: An Introduction,* (New Delhi: Orient BlackSwan)
5. Johari, J. C., *Indian Government and Politics*, Vol. 1 and 2 (New Delhi: Vikash Publication)
6. Khosla, Madhab, *The Indian Constitution* (New Delhi: Oxford)

MULTIDISCIPLINARY COURSE/ INTERDISCIPLINARY COURSE (MDS/IDS)
Course-1

Introducing Indian Constitution

(Credit: 3)

Code: POLS 2031

1. **Salient Features of the Indian Constitution; Preamble**
2. **(a) Fundamental Rights and Duties (b) Directive Principles of State Policy**
3. **Nature of Indian Federalism;**
4. **Union Legislature: Lok Sabha and Rajya Sabha –Composition and Functions; the Speaker;**
5. **Union & State Executive: President and Prime Minister: Powers and functions; Governor and Chief Minister: Powers and functions**
6. **Judiciary: Supreme Court and High Courts – Composition and Functions;**
7. **Party System in India: Features and Trends; Coalition Government**

Suggested Readings:

1. Basu, D. D, *Introduction to the Constitution of India* (Nagpur: Lexis Nexis)
2. Kashyap, S. C., *Our Constitution* (New Delhi: National Book Trust)

3. Kashyap, S.C., *Our Political System* (New Delhi: National Book Trust)
4. Hiregowder, G. C. et al., *The Indian Constitution: An Introduction*, (New Delhi: Orient BlackSwan)
5. Johari, J. C., *Indian Government and Politics*, Vol. 1 and 2 (New Delhi: Vikash Publication)
6. Khosla, Madhab, *The Indian Constitution* (New Delhi: Oxford)

Skill Enhancement Course (SEC)

Legislative Support

(Credit- 3)

Code: POLS 2051

1. **Powers and functions of people's representatives at different tiers of governance: Members of Parliament andState Legislative Assemblies.**
2. **Law-making procedure in Parliament; Role of Committees in Parliament.**
3. **Procedure of Budget-making.**
4. **Ministry of Parliamentary Affairs and External Affairs: Main functions.**
5. **NITI Ayog: Composition & Functions.**

Suggested Readings:

1. Madhavan, M.R. &N.Wahi Financing of Election Campaigns PRS, Centre for Policy Research,New
2. Delh, 2008. Available at: ttp://www.prsindia.org/uploads/media/conference/Campaign _finance_brief.pdf
3. Kalra, H. Public Engagement with the Legislative Process PRS, Centre for Policy Research, New Delhi, 2011. Available at: http://www.prsindia.org/administrator/uploads/media/Conference%202011/Public %20Engagement% 20
4. with%20the%20Legislative%20Process.pdf
5. Government of India (Lok Sabha Secretariat) Parliamentary Procedures (Abstract Series), 2009.Available at: http://164.100.47.132/LssNew/abstract/index.aspx
6. Government of India, (Ministry of Parliamentary Affairs) Legislation, Parliamentary Procedure,2009.
7. Available at: http://mpa.nic.in/Manual/Manual_English/Chapter/chapter-09.htm
8. Government of India, (Ministry of Parliamentary Affairs) Subordinate Legislation, ParliamentaryProcedure, 2009. Available at: http://mpa.nic.in/Manual/Manual_English/Chapter/chapter-11.htm
9. Mathur K. Chandrakanta, Legislative Support, Shivalik Prakashan, New Delhi
10. Radha Kumari *et. al*. A Primer on Legislative Support, Adroit Publishers, 2018.

MATHEMATICS

The University of Burdwan

SYLLABUS FOR 3-YEAR DEGREE/4-YEAR HONOURS IN MATHEMATICS

Under Curriculum and Credit Framework

for

Undergraduate Programmes (CCFUP) as per NEP, 2020

With effect from 2023-2024

Preamble

Undergraduate (UG) Programme is of either 3 or 4-year duration, with multiple entry and exit points and re-entry options, with appropriate certifications such as:

- UG Certificate after completing 1 year (2 Semesters) of study in the chosen fields of study,
- UG Diploma after 2 years (4 Semesters) of study,
- Bachelor's Degree after a 3-year (6 Semesters) programme of study,
- Bachelor's Degree (Honours) after a 4-year (8 Semesters) programme of study.
- Bachelor's Degree (Honours with research), if the students complete a rigorous research project/ dissertation in their major area(s) of study in the 4th year of a bachelor's degree.

The courses offered at the UG level are grouped into eight broad categories which along with the minimum credit requirements are as follows.

Category	**Credit requirement**	
	3-year UG	**4-year UG**
Major (Core)	64	94
Minor	24	32
Multidisciplinary	09	09
Ability Enhancement Courses (AEC)	08	08
Skill Enhancement Courses (SEC)	09	09
Value Added Courses common for all UG students	08	08
Summer Internship	02	02
Research Project/Dissertation*	---	12
Total	124	174

*Honours students who will not undertake research will pursue three 4-credit major courses in lieu of a research project/Dissertation

SEMESTER WISE & COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

Semester	Course Type with Code	Level	Course Title	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
I	Major/DS Course (Core) Code: MATH1011	100-199	Calculus, Geometry & Vector Calculus	4	3	1	0	75	60	0	15
	Minor Course Code: MATH1021	100-199	Calculus, Geometry & Vector Calculus	4	3	1	0	75	60	0	15
	Multi/Inter disciplinary Code: MATH1031		Trigonometry and Coordinate Geometry	3	2	1	0	50	40	0	10
	Ability Enhancement Course (AEC) [L_1-1 MIL] Code: AEC1041		Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equvlnt. Course from SWAYAM /Any other UGC recognized platform	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC) Code: MATH1051		Graph Theory	3	2	1	0	50	40	0	10
	Common Value Added (CVA) Course Code: CVA1061		Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			**20**				**400**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
II	Major/DS Course (Core) Code: MATH2011	100-199	Introductory Algebra & Number Theory	4	3	1	0	75	60	0	15
	Minor Course Code: MATH2021	100-199	Introductory Algebra & Number Theory	4	3	1	0	75	60	0	15
	Multi/Interdisciplinary Code: MATH2031		Algebra	3	2	1	0	50	40	0	10
	Ability Enhancement Course (AEC)[L_2-1] Code: AEC2041		English or Equvlnt. Course from SWAYAM/ /Any other UGC-recognized platform	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC) Code: MATH2051		Programming in C	3	2	1	0	50	40	0	10
	Common Value Added (CVA) Course Code: CVA2061		Understanding India/Digital & Technological Solutions/Health & Wellness, Yoga Education, Sports & Fitness	4	3/3	1/0	0/1	100	80/60	0/20	20
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**20**				**400**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
III	Major/DS Course (Core) Code: MATH3011	200-299	Real Analysis I	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20 or 60	15
	Major/DS Course (Core) Code: MATH3012	200-299	Linear Algebra	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20 or 60	15
	Minor Course Code: MATH3021	200-299	Intermediate Level Course (Voc. Edn. &Trng.)	4	3/3 or 0	1/0 or 0	0/1 or 4	75	60/40	0/20 or 60	15
	Multi/Interdisciplinary Code: MATH3031		Calculus	3	2/2/0	1/0/0	0/1/3	50	40	0	10
	Ability Enhancement Course (AEC)[L_2-1] Code: AEC3041			2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC) Code: MATH3051		Mathematical Modelling	3	2/2/0	1/0/0	0/1/3	50	40	0	10
	Total			**22**				**375**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
IV	Major/DS Course (Core) Code: MATH4011	200-299	Metric Spaces	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH4012	200-299	Group Theory & Ring Theory	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH4013	200-299	Multivariate Calculus & Tensor Calculus	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Minor Course Code: MATH4021	200-299	Intermediate Level Course (Voc. Edn. &Trng.)	4	3/3 or 0	1/0 or 0	0/1 or 4	75	60/40	0/20	15
	Ability Enhancement Course (AEC)[L_2-1] Code: AEC4041		English or Equvlnt. Course from SWAYAM	2	2	0	0	50	40	0	10
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**21**				**350**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
V	Major/DS Course (Core) Code: MATH5011	200-299	Riemann Integration & Series of functions	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH5012	200-299	Probability, Statistics & Linear Programming Problem	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH5013	200-299	Differential Equations and Vector Analysis	5	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Minor Course Code: MATH5021	100-199	Linear Algebra & Ordinary Differential Equation	4	3	1	0	75	60	0	15
	Internship(for all students)			2	0	0	2	50	Project – 30 & Viva - 20		
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**21**				**350**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
VI	Major/DS Course (Core) Code: MATH6011	300-399	Numerical Analysis	4	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH6012	300-399	Real Analysis II & Complex Analysis I	4	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH6013	300-399	Partial Differential Equations	4	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH6014	300-399	Mechanics	4	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Minor Course	300-399	Intermediate Level Course (Voc. Edn. &Trng.)	4	3/3 or0	1/0 or0	0/1 or 4	75	60/40	0/20 or60	15
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**20**				**375**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
VII	Major/DS Course (Core) Code: MATH7011	400-499	Operations Research, Integral Transforms & Integral Equations	6	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH7012	400-499	Real Analysis III & Complex Analysis II	(2+4) 6	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH7013	400-499	Classical Mechanics	6	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Major/DS Course (Core) Code: MATH7014	400-499	General Topology	6	4/3 or 0	1/0 or 0	0/2 or 5	75	60/40	0/20	15
	Minor Course Code: MATH7021	300-399	Partial Differential Equations & Tensor Calculus	4	3/3 or 0	1/0 or0	0/1 or4	75	60	0	15
Initiation of Research Project / Dissertation											
	Total			**28**				**375**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva-voce	Full Marks	Distribution of Marks		
									Theory	Pract./ Viva-voce	Internal Assessment
VIII (Hons. With Research)	Major/DS Course (Core) Code: MATH8011	400-499	Numerical Analysis & Practical	6	5	1	0	75	60	0	15
	Minor Course Code: MATH8021	300-399	Real Analysis	4	3	1	0	75	60	0	15
	Research Project Code: MATH8091		Research Project	12	0	0	12	225	Seminar Presentation, Preparation & Submission of Research Project/ Dissertation - 135 + Viva - 90		
OR											
VIII (Hons. Without Research)	Major/DS Course (Core) Code: MATH8011	400-499	Numerical Analysis & Practical	6	5	1	0	75	60	0	15
	Major/DS Course (Core) Code: MATH8012	400-499	Geometry of Curves and surfaces	4	3	1	0	75	60	0	15
	Major/DS Course (Core) Code: MATH8013	400-499	Elements of Functional Analysis & Calculus of R^n	4	3	1	0	75	60	0	15
	Major/DS Course (Core) Code: MATH8014	400-499	Algebra	4	3	1	0	75	60	0	15
	Minor Course Code: MATH8021	300-399	Real Analysis	4	3	1	0	75	60	0	15
	Total			**22**				**375**			
	Total Credit/ Marks			**174**				**3000**			

Objectives

- To impart teaching so that the students could develop higher-order thinking capacities about the fundamental aspects of mathematics.
- To train the students with mathematical knowledge and computational techniques so that they can deal with the problems faced in different walks of life.
- To impart sophisticated mathematical skills so that students can undertake self-employment initiatives.
- To make the students capable of pursuing research work in various emerging fields of mathematics and its applications.

Pre-requisite

For major, minor and skill development courses, the students should possess the knowledge on the mathematics courses at (10+2) level. For multidisciplinary courses the students should possess the knowledge on the mathematics courses at secondary level.

Programme Outcomes

- Development of critical thinking for solving complex problems.
- Skills to characterise problems, formulate a hypothesis, evaluate and validate outcomes, and draw reasonable conclusions thereof.
- Development of the effective scientific and technical communications in both oral and written forms.

Programme Specific Outcomes

- Understanding the fundamental axioms in mathematics, and capability of developing ideas based on them.
- Development of mathematical reasoning and an understanding of the underlying fundamental structures of mathematics (i.e., sets, relations and functions, logical structure), and the relationship among them.
- Motivation for research studies in mathematics and related fields with real life applications.
- Knowledge in a wide range of mathematical techniques and applications of mathematical methods/tools in other scientific and engineering domains.
- Nurturing problem-solving skills, thinking, creativity through assignments, tutorials.
- Preparing for various competitive examinations at the national and international levels.

DETAILED SYLLABUS

SEMESTER – I

MAJOR COURSES

Course Code: MATH1011
Course Name: Calculus, Geometry &Vector Calculus
(Credit: 4, Marks: 75)
Total Hours: Lecture -45, Tutorial – 15

Objectives

To study calculus, geometry and vector calculus

Learning outcomes

On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. higher order derivatives and its applications, concavity of curves, asymptotes and curve tracing techniques.
ii. reduction formula for integration of functions like $\sin nx$, $\sin^m x \sin^n x$ etc., area of surface of revolution, parametric curves etc.
iii. classification of conics and conicoids, polar equation of conics.
iv. vector valued functions and vector calculus.

Skills: The students would be able to

i. parametrize curves, sketch functions and plot them.
ii. visualize standard quadratic surfaces like cone, ellipsoid etc.
iii. apply calculus on vector valued functions.
iv. find gradient of scalar functions, divergence and curl of vector valued functions.

General competence: The students would gain

i. a general idea of advance calculus and its applications.
ii. the idea of solving complex problems using vector calculus and geometry.
iii. analytical and reasoning skills, which improve their thinking power and enhance their problem-solving ability.

Contents:

Hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to problems of type $e^{ax+b} \sin x$, $e^{ax+b} \cos x$, $(ax+b)^n sinx, (ax+b)^n cosx$, indeterminate forms, L'Hospital's rule, concavity of curves, points of inflection, envelopes, asymptotes, curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves. **[L-12H & T-4H]**

Reduction formulae, derivations and illustrations of reduction formulae for the integration of $sinnx$, $\cos nx$, $tannx$, $secnx$, $(logx)^n$, $\sin^n x \sin^m x$, parametric equations, parametrizing a curve, arc length, arc length of parametric curves, area of surface of revolution. **[L-10H & T-3H]**

Reflection properties of conics, translation and rotation of axes, general equation of second-degree, classification of conics, polar equations of conics, spheres, cylindrical surfaces. central conicoid, paraboloids, plane sections of conicoid, generating lines, classification of quadrics. **[L-11H & T-4H]**

Triple product of vectors, introduction to vector functions, algebraic operations on vector-valued functions, limits and continuity of vector functions, differentiation and partial differentiation of vector functions, gradient of a scalar function, divergence and curl of vector functions. [L-**12H & T-4H]**

Reading References:

Text Books:

1. Calculus - G.B. Thomas and R.L. Finney, 9th Ed., (Pearson Education, Delhi, 2005).
2. Calculus - M.J. Strauss, G.L. Bradley and K. J. Smith, 3rd Ed., (Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007).
3. Integral Calculus - K.C. Maity and R. K. Ghosh., (New Central Book Agency (P) Limited, 1999).
4. An Elementary Treatise on Coordinate Geometry of three-Dimensions–R.J.T. Bell, (MacMillan & Co.).
5. The Elements of Coordinate Geometry-S.L. Loney, (MacMillan & Co.).
6. Vector Analysis- K.C. Maity and R. K. Ghosh, (New Central Book Agency (P) Ltd. Kolkata, 1999).

Reference Books:

1. Calculus- T. M. Apostol, (Volumes I and II. Vol-I, 1966, Vol-II, 1968).
2. Calculus- H. Anton, I. Bivens and S. Davis, 7th Ed., (John Wiley and Sons (Asia) P. Ltd., Singapore, 2002).
3. Introduction to Calculus and Analysis - R. Courant and F. John, (Volumes I & II), (Springer-Verlag, New York, Inc., 1989).
4. Analytical Geometry of two and three-dimensions- N. Dutta and R. N. Jana, (Shredhar Prakashani).
5. Calculus and Mathematical Analysis- S. Goldberg, 1989.
6. Vector Calculus- J. Marsden, and Tromba, (McGraw Hill, 1987).
7. Schaum's outline of Vector Analysis- M.R. Spiegel, (McGraw Hill, 1980).
8. Vector Analysis with Applications - A. A. Shaikh and S. K. Jana, (Alpha Science International Ltd., 2009).

MINOR COURSES

Course Code: MATH1021
Course Name: Calculus, Geometry &Vector Calculus
(Credit: 4, Marks: 75)
Total Hours: Lecture -45, Tutorial – 15

Objectives
To study calculus, geometry and vector calculus

Learning outcomes
On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. higher order derivatives and its applications, concavity of curves, asymptotes and curve tracing techniques.
ii. reduction formula for integration of functions like $\sin nx$, $\sin^m x \sin^n x$ etc., area of surface of revolution, parametric curves etc.
iii. classification of conics and conicoids, polar equation of conics.
iv. vector valued functions and vector calculus.

Skills: The students would be able to

i. parametrize curves, sketch functions and plot them.
ii. visualize standard quadratic surfaces like cone, ellipsoid etc.
iii. apply calculus on vector valued functions.
iv. find gradient of scalar functions, divergence and curl of vector valued functions.

General competence: The students would gain

i. a general idea of advance calculus and its applications.
ii. the idea of solving complex problems using vector calculus and geometry.
iii. analytical and reasoning skills, which improve their thinking power and enhance their problem-solving ability.

Contents:
Hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to problems of type $e^{ax+b} \sin x$, $e^{ax+b} \cos x$, $(ax+b)^n sinx, (ax+b)^n cosx$, indeterminate forms, L'Hospital's rule, concavity of curves, points of inflection, envelopes, asymptotes, curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves. **[L-12H & T-4H]**
Reduction formulae, derivations and illustrations of reduction formulae for the integration of $sinnx$, $\cos nx$, $tannx$, $secnx$, $(logx)^n$, $\sin^n x \sin^m x$, parametric equations, parametrizing a curve, arc length, arc length of parametriccurves, area of surface of revolution. **[L-10H & T-3H]**

Reflection properties of conics, translation and rotation of axes, general equation of second-degree, classification of conics, polar equations of conics, spheres, cylindrical surfaces. central conicoid, paraboloids, plane sections of conicoid, generating lines, classification of quadrics. **[L-11H & T-4H]**

Triple product of vectors, introduction to vector functions, algebraic operations on vector-valued functions, limits and continuity of vector functions, differentiation and partial differentiation of vector functions, gradient of a scalar function, divergence and curl of vector functions. [L-**12H & T-4H]**

Reading References:

Text Books:

1. Calculus - G.B. Thomas and R.L. Finney, 9th Ed., (Pearson Education, Delhi, 2005).
2. Calculus - M.J. Strauss, G.L. Bradley and K. J. Smith, 3rd Ed., (Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007).
3. Integral Calculus - K.C. Maity and R. K. Ghosh., (New Central Book Agency (P) Limited, 1999).
4. An Elementary Treatise on Coordinate Geometry of three-Dimensions–R.J.T. Bell, (MacMillan & Co.).
5. The Elements of Coordinate Geometry-S.L. Loney, (MacMillan & Co.).
6. Vector Analysis- K.C. Maity and R. K. Ghosh, (New Central Book Agency (P) Ltd. Kolkata, 1999).

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1. Calculus- T. M. Apostol, (Volumes I and II. Vol-I, 1966, Vol-II, 1968).
2. Calculus- H. Anton, I. Bivens and S. Davis, 7th Ed., (John Wiley and Sons (Asia) P. Ltd., Singapore, 2002).
3. Introduction to Calculus and Analysis - R. Courant and F. John, (Volumes I & II), (Springer-Verlag, New York, Inc., 1989).
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5. Calculus and Mathematical Analysis- S. Goldberg, 1989.
6. Vector Calculus- J. Marsden, and Tromba, (McGraw Hill, 1987).
7. Schaum's outline of Vector Analysis- M.R. Spiegel, (McGraw Hill, 1980).
8. Vector Analysis with Applications - A. A. Shaikh and S. K. Jana, (Alpha Science International Ltd., 2009).

MULTIDISCIPLINARY COURSES

Course Code: MATH1031
Course Name: Trigonometric functions and coordinate geometry
(Credit: 3, Marks: 50)
Total Hours: Lecture - 30, Tutorial – 15

Objectives

To present the concepts of Trigonometric Functions, Straight Lines, Conic Sections and Introduction to Three - dimensional Geometry.

Learning outcomes

On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. Trigonometric Functions.
ii. Straight Lines.
iii. Conic Sections.
iv. Introduction to Three - dimensional Geometry.

Skills: The students would be able to

i. solve the problem of Trigonometric Functions.
ii. solve the problem of Straight Lines.
iii. solve the problem of Conic Sections.
iv. solve the problem of Three - dimensional Geometry.

General competence: The students would gain

i. general idea of Trigonometric Functions, Straight Lines, Conic Sections and Introduction to Three - dimensional Geometry.
ii. analytical and reasoning skills, which improve their thinking power.

Contents:

Trigonometric Functions: Measurement of trigonometric angles, trigonometric functions and standard angles, trigonometric functions of associated angles, trigonometric functions of compound angles, transformations of sums and products of trigonometric functions, trigonometric functions of multiple angles, trigonometric functions of submultiple angles, general solution of the equations of trigonometric functions, properties of triangles. **[L-12H & T-6H]**

Two-dimensional geometry:

Straight line, circle, parabola, ellipse, hyperbola. **[L-12H & T-6H]**

Three - dimensional Geometry:

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points. **[L-6H & T-3H]**

Reading references:

Text Books:

1. Mathematics Part I - Textbook for Class XII, NCERT Publication
2. Mathematics Part II - Textbook for Class XII, NCERT Publication
3. Mathematics Exemplar Problem for Class XI, Published by NCERT
4. Elements of Mathematics - A. P. Baisnab and B. N. Ghatak, Oriental Book Company Pvt. Ltd.

Reference Books

1. Mathematics Exemplar Problem for Class XII, Published by NCERT
2. Mathematics for Class 12, R D Sharma, Dhanpat Rai Publications (P) LTD.
3. Mathematics for class 12, S.N.DE, Chhaya Prakashani Limited
4. Mathematics Class XII, Sandeep Garg, Dhanpat Rai Publications
5. Elements of Mathematics For Class XII (Vol-I and Vol-II), M.L. Bhargava, G.K Kharbanda, Anil Kathuria, Jeevan sons Publications

SKILL ENHANCEMENT COURSES

Course Code: MATH1051
Course Name: Graph Theory
(Credit: 3, Marks: 50)
Total Hours: Lecture -30, Tutorial – 15

Objectives

To study the basics of Graph theory and its applications.

Learning outcomes

On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. undirected and directed graphs.
ii. ismorphism of graphs.
iii. Eulerian graphs, Hamiltonian graphs.
iv. various characterizations of trees with applications.
v. bipartite graph and its characterization.
vi. planar and non-planar graphs.
vii. colouring of a graph.
viii. matrix representation of graphs.

Skills: The students would be able to

i. assimilate various graph theoretic concepts and familiarize with their applications.
ii. efficiency in handling with discrete structures.
iii. efficiency in notions of matrix representation of graph, planarity.
iv. efficiency in solving concrete graph colouring problems.
v. solve real world problems that can be modelled by graphs.

General competence: The students would gain

i. general idea of graph theory and its real-life applications.
ii. understanding about graphic sequence.
iii. experience to apply Euler's formula.
iv. ability to use graphs for various map colouring problems.
v. idea about the application of graphs in computer science.

Contents

Definition, examples and basic properties of graphs, complete graphs, Havel-Hakimi theorem (Statement and its application), bi-partite graphs, isomorphism of graphs. **[L-8H & T-3H]**

Königsberg bridge problem, Eulerian graph, Hamiltonian graph, Representation of a graph by a matrix, the adjacency matrix, incidence matrix, weighted graph. **[L-9H & T-3H]**

Travelling salesman's problem, shortest path, Tree and their properties, spanning tree, Dijkstra's algorithm, Warshall algorithm. **[L-9H & T-3H]**

Planar and non-planar graphs, Euler's formula, colouring of graphs, four colour problem, five colour theorem. **[L-4H & T-1H]**

Reading references:

Text Books:

1. Graph Theory-N. S. Deo, (Prentice-Hall, 1974).
2. Introduction to Graph Theory - D. S. Malik, M. K. Sen & S. Ghosh, (Cengage Learning Asia, 2014).

Reference Books

1. A First Look at Graph Theory - J. Clark & D. A. Holton, (Allied Publishers Ltd., 1995).
2. Introduction to Graph Theory- Douglas Brent West, (Prentice Hall, 2001).
3. Graph Theory- Frank Harary, (Addison-Wesley, 1971).
4. Graph Theory with Applications- J. A. Bondy & U.S.R. Murty, (Macmillan, 1976).

SEMESTER – II

MAJOR COURSES

Course Code: MATH2011
Course Name: Introductory Algebra and Number Theory (Credit: 4, Marks: 75)
Total Hours: Lecture -45, Tutorial – 15

Objectives

To present a systematic introduction to number theory and basic course on algebra.

Learning outcomes

On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. number theory which has wide applicability in advanced mathematics and also in various practical field, e.g., cryptography, computer science and many competitive exams.
ii. complex number and its properties which are equally indispensable tools for advanced studies and different practical field.
iii. a basic introduction to modern algebra which has wide applicability in different branch of sciences.

Skills:

The students would be able to

i. access and also generate different tricky examples and counter examples involving integers during their advanced study of ring theory and field theory.
ii. simplify a mathematical problem in different field of science using complex number.
iii. motivate themselves for future research after getting the glimpse of gateway of modern algebra from classical algebra and number theory and relate use of group, ring and field in different field of science.

General competence: The students would gain

i. descriptive idea of various properties of complex number.
ii. knowledge of richness in number theory.
iii. understanding in basic concepts of group, ring and field.
iv. expertise in solving many tricky problems in number theory, complex numbers.

Contents:

Algebra

Complex Numbers: De Moivre's theorem for rational indices and its applications.

Theory of equations: Fundamental Theorem of Algebra (Statement), Relation between roots and coefficients, Transformation of equation, Descarte's rule of signs, Cubic and biquadratic equations, Reciprocal equation, separation of the roots of equations, Strum's theorem.
Inequality: The inequality involving AM≥GM≥HM, Cauchy-Schwartz inequality. [L-**10H & T-4H]**

Partial order, total order relations, partitions of a set and its connection with equivalence relation, greatest lower bound, least upper bound, maximal, minimal elements, lattice, bounded lattice, modular lattice, distributive lattice, complemented lattice, statement of Zorn's lemma.

[L-**5H & T-2H]**

Semigroups, Monoids, Groups – examples including permutation group, Matrix groups $(M_{n\times n}(\mathbb{R}), GL_n(\mathbb{R}), SL_n(\mathbb{R}))$, Z_n, elementary properties of groups, generators and relations, order of an element of a group, Subgroups and examples of subgroups, cosets, normal subgroup, center of a group, cyclic groups, Lagrange's theorem, Rings, subrings, Ideals (left, right and two sided), integral domain, field, subfield – examples and basic properties, characteristic of a ring and field.

[L-**10H & T-4H]**

Number Theory

Well ordering principle of set of natural numbers, pigeon-hole principle, division algorithm, greatest common divisor (gcd), Euclidean algorithm, least common multiple (lcm), Linear Diophantine equation, prime numbers, relatively prime numbers and related properties including Euclid's lemma, fundamental theorem of arithmetic and its applications, perfect square and square free integers, congruences, solution of congruences, Binary and decimal representation of integer, Chinese remainder theorem and its application. Fermat's little theorem, Wilson's theorem, sum of two squares, Arithmetic function-$\phi(n), d(n), \sigma(n)$. [L-**20H & T-5H]**

Reading References:

Text books:

1. Classical Algebra- S. K. Mapa,8th Edition, (Sarat Book House).
2. Topics in Abstract Algebra – M.K. Sen, S. Ghosh, P. Mukhopadhyay, S. K. Maity, 3rd Edition (University Press).
3. Higher Algebra- S. K. Mapa,8th Edition, (Sarat Book House).
4. An introduction to Theory of Numbers- Niven, Ivan,S. Zuckerman Herbert, L. Montogomery Hugh,5th Edition, (Willey).
5. Elementary Number Theory- D. M. Burton, (Mc Graw Hill Education).

Reference Books:

1. Topics in Algebra – I. N. Herstein,2nd Edition, (Wiley).
2. Contemporary Abstract Algebra - Gallian, A. Joseph, Standard Edition, (Cengage India Private Limited).
3. Higher Algebra - S. Barnards, J. M. Child, (Arihant).
4. Algebra - M. Artin, 2nd Edition, (Pearson Education, India).
5. A first course in Abstract Algebra - J. B. Fraleigh7th Edition, (Pearson Education, India).

MINOR COURSES

Course Code: MATH2021
Course Name: Introductory Algebra and Number Theory
(Credit: 4, Marks: 75)
Total Hours: Lecture -45, Tutorial – 15

Objectives

To present a systematic introduction to number theory and basic course on algebra.

Learning outcomes

On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. number theory which has wide applicability in advanced mathematics and also in various practical field, e.g., cryptography, computer science and many competitive exams.
ii. complex number and its properties which are equally indispensable tools for advanced studies and different practical field.
iii. a basic introduction to modern algebra which has wide applicability in different branch of sciences.

Skills:

The students would be able to

i. access and also generate different tricky examples and counter examples involving integers during their advanced study of ring theory and field theory.
ii. simplify a mathematical problem in different field of science using complex number.
iii. motivate themselves for future research after getting the glimpse of gateway of modern algebra from classical algebra and number theory and relate use of group, ring and field in different field of science.

General competence: The students would gain

i. descriptive idea of various properties of complex number.
ii. knowledge of richness in number theory.
iii. understanding in basic concepts of group, ring and field.
iv. expertise in solving many tricky problems in number theory, complex numbers.

Contents:

Algebra

Complex Numbers: De Moivre's theorem for rational indices and its applications.

Theory of equations: Fundamental Theorem of Algebra (Statement), Relation between roots and coefficients, Transformation of equation, Descarte's rule of signs, Cubic and biquadratic equations, Reciprocal equation, separation of the roots of equations, Strum's theorem.

Inequality: The inequality involving AM≥GM≥HM, Cauchy-Schwartz inequality. [L-**10H & T-4H]**

Partial order, total order relations, partitions of a set and its connection with equivalence relation, greatest lower bound, least upper bound, maximal, minimal elements, lattice, bounded lattice, modular lattice, distributive lattice, complemented lattice, statement of Zorn's lemma.

[L-**5H & T-2H]**

Semigroups, Monoids, Groups – examples including permutation group, Matrix groups $(M_{n\times n}(\mathbb{R}), GL_n(\mathbb{R}), SL_n(\mathbb{R}))$, Z_n, elementary properties of groups, generators and relations, order of an element of a group, Subgroups and examples of subgroups, cosets, normal subgroup, center of a group, cyclic groups, Lagrange's theorem, Rings, subrings, Ideals (left, right and two sided), integral domain, field, subfield – examples and basic properties, characteristic of a ring and field.

[L-**10H & T-4H]**

Number Theory

Well ordering principle of set of natural numbers, pigeon-hole principle, division algorithm, greatest common divisor (gcd), Euclidean algorithm, least common multiple (lcm), Linear Diophantine equation, prime numbers, relatively prime numbers and related properties including Euclid's lemma, fundamental theorem of arithmetic and its applications, perfect square and square free integers, congruences, solution of congruences, Binary and decimal representation of integer, Chinese remainder theorem and its application. Fermat's little theorem, Wilson's theorem, sum of two squares, Arithmetic function-$\phi(n), d(n), \sigma(n)$. [L-**20H & T-5H]**

Reading References:

Text books:

1. Classical Algebra- S. K. Mapa,8th Edition, (Sarat Book House).
2. Topics in Abstract Algebra – M.K. Sen, S. Ghosh, P. Mukhopadhyay, S. K. Maity, 3rd Edition (University Press).
3. Higher Algebra- S. K. Mapa,8th Edition, (Sarat Book House).
4. An introduction to Theory of Numbers- Niven, Ivan, S. Zuckerman Herbert, L. Montogomery Hugh,5th Edition, (Willey).
5. Elementary Number Theory- D. M. Burton, (Mc Graw Hill Education).

Reference Books:

1. Topics in Algebra – I. N. Herstein,2nd Edition, (Wiley).
2. Contemporary Abstract Algebra - Gallian, A. Joseph, Standard Edition, (Cengage India Private Limited).
3. Higher Algebra - S. Barnards, J. M. Child, (Arihant).
4. Algebra - M. Artin, 2nd Edition, (Pearson Education, India).
5. A first course in Abstract Algebra - J. B. Fraleigh7th Edition, (Pearson Education, India).

MULTIDISCIPLINARY COURSES

Course Code: MATH2031
Course Name: Algebra (Credit: 3, Marks: 50)
Total Hours: Lecture - 30, Tutorial – 15

Objectives

To present the concepts of Principle of Mathematical Induction, Complex Numbers and Quadratic Equations, Linear Inequality, Permutation and Combinations, Binomial Theorem, Sequence and Series, Matrices and Determinants.

Learning outcomes

On completion of the course, the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about

i. Principle of Mathematical Induction.
ii. Complex Numbers and Quadratic Equations.
iii. Linear Inequality, Permutation and Combinations.
iv. Binomial Theorem.
v. Sequence and Series.
vi. Matrices and Determinants

Skills: The students would be able to

i. solve the problem by using Principle of Mathematical Induction.
ii. solve the problem of Complex Numbers and Quadratic Equations.
iii. solve Linear Inequality, Permutation and Combinations.
iv. calculate Binomial Theorem, Sequence and Series.
v. calculate Matrices and Determinants.

General competence: The students would gain

i. general idea of Principle of Mathematical Induction, Complex Numbers and Quadratic Equations, Linear Inequality, Permutation and Combinations, Binomial Theorem, Sequence and Series, Matrices and Determinants.
ii. analytical and reasoning skills, which improve their thinking power.

Contents:

Mathematical induction, laws of indices, logarithm, complex numbers, quadratic equations, linear inequations, permutation and combination, binomial theorem, sequence and series. [**L-20H & T-10H]**

Matrices:

Types of matrix, operations on matrices, determinant, adjoint and inverse of a matrix, solution of linear simultaneous equations by matrix method **[L-10H & T-5H]**

Reading references:

Text Books:

1. Mathematics Part I - Textbook for Class XII, NCERT Publication
2. Mathematics Part II - Textbook for Class XII, NCERT Publication
3. Mathematics Exemplar Problem for Class XI, Published by NCERT
4. Elements of Mathematics - A. P. Baisnab and B. N. Ghatak, Oriental Book Company Pvt. Ltd, 2022.

Reference Books

1. Mathematics Exemplar Problem for Class XII, Published by NCERT
2. Mathematics for Class 12, R D Sharma, Dhanpat Rai Publications (P) LTD.
3. Mathematics for class 12, S.N.DE, Chhaya Prakashani Limited
4. Mathematics Class XII, Sandeep Garg, Dhanpat Rai Publications
5. Elements of Mathematics For Class XII (Vol-I and Vol-II), M.L. Bhargava, G.K Kharbanda, Anil Kathuria, Jeevansons Publications

SKILL ENHANCEMENT COURSES

Course Code: MATH2051
Course Name: Programming in C
(Credit: 3, Marks: 50)
Total Hours: Lecture -30, Tutorial – 15

Objectives

To learn the basics of C programming and its different features viz. branching & looping, array, user defined functions, structures and pointers

Learning outcomes

On completion of the course, the student should have the following outcomes defined in terms of knowledge, skills and general competence:

Knowledge: The students would gain knowledge about the

i. basics of C programming i.e., basic structure, keywords, identifiers, operators with operator precedence and associativity, input-output statements.
ii. concepts of branching & looping and array.
iii. user defined functions and their use.
iv. use of structures and pointers.

Skills: The students would be able to

i. learn the keywords, identifiers, different types of operators with precedence and associativity, use of formatted and non-formatted input-output statements.
ii. use branching and looping statements for decision making.
iii. learn the concepts of array, string handling arrays.
iv. use library and user-defined functions along with string handling functions.
v. write programs using structures and pointers.

General Competence: The students would gain

i. general idea about the writing of different C programs using branching & looping statements, arrays, functions, structures and pointers.
ii. program writing and reasoning skills which improve their thinking power.

Contents:

Introduction, basic structures, character set, keywords, identifiers, constants, variable-type declaration, operators: arithmetic, relational, logical, assignment, increment, decrement, conditional. [L- 3H & T- 1H]

Operator precedence and associativity, arithmetic expression, evaluation and type conversion, character reading and writing, formatted input and output statements. [L- 3H & T-1H]

Decision making (branching and looping): Simple and nested *if, if – else, switch, while, do-while, for* statements. [L- 5H & T-3H]

Concept of array variables, string handling with arrays – reading and writing, string handling functions. [L- 4H &T-2H]

User defined functions, call-by-value, call-by-reference functions and their uses, return values and their types, nesting of functions, recursion. [L- 5H & T-3H]

Structures: Declaration, initialization, nested structures, array of structures, array within structures. [L- 4H & T- 2H]

Pointers: Declaration, initialization, accessing variables through pointer, pointer arithmetic, pointers and arrays. [L- 6H & T-3H]

Reading references:

Text Books:

1. Programming in ANSI C-E. Balaguruswamy, (TMH, 2011).
2. Programming with C-B. S. Gottfried, (TMH, 2011).

Reference Books:

1. Programming with C-K. R. Venugopal and S. R. Prasad, (TMH, 1997).
2. The C Programming Language -Brian W. Kernighan and Dennis Ritchie, (Pearson Education India, 2015).
3. C Language and Numerical Methods-C. Xavier, (New Age International (P) Ltd. Pub, 2007).
4. The C Programming Language-Brian W. Kernighan / Dennis Ritchie, (Pearson Education India, 2015).

PHYSICS

The University of Burdwan

Syllabus for 3-year Degree/ 4-year Honours
in
Physics
Under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020
with effect from 2023-24

SEMESTER WISE & COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP AS PER NEP, 2020

Semester	Course Type with Code	Level	Course Title	Credit	Lect.	Tuto.	Practical	Full Marks	Distribution of Marks		
									Theory	Prac-tical	Internal Assessment
I	Major/DS Course (Core) Code: PHYS1011	100-199	MATHEMATICAL PHYSICS-I	4	3	0	1	75	40	20	15
	Minor Course Code: PHYS1021	100-199	MATHEMATICAL PHYSICS-I	4	3	0	1	75	40	20	15
	Multi/Inter disciplinary Code: PHYS1031		CNCEPTS OF PHYSICS 1	3	2	1	0	50	40	00	10
	Ability Enhancement Course (AEC) [L_1-1 MIL] Code: AEC1041		Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equvlnt. Course from SWAYAM /Any other UGC recognized platform	2	2	0	0	50	40	00	10
	Skill Enhancement Course (SEC) Code: PHYS1051		RENEWABLE ENERGY AND ENERGY HARVESTING	3	2	1	0	50	40	00	10
	Common Value Added (CVA) Course Code: CVA1061		Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			**20**				**400**			

Semester	Course Type with Code	Level	Name of the Course	Credit	Lect.	Tuto.	Practical	Full Marks	Distribution of Marks		
									Theory	Prac-tical	Internal Assessment
II	Major/DS Course (Core) Code: PHYS2011	100-199	MECHANICS	4	3	0	1	75	40	20	15
	Minor Course Code: PHYS2021	100-199	MECHANICS	4	3	0	1	75	40	20	15
	Multi/Interdisciplinary Code: PHYS2031		CNCEPTS OF PHYSICS 2	3	2	1	0	50	40	00	10
	Ability Enhancement Course (AEC)[L_2-1] Code: AEC2041		English or Equvlnt. Course from SWAYAM//Any other UGC-recognized platform	2	2	0	0	50	40	00	10
	Skill Enhancement Course (SEC) Code: PHYS2051		ELECTRICAL CIRCUITS AND NETWORK SKILLS	3	2	1	0	50	40	00	10
	Common Value Added (CVA) Course Code: CVA2061		Understanding India/Digital & Technological Solutions/Health & Wellness,Yoga Education, Sports & Fitness	4	3/3	1/0	0/1	100	80/60	0/20	20
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the program within the stipulated max. period of 7 years											
	Total			**20**				**400**			

MAJOR-PHYSICS COURSE

Semester I

MAJOR-I: PHYS1011: MATHEMATICAL PHYSICS-I (Credits: Theory-03, Practical - 01)

F.M. = 75 (Theory – 40, Practical – 20, Internal Assessment –15)

COURSE OBJECTIVE: The aim of this course is to equip the students with mathematical methods that are important prerequisites for physics courses.

Theory: 45 Lectures

Calculus:

Recapitulation: Limits, Continuity, Average and instantaneous quantities, Differentiation. Plotting functions. Intuitive ideas of continuous, differentiable etc. functions and plotting of curves. Approximation: Taylor and binomial series (statements only).

(3 Lectures)

First Order and Second Order Differential equations: First Order Differential Equations and Integrating Factor. Homogeneous Equations with constant coefficients. Wronskian and general solution. Statement of the existence and the Uniqueness theorem for Initial Value Problems. Particular Integral.

(9 Lectures)

Calculus of functions of more than one variable: Partial derivatives, Exact and inexact differentials.

(6 Lectures)

Vector Calculus:

Recapitulation of vectors: Properties of vectors under rotations. Scalar product and its invariance under rotations. Vector product, Scalar triple product and their interpretation in terms of area and volume respectively. Scalar and Vector fields.

(5 Lectures)

Vector Differentiation: Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators. Vector identities.

(6 Lectures)

Vector Integration: Ordinary integrals of vectors, Multiple integrals, Jacobian. Notion of an infinitesimal line, surface and volume elements. Line, surface and volume integrals of vector fields. Flux of a vector field, Gauss' divergence theorem. Green's and Stokes Theorems and their applications (no rigorous proofs).

(10 Lectures)

Orthogonal Curvilinear Coordinates:

Derivation of Gradient, Divergence, Curl and Laplacian in Cartesian, Spherical and Cylindrical Coordinate Systems.

(6 Lectures)

Reference Books:

1. Mathematical Methods for Physicists, G.B. Arfken, H.J. Weber, F.E. Harris, 2013, 7th Edn., Elsevier.
2. An introduction to ordinary differential equations, E.A. Coddington, 2009, PHI learning
3. Vector Analysis, M R Spiegel, Schaums Outline Series.
4. Mathematical Tools for Physics, James Nearing, 2010, Dover Publications.
5. Higher Engineering Mathematics, B S Grewal, Khanna Publisher.
6. Advanced Engineering Mathematics, D.G. Zill and W.S. Wright, 5 Ed., 2012, Jones and Bartlett Learning
7. Mathematical Physics, H K Dass and R Verma, S. Chand & Company Pvt. Ltd.
8. Engineering Mathematics, S.Pal and S.C. Bhunia, 2015, Oxford University Press
9. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India.
10. Essential Mathematical Methods, K.F.Riley&M.P.Hobson, 2011, Cambridge Univ. Press

MAJOR-I: PHYS1011: MATHEMATICALPHYSICS-I

Practical:

COURSE OBJECTIVE: The aim of this course is to learn computer programming and numerical analysis and to emphasize its role in solving problems in Physics.

Practical: 30 Lectures

Topics	**Description with Applications**
Introduction and Overview	Computer architecture and organization, Memory, Input/Output devices.
Basics of scientific computing	Binary and decimal arithmetic, Floating point numbers, Algorithms, Sequence, Selection and Repetition, Single and double precision arithmetic, Underflow and overflow, Emphasize the importance of making equations in terms of dimensionless variables, Iterative methods.

Errors and Error-Analysis	Truncation and round off errors, Absolute and relative errors, Floating point computations.
Review of C & C++ Programming Fundamentals	Introduction to Programming, Constants, Variables, Data types, Operators and expressions, I/O statements, scanf and printf, cin and cout, Manipulators for data formatting, Control statements (Decision making statements: if statement, if else Statement, Nested if structure, else if ladder statement, Ternary Operator, goto statement, switch case statement. Unconditional and conditional looping: while loop, do-while loop, for loop, break and continue statements, Nested loops). Arrays (1D & 2D), Strings, User defined functions, Structure and Union, Idea of classes and objects.

Programs:

1. Write and execute a program in C/C++ to compute the factorial of a positive integer including Zero.
2. Write and execute a program in C/C++ to calculate sum of squares of n natural numbers.
3. Write and execute a program in C/C++ to find the area and the volume of a Sphere by varying the radius.
4. Write and execute a program in C/C++ to display Fibonacci series.
5. Write and execute a program in C/C++ to find the value of Sine function using power series (The argument will be given during execution).
6. Write and execute a program in C/C++ to find the value of Cosine function using power series (The argument will be given during execution)
7. Write and execute a program in C/C++ to find the value of ex (x will be given during execution of the program).
8. Write and execute a program in C/C++ to sort elements of an array of elements in ascending/ descending order.
9. Write and execute a program in C/C++ to separate odd and even integers in arrays.
10. Write and execute a program in C/C++ to find the largest and smallest in a given set of numbers.
11. Write and execute a program in C/C++ to calculate value of π.

COURSE OUTCOME: On completion of this course, the student must be able to perform different mathematical operations like calculus and vector operations which are extremely essential to study theoretical and experimental physics.

Reference Books

1. Introduction to Numerical Analysis, S .S.Sastry,5 thEdn., 2012 ,PHI Learning Pvt.Ltd.
2. Schaum's Outline of Programming with C++ .J.Hubbard,2000, McGraw-Hill Pub.
3. Numerical Recipes in C: The Art of Scientific Computing, W.H. Press et al, 3rd Edn., 2007, Cambridge University Press.
4. A first course in Numerical Methods, U.M. Ascher & C.Greif, 2012, PHI Learning.
5. Elementary Numerical Analysis,K.E.Atkinson, 3rd Edn., 2007, Wiley India Edition.
6. An Introduction to Computational Physics, T.Pang, 2nd Edn., 2006, Cambridge Univ. Press
7. Computational Physics, DarrenWalker, 1st Edn., 2015, Scientific International Pvt. Ltd.
8. Programming in ANSI C, E Balagurusamy, McGraw Hill Education.
9. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
10. Let Us C, Y Kanetkar, BPB Publications.

MAJOR-PHYSICS COURSE

Semester II

MAJOR II: PHYS2011: MECHANICS (Credits: Theory - 03, Practical - 01)

F.M. = 75 (Theory- 40, Practical – 20, Internal Assessment –15)

COURSE OBJECTIVE: The objectives of this course is to provide an in-depth understanding of the principles of Newtonian mechanics and apply them to solve problems involving the dynamics of classical mechanical systems.

Theory: 45 Lectures

Fundamentals of Dynamics: Reference frames, Inertial frames, Review of Newton's Laws of Motion. Galilean transformations, Galilean invariance. Momentum of variable-mass system: Motion of a rocket, Motion of a projectile in Uniform gravitational field, Dynamics of a system of particles: Centre of Mass, Motion relative to the centre of mass, Principle of conservation of momentum, Impulse.

(6 Lectures)

Work and Energy: Work-Energy theorem, Conservative and non-conservative forces, Potential energy, Energy diagram, Stable and unstable equilibrium, Force as gradient of potential energy, Work and potential energy, Work done by non-conservative forces, Law of conservation of Energy.

(4 Lectures)

Collisions: Elastic and inelastic collisions between particles in Centre of mass and Laboratory frames.

(3 Lectures)

Rotational Dynamics: Angular momentum of a particle and a system of particles, Torque and the principle of conservation of angular momentum, Rotation about a fixed axis, Moment of Inertia, Calculation of moments of inertia for regular shaped bodies, Kinetic energy of rotation. Motion involving both translation and rotation.

(8 Lectures)

Elasticity: Elastic properties of matter, Hooke's Law, Relation between Elastic constants, Twisting torque on a cylinder or a wire, Bending of Beams: Cantilever, Beam supported near the ends on two knife edges held in the same horizontal plane and a concentrated load W is applied at the midpoint.

(4 Lectures)

Gravitation and Central Force Motion: Law of gravitation, Gravitational potential energy, Inertial and gravitational mass, Gravitational potential and the gravitational field due to a spherical shell and a solid sphere.

(4 Lectures)

Motion of a particle under a central force field: Two-body problem, its reduction to one-body problem and its solution, the energy equation and energy diagram. Kepler's Laws, Satellite in circular orbit and

applications. Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS).

(6 Lectures)

Oscillations: Simple Harmonic Oscillations: Differential equation of SHM and its solution, Kinetic energy, potential energy, Total energy and their time-averaged values. Damped oscillation, Forced oscillations: Transient and steady states, Resonance, Sharpness of resonance, Power dissipation and Quality Factor, Compound pendulum.

(6 Lectures)

Non-Inertial Systems: Non-inertial frames and fictitious forces: Uniformly rotating frame, Laws of Physics in rotating coordinate systems, Centrifugal force, Coriolis force and its applications. Components of velocity and acceleration in cylindrical and spherical coordinate

(4 Lectures)

COURSE OUTCOME: This course in Mechanics serves as the foundation for further progress towards the study of physics at graduate or post-graduate level. Upon completion of the course, the student will be able to apply Newton's laws of motion to different force fields for a single particle and for a system of particles.

Reference Books:

1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
3. Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
4. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000
5. University Physics. F.W Sears, M.W Zemansky, H.D Young 13/e, 1986, Addison Wesley
6. An Introduction to Classical Mechanics, R G Takwale & P S Puranik, TMG Hill.
7. Mechanics, P K Srivastava, New Age International Pvt. Ltd.
8. Theoretical Mechanics, M.R. Spiegel, 2006, Tata McGraw Hill.
9. Vibrations, Waves and Acoustics, D Chattopadhyay and P C Rakshit, Books and Allied Pvt. Ltd.
10. Advanced Acoustics, D P Roychaudhuri and P Banerjee, The New Book Stall, 2009

MAJOR-II: PHYS2011: MECHANICS

Practical: 30 Lectures

Practical:

1. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
2. To determine the Moment of Inertia of a Flywheel/regular shaped body.
3. To determine g and velocity for a freely falling body using Digital Timing Technique.
4. To determine the Young's Modulus of a Wire by Optical Lever Method.
5. To determine the Modulus of Rigidity of a Wire by Maxwell's needle/dynamical method.
6. To determine the elastic Constants of a wire by Searle's method.
7. To determine the value of g using Bar pendulum/Kater's Pendulum.
8. To determine the value of Young's Modulus by Flexure method.

Reference Books

1. Advanced Practical Physics for students, B. L. Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, I.Prakash & Ramakrishna,11thEdn,2011,KitabMahal.
3. Engineering Practical Physics, S.Panigrahi &B.Mallick,2015,CengageLearningIndiaPvt.Ltd.
4. Practical Physics,G.L.Squires,2015, 4thEdition,CambridgeUniversityPress.
5. Practical Physics, D Chattopadhyay, P C Rakshit and B Saha, Books and Allied Pvt. Ltd.
6. Advanced Practical Physics, B Ghosh and K G Mazumdar, Sreedhar Publishers.
7. B. Sc. Practical Physics, Harnam Singh and P S Heme, S Chand and Company Limited.
8. B. Sc. Practical Physics, C L Arora, S Chand and Company Limited.

MINOR-PHYSICS COURSE

Semester I

MINOR-I: PHYS1021: MATHEMATICAL PHYSICS-I (Credits: Theory - 03, Practical - 01)

F.M. = 75 (Theory - 40, Practical - 20, Internal Assessment - 15)

COURSE OBJECTIVE: The aim of this course is to equip the students with mathematical methods that are important prerequisites for physics courses.

Theory: 45 Lectures

Calculus:

Recapitulation: Limits, Continuity, Average and instantaneous quantities, Differentiation. Plotting functions. Intuitive ideas of continuous, differentiable etc. functions and plotting of curves. Approximation: Taylor and binomial series (statements only).

(3 Lectures)

First Order and Second Order Differential equations: First Order Differential Equations and Integrating Factor. Homogeneous Equations with constant coefficients. Wronskian and general solution. Statement of the existence and the Uniqueness theorem for Initial Value Problems. Particular Integral.

(9 Lectures)

Calculus of functions of more than one variable: Partial derivatives, Exact and inexact differentials.

(6 Lectures)

Vector Calculus:

Recapitulation of vectors: Properties of vectors under rotations. Scalar product and its invariance under rotations. Vector product, Scalar triple product and their interpretation in terms of area and volume respectively. Scalar and Vector fields.

(5 Lectures)

Vector Differentiation: Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators. Vector identities.

(6 Lectures)

Vector Integration: Ordinary integrals of vectors, Multiple integrals, Jacobian. Notion of an infinitesimal line, surface and volume elements. Line, surface and volume integrals of vector fields. Flux of a vector field, Gauss' divergence theorem. Green's and Stokes Theorems and their applications (no rigorous proofs).

(10 Lectures)

Orthogonal Curvilinear Coordinates:

Derivation of Gradient, Divergence, Curl and Laplacian in Cartesian, Spherical and Cylindrical Coordinate Systems.

(6 Lectures)

Reference Books:

1. Mathematical Methods for Physicists, G.B. Arfken, H.J. Weber, F.E. Harris, 2013, 7th Edn., Elsevier.
2. An introduction to ordinary differential equations, E.A. Coddington, 2009, PHI learning
3. Vector Analysis, M R Spiegel, Schaums Outline Series.
4. Mathematical Tools for Physics, James Nearing, 2010, Dover Publications.
5. Higher Engineering Mathematics, B S Grewal, Khanna Publisher.
6. Advanced Engineering Mathematics, D.G. Zill and W.S. Wright, 5 Ed., 2012, Jones and Bartlett Learning
7. Mathematical Physics, H K Dass and R Verma, S. Chand & Company Pvt. Ltd.
8. Engineering Mathematics, S.Pal and S.C. Bhunia, 2015, Oxford University Press
9. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India.
10. Essential Mathematical Methods, K.F.Riley&M.P.Hobson, 2011, Cambridge Univ. Press

MINOR-I: PHYS1021: MATHEMATICALPHYSICS-I

Practical:

COURSE OBJECTIVE: The aim of this course is to learn computer programming and numerical analysis and to emphasize its role in solving problems in Physics.

Practical: 30 Lectures

Topics	**Description with Applications**
Introduction and Overview	Computer architecture and organization, Memory, Input/Output devices.

Basics of scientific computing	Binary and decimal arithmetic, Floating point numbers, Algorithms, Sequence, Selection and Repetition, Single and double precision arithmetic, Underflow and overflow, Emphasize the importance of making equations in terms of dimensionless variables, Iterative methods.
Errors and Error-Analysis	Truncation and round off errors, Absolute and relative errors, Floating point computations.
Review of C & C++ Programming Fundamentals	Introduction to Programming, Constants, Variables, Data types, Operators and expressions, I/O statements, scanf and printf, cin and cout, Manipulators for data formatting, Control statements (Decision making statements: if statement, if else Statement, Nested if structure, else if ladder statement, Ternary Operator, goto statement, switch case statement. Unconditional and conditional looping: while loop, do-while loop, for loop, break and continue statements, Nested loops). Arrays (1D & 2D), Strings, User defined functions, Structure and Union, Idea of classes and objects.

Programs:

1. Write and execute a program in C/C++ to compute the factorial of a positive integer including Zero.
2. Write and execute a program in C/C++ to calculate sum of squares of n natural numbers.
3. Write and execute a program in C/C++ to find the area and the volume of a Sphere by varying the radius.
4. Write and execute a program in C/C++ to display Fibonacci series.
5. Write and execute a program in C/C++ to find the value of Sine function using power series (The argument will be given during execution).
6. Write and execute a program in C/C++ to find the value of Cosine function using power series (The argument will be given during execution)
7. Write and execute a program in C/C++ to find the value of ex (x will be given during execution of the program).
8. Write and execute a program in C/C++ to sort elements of an array of elements in ascending/ descending order.
9. Write and execute a program in C/C++ to separate odd and even integers in arrays.
10. Write and execute a program in C/C++ to find the largest and smallest in a given set of numbers.
11. Write and execute a program in C/C++ to calculate value of π.

COURSE OUTCOME: On completion of this course, the student must be able to perform different mathematical operations like calculus and vector operations which are extremely essential to study theoretical and experimental physics.

Reference Books

1. Introduction to Numerical Analysis, S .S.Sastry,5 thEdn., 2012 ,PHI Learning Pvt.Ltd.

2. Schaum's Outline of Programming with C++ .J.Hubbard,2000, McGraw-Hill Pub.

3. Numerical Recipes in C: The Art of Scientific Computing, W.H. Press et al, 3rd Edn., 2007, Cambridge University Press.

4. A first course in Numerical Methods, U.M. Ascher & C.Greif, 2012, PHI Learning.

5. Elementary Numerical Analysis,K.E.Atkinson, 3rd Edn., 2007, Wiley India Edition.

6. An Introduction to Computational Physics, T.Pang, 2nd Edn., 2006, Cambridge Univ. Press

7. Computational Physics, DarrenWalker, 1st Edn., 2015, Scientific International Pvt. Ltd.

8. Programming in ANSI C, E Balagurusamy, McGraw Hill Education.

9. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.

10. Let Us C, Y Kanetkar, BPB Publications.

MINOR-PHYSICS COURSE

Semester II

MINOR II : PHYS2021: MECHANICS (Credits: Theory - 03, Practical - 01)

F.M. = 75 (Theory - 40, Practical – 20, Internal Assessment –15)

COURSE OBJECTIVE: The objectives of this course is to provide an in-depth understanding of the principles of Newtonian mechanics and apply them to solve problems involving the dynamics of classical mechanical systems.

Theory: 45 Lectures

Fundamentals of Dynamics: Reference frames, Inertial frames, Review of Newton's Laws of Motion. Galilean transformations, Galilean invariance. Momentum of variable-mass system: Motion of a rocket, Motion of a projectile in Uniform gravitational field, Dynamics of a system of particles: Centre of Mass, Motion relative to the centre of mass, Principle of conservation of momentum, Impulse.

(6 Lectures)

Work and Energy: Work-Energy theorem, Conservative and non-conservative forces, Potential energy, Energy diagram, Stable and unstable equilibrium, Force as gradient of potential energy, Work and potential energy, Work done by non-conservative forces, Law of conservation of Energy.

(4 Lectures)

Collisions: Elastic and inelastic collisions between particles in Centre of mass and Laboratory frames.

(3 Lectures)

Rotational Dynamics: Angular momentum of a particle and a system of particles, Torque and the principle of conservation of angular momentum, Rotation about a fixed axis, Moment of Inertia, Calculation of moments of inertia for regular shaped bodies, Kinetic energy of rotation. Motion involving both translation and rotation.

(8 Lectures)

Elasticity: Elastic properties of matter, Hooke's Law, Relation between Elastic constants, Twisting torque on a cylinder or a wire, Bending of Beams: Cantilever, Beam supported near the ends on two knife edges held in the same horizontal plane and a concentrated load W is applied at the midpoint.

(4 Lectures)

Gravitation and Central Force Motion: Law of gravitation, Gravitational potential energy, Inertial and gravitational mass, Gravitational potential and the gravitational field due to a spherical shell and a solid sphere.

(4 Lectures)

Motion of a particle under a central force field: Two-body problem, its reduction to one-body problem and its solution, the energy equation and energy diagram. Kepler's Laws, Satellite in circular orbit and

applications. Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS).

(6 Lectures)

Oscillations: Simple Harmonic Oscillations: Differential equation of SHM and its solution, Kinetic energy, potential energy, Total energy and their time-averaged values. Damped oscillation, Forced oscillations: Transient and steady states, Resonance, Sharpness of resonance, Power dissipation and Quality Factor, Compound pendulum.

(6 Lectures)

Non-Inertial Systems: Non-inertial frames and fictitious forces: Uniformly rotating frame, Laws of Physics in rotating coordinate systems, Centrifugal force, Coriolis force and its applications. Components of velocity and acceleration in cylindrical and spherical coordinate systems.

(4 Lectures)

COURSE OUTCOME: This course in Mechanics serves as the foundation for further progress towards the study of physics at graduate or post-graduate level. Upon completion of the course, the student will be able to apply Newton's laws of motion to different force fields for a single particle and for a system of particles.

Reference Books:

1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
3. Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
4. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000
5. University Physics. F.W Sears, M.W Zemansky, H.D Young 13/e, 1986, Addison Wesley
6. An Introduction to Classical Mechanics, R G Takwale & P S Puranik, TMG Hill.
7. Mechanics, P K Srivastava, New Age International Pvt. Ltd.
8. Theoretical Mechanics, M.R. Spiegel, 2006, Tata McGraw Hill.
9. Vibrations, Waves and Acoustics, D Chattopadhyay and P C Rakshit, Books and Allied Pvt. Ltd.
10. Advanced Acoustics, D P Roychaudhuri and P Banerjee, The New Book Stall, 2009

MINOR II : PHYS2021: MECHANICS

Practical: 30 Lectures

Practical:

1. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
2. To determine the Moment of Inertia of a Flywheel/regular shaped body.
3. To determine g and velocity for a freely falling body using Digital Timing Technique.
4. To determine the Young's Modulus of a Wire by Optical Lever Method.
5. To determine the Modulus of Rigidity of a Wire by Maxwell's needle/dynamical method.
6. To determine the elastic Constants of a wire by Searle's method.
7. To determine the value of g using Bar pendulum/Kater's Pendulum.
8. To determine the value of Young's Modulus by Flexure method.

Reference Books

1. Advanced Practical Physics for students, B. L. Flint and H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, I.Prakash & Ramakrishna,11thEdn,2011,KitabMahal.
3. Engineering Practical Physics, S.Panigrahi &B.Mallick,2015,CengageLearningIndiaPvt.Ltd.
4. Practical Physics,G.L.Squires,2015, 4thEdition,CambridgeUniversityPress.
5. Practical Physics, D Chattopadhyay, P C Rakshit and B Saha, Books and Allied Pvt. Ltd.
6. Advanced Practical Physics, B Ghosh and K G Mazumdar, Sreedhar Publishers.
7. B. Sc. Practical Physics, Harnam Singh and P S Heme, S Chand and Company Limited.
8. B. Sc. Practical Physics, C L Arora, S Chand and Company Limited.

MULTI-DISCIPLINARY COURSE (PHYSICS)

Semester I

MULTI-DISCIPLINARY-1: PHYS1031: CNCEPTS OF PHYSICS 1 (Credits: 03)

F.M. = 50 (Theory- 40, Internal Assessment – 10)

COURSE OBJECTIVE: The aim of the course is to enable the students to be familiar with basic Physics.

Theory: 45 Lectures

Unit, Dimensions and Measurement of Physical Quantities

Need for a measurement, Units of measurement, Systems of units, SI units, Fundamental and derived units. Length, mass and time measurements, Accuracy and precision of measuring instruments, Errors in measurements, Significant figures. Dimensions of physical quantities, Dimensional analysis and its applications.

(4 Lectures)

Kinematics

Motion in a Straight Line, Uniform and non-uniform rectilinear motion, Average speed and instantaneous velocity, Uniformly accelerated motion, Velocity-time and position-time graphs, Kinematic equations for uniformly accelerated motion (graphical treatment).

(3 Lectures)

Scalar and vector quantities

Unit vector, Position and displacement vectors, Equality of vectors, Multiplication of vectors by a real number, Addition and subtraction of vectors, Relative velocity, Resolution of a vector in a plane, Rectangular components, Scalar and vector product of two vectors.

(3 Lectures)

Motion in a plane

Uniform circular motion, projectile motion.

(2 Lectures)

Laws of Motion

Intuitive concept of force, Inertia, Newton's first law of motion, Momentum and Newton's second law of motion, Impulse, Newton's third law of motion. Law of conservation of linear momentum and its applications. Static and kinetic friction, Laws of friction, Rolling friction, Lubrication. Dynamics of uniform circular motion, Centripetal force, Examples of circular motion (vehicle on a leveled circular road, vehicle on a banked road).

(8 Lectures)

Work, Energy and Power

Work done by a constant force and a variable force, Kinetic energy, Work-energy theorem, power. Notion of potential energy, Potential energy of a spring, Conservative forces, Conservation of mechanical energy (Sum of kinetic and potential energies), Non-conservative forces, Motion in a vertical circle, Elastic and inelastic collisions in one and two dimensions.

(8 Lectures)

System of Particles and Rotational Motion

Centre of mass of a two-particle system, Momentum conservation and Motion of centre of mass. Centre of mass of a rigid body, Centre of mass of a uniform rod. Moment of a force, Angular momentum, Law of conservation of angular momentum and its applications. Equilibrium of rigid bodies, Rigid body rotation and equations of rotational motion, Comparison of linear and rotational motion. Moment of inertia, Radius of gyration, Values of moments of inertia for simple geometrical objects (no derivation).

(12 Lectures)

Gravitation

Universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy and gravitational potential, Escape velocity, Orbital velocity of a satellite, Geo-stationary satellites.

(5 Lectures)

COURSE OUTCOME: Students will develop the problem-solving capability and also learn the applications of Newtonian mechanics in daily life.

Reference Books:

1. Vector analysis, M.R. Spiegel, Tata McGraw Hill.
2. An introduction to Mechanics, D. Kleppner, R.J. Kolenkow, McGraw-Hill.
3. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. Tata McGraw-Hill.
4. Concepts of Physics, H C Verma, Vol 1 & 2, BharatiBhawan.
5. Mechanics, D.S. Mathur, S. Chand and Company Limited,
6. University Physics. F.W Sears, M.W Zemansky, H.D Young 13/e, Addison Wesley
7. Theoretical Mechanics, M.R. Spiegel, Tata McGraw Hill.
8. New Simplified Physics, S L Arora, Dhanpat RaI & Co. Pvt. Ltd, Vol.1, 2020

MULTI-DISCIPLINARY COURSE (PHYSICS)

Semester II

MULTI-DISCIPLINARY-2: PHYS2031 CNCEPTS OF PHYSICS 2 (Credits: 03)

F.M.= 50 (Theory-40, Internal Assessment–10)

COURSE OBJECTIVE: The aim of the course is to enable the students to be familiar with basic Physics.

Theory: 45 Lectures

General Properties of Matter

Mechanical properties of solids, Stress-strain relationship, Hooke's law, Elastic moduli. Mechanical properties of fluids, Pressure due to a fluid column, Pascal's law and its applications (hydraulic lift and hydraulic brakes).

Viscosity, Stokes' law, Terminal velocity, Streamline and turbulent flow, Critical velocity, Bernoulli's theorem and its applications.

Surface energy and surface tension, Angle of contact, Excess-pressure across a curved surface, Effects of surface tension to drops, bubbles and capillary rise.

(13 Lectures)

Thermal Properties of Matter

Heat, Temperature, Thermal expansion, Thermal expansion of solids, liquids and gases, Anomalous expansion of water, Specific heat capacity, C_p, C_v – Calorimetry, Change of state, Latent heat capacity.

Processes of heat transfer: Conduction, Convection and Radiation, Thermal conductivity. Blackbody radiation, Planck’s distribution law (qualitative discussion), Wien's displacement Law, Stefan's law.

(8 Lectures)

Behavior of Perfect Gases and Kinetic Theory of Gases

Equation of state of a perfect gas, Work done in compressing a gas, Kinetic theory of gases: Postulates, Concept of pressure, Kinetic interpretation of temperature, RMS speed of gas molecules, Degrees of freedom, the law of equi-partition of energy (statement only) and its application to specific heat capacities of gases, Concept of mean free path, Avogadro's number.

(8 Lectures)

Thermodynamics

Zeroth law of thermodynamics, Heat, work and internal energy, First law of thermodynamics, Isothermal and adiabatic processes, Second law of thermodynamics: Reversible and irreversible processes, Concept of entropy.

(8 Lectures)

Oscillations and Waves

Oscillations: Periodic motion, Time period, Frequency, Displacement as a function of time, Simple harmonic motion (S.H.M): Differential equation, Phase, Oscillations of a loaded spring, Restoring force and force constant, Energy in S.H.M., Kinetic and potential energies, Derivation of the expression for the time period of a simple pendulum. Free, Forced and Damped oscillations (qualitative ideas only), Resonance.

(8 Lectures)

COURSE OUTCOME: Students will develop the problem-solving capability and also learn the applications of Newtonian mechanics in daily life.

Reference Books:

1. Thermal Physics, S.Garg, R.Bansal and C.Ghosh,1993,Tata McGraw-Hill.
2. New Simplified Physics, S L Arora, Dhanpat RaI & Co. Pvt. Ltd, Vol.1, 2020
3. Concepts of Physics, H C Verma, Vol 1 & 2, Bharati Bhawan.
4. Waves: Berkeley Physics Course,vol.3,FrancisCrawford,2007,TataMcGraw-Hill.
5. Heat Thermodynamics and Statistical Physics, Brijlal, Subrahmanyam, Heme, S Chand.
6. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears & G.L.Salinger. 1988, Narosa.
7. A Treatise on Heat, Meghnad Saha and B.N.Srivastava, 1969, Indian Press.

SEC-PHYSICS

Semester-I

SEC-1:PHYS1051: RENEWABLE ENERGY AND ENERGY HARVESTING (Credits: 03)

F.M. = 50 (Theory - 40, Internal Assessment - 10)

COURSE OBJECTIVE: To impart knowledge and hands on learning about various alternative energy sources like Wind, Solar, Mechanical, Ocean, Geothermal etc. To review the working of various energy harvesting systems which are installed worldwide.

Theory: 45 Lectures

Fossil Fuels and Alternate Sources of Energy: Fossil fuels and nuclear energy, Their limitation, Need of renewable energy, Non-conventional energy sources. An overview of the developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, Solar energy, Biomass, Biochemical conversion, Biogas generation, Geothermal energy, Tidal energy, Hydroelectricity. (8 Lectures)

Solar energy: Solar energy and its importance, Storage of solar energy, Solar pond, Non-convective solar pond, Applications of solar pond and solar energy, Solar water heater, Flat plate collector, Solar distillation, Solar cooker, Solar green houses, Solar cell, Absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits and sun tracking systems. (8 Lectures)

Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces and grid interconnection topologies. (5 Lectures)

Ocean Energy: Ocean Energy, Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass. (5 Lectures)

Geothermal Energy: Geothermal resources, Geothermal technologies. (4 Lectures)

Hydro Energy: Hydropower resources, Hydropower technologies, Environmental impact of hydro power sources. (5 Lectures)

Piezoelectric Energy harvesting: Introduction, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modelling piezoelectric generators, Piezoelectric energy harvesting applications, Human power. (5 Lectures)

Electromagnetic Energy Harvesting: Linear generators, Related Physics, Mathematical models, Recent applications, Carbon captured technologies, cell, Batteries, Power consumption, Environmental issues and Renewable sources of energy, Sustainability. (5 Lectures)

COURSE OUTCOME: The students are expected to learn not only the theories of the renewable sources of energy, but also to have hands-on experiences on them wherever possible.

Reference Books:

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi
2. Solar energy - M P Agarwal - S Chand and Co. Ltd.
3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.
4. Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University.
5. Dr. P Jayakumar, Solar Energy: Resource Assesment Handbook, 2009
6. J.Balfour, M.Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).
7. http://en.wikipedia.org/wiki/Renewable_energy
8. Snatak Padartha Vigyan, Renewable Energy Sources, A M Rudra, A Bhattacharya and A Dan, The New Book Stall, 2018.

SEC-PHYSICS

Semester-II

SEC-2: PHYS2051: ELECTRICAL CIRCUITS AND NETWORK SKILLS (Credits: 03)

F.M.= 50 (Theory - 40, Internal Assessment - 10)

COURSE OBJECTIVE*:* The aim of this course is to enable the students to understand the basics of electronic circuits. Practical design and trouble shoot of electronic instrument is also a major objective of this Couse.

Theory: 45 Lectures

Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter. (5 Lectures)

Understanding Electrical Circuits: Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-phase and three-phase alternating current sources. Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source. Power factor. Saving energy and money.

(8 Lectures)

Electrical Drawing and Symbols: Drawing symbols. Blueprints. Reading Schematics. Ladder diagrams. Electrical Schematics. Power circuits. Control circuits. Reading of circuit schematics. Tracking the connections of elements and identify current flow and voltage drop. (5 Lectures)

Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. (5 Lectures)

Electric Motors: Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor. (5 Lectures)

Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources (5 Lectures)

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Interfacing DC or AC sources to control elements (relay protection device) (5 Lectures)

Electrical Wiring: Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit Cable trays. Splices: wire nuts, crimps, terminal blocks, split bolts, and solder. Preparation of extension board. (7 Lectures)

COURSE OUTCOME: After the completion of the course the student will acquire necessary skills/ hands on experience /working knowledge on Multimeter, voltmeters, ammeters, electric circuit elements, dc power sources. With the knowledge of basic electronics a student can able to detect troubleshoot and repair some of the electronic instruments used in our daily life.

Reference Books:

1. A Text book in Electrical Technology - B L Theraja - S Chand & Co.
2. A Text book of Electrical Technology - A K Theraja
3. Performance and design of AC machines - M G Say ELBS Edn.

CHEMISTRY

THE UNIVERSITY OF BURDWAN

Syllabus of 3-Year Degree/4-Year Honours in Chemistry

Under Curriculum and Credit Framework for Undergraduate Programme (CCFUP) as per National Education Policy 2020

with effect from 2023-24

Paper codes, credit allocation, marks distribution, etc

Sem	Course type	Paper code	Course name	Credit				Marks			
				T	Lec	Prac	Tut	Th	Prac	IA	T
I	Major	CHEM101-1	Basic Chemistry-I	4	3	1	0	40	20	15	75
	Minor	CHEM102-1	General Chemistry-I	4	3	1	0	40	20	15	75
	Multi/ interdisciplinary	CHEM103-1	Chemistry for household importance	3	3	0	0	40	00	10	50
	Ability Enhancement Course (AEC)		-								
	Skill Enhancement Course (SEC)	CHEM105-1	Drugs and pharmaceuticals	3	3	0	0	40	00	10	50
	Common Value Added (CVA) Course		-								
II	Major	CHEM201-1	Basic Chemistry-II	4	3	1	0	40	20	15	75
	Minor	CHEM202-1	General Chemistry-II	4	3	1	0	40	20	15	75
	Multi/interdisciplinary	CHEM203-1	Chemistry of Dyes, pigments, cosmetics and perfumes	3	3	0	0	40	00	10	50
	Ability Enhancement Course (AEC)	PMGL2041	Functional English								
	Skill Enhancement Course (SEC)	CHEM205-1	Basic Analytical Chemistry	3	3	0	0	40	00	10	50
	Common Value Add-ed (CVA) Course										

Sem	Course type	Paper code	Course name	Credit				Marks			
				T	Lec	Prac	Tut	Th	Prac	IA	T
III	Major	CHEM301-1	Inorganic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM301-2	Inorganic Chemistry (Prac)	4	0	4	0	00	60	15	75
	Multi/ interdisciplinary	CHEM303-1		3	3	0	0	40	00	10	50
	Skill Enhancement Course (SEC)	CHEM305-1	IT skills in Chemistry	3	3	0	0	40	00	10	50
IV	Major	CHEM401-1	Organic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM401-2	Physical Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM401-3	Organic & Physical Chemistry (Prac)	4	0	4	0	00	60	15	75
V	Major	CHEM501-1	Inorganic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM501-2	Organic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM501-3	Inorganic & Organic Chemistry (Prac)	4	0	4	0	00	60	15	75
	Minor	CHEM502-1	General Chemistry-III	4	4	0	0	60	00	15	75
VI	Major	CHEM601-1	Physical Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM601-2	Inorganic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM601-3	Organic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM601-4	Practical	4	0	4	0	00	60	15	75
VII	Major	CHEM701-1	Inorganic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM701-2	Organic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM701-3	Physical Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM701-4	Practical	4	0	4	0	00	60	15	75
VIII	Major	CHEM801-1	Inorganic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM801-2	Organic Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM801-3	Physical Chemistry (Th)	4	4	0	0	60	00	15	75
		CHEM801-4	Practical	4	0	4	0	00	60	15	75

Semester-I

Chemistry MAJOR

Paper code: CHEM101-1
Paper title: Basic Chemistry-I
Credits 3+1

Theory Credits 3

1. Atomic structure

Bohr's theory- its limitations and atomic spectra of hydrogen atom, Sommerfeld's theory, wave mechanics- de Broglie equation, Heisenberg's uncertainty principle and its significance, Schrödinger's wave equation, significance of ψ and ψ^2, quantum numbers and their significance, Radial and angular wave functions for hydrogen atom, radial and angular distribution curves, shapes of s, p, d and f orbitals, Pauli's exclusion principle, Hund's rules and multiplicity, exchange energy, Aufbau principle and its limitations, Ground state Term symbols of atoms and ions for atomic number upto 30 *6 Hours*

2. Periodic properties

Modern IUPAC periodic table, effective nuclear charge, screening effects and penetration, Slater's rules, atomic radii, ionic radii (Pauling's univalent), covalent radii, lanthanide contraction; ionization potential, electron affinity and electronegativity (Pauling's, Mulliken's and Allred-Rochow's scales) and factors influencing these properties, group electronegativities, group trends and periodic trends in these properties in respect of s-, p- and d-block elements, secondary periodicity, relativistic Effect, inert pair effect *6 Hours*

3. Acids and bases

Acid-Base concept- Arrhenius concept, theory of solvent system (in H_2O, NH_3, SO_2 and HF); Bronsted-Lowry's concept, relative strength of acids, Pauling's rules, Lux-Flood concept, Lewis concept, group characteristics of Lewis acids, solvent levelling and differentiating effects, thermodynamic acidity parameters, Drago-Wayland equation, superacids, gas phase acidity and proton affinity, HSAB principle, acid-base equilibria in aqueous solution (proton transfer equilibria in water), pH, buffer, acid-base neutralisation curves, indicator, choice of indicators, concept of organic acids and bases, effect of structure, substituent and solvent on acidity and basicity, proton sponge, gas-phase acidity and basicity *6 Hours*

4. Fundamentals in Organic chemistry

Electron displacement phenomena and physical properties: inductive effect, field effect, hyperconjugation, mesomeric effect, resonance energy, bond polarization and bond polarizability, electromeric effect, steric effect, steric inhibition of resonance, influence of hybridization on bond properties, bond dissociation energy (BDE) and bond energy, bond distances, bond angles, concept of bond angle strain (Baeyer's strain theory), melting point/boiling point and solubility of common organic compounds in terms of covalent & non-covalent intermolecular forces, polarity of molecules and dipole moments, relative stabilities of isomeric hydrocarbons in terms of heat of hydrogenation, heat of combustion and heat of formation, calculation of formal charges and double bond equivalent (DBE)

Reactive intermediates: carbocations (carbenium and carbonium ions), carbanions, carbon radicals, carbenes, benzynes and nitrenes, generation and stability, structure using orbital picture and electrophilic/nucleophilic behaviour of the reactive intermediates (elementary idea)

Concept of aromaticity: Hückel's rules for aromaticity up to [10]-annulene (including mononuclear heterocyclic compounds up to 6-membered ring), concept of antiaromaticity and homoaromaticity, non-aromatic molecules, Frost diagram, elementary idea about α and β, measurement of delocalization energies in terms of β for buta-1,3-diene, cyclobutadiene, hexa-1,3,5-triene and benzene 12 *Hours*

5. Properties of Gases

Ideal and real gases: Deviation of gases from ideal behaviour, compressibility factor, Boyle temperature, Andrew's and Amagat's plots, van der Waals equation and its features, its derivation and application in explaining real gas behaviour, Dieterici equation of state, existence of critical state, critical constants in terms of van der Waals constants, law of corresponding states, virial equation of state, van der Waals equation expressed in virial form and significance of second virial coefficient, intermolecular forces (Debye, Keesom and London interactions, Lennard-Jones potential - elementary idea) *4 Hours*

6. Chemical Kinetics-I

Rate law, order and molecularity: Introduction of rate law, extent of reaction, rate constants, order, forms of rate equations of first-, second- and n-th order reactions, pseudo first-order reactions (example using acid catalyzed hydrolysis of methyl acetate), determination of order of a reaction by half-life and differential method, opposing reactions, consecutive reactions and parallel reactions (with explanation of kinetic and thermodynamic control of products with all steps of first order)

Temperature and theories of reaction rate: Temperature dependence of rate constant; Arrhenius equation, energy of activation, rate-determining step and steady-state approximation – explanation with suitable examples. *5 Hours*

7. Thermodynamics-I

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

Thermochemistry: standard states, heats of reaction, enthalpy of formation of molecules and ions and enthalpy of combustion and its applications, laws of thermochemistry, bond energy, bond dissociation energy and resonance energy from thermochemical data, Kirchhoff's equations and effect of pressure on enthalpy of reactions, adiabatic flame temperature, explosion temperature

6 Hours

Reference Books:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.

2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970.

4. Atkins, P. Shriver & Atkins' Inorganic Chemistry 5th Ed. Oxford University Press (2010).

5. Cotton, F.A., Wilkinson, G. and Gaus, P.L., Basic Inorganic Chemistry 3rd Ed.; Wiley India.

6. Sharpe, A.G., Inorganic Chemistry, 4th Indian Reprint (Pearson Education) 2005.

7. Huheey, J. E.; Keiter, E.A. &Keiter, R.L. Inorganic Chemistry, Principles of Structure and Reactivity 4th Ed., Harper Collins 1993, Pearson, 2006.

8. Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).

9. Winter, M. J., The Orbitron, http://winter.group.shef.ac.uk/orbitron/ (2002). An illustrated gallery of atomic and molecular orbitals.

10. Burgess, J., Ions in solution: basic principles of chemical interactions. Ellis Horwood (1999).

11. Clayden, J., Greeves, N. & Warren, S. Organic Chemistry, Second edition, Oxford University Press, 2012.

12. Smith, J. G. Organic Chemistry, Tata McGraw-Hill Publishing Company Limited.

13. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

14. Pathak & Saha, Organic Chemistry (Volume-1), Books and Allied (P) Ltd.

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

16. Morrison, R. T. Study guide to organic Chemistry, Pearson.

17. Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, Oxford University Press.
18. Castellan, G. W., Physical Chemistry, Narosa Publishing House.
19. McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press.
20. Engel, T. & Reid, P. Physical Chemistry, Pearson.
21. Maron, S. &Prutton, Principles of Physical Chemistry, Collier Macmillan Ltd.
22. Mortimer, R. G. Physical Chemistry, Elsevier.
23. Ball, D. W., Physical Chemistry, Thomson Press.
24. Glasstone, S. & Lewis, G.N. Elements of Physical Chemistry.
25. Rakshit, P.C., Physical Chemistry, Sarat Book House.
26. Zemansky, M. W. &Dittman, R.H. Heat and Thermodynamics, Tata-McGraw-Hill.
27. Rastogi, R. P. & Misra, R.R. An Introduction to Chemical Thermodynamics, Vikas Publishing House.
28. Clauze& Rosenberg, Chemical Thermodynamics: Basic concepts & Methods, John Wiley & Sons, 2008.
29. Sharma, K. K. & Sharma, L. K., A Textbook of Physical Chemistry, Vikas Publishing House.
30. Rajaram, J. Chemical Thermodynamics: Classical, Statistical and Irreversible, Pearson.
30. Chatterjee Hrishikesh, Physical Chemistry (Volume-1), Platinum Publisher
31. Kapoor, K.L., Textbook of Physical Chemistry (Volume 1 and Volume-2), McGraw Hill Education
32. Ghoshal, A. Numerical problems & short questions on Physical Chemistry, Books and Allied (P) Ltd.
33. Bajpai, D. N., Advanced Physical Chemistry, S. Chand Publication.
34. Levine, I. N. Physical Chemistry, Tata McGraw-Hill.

Practical Credit 1

(i) Separation, purification and melting point determination

Separation of components of a binary solid mixture based on solubility by using common laboratory reagents like water (cold, hot), dil. HCl, dil. NaOH, dil. $NaHCO_3$, etc., purification of any one ofthe separated components by crystallization and determination of its melting point. Thecomposition of the mixture may be of the following types: Benzoic acid/*p*-toluidine, *p*-nitrotolune/*p*-anisidine, benzoic acid/benzophenone, urea/benzophenone, salicylic acid/*p*-nitrotoluene, etc. *12 Hours*

(ii) Determination of boiling point

Boiling points of common organic liquid compounds e.g., ethanol,cyclohexane, ethyl methyl ketone, cyclohexanone, acetylacetone, anisole, crotonaldehyde, mesityl oxide, etc.

6 Hours

[Boiling points of the chosen organic compounds should preferably be less than 160°C]

(iii) Identification of a pure organic compound by chemical test(s)

Solid compounds: oxalic acid, succinic acid, resorcinol, urea, glucose and salicylic acid.

Liquid Compounds: acetic acid, ethyl alcohol, acetone, aniline and nitrobenzene

12 Hours

Reference Books:

1. Bhattacharyya, R. C, A Manual of Practical Chemistry.

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

3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).

4. A.K. Manna, Practical Organic Chemistry, Books & Allied (P) Ltd.

Ghosh, Das Sharma, Majumdar, Manna, Chemistry in Laboratory, Santra Publication (P) Ltd.

Chemistry MINOR

Paper code: CHEM102-I

Paper title: General Chemistry-I Credits 3+1

Theory Credits 3

1. **Atomic structure**

Bohr's theory for hydrogen atom (simple mathematical treatment), atomic spectra of hydrogen and Bohr's model, Sommerfeld's model, quantum numbers and their significance, Pauli's exclusion principle, Hund's rule, electronic configuration of many-electron atoms, Aufbau principle and its limitations *6 Hours*

2. **Periodic properties**

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

6 Hours

3. **Acids and bases**

Brönsted–Lowry concept, conjugate acids and bases, relative strengths of acids and bases, effects of substituent and solvent, differentiating and levelling solvents,Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept and solvent system concept, hard and soft acids and bases (HSAB concept), applications of HSAB process, acidity and basicity of common organic compounds *7 Hours*

4. **Aliphatic hydrocarbons**

Functional group approach for the following compounds to be studied in context of their preparations, properties, structures and reactions

Alkanes (up to 5 carbons): preparation- catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis using Grignard reagent; Reaction mechanism for free radical substitution, halogenation

Alkenes (up to 5 carbons): preparation- elimination reactions, dehydration of alcohols and dehydrohalogenation of alkyl halides, *cis* alkenes (partial catalytic hydrogenation) and trans alkenes (Birch reduction), reactions- *cis*-addition (alkaline KMnO4) and trans-addition (bromine) with mechanism, addition of HX [Markownikoff's (with mechanism) and anti-Markownikoff's addition], hydration, ozonolysis, oxymercuration-demercuration and hydroboration-oxidation reaction

Alkynes (up to 5 carbons):preparation- acetylene from CaC_2 and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinal dihalides, formation of metal acetylides, addition of bromine and alkaline $KMnO_4$, ozonolysis and oxidation with hot alkaline $KMnO_4$ *10 Hours*

5. Ideal and real gases

Concept of pressure and temperature, Deviation of gases from ideal behaviour, compressibility factor, Boyle temperature, Andrew's and Amagat's plots, van der Waals equation and its features, derivation and application in explaining real gas behaviour, existence of critical state, critical constants in terms of van der Waals constants, law of corresponding states

Viscosity of gases and effect of temperature and pressure on coefficient of viscosity (qualitative treatment only) *5 Hours*

6. Thermodynamics-I

Intensive and extensive properties state and path functions, isolated, closed and open systems, zeroth law of thermodynamics,concept of heat, work, internal energy and statement of first law; enthalpy, H, relation between heat capacities, calculations of q, w, U and H for reversible, irreversible and free expansion of gases

Standard states, heat of reaction, enthalpy of formation of molecules and ions, enthalpy of combustion and its applications, laws of thermochemistry, bond energy, bond dissociation energy and resonance energy from thermochemical data, Kirchoff's equation and effect of pressure on enthalpy, adiabatic flame temperature, explosion temperature

7 Hours

7. Chemical Kinetics-I

Introduction of rate law, order and molecularity, extent of reaction, rate constants, rates of first-, second- and n-th order reactions and their integrated forms (with derivation), pseudo first order reactions, determination of order of a reaction- half-life and differential method, opposing reactions, consecutive reactions and parallel reactions (elementary idea)

Theories of reaction rate: Temperature dependence on reaction rate, Arrhenius equation, energy of activation *4 Hours*

Reference Books:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.

2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970.

4. Atkins, P. Shriver & Atkins' Inorganic Chemistry 5th Ed. Oxford University Press (2010).

5. Cotton, F.A., Wilkinson, G. and Gaus, P.L., Basic Inorganic Chemistry 3rd Ed.; Wiley India.

6. Sharpe, A.G., Inorganic Chemistry, 4th Indian Reprint (Pearson Education) 2005.

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30. Chatterjee Hrishikesh, Physical Chemistry (Volume-1), Platinum Publisher

31. Kapoor, K.L., Textbook of Physical Chemistry (Volume 1 and Volume-2), McGraw Hill Education

32. Ghoshal, A. Numerical problems & short questions on Physical Chemistry, Books and Allied (P) Ltd.

33. Maron, S. &Prutton, Principles of Physical Chemistry, Collier Macmillan Ltd.

34. Levine, I. N. Physical Chemistry, Tata McGraw-Hill.

Practical Credit 1

(i) Determination of boiling points

Boiling points of common organic liquid compounds e.g., ethanol, cyclohexane, ethyl methyl ketone, cyclohexanone, acetylacetone, anisole, crotonaldehyde, mesityl oxide,etc.

12 Hours

(ii) Identification of a pure organic compound

Solid compounds: oxalic acid, succinic acid, resorcinol, urea, glucose, benzoic acid and salicylic acid.

Liquid Compounds: acetone, aniline and nitrobenzene *18 Hours*

Reference Books:

1. Bhattacharyya, R. C, A Manual of Practical Chemistry.

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

3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).

4. A.K. Manna, Practical Organic Chemistry, Books & Allied (P) Ltd.

Ghosh, Das Sharma, Majumdar, Manna, Chemistry in Laboratory, Santra Publication (P) Ltd.

MULTIDISCIPLINARY (for other than Chemistry Major students)

Paper code: CHEM103-I

Paper title: Chemistry for Household Importance Credits 3

Theory

1. Food chemistry: Food additive, food flavor, adulterant, preservative, artificial sweeteners *8 Hours*
2. Drugs and pharmaceuticals: Structure and function, antipyretic and analgesic drugs – aspirin, paracetamol, ibuprofen *8 Hours*
3. Vitamins: Vitamin C and B_{12} *2 Hours*
4. Antibiotics: Penicillin, sulphaguanidine, chloramphenicol *4 Hours*
5. Glass and ceramics: Definition and manufacture of glasses, optical and colour glasses *6 Hours*
6. Surface chemistry: Soaps and detergents *2 Hours*
7. Chemistry of fuels: Conventional and non-conventional energy sources, classification of fuels, calorific values of fuels like kerosene, coal, coal gas, petrol, liquefied petroleum gas, octane number, biogas *15 Hours*

Reference Books:

1. Thapar, Food Chemistry, Pacific Book International
2. Gayatri Baidya, Textbook of Food Chemistry, Book Rivers
3. Mandal, S.K., Pharmaceutical Chemistry and Production: An Introductory Textbook Rebeca Ghanta; Bentham Science Publishers 2022, ISBN: 978-1-68108-890-7
4. Sengupta,S.,Application Oriented Chemistry Books Syndicate Pvt. Ltd., 2000

SKILL ENHANCEMENT COURSE

Paper code: CHEM105-1

Paper title: Drugs and pharmaceuticals

Theory Credits 3

Drug discovery, design and development,synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents (aspirin, paracetamol, ilbuprofen), antibiotics (penicillin, chloramphenicol), antibacterial and antifungal agents (sulphonamides, sulphanethoxazol, sulphacetamide, trimethoprim); antiviral agents (acyclovir), central nervous system agents (phenobarbital, diazepam), cardiovascular (glyceryl trinitrate), antilaprosy (dapsone), HIV-AIDS related drugs(AZT-Zidovudine)

45 Hours

Reference Books:

1. Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.

2. Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.

3. Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B.I. Waverly Pvt. Ltd. New Delhi.

4. El-Mansi, E.M.T., Bryce, C.F.A., Ddemain, A.L., Allman, A.R., Fermentatias Microbiology and Biotechnology, 2nd Ed. Taylor & Francis.

5. Prescott & Dunn’s Industrial Microbiology, 2004, CBS Publisher.

Semester-II

Chemistry MAJOR

Paper code: CHEM201-1

Paper title: Basic Chemistry-II Credits 3+1

Theory Credits 3

1. Chemical bonding-I

Ionic bond: general characteristics, types of ions, size effects, radius ratio rule and its application and limitations, packing of ions in crystals Born-Landé equation with derivation and importance, Kapustinskii expression for lattice energy, Madelung constant, Born-Haber cycle and its application, solvation energy, solubility energetics of dissolution process.

Covalent bond: polarizing power and polarizability, ionic potential, Fazan's rules,Lewis structures, formal charge, Valence Bond Theory- hydrogen molecule (Heitler-London approach), directional character of covalent bonds, hybridizations, equivalent and non-equivalent hybrid orbitals, Bent's rule, dipole moments, VSEPR theory, shapes of molecules and ions containing lone pairs and bond pairs (examples from main groups chemistry) and multiple bonding (σ and π bond approach) *6 Hours*

2. Redox Reactions and Precipitation Reactions

Balancing of redox reactions: ion-electron method, elementary idea on standard redox potentials- Nernst equation (without derivation), influence of complex formation, precipitation and pH, formal potential

Redox titrations: feasibility, redox potential at the equivalence point, redox indicators, redox potential diagram (Latimer and Frost diagrams) of common elements and their applications Disproportionation and comproportionation reactions (typical examples), solubility product principle, common ion effect and their applications to the precipitation and separation of common metallic ions as hydroxides, sulfides, phosphates, carbonates, sulfates and halides *4 Hours*

3. Stereochemistry-I

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

Chirality and symmetry: symmetry elements and point groups (C_v, C_{nv}, C_{nh}, C_n, D_h, D_{nh}, D_{nd}, D_n, S_n (C_s, C_i), molecular chirality and centre of chirality, asymmetric and dissymmetric molecules, enantiomers and diastereomers, epimers, stereogenicity,

chirotopicity and pseudoasymmetry, chiral centres and number of stereoisomerism, systems involving 1/2/3-chiral centre(s)- AA, AB, ABA and ABC types

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

Optical activity compounds: optical rotation, specific rotation and molar rotation, racemic compounds, racemisation (through cationic, anionic, radical intermediates and through reversible formation of stable achiral intermediates), resolution of acids, bases and alcohols via diastereomeric salt formation, optical purity and enantiomeric excess. *6 Hours*

4. General Treatment of Reaction Mechanism

Free energy profiles: one-, two- and three-step reactions, catalyzed reactions- electrophilic and nucleophilic catalysis, kinetic control and thermodynamic control of reactions, isotope effect- primary and secondary kinetic isotopic effect (k_H /k_D), principle of microscopic reversibility

Tautomerism: prototropy (keto-enol, amido-imidol, nitroso-oximino, diazo-amino and enamine-imine systems) and ring-chain tautomerism, composition of the equilibrium in different systems (simple carbonyl; 1,2- and 1,3-dicarbonyl systems, phenols and related systems), factors affecting keto-enol tautomerism, application of thermodynamic principles in tautomeric equilibria *6 Hours*

5. Substitution and Elimination Reactions

Nucleophilic substitution reactions: substitution at sp3 centre- mechanisms (with evidence), relative rates, stereochemical features, S_N^1, S_N^2, $S_N^{2'}$, $S_N^{1'}$ (allylic rearrangement) and S_N^i, effects of solvent, substrate structure, leaving group and nucleophiles (including ambident nucleophiles, cyanide & nitrite), electrofuges and nucleofuges, substitutions involving NGP, role of crown ethers and phase transfer catalysts [systems: alkyl halides, allyl halides, benzyl halides, alcohols, ethers, epoxides]

Elimination reactions: E_1, E_2, E_1cB and Ei (pyrolytic syn eliminations), formation of alkenes and alkynes, mechanisms (with evidence), reactivity, regioselectivity (Saytzeff/Hofmann) and stereoselectivity, comparison between substitution and elimination *6 Hours*

6. Kinetic Theory of gases:

Concept of pressure and temperature; collision of gas molecules, collision diameter, collision number and mean free path, frequency of binary collisions (similar and different molecules), wall collision and rate of effusion

Maxwell's distribution of speed and energy: Nature of distribution of velocities, Maxwell's distribution of speeds in one, two and three dimensions, kinetic energy distribution in one, two and three dimensions, calculations of average, root mean square and most probable values in each case, calculation of number of molecules having energy $\geq \varepsilon$, equipartition principle and its application to calculate the classical limit of molar heat capacity of gases. *5 Hours*

7. Liquid state

Viscosity: General features of fluid flow (streamline and turbulent flow); Newton's equation, viscosity coefficient; Poiseuille's equation; principle of determination of viscosity coefficient of liquids by falling sphere method; temperature variation of viscosity of liquids and comparison with that of gases

Surface tension and energy: Surface tension, surface energy, excess pressure, capillary rise and surface tension; work f cohesion and adhesion, spreading of liquids over other surfaces; vapour pressure over curved surface; temperature dependence of surface tension, principle of surface tension measurement *6 Hours*

8. Thermodynamics-II

Second Law: its need and statement, concept of heat reservoirs and heat engines, Carnot cycle, physical concept of entropy, Carnot engine and refrigerator, Kelvin – Planck and Clausius statements and their equivalence in entropic formulation, Carnot's theorem,values of §dQ/T and Clausius inequality, entropy change of systems and surroundings for various processes and transformations, entropy and unavailable work, auxiliary state functions (G and A) and their variations (with T, P and V), criteria of spontaneity and equilibrium

Thermodynamic relations: Maxwell's relations, Gibbs- Helmholtz equation, Joule-Thomson experiment and its consequences, inversion temperature, Joule-Thomson coefficient for a van der Waals gas, general heat capacity relations. *6 Hours*

Reference Books:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.
2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970.
4. Atkins, P. Shriver & Atkins' Inorganic Chemistry 5th Ed. Oxford University Press (2010).
5. Cotton, F.A., Wilkinson, G. and Gaus, P.L., Basic Inorganic Chemistry 3rd Ed.; Wiley India.
6. Sharpe, A.G., Inorganic Chemistry, 4th Indian Reprint (Pearson Education) 2005.

7. Huheey, J. E.; Keiter, E.A. &Keiter, R.L. Inorganic Chemistry, Principles of Structure and Reactivity 4th Ed., Harper Collins 1993, Pearson, 2006.

8. Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).

9. Winter, M. J., The Orbitron, http://winter.group.shef.ac.uk/orbitron/ (2002). An illustrated gallery of atomic and molecular orbitals.

10. Burgess, J., Ions in solution: basic principles of chemical interactions. Ellis Horwood (1999).

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13. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

14. Pathak & Saha, Organic Chemistry (Volume-1), Books and Allied (P) Ltd.

15. Rajaram, J. Chemical Thermodynamics: Classical, Statistical and Irreversible, Pearson.

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

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19. Castellan, G. W. Physical Chemistry, Narosa Publishing House.

20. Maron, S. &Prutton, Principles of Physical Chemistry, Collier Macmillan Ltd.

21. Laidler, K. J. Chemical Kinetics, Pearson.

22. Glasstone, S. & Lewis, G.N. Elements of Physical Chemistry.

23. Rakshit, P.C., Physical Chemistry, Sarat Book House.

24. Rastogi, R. P. & Misra, R.R. An Introduction to Chemical Thermodynamics, Vikas.

25. Sharma, K. K. & Sharma, L. K., A Textbook of Physical Chemistry, Vikas Publishing House.

26. Nasipuri, D.Stereochemistry of Organic Compounds, New Age International (P) Ltd.

27. Sengupta,S. Basic Stereochemistry of Organic Molecules, Oxford University Press

28. Manna, A.K. Organic Molecular Spectroscopy, Books and Allied (P) Ltd.

29. Bajpai, D. N., Advanced Physical Chemistry, S. Chand Publication.

30. Engel, T. & Reid, P. Physical Chemistry, Pearson.

31 Levine, I. N. Physical Chemistry, Tata McGraw-Hill.

32. Ball, D. W. Physical Chemistry, Thomson Press.

33. Chatterjee Hrishikesh, Physical Chemistry (Volume-1), Platinum Publisher

34. Kapoor, K.L., Textbook of Physical Chemistry (Volume 1 and Volume-2), McGraw Hill Education

35. Ghoshal, A. Numerical problems & short questions on Physical Chemistry, Books and Allied (P) Ltd.

Practical Credit 1

1. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate
2. Study of kinetics of decomposition of H_2O_2 by KI
3. Determination of pH of unknown strong alkali and acid solution by colour matching method
4. Determination of pH of unknown buffer solution by colour matching method
5. Study of viscosity of unknown liquid (glycerol, sugar) with respect to water
6. Determination of surface tension of a liquid using Stalagmometer

30 Hours

Reference Books:

1. Bhattacharyya, R. C, A Manual of Practical Chemistry.
2. Nad, Mahapatra, Ghosal, An Advance course in Practical Chemistry, New Central Book Agency (P) Ltd.
3. K. S. Mukherjee, Textbook on Practical Chemistry, New Central Book Agency (P) Ltd.
4. Ghosh, Das Sharma, Majumdar, Manna, Chemistry in Laboratory, santra Publication (P) Ltd.
5. Poddar and Ghosh, Degree Practical Chemistry, Book Syndicate (P) Ltd.

Chemistry MINOR

Paper code: CHEM202-I

Paper title: General Chemistry-II Credits 3+1

Theory Credits 3

1. **Thermodynamics-II**

Statement of the second law of thermodynamics, concept of heat reservoirs and heat engines, Carnot cycle, physical concept of entropy, Carnot engine, refrigerator and efficiency, entropy change of systems and surroundings for various processes and transformations, auxiliary state functions (G and A) and criteria for spontaneity and equilibrium

5 Hours

2. **Ideal gas**

Collision of gas molecules, collision diameter, collision number and mean free path, frequency of binary collisions (similar and different molecules), rate of effusion

Nature of distribution of velocities, Maxwell's distribution of speed and kinetic energy, average velocity, root mean square velocity and most probable velocity, equipartition principle and its application to calculate the classical limit of molar heat capacity of gases.

5 Hours

3. **Chemical Kinetics-II**

Collision theory, Lindemann theory of unimolecular reaction, outline of Transition State theory (classical treatment) *5 Hours*

4. **Fundamentals of Organic Chemistry**

Electronic displacement phenomena- inductive effect, resonance and hyperconjugation, cleavage of bonds- homolytic and heterolytic, structures of organic molecules on the basis of VBT, nucleophiles, electrophiles, reactive intermediates- carbocations, carbanions and free radicals.

6 Hours

5. **Stereochemistry**

Isomerism- geometrical and optical isomerism, concept of chirality and optical activity (up to two carbon atoms), asymmetric carbon atom, elements of symmetry (plane and centre), interconversion of Fischer and Newman representations, enantiomerism and diastereomerism, meso compounds, threo and erythro, D and L, cis- and trans- nomenclatures, CIP rules: R/S (upto 2 chiral carbon atoms) and E/Z nomenclatures.

6 Hours

6. Nucleophilic Substitution and Elimination Reactions

Nucleophilic substitutions- S_N1, S_N2 and $S_Ni$reactions, eliminations- E_1 and E_2 reactions (elementary mechanistic aspects), Saytzeff and Hofmann eliminations, elimination vs. substitution *6 Hours*

7. Chemical Bonding and Molecular Structure

Ionic Bonding: general characteristics, energy considerations, lattice energy and solvation energy and their importance for stability and solubility of ionic compounds, statement of Born-Landé equation for lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability, Fajans' rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character

Covalent bonding: Valence Bond (VB) theory approach, shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements Concept of resonance and resonating structures in various inorganic and organic compounds Molecular orbital (MO) theory approach -the LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals, nonbonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods. (including the idea of s-p mixing) and heteronuclear diatomic molecules such as CO, NO and NO+, comparison of VB and MO approaches *12 Hours*

Reference Books:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.

2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970.

4. Atkins, P. Shriver & Atkins' Inorganic Chemistry 5th Ed. Oxford University Press (2010).

5. Cotton, F.A., Wilkinson, G. and Gaus, P.L., Basic Inorganic Chemistry 3rd Ed.; Wiley India.

6. Sharpe, A.G., Inorganic Chemistry, 4th Indian Reprint (Pearson Education) 2005.

7. Huheey, J. E.; Keiter, E.A. &Keiter, R.L. Inorganic Chemistry, Principles of Structure and Reactivity 4th Ed., Harper Collins 1993, Pearson, 2006.

8. Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).

9. Burgess, J., Ions in solution: basic principles of chemical interactions. Ellis Horwood (1999).

10. Clayden, J., Greeves, N. & Warren, S. Organic Chemistry, Second edition, Oxford University Press, 2012.

11. Smith, J. G. Organic Chemistry, Tata McGraw-Hill Publishing Company Limited.

12. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

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

14. Morrison, R. T. Study guide to organic Chemistry, Pearson.

15. Pathak & Saha, Organic Chemistry (Volume-1), Books and Allied (P) Ltd.

16. Castellan, G. W. Physical Chemistry, Narosa Publishing House.

17. Engel, T. & Reid, P. Physical Chemistry, Pearson.

18. Maron, S. &Prutton, Principles of Physical Chemistry, Collier Macmillan Ltd.

19. Laidler, K. J. Chemical Kinetics, Pearson.

20. Glasstone, S. & Lewis, G.N. Elements of Physical Chemistry.

21. Rakshit, P.C., Physical Chemistry, Sarat Book House.

22. Rastogi, R. P. & Misra, R.R. An Introduction to Chemical Thermodynamics, Vikas Publishing House.

23. Sharma, K. K. & Sharma, L. K., A Textbook of Physical Chemistry, Vikas Publishing House.

24. Bajpai, D. N., Advanced Physical Chemistry, S. Chand Publication.

25. Rajaram, J. Chemical Thermodynamics: Classical, Statistical and Irreversible, Pearson.

26. Nasipuri, D. Stereochemistry of Organic Compounds, New Age International (P) Ltd.

27. Sengupta,S.Basic Stereochemistry of Organic Molecules, Oxford University Press

28. Chatterjee Hrishikesh, Physical Chemistry (Volume-1), Platinum Publisher

29. Kapoor, K.L., Textbook of Physical Chemistry (Volume 1 and Volume-2), McGraw Hill Education

30. Ghoshal, A. Numerical problems & short questions on Physical Chemistry, Books and Allied (P) Ltd.

31. Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, Oxford University Press.

Practical Credit 1

1. Determination of pH of unknown strong alkali and acid by colour matching method
2. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate
3. Estimation of Mohr's salt by titrating with $KMnO_4$/ $K_2Cr_2O_7$
4. Estimation of sodium carbonate and sodium hydrogen carbonate in a mixture *30 Hours*

Reference Books:

1. Bhattacharyya, R. C, A Manual of Practical Chemistry.

2. Nad, Mahapatra, Ghosal, An Advance course in Practical Chemistry, New Central Book Agency (P) Ltd.

3. K. S. Mukherjee, Textbook on Practical Chemistry, New Central Book Agency (P) Ltd.

4. Ghosh, Das Sharma, Majumdar, Manna, Chemistry in Laboratory, santra Publication (P) Ltd.

5. Poddar and Ghosh, Degree Practical Chemistry, Book Syndicate (P) Ltd.

MULTIDISCIPLINARY (for other than Chemistry Major students)

Paper code: CHEM203-1

Paper title: Chemistry of Dyes, Pigments, Cosmetics and Perfumes Credits 3

Theory

Definition and classification, structures and theories of coloration, preparation, properties and uses of dyes like phenolphthalein, methyl orange, malachite green, alizarin, indigo, different types of pigments like chlorophyll, carotenoids, anthocyanins, flavonoids (elemental idea)

Preparation and uses of the following: hair dye, hair spray, shampoo, suntan lotions, face powder, lipsticks, talcum powder, nail enamel, creams (cold, vanishing and shaving creams), antiperspirants and artificial flavours

Essential oils and their importance in cosmetic industries with reference to eugenol, geraniol, sandalwood oil, eucalyptus, rose-oil, 2-phenyl ethyl alcohol, jasmone, civetone, muscone

45 Hours

Reference Books:

1. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd., (Pearson Education).
2. Bahl and Bahl, A Text book of Organic Chemistry, S. Chand publication
3. StocchiE.: Industrial Chemistry, Vol -I, Ellis Horwood Ltd. UK.
4. Jain, P.C.&Jain,M:.Engineering Chemistry, Dhanpat Rai & Sons, Delhi.
5. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996).

SKILL ENHANCEMENT COURSE

Paper title: CHEM205-1

Paper code: Basic Analytical Chemistry Credits 3

Theory

1. **General principle**

Introduction to analytical chemistry and its interdisciplinary nature, concept of sampling, importance of accuracy, precision and sources of error in analytical measurements, presentation of experimental data and results, role of significant figures *8 Hours*

3. **Analysis of soil**

Composition of soil, concept of pH and pH measurement, complexometric titrations, chelation, chelating agents, use of indicators *6 Hours*

3. Analysis of water

Definition of pure water, contaminants (different types), water sampling methods, water purification methods *6 Hours*

4. Analysis of food products

Nutritional value of a food, idea about food processing and food preservations, and adulteration

6 Hours

5. **Chromatography**

Definition, general introduction on principles of chromatography, paper chromatography, TLC etc., column chomatography, ion-exchange chromatography, etc., determination of ion exchange capacity of anion /cation exchange resin *10 Hours*

6. Analysis of cosmetics

Major and minor constituents of cosmetics and their functions, analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate *9 Hours*

Reference Books:

1. Willard, H.H., Merritt, L.L., Dean, J. &Settoe, F.A. Instrumental Methods of Analysis, 7th Ed. Wadsworth Publishing Company Ltd., Belmont, California, USA, 1988.

2. Skoog, D.A., Holler, F.J. & Crouch, S. Principles of Instrumental Analysis, Cengage Learning India Edition, 2007.

3. Skoog, D.A.; West, D.M. & Holler, F.J. Analytical Chemistry: An Introduction sixth Ed., Saunders College Publishing, Fort Worth, Philadelphia (1994).

4. Harris, D. C. Quantitative Chemical Analysis, 9th ed. Macmillan Education, 2016.

5. Dean, J. A. Analytical Chemistry Handbook, McGraw Hill, 2004.

6. Day, R. A. & Underwood, A. L. Quantitative Analysis, Prentice Hall of India, 1992.

7. Freifelder, D.M. Physical Biochemistry 2nd Ed., W.H. Freeman & Co., N.Y. USA (1982).

8. Cooper, T.G. The Tools of Biochemistry, John Wiley & Sons, N.Y. USA. 16 (1977).

9. Vogel, A. I. Vogel's Qualitative Inorganic Analysis 7th Ed., Prentice Hall, 1996.

10. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.

11. Robinson, J.W. Undergraduate Instrumental Analysis 5th Ed., Marcel Dekker, Inc., New York (1995).

12. Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.

PHYSICAL EDU.

THE UNIVERSITY OF BURDWAN

Syllabus of 3-Year Degree / 4-Year Honours in

Physical Education and Sports

Under Curriculum & Credit Framework for Under Graduate Programmes (CCFUP) asperNEP-2020

w.e.f. 2023-2024

Total Credit- 174
*UG Certificate- 40 Credit (SEM- I & II)
** UG Diploma- 83 Credit (SEM- I to IV)
***3 Year Degree- 124 Credit (SEM- I to VI)
****4 Year UG Degree Honours - 174 Credit (SEM- I to VIII)
****4 Year UG Degree Honours with Research - 174 Credit (SEM- I to VIII)

Semester	Course Type	Level	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva	Full Marks	Distribution of Marks		
									Theory	Pract. / Tuto./ Viva-voce	Internal Assessment
I	Major/DS Course (Core)	100-199	**Foundation and History of Physical Education and Sports Science**	4	3	0	1	75	40	20	15
	Minor Course	100-199	(Course of any allied subject for the students with Major Physical Education and Sports) **Introduction of Physical Education and Sports** (For the students without Physical Education and Sports as Major)	4	3	1	0	75	60	0	15
	Multi/Interdisciplinary		**Fitness and Wellness** (For the students other than Physical Education and Sports as Major or Minor)	3	2	1	0	50	40	0	10
	Ability Enhancement Course (AEC) [L_1-1 MIL]		Arabic/ Bengali/ Hindi/ Sanskrit/ Santali/ Urdu or Equvlnt. Course from SWAYAM or UGC recognized others	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC)		**Exercise and Sports for Elementary Students**	3	0	0	3	50	0	40	10
	Value Added (VA) Course		Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			20				400			

Semester	Course Type	Level	Name of the Course	Credit	Lect.	Tuto.	Pract. /Viva	Full Marks	Distribution of Marks		
									Theory	Pract. / Tuto./ Viva-voce	Internal Assessment
II	**Major/DS Course (Core)**	100-199	**Health and Wellness Education**	4	3	0	1	75	40	20	15
	Minor Course	100-199	(Course of any allied subject for the students with Major Physical Education and Sports) **Health and Life Style Management** (For the students without Physical Education and Sports as Major)	4	3	1	0	75	60	0	15
	Multi/Interdisciplinary		**Yoga Vyayama** (For the students other than Physical Education and Sports as Major or Minor)	3	0	0	3	50	40	0	10
	Ability Enhancement Course (AEC)[L_2-1]		English or Equvlnt. Course from SWAYAM or UGC recognized others	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC)		**Sports Massage**	3	0	0	3	50	40	0	10
	Value Added (VA) Course			4				100			
Skill based vocational course (addl. 4 Cr) during summer term for 8 weeks, who will exit the programme after securing 40 cr.											
For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years and complete the programme within the stipulated max. period of 7 years											
	Total			**20**				**400**			

Physical Education and Sports

SEMESTER- I

Course Title: Foundation and History of Physical Education and Sports Science

Course Type: Major (Code: PEDS1011)

Credit: 4 (Lect.- 3 & Pract.- 1)

Full Marks- 75 (Theory: 40, Practical: 20 & Internal Assessment: 15)

Objectives:

i. Students may understand the historical development and the concept of Physical Education, Exercise and Sports Science
ii. Students may learn the Philosophical, Biological, Psychological and Sociological foundation of this subject

Outcomes:

i. Students may know the strong background of Physical Education, Exercise and Sports Science
ii. This subject may generate vibration for further development of Physical Education, Exercise and Sports Science

UNIT- 1: Concept of Physical Education and Sports Science — L- 5H

1.1 Meaning, Definition and Scope of Physical Education and Sports Science
1.2 Concept of Play, Games and Sports
1.3 Aim, Objectives and Importance of Physical Education and Sports Science
1.4 Modern concept of Physical Education and Sports Science

UNIT- 2: Historical Development of Physical Education and Sports Science — L- 10H

2.1 Ayurveda: Concept of human, Yoga, Vyayama (exercise) and Krida (Sports)
2.2 Historical development of Physical Education and Sports in India of Pre-Independence period
2.3 Historical development of Physical Education and Sports in India of Post-Independence period
2.4 National Sports Awards: Major Dhyan Chand Khel Ratna Award, Arjuna Award, Dronacharya Award

UNIT- 3: Olympic Movement, Commonwealth and Asian Games — L- 15H

3.1 Ancient Olympic Games
3.2 Modern Olympic Games: History, Objectives, Motto, Flag, Emblem, Torch, Oath, Olympic Village, Opening, Victory and Closing Ceremony
3.3 Historical background of Commonwealth and Asian Games
3.4 Analysis of Indian Sports performance: Olympic, Commonwealth and Asian Games

UNIT- 4: Foundation & Principles of Physical Education and Sports Science — L- 15H

4.1 Philosophical Foundation in Physical Education and Sports: Idealism, Realism, Pragmatism and Naturalism
4.2 Biological Principles: Meaning and definition of growth and development. Factors affecting growth and development. Differences of growth and development. Principles of growth and development. Age: Chronological age, Anatomical age, Physiological age and Mental age
4.3 Psychological Foundation- Meaning and definition of Psychology and Sports Psychology. Importance of Psychology and Sports Psychology in Physical Education and Sports Science
4.4 Sociological Foundation: Meaning and definition of Sociology, Society and Socialization. Role of games and sports in National and International integration

FIELD PRACTICAL (Preparation of Record Book is Compulsory) — P-30H

1. Physical Fitness Test through AAHPERD (10 Marks)
2. Preparation of record book of Indian Sports performance: Olympic, Commonwealth and Asian Games (10 Marks)

Physical Education and Sports

SEMESTER- I

Course Title: Introduction of Physical Education and Sports

Course Type: Minor (Code: PEDS1021)
Credit: 4 (Lect.- 3 & Tuto.- 1)
Full Marks- 75 (Theory: 60 & Internal Assessment: 15)

Objectives:
i. To educate the students about Physical Education and sports
ii. To improve the students understanding about the benefit Physical Education and sports

Outcomes:
i. Students may be interested for participating in Physical Education and sports
ii. Students may convince others for exercise and sports participation

UNIT- 1: Concept of Physical Education and Sports Science **L- 15H**

1.1 Meaning, Definition and Scope of Physical Education and Sports Science
1.2 Concept of Play, Games and Sports
1.3 Aim, Objectives and Importance of Physical Education and Sports Science
1.4 Modern concept of Physical Education and Sports Science

UNIT- 2: Historical Development of Physical Education and Sports Science **L- 15H**

2.1 Historical development of Physical Education and Sports in India of Pre-Independence period
2.2 Historical development of Physical Education and Sports in India of Post-Independence period
2.3 National Sports Awards: Major Dhyan Chand Khel Ratna Award, Arjuna Award, Dronacharya Award
2.4 Sports schemes in India

UNIT- 3: Olympic Movement, Commonwealth and Asian Games **L- 15H**

3.1 Ancient Olympic Games
3.2 Modern Olympic Games: History, Objectives, Motto, Flag, Emblem, Torch, Oath, Olympic Village, Opening, Victory and Closing Ceremony
3.3 Historical background of Commonwealth and Asian Games
3.4 Indian Sports performance: Olympic, Commonwealth and Asian Games

UNIT- 4: Foundation & Principles of Physical Education and Sports Science **L- 15H**

4.1 Biological Principles: Meaning and definition of growth and development. Factors affecting growth and development. Differences of growth and development. Principles of growth and development.
4.2 Age: Chronological age, Anatomical age, Physiological age and Mental age
4.3 Psychological Foundation- Meaning and definition of Psychology and Sports Psychology. Importance of Psychology and Sports Psychology in Physical Education and Sports Science
4.4 Sociological Foundation: Meaning and definition of Sociology, Society and Socialization. Role of games and sports in National and International integration

Physical Education and Sports

SEMESTER- I

Course Title: Fitness and Wellness

Course Type: Multi/Interdisciplinary (Code: PEDS1031)
Credit: 3 (Lect.- 2 & Tuto.- 1)
Full Marks- 50 (Theory: 40 & Internal Assessment: 10)

Objectives:
i. To educate students about physical fitness, mental fitness and wellness
ii. To motivate students for maintaining own fitness and wellness

Outcomes:
i. Students may accept fitness and wellness programme in daily life
ii. They may lead healthy lifestyle and convince others

UNIT- 1: Health Related Physical Fitness **L- 15H**

1.1 Concept of Fitness and Physical Fitness
1.2 Concept of Health Related Physical Fitness
1.3 Components of Health related Physical Fitness
1.4 Assessment Techniques of Health related Physical Fitness

UNIT- 2: Performance Related Physical Fitness **L- 15H**

2.1 Modern concept of Physical Fitness
2.2 Concept of Performance Related Physical Fitness
2.3 Components of Performance related Physical Fitness
2.4 Assessment Techniques of Performance related Physical Fitness

UNIT- 3: Wellness **L- 15H**

3.1 Concept of Wellness
3.2 Aim and Objectives of Wellness
3.3 Components of Wellness
3.4 Importance of Wellness in the Modern Society

Physical Education and Sports

SEMESTER- I

Course Title: Exercise and Sports for Elementary Students

Course Type: Skill Enhancement Course (Code: PEDS1051)
Credit: 3 (Practical: 3)
Full Marks- 50 (Practical: 40 & Internal Assessment: 10)

Objectives:
i. Prepare the students to organise exercise & sports for elementary school children
ii. Students may develop self-confidence about nurturing elementary students

Outcomes:
i. Students may gate jobs in nursery, kindergarten, play school and elementary school
ii. Students may start their own play school in their area

Unit- 1: Exercise for Elementary Students **P- 30H**

1.1 Rhymes Exercise
1.2 Mimicking Exercise
1.3 Partner Exercise

Unit- 2: Recreational Games for Elementary Students **P- 30H**

2.1 Recreational Games- Individual
2.2 Recreational Games- Group
2.3 Recreational Games- with Teacher / Parents

Unit- 3: Sports for Elementary Students **P- 30H**

3.1 Fundamental Movement Sports
3.2 Low Level Individual Sports
3.3 Low Level Group Sports

Physical Education and Sports

SEMESTER- II

Course Title: Health and Wellness Education

Course Type: Major (Code: PEDS2011)
Credit: 4 (Lect.- 3 & Pract.- 1)
Full Marks- 75 (Theory: 40, Practical: 20 & Internal Assessment: 15)

Objectives:
i. To educate students about good and bad health habits
ii. To prepare students about wellbeing and wellness culture

Outcomes:
i. Mental set up would be ready for maintaining good health habits
ii. Students may follow wellness guidelines

Unit- 1: Health and Health Education **L- 9H**

1.1 Concept, Definition, Spectrum and Dimension of Health
1.2 Definition, aim, objectives, Importance and principles of Health Education
1.3 Health Agencies: World Health Organization (WHO), United Nations Educational Scientific and Cultural Organization (UNESCO)
1.4 School Health Program: Health Service, Health Instruction, Health Supervision, Health appraisal and Health Record

Unit- 2: Health Problems in India- Prevention and Control **L- 12H**

2.1 Communicable Diseases: Malaria, Dengue and COVID-19
2.2 Life style Diseases (Hypokinetic): Obesity and Diabetes
2.3 Life style Diseases (Hyperkinetic): Hypertension and Psychological Disorder- Stress
2.4 Postural Disorders- Spine: Kyphosis, Lordosis, Scoliosis; Leg: Bow leg, Knock knee, Flat foot

Unit- 3: Diet and Nutrition **L- 12H**

3.1 Concept of diet; Meaning, definition and role of Nutrition
3.2 Macro nutrients and micro nutrients
3.3 Role of macro and micro nutrients for exercise
3.4 Concept of Balance Diet: Factors and Importance

Unit- 4: Physical Fitness and Wellness **L- 12H**

4.1 Concept of Physical Fitness
4.2 Components of Health related and Performance related Physical Fitness
4.3 Concept of Wellness
4.4 Components of Wellness

FIELD PRACTICAL (Preparation of Record Book is Compulsory) **P- 30H**

1. Physical Fitness Test through AAHPERD (10 Marks)
2. Measurement of Health related physical fitness (10 Marks)

Physical Education and Sports

SEMESTER- II

Course Title: Health and Life Style Management

Course Type: Minor (Code: PEDS2021)
Credit: 4 (Lect.- 3 & Tuto.- 1)
Full Marks- 75 (Theory: 60 & Internal Assessment: 15)

Objectives:
i. Students may understand the modern life and its positive management skill
ii. Students will be educated about lifestyle diseases

Outcomes:
i. Students may repair flaws in lifestyle and advice others
ii. Students may start practicing positive lifestyle skills

Unit- 1: Health and Health Education — L- 15H

1.1 Concept, Definition, Spectrum and Dimension of Health
1.2 Definition, aim, objectives, Importance and principles of Health Education
1.3 Health Agencies: World Health Organization (WHO), United Nations Educational Scientific and Cultural Organization (UNESCO)
1.4 School Health Program: Health Service, Health Instruction, Health Supervision, Health appraisal and Health Record

Unit- 2: Metabolic Disorders and Lifestyle Management — L- 15H

2.1 Life style Diseases (Hypokinetic): Obesity and Diabetes
2.2 Life style Diseases (Hyperkinetic): Hypertension and Psychological Disorder- Stress
2.3 Postural Disorders- Spine: Kyphosis, Lordosis, Scoliosis; Leg: Bow leg, Knock knee, Flat foot
2.4 Hygiene: Personal and Community hygiene, Hygienic practices for all seasons and inclimate weather

Unit- 3: Diet and Nutrition — L- 15H

3.1 Concept, meaning, definition, Nutrition and health for all ages
3.2 Macro nutrients and micro nutrients
3.3 Role of macro and micro nutrients for exercise
3.4 Balance Diet: Factors and Importance

Unit- 4: Physical Fitness and Wellness — L- 15H

4.1 Concept of Physical Fitness
4.2 Components of Health related and Performance related Physical Fitness
4.3 Concept of Wellness
4.4 Components of Wellness

Physical Education and Sports

SEMESTER- II

Course Title: Yoga Vyayama

Course Type: Multi/Interdisciplinary (Code: PEDS2031)
Credit: 3 (Practical: 3)
Full Marks- 50 (Practical: 40 & Internal Assessment: 10)

Objectives:
i. To know the benefit of yoga in daily life
ii. To understand the utility of regular scheduled vyayama

Outcomes:
i. After practicing Yoga vyayama students may feel its flavour
ii. They may include it in their daily routine

Unit- 1: Vyayama **P- 30H**

1. Suksma Vyayama: Netra-Sakthi Vikasaka (Eye), Kapola-Sakthi Vikasaka (Cheek), Karna-Sakthi Vikasaka (Ear), Griva-Sakthi Vikasaka (Neck)
2. Sthula Vyayama: Rekha-Gati, Hrd-Gati, Utkurdana, Urdhva-Gati, Sarvanga-Pusti

Unit- 2: Asanas **P- 30H**

1. Vishramasana (Relaxative Posture): Shavasana, Makarasana
2. Dhyanasana (Meditative Posture): Sukhasana, Padmasana, Vajrasana, Sastikasana
3. Swasthyasana(Cutural Posture):
   Standing Posture: Ardhachandrasana, Brikshasana, Padahastasana
   Sitting Posture: Ardhakurmasana, Paschimottanasana, Gomukhasana
   Supine Posture: Setubandhasana, Halasana, Matsyasana
   Prone Posture: Bhujangasana, Salvasana, Dhanurasana

Unit- 3: Pranayama and Meditation **P- 30H**

1. Pranayama
   a. Anulom-Vilom
   b. Bhastrika
   c. Bhramari
2. Meditation
   a. Sakshi-Bhava
   b. Maitri-Bhava
   c. OM-Meditation

Physical Education and Sports

SEMESTER- II

Course Title: Sports Massage

Course Type: Skill Enhancement Course (Code: 2051)
Credit: 3 (Practical: 3)
Full Marks- 50 (Practical: 40 & Internal Assessment: 10)

Objectives:
i. To prepare the students about basic and advance massage in Indian style (Mardana) and western style
ii. To educate the students about the special types of sports massage

Outcomes:
i. Students may join in the massage parlor, spa centre and health club
ii. Students may be self employed as a masseur

Unit- 1: Historical and Scientific Background of Massage (Record Book Preparation) **P- 30H**

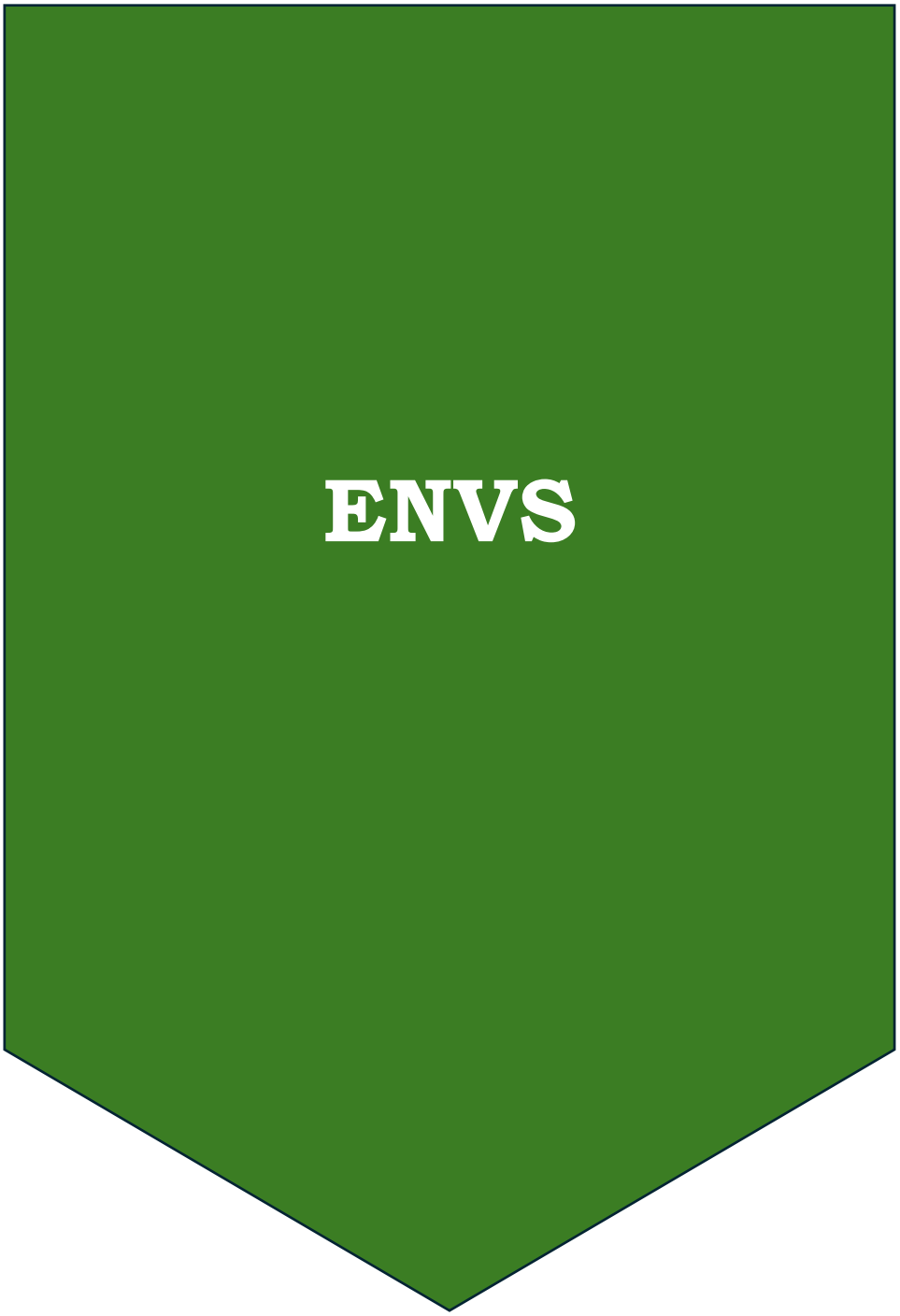
1.1 Massage in Ancient time in India and abroad
1.2 Relationship of Anatomy and Physiology to massage and body work
1.3 Physiological changes during massage- muscular, circulatory, lymph-vascular system
1.4 Roll of Therapeutic massage in stress and pain

Unit- 2: Techniques of Massage **P- 30H**

2.1 Superficial Massage- Rubbing, Scrubbing, Wringing, Stroking
2.2 Deep Tissue Massage- Rolling, Stretching, Gripping, Kneeding
2.3 Massage with different oil and aroma
2.4 Ayurvedic Massage

Unit- 3: Techniques Sports Massage **P- 30H**

3.1 Compression and Broadening
3.2 Friction
3.3 Effleurage
3.4 Petrissage


ENVS

THE UNIVERSITY OF BURDWAN

SYLLABUS FOR 3-YEAR DEGREE/4-YEAR HONS. IN ENVIRONMENTAL SCIENCE

Under

Curriculum and Credit Framework for Undergraduate Program (CCFUP), as per N.E.P. 2020)

w.e.f 2023 – ’24

FINAL UG SYLLABUS FOR ENVIRONMENTAL SCIENCE [CODE: ENVSC]
UNDER THE UNIVERSITY OF BURDWAN, BURDWAN
[As per NEP 2020]

3-Year Degree/4-Year Hons. in Environmental Science

SEMESTER	Paper No	Code	Name of the Paper	Credits	L – T - P	Marks	Marks Dist. T – P - IA
I	Major/Core Course	**ENVSC 1011**	Environment & Ecology	4	3 – 1 - 0	75	60 – 00 - 15
	Minor Course [for other disciplines]	**ENVSC 1021**	Environment & Ecology	4	3 – 1 - 0	75	60 – 00 - 15
	Multi-disciplinary Course [from pool of courses]	**ENVSC 1031**	Natural resources & Sustainable Development	3	2 – 1 - 0	50	40 – 00 – 10
	Ability Enhancement Course (AEC)	**AEC 1041**	MIL (L_1- 1): (from Hindi /Bengali/ Sanskrit/ Santali /Arabic /Urdu) OR Eq. course from SWAYAM/other UGC recogn. platforms	2	2 – 0 - 0	50	40 – 00 - 10
	SEC [from Major]	**ENVSC 1051**	Environmental Monitoring Techniques	3	2 – 1 – 0	50	40 - 00 – 10
	Value Added Course (VAC)	**CVA 1061**	Environmental Science/ Education	4	3 – 0 - 1	100	60 – 20 - 20
	Total			**20**		**400**	
II	Major/Core Course	**ENVSC 2011**	Ecosystem & Biomes	4	3 – 0 - 1	75	40 – 20 - 15
	Minor Course [for other disciplines]	**ENVSC 2021**	Ecosystem & Biomes	4	3 – 0 - 1	75	40 – 20 - 15
	Multi-disciplinary Course [from pool of courses]	**ENVSC 2031**	Biodiversity Conservation & Ecotourism	3	2 – 1 - 0	50	40 – 00 – 10
	AEC (Communicative English)	**ENGL 2041**	MIL (L_2 -1): English	2	2 – 0 - 0	50	40 – 00 - 10
	SEC [from Major]	**ENVSC 2051**	Human Health and Conservation & Ecotourism	3	2 – 1 – 0	50	40 - 00 – 10
	VAC	**CVA 2061**	Understanding India/Fitness & Hygiene & Yoga/Digital India	4	3 – 1 – 0 OR 3 – 0 - 1	100	80 – 00 – 20 OR 60 – 20 - 20
	Skill based Vocational additional Course Cr. 4 (During Summer term for 8 weeks for Certificate award) - Students who want to exit after securing Cr 40			4			
	Total			**20**		**400**	

SEMESTER	Paper No	Code	Name of the Paper	Credits	L – T - P	Marks	Marks Dist. T – P - IA
III	Major/Core Course	**ENVSC 3011**	Environmental Resources	**5**	4 – 1 - 0	75	60 – 00 - 15
	Major/Core Course	**ENVSC 3012**	Environmental Earth Science	**5**	4 – 0 - 1	75	40 – 20 - 15
	Minor Course	**ENVSC 3021**	Environmental Resources [may be offered for all students irrespective of discipline including Env Sc.] [Voc. Edn & Trng.]	**4**	3 – 1 - 0	75	60 – 00 - 15
	Multi-disciplinary Course	**ENVSC 3031**	Climate Change & Climate Action	**3**	2 – 1 - 0	50	40 – 00 - 10
	AEC	**AEC 3041**	MIL (L_1 -2)	**2**	2 – 0 - 0	50	40 – 00 - 10
	SEC	**ENVSC 3051**	RS & GIS and Resource Mapping	**3**	2 – 1 - 0	50	40 – 00 - 10
	Total			**22**		**375**	
IV	Major/Core Course	**ENVSC 4011**	Environmental Chemistry & Physics	5	4 – 0 - 1	75	40 – 20 - 15
	Major/Core Course	**ENVSC 4012**	Energy & Environment	5	4 – 1 - 0	75	60 – 00 - 15
	Major/Core Course	**ENVSC 4013**	Ecotoxicology & Environmental Biotechnology **(**)**	5	4 – 0 - 1	75	40 – 20 - 15
	Minor Course	**ENVSC 4021**	Energy & Environment [may be offered for all students irrespective of discipline including Env Sc.] [Voc. Edn & Trng.]	4	3 – 1 - 0	75	60 – 00 - 15
	AEC (MIL)	**AEC 4041**	MIL (L_2 -2) English	2	2 – 0 - 0	50	40 – 00 - 10
	Skill based Vocational additional Course Cr. 4 (During Summer term for 8 weeks for Certificate award) - Students who want to exit after securing Cr 83			4	0 – 0 - 4	50	00 – 50 - 00
	Total			**21**		**400**	

(**) Practical/Field visit

SEMESTER	Paper No	Code	Name of the Paper	Credits	L – T - P	Marks	Marks Dist. T – P - IA
V	Major/Core Course	**ENVSC 5011**	Environmental Pollution	5	4 – 0 - 1	75	40 – 20 - 15
	Major/Core Course	**ENVSC 5012**	Environmental Laws, Policies & EIA	5	4 – 1 - 0	75	60 – 00 - 15
	Major/Core Course	**ENVSC 5013**	Environmental Analysis (Practical)	5	0 – 0 - 5	75	00 – 60 - 15
	Minor Course	**ENVSC 5021**	Environmental Pollution Measurement	4	3 – 0 - 1	75	40 – 20 - 15
	Internship for all	**INT 5081**		2	0 – 0 - 2	50	00 – 50 - 00
	Total			**21**		**350**	
VI	Major/Core Course	**ENVSC 6011**	Environmental Health & Stress Physiology	4	3 – 0 - 1	75	40 – 20 - 15
	Major/Core Course	**ENVSC 6012**	Environmental Engineering & Statistics	4	3 – 1 - 0	75	60 – 00 - 15
	Major/Core Course	**ENVSC 6013**	Environmental Economics & Management	4	3 – 1 - 0	75	60 – 00 - 15
	Major/Core Course	**ENVSC 6014**	Field visit Visit – 15 & Report - 60	4	0 – 0 - 4	75	00 – 60 - 15
	Minor Course	**ENVSC 6021**	Environmental Economics & Management [may be offered for all students irrespective of discipline including Env Sc.] [Voc. Edn & Trng.]	4	3 – 1 - 0	75	60 – 00 - 15
	Total			**20**		**375**	
	Total (I+II+III+IV+V+VI)			**124**		**2250**	

SEMESTER	Paper No	Code	Name of the Paper	Credits	L – T - P	Marks	Marks Dist. T – P - IA
VII	Major/Core Course	**ENVSC 7011**	Natural Hazards & Management and Waste Management	6	4 – 0 - 2	75	40 – 20 - 15
	Major/Core Course	**ENVSC 7012**	Wildlife Management & Conservation	6	4 – 0 - 2	75	40 – 20 - 15
	Major/Core Course	**ENVSC 7013**	Environmental Biotechnology & Application	6	4 – 0 - 2	75	40 – 20 - 15
	Major/Core Course	**ENVSC 7014**	Bacteriological Investigation (Practical)	6	0 – 0 - 6	75	00 – 60 - 15
	Minor Course	**ENVSC 7021**	Advancement in Environmental Biotechnology	4	3 – 0 - 1	75	40 – 20 - 15
	Total			**28**		**375**	
Initiation of Research Project/Dissertation from SEM VII							
VIII For UG Hons. with Res Proj.	Major/Core Course	**ENVSC 8011**	Green Technology	6	4 – 0 - 2	75	40 – 20 - 15
	Minor Course	**ENVSC 8021**	Green Chemistry	4	3 – 0 - 1	75	40 – 20 - 15
	Research Project/Dissertation	**RESCH 8081**	Seminar Preparation, submission & PPT [Dissertation: 135+ Viva: 90]	12	0 – 0 - 12	225	00 - 225 - 00
	Total			**22**			
VIII For UG Hons. without Res Proj.	Major/Core Course	**ENVSC 8011**	Green Technology	6	4 – 0 - 2	75	40 – 20 - 15
	Major/Core Course	**ENVSC 8012**	Atmosphere & Global Climate Change	4	3 – 0 - 1	75	40 – 20 - 15
	Major/Core Course	**ENVSC 8013**	Geospatial Science	4	3 – 1 - 0	75	60 – 00 - 15
	Major/Core Course	**ENVSC 8014**	Atmospheric Analysis & Geospatial Modelling (Practical)	4	0 – 0 - 4	75	00 – 60 - 15
	Minor Course	**ENVSC 8021**	Green Chemistry	4	3 – 0 - 1	75	40 – 20 - 15
	Total			**22**		**375**	
	Total			**174**		**3000**	

SEMESTER- I
PAPER CODE: ENVSC1011 [ENVSC Major: COURSE NO. 1]
ENVIRONMENT & ECOLOGY
TOTAL CREDITS: 4

TIME: 3 Hours **MARKS: 60**

Learning Objectives:

- *To get knowledge on environmental education, concept of an ecosystem & component, disturbances and modification of environment and their effects*
- *Understanding on the biosphere & biotic community and biological invasions*
- *To get knowledge on Geological interaction with environment and its interactions within geology*
- *Overall students will examine and explain how organisms modify their environments to sustain their needs*

Unit 1: Environment **(LECTURE – 30)**

Concept/Definition and importance of environment; Types and components of environment; Lithosphere, Atmosphere, Hydrosphere, Biosphere; Scope and multidisciplinary nature of the subject; Man-environment relationships; Environmental awareness

Unit 2: Environmental Education **(LECTURE – 15)**

Environmental education at primary, secondary and tertiary level; Goals of environmental education; Applications of and Career in Environmental Science

Unit 3: Concept of Ecology **(LECTURE – 45)**

Concepts of Ecology: Definition and divisions of ecology; Ecological classification: Aquatic, desert and marine (plants & animals) and their morphological, physiological and biochemical adaptation; Ecotype; Ecological factors - climatic, edaphic, physiographic and biotic; Limiting factor and Shelford's Law of tolerance, Liebig law of minimum; Concept of Biological clock, circadian rhythm

Unit 4: Geology and Ecology: **(LECTURE – 10)**

Geological interaction with biodiversity/environment; Concepts of community and keystone species, and relationship with geology; Role of geology in ecological restoration

Unit 5: Biological Invasions: **(LECTURE – 5)**

Concepts of exotic and invasive spices; Characteristics of invaders; Stages of invasion; Mechanisms of invasions

Learning outcomes:

- *Understanding the different complex environmental issues and interdisciplinary perspective.*
- *Understanding the ecological and physical sciences and their application in environmental problem-solving*
- *Knowledge on major physical, chemical, and biological components of the earth's systems and show how they function*
- *Understanding the ethical, cross-cultural and historical context of environmental issues and their links between human and natural systems*

SEMESTER- I
PAPER CODE: ENVSC1021 [ENVSC Minor: COURSE NO. 1]
ENVIRONMENT & ECOLOGY
TOTAL CREDITS: 4

TIME: 3 Hours **MARKS: 60**

Learning Objectives:

- *To get knowledge on environmental education, concept of an ecosystem & component, disturbances and modification of environment and their effects*
- *Understanding on the biosphere & biotic community and biological invasions*
- *To get knowledge on Geological interaction with environment and its interactions within geology*
- *Overall students will examine and explain how organisms modify their environments to sustain their needs.*

Unit 1: Environment **(LECTURE – 30)**

Concept/Definition and importance of environment; Types and components of environment; Lithosphere, Atmosphere, Hydrosphere, Biosphere; Scope and multidisciplinary nature of the subject; Man-environment relationships; Environmental awareness

Unit 2: Environmental Education **(LECTURE – 15)**

Environmental education at primary, secondary and tertiary level; Goals of environmental education; Applications of and Career in Environmental Science

Unit 3: Concept of Ecology **(LECTURE – 45)**

Concepts of Ecology: Definition and divisions of ecology; Ecological classification: Aquatic, desert and marine (plants & animals) and their morphological, physiological and biochemical adaptation; Ecotype; Ecological factors - climatic, edaphic, physiographic and biotic; Limiting factor and Shelford's Law of tolerance, Liebig law of minimum; Concept of Biological clock, circadian rhythm

Unit 4: Geology and Ecology: **(LECTURE – 10)**

Geological interaction with biodiversity/environment; Concepts of community and keystone species, and relationship with geology; Role of geology in ecological restoration

Unit 5: Biological Invasions: **(LECTURE – 5)**

Concepts of exotic and invasive spices; Characteristics of invaders; Stages of invasion; Mechanisms of invasions

Learning outcomes:

- *Understanding the different complex environmental issues and interdisciplinary perspective.*
- *Understanding the ecological and physical sciences and their application in environmental problem-solving*
- *Knowledge on major physical, chemical, and biological components of the earth's systems and show how they function*
- *Understanding the ethical, cross-cultural and historical context of environmental issues and their links between human and natural systems*

SEMESTER- I
PAPER CODE: ENVSC 1031 [ENVSC Multidisciplinary: COURSE NO. 1]
NATURAL RESOURCES & SUSTAINABLE DEVELOPMENT

TOTAL CREDITS: 3

TIME: 2 Hours **MARKS: 40**

Learning objectives

- *Explain the fundamentals of natural resources and their distribution*
- *Present available natural resources.*
- *Describe the judicial uses of natural resources*
- *Outline & basic elements of sustainable development*

Unit 1: Natural resources **(Lectures - 5)**
Overview of natural resources: Definition of resources; Classification of natural resources – biotic and abiotic, renewable and non-renewable

Unit 2: Biotic and water resources **(Lectures - 10)**
Major types of biotic resources: Forests, Grasslands, Wildlife and Aquatic
Types of water resources: Freshwater and marine water resources; Availability and use of water resources; Conflicts over water resource – International and National perspectives

Unit 3: Soil and mineral resources **(Lectures - 10)**
Soil types and distribution in India; Major degradation of soil; Major minerals in India; Over exploitation and environmental problems

Unit 4: Energy resources **(Lectures - 10)**
Types of energy sources; Renewable resources (Solar, Hydro, Ocean and biomass); Non-renewable sources (Coal, Petroleum and Nuclear resources)

Unit 5: Sustainable Development **(Lectures - 10)**
Concept, SDGs – Goals, Targets & Indicators; Challenges & strategies of SDGs in India

Learning outcome (After completion of this unit students would be able to:)

- *Understand the concept of natural resources; identify types of natural resources, their distribution and use with special reference to India*
- *Discuss the factors affecting the availability of natural resources, their conservation and management*
- *Explain sustainable development, its goal, targets, challenges and Indian strategies for SDGs*

Proposed faculty involvement

Unit 1 & 2: Social Science/ Botany/ Zoology
Unit 3: Geography/ Botany/ Zoology/ History
Unit 4: Geography/ Social Science/ Physics
Unit 5: Political Science/Social Science

SEMESTER- I
PAPER CODE: ENVSC1051 [ENVSC Skill Enhancement: COURSE NO. 1]
ENVIRONMENTAL MONITORING TECHNIQUES
TOTAL CREDITS: 3

TIME: 2 Hours **MARKS: 50**

Learning objectives

- *To provide theoretical and practical knowledge on various aspects of environmental monitoring techniques*
- *To develop sampling and analytical skills for environmental monitoring*
- *To get knowledge on various standard protocols used in environmental monitoring*

Unit 1: Air quality Monitoring **(LECTURE – 10)**

Collection of air sample [High volume sampler, Glass fiber filter paper, co/co,/03. meter, particulate matter (PM2.5, PM10)]; Concept of SPM au RSPM.

Unit 2: Water quality monitoring **(LECTURE – 10)**

Water quality parameters; Water sampling techniques & measurements and instruments (Titrimetric and Gravimetric methods, Portable pH meter, conductivity meter, Spectrophotometer); Calibration, Reagent blank, Reference material, standard curve

Unit 3: Soil quality Monitoring **(LECTURE – 5)**

Classification of texture (International pipette and Hygrometer method); Soil sampling and measurement of different soil parameters [pH meter, conductivity meter, Soil organic carbon (Titrimetric method), Nitrogen (modified Kjeldahl's method), & Flame photometer]

Unit 4: Noise monitoring **(LECTURE – 5)**

Concept of sound and noise, sound pressure; Instrumentation and measurement of noise (Noise meter); Equal loudness contours; Percentile Indices of noise.

Unit 5: Biological and Microbiological monitoring **(LECTURE – 20)**

Bacteriological techniques: Preparation of media (solid and liquid media), identification [Principle of staining; Simple, negative and differential staining (Gram staining)], MPN technique, Sterilization; Inoculation and incubation; Preparation of slants; Pure culture techniques (spread plate, pour plate, streak plate); instrumentation (Principle of autoclave, laminar air flow, BOD incubator, Shaker, Centrifuge, Magnetic Stirrer, Concept of BLAST)

Biological monitoring: Quantification (Sedgwick Rafter counter) & qualification of freshwater plankton (phyto- & zoo-plankton), aquatic macrophytes of importance); Types of plankton net.

Learning outcomes

- *Undertake field and laboratory experiments in a systematic way*
- *Understanding of physicochemical and microbiological methods used to test air, water, soil or food for environmental health purposes*
- *Getting training in analytical and conceptual skills required for environmental monitoring techniques and methods*

SEMESTER- II

PAPER CODE: ENVSC2021 [ENVSC Major: COURSE NO. 1]
ECOSYSYTEM & BIOMES
TOTAL CREDITS: 4

TIME: 2 Hours **MARKS: 40**

Learning objectives:

- *Understanding the fundamental structure and function of an ecosystem as well as levels of ecological organization like organism, population, community, ecosystem, biome and biosphere*
- *Knowledge on establishment of interactions and relationships (e.g., competition, predation, symbiosis) in an ecosystem*
- *Knowledge on energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids*
- *Understand the biogeochemical cycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle and nitrogen cycle)*
- *Understanding the major biomes and the communities*

Unit 1: Concept of Ecosystem **(LECTURE – 20)**

Ecosystems: Concept & classification (terrestrial and aquatic); Structure and function of ecosystems: trophic levels, food chain, food web and ecological pyramids; Energy flow in ecosystem: Energy flow models (single and double channel model); Productivity (concept & types: primary and secondary); Biogeochemical cycles (carbon, nitrogen and phosphorous cycle)

Unit 2: Major Ecosystem types **(LECTURE – 15)**

Terrestrial ecosystems (Grassland ecosystem, forest ecosystem, agro-ecosystem); Aquatic ecosystems (Lentic and lotic ecosystem, wetland ecosystem, estuarine ecosystem, and marine ecosystem)

Unit 3: Population ecology **(LECTURE – 20)**

Concept and characteristics of population (natality, mortality, age structure, population pyramids, population density, population dispersion, population growth, exponential, logistics, Density dependent, Limits of population growth; life table and survivorship curves; Population interactions (competition, predation, parasitism, symbiosis, commensalism, mutualism, and ammensalism)

Unit 4: Community ecology **(LECTURE – 15)**

Concept of community & classification; Community structure (horizontal and vertical stratification); Biomass, Keystone Species, Ecotone and Edge effects; Ecological Succession (concept, processes, stages and types of successions); Concept of Climax

Unit 5: Biomes **(LECTURE – 20)**

Concept and characteristics of biome; Types and distribution of major biomes (e.g., desert, grass lands, tropical evergreen rain forests and tundra); Endemism and endemic species of India

Learning outcome

- *Understand the complexity of an ecosystem and biomes*
- *Understand the energy cycle within ecosystems*
- *Unique facts about the biomes of our world*
- *Understanding their learning to the balance required in ecosystems*

SEMESTER- II

PAPER CODE: ENVSC2011 [ENVSC Major: COURSE NO. 1]
ECOSYSYTEM & BIOMES [Practical]

TIME: 2 Hours **MARKS: 20**

PRACTICAL

Description of Items		**Distribution of Marks**
1) One Major experiment	:	07
2) Identification	:	03
3) Laboratory Note Book	:	02
4) *Viva-voce*	:	03
5) Internal Assessment	:	10

PRACTICAL COURSES

Major Experiments:

1. Estimation of water parameters—pH, DO, Free and Combined CO_2, Hardness, Alkalinity, Acidity, Chloride
2. Estimation of soil parameters—pH, Temperature, soil moisture, Organic carbon

3. Identification with reasons (at least one from each A & B must be set during examination): Study on Aquatic organisms (Plankton and Macrophytes)

SEMESTER- II

PAPER CODE: ENVSC2021 [ENVSC Minor: COURSE NO. 1]
ECOSYSYTEM & BIOMES
TOTAL CREDITS: 4

TIME: 2 Hours **MARKS: 40**

Learning objectives:

- *Understanding the fundamental structure and function of an ecosystem as well as levels of ecological organization like organism, population, community, ecosystem, biome and biosphere*
- *Knowledge on establishment of interactions and relationships (e.g., competition, predation, symbiosis) in an ecosystem*
- *Knowledge on energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids*
- *Understand the biogeochemical cycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle and nitrogen cycle)*
- *Understanding the major biomes and the communities*

Unit 1: Concept of Ecosystem **(LECTURE – 20)**

Ecosystems: Concept & classification (terrestrial and aquatic); Structure and function of ecosystems: trophic levels, food chain, food web and ecological pyramids; Energy flow in ecosystem: Energy flow models (single and double channel model); Productivity (concept & types: primary and secondary); Biogeochemical cycles (carbon, nitrogen and phosphorous cycle)

Unit 2: Major Ecosystem types **(LECTURE – 15)**

Terrestrial ecosystems (Grassland ecosystem, forest ecosystem, agro-ecosystem); Aquatic ecosystems (Lentic and lotic ecosystem, wetland ecosystem, estuarine ecosystem, and marine ecosystem)

Unit 3: Population ecology **(LECTURE – 20)**

Concept and characteristics of population (natality, mortality, age structure, population pyramids, population density, population dispersion, population growth, exponential, logistics, Density dependent, Limits of population growth; life table and survivorship curves; Population interactions (competition, predation, parasitism, symbiosis, commensalism, mutualism, and ammensalism)

Unit 4: Community ecology **(LECTURE – 15)**

Concept of community & classification; Community structure (horizontal and vertical stratification); Biomass, Keystone Species, Ecotone and Edge effects; Ecological Succession (concept, processes, stages and types of successions); Concept of Climax

Unit 5: Biomes **(LECTURE – 20)**

Concept and characteristics of biome; Types and distribution of major biomes (e.g., desert, grass lands, tropical evergreen rain forests and tundra); Endemism and endemic species of India

Learning outcome

- *Understand the complexity of an ecosystem and biomes*
- *Understand the energy cycle within ecosystems*
- *Unique facts about the biomes of our world*
- *Understanding their learning to the balance required in ecosystems*

SEMESTER- II

PAPER CODE: ENVSC2021 [ENVSC Minor: COURSE NO. 1]
ECOSYSYTEM & BIOMES [Practical]

TIME: 2 Hours **MARKS: 20**

PRACTICAL

Description of Items		**Distribution of Marks**
1) One Major experiment	:	07
2) Identification	:	03
3) Laboratory Note Book	:	02
4) *Viva-voce*	:	03
5) Internal Assessment	:	10

PRACTICAL COURSES

Major Experiments:

3. Estimation of water parameters—pH, DO, Free and Combined CO_2, Hardness, Alkalinity, Acidity, Chloride
4. Estimation of soil parameters—pH, Temperature, soil moisture, Organic carbon

3. Identification with reasons (at least one from each A & B must be set during examination): Study on Aquatic organisms (Plankton and Macrophytes)

SEMESTER- II
PAPER CODE: ENVSC2051 [ENVSC Skill Enhancement Course: COURSE NO. 1]
HUMAN HEALTH AND CONSERVATION & ECOTOURISM
TOTAL CREDITS: 3

TIME: 2 Hours **MARKS: 40**

Learning objectives

- *To understand the basic concept of health & disease, and immunology and immunodeficiency diseases*
- *Understanding the diagnosis and prevention of infectious diseases including immunization vaccination for the prevention of communicable diseases and health programme in India*
- *Knowledge of importance of natural resource conservation, benefits and sustainable tourism development*
- *Understanding the dangers and limitations of ecotourism*

Unit 1: Human Health **(LECTURE – 5)**

Concept of health and disease; Principles of epidemiology and epidemiological methods; Health Programs in India; Nutrition and health; Health education

Unit 2: Diseases **(LECTURE – 10)**

Concept on air, water, vector borne diseases; some communicable diseases (Viral hepatitis, dengue); Non-communicable diseases (cardiovascular, diabetes); Immunology- elementary ideas about antigens and antibody; Immunodeficiency diseases

Unit 3: Conservation **(LECTURE – 10)**

Concept of Wildlife Conservation - Reserves design, survey techniques of tiger, birds, elephants and insect; Major conservation policies: *in-situ* and *ex-situ* approaches; Major protected areas; National and International instruments for biodiversity conservation; Role of traditional knowledge; Community based conservation; Gender and conservation; Concept of Zoo management

Unit 4: Ecotourism **(LECTURE – 15)**

Tourism and Leisure; Types of Tourism; Ecotourism – Growth and developments, Impact and management of ecotourism; Home stay tourism; Elementary idea of Rural truism, Role of ecotourism for addressing Sustainable Development Goals (SDGs)

Learning outcome:

- *Knowledge to relate to the internal, external and environmental factors that impact on health and well-being of individuals as well as health programmes in India*
- *Understanding on the reasons of occurrence of diseases*
- *Knowledge on conservation methods of biodiversity*
- *Understanding the ecotourism and the major challenges in sustainable tourism*
- *Knowledge on role of nutrients and its relationship with health*

SEMESTER- II
PAPER CODE: ENVSC 2031 [ENVSC Multidisciplinary: COURSE NO. 1]
BIODIVERSITY CONSERVATION AND ECOTOURISM
TOTAL CREDITS: 3

TIME: 2 Hours **MARKS: 40**

Course objectives

- *Concept of biodiversity*
- *Factors affecting biodiversity*
- *Understanding the major conservation policies*
- *Getting knowledge on ecotourism with home-stay tourism approach*

Unit 1: Biodiversity & its distribution **(Lectures – 15)**
Definition & Concept of biodiversity, levels and types of biodiversity; Biodiversity in India and the world; Biodiversity hotspots and Megadiversity countries

Unit 2: Threats to biodiversity: **(Lectures – 10)**
Types & causes of biodiversity loss - Land use and Land cover changes, commercial exploitation of species, invasive species, fire, disaster and climate change

Unit 3: Conservation policies **(Lectures – 10)**
Importance & major policies – in situ and ex situ conservation; Major protected areas; National & International instruments for biodiversity conservation; Role of traditional knowledge for conservation; Community-based conservation, concept of Zoo management

Unit 4: Tourism & Leisure **(Lectures – 10)**
Types of Tourism; Ecotourism – Concept, Growth and Developments; Impacts and management of ecotourism; Home stay tourism

Learning outcome (After completion of this unit students would be able to:)

- *Understand the concepts of biodiversity and conservation*
- *Understand the factors impacting biodiversity loss in India and the World*
- *Major conservation strategies taken in India*
- *Ideas on ecotourism with special emphasis on home-stay tourism*

Proposed faculty involvement

Unit 1 & 2 & 3: Social Science/ Botany/ Zoology/ Political Science/ History
Unit 4: Management/ Economics/ Commerce/ Humanities subjects

Suggested readings for Environmental Science (SEM I & II)

1. Gore, A. 2009. Our Choice: A Plan to Solve the Climate Crisis, Rodale Books
2. Girardet, H. 2007. Surviving the Century: Facing Climate Chaos and Other Global Challenges, Earth Scan
3. Plimer, I. 2005. Heaven and Earth: Global Warming – The Missing Science, Connor Court Publishing.
4. Thunberg, G. 2022. The Climate Book, Penguin Random House.
5. World Meteorological Organization (2012). Greenhouse Gas Bulletins.
6. Lawson, N. 2008. An Appeal to Reason: A Cool Look at Global Warming, Overlook Duckworth (UK).
7. Cambridge University (2013). Climate Change: Action, Trends and Implications for Business. IISD, UNITAR & UNEP (2009).
8. IEA Training Material: Vulnerability and Climate Change Impact Assessment for Adaptation.
9. IPCC (2013). Climate Change 2013. The Physical Science Basis - Summary for Policymakers.
10. OECD (2009): Guidance on Integrating Climate Change Adaptation into Development Co-operation. 11. UNEP (2009). Climate Change Science Compendium
12. UNEP (2009). Climate in Peril, a Popular Guide to the Latest IPCC Report.
13. UNFCCC (2008). Compendium on Methods and Tools to Evaluate Impacts of, and Vulnerability and Adaptation to, Climate Change.
14. UNFCCC (2006). UNFCCC Handbook.
15. World Bank Report (2012). Turn Down the Heat.

Natural resources:

Brebbia, C.A. 2013.*Water Resources Management VII*. WIT Press.
CEA. 2011. *Water Resources and Power Maps of India*. Central Board of Irrigation & Power.
Dasgupta and Heal (1979): Economic Theory of Exhaustible Resources; CUP
Groom.B.&Jenkins.M.2000.*GlobalBiodiversity:Earth'sLivingResourcesinthe21stCent Ury*
John W. Twidell and Anthony D. (2015). Renewable Energy Sources, 3rd Edition, Weir Publisher (ELBS)
Klee, G.A. 1991. *Conservation of Natural Resources*. Prentice Hall Publication.
Kneese & Sweeny (1993): Handbook of natural Resource and Energy Economics/3 Volumes; North-Holland
Mays, L.W. 2006.*WaterResources Sustainability*. The McGraw-Hill Publications.
Owen,O.S,Chiras,D.D,&Reganold,l.P.1998.*NaturalResaurceCanservatian- Management for Sustainable Future* (7thedition). Prentice Hall.
Parikh (1993): Natural Resources Accounting: A Framework for India
The Economic Approach to Environmental & Natural Resources, James R. Kahn., George Proval

Biodiversity and its conservation:

Bawa, K.S., Oomen, M.A. and Primack, R. (2011) Conservation Biology: A Primer for South Asia. Universities Press.
Bhagwat, Shonil (Editor) (2018) Conservation and Development in India: Reimagining Wilderness, Earthscan Conservation and Development, Routledge.
BharuchaErach, The Biodiversity Biology of India, Mapin Publishing Pvt. Ltd. Ahmedbad,India
ErachBharucha, 2016. Text Book of Environmental Studies for Undergraduate Courses (Second Edition) for UGC. University Press.
Gadgil, M. 1993. Biodiversity and India's degraded lands. *Ambio***22:** 167-172.
Gaston, KJ. & Spicer, J.I. 1998. *Biodiversity: An Introduction.* Blackwell Science, London,
Heywood,V.h&Watson,R.T. 1995. Global Biodiversity Assessment. Cambridge UniversityPress.
Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
Pandit, M.K. *et al.,* 2007. Unreported yet massive deforestation driving loss of endemic biodiversity in Indian Himalaya. *Biodiversity Conservation* **16**: 153-163.
Santra S.C. 2005. Environmental Science, New Central Book Agency (P) Ltd. Kolkata
Saha T.K. 2010. Ecology and Environmental Biology, Books and Allied (P) Ltd. Kolkata.
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The University of Burdwan

Syllabi of Value Added Course (Sem-II)
in
Understanding India, Digital & Technological Solutions and Health & Wellness, Yoga Education, Sports and Fitness
(for 3- Year Degree and/ or 4-Year Honours Programmes)
under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020
with effect from 2023-'24

SEMESTER- II

(A student will choose any one of the following 03 courses)

Semester-II	Course Type with Code	Name of the Course	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
								Theory	Pract./ Viva-	Internal Assessment
	Value Added (VA) Course Code:CVA2061	Understanding India	4	3	1	0	100	80	0	20

Value Added (VA) Course

Course Name: Understanding India **Total Lecture Hours (Theory) :** 45

Course Code: CVA2061 **Total Lecture Hours (Tutorial):** 15

Credit: 4

Learning Objectives

- *To create awareness and understanding about Indian society, its land, and people*
- *To make students aware about the majorcultural traditions of Indian society*
- *To learnaboutthe social history of India including its struggle for freedom*
- *To impart knowledge about the ideas and values propagated by four Indian thinkers*

Total 60 Lectures

Unit 1: Introducing India: (7 lectures)

I. The Land of India: Geographical Setting; Physical and Natural Environment
II. The People of India, Indian Constitution, Demography, Culture and Languages

Unit 2: Social History of India (8 lectures)

i) Society and Culture in Pre-British India
ii) Brief History of India's Freedom Struggle
iii) Society in Independent India: Federalism, Secularism, and Fundamental Rights

Unit 3: India as a Plural Society: (8 lectures)

i. Religious, Linguistic and Cultural Diversity;
ii. Significance of Pluralism for Indian Culture:
iii. Unity in Diversity

Unit 4: MajorIdeas of Swami Vivekananda (8 lectures)

i) Synthetic Religion: Vedantic Approach
ii) National Regenerationand Patriotism
iii) Philosophy of Freedom and Acceptance

Unti 5: Major Ideas of Mahatma Gandhi (8 lectures)

i) Non-Violenceand Ethical Development
ii) Swaraj and Sarvodaya
iii) Critique of Modernity and Individualism

Unit 6: Major Ideas of Rabindra Nath Tagore (7 lectures)

i) Cooperation, Social Service,and Ideals of Humanity
ii) Self-Strength, Self-Identity, and Creative Freedom
iii) Concept of Nation and Nationalism

Unit 7: Major Ideas of B. R. Ambedkar (7 lectures)

i) Caste Oppression and Inequality
ii) Gender Inequality
iii) Prabuddha Bharat: Rights, Identity and Liberation

Unit 8: India & the World (7 lectures)

i) India's relations with Asian and Western Countries
ii) Globalization & India
iii) Technological and other achievements of India

References:

Basham, L. 1997. *A Cultural History of India*. Oxford University Press.
Basham, L. 1994. *A Wonder that was India*. Rupa, New Delhi.
Basu, Nimai Sadhan (ed.). 1992. *শাশ্বতবিবেকানন্দ*/Ananda publishers.
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Desai, A. R. 2015. *ভারতীয়জাতীয়তাবাদেরসামাজিকপটভূমি*/ K P Bagchi & Company
Dube, S. C. 2005. Indian Society (Chapters 2, 4). National Book Trust
Ghosh, Biswajit. 2020. 'Ambedkar as a Subaltern Theorist: His Relevance in Contemporary India', in Arun Bandyopadhyay (Ed), 2020. *Prabuddha Bharat- Understanding Ambedkar in the Passage of Time* (89-111). Kolkata: Asiatic Society
Ghosh,Kritya Priya. 2006. *Unish-Bish*. Kolkata: Punachya.
Hardiman, David. 2005. Gandhi – in his time and ours. New Delhi: Permanent Black.
Majumdar, R.C. (ed.). 2015. History and Culture of Indian People (Relevant Volumes and Chapters). Bharatiya Vidya Bhavan.
Amal Mukhopadhyay (ed.).1979.*Bengali Intellectual Tradition: From Rammohun Roy to DhirendranathSen*(Chapter on Tagore). K P Bagchi & Company

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Roy, Arundhuti. 2014. 'The Doctor and the Saint', in Ambedkar, B.R. 2014 (1936). Annihilation of Caste - The Annotated Critical Edition (17-179). New Delhi: Navayana.
Swami Lokeswarananda (ed.) 1996. *Chintanayak Vivekananda*. Ramkrishna Mission Institute of Culture.
Swami Vivekananda. 1986. *আমার ভারত অমর ভারত* / Ramkrishna Mission Institute of Culture.

Learning Outcomes

- *Understand the Physical and Natural Environment of Indian Society*
- *Learn about the demography, culture, and languages of Indian populace*
- *Understand the significance of plural and tolerant culture of India*
- *Basic Ideas on social and political history of India through ages*
- *Understand the major ideas and values propagated by four Indian thinkers*
- *Application of the ideas and values propagated by Indian scholars to comprehend contemporary social reality.*

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Semester-II	Course Type with Code	Name of the Course	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
								Theory	Pract./ Viva-	Internal Assessment
	Value Added (VA) Course Code:CVA2061	Digital & Technological Solutions	4	3	0	1	100	60	20	20

Value Added (VA) Course

Course Name: Digital & Technological Solutions **Total Lecture Hours (Theory) :** 45

Course Code: CVA2061 **Total Lecture Hours (Practical):** 30

Credit: 4

Course Objectives:

1. Course in Microsoft Office & Internet will help students to broaden their employment opportunities by proving skills in Microsoft Office and knowledge of working with Internet.
2. This course can result in higher earning potential and career advancement.
3. This course not only aims to provide them ability to use MS Word, MS Excel, MS PowerPoint applications for on-the-job needs but also provides a valuable distinction in entering higher education or the workforce by promoting academic preparedness and an opportunity to develop skills which businesses need for workforce readiness.

Learning Outcomes:

This course helps students to build a brighter future by empowering them with:

1. Basic Essential Computing skills companies are looking for.
2. Hands-on Practical Knowledge.
3. Boosting their resume.
4. Providing an edge over other applicants in the competitive job market.
5. Providing valuable experience and confidence.
6. Heightening their earning potential.
7. Gaining recognition among peers and employers.
8. Helping them in pursuit of higher education or a successful career.

Contents of the relevant course as above

Computer Basics **Duration of Hours:** 3 hours Theory & 3 hours Practical

Computer Basic: Creating Folder, Paint, Directories, input units, Output unit, Central Processing Units, What is hard ware, what is Soft ware, Windows short cut keys.

Input devices and their uses: Identify input devices and their uses, e.g.: keyboards, numeric keypads, pointing devices (including mouse, touch pad and tracker ball), remote controls, joysticks, touch screens, scanners, and digital cameras.

Output devices and their uses: Identify output devices and their uses, e.g.: CRT monitor, TFT/LCD monitor, IPS/LCD monitor, LED monitor, touch screen (as an output device), multimedia projector, laser printer, inkjet printer, dot matrix printer, wide format printer, 3D printer.

I. MS Word **Duration of Hours:** 12 hours Theory & 7 hours Practical

Text Basics: Typing the text, Alignment of text, Editing Text: Cut, Copy, Paste, Select All, Clear, Find & Replace

Text Formatting and saving file: New, Open, Close, Save, Save As, Formatting Text: Font Size, Font Style, Font Colour, Use the Bold, Italic, and Underline, Change the Text Case, Line spacing, Paragraph spacing, Shading text and paragraph, Working with Tabs and Indents.

Working with Objects: Shapes, Clipart and Picture, Word Art, Smart Art, Columns and Orderings - To Add Columns to a Document, Change the Order of Objects, Page Number, Date & Time, Inserting Text boxes, Inserting Word art, Inserting symbols, Inserting Chart.

Header & Footers: Inserting custom Header and Footer, Inserting objects in the header and footer, Add section break to a document.

Working with bullets and numbered lists: Multilevel numbering and Bulleting, Creating List, Customizing List style, Page bordering, Page background.

Tables: Working with Tables, Table Formatting, Table Styles, Alignment option, Merge and split option.

Merging Documents: Typing new address list, Importing address list from Excel file, Write and insert field, Merging with outlook contact, Preview Result, Merging to envelopes, Merging to label, Setting rules for merges, Finish & Merge options.

Sharing and Maintaining Document: Changing Word Options, Changing the Proofing Tools, Managing Templates, Restricting Document Access, Using Protected View, Working with Templates, Managing Templates, Understanding building blocks.

Proofing the document: Check Spelling as You Type, Mark Grammar Errors as You Type, Setting AutoCorrect Options

Printing: Page Setup, Setting margins, Print Preview, Print.

II. MS Excel **Duration of Hours:** 12 hours Theory & 7 hours Practical

Introduction to Excel: Introduction to Excel interface, Understanding rows and columns, Naming Cells, Working with excel workbook and sheets.

Formatting excel work book: New, Open, Close, Save, Save As, Formatting Text: Font Size, Font Style, Font Colour, Use the Bold, Italic, and Underline, Wrap text, Merge and Centre, Currency, Accounting and other formats, Modifying Columns, Rows & Cells.

Perform Calculations with Functions: Creating Simple Formulas, Setting up your own formula, Date and Time Functions, Financial Functions, Logical Functions, Lookup and Reference, Functions Mathematical Functions, Statistical Functions, Text Functions.

Sort and Filter Data with Excel: Sort and filtering data, Using number filter, Text filter, Custom filtering, Removing filters from columns, Conditional formatting.

Create Effective Charts to Present Data Visually: Inserting Column, Pie chart etc., Create an effective chart with Chart Tool, Design, Format, and Layout options, Adding chart title, Changing layouts, Chart styles, editing chart data range, Editing data series, Changing chart.

Analyze Data Using PivotTables and Pivot Charts: Understand PivotTables, Create a PivotTable, Framework Using the PivotTable and PivotChart, Create Pivot Chart from pivot Table, Inserting slicer and Creating Calculated fields.

Proofing and Printing: Page setup, Setting print area, Print titles, Inserting custom Header and Footer, Inserting objects in the header and footer, Page Setup, Setting margins, Print Preview, Print, Enable back ground error checking, Setting AutoCorrect Options.

III. MS PowerPoint **Duration of Hours:** 12 hours Theory & 7 hours Practical

Setting Up PowerPoint Environment: New, Open, Close, Save, Save As, Typing the text, Alignment of text, Formatting Text: Font Size, Font Style, Font Colour, Use the Bold, Italic, and Underline Cut, Copy, Paste, Select All, Clear text, Find & Replace, Working with Tabs and Indents.

Creating slides and applying themes: Inserting new slide, changing layout of slides, Duplicating slides, Copying and pasting slide, Applying themes to the slide layout, Changing theme colour, Slide background, Formatting slide background and Using slide views.

Working with bullets and numbering: Multilevel numbering and Bulleting, Creating List, Page bordering, Page background, Aligning text, Text directions and Columns option.

Working with Objects: Shapes, Clipart and Picture, Word Art, Smart Art, Change the Order of Objects, Inserting slide header and footer, Inserting Text boxes, Inserting shapes using quick styles, Inserting Word art, Inserting symbols, Inserting Chart.

Working with Movies and Sounds: Inserting Movie From a Computer File, Inserting Audio file, Audio Video playback and format options, Video options, Adjust options, Reshaping and bordering Video.

Using Smart Art and Tables: Working with Tables, Table Formatting, Table Styles, Alignment option, Merge and split option Converting text to smart art.

Animation and Slide Transition: Default Animation, Custom Animation, Modify a Default or Custom Animation, Reorder Animation Using Transitions, Apply a Slide Transition, Modifying a Transition, Advancing to the Next Slide.

Slide show option: Start slide show, Start show from the current slide, Rehearse timing, and creating custom slide show.

Proofing and Printing: Check Spelling as You Type, Setting AutoCorrect Options, Save as video, Save as JPEG files, Save as PowerPoint Show file, Print Preview, Print.

IV. Internet & E-Mail **Duration of Hours:** 6 hours Theory & 6 hours Practical

What is Internet?, Receiving Incoming Messages, Sending Outgoing Messages, Email addressing, Email attachments, Browsing, Search engines, Text chatting, Job Searching, Downloading video and Music, Uploading Video or Music, Acquire the essentials for using Google apps: Drive, Docs, Sheets, Slides, and Forms.

List of Practical Experiments:

1. Create a document and apply formatting options.
2. Design a greeting card using word art for different festivals.
3. Create your bio-data and use page borders and shading.
4. Create a document and insert header, footer and page title, etc.
5. To create a document, set the margins, orientation, size, column, water mark, page colors and page borders.
6. Insert a table into the document.
7. Prepare a mark sheet of your class subjects.
8. Apply the creating, editing, saving, printing, securing and protecting operations to an excel spreadsheets.
9. Prepare a bar chart and pie chart for the analysis of five year result of your institute.
10. Work on the following exercise on a workbook
    a. Copy an existing sheet.
    b. Rename the old sheet.
    c. Insert a new sheet into the existing workbook.
    d. Delete the renamed sheet.

11. Prepare an attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student and calculate average attendance.
12. Apply themes and layouts to power point slides and insert pictures, graphics, shapes, and tables into presentations.
13. In power point slide make use of adding transitions and animations and working with master slides.
14. Create an excel worksheet and perform computations using available data and using mathematical functions chosen from menus.
15. Make a question paper using Google forms.
16. Similar kinds of problems to be solved using MS Word/MS Excel/MS PowerPoint/Google Sheet.

Suggested Reading

1. *"MICROSOFT OFFICE 2016 STEP BY STEP" by Joan Lambert and Curtis Frye*
2. *"Office 2016 for Beginners" by Steven Weikler*

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Semester-II	Course Type with Code	Name of the Course	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
								Theory	Pract./ Viva-	Internal Assessment
	Value Added (VA) Course Code:CVA2061	Health & Wellness, Yoga Education, Sports and Fitness	4	3	0	1	100	60	20	20

Value Added (VA) Course

Course Name: Health & Wellness, Yoga Education, Sports and Fitness

Course Code: CVA2061 **Total Lecture Hours (Theory) :** 45

Credit: 4 **Total Lecture Hours (Practical):** 30

Unit- 1: Concepts of Wellness and Illness (15 Lecture Hours)

Concept of health (Modern and Ancient View); Concept of Wellness and Illness (Modern and Ancient View); Concept of Body (Pancha Kosha according to Taittiriya Upanisada); Potential causes of illness according to Yoga Vasishta- Concept of Adhi and Vyadhi and their consequences on the body

Unit- 2: Yogic Concept on Holistic Health (15 Lecture Hours)

Total Human Development through Yogic practices for Pancha Kosha (Annamaya Khosha, Pranamaya Kosha, Manomaya Kosha, Vijnanamaya Kosha and Ananda Maya Kosha) and its integration with Ashtanga Yoga of Patanjali.

Unit- 3: Yoga as Preventive Health Care (15 Lecture Hours)

Concept of stress according to modern science and yoga; Stress as the cause for illness; Role of Yoga in Stress Management: Holistic approach of catering to moderation in eating (yogic Diet), Sleeping (rhythm of the nature), Working (the sense of duty as per BG), Entertainment (moderation), Change in life style;

Unit-4 (Practical) : Asana (30 Lecture Hours)

Pranayama: Anulome-Vilome, Suryabhidana, Chancrabhedana, Ujjai, Sitali

Meditation: A-U-M Meditation, Yog Nidra

Reference Books:

1. Ajith 'Yoga Pravesh' Rastrotana Paruhad Bangalore.
2. Bachelor of Sports Management Syllabus (Revised) 2008.
3. B. C. Rai Health Education and Hygiene, Published by Prakashana Kendra, Lucknow.
4. B.K.S. Iyenger 'Yoga The Path of Holistic Health', Dorling Kindersley, Delhi 2001.
5. Dixit Suresh (2006) Swasthya Shiksha Sports Publication, Delhi.
6. Puri, K. Chandra, S.S (2005) Health and Physical Education, New Delhi, Surjeet Publication.
7. A Text Book on Physical Education & Health Education Fitness, Wellness and Nutrition, Dr. A. K. Uppal, Dr. P. P. Ranganathan.
8. Warner W. K. Oeger & Sharon A. Hoeger, Fitness & Wellness, Morton Publishing Co., 1990
9. Robert Malt. 90 day Fitness Plan, D. K. Publishing, Inc. 95, Madison Avenue, New York 2001.

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Syllabi of Value Added Course (Sem-II)
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SEMESTER- II

(A student will choose any one of the following 03 courses)

Semester-II	Course Type with Code	Name of the Course	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
								Theory	Pract./ Viva-	Internal Assessment
	Value Added (VA) Course Code:CVA2061	Understanding India	4	3	1	0	100	80	0	20

Value Added (VA) Course

Course Name: Understanding India **Total Lecture Hours (Theory) :** 45

Course Code: CVA2061 **Total Lecture Hours (Tutorial):** 15

Credit: 4

Learning Objectives

- *To create awareness and understanding about Indian society, its land, and people*
- *To make students aware about the majorcultural traditions of Indian society*
- *To learnaboutthe social history of India including its struggle for freedom*
- *To impart knowledge about the ideas and values propagated by four Indian thinkers*

Total 60 Lectures

Unit 1: Introducing India: (7 lectures)

I. The Land of India: Geographical Setting; Physical and Natural Environment
II. The People of India, Indian Constitution, Demography, Culture and Languages

Unit 2: Social History of India (8 lectures)

i) Society and Culture in Pre-British India
ii) Brief History of India's Freedom Struggle
iii) Society in Independent India: Federalism, Secularism, and Fundamental Rights

Unit 3: India as a Plural Society: (8 lectures)

i. Religious, Linguistic and Cultural Diversity;
ii. Significance of Pluralism for Indian Culture:
iii. Unity in Diversity

Unit 4: MajorIdeas of Swami Vivekananda (8 lectures)

i) Synthetic Religion: Vedantic Approach
ii) National Regenerationand Patriotism
iii) Philosophy of Freedom and Acceptance

Unti 5: Major Ideas of Mahatma Gandhi (8 lectures)

i) Non-Violenceand Ethical Development
ii) Swaraj and Sarvodaya
iii) Critique of Modernity and Individualism

Unit 6: Major Ideas of Rabindra Nath Tagore (7 lectures)

i) Cooperation, Social Service,and Ideals of Humanity
ii) Self-Strength, Self-Identity, and Creative Freedom
iii) Concept of Nation and Nationalism

Unit 7: Major Ideas of B. R. Ambedkar (7 lectures)

i) Caste Oppression and Inequality
ii) Gender Inequality
iii) Prabuddha Bharat: Rights, Identity and Liberation

Unit 8: India & the World (7 lectures)

i) India's relations with Asian and Western Countries
ii) Globalization & India
iii) Technological and other achievements of India

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Swami Vivekananda. 1986. *আমার ভারত অমর ভারত* / Ramkrishna Mission Institute of Culture.

Learning Outcomes

- *Understand the Physical and Natural Environment of Indian Society*
- *Learn about the demography, culture, and languages of Indian populace*
- *Understand the significance of plural and tolerant culture of India*
- *Basic Ideas on social and political history of India through ages*
- *Understand the major ideas and values propagated by four Indian thinkers*
- *Application of the ideas and values propagated by Indian scholars to comprehend contemporary social reality.*

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Semester-II	Course Type with Code	Name of the Course	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
								Theory	Pract./ Viva-	Internal Assessment
	Value Added (VA) Course Code:CVA2061	Digital & Technological Solutions	4	3	0	1	100	60	20	20

Value Added (VA) Course

Course Name: Digital & Technological Solutions **Total Lecture Hours (Theory) :** 45

Course Code: CVA2061 **Total Lecture Hours (Practical):** 30

Credit: 4

Course Objectives:

1. Course in Microsoft Office & Internet will help students to broaden their employment opportunities by proving skills in Microsoft Office and knowledge of working with Internet.
2. This course can result in higher earning potential and career advancement.
3. This course not only aims to provide them ability to use MS Word, MS Excel, MS PowerPoint applications for on-the-job needs but also provides a valuable distinction in entering higher education or the workforce by promoting academic preparedness and an opportunity to develop skills which businesses need for workforce readiness.

Learning Outcomes:

This course helps students to build a brighter future by empowering them with:

1. Basic Essential Computing skills companies are looking for.
2. Hands-on Practical Knowledge.
3. Boosting their resume.
4. Providing an edge over other applicants in the competitive job market.
5. Providing valuable experience and confidence.
6. Heightening their earning potential.
7. Gaining recognition among peers and employers.
8. Helping them in pursuit of higher education or a successful career.

Contents of the relevant course as above

Computer Basics **Duration of Hours:** 3 hours Theory & 3 hours Practical

Computer Basic: Creating Folder, Paint, Directories, input units, Output unit, Central Processing Units, What is hard ware, what is Soft ware, Windows short cut keys.

Input devices and their uses: Identify input devices and their uses, e.g.: keyboards, numeric keypads, pointing devices (including mouse, touch pad and tracker ball), remote controls, joysticks, touch screens, scanners, and digital cameras.

Output devices and their uses: Identify output devices and their uses, e.g.: CRT monitor, TFT/LCD monitor, IPS/LCD monitor, LED monitor, touch screen (as an output device), multimedia projector, laser printer, inkjet printer, dot matrix printer, wide format printer, 3D printer.

I. MS Word **Duration of Hours:** 12 hours Theory & 7 hours Practical

Text Basics: Typing the text, Alignment of text, Editing Text: Cut, Copy, Paste, Select All, Clear, Find & Replace

Text Formatting and saving file: New, Open, Close, Save, Save As, Formatting Text: Font Size, Font Style, Font Colour, Use the Bold, Italic, and Underline, Change the Text Case, Line spacing, Paragraph spacing, Shading text and paragraph, Working with Tabs and Indents.

Working with Objects: Shapes, Clipart and Picture, Word Art, Smart Art, Columns and Orderings - To Add Columns to a Document, Change the Order of Objects, Page Number, Date & Time, Inserting Text boxes, Inserting Word art, Inserting symbols, Inserting Chart.

Header & Footers: Inserting custom Header and Footer, Inserting objects in the header and footer, Add section break to a document.

Working with bullets and numbered lists: Multilevel numbering and Bulleting, Creating List, Customizing List style, Page bordering, Page background.

Tables: Working with Tables, Table Formatting, Table Styles, Alignment option, Merge and split option.

Merging Documents: Typing new address list, Importing address list from Excel file, Write and insert field, Merging with outlook contact, Preview Result, Merging to envelopes, Merging to label, Setting rules for merges, Finish & Merge options.

Sharing and Maintaining Document: Changing Word Options, Changing the Proofing Tools, Managing Templates, Restricting Document Access, Using Protected View, Working with Templates, Managing Templates, Understanding building blocks.

Proofing the document: Check Spelling as You Type, Mark Grammar Errors as You Type, Setting AutoCorrect Options

Printing: Page Setup, Setting margins, Print Preview, Print.

II. MS Excel **Duration of Hours:** 12 hours Theory & 7 hours Practical

Introduction to Excel: Introduction to Excel interface, Understanding rows and columns, Naming Cells, Working with excel workbook and sheets.

Formatting excel work book: New, Open, Close, Save, Save As, Formatting Text: Font Size, Font Style, Font Colour, Use the Bold, Italic, and Underline, Wrap text, Merge and Centre, Currency, Accounting and other formats, Modifying Columns, Rows & Cells.

Perform Calculations with Functions: Creating Simple Formulas, Setting up your own formula, Date and Time Functions, Financial Functions, Logical Functions, Lookup and Reference, Functions Mathematical Functions, Statistical Functions, Text Functions.

Sort and Filter Data with Excel: Sort and filtering data, Using number filter, Text filter, Custom filtering, Removing filters from columns, Conditional formatting.

Create Effective Charts to Present Data Visually: Inserting Column, Pie chart etc., Create an effective chart with Chart Tool, Design, Format, and Layout options, Adding chart title, Changing layouts, Chart styles, editing chart data range, Editing data series, Changing chart.

Analyze Data Using PivotTables and Pivot Charts: Understand PivotTables, Create a PivotTable, Framework Using the PivotTable and PivotChart, Create Pivot Chart from pivot Table, Inserting slicer and Creating Calculated fields.

Proofing and Printing: Page setup, Setting print area, Print titles, Inserting custom Header and Footer, Inserting objects in the header and footer, Page Setup, Setting margins, Print Preview, Print, Enable back ground error checking, Setting AutoCorrect Options.

III. MS PowerPoint **Duration of Hours:** 12 hours Theory & 7 hours Practical

Setting Up PowerPoint Environment: New, Open, Close, Save, Save As, Typing the text, Alignment of text, Formatting Text: Font Size, Font Style, Font Colour, Use the Bold, Italic, and Underline Cut, Copy, Paste, Select All, Clear text, Find & Replace, Working with Tabs and Indents.

Creating slides and applying themes: Inserting new slide, changing layout of slides, Duplicating slides, Copying and pasting slide, Applying themes to the slide layout, Changing theme colour, Slide background, Formatting slide background and Using slide views.

Working with bullets and numbering: Multilevel numbering and Bulleting, Creating List, Page bordering, Page background, Aligning text, Text directions and Columns option.

Working with Objects: Shapes, Clipart and Picture, Word Art, Smart Art, Change the Order of Objects, Inserting slide header and footer, Inserting Text boxes, Inserting shapes using quick styles, Inserting Word art, Inserting symbols, Inserting Chart.

Working with Movies and Sounds: Inserting Movie From a Computer File, Inserting Audio file, Audio Video playback and format options, Video options, Adjust options, Reshaping and bordering Video.

Using Smart Art and Tables: Working with Tables, Table Formatting, Table Styles, Alignment option, Merge and split option Converting text to smart art.

Animation and Slide Transition: Default Animation, Custom Animation, Modify a Default or Custom Animation, Reorder Animation Using Transitions, Apply a Slide Transition, Modifying a Transition, Advancing to the Next Slide.

Slide show option: Start slide show, Start show from the current slide, Rehearse timing, and creating custom slide show.

Proofing and Printing: Check Spelling as You Type, Setting AutoCorrect Options, Save as video, Save as JPEG files, Save as PowerPoint Show file, Print Preview, Print.

IV. Internet & E-Mail **Duration of Hours:** 6 hours Theory & 6 hours Practical

What is Internet?, Receiving Incoming Messages, Sending Outgoing Messages, Email addressing, Email attachments, Browsing, Search engines, Text chatting, Job Searching, Downloading video and Music, Uploading Video or Music, Acquire the essentials for using Google apps: Drive, Docs, Sheets, Slides, and Forms.

List of Practical Experiments:

1. Create a document and apply formatting options.
2. Design a greeting card using word art for different festivals.
3. Create your bio-data and use page borders and shading.
4. Create a document and insert header, footer and page title, etc.
5. To create a document, set the margins, orientation, size, column, water mark, page colors and page borders.
6. Insert a table into the document.
7. Prepare a mark sheet of your class subjects.
8. Apply the creating, editing, saving, printing, securing and protecting operations to an excel spreadsheets.
9. Prepare a bar chart and pie chart for the analysis of five year result of your institute.
10. Work on the following exercise on a workbook
    a. Copy an existing sheet.
    b. Rename the old sheet.
    c. Insert a new sheet into the existing workbook.
    d. Delete the renamed sheet.

11. Prepare an attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student and calculate average attendance.
12. Apply themes and layouts to power point slides and insert pictures, graphics, shapes, and tables into presentations.
13. In power point slide make use of adding transitions and animations and working with master slides.
14. Create an excel worksheet and perform computations using available data and using mathematical functions chosen from menus.
15. Make a question paper using Google forms.
16. Similar kinds of problems to be solved using MS Word/MS Excel/MS PowerPoint/Google Sheet.

Suggested Reading

1. *"MICROSOFT OFFICE 2016 STEP BY STEP" by Joan Lambert and Curtis Frye*
2. *"Office 2016 for Beginners" by Steven Weikler*

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Semester-II	Course Type with Code	Name of the Course	Credit	Lect.	Tuto.	Pract./ Viva-voce	Full Marks	Distribution of Marks		
								Theory	Pract./ Viva-	Internal Assessment
	Value Added (VA) Course Code:CVA2061	Health & Wellness, Yoga Education, Sports and Fitness	4	3	0	1	100	60	20	20

Value Added (VA) Course

Course Name: Health & Wellness, Yoga Education, Sports and Fitness

Course Code: CVA2061 **Total Lecture Hours (Theory) :** 45

Credit: 4 **Total Lecture Hours (Practical):** 30

Unit- 1: Concepts of Wellness and Illness (15 Lecture Hours)

Concept of health (Modern and Ancient View); Concept of Wellness and Illness (Modern and Ancient View); Concept of Body (Pancha Kosha according to Taittiriya Upanisada); Potential causes of illness according to Yoga Vasishta- Concept of Adhi and Vyadhi and their consequences on the body

Unit- 2: Yogic Concept on Holistic Health (15 Lecture Hours)

Total Human Development through Yogic practices for Pancha Kosha (Annamaya Khosha, Pranamaya Kosha, Manomaya Kosha, Vijnanamaya Kosha and Ananda Maya Kosha) and its integration with Ashtanga Yoga of Patanjali.

Unit- 3: Yoga as Preventive Health Care (15 Lecture Hours)

Concept of stress according to modern science and yoga; Stress as the cause for illness; Role of Yoga in Stress Management: Holistic approach of catering to moderation in eating (yogic Diet), Sleeping (rhythm of the nature), Working (the sense of duty as per BG), Entertainment (moderation), Change in life style;

Unit-4 (Practical) : Asana (30 Lecture Hours)

Pranayama: Anulome-Vilome, Suryabhidana, Chancrabhedana, Ujjai, Sitali

Meditation: A-U-M Meditation, Yog Nidra

Reference Books:

1. Ajith 'Yoga Pravesh' Rastrotana Paruhad Bangalore.
2. Bachelor of Sports Management Syllabus (Revised) 2008.
3. B. C. Rai Health Education and Hygiene, Published by Prakashana Kendra, Lucknow.
4. B.K.S. Iyenger 'Yoga The Path of Holistic Health', Dorling Kindersley, Delhi 2001.
5. Dixit Suresh (2006) Swasthya Shiksha Sports Publication, Delhi.
6. Puri, K. Chandra, S.S (2005) Health and Physical Education, New Delhi, Surjeet Publication.
7. A Text Book on Physical Education & Health Education Fitness, Wellness and Nutrition, Dr. A. K. Uppal, Dr. P. P. Ranganathan.
8. Warner W. K. Oeger & Sharon A. Hoeger, Fitness & Wellness, Morton Publishing Co., 1990
9. Robert Malt. 90 day Fitness Plan, D. K. Publishing, Inc. 95, Madison Avenue, New York 2001.

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