

ISLAMIAH COLLEGE

(AUTONOMOUS)

VANIYAMBADI – 635 752

(AIDED & SELF FINANCE)



SYLLABI BOOK IX

10TH ACADEMIC COUNCIL MEETING

(For the UG & PG Candidates Admitted from 2018-2019)

04Th FEBRUARY 2018

Part-I Language	SEMESTER I	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	Urdu Paper I - PROSE, GRAMMER & LETTER WRITING	U8FUR101	

UNIT I

1. SAIR PAHLAY DARWESH KI - Meer Amman Dehlavi
2. Ism aur Uski Qismein
3. Letter to the Principal Seeking leave

UNIT II

1. GHALIB KE AKHLAQ -O- AADAT - Moulana Althaf Hussain Hali
2. Fe'l aur Uski Qismein
3. Letter to the father/guardian asking money for payment of college fees

UNIT III

1. BEHS-O-TAKRAR - Sir Syed Ahmed Khan
2. Sifat aur Uski Qismein
3. Letter to a friend inviting him to your sister's marriage

UNIT IV

1. KHAWAJA MOINUDDEEN CHISTI – Shebaz Hussain
2. Zameer aur Uski Qismein
3. Letter to the manager of a firm seeking employment

UNIT V

1. SAWERAY JO KAL MERI AANKH KHULI – Putars Bukhari
2. Jins aur Uske Aqsaam
3. Letter to a publisher of a book seller placing order for books.

Books for reference:

URDU TEXT BOOK CUM WORK BOOK

Published by the Department of Urdu & Arabic
Islamiah College(Autonomous), Vaniyambadi

Part-I Language	SEMESTER II	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	URDUPAPER II- GHAZALIAT, MANZOOMAT , RUBAIYAT &TRANSLATION	U8FUR201	

UNIT - I

1. MEER TAQI MEER – Ulti hogayeen Sab tadbeerein kuch na dawa nay kam kiya
2. KHUSH AAMAD – NAZEER AKBAR ABADI
3. MEER ANEES – Gulshan me phirun k sair sehra dekhun

UNIT II

1. GHALIB – Hazaron Qaheeshein aisi k har qahish pe dam nikley
2. SHIKWA – ALLAMA IQBAL
3. AMJAD – Is naam ki zindagi me kuch jan to ho

UNIT III

1. NIYAZ VANIYAMBADI – Hum O hain jo k waqt ki chalon me aagaye
2. JAWAB-E-SHIWA—ALLAMA IQBAL
3. AKBAR – Gaflat ki hansa se aah bharna achcha

UNIT IV

1. SHAKIR VANIYAMBADI – Jan dena kiya hai niyyat chahiye
2. TAJ MAHAL—SAHIR LUDHIANAWI
3. JOSH – Pa mal-e-Gham insane huwa jata hai

UNIT V

1. JIGAR MURADABADI – Aankhon mein bas ke dil me sama kar chale gaye
2. SUBH-E-AZADI—FAIZ AHMED FAIZ
3. ASGAR VELLORI – Dhoondha to kitabon me sadaqat na mili
4. TRANSLATION from English to Urdu

Books for reference:

URDU TEXT BOOK CUM WORK BOOK

Published by the Department of Urdu & Arabic, Islamiah College(Autonomous), Vaniyambadi

Part-I	SEMESTER I	Credit	5
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Language		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	ARABIC PAPER I - PROSE AND TRANSLATION	U8FAR101	

UNIT I PROSE [LESSON 1 – 5]

UNIT II PROSE [LESSON 6 – 10]

UNIT III HADITH [LESSON 1 – 8]

UNIT IV HADITH [LESSON 9 – 16]

UNIT V HADITH [LESSON 17 – 25]

Part-I Language	SEMESTER II	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	ARABIC PAPER II - PROSE AND TRANSLATION	U8FAR201	

UNIT I PROSE [LESSON 11 – 17]

UNIT II PROSE [LESSON 18 – 23]

UNIT III HADITH [LESSON 26 – 33]

UNIT IV HADITH [LESSON 34 – 41]

UNIT V HADITH [LESSON 42 – 50]

REFERENCE BOOK: PROSE: DUROOS - U L - LUGHAT - AL – ARABIYA,

PART – I BY DR. V, ABDUL RAHIM

MIATU – HADITHIN LIJEELIN SALEEMIN BY DR. K. MUJEEB RAHMAN

Part-I Language	SEMESTER I	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	HINDI PAPER – I	U8FHD101	

Objectives: 1. *Appreciation of literature using the best specimens provided as a reading list or anthology.* 2. *Familiarizing the practical grammar and analyzing the problems and challenges of effective communication in Hindi.* 3. *Functional Hindi will help the students to improve their writing skills*

UNIT – I PROSE: ‘GADYA NIKASH’

LESSONS PRESCRIBED:

1. MAHAVEER PRASAD DWIVEDI - LOBH
2. PREMCHAND - SABHYATA KA RAHASYA
3. DINAKAR - BHARAT EK HAI
4. HARISHANKAR PARSAYEE - KRANTIKARI KI KATHA
5. RAJENDRA YADAV – BIRADARI BAAHAR

UNIT – II APPLIED GRAMMAR-

PRESCRIBED POINTS: a) SANDHI b) LING c) VACHAN
d) PRERANARTHA KRIYA e) SHUDDH ROOP.

UNIT – III LETTER WRITING:

PRESCRIBED LETTERS: (PERSONAL & COMMERCIAL):

1. ORDERING FOR BOOKS
2. EMPLOYMENT LETTER
3. LETTER OF COMPLAINT
4. LETTER TO BANK
5. LETTER TO PARENTS & 6. LETTER TO A FRIEND

UNIT – IV FUNCTIONAL HINDI: ADMINISTRATIVE & BUSINESS

TERMINOLOGY: TERMS/WORDS FROM ENGLISH TO
HINDI & VICE VERSA

UNIT – V PHRASES FROM HINDI TO ENGLISH only

[PRESCRIBED TERMINOLOGY ENCLOSED]

BOOK FOR STUDY:

GADYA NIKASH, Ed. SHAIK ABDUL WAHAB, RAKA PRAKASHAN, ALLAHABAD

BOOKS FOR REFERENCE:

1. SHAIKSHIK VYAKARAN AUR VYAVAHARIK HINDI, Dr. KRISHNA KUMAR GOSWAMI, AALEKH PRAKASHAN, DELHI – 32.
2. HINDI VYAKARAN BY SHASTRI & APTE, D.B.H. PRACHAR

SABHA, CHENNAI. 1998.

3. PRAMANIK ALEKHAN AUR TIPPAN, PROF. VIRAJ, RAJPAL & SONS,
KASHMERE GATE, DELHI, 2001

4. SAMPOORNA HINDI VYAKARAN, SREESHARAN & SRI ALOK KUMAR
RASTOGI, MADHUR BOOKS, DELHI - 51.

4. GLOSSARY OF ADMINISTRATIVE TERMINOLOGY, MINISTRY OF HRD,
NEW DELHI, 2004

PREScribed TERMINOLOGY : UNIT – IV

ADMINISTRATIVE AND BUSINESS TERMINOLOGY

A) ENGLISH TO HINDI and VICE VERSA

ACCOUNTANT = लेखपाल; ACTING = कार्यकारी; ADMINISTRATOR = प्रशासक;
ALLOTMENT = आबंटन; AUCTION = नीलाम; AUDITOR = लेखापरीक्षक; ALLOWANCE =
भत्ता; BALANCE SHEET = तुलनपत्र; BROKER = दलाल; MANAGER = प्रबंधक; BEARER =
धारक; CABINET = मंत्रिमंडल; CIRCULAR = परिपत्र; CLERK = लिपिक; CONTROLLER =
नियंत्रक; CONSUMER = उपभोक्ता; COMMISSIONER = आयुक्त; CASHIER = रोकडिया;
CUSTOMER = ग्राहक; DEBENTURE = ऋणपत्र; DIRECTOR = निदेशक; DOCUMENT = प्रलेख
/ दस्तावेज़; EDITOR = संपादक; ELECTION = चुनाव; EMPLOYMENT = रोज़गार; EXCHANGE
= विनिमय; FUND = निधि; GOVERNOR = राज्यपाल; GRANT = अनुदान; GAZETTE = राजपत्र;
INCOME TAX = आयकर; INSPECTOR = निरीक्षक; INSURANCE = बीमा; INVOICE = बीजक;
MAYOR = महापौर; MINISTRY = मंत्रालय; PRIME MINISTER = प्रधानमंत्री; MINISTRY OF
DEFENCE = रक्षामंत्रालय; MINISTRY OF FINANCE = वित्तमंत्रालय; MINISTRY OF HOME =
गृहमंत्रालय; MINISTRY OF HEALTH = स्वास्थ्यमंत्रालय; MINISTRY OF RAILWAYS =
रेलमंत्रालय; MINISTRY OF EXTERNAL AFFAIRS = विदेशमंत्रालय; MINISTRY OF COMMERCE =
वाणिज्यमंत्रालय; PARLIAMENT = संसद; PASSPORT = पारपत्र; QUALIFICATION = अर्हता /
योग्यता; SECRETARY = सचिव; DEPUTY SECRETARY = उपसचिव; JOINT SECRETARY =
संयुक्तसचिव; GENERAL SECRETARY = महासचिव; SUPER TAX = अधिकर; TENDER =
निविदा; TYPIST = टंकक; UNDERTAKING = उपक्रम; VICE CHANCELLOR = कुलपति; WHIP
= सचेतक.

B) HINDI TO ENGLISH PHRASES:

तदनुसार = ACCORDINGLY; यथाप्रस्तावअनुमोदित = APPROVED AS PROPOSED;
यथासंभव = AS FAR AS POSSIBLE; केप्राधिकारसे = BY AUTHORITY OF; पदकेनाते = by
VIRTUE OF OFFICE; अनुमोदनार्थप्राारूप = DRAFT FOR APPROVAL; कार्यवाईशीघ्रकरे =
EXPEDITE ACTION; मुझेनिदेशहुआहै = I AM DIRECTED TO; सेपरामर्शकरके = IN
CONSULTATION OF; अमुमतिदीजाये = MAY BE PERMITTED; पक्ष-विपक्ष = PROS

ANDCONS; देखलिया , धन्यवाद = SEEN, THANKS; प्रमाणित किया जाता है = THIS IS TO CERTIFY; कीसीमा तक = TO THE EXTENT OF; केबारेमें = with REGARD TO; अवलोकनार्थ = FOR PERUSAL; सूचनार्थ = FOR INFORMATION; मार्गदर्शनकेलिए = FOR GUIDANCE; हस्ताक्षरकेलिए = FOR SIGNATURE; केआदेशसे = BY ORDER; लागुहोना = COME INTO FORCE; टिप्पणीकेलिए = FOR COMMENTS; आजहीजारीकरें = ISSUE TODAY; पालनकरना = ABIDE BY; इसमामले / विषयमें = IN THIS CASE / IN THIS INSTANCE.

Part-I Language	SEMESTER II	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	HINDI PAPER – II	U8FHD201	

Objectives: 1. Fiction and One – Act plays to the students for appreciation and critical analysis, to help them develop their creative thinking and writing. 2. Dialogue Writing enables students to develop the effective communicative skills. 3. To help students develop Practical translation skills.

UNIT – I ONE ACT PLAY: GADYA NIKASH

LESSONS PRESCRIBED :

1. RAMKUMAR VARMA - CHARUMITRA
2. UDAYSHANKAR BHATT - DAS HAZAR.
3. HARIKRISHNA PREMI - RAKSHA BANDHAN

UNIT – II SHORT- STORY: TEXT – GADYA NIKASH

LESSONS PRESCRIBED

1. PREMCHAND - MUKTIDHAN
2. JAYASHANKAR PRASAD - DEVRATH
3. SUBHADRAKUMARI CHOUHAN – RAAHI

UNIT – III TRANSLATION PRACTICE:

HINDI TO ENGLISH & VICE VERSA

LESSONS PRESCRIBED: ENGLISH TO HINDI – 16, 17, 18 & 19. HINDI TO ENGLISH – 8, 9, 10, 11 & 12 only.

UNIT – IV DIALOGUE WRITING:

PRESCRIBED COMMUNICATIONS:

1. PITA AUR PUTRA. 2. ADHYAPAK AUR VIDYARTHI
3. DOCTOR AUR ROGI 4. DUKANDAR AUR GRAHAK
5. DOYAATRI 6. DUKANDAR AUR VIDYARTHI 7. DO MITRA.

UNIT –V APPLIED GRAMMAR:

1. ANEKARTHI SHABD 2. VILOM SHABD 3. SANDHI
VICHCHED 4. YUGM SHABD 5. ABSTRACT NOUN

BOOKS FOR STUDY:

1. GADYA NIKASH, Ed. SHAIK ABDUL WAHAB, RAKA PRAKASHAN, ALLAHABAD, 2018
2. ANUVAD ABHYAS – I, D.B.HINDI PRACHAR SABHA, CHENNAI.

BOOKS FOR REFERENCE:

1. NAYEE HINDI RACHNA- PART – II D.B.HINDI PRACHAR SABHA, CHENNAI, 2001
2. SHAIKSHIK VYAKARAN AUR VYAVAHARIK HINDI, Dr.KRISHNA KUMAR GOSWAMI, AALEKH PRAKASHAN, DELHI – 32.
3. BOLCHAL KI HINDI, Dr.SUSHEELA GUPTA, LOKBHARATI PRAKASHAN, ALLAHABAD, 2006
4. HINDI VYAKARAN: SASTRI & APTE, D.B.H.P.SABHA, CHENNA, 1998.

Part-I Language	SEMESTER I	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	TAMIL PAPER – I	U8FTA101	

அலகு 1 :சங்க இலக்கியம்

குறுந்தொகை 5 பாடல்கள்
புறநானூறு 5 பாடல்கள்

அலகு 2 :நீதி இலக்கியம்

இனியவை நாற்பது 10 பாடல்கள்
ஆசாரக்கோவை 10 பாடல்கள்
நான்மணிக்கடிகை 10 பாடல்கள்

அலகு 3 :இலக்கிய வரலாறு

சங்க இலக்கியம்
நீதி இலக்கியம்

அலகு 4 :தன்னம்பிக்கைக் கட்டுரைகள்

1. எண்ணங்கள்- எம்.எஸ். உதயமூர்த்தி
2. கல்வியியல் கருத்து- எம்.ஆர்.எம். அப்துல் றஹீம்

அலகு 5 :மொழித்திறன்
அகரவரிசைப்படுத்தல்
எழுத்துப்பிழை நீக்கம்
வல்லினம் மிகுமிடம்
கலைச்சொல்லாக்கம்
நிறுத்தக்குறிகள்

பார்வை நூல்கள்

1. **குறுந்தொகை மூலமும் உரையும்**
(ப.ஆ) புலியூர்க்கேசிகன்
சாரதா பதிப்பகம்
ஜி-4, சாந்தி அடுக்ககம்
3 - ஸ்ரீ கிருணாபுரம் தெரு
ராயப்பேட்டை
சென்னை - 14
முதல் பதிப்பு, சூன் 2010
2. **புறநானூறு மூலமும் உரையும்**
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிமிடெட்
41 - பி சிட்கோ, இண்டஸ்ட்ரியல் எஸ்டேட்
அம்பத்தூர், சென்னை - 600 098
முதல் பதிப்பு, முதல் பதிப்பு, ஏப்ரல் - 2014
3. **இனியவை நாற்பது மூலமும் உரையும்**
ந.மு. வேங்கடசாமி நாட்டார் உரை
சாரதா பதிப்பகம்
ஜி-4, சாந்தி அடுக்ககம்
3 - ஸ்ரீ கிருணாபுரம் தெரு
ராயப்பேட்டை
சென்னை - 14
முதல் பதிப்பு, ஆகஸ்ட் 2005
4. **ஆசாரக்கோவை மூலமும் உரையும்**
ந.மு. வேங்கடசாமி நாட்டார் உரை
சாரதா பதிப்பகம்
ஜி-4, சாந்தி அடுக்ககம்
3 - ஸ்ரீ கிருணாபுரம் தெரு
ராயப்பேட்டை
சென்னை - 14
எட்டாம் பதிப்பு, ஆகஸ்ட் 2012
5. **நான்மணிகடிகை பாட்டும் உரையும்**
ப.அ. சிதம்பரநாதர்
இலக்கிய நிலையம்
19, சவுராட்டி நகர், 7 வது தெரு

சென்னை – 600 094

6. தமிழ் இலக்கிய வரலாறு

மு. அருணாசலம்

தி.பார்க்கர்

293, அகமது வணிக வளாகம்

இராயப்பேட்டை, சென்னை – 14

முதல் பதிப்பு சித்திரை 1971

7. எண்ணங்கள்

எம். எஸ். உதயமூர்த்தி

கங்கை புத்தக நிலையம்

13, தீனதயாளன் தெரு

தி.நகர் சென்னை - 17

8. கல்வியியல் கருத்து

எம்.ஆர்.எம். அப்துல் றஹீம்

யூனிவர்ஸல் பப்ளிஷர்ஸ்

பதினோறாம் பதிப்பு, செப்டம்பர், 2012

சென்னை -17

9. மொழித்திறன் (பொதுத்தமிழ்)

முனைவர் முகமது அலி ஜின்னா

அன்னம் நூல் அங்காடி

65.25 கந்தசாமி வாத்தியார் தெரு

தருமபுரி முதல் பதிப்பு 2014

Part-I Language	SEMESTER II	Credit	5
		Hrs./Week	6
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	TAMIL PAPER – II	U8FTA201	

அலகு 1 :பக்தி இலக்கியம்

சைவம் திருநாவுக்கரசர் தேவாரம்

திருத்தாண்டகம் (10 பாடல்கள்)

வைணவம் ஆண்டாள் (10 பாடல்கள்)

இசுலாம் சீறாப்புராணம் - ஒட்டகை பேசிய படலம்

கிறித்துவம் தேம்பாவணி - வளன் சனித்த படலம்

அலகு 2 :காப்பிய இலக்கியம்

சிலப்பதிகாரம் - காட்சிக் காதை

கம்பராமாயணம்- நகர் நீங்கு படலம்

அலகு 3 :இணையமும் தமிழும்

இணையம் - அறிமுகம்

இணையம் வழி தமிழ் கற்றலும், கற்பித்தலும்

அலகு 4 :பேச்சுக்கலை

பேச்சாளர் தகுதிகள், வகைகள், பேச்சுக்கலையின் பண்புகள்,
கற்றல் - கற்பித்தல் கலை

அலகு 5 :இலக்கிய வரலாறு

பக்தி இலக்கிய வரலாறு
காப்பிய இலக்கிய வரலாறு

பார்வை நூல்கள்

1. **திருப்பாவை -ஆண்டாள்**
(ப.ஆ) - எஸ். கௌமாரீஸ்வரி
சாரதா பதிப்பகம்
ஜி- 4, சாந்தி அடுக்ககம்
3 - ஸ்ரீ கிருணாபுரம் தெரு
ராயப்பேட்டைஇசென்னை - 14
முதல் பதிப்பு, பிப்பரவரி 2012
2. **சீறாப்புராணம் - உமறுப்புலவர்**
ஹாஜி எம். முகமது யூசுப்
கவியோகி நாச்சிக்குலத்தார்
உதயமாதத்தாண்டபுரம் அஞ்சல்
திருவாரூர் மாவட்டம் (மே 1999)
3. **கிறித்தவம் - தேம்பாவணி**
சாரதா பதிப்பகம்
ஜி-4, சாந்தி அடுக்ககம்
3 - ஸ்ரீ கிருணாபுரம் தெரு
ராயப்பேட்டை
சென்னை - 14 (2012)
4. **சிலப்பதிகாரம்**
(ப.ஆ) புலியூர்க்கேசிகன்
சாரதா பதிப்பகம்
ஜி-4, சாந்தி அடுக்ககம்
3 - ஸ்ரீ கிருணாபுரம் தெரு
ராயப்பேட்டை
சென்னை - 14
பதினாறாம் பதிப்பு, மார்ச் 1995
5. **கம்பராமாயணம்**
கிருபானந்தவாரியார்
திருப்புகழ் அமிர்தம் காரியாலயம்
107, சிங்கண்ண செட்டித் தெரு
சிந்தாதிரிப்பேட்டை, சென்னை -12
முதல் பதிப்பு நவம்பர் 1984

6. ஆஇணையமும் இனியத் தமிழும்
முனைவர் க. துரையாசன்
இசைப்பதிப்பகம் (சூன் 2009)
24, சபரி நகர்
டாக்டர் மூர்த்தி சாலை, கும்பகோணம் -1
7. தமிழும் இணையமும்
முனைவர் மு.இளங்கோவன்
வயல்வெளி பதிப்பகம் (ஆகஸ்ட் 2009)
இடைக்கட்டு, உள்கோட்டை அஞ்சல்
அரியலூர் மாவட்டம்.
8. நீங்கள் பேச்சாளர் ஆகலாம்
குமரி அனந்தன்
பூம்புகார் பதிப்பகம்
சென்னை.14
9. தமிழ் இலக்கிய வரலாறு
கா.கோ.வேங்கடராமன்
கலையக வெளியீடு
275:35 பாலாஜி நகர்
பரமத்தி வேலூர்
நாமக்கல் மாவட்டம்
நான்காம் பதிப்பு (சூன் 2006)

Part-II Language	SEMESTER I	Credit	4
		Hrs./Week	4
Elective Course	UG - FOUNDATION COURSE (All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	ENGLISH PAPER – I	U8FEN101	

OBJECTIVES:

The prime objective of this paper is to promote the linguistics competence into the minds of the young learners through teaching the basics of English and acquainting them with situational dialogues and expose the learners to the production and receptive skills.

Unit I Grammar

A. Parts of Speech

1. Noun
2. Pronoun
3. Adjective
4. Verb
5. Adverb
6. Preposition
7. Conjunction
8. Interjection

B. Articles

Unit II

Infinitives

Participles

Gerunds

Auxiliaries and Modals

Subject Verb Agreement

Tenses

Language Lab – 1 *hour per week.*

Unit III

Conversational Dialogues in Social Context

1. To introduce yourself
2. Making request
3. Seeking permission
4. Seeking clarification
5. Invitation

Unit IV

Conversational Dialogues at work place

1. In a shop
2. At the airport
3. Telephone banking
4. At a restaurant
5. Getting a driving license

Unit V

Writing

1. Short messages
2. Spotting errors
3. Note – making
4. Jumbled sentences
5. Comprehension

TEXT BOOKS:

1. Foundation English for Semester I – published by Islamiah College (Autonomous), Vaniyambadi, 2013.
2. Text for Environmental Studies, Erach Bharucha, University Grants Commission, New Delhi, 2004

Ability Enhancement Course (AEC I)	SEMESTER I	Credit	1
		Hrs./Week	2
	(All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	VALUE EDUCATION	U8VED101	

Unit I

1. Definition and relevance in present day
2. Good values to be followed by individuals
3. Values related to self, society, culture, organization, country development, goodness and self-esteem

Unit II Family

1. Family and family values – responsibility of the family
2. Neutralization of anger, adjustability and threats of family life
3. Status of women in family – society, caring for needy and elders, time allotment and sharing

Unit III Ethics

1. Definition –Types – Ethical Values
2. Professional Ethics – Mass Media Ethics – Advertisement Ethics
3. Leadership qualities – personality development

Unit IV Social Values

1. Definition –faith - service - secularism – social senses and commitment
2. Students and Politics – Social Awareness – Consumer Awareness
3. Rights and Responsibility – Rights to Food and Shelter, good education, medical care and attention, to earn in right and good manner

Unit V Global Issues

1. Definition – Effect of International Affairs on values of life – Issues of Globalization
2. Environmental Issues
3. Mutual respect for different culture, religion and their values

TEXT BOOK:

Value Education: M. Uma Maheswari & K.R. Lakshmi Narayanan, Nanilam Pathipagam, Chennai

Part-II Language	SEMESTER II	Credit	5
		Hrs./Week	6
Elective Course	(All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	ENGLISH PAPER II	U8FEN201	

Unit I Prose

1. Stephen Leacock : My Lost Dollar
2. Anita Desai : A Devoted Son
3. R.K. Narayan : Sweet for Angels

Unit II Poetry

1. Nissim Ezeikel : Night of the Scorpion
2. Robert Frost : The Road Not Taken
3. William Wordsworth: Daffodils

Unit III Grammar

1. Active and passive voice
2. Direct and indirect speech
3. Degrees of comparison

Unit IV Soft Skills

A. Time management

- i. Importance of time
- ii. Characteristics of management tasks
- iii. Determining time elements
- iv. Time management techniques

B. Entrepreneurship

- i. Entrepreneur and its role
- ii. Essentials steps to become an entrepreneur
- iii. EDP training

Unit V Writing

- i. Report writing
- ii. Cover letter
- iii. Curriculum vitae

TEXT BOOK:

1. Foundation English for Semester II – Published by Islamiah College (Autonomous), Vaniyambadi, 2013.

ABILITY ENHANCEMENT COURSE (AEC2)	SEMESTER II	Credit	1
		Hrs./Week	2
	(All UG I Year From 2018-19 onwards)	Exam Hrs.	3
COURSE TITLE	ENVIRONMENTAL STUDIES	U8ENV201	

OBJECTIVES:

- To develop the sense of awareness among the students about environment and its various problems.
- To develop proper skill required for the fulfillment of the aims of environmental education, educational evaluations and to solve environmental problems through social, political, cultural and educational processes.

Unit 1: Introduction to environmental studies and Ecosystems

(5 lectures)

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.
- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 2: Natural Resources: Renewable and Non-renewable Resources

(5 lectures)

- Land resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 3: Biodiversity and Conservation

(5 lectures)

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hotspots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit 4: Environmental Pollution

(5 lectures)

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.

Unit 5: Environmental Policies & Practices

(5 lectures)

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Unit 6: Human Communities and the Environment

(5 lectures)

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquake, cyclones and landslides.

- Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Unit 7: Field work

(5 lectures)

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

BOOKS FOR STUDY

1. Environmental Studies, Bishop Heber College, Tiruchirappalli, Tamil Nadu, India
2. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*.
3. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
4. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voice From the Tropics* John Wiley & Sons
5. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.

BOOKS FOR REFERENCE

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge
4. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dam *Science*, 339:36-37.
5. McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp. 29-64), Zed Books
6. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
7. Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
8. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
9. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*, Oxford and IBH Publishing Co. Pvt. Ltd.
10. Raven P.H., Hassenzehl, D.M. & Berg, L. R. 2012. *Environment*. 8th edition. John Wiley & Sons.
11. Rosencranz, A., Divan, S., & Noble, M.L. 2001. *Environmental and policy in India*. Tripathi 1992.

11. Warren, C.E. 1971. *Biology and Water Pollution Control*. WBSaunders.
12. Wilson, E.O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
13. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.

CC01(CORE)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	INDIAN LITERATURE IN ENGLISH	Exam Hrs.	3
		U8EN1001	

OBJECTIVES:

- To get the glimpse of later part of the 18th century which had witnessed the need for English education in India?
- To understand the works of social reformists who had stirred the mindset of populations on topics like women's emancipation and their voting rights.

UNIT-I: POETRY

1. Rabindranath Tagore: Selections from Gitanjali (Lyrics 35, 36 and 50)
2. Saleem Peeradina: The Evening Sun

UNIT-II: POETRY

1. A.K.Ramanujan : A River
2. Nissim Ezekiel: Virginal

UNIT-III: PROSE

Jawaharlal Nehru: Selections from the Discovery of India – Macmillan

G.K. Gokhale: The Elevation of the Depressed Classes

Nirad C Chaudhuri: The Eternal Silence of Infinite Crowds

UNIT-IV: DRAMA

M.R. Anand: Coolie

Girish Karnad: Hayavadana – Oxford University Press

UNIT-V: FICTION

R.K. Narayan: English Teacher

Raja Roa: Kanthapura

Text Prescribed

For Units 1 and 2

Vol.3 Blackie and Sons, 1992

For Unit 3

A.K.Raju.ed., The Lotus and Rose – An Anthology of Indian Writing In English.
Vol.4.Blackie and sons, 1992.

Girish Karnad. Hayavadana. Oxford : OUP.1997

Reference Books

1. K.R.Srinivasa Iyenger: Indian Writing in English, Sterling Publishers, New Delhi.
2. M.K.Naik – A History of Indian English Literature, Satitya Akademi, New Delhi.
3. H.M.Williams – Indo-Anglian Literature 1800-1970 : A Survey, Orient Longman,Chennai.

(CC02) CORE	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	FICTION	Exam Hrs.	3
		U8EN1002	

OBJECTIVES:

- To get a quick glance of the 19th century, which is the period of notable creation of literary works ranging from novel, short story and magazine.
- To evoke an emotional response among the students, social problems of the day caused by industrialization and the urbanization of the working classes.

UNIT-I

Jane Austen – Pride and Prejudice

UNIT-II

Joesph Conrad -Heart of Darkness

UNIT-III

George Orwell - Animal Farm

UNIT-IV

Thomas Hardy - The Mayor of Casterbridge

UNIT-V

Graham Greene - The Power and the Glory

CC03 (ALLIED I)	SEMESTER I	Credit	4
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		Hrs./Week	5
COURSE TITLE	ALLIED-LITERARY FORMS	Exam Hrs.	3
		U8ENAL11	

OBJECTIVES:

- To retain the core values of human society and to feel worthy of leading a humanistic life in the society
- To highlight the immemorial traditions which creates the basic structure of human life
- To understand the use of language structure and analyzing the context critically

UNIT-I

The Essay, The Short Story, Biography, Autobiography

UNIT-II

The Lyric, The Sonnet, The Elegy, The Epic

UNIT-III

The Miracle and Mystery Plays, Comedy, Tragedy, Tragic-Comedy

UNIT-IV

The Dramatic Monologue, Soliloquy and Aside, The Absurd Drama, The One Act Play.

UNIT-V

The Detective Novel, The Stream of Consciousness Novel, The Realistic Novel.

Reference Books

1. William Henry Hudson: An Introduction to the Study of Literature, Kalayani Publishers, Ludhiana
2. Birjadesh Prasad: A Background to the Study of English Literature (Revised Edition); Macmillan Company, Chennai.
3. R.J.Rees: English Literature – An Introduction for foreign Readers, Macmillan, London.
4. K.R.Srinivasa Iyengar and Prema Nandakumar: Introduction to the Study of English Literature; Asia Publishing House, Bombay.

EC03 (ALLIED I)	SEMESTER I	Credit	3
		Hrs./Week	4

COURSE TITLE	ALLIED -THE HISTORY OF ENGLISH LITERATURE – I (1350-1850)	Exam Hrs.	3
		U8ENAL12	

OBJECTIVES:

- To acquaint the students with the linguistic development of the language.
- To understand the past history of all sections of the society from gentry to humblecraftsmen
- To make the students to read out the selected passages aloud

PROSE

Unit-1

Thomas More, Bacon, Philip Sidney, Steele, Addison, Dr. Johnson, G. K. Chesterton, George Orwell, A. G. Gardiner.

POETRY

Unit-2

Chaucer, Spenser, Shakespeare, Donne, Dryden and Pope

Unit-3

Blake, Wordsworth, Shelley, Keats, Tennyson, Arnold, W.B. Yeats and T.S. Eliot

DRAMA

Unit-4

Mystery play, Shakespeare, Ben Jonson, Goldsmith, Sheridan, G.B. Shaw

FICTION

Unit-5

Defoe, Jane Austen, Walter Scott, Dickens, George Eliot, Thomas Hardy, E.M. Forster

Book for Reference;

An Outline History of English Literature - Hudson.

CC04(CORE)	SEMESTER II	Credit	4
		Hrs./Week	4

COURSE TITLE	ENGLISH PROSE	Exam Hrs.	3
		U8EN2001	

OBJECTIVES:

- To acquaint the students with the thoughts of free flowing speeches of different writers
- To enable the students to connect with the different forms of media; newspaper, novel, magazine and letters

Unit-1

Francis Bacon : Of Studies
Francis Bacon : Of Revenge
Francis Bacon : Of Love

Unit-2

Joseph Addison : Sir Roger and Will Wimble

Unit-3

Oliver Goldsmith : Man in Black
Charles Lamb : Poor Relations

Unit-4

Stephen Leacock : My Lost Dollar
George Orwell : Sporting Spirit

Unit-5

Robert Lynd : Pocket Money
C.E.M.Joad : A Dialogue on Civilization

Content as in:

A collection of prose- (Compiled by) Department of English,
Islamiah College, Vaniyambadi

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CC05 (CORE)	SEMESTER II	Credit	3
		Hrs./Week	4

COURSE TITLE	ENGLISH DRAMA	Exam Hrs.	3
		U8EN2002	

OBJECTIVES:

- To understand the past history of all sections of the society from gentry to humble craftsmen
- To acquaint students with the changing times of linguistic development of the language.

Detailed

Unit-1

Christopher Marlowe : Doctor Faustus

Unit-2

Bernard Shaw : Pygmalion

Non-Detailed

Unit-3

Oliver Goldsmith : She Stoops to Conquer

Unit-4

John Osborne : Look Back in Anger

Unit-5

Samuel Beckett : Waiting for Godot

CC06 (ALLIED I)	SEMESTER II	Credit	4
		Hrs./Week	4

COURSE TITLE	ALLIED – THE SOCIAL HISTORY OF ENGLAND	Exam Hrs.	3
		U8ENAL21	

OBJECTIVES:

- To explore the transforming influence of pre-history to the early modern England
- To help students to think critically the impact upon the English society and its literature.

UNIT-I (16th C)

The Reformation in England
Dissolution of the Monasteries

UNIT-II (17th C)

English Colonial Expansion
Coffee- House Life

UNIT-III (18th C)

Causes and Effects of Industrial Revolution
Agrarian Revolution

UNIT-IV (19th C)

Anti-Slavery Movement
The Influence of Science on Victorian England

UNIT-V (20th C)

Means of Communication
Education in the 20th Century

EC06 (ALLIED I)	SEMESTER II	Credit	3
		Hrs./Week	4

COURSE TITLE	ALLIED – THE HISTORY OF ENGLISH LITERATURE-II (1851-1950)	Exam Hrs.	3
		U8ENAL22	

OBJECTIVES:

- To acquaint the students with the linguistic development of the language.
- To understand the past history of all sections of the society from gentry to humble craftsmen.
- To make the students to read out the selected passages aloud.

UNIT-I (PROSE)

G.K. Chesterton
George Orwell
Thomas Carlyle

UNIT-II (POETRY)

Matthew Arnold
Alfred Lord Tennyson
Robert Browning

UNIT-III (POETRY)

W.B. Yeats
W.H. Auden
Dylan Thomas

UNIT-IV (DRAMA)

T.S. Eliot
Samuel Beckett
Bernard Shaw

UNIT-V (NOVEL)

Charles Dickens
Thomas Hardy
Rudyard Kipling

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6

COURSE TITLE	CHAUCER AND ELIZABETHAN AGE	Exam Hrs.	3
		P8EN1001	

OBJECTIVES:

The learners will have the inspiration from the visual arts, literature, theatre and music from the golden period of English.

UNIT I (POETRY)

Geoffery Chaucer	Prologue to the Canterbury Tales (The Knight, The Wife of Bath & The Monk)
Edmund Spenser	Epithalamion, Prothalamion

UNIT II (POETRY)

John Donne	The Canonization
Death, Be Not Proud	
William Shakespeare	Let me not to the marriage of true minds (Sonnet: 116)

UNIT III (PROSE)

Francis Bacon	Of Truth, Of Marriage and Single life
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UNIT IV (DRAMA)

Webster	The Duchess of Malfi
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UNIT V (DRAMA)

Ben Jonson	Every Man in His Humour, The Alchemist
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URLs:

1. <http://www.cliffsnotes.com/literature/c/the-canterbury-tales/summary-and-analysis/the-prologue>
2. <http://www.gradesaver.com/spensers-amoretti/study-guide/summary>
3. <http://www.shmoop.com/the-duchess-of-malfi/suffering-theme.html>
4. <http://www.enotes.com/topics/every-man-his-humour>

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6

COURSE TITLE	THE NEO CLASSICAL AGE	Exam Hrs.	3
		P8EN1002	

OBJECTIVES:

- The learners will have the inspiration from the visual arts, literature, theatre and music from the decorative Western movements.
- To draw the inspiration from the Classical work of Greece or Rome.
- To give the learners the picture of 18th century as the Age of Enlightenment.

UNIT I (POETRY)

John Milton (1608-1674) : Paradise Lost Book IX

UNIT II (POETRY)

Andrew Marvell (1621-1678) : To His Coy Mistress

John Dryden (1631-1695) : Mac Flecknoe

Alexander Pope (1688-1744) : Epistle To Dr. Arbuthnot

UNIT III (PROSE)

Dr. Johnson : Life of Milton

UNIT IV (DRAMA)

Sheridan : The Rivals

William Congreve : The Way of the World

UNIT V (NOVEL)

John Bunyan : The Pilgrim's Progress

Jonathan Swift (1667-1745) : Gulliver's Travels

URLs:

1. <http://www.shmoop.com/to-his-coy-mistress/summary.html>

2. <http://spenserians.cath.vt.edu/TextRecord.php?textsid=34942>

3. <http://www.cliffsnotes.com/literature/w/the-way-of-the-world/play-summary>

4. <http://www.sparknotes.com/lit/crusoe/summary.html>

CORE PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6

COURSE TITLE	THE ROMANTIC AND THE VICTORIAN AGES	Exam Hrs.	3
		P8EN1003	

OBJECTIVES:

To portrait the ideals of the 19th century through the emotional, personal, natural and artistic themes of memorable works form scintillating poets.

UNIT I (POETRY)

William Wordsworth	:Tintern Abbey
Samuel Taylor Coleridge	:Christabel
John Keats	:Eve of St. Agnes
Tennyson	:Lucretius

UNIT II (POETRY)

P.B. Shelley	:A Dialogue
Robert Browning	:My Last Duchess
William Blake	:The Lamb/Tiger/London
Mathew Arnold	:The Scholar Gipsy

UNIT III (PROSE)

Charles Lamb	:Old China
William Hazlitt	:On going a Journey
Mathew Arnold	:The Study of Poetry

UNIT IV (DRAMA)

Oscar Wilde	:The Importance of Being Ernest
Oscar Wilde	:Lady Windermere's Fan
Henrik Ibsen	:A Doll's House

UNIT V (NOVEL)

Charles Dickens	:Hard Times
Thomas Hardy	:Far from the Madding Crowd

URLs:

1. <http://www.poetryfoundation.org/poem/173744>.
2. <http://www.shmoop.com/my-last-duchess/themes.html>
3. <http://www.poetryfoundation.org/learning/essay/237816>
4. <http://www.shmoop.com/great-expectations/summary.html>
5. <http://www.sparknotes.com/lit/maddingcrowd/summary.html>

CORE PAPER IV	SEMESTER I	Credit	4
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		Hrs./Week	6
COURSE TITLE	TWENTIETH CENTURY LITERATURE	Exam Hrs.	3
		P8EN1004	

OBJECTIVES:

- To make learners how the influence of science and technology rooted in the minds of 20th writers
- To make students aware of the growth and liberation of human spirit of the time.

UNIT I (POETRY)

T.S. Eliot :The Waste Land

UNIT II (POETRY)

W.B. Yeats :Prayer for my Daughter
G.M. Hopkins :Wreck of Deutschland
W.H. Auden :The Shield of Achilles
Wilfred Owen :In sensibility

UNIT III (PROSE)

D.H. Lawrence :Why the Novel Matters
T.S. Eliot :Tradition and Individual Talent

UNIT IV (DRAMA)

T.S. Eliot :Murder in the Cathedral
Harold Pinter :Caretaker

UNIT V (NOVEL)

Virginia Woolf :Mrs. Dalloway
D.H. Lawrence :Sons & Lovers

URLS:

1. <http://www.poetryfoundation.org/poem/176735>
2. <http://www.potw.org/archive/potw351.html>
3. https://en.wikipedia.org/wiki/The_Shield_of_Achilles
4. https://en.wikipedia.org/wiki/Tradition_and_the_Individual_Talent
5. <http://study.com/academy/lesson/ts-eliot-murder-in-the-cathedral-summary-lesson-quiz.html>

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper-I)	Credit	4
		Hrs./Week	6

COURSE TITLE	CREATIVE WRITING	Exam Hrs.	3
		P8ENEP11	

OBJECTIVES:

- To teach how to draft, revise and edit the passage.
- To compile the journals and magazines
- To compose the professional letter.

UNIT I Creative Writing

Imagination and Writing – Measuring creative writing –
The Importance of Reading

UNIT II The Art of Writing

Tropes and figures – Style and Register – Playing with words

UNIT III Writing Fiction and Short Stories

Fiction and Non fiction – Literary and popular fiction – Character, Plot, Point of View and
Setting in Short Story

UNIT IV Writing Drama

Concepts and Characteristics of Drama – Plot, Structure and Characterization

UNIT V Technical Writing

End user documentation, traditional writing and technological marketing communication

Books for Reference :

Elements of Literature. (Eds.) Scholes et al. (Oxford)
Creative writing. Anjana Neira Dev, Anuradha Marwah, Swathi Pal. Pearson
Longman Publication.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper-II)	Credit	4
		Hrs./Week	6
COURSE TITLE	ENGLISH FOR COMMUNICATION	Exam Hrs.	3

OBJECTIVES:

- To teach how pre-read and scan the academic materials to get its meaning.
- To teach the writer's purpose of setting the tone in the context.
- To enable him to synthesize the ideas from what they have comprehended.

UNIT-I

1. The importance of communication
2. Interpersonal communication

UNIT – II

1. Body language

UNIT - III

1. Dealing with people
2. Helping people to like you

UNIT -IV

1. Meeting
2. Preparation
3. Content

UNIT - V

1. The Role of Visual Aids
2. Appearance and Attitude
3. Developing Good Habits
4. Giving up Bad Habits
5. Overcoming nervousness and Tension
6. Stage Presentation
7. Audience Oriented Speech

Books for Reference :

DR. K.M.PRABU- “SKILLS FOR COMMUNICATION AND PRESENTATION”

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	ENGLISH LANGUAGE AND	Exam Hrs.	3

	LINGUISTICS	P8EN2001
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OBJECTIVES:

- To set an aim to reflect the history of English Language through different periods, an individual's personality through the language development
- To enable learners to have deeper understanding in studying the language.
- To teach the 44 sounds of 26 English letters.
- To reflect the current status of English in India.

UNIT I

English Language

1. The History of English Language
2. The Growth of English Vocabulary
3. Standard English
4. English in India

UNIT II

1. What is studying a language?
2. What Linguistics is
3. Scientific Study of a Language
4. Linguistics in a historical context
5. Phonetics and Phonology
6. Organs of Speech
7. Morphological Structure of Words
8. Syntax – Constituent, Argument and Thematic Structures
9. Semantics and Pragmatics

UNIT III

1. Description and classification of consonants and vowels – allophonic variants
2. Syllable and its structure
3. Intonation, Rhythm and Stress

UNIT IV

Socio-linguistics

1. What is sociolinguistics?
2. Functions of a language
3. Linguistics versus communicative competence
4. Language and Mind
5. Applied Linguistics

UNIT V

Approaches to Grammar

1. Structural grammar
2. Transformative Generative Grammar
3. Communicative Grammar

Books for Reference :

1. F.T.Wood -“*An Outline History of English Language*”

2. Frank Palmer -“Grammar”
3. A C Gimson -“An Introduction to the Pronunciation of English”
4. Daniel Jones -“English Pronouncing Dictionary”.
5. George Yule -“The Study of Language”
6. Crystal David -“Linguistics”
7. A C Bough -“A History of English Language”
8. Andrew Radford, Martin Atkinson and David Britain – “Linguistics: An Introduction”, Cambridge University Press
9. Niladri Sekhar Dash – “Applied Linguistics”, Heritage Publication
10. RA Hudson -“Sociolinguistics”, Cambridge University Press
11. Monica Marquez – “Methods in Cognitive Linguistics”, John Benjamins Publishing Company, 2006

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	INDIAN LITERATURE IN ENGLISH	Exam Hrs.	3
		P8EN2002	

OBJECTIVES:

- To enhance the learners with early contribution of Indian English Writers.
- To introduce the learners the varied range of Indian English writers from R.K.Narayan, Mulk Raj Anand, Raja Rao to Salman Rushdie.

UNIT I (POETRY)

Nissim Ezekiel : Goodbye Party For Miss Pushpa T.S
Arun Kolatkar : Jejuri
Dom Moraes : Sindbad

UNIT II (POETRY)

Rabindranath Tagore : Gitanjali
Nissim Ezekiel : Poet, Lover, Birdwatcher

UNIT III (PROSE)

B.R. Ambedkar : Annihilation of Caste
Sri Aurobindo : The Renaissance in India

UNIT IV (DRAMA)

Girish Karnad : Nagamandala
Manjula Padmanabhan : Harvest

UNIT V (NOVEL)

Sashi Deshpande : The Dark Holds No Terrors
Kamala Markandaya : A Handful Of Rice

URLs:

1. <http://education.seattlepi.com/main-theme-poem-goodbye-party-miss-pushpa-ts-6614.html>
2. <http://www.sacred-texts.com/hin/tagore/gitnjali.htm>
3. <http://oscareducation.blogspot.in/2013/10/nagamandala-summary.html>
4. <http://ijellh.com/dark-holds-terrors-woman-searching-for-her-identity/>

CORE PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	SHAKESPEARE	Exam Hrs.	3
		P8EN2003	

OBJECTIVES: *To introduce learners to 15th Century's social and economy through the works of Shakespeare*

UNIT I

The Elizabethan Theatre and Audience
Trends in Shakespeare Studies

UNIT II

Macbeth
King Lear

UNIT III

As you like it
A Midsummer Night's Dream

UNIT IV

Romeo and Juliet
Antony and Cleopatra

UNIT V

Henry IV
Julius Caesar

URLs:

1. <http://www.theatrehistory.com/british/bellinger001.html>
2. https://en.wikipedia.org/wiki/Shakespeare%27s_reputation
3. <http://www.shakespeare-online.com/plays/kinglear/kinglearps.html>
4. <http://www.cliffsnotes.com/literature/a/as-you-like-it/play-summary>

CORE PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	AMERICAN LITERATURE	Exam Hrs.	3

		P8EN2004
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OBJECTIVES:

- To introduce students to the major works of American authors and their intellectual philosophies
- To portrait different periods and movements through American Literature

UNIT I (POETRY)

Walt Whitman	: 'A Child Said, What Is The Grass'?
Emily Dickinson	: Success is Counted Sweetest,
	: The last night that she lived
Robert Frost	: Home Burial

UNIT II (POETRY)

E.E.Cummings	: Any one lived in a pretty how town.
Langston Hughes	: I too Sing America
Sylvia Plath	: Daddy

UNIT III (PROSE)

Ralph Waldo Emerson	: Self-Reliance
Martin King Jr.	: I have a Dream

UNIT IV (DRAMA)

Nathaniel Hawthorne	: The Scarlet Letter
Arthur Miller	: The Death of a Salesman

UNIT V (NOVEL)

Toni Morrison	: The Bluest Eye
Tennessee Williams	: The Glass Menagerie

URLs:

1. <http://www.gradesaver.com/walt-whitman-poems/study-guide/summary-a-child-said-what-is-the-grass>
2. <http://www.enotes.com/topics/american-scholar>
3. <http://www.biography.com/people/ralph-waldo-emerson-9287153>
4. <http://www.sparknotes.com/lit/menagerie/>

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper-I)	Credit	4
		Hrs./Week	6
COURSE TITLE	NEW LITERATURE IN ENGLISH	Exam Hrs.	3
		P8ENEP21	

OBJECTIVES:

- To introduce students to modern literature
- To provide exposure to millennial thinking

UNIT I (POETRY)

Vikram Seth	:Equals
Wole Soyinka	:Telephone Conversation
A.D. Hope	: Australia
Judith Wright	:Fire at the Murdering Hut

UNIT II (POETRY)

Derek Walcott	:Ruins of a Great House
Margaret Atwood	:Journey to the Interior
Faiz Ahmed Faiz	: Nowhere, no Trace Can I Discover

UNIT III (PROSE)

Chinua Achebe	:Marriage is a Private Affair
Ananda Coomarasamy	: The Dance of Siva

UNIT IV (DRAMA)

Wole Soyinka	: The Lion and the Jewel
Dario Fo	: Accidental Death of an Anarchist

UNIT V (NOVEL)

Margaret Laurence	:Stone Angel
James Ngugi	: A Grain of Wheat

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper-II)	Credit	4
		Hrs./Week	6
COURSE TITLE	BUSINESS WRITING IN ENGLISH	Exam Hrs.	3
		P8ENEP22	

OBJECTIVES:

- To provide exposure to business writing skills
- To introduce them to etiquettes of business communication

UNIT I

1. Getting Help
2. Layout Guide-E-Mails and Letters
3. Dictionary Skills

UNIT II

1. Steps in Writing
2. Choice of Words
3. Checking Spelling and Grammar

UNIT III

1. Writing a Plan
2. Referring and Giving News
3. Saying What You Can/Can't do and Giving Reasons

Writing Process

UNIT IV

1. Steps to Prepare An Appropriate Reply
2. Understanding the Source
3. Preparing Hints
4. Drafting

UNIT V

1. Mechanics of Writing
2. Framing a reply
3. Final Steps
4. Checking Reply
5. Polishing and Improving

Books for Reference:

Dr. K.M. Prabu-“Advanced Business Writing”

CC01 (CORE)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	HISTORY OF INDIA UP TO 712 A.D.	Exam Hrs.	3
		U8HI1001	

Objectives:

- (i) To trace the history of the development of human civilization in ancient India,*
- (ii) To study the Indus Valley sites and the society under the Vedic and later Vedic period*
- (iii) To analyse the teachings of Jainism and Buddhism*
- (iv) To study the different dynasties of Ancient India*

Unit - I: Pre-history and Indus-Valley Civilization: Geographical features of India – Influence on Indian History – Sources: Literary, Archaeology and Foreign Accounts - Pre-history: Meaning - Different stages in Pre-historic Ages - Indus-Valley Civilization: Important sites - Harappa, Mohenjodaro, Kalibangan, Lothal and Dholavira – Features - Town Planning - Economy – Religion - Causes for its extinction

Unit - II: Vedic Age: Early Vedic Age: Theories of origin - Vedic Civilization - Later Vedic Age: Varnashrama Dharma – Later Vedic Civilization – Ashrama System

Unit - III: Jainism and Buddhism: Rise of Jainism and Buddhism - Teachings of Mahavira and Gautama Buddha – Councils - Schism in Buddhism

Unit - IV: Mauryan Empire: Mahajanapadas – Nandas - Alexander's invasion - Geographical boundary – Chronology - Megasthenes Accounts - Chandra Gupta Maurya – Bindusara - Asoka – Administration - Art and Architecture – Causes for its decline – Sungas – Kanavas - Andhras – Sakas - Kushanas

Unit - V: Gupta Dynasty: Geographical boundary - Chandra Gupta I – Samudra Gupta – Chandra Gupta II - Fahien Accounts – Conquests – Administration – Art and Architecture Golden Age - Successors of Chandra Gupta II - Downfall of Guptas

Books for Study:

- 1) R.C. Majumdar, H.C. Raychaudri & K. Dutta: *An Advanced History of India*
- 2) J.C. Agrawal: *Ancient Indian History*
- 3) V.D. Mahajan: *Ancient India*

Books for Reference:

- 1) Romila Thapar: *Ancient India*
- 2) D.N.Jha: *Ancient India*
- 3) A.L.Basham: *The Wonder That was India*

CC02 (CORE)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	HISTORY OF TAMIL NADU UP TO 1336 A.D.	Exam Hrs.	3
		U8HI1002	

OBJECTIVES:

- i) To acquaint with the geographical features of Tamil Nadu.*
- ii) To familiarize the various sources for the study of Tamil age*
- iii) To make the students to understand, the socio-economic Conditions of ancient TamilNadu during different period namely Sangam Age, Kalabhras, Pallavas, Pandiyas Imperial Cholas*
- iv) To create awareness about our regional past glorious*

Unit - I: Geographical features and Pre-historic Period: Geographical features of Ancient Tamil Nadu – Sources – Races and Tribes – Pre-history of Tamils – Aryanization

Unit – II: Sangam Age: Literature – Polity – Chieftains – Society – Economy – Religion – Education and Fine Arts

Unit – III: Kalabhras and Age of the Pallavas: KalabhraIdentity - Rule – Anti-Brahminical attitude – Pallavas – Origin – Early Pallavas - Mahendravarman I - Narasimhavarman I - His Successors - Nandivarman II – Administration – Literature – Development of Art and Architecture – Bakthi Movement – Decline of Pallavas

Unit – IV: Pandiyan Empire: First Pandiyan rulers - Second Pandiyan Rulers - Marco Polo and Abdullah Wassaf - Literature – Administration – Art and Architecture

Unit – V: Age of the Imperial Cholas: Rise of Imperial Cholas – Parantaka I - Raja Raja I – Rajendra I - Chaluya Cholas – Kulotunga I - Successors – Literature – Administration - Art and Architecture – Decline of the Cholas

Books for Study:

- 1) Manojanjithamani C, *History of Tamil Nadu*, Dave Bery Publications, Tirunelveli, 2012.
- 2) Devanesan, *History of Tamil Nadu*, Marthandam, Benu Publication, 2004
- 3) Rajayyan, K., *History of Tamil Nadu, Madurai, 1982.*
- 4) Pillay K.K, *Historical Heritage of the Tamils*, MJP Publishers, Chennai, 1979.

Books for Reference:

- 1) K.A. Nilakantasastri, The Cholas
- 2) Subramanian. N, *Original Sources for the History of Tamil Nadu*, Ennes Publication, Udumalaipettai, 1994.
- 3) S. R. Krishnamurthy, *A Study of the Cultural Development in the Chola period*, Annamalai University, Annamalai Nagar, 1966.

CC03 (ALLIED I)	SEMESTER I	Credit	4
		Hrs./Week	5
COURSE TITLE	ALLIED- INTRODUCTION TO TOURISM	Exam Hrs.	3
		U8HIAL11	

Objectives:

- i) *To impart the knowledge on basic concepts about Tourism*
- ii) *To create awareness about Tourism enabled Services and Industries*
- iii) *To analyse the role of Various Organisations in the promotion of Tourism*
- iv) *To assess the role of Government in Promoting Tourism*

Unit - I: Introduction: Definition, Nature, Scope and Importance of Tourism – Negative impact of Tourism – Basic Components of Tourism – Motivation for Tourism – Factors Affecting Tourism – Tourism and Economy

Unit - II: Types of Tourism: Kinds of Tourism: Domestic – International – Space – Forms of Tourism: Historical Tourism – Social Tourism - Cultural Tourism – Educational Tourism – Religious and Spiritual Tourism – Medical and Health Tourism – Adventure Tourism – Dark Tourism – Rural Tourism - Eco-Tourism

Unit - III: Tourism Amenities: Transport: Rail – Road –National Highways – Water – Air – Accommodation: International Hotels – Resort Hotels – Commercial Hotels – Residential Hotels – Heritage Hotels – Flotels – Rotels – Airtels – Space Hotels – Supplementary Accommodation: Motels – Youth Hostels – Caravan and Camping sites – Pensions – Apartment Hotels – Tourist Villages – Tourist Huts – Robot Hotels – Accommodation in India: Chaultries – Sarais and Musafirkanas

Unit - IV: Tourism Organisations: World Tourism Organisation (WTO) – National Tourist Organisation (NTO) – International Air Transport Association

(IATA) – International Civil Aviation Organisation (ICAO) – Pacific Area Travel Association (PATA) –Travel Agents Association of India (TAAI)

Unit - V: Role of Government in Promoting Tourism in India: Sargent Committee – Ministry of Tourism – India Tourism Development Corporation (ITDC) – Tamil Nadu Tourism Development Corporation (TTDC) - National Tourism Action Plan 1992

Books for Study:

- 1) Charles R. Goeldner, Bernard Cohen: *Tourism Principles, Practices, Philosophies*, Wiley Students Edition, Wiley India, New Delhi, 1984
- 2) Dr. C. Selvaraj, *Principles of Tourism*, CSR Publication, Kanyakumari District
- 3) Dr. R. Santha Kumari, *Tourism*, Santha Publishers, Chennai,

Books for Reference:

- 1) Bhatia, A.K: *Tourism Development: Principals and Practices*, Sterling Publishers Pvt,Ltd, New Delhi, 1989
- 2) Burkart A.J. and Madlik: *Tourism, Past, Present and Future*, Heinemann, London,1994
- 3) Ashu Pasricha: *International Tourism*, Concept Publications, New Delhi, 2009

EC03 (ALLIED I)	SEMESTER I	Credit	4
		Hrs./Week	5
COURSE TITLE	ALLIED- INTELLECTUAL HISTORY OF THE 20 th CENTURY INDIA	Exam Hrs.	3
		U8HIAL12	

Objectives:

- i) *To study about the ideas of Nationalist Leaders*

ii) *To study about the contribution of Muslim thinkers*

iii) *To trace the ideology of Communist thinkers*

iv) *To study about the great intellectuals of India*

Unit - I: Nationalist Thinkers: Dadabhai Naoroji – Gopala Krishna Gokhale – Bala Gangadhar Tilak – Aurobindo Gosh – Mahatma Gandhi

Unit - II: Nationalist Thinkers: Subash Chandra Bose – Sardar Vallabai Patel - B. R. Ambedkar - Jawaharlal Nehru

Unit - III: Muslim Thinkers: Maulana Abul Kalam Azad - Mohammed Ali Jinnah - Ali Brothers - Hakim Ajmal Khan - Moulana Mahamudul Hassan

Unit - IV: Communist Thinkers: M. N. Roy – P. C. Joshi – S. A. Dange - E. M. S. Namboodiripad

Unit - V: Socialist Thinkers: Vinoba Bhave - Ram Manohar Lohia - Jayaprakash Narayan

Books for Study:

- 1) Naravane, V.S.: *Modern Indian Thought*, Orient Longman, New Delhi.
- 2) Grover, B.L. & Grover, S: *A New Look at Modern Indian History (from 1707 to the Modern times)*
- 3) Sen, S.P.(ED.), *Social and Religious Reform Movements in the 19th and 20th Centuries*, Calcutta Institute of Historical Studies, 1979.

Books for Reference:

- 1) Nanda, B.R: *Jawaharlal Nehru, Rebel and statesman*, Oxford University press, Delhi 1995.
- 2) Gopalakrishnan, M.D.: Periyar, *Father of Tamil Race*, Emerald Publishers, Chennai.
- 3) Bharathi: *Mahatma Gandhi, Man of the Millinieum*, S.Chand&Co, New Delhi, 2000.

CC04 (CORE)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	HISTORY OF INDIA FROM 712 A.D. TO 1526 A.D.	Exam Hrs.	3
		U8HI2001	

Objectives:

(i) *To enlighten on early medieval Indian History.*

- (ii) To ascertain the legacy of medieval Indian rulers to Modern India*
- (iii) To study the cultural synthesis of Indo-Islamic civilizations*
- (iv) To know the contribution of early medieval rulers to Indian Culture and Heritage*

Unit - I: Early Medieval India: Sources - Harshavardana: Achievements of Harsha - Hieun-Tsang's Accounts - Rajputs: Principal Rajput Kingdoms - Kingdoms of South: Chalukyas Rashtrakutas – Kakatias - Yadavas and Hoysalas - Arab invasion of Sind: Muhammed-bin-Qasim – Turko-Afghan invasions: Mahmud Gazni - Muhammad Ghori

Unit - II: Delhi Sultanate - (Slave and Khilji Dynasties): Slave Dynasty: Kutbud-din Aibak – Iltutmish - Raziya Sultana - Balban – Administration – Art and Architecture - Khilji Dynasty: Jaladuddin Khilji - Alauddin Khilji - His Southern Expedition – Reforms – Administration - Malik Kafur – Art and Architecture

Unit - III: Delhi Sultanate - (Tughlaq, Sayyid and Lodhi Dynasties): Tughlaq Dynasty: Ghiasuddin Tughlaq - Muhammad bin Tughlaq - His Administration – Firoz Tughlaq - Art and Architecture - Timur's invasion - Sayyid Dynasty: Khizar Khan - Muhammad Shah - Alauddin Shah - Art and Architecture - Lodhi Dynasty: Bahlol Lodhi - Sikandar Lodhi - Ibrahim Lodhi - Art and Architecture - Downfall

Unit - IV: Vijayanagar Empire: Geographical Boundary - Sangama, Saluva, Tuluva and Aravidu Dynasties – Administration – Art and Architecture - Fall of Vijayanagar Empire

Unit – V: Bahmani Kingdom: Geographical Boundary - Bahmani Sultans - Administration – Art and Architecture - Disintegration of Bahmani Kingdom and emergence of independent states

Books for Study:

- 1) Majumdar, H.C., Raychaudri & K. Dutta: *An Advanced History of India*
- 2) Mahajan, V.D., *History of Medieval India*
- 3) Sharma, L.P., *History of Medieval India*

Books for Reference:

- 1) Sathish Chandra: *History of Medieval India*
- 2) Charusia, *Medieval History of India*

3) Mehta, J. L., *History of Medieval India*

CC05 (CORE)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	HISTORY OF TAMILNADU FROM 1336 A.D. TO 1806 A.D.	Exam Hrs.	3
		U8HI2002	

Objectives:

i) To enable students to gain knowledge about the establishment and impact of Vijayanagar rule in Tamil Nadu

ii) To trace the emergence and impact of Madurai Muslim Sultanate

iii) To inform the students about the significance of Nayak and Poligar rulers

iv) To discuss the effect of the Coming of Europeans and early Native resistance

Unit - I: Vijayanagar Empire: Establishment – Expeditions of Kumara Kampana – Administration – Nayankara System – Provincial and Local Administration – Education and Literature - Decline

Unit - II: Madurai Sultanate: Mabaari Sultanate – Jallaluddin Hassan Shah – Influence of Islam on Tamil Society and Culture – Administration – Art and Architecture - Decline

Unit - III: Nayaks: Nayaks of Gingee, Tanjore, Madurai – Administration – Socio-Economic Conditions – Literature, Art and Architecture

Unit - IV: Nawabs of Arcot: The Mughal Invasion – Zulifiquar Ali Khan – Sadatullah Khan – Anwaruddin Khan – Mohammed Ali Walajah - Poligar System – The Marathas of Gingee and Tanjore – Society – Literature – Art and Architecture

Unit - V: Advent of Europeans: European Settlements in Tamil Nadu – British East India Company – Carnatic Wars – Rebellion of Yusuf Khan - Mysore Wars – Virapandiya Kattta Bomman – Marudhu Brothers – Poligar Rebellion – South Indian Confederacy and the Rebellion – Vellore Mutiny of 1806

Books for Study:

1) Rajayyan, K., *History of Tamil Nadu*, Madurai, 2005.

2) Devanesan, A., *History of Tamil Nadu*, Marthandam, 2004.

3) Subramanian, N, *Social and Cultural History of Tamilnadu (1336 – 1984)*, Ennes Publications, Udumalpet, 2007

Books for Reference:

- 1) Mahalingam, T. V., *Administration and Social Life under Vijayanagar*, University of Madras, Madras, 1951.
- 2) Rajayyan, K, *History of Madurai*, Madurai University, Madurai, 1974.
- 3) Subramanian, N, *History of Tamil Nadu*, Koodal Publications, Madurai, 1976.

CC06 (ALLIED I)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	ALLIED- TOURISM RESOURCES OF INDIA	Exam Hrs.	3
		U8HIAL21	

Objectives:

- i) To focus the availability of various types of tourist potentials in India*

ii) Create awareness about the copious natural and man-made tourist attractions in India

iii) To educate the students to identify the tourist spots according to the taste of tourists

iv) To create interests through focusing the glory of our mixed culture and make them to promote tourist products in and around India

Unit - I: Historical, Religious and Spiritual Tourism Resources: Historical Tourism Resources: Qutub Minar – Fatehpur Sikri – Red Fort – Jamia Masjid, Delhi – India Gate – Jantar Mantar – Teen Murti Bhavan – Taj Mahal – Hawa Mahal – Religious Tourism Resources: Char Dham Yatra, Vaishnavadevi Temple – Bodhgaya – Mount Abu – Golden Temple – Spiritual Tourist Resources: Ajmer Shareef – Hazrath Nizamuddin Dargah – Gulbarga Dargah

Unit - II: National Parks and Wildlife Sanctuaries: Jim Corbett National Park – Kanha National Park – Sanjay Gandhi National Park – Kaziranga National Park – Gir Wildlife Sanctuary – Mudumalai Wildlife Sanctuary

Unit - III: Bird Sanctuaries and Waterfalls: Salim Ali Bird Sanctuary – Porbandar Bird Sanctuary – Nawab Ganj Bird Sanctuary – Nalsarovar Bird Sanctuary – Vedanthangal Bird Sanctuary – Waterfalls: Kunchikal Waterfalls – Jog Falls – Meenmutti Waterfalls – Hogenekkal Waterfalls – Kuttralam Waterfalls

Unit - IV: Hill Stations and Beaches: Hill Stations: Shimla – Darjeeling – Nainital – Srinagar – Mussoorie – Ooty – Beaches: Goa Beaches – Havelock Beach – Paradise Beach – Marina Beach – Kovalam Beach

Unit - V: Fairs and Festivals: Id-ul-Fitr – Id-ul-Azha – Dussehra – Christmas – Kumbh Mela – Pushkar – Baisakhi – Pongal – Holi – Durga Puja – Diwali – Sankranti

Books for Study:

- 1) Michael George ; *Monuments of India, Vol, 1 and 2*, London, 1988
- 2) Percy Brown: *Indian Architecture: Buddhist and Hindu*, Bombay, 1972.
- 3) Percy Brown: *Indian Architecture: Islamic Architecture*, Bombay, 1972.

Books for Reference:

- 1) Oki Morihiko: *Fairs and Festivals*, World Friendship Association, Tokyo, 1988
- 2) Vikram Bhat: *Hill Stations of India*, Grantha, U.K

3) Bikram Grewal (Ed.): *Indian Wildlife*

EC06 (ALLIED I)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED- INTELLECTUAL HISTORY OF 20TH CENTURY TAMIL NADU	Exam Hrs.	3
		U8HIAL22	

Objective:

- i) To study about the great intellectuals of 20th century Tamil Nadu*
- ii) To study their contributions in politics*
- iii) To study the social, religious, cultural and scientific developments in 20th century Tamil Nadu*
- iv) To study the contribution of great intellectuals to society*

Unit - I: Political: E. V. Ramaswamy Naicker - Rajaji - Pasumpon Muthuramalinga Thevar - Rettamalai Srinivasan - M. C. Raja - Thillaiyadi Valliammai

Unit - II: Social: Subramaniya Bharathi - Ramalinga Adigal - Vallal Alagappan – Bharathidasan - Arcot Brothers - Ida Scudder - Nawab C. Abdul Hakeem – Haji Jamal Mohammed

Unit - III: Communist: Singaravelu - P. Jeevanandam - P. Ramamurthy - B. Srinivasa Rao

Unit - IV: Cultural: Ayodhi Dasa Pandithar - G. Subramania Iyer - M. S. Subbulakshmi - Pattukottai Kalyana Sundaram - Kannadasan - Padma Subramaniam - Justice M. M. Ismail

Unit - V: Scientist: G. D. Naidu - M. S. Swaminathan - Rangarajan (Sujatha) - Dr. A.P.J. Abdul Kalam - Mayilsamy Annadurai

Books for Study:

- 1) Paramarthalingam.C: *Religion and Social Reform in Tamil Nadu*, Rajkumari Publications, Madurai, 1997
- 2) Sen, S.P.(ED.), *Social and Religious Reform Movements in the 19th and 20th*

Centuries, Calcutta Institute of Historical Studies, 1979

3) Pillai K.K.: *Tamilagavaralarum, Makkalum Panpadum(Tamil) International institute of Tamil Studies*, Chennai 2004.

Books for Reference:

1) Rajayyan.K: *History of TamilNadu (1585-1982)*, Raj Publishers, Madurai 1982.

2) Vishhwanathan, E.Sa.: *The Political Career of E.V.R.*, Ravi & Vasanth Publications, Madras, 1983

3) Sivagnanam M.P., *Viduthalai Poril Tamilagam (Tamil) Vol.I&II*, Poongkodi Ptthippagam, Chennai 2005

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	SOCIAL AND CULTURAL HISTORY OF INDIA UP TO 1206 A.D.	Exam Hrs.	3
		P8HI1001	

Objective:

- i) To study the Socio -Cultural situation in Ancient India*
- ii) To understand the influence of India's Ancient Past to Present*
- iii) To study the evolution of religious ideas in Ancient India*
- iv) To trace the growth of Art and Architecture in Ancient India*

Unit - I: Indus Valley Civilization and Vedic Culture: Sources – Pre-Historic Culture - Indus Valley Civilization - Town Planning - Religious Ideas – Economy - Vedic and Later Vedic Culture - Position of Women - Caste System - Religious ferment in the 6th Century B.C. - Rise of Jainism and Buddhism - Persian and Greek influences on Indian Society

Unit - II: Age of Mauryas: Social Conditions – Literature - Art and Architecture – Indian between 2nd Century B.C. and 3rd Century A.D. Brahminical Culture and Synthesis - Social and Economic Conditions - Mahayana and Hinayana Buddhism - Gandhara and Mathura School of Arts – Vaishnavism and Saivism

Unit - III: The Classical Age: Guptas Cultural Florescence - Art and Architecture (Nagara, Vesara and Dravida Style) - Paintings (Ajantha and Ellora Style) - The Age of Harsha – Socio-Economic and religious condition – Hiuen Tsang

Unit - IV: Advent of the Arabs: Condition of India on the eve of Arab Conquest - Effects of Arab Conquest - Invasions of Mahmud Ghazni and Muhammad Ghori and its effect

Unit - V: India between 8th and 12th Century A.D.: Social and Cultural Conditions - Art and Architecture

Books for Study:

- 1) Basham, A.L. (ed.): *A Cultural History of India*, Oxford University Press, New Delhi, 2006
- 2) Majumdar, Raychaudhuri & Datta: *An Advanced History of India*
- 3) Mahajan, V.D.: *Ancient India*, Sultan Chand, New Delhi, 2000

Books for Reference:

- 1) Chandra, Satish: *Essays on Medieval India History*, Oxford University Press, New Delhi, 2004
- 2) Jha, D.N.: *Ancient India*, Manohar Publication, New Delhi, 2004
- 3) Romila Thapar: *Ancient India Social History*, Orient Longman (P) Ltd, New Delhi, 2004

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	SOCIAL AND CULTURAL HISTORY OF TAMILNADU UP TO 1565 A. D.	Exam Hrs.	3
		P8HI1002	

Objectives:

- i) *To study the social and cultural history of Tamil Nadu*
- ii) *To study the legacy of the Past to Present day Tamil Nadu*

- iii) *To study the economic condition of Tamil Nadu*
- iv) *To trace the literary developments in ancient Tamil Nadu*

Unit - I: Sangam and post Sangam Age: The fivefold physiographical division of land – Sangam Polity – Socio-economic conditions – Religion – Trade – Literature and Fine arts

Unit - II: Pallavas: Socio-economic conditions – Education – Literature – Art – Sculpture and Painting

Unit - III: Imperial Cholas: Local Self-Government – Social Condition – Status of Women – Temples - Economic Condition – Trade – Education and Literature – Religious Condition - Art and Architecture - Iconography – Sculpture and Painting

Unit - IV: Pandiyan Empire: Socio-economic conditions – Literature – Religion – Art and Architecture – Painting and Fine arts

Unit - V: Age of Vijayanagar: Society – Economic life – Religion – Literature – Art and Fine Arts

Books for Study:

- 1) Subramaniam. N.: *History of Tamil Nadu*.
- 2) Rajayyan.K: *History of Tamil Nadu*.
- 3) Manoranjithamani: *The History of Tamil Nadu*

Books for Reference:

- 1) Neelakanda Shastri. K. A: *The Cholas*.
- 2) Pillai. K K: *A Social History of Tamils, Tamil Nadu History its people and culture*.
- 3) Pillai, K.K: *History of South India*

CORE PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	HISTORY OF ANCIENT CIVILIZATIONS	Exam Hrs.	3
		P8HI1003	

Objective:

- i) *To trace the evolutionary process of culture and civilization*
- ii) *To compare and analyse the various civilizations*
- iii) *To assess the contribution of various civilizations to the modern world*
- iv) *To evaluate the formation of social and political institutions*

Unit - I: Introduction: Definition - Origin and growth of Civilization – Nature and scope - Pre-Historic Culture: Palaeolithic, Mesolithic and Neolithic cultures

Unit - II: Mesopotamian Civilization: Origin and growth – Polity - Society - Economy – Religion - Trade and commerce - Art and Architecture

Unit - III: Egyptian and Persian Civilizations: Origin and growth – Polity – Society – Economy - Religion - Trade and commerce - Art and Architecture

Unit - IV: Chinese and Japanese Civilizations: Origin and growth – Polity - Society - Economy – Religion and Philosophy – Trade and commerce – Art and Architecture

Unit - V: Greek and Roman Civilizations: Origin and growth – Polity - Society - Economy – Religion and Philosophy – Trade and commerce – Art and Architecture

Books for Study:

- 1) B.V. Rao: *World History*, Sterling Publishers
- 2) Swain J.E.: *A History of World Civilizations*, Eurasia Publishing House Pvt. Ltd., New Delhi, 1994
- 3) Gokhale, B. K.: *Introduction to Western Civilization*, S. Chand & Co, New Delhi, 1970

Books for Reference:

- 1) Scheneidere. H.: *The World Civilizations*
- 2) Durant, W.: *The History of Civilizations our Oriental Heritage*
- 3) Rosovzeff: *A History of Ancient World Vol. I & II*, Oxford, 1926

CORE PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	ISLAMIC HISTORY FROM 500 A.D. TO 750 A.D.	Exam Hrs.	3
		P8HI1004	

Objective:

- i) To inform the students about the reformist Zeal of Islam
- ii) To study the Ideals and Values of Islam
- iii) To enlighten the students about the life Prophet Muhammad (PBUH)

iv) To discuss the rule of Pious Caliphate and subsequent dynasties

Unit - I: Pre-Islamic Arabia: Geography of Arabia – Jahiliya Period – Political, Social, Cultural and Religious life of the Arabs

Unit - II: Prophet Muhammad (PBUH): Early Life – Prophethood – Teachings of Islam – Quran and Hadith - Prophet Muhammad as a multi-dimensional personality: Social Reformer, Administrator, Military Commander, Legal luminary and Economic reformer

Unit - III: Pious Caliphate: Hazrat Abu Bakr - Hazrat Umar - Hazrat Uthman - Hazrat Ali – Their Administration

Unit - IV: Umayyad Dynasty: Muawiyah I – Yazid I – Abdul Malik – Al Walid I – Umar bin Abdul Aziz

Unit - V: Cultural Progress under the Umayyads: Literature – Art and Architecture – Fall of the Umayyads

Books for Study

- 1) Syed Ameer Ali: *The Spirit of Islam*
- 2) Syed Ameer Ali: *A short History of Saracens*
- 3) Dr. Major Syed Shahabuddeen: *History of Arabia (Tamil)*

Books for Reference

- 1) Philip K, Hitti: *History of Arabs*
- 2) Thomas Arnold: *The Legacy of Islam*
- 3) Abbas: *Civilization in Islam*

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	TRAVEL MANAGEMENT	Exam Hrs.	3
		P8HIEP11	

Objectives:

- i) To create awareness on the various tasks in Travel and Travel Business*
- ii) To understand the Travel related services and opportunities*
- iii) To understand the job potentiality in travel and tourism industries both employment and Self-employment*
- iv) To educate the students on various technics practiced practically in the travel industries*

Unit - I: Introduction: Post-War Boom in Travel – Modes of Travel: Roadways, Railways, Waterways and Airways

Unit - II: Travel Agency: Types of Travel Agency - Departments of Travel Agency - Functions of Travel Agency - Travellers Cheque – Hotel Coupons – Travel Guide Book – Public Transport Timetable

Unit - III: Travel Documents: Passport - Types of Passports – Procedure for Passport – Visa – Types of Visas – Health Requirements and Vaccines – Taxes – Travel Insurances

Unit - IV: Travel Formalities: Money Exchange and Currency Conversion – Luggage and Baggage – Immigration and Emigration Formalities - Customs Formalities - Airport Information – Transit Areas

Unit - V: Airline Travel Techniques: Airline Geography – Types of Journey – ABC World Guideline in Ticketing – Preparation of Air Route Itinerary – Fare Constructions: Class of Services – Fare Basis – Air Transportation Taxes - Time Calculations from GMT – GDS through CRS with special reference to Galileo, Amadeus & Sabre –Online Bookings: Flight, Hotel, Train and Car Bookings

Books for Study:

- 1) Jagmohan Negi, *Air Travel Ticketing and Fare Construction*, Kanishka Publishers, New Delhi, 2008
- 2) Dr. Devanesan, *Travel Management*, Renu Publications, Kanyakumari District
- 3) A.K. Bhatia: *The Business of Travel Agency & Tour Operations Management*

Books for Reference:

- 1) Md Abu Barkat Ali: *Travel and Tourism Management*, PHI Learning Pvt Ltd., Delhi, 2015
- 2) Biswanath Ghosh: *Tourism and Travel Management*, Vikas Publishing House Pvt Ltd, New Delhi, 2001
- 3) Peter Robinson, Paul Fallan, Harry Cameron & John Crafts: *Operations Management in the Travel Industry*, CAB International, Oxfordshire, UK

CORE BASED	SEMESTER I	Credit	4
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ELECTIVE PAPER I	(Option Paper II)	Hrs./Week	6
COURSE TITLE	FUNDAMENTALS OF DEFENCE AND STRATEGIC STUDIES	Exam Hrs.	3
		P8HIEP12	

Objectives:

i) To Study the concepts of Defence and Strategic Studies

ii) To discuss the History of Warfare

iii) To study the importance of International Relations

iv) To analyse the approaches to peace

Unit - I: Introduction and Conceptual Formulations: Introduction to the discipline of defence and Strategic studies – Its subject contents – contemporary relevance and significance - Basic Concepts of war, battle, campaign etc. - Definition of security, Defence Strategy, Peace etc.

Unit - II: History of Warfare: Historical evolution of Warfare – Its features and significance: Principles of War, Causes of War, Functions of War: Types of War and Scope

Unit - III: Basics of International Relations: Nature and Scope of International Relations; Features of International Political System – Structure of International Political System (Uni, Bi and Multi polar) – Actors in International Political System – State and Non-State Actors; World Governments (UNO) – Security Features in International Political System – Collective Security, Balance of Power, Hegemony, Regionalism etc.

Unit - IV: Introduction to Peace: Meaning and Definition of peace; Typology of peace – Approaches to peace – Disarmament, International Law – Peace Movements, Peace Research, Peace-making, peace building, peace keeping

Unit - V: Mechanics of Peace: Role and Functions of International Organisations – League of Nations, United Nations Organisations – Amicable means to settle Inter-State Conflicts; Diplomacy scope and function; types of diplomacy – its features

Books for Study:

1) Gautam Banerjee, *The 21st Century Army: Strategies for Future*, 2012

- 2) Anil Chauhan, *Aftermath of A Nuclear Attack*, 2010
- 3) Ravi Ranjan, *Armed Conflict and Security in South Asia*, 2012

Books for Reference:

- 1) Sushma Sood, *Armed Forces and Nation Building*, 1998
- 2) Barun De Jomini, *Art of War*, 2012
- 3) Rameshwar Prasad, *The Army Logistics and War*, 2011

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	SOCIAL AND CULTURAL HISTORY OF INDIA FROM 1206 A.D. TO 1857 A. D.	Exam Hrs.	3
		P8HI2001	

Objectives:

- i) *To study the legacy of Medieval India to Modern India*
- ii) *To focus on the Socio-Cultural Condition in Medieval India*
- iii) *To discuss on the synthesis of Indo Islamic culture*
- iv) *To highlight on the importance of Provincial kingdoms in Medieval India*

Unit - I: Delhi Sultanate: Sources - Social Condition - Status of Women – Religion – Cultural Condition: Literature, Learning, Art and Architecture

Unit - II: Bhakti Movement: Introduction - Bhakti Cult - Sufi Movement: Introduction - Sufi Orders: Chistiya, Suharwardiya, Qadiriya and Naqshbandiya

Unit - III: Social and Cultural life under the Vijayanagaras and Bhamanis: Social and Cultural life - Literature, Learning,- Art and Architecture

Unit - IV: India Under the Mughals: Social and Cultural Conditions - The Ruling Class – Mansabdars, Jagirdars, Zaminadars – Peasants - Status of Women – Religion - Cultural developments: Literature, Education - Painting - Music - Art and Architecture

Unit - V: European Penetration: Growth of Indology - Social and Cultural Policy of East India Company - Activities of Christian Missionaries - Growth of Humanitarianism - Education in British and Independent India: Traditional Hindu and Muslim Educational System under the Europeans - Patshalas and Madrasas - Introduction of Western Education - Wood's Despatch - Universities of 1857.

Books for Study:

- 1) Chandra, Satish: *Essays on Medieval India History*, Oxford University Press, New Delhi, 2004
- 2) Chandra, Satish: *Medieval India from Sultanate to Mughal – Part – 1, 1206 – 1526*, Har Anand Publications, New Delhi, 1975.
- 3) Mahajan, V.D.: *History of Delhi Sultanate*, Sultan Chand, New Delhi, 2000

Books for Reference:

- 1) Mehta, J.L.: *An Advance History of Medieval India (1526-1707)*
- 2) Bose, M.L.: *Social and Cultural History of India*, Concept Publication, New Delhi, 1989
- 3) Basham, A.L.: *A Cultural History of India*, Oxford University Press, New Delhi, 2006

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	SOCIAL AND CULTURAL HISTORY OF TAMIL NADU FROM 1565 A.D. TO 2000 A. D.	Exam Hrs.	3
		P8HI2002	

Objectives:

- i) *To discuss about the Socio-Cultural condition of Medieval and Modern Tamil Nadu*
- ii) *To analyse the importance of Reform Movements in Tamil Nadu*
- iii) *To assess the Contribution of Tamil Nadu in India's Freedom Struggle*

iv) To trace the impact of Dravidian Movement

Unit – I: Nayaks and Marathas: Social and Economic conditions – Education and Literature – Art and architecture

Unit – II: Reform Movements: Social Reform Movement – Justice Party – Self-Respect Movement – Women's Movement and Social Legislations – Anti-Hindi Agitations

Unit – III: Tamil Nadu in the Freedom Struggle: Formation of Congress – Moderates and Extremist – Swadeshi Movement – V. O. Chidambaram Pillai – Subramani Siva - Role of Tamil Literature and Press – Simon Commission – Civil Disobedience Movement – Quit India Movement

Unit – IV: Development of Education: Introduction to Western Education – Higher Education – Educational Policies – Development of Science and Technology and Professional Education

Unit – V: Rule of Dravidian Parties: DMK and AIADMK – Planning commission – Social Justice and Reservation Policies - Industrial growth

Books for Study:

- 1) K.K. Pillai: *A Social History of Tamils – Tamil Nadu History – Its People and Culture*
- 2) Chitra Madhavan: *History and Culture of Tamil Nadu. 1310 to 1885 A.D.*, 2005
- 3) N. Jeyapalan: *Social and Cultural History of Tamil Nadu*
- 4) K.Rajayyan: *History of Tamil Nadu*

Books for Reference:

- 1) N. Subramanian: *History of Tamil Nadu.*
- 2) K.A.Neelakanda Sastri: *The history of Cholas*
- 3) Nambiarooran, K.A: *Tamil Renaissance and Dravidian Nationalism*

CORE PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	HISTORY OF MEDIEVAL CIVILIZATIONS	Exam Hrs.	3
		P8HI2003	

Objectives:

- i) To analyse the transition of world order from ancient to medieval*
- ii) To analyse the contribution of Religion to civilize the people and society*
- iii) To assess the formation and services of the various Monastic orders and their impacts*
- iv) To trace the formulation of formal educational system*

Unit - I: Christianity: Rise and Spread of Christianity – The Papacy - Monastic Orders: Byzantine and Benedictine Monasticism – Monastic Reforms - Contribution of Byzantine Empire

Unit - II: Islamic Civilization: Rise of Islam – Tenets of Islam - Islamic Empires – Administrative features of Pious Caliphate - Literature and learning – Development of Science – Muslims contribution to Humanity

Unit - III: Feudalism: Origin – Feudal Hierarchy: Lord, Vassal and Knighthood – Merits and demerits of Feudalism – Crusades – Causes and results of Crusades

Unit - IV: Medieval Europe: Life in Medieval Cities - Markets, Guilds, Municipal Services and Crimes

Unit - V: Medieval Universities: Important Universities - Subjects of study – Relation between Teachers and students – Life in the Medieval Universities

Books for Study:

- 1) R. K. Majumdar & N. Srivatsava: *History of World Civilizations*
- 2) Wall blank, T.W: *Civilization- Past and Present* Balley, N.M
- 3) Will Durant: *The story of Civilizations*, Vol-I & Vol-II

Books for Reference:

- 1) Edward. Said ; *History of World Civilizations*.
- 2) Judd, G.P: *History of Civilization*.
- 3) Will Durant: *The Story of Civilisation*(Vol. I & II)

CORE PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	ISLAMIC HISTORY FROM 750 TO 1258 A.D.	Exam Hrs.	3
		P8HI2004	

Objectives

- i) To study the impact Abbasid dynasty to World Civilization*
- ii) To discuss about the significance of Crusades*
- iii) To Know about the Fathimids of Egypt and Moors of Spain*
- iv) To discuss on the Contribution of Arabs to Science*

Unit - I: Abbasid Dynasty: Abbasid Revolution – Abul Abbas as-Saffah – Abu Jaffar al-Mansur – Harun al-Rasheed – Mamun al-Rasheed - al-Mutawakkil – Causes for the downfall of the Abbasids

Unit - II: The Crusades: Causes - Course - Imadudddin Zengi – Sultan Salahuddin Ayyubi - Results of the Crusades

Unit - III: Fatimids of Egypt: Obaidullah al-Mahdi – Al-Muiz – Al-Aziz – Cultural Contribution of the Fatimids – Downfall of the Fatimids

Unit - IV: Moors of Spain: Abdul Rahman I - Abdul Rahman II - Abdul Rahman III – Development of Literature, Art and Architecture under the Moors

Unit - V: Contribution of Arabs to Science: Medicine, Astronomy, Mathematics, Chemistry and Ophthalmology – Famous Muslims Scientists and Historians

Books for Study:

- 1) Syed Ameer Ali: *The Spirit of Islam*
- 2) Syed Ameer Ali: *A short History of Saracens*
- 3) Dr. Major Syed Sahabhudeen: *History of Arabia (Tamil)*

Books for Reference:

- 1) Philip K, Hitti: *History of Arabs*
- 2) Thomas Arnold: *The Legacy of Islam*
- 3) Abbas: *Civilization in Islam*
- 4) Dr. Major Syed Shahabuddeen: *Muslims contribution to Humanity*

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper I)	Credit	4
		Hrs./Week	5
COURSE TITLE	HOTEL MANAGEMENT	Exam Hrs.	3
		P8HIEP21	

Objectives:

- i) To educate the students about the classification of Hotels on various parameters on the basis of changing trends in the Hospitality Industry*
- ii) To create awareness about the systemised operational functions of Hotel Industry*
- iii) To analyse the types of Hotels and their functions according to the modern scenario*

iv) To understand the changing trends in the services offered by Hotel Industries and make them ready for employments in the hotel/hospitality industry

Unit - I: Classification of Hotels: Different Types of Star Hotels – International Hotel Chains – Indian Hotel Chains – Public and Private Sector Hotels in India – Rules and Regulations Governing Hotel Business in India

Unit - II: Front Office: Dressing sense - Reservations: Reservation Techniques – Phone Service and Telephonic etiquettes – Finance and Accounting

Unit - III: Housekeeping Procedures: House Keeping: Making Beds - Tidying Rooms - Cleaning and Polishing - Washing and Removing Stains - Vacuuming – Handling of Drunken Guests

Unit - IV: Food and Beverages: Food and Beverage Service: Quick Service, Table Service, Specialty Restaurants, Coffee Shops, Buffets and Banquets, Wedding and Birthday Services

Unit - V: Miscellaneous Functions: Other Departments of a Hotel: Sales and Marketing Division, Accounting Division, Engineering and Maintenance Division, Security Division, Human Resources Division

Books for study:

- 1) James A Bardi: *Hotel Front Office Management*
- 2) *Hotel Front Office: Operations and Management*: Oxford Higher Education
- 3) *Front Office Manual*: TATA McGraw Hill Publications

Books for Reference:

- 1) V Prakash Kainthola, *principles of Hotel Management*, Gyan Books Pvt. Ltd, New Delhi, 2006.
- 2) Jatashankar R. Tewari, *Hotel Front Office: Operations and Management*, Oxford University Press, India, June 2009
- 3) Alan T Stutis, James F Wortman: *Hotel and Lodging management*

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper II)	Credit	4
		Hrs./Week	5
COURSE TITLE	FUNDAMENTALS OF NATIONAL SECURITY	Exam Hrs.	3
		P8HIEP21	

Objectives:

- i) To study the significance of study of National Security*
- ii) To discuss key features of Foreign and Defence Policy*
- iii) To Know different approaches to National Security*
- iv) To highlight on the significance of India's Defence Security*

Unit - I: Introduction: Definition, Scope and features of the concept of National Security – Concept of National Power – Elements of National Power (Tangible and Intangible) – Fundamental factors – Values – Goals and Policies that determine National Security

Unit - II: Foreign Policy and Defence Policy: Definition – Meaning – Scope of foreign policy and Defence policy – Determinants of Foreign policy and Defence policy – Instruments of Foreign policy and Defence policy – Diplomacy and Defence

Unit - III: Approaches to National Security: Coercive and Non-Coercive Approach – Meaning and Scope – Coercive means – Threats – Threat perception and defence apparatus – Armed forces – Its organisations and functions (India) – Non-coercive means – Peace mechanics – Peace making; Peace building

Unit - IV: Strategic Environment of India: Feature of Strategic Environment – Its scope in Policy making – India's Strategic Environments – Immediate Neighbours – Adjacent Regions in Indian Ocean and Global Structure – India's Military preparedness – Defence Budget – Force Structure and Organisation

Unit - V: India's Strategic Relationship (Salient Features): India – Pakistan Politics – Strategic Relations – Indi-China Politics – Strategic Relations – India and World Powers

Books for Study:

- 1) Gautam Banerjee, *The 21st Century Army: Strategies for Future*, 2012.
- 2) Anil Chauhan, *Aftermath of A Nuclear Attack*, 2010.
- 3) Ravi Ranjan, *Armed Conflict and Security in South Asia*, 2012.

Books for Reference:

- 1) Sushma Sood, *Armed Forces and Nation Building*, 1998.
- 2) Barun De Jomini, *Art of War*, 2012.

3) Rameshwar Prasad, *The Army Logistics and War*, 2011

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8HI01	

CORE PAPER I	SEMESTER I	Credit	5
		Hrs/ Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8H101	
COURSE OUTCOMES			
CO 1	The scholars acquire skills regarding the different trends and methods in Research and emulate an ethical approach to Research.		
CO 2	The scholars are empowered with the ability to identify and formulate the research problem.		
CO 3	The scholars obtain the ability to collect data from different source repositories		
CO 4	The scholars attain the attributes to effectively analyse the collected in an objective manner.		
CO 5	The scholars get the ability to successfully document their findings.		

Objectives:

- 1.To introduce the scholars to the latest trends of research methodology*
- 2. To promote a spirit of inquiry among the scholars*
- 3. To inform the scholars about various sources and methods of Data Collection*
- 4. To train the scholars to analyse and document the data*

Unit - I: Trends In Methodology: Scientific Method as applied in History-
Heuristics Hermeneutics – Quantitative and Qualitative Methods – Textual Analysis
– Oral Traditions Semiotics and Studies of Symbols – Inter – Disciplinary
Approaches

Unit - II: Research Process: Problems in Existing Research – Selection of Topic –
Feasibility – Methods of authentication – Research Plan and Working Hypothesis

Unit - III: Data Collection: Sources – Repositories of Sources – Libraries and Archives – Digital Information – Possibilities of field Research – Data Arrangement – Manual Card system – Word Processor – Files and Folders

Unit - IV: Data Analysis: Source Analysis – Content Analysis- Objectivity and Bias reasoning – Fallacies- Generalizations and Explanations – Ordering of the Data – Conceptual Linkages – Method of Explanation - Verification of Hypothesis – Formulation of the final argument

Unit - V: Documentation: Chapterisation – Logical Arrangement of chapters – Citations – Acknowledgement of sources – References and functions of Bibliography – Use of Tables, Charts and Maps –Analytical Writing – Language – Need for consistency and terminological clarity – Glossary and Index

Books for Study:

1. Kate Turabian: A manual for the writers of term papers, theses and dissertations
2. William Good and Paul Hatt : The methods of Social Research
3. March Bloch: The Historians Craft.

Books for Reference:

1. Roderick Floud, An Introduction to Quantitative Methods for Historians, London, 1993
2. Malcolm Williams, Science and Social Science: An Introduction, London, New York and Routledge, 2000
3. M.L.A. Hand Book for Researchers Thesis & Assignment Writing Wily Eastern, New Delhi, 1990.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	HISTORIOGRAPHY	Exam Hrs.	3
		MPH8HI02	

CORE PAPER II	SEMESTER I	Credit	5
		Hrs/ Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8H102	
COURSE OUTCOMES			
CO 1	The scholars identify the nature and functions of History		
CO 2	The scholars understand the intimacy of History with other disciplines.		
CO 3	The scholars comprehend the value of History and recognise how History can be misused.		
CO 4	The scholars realise the evolution of Historical Writing from earliest days to medieval period.		
CO 5	The scholars recognise the recent trends in Historical Writing.		

Objectives:

1. *To introduce the scholars the nature and scope of History*
2. *To relate the connectivity between History and other disciplines*
3. *To study the use and abuse of History*
4. *To study the various trends of Historiography*

Unit - I: Introduction: Definition, Nature, Scope, Functions

Unit - II: History and Allied Disciplines: Economics, Sociology, Geography, Literature and Auxillary Sciences

Unit - III: Value and Subject matter of History: Use and abuse of History, History Art or Science

Unit - IV: Early Trends: Greco-Roman- Ancient Indian-Medieval, Church and Arab- Enlightenment

Unit - V:Modern Trends:Romanticist – Scientific theory-Materialist theory – Structuralism – Poststructuralism-post modernism

Books for Study:

1. E.H. Carr: What is History
2. R.G. Collingwood: The Idea of History
3. B.Sheikh Ali: History its theory and Method

Books for Reference:

1. Harvey kay, The British Marxist Historians (Polity)
2. Stein, Burton, History of India
3. Champakalakshmi, R. Trade,Ideology and Urbanization: South 300 B.C. to A.D 1300

CC01 (CORE)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	PRINCIPLES OF MANAGEMENT	Exam Hrs.	3
		U8BA1001	

UNIT – 1

Management-Importance-Definition-Nature and Scope of Management-Management process-Role and Function of a manager-Levels of management-Management vs. Administration-Management as an art or science-Management as a Profession-Management Approaches (Henry Fayol, F.W.Taylor, Elton Mayo's Contribution only).

UNIT – 2

Planning-Nature-Importance-Steps in planning-Types of plans-Objectives-Policies-Procedures-And methods-Nature and types of policies-Decision making-Process of Decision Making-Types of Decision-Problem involved in Decision Making.

UNIT – 3

Organisation-Types of organization structure-Span of control-Departmentation-Informal Organisation.

UNIT – 4

Authority-Delegation-Difference between Authority and Power-Decentralization- Responsibility-Staffing-Sources of Recruitment-Selection process-Training.

UNIT – 5

Coordination-Need of coordination-Types-Techniques-Distinction between coordination and cooperation-Requisites for Excellent coordination-Controlling-Meaning and Importance of Controls-Control process.

TEXT BOOKS:

1. P.C Tripathi & P.N.Reddy -Principles of Management-Tata Mc.Graw Hill
2. Prasad L.M- Principles and Practice of Management
3. R.N. Gupta- Principles of Management- S.Chand Pub.

REFERENCE BOOKS:

1. Gupta CB- Business Management
2. Peter-F,Drucker- Principles of Management
3. Harold Koontz-aryasri & heniz weirich- Principles of Management- Tata Mc.Graw Hill

CC02 (CORE)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	BUSINESS ORGANISATION	Exam Hrs.	3
		U8BA1002	

UNIT – 1

Business-Meaning-Types of Business-Industry-Types of Industry-Commerce and Trade-Profession-Differences between Business and Profession- Difference between Profession and Employment-Organisation-Meaning and Principles of Business Organisation.

UNIT – 2

Forms of Business Organisation-Sole Trader-Partnership-Differences between Sole Trader and -Joint Stock Companies-Differences between Partnership firm and Joint stock company-Cooperatives Societies-MNC's.

UNIT – 3

Location of Industry-Factors Influencing Location and Size-Industrial Estate-District Industries Center.

UNIT – 4

Corporate Social responsibility-Business Ethics-Unethical practices in business.

UNIT – 5

Business combination-Causes-Types-Simple combination-Compound combination- Trade Association and Chamber of Commerce-Differences between Trade Association and Chamber of Commerce.

TEXT AND REFERENCE BOOKS:

1. Bhutan Y.K- Business Organisation
2. Prakesh Jagadesh- Business Organisation and Management
3. Reddy P.N and Gulshan S.S.- Principles of Business Organisation and Management.
4. Vasudevan and Radhaswami- Business Organisation
5. M.C.Shukla- Business Organisation and Management.

EC03 (ALLIED I)	SEMESTER I	Credit	4
		Hrs./Week	5
COURSE TITLE	ALLIED - BUSINESS MATHEMATICS AND STATISTICS I	Exam Hrs.	3
		U8BAAL11	

OBJECTIVES:

To apply the concepts of statistics and Mathematics in Business

UNIT – 1

Statistics-Definition-Scope and Limitation-Presentation of Data-Diagrammatic and Graphical Representation of Data.

UNIT – 2

Measures of Central Tendency-Mean-Median and Mode-GM and HM-Advantages and Limitations.

UNIT – 3

Measures of Dispersion-Range-Mean Deviation-Quartile Deviation-Standard Deviation-Coefficient Variation-Measures of Skewness-Karl Pearson and Bowleys methods.

UNIT – 4

Mathematics for Finance-Simple and Compound Interest-Annuities-Sinking Funds-Discount and Present-Values.

UNIT – 5

Basic Calculus-Rules for Differentiation-Maxima and Minima and their Application to Business.

Note: The proportion between theory and problems shall be 20:80

TEXT AND REFERENCE BOOKS:

1. J.K. Sharma- Business Statistics- Pearson Publications
2. P. Naveenthams- Business Statistics and Mathematics
3. P.R. Vital- Business Statistics and Mathematics

EC04 (ALLIED I)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED – FUNDAMENTALS OF COMPUTER	Exam Hrs.	3
		U8BAAL12	

Unit I – Computer Fundamentals

Introduction- Characteristics of Computers- Classification (Digital, Analog, Hybrid), Micro, Mini and Super Computers - Personal and Advance Computer- Operating System.

Unit II - Components of Computer

Input devices-Types-Keyboards- Mouse-Output Devices-Classification of Output- Printers- Plotters- Monitors.

Unit III – MS Office

MS Office – Introduction – Word pad, Note pad. Standard Menu (file – edit-view-insert) -format menu-of MS Word, Excel and Power point,

Unit IV – Data communication and Networking

Concept of Data Communication and Networking – Types of Network, Communication Media, Mode of transmission analysis, Digital transmission, Different Topologies.

Unit V – Internet

Internet basics- Basic Internet terms – Getting connected to Internet – Internet application – Electronic Mail – How E-Mail works - Searching the Web.

TEXT AND REFERENCE BOOKS:

1. Fundamental of Computers-Rajaraman, Prentice Hall
2. Computer Today –B. Sandra
3. Fundamental of Computer –P.K. Sinha
4. Elementary Computer Application –Sharma, Upadyay and Agarwal
5. Computer Fundamentals –Sinha,P - BPB Publication , Jaipur
6. Introduction to Computers –Norton, Peter , Tata Mc Graw hills, New Delhi
7. Computer Fundamental – Anubha Jain , Deep Shikha Bhargav
8. Computer Fundamentals – V.K. Jain
9. A first course in computer – Vikas Publishing House
10. Introduction to Computer Science – ITL Education Solution Ltd.

CC03 (CORE)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	MANAGERIAL COMMUNICATION	Exam Hrs.	3
		U8BA2001	

UNIT – 1

Business Communication -Meaning- Importance- Objectives- Communication process- Types of communication- Methods of communication- Barriers to communication.

UNIT – II

Business letters -Structure of a Business letter- Qualities of a good Business letter- Letter of enquiry-Letter of Order- Execution of order letter- Cancellation of Order -Letter of Complaints- Collection letter.

UNIT – III

Circular letters -Banking Correspondence -Insurance Correspondence.

UNIT – IV

Application for Situation- Secretarial Correspondence-Preparation of Agenda and Minutes

UNIT – V

Communication Media –Telephone –Telex –Fax - Cell phones- Internet.

TEXT AND REFERENCE BOOKS:

1. Rajendra pal and Korlehalli-Essentials of Business Communication
2. Pillai and Bagawathi-Modern Commercial Correspondence
3. A.N.Kapoot- Business Communication
4. Sandhanam.R- Business Communication
5. Ramesh and Patten shetty- Business English and Correspondence
6. L.Gartside- Modern Business and Correspondence

CC04 (CORE)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	BANKING AND FINANCIAL SYSTEM	Exam Hrs.	3
		U8BA2002	

UNIT – I

Definition of bank - Origin of banks - -Types of bank - Unit bank- Merits and Demerits of unit bank- -Branch bank- Its merits and demerits - Mixed banking - Retail banking -Wholesale banking-Universal banking.

UNIT – II

Function of modern commercial banks-Savings accounts-Current account- Difference between savings account and current accounts- Fixed Deposit - Recurring Deposit - Granting of loan -Clean loan- Secured loan- Over draft- Cash credit.

UNIT – III

Role of Reserve Bank of India -Co-operative banks - -NABARD (National Bank for Agriculture and Rural Development)- EXIM Bank Economic and Monetary implications of modern banking operations - Concepts of social responsibility of banks .

UNIT – IV

Financial System-Components –Financial Institutions – Financial Market-Services of stock exchange – Financial Instruments (Promissory Note, Bill of Exchange and Cheque only).

UNIT – V

Financial Services (Factoring, Leasing, Hire Purchase, Housing Finance, Credit Card only), E-Banking

TEXT AND REFERENCE BOOKS:

- 1.B.Santhanam,Sundaram & Varshney-Banking and financial system.
- 2.B.Santhanam-Banking theory law and practice
- 3.Kandasami.K.P.-Banking law and practice.

EC07 (ALLIED I)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	ALLIED- BUSINESS MATHEMATICS AND STATISTICS II	Exam Hrs.	3
		U8BAAL21	

OBJECTIVES

To apply the concepts of Mathematics and Statistics in Business.

UNIT – 1

Matrix Theory-operations of Determinants-Inverse of a Square Matrix (not more than 3rd order)

UNIT – 2

Solving Simultaneous Equations using Matrix Method-Integration and thier application to business.

UNIT – 3

Correlation-Karl Pearson`s Correlation-Concurrent Deviation Methiod-Rank Correlation-Regression lines-Regression Coeffients-Properties of Regression Coefficient.

UNIT – 4

Time Series-Components of Time Series-Measurements of Trend-Semi Average Method-Moving Average Method-Methods of Least Squares.

UNIT – 5

Index Numbers-Weighted and UnWeighted Index Numbers-Cost of Living Index Numbers.

Note: The proportion between theory and problems shall be 20:80

TEXT AND REFERENCE BOOKS:

1. J.K.Sharma-Business Statistics-Pearsons Publications
- 2.P.Navaneetham-Business Statistics & Mathematics
- 3.P.R.Vittal-Business Statistics & Mathematics
- 4.S.P.Gupta-Elementary Statistical Method.

EC07 (ALLIED I)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED- TRAINING AND DEVELOPMENT OF EMPLOYEES	Exam Hrs.	3
		U8BAAL22	

Objective:

To provide an in-depth understanding of the role of Training in the HRD and to enable the course participants to manage the Training Systems and Processes.

UNIT I – Introduction

Concepts of Training and Development – Identifying Training Needs – Structure and Functions of Training Development – Evaluation of Training Programme – Role, Responsibilities and Challenges to Training Managers.

UNIT II – Training Techniques:

On the Job Training Techniques – Coaching – Apprenticeship – Job Rotation – Job Instruction Training – Training by Supervisors – Off the Job Training Techniques – Lecture, Conference, Group Discussion.

UNIT III – Career Planning:

Concept of Career – Career Stages – Career Planning and Development – Steps in Career Planning – Methods of Career Planning and Development.

UNIT IV – Management Development Program (MDP):

Concept of Management Development – Need and Importance – Process – Components of MDP – Management Development Institutes – Productivity Councils.

UNIT V – Training Institutions:

Need for Training in India – Government Policy on Training – Training Institutes in India.

TEXT AND REFERENCE BOOKS:

1. Manpower Planning, Selection, Training & Development – Aggarwala D V, Deep & Deep Publications.
2. Training for Development – Rolf Lynton & Udai Pareek, Sage Publications.

CC01 (CORE)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	FINANCIAL ACCOUNTING I	Exam Hrs.	3
		U8CO1001	

Objective: *To impart theoretical and practical knowledge of fundamental accounting principles.*

UNIT–I: Introduction (15 Hours)

Basic Accounting Concepts – Accounting Conventions – Journal – Ledger – Preparation of Trial Balance – Meaning and Types of Accounting Errors.

UNIT–II: Final Accounts (15 Hours)

Preparation of Final Accounts – Trading Account – Profit and Loss Account – Balance Sheet – Adjustment Entries.

UNIT–III: Depreciation Accounting (15 Hours)

Meaning of Depreciation – Causes of Depreciation – Methods of providing Depreciation – Straight Line Method – Diminishing Balance Method (Excluding change in the method of depreciation) – Annuity Method – Sinking Fund Method (Simple Problems only) – Concept of Depreciation under the Companies Act, 2013.

UNIT-IV: Average Due Date and Fire Insurance Claims (15 Hours)

Determination of Due Date – Calculation of Interest. Fire Insurance Claims – Need for fire Insurance – Computation of claim to be lodged for loss of stock – Average Clause.

UNIT-V: Single Entry System (15 Hours)

Single Entry System - Objectives – Definition – Features – Limitations of Single Entry System – Differences between Single Entry System and Double Entry System– Ascertainment of profit through Networth Method (Statement of Affairs) and Conversion Method.

Note: Weightage of marks: Theory 20% and Problems 80%

Books for Study:

1. **R.L.Gupta and M. Radhaswamy**, Financial Accounting, Sultan Chand & Sons., New Delhi.
2. **T.S. Reddy and Murthy**, Financial Accounting, Margham Publications, Chennai.

Books for Reference:

1. **M.C.Shukla, T.S.Grewal, S.C. Gupta**, Advanced Accounts – Volume I, S.Chand & Co., - New Delhi.
2. **S.P. Jain and K.L.Narang**, Financial Accounting, Kalyani Publishers, Ludhiana.
3. **Mukherji & M. Hanif**, Financial Accounting, Tata McGraw Hill Pub. Co. Ltd.,New Delhi.

CC02 (CORE)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	BUSINESS ORGANISATION	Exam Hrs.	3
		U8CO1002	

Objective: To acquaint the students with the basic concepts of business and commercial organisations.

UNIT-I: Nature of Business (12 Hours)

Business - Meaning – Characteristics – Objectives - Classification of Business Activities - Industry - Commerce - Trade - Distinction between Trade and Commerce.

UNIT-II: Size of Business Units (12 Hours)

Criteria for measuring size of business – Factors determining the size – Classification of business according to size – Micro – Small – Medium – Large – Importance of MSME units – Benefits available to MSMEs.

UNIT-III: Forms of Business Enterprises (12 Hours)

Forms of Business Organisation (meaning, merits and demerits of each type)-Sole Proprietorship–HUF-Partnership Firm–Limited Liability Partnership-Co-operative societies-Joint Stock Companies – One Person Company - Public Utilities – Public Enterprises - Public Private Partnership – MNCs.

UNIT-IV: Emerging Opportunities in Business (12 Hours)

Franchising – Business Process Outsourcing – E-Commerce – M-Commerce – Process of setting up a Business Enterprise – Opportunities and Idea Generation.

UNIT-V: Business Combinations (12 Hours)

Business Combinations – Meaning – Advantages – Limitations – Types - Trade Association – Trade Union - Chamber of Commerce - FICCI - Difference between Trade Association and Chamber of Commerce.

Books for Study:

1. **C.B.Gupta**, Business Organisation and Management, Sultan Chand & Sons, New Delhi.
2. **C.D.Balaji and G. Prasad**, Business Organization, Margham Publications, Chennai.

Books for Reference:

1. **Motihar**, Business Organisation, Vrinda Publications (P) Ltd., Delhi.
2. **Rajendran, J.P. Maheshwari, Mahajan** , Business Organisation, International Book House Pvt. Ltd., New Delhi.
3. **K. Abirmi Devi, M. Alagamani**, E-Commerce, Margham Publications, Chennai.

CC03 (ALLIED I)	SEMESTER I	Credit	4
		Hrs./Week	5
COURSE TITLE	ALLIED-BUSINESS COMMUNICATION	Exam Hrs.	3
		U8COAL11	

Objective: *To familiarize students with the principles of Business Communication and to train them to draft various business letters.*

UNIT – I: Communication (15 Hours)

Communication - Meaning – Objectives – Importance of communication in business
 - Types of communication – Verbal and Non-verbal – Formal and Informal –
 Directions of Communication – Principles of Communication – Barriers of
 Communication.

UNIT – II: Business Letters (15 Hours)

Business letter – Functions - Kinds of business letters – Essentials of a business
 letter – Lay-out of a business letter – Tips for writing an effective business letter –
 Etiquettes for E-Correspondence.

UNIT – III: Enquiries and Replies (15 Hours)

Enquiries – Status Enquiry - Replies – Offers and Quotations – Important terms used
 in offers and Quotations – Orders and their execution – Tenders – Guidelines for

drafting tender notice – Drafting a tender notice.

UNIT – IV: Collection Letters

(15 Hours)

Collection letter – Effective collection letter – Collection series - Replies of debtors - Circular letters - Objectives of writing circular letters – Drafting a circular letter.

UNIT – V: Application Letters

(15 Hours)

Introduction – Contents – Job Application Letter – Bio-Data - Curriculum Vitae – Resume - Interview Call Letter.

Books for Study:

1. **Rajendra Pal, J.S. Korlahalli**, Essentials of Business communication, Sulthan Chand & Sons, New Delhi.
2. **N.S. Raghunathan, B.Santhanam**, Business Communication Margham Publication, Chennai.

Books for Reference:

1. **Shirley Taylor**, Communication for business, Pearson publication, New Delhi.
2. **CB Gupta**, Basic Business Communication, Sultan Chand & Sons, New Delhi
3. **Dr. Sundar**, Business Communication, Vijay Nicole Publishing Co., Chennai.

CC03 (ALLIED I)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED- BUSINESS ECONOMICS I	Exam Hrs.	3
		U8COAL12	

Objective:*To familiarise students with basic concepts in economics and its application in business.*

UNIT – I: Business Economics

(12 Hours)

Meaning – Definition – Characteristics –Importance – Scope – Differences between Micro Economics and Macro Economics – Role and Responsibilities of a Business Economist.

UNIT – II: Utility Analysis

(12 Hours)

Meaning – Characteristics – Cardinal – Ordinal – Total utility – Marginal utility – Law of Diminishing Marginal Utility – Law of Equi-Marginal Utility.

UNIT – III: Demand

(12 Hours)

Meaning – Definition – Characteristics – Types of Demand - Factors determining Demand –Elasticity of demand – Types – Demand Forecasting – Meaning - Methods.

UNIT – IV: Production and Costs

(12 Hours)

Production - Meaning – Factors – Production Function – Law of Variable Proportions –Economies of Scale – Break-Even Analysis.

UNIT – V: Supply

(12 Hours)

Meaning – Factors affecting supply – Law of Supply - Assumptions and Exceptions – Elasticity of Supply – Meaning – Determinants of Elasticity of Supply.

Books for Study:

1. **Sankaran S**, Business Economics, Margham Publications, Chennai.
2. **Ahuja H.L.**, Business Economics, S.Chand & Co. Ltd., New Delhi.

Books for Reference:

1. **Agarwal M.D., and Som Deo**, Business Economics, Ramesh Book Depot, New Delhi.
2. **Mehta P.L.**, Managerial Economics, Sultan Chand & Sons., New Delhi.
3. **Mithani, D.M.**, Managerial Economics – Theory and Application, Himalaya Publishing House Pvt. Ltd., Mumbai.

CC04 (CORE)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	FINANCIAL ACCOUNTING II	Exam Hrs.	3
		U8CO2001	

Objective: To impart theoretical and practical knowledge of functional aspects of Accounting.

UNIT – I: Branch Accounts

(12 Hours)

Objectives of Branch Accounts – Types of Branches – Dependent Branch – Accounting for Dependent Branches - Debtor System - Stock and Debtors System – Independent branch (Foreign Branch excluded) – Final Account System.

UNIT – II: Departmental Accounts

(12 Hours)

Distinction between Departments and Branches – Allocation of common expenses – Expenses which cannot be allocated – Preparation of Departmental Accounts - Inter-departmental transfer at cost price and selling price. (Simple problems only)

UNIT – III: Hire Purchase System (12 Hours)

Hire Purchase System vs Instalment Purchase System – Accounting Treatment in Hire Purchase System – Calculation of Interest – Books of Hire Purchaser and Hire Vendor – Meaning of Default and Repossession (Simple problems).

UNIT – IV: Partnership Accounts (Admission, Retirement and Death of Partner) (12 Hours)

Partnership – Meaning and Features – Types of Partners - Admission of a partner – Treatment of Goodwill – Revaluation of Assets and Liabilities – Retirement and Death of a partner. (Simple problems only).

UNIT – V: Partnership Accounts (Dissolution) (12 Hours)

Dissolution of partnership firm – Insolvency of a Partner and Partnership Firm – Gradual Realization and Piecemeal Distribution. (Simple problems only).

Note: Weightage of marks: Theory 20% and Problems 80%

Books for Study:

1. **R.L.Gupta and M. Radhaswamy**, Financial Accounting, Sultan Chand & Sons., New Delhi.
2. **T.S. Reddy and Murthy**, Financial Accounting, Margham Publications, Chennai.

Books for Reference:

1. **M.C.Shukla, T.S.Grewal, S.C. Gupta**, Advanced Accounts, S.Chand & Co., New Delhi.
2. **S.P. Jain and K.L.Narang**, Financial Accounting, Kalyani Publishers, Ludhiana.
3. **Mukherji & M. Hanif**, Financial Accounting, Tata McGraw Hill Pub. Co. Ltd., New Delhi.

CC05 (CORE)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	BUSINESS MANAGEMENT	Exam Hrs.	3
		U8CO2002	

Objective: *To familiarise students with the principles of management and techniques used to effectively manage a business firm.*

UNIT-I: Introduction to Management (12 Hours)

Management - Nature – Importance - Scope – Levels - Management vs. Administration – Principles of Scientific Management by Henri Fayol and by Frederick Winslow Taylor – Contributions of Peter Ferdinand Drucker and Mary Parker Follett to the field of Management - Management Process (POSDCORB).

UNIT –II: Planning (12 Hours)

Planning – Nature – Importance – Limitations – Principles – Types – Components of Planning (definitions of various components only) – Planning Process. Forecasting – Importance – Limitations – Process. Decision-Making – Nature – Process.

UNIT – III: Organising (12 Hours)

Organising – Nature – Steps – Significance – Determinants of an Organisation structure – Types – Formal and Informal – Departmentation - Span of Management – Determinants - Authority and Responsibility – Delegation – Importance – Process – Types – Decentralisation – Merits – Demerits – Determinants – Delegation Vs. Decentralisation.

UNIT – IV: Staffing and Directing (12 Hours)

Staffing – Importance - Principles. Directing – Nature – Significance – Principles – Motivation – Nature – Importance – Types – Theories – Abraham Maslow's Need Hierarchy Theory – Herzberg's Two Factor Theory - McGregor's Theory X and Theory Y – Morale – Building high Morale – Leadership – Nature – Importance – Styles – Leadership Qualities.

UNIT –V: Controlling and Coordination (12 Hours)

Controlling – Nature – Significance – Process – Overview of Traditional and Modern Control Techniques. Coordination – Nature – Importance – Types - Techniques.

Books for Study:

1. **C.B. Gupta**, Business Management Theory and Practice – Sultan Chand & Sons, New Delhi.
2. **J. Jayasankar**, Principles of Management, Margham Publications, Chennai.

Books for Reference:

1. **L.M. Prasad**, Principles and Practice of Management, Sultan Chand & Sons, New Delhi.
2. **Harold Koontz, Cyril O'Donnell**, Principles of Management – An Analysis of Managerial Functions, International Student, New Delhi.
3. **Peter Ferdinand Drucker**, Management Cases, Harper and Row Publishers, New

York.

CC06 (ALLIED I)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	ALLIED PRACTICAL:BUSINESS COMPUTER APPLICATIONS	Exam Hrs.	3
		U8COAP21	

Objective: To enable the students to acquire basic theoretical and practical knowledge in Computer and Internet and its applications in various areas of business.

Unit I: Introduction to Computer (12 Hours)

Meaning – Definition – Importance - Features - Functions of Computer - Components of Computer - Hardware and Software - Input and Output Devices. (Basics only)

Unit II: Computer Memory and Role of Computers in Business (12 Hours)

Introduction - Meaning - Types of Computer Memory – Primary and Secondary Memories - Types of Storage Devices - Auxiliary storage - Hard Disks, Compact Disk, Pen Drive (USB) - Role of Computers in Business. (Basics only)

Unit III: Word Document (12 Hours)

Introduction – Uses of Word Documents - Word Basics - Various parts of a word window - Formatting Text and Documents - Line spacing – Margins - Borders and

Shading - Headers and Footers – Tables - Creating table – Inserting, Changing and Deleting rows – Inserting, Changing and Deleting column - Overview of Word menu options - Word basic tool bar. (Basics only)

Unit IV: Excel/Spreadsheet

(12 Hours)

Introduction to Spreadsheet – Uses of Spreadsheet in Accounting, Finance and Marketing functions of Business – Spreadsheet basics – Parts of Spreadsheet - Creating, Inserting and Deleting Rows and Columns – Drawing Bar Charts and Pie Diagram. (Basics only)

Unit V: PowerPoint Presentations

(12 Hours)

PowerPoint Presentations: Basics – Creating Presentations - Using blank presentation option - Using design template option - Adding a slide - Deleting a slide - Importing Images - Transition and build effects - Numbering a slide - Saving presentation - Closing presentation - Printing presentation elements – Making a Slideshow. (Basics only)

Books for Study:

1. **Sanjay Saxena**, Introduction to Computers & MS Office, Vikas Publishing House Pvt. Ltd., New Delhi.
2. **Ananthi Sheshasaayee & Sheshasaayee**, Computer Applications in Business and Management, Margham Publications, Chennai.

Books for Reference:

1. **Alexis Leon & Mathews Leon**, Computer Applications in Business, Vijay Nicole Imprints Pvt.Ltd., Chennai.
2. **Srinivasa Vallabhan**, Computer Applications in Business, Sultan Chand & Sons, New Delhi.
3. **Ed Bott, woody Leonhard**, Using Microsoft Office 2007, Pearson Education, New Delhi.

EC06 (ALLIED I)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED BUSINESS ECONOMICS - II	Exam Hrs.	3
		U8COAL22	

Objective: *To acquaint students with application of economic theories in National and International Economics.*

UNIT – I: Market Structure (12 Hours)

Meaning – Classification – Monopoly – Duopoly - Oligopoly - Monopolistic Competition – Perfect Competition (Meaning and Features only).

UNIT – II: Price and Profit (12 Hours)

Equilibrium Price – Profit Maximization – Sales Maximization – Theories of Profit – Rent, Risk and Uncertainty.

UNIT –III: National Income (12 Hours)

National Income - Definition – Circular flow – Measurement of National Income – Gross Domestic Product – National Domestic Product – Gross National Product – Net National Product – Difficulties in measurement of national income – National income and welfare.

UNIT –IV: Fiscal Economics & Monetary Policy (12 Hours)

Public Revenue - Public Expenditure – Fiscal Deficit - Fiscal Policy - Monetary Policy: Meaning - Importance – Objectives - Types - Instruments.

UNIT –V: International Trade**(12 Hours)**

International Trade - Meaning – Importance – Modern theory of International trade - Balance of Trade - Balance of Payment – Components.

Books for Study:

1. **Sankaran S**, Business Economics, Margham Publications, Chennai.
2. **Ahuja H.L.**, Business Economics, S.Chand & Co. Ltd., New Delhi.

Books for Reference:

1. **Agarwal M.D., and Som Deo**, Business Economics, Ramesh Book Depot, New Delhi.
2. **Mehta P.L.**, Managerial Economics, Sultan Chand & Sons., New Delhi.
3. **Mithani. D.M.**, Managerial Economics – Theory and Application, Himalaya Publishing House Pvt. Ltd., Mumbai.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	MARKETING MANAGEMENT	Exam Hrs.	3
		P8CO1001	

Objective:*To provide insight into various concepts and tools used in Marketing.*

UNIT – I: Marketing

(18 Hours)

Marketing - Definition – Scope – Functions – Marketing Concepts – Mass marketing – Niche marketing – Strategic marketing – Demarketing – Remarketing – Social marketing – Green marketing – Marketing Management – Areas of Marketing Management.

UNIT – II: Product Planning & Product Life Cycle(18 Hours)

Product – Features – Classification - Product life cycle - Product line – Factors determining the scope of product line - Product mix - Developing a new product — Challenges in new product development. Branding -Advantages and Disadvantages of branding – Brand Management – Packaging and Labeling.

UNIT – III: Designing Pricing Strategies

(18 Hours)

Pricing - Objectives – Factors affecting pricing decisions – Procedure for price determination – Kinds of pricing – Pricing of a new product.

UNIT – IV: Channels of Distribution (18 Hours)

Channels of Distribution - Objectives – Functions – Types – Channel management decisions – Evaluating the major channels – Vertical marketing system – Horizontal marketing system – Multi channel system.

UNIT – V: Managing Direct and Online Marketing

(18 Hours)

Direct Marketing – Benefits – Limitations - Major channels for direct marketing — Online marketing – Advantages and disadvantages – Prospects and challenges of online marketing – Ethical issues in direct marketing.

Books for Study:

- 1. Ramaswamy V S and Nandakumari S**, Marketing Management, McMillan, Delhi.
- 2. Varshney R L and Gupta S L**, Marketing Management, Sultan Chand & Sons., New Delhi.

Books for Reference:

1. **Philip Kotler**, Marketing Management, Prentice Hall of India Pvt. Ltd., New Delhi.
2. **Bagozzi R P**, Principles of Marketing Management, Science Research Associates, Chicago.
3. **Govindarajan M**, Marketing Management, Prentice Hall of India Pvt. Ltd., New Delhi.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED MANAGEMENT ACCOUNTING	Exam Hrs.	3
		P8CO1002	

Objective: *To familiarize the students with Accounting Tools used in Decision Making.*

UNIT – I: Management Accounting (18 Hours)

Management Accounting - Scope and importance – Management Accounting Vs Financial Accounting – Management Accounting as a tool for decision making – Ratio Analysis.

UNIT – II: Decision Making Techniques (18 Hours)

Cost Volume Profit Analysis – BEP – Margin of Safety – Pricing decisions – Make or buy – Key factor – Selection of suitable Product Mix.

UNIT – III: Funds Flow Statement (18 Hours)

Funds Flow Statement - Utility - Preparation of Fund Flow Statement.

UNIT – IV: Cash Flow Statement (18 Hours)

Cash Flow Statement - Distinction between fund flow statement and cash flow statement - Utility – Preparation of Cash Flow Statement - Statement as per AS 3.

UNIT – V: Budget and Budgetary Control (18 Hours)

Budget – Budgetary Control - Concept - objectives – Budget administration – Functional budgets – Fixed and flexible budgets – Zero base budget – Performance budget.

Note: Weightage of marks: Theory 20% and Problems 80%

Books for Study:

1. **I M Pandey**, Management Accounting, Vikas Publishing House.
2. **S N Maheswari**, Management Accounting, Sultan Chand & Sons, New Delhi

Books for Reference:

1. **Khan and Jain**, Management Accounting, Tata McGraw Hill, New Delhi
2. **Ravi M Kishore**, Management Accounting, Taxman Publication, New Delhi
3. **Robert S Kaplan and Anthony Atkinson**, Advance Management Accounting , Prentice Hall, New Delhi.

CORE PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	ADVANCED BUSINESS STATISTICS – I	Exam Hrs.	3
		P8CO1003	

Objective: *To familiarize students with advanced statistical tools and techniques of data analysis in business and research.*

UNIT-I: Statistics (18 Hours)

Meaning - Definition – Characteristics – Functions and Scope of Statistics. Data: Meaning – Types of data – Primary vs. Secondary data – Sources of primary data and secondary data – Vital statistics.

UNIT-II: Correlation Analysis (18 Hours)

Meaning – Uses – Correlation and causation – Types of Correlation – Methods of Correlation – Scatter diagram method – Graphic method – Karl Pearson's co-efficient of correlation – Rank correlation – Concurrent deviation method.

UNIT-III: Regression Analysis (18 Hours)

Meaning – Uses – Distinction between Correlation and Regression – Direct method – Actual Mean Method – Assumed mean method – Grouped data.

UNIT-IV: Partial Correlation, Multiple Correlation & Multiple Regression

(18 Hours)

Partial Correlation – Multiple Correlation - Characteristics – Multiple Regression Analysis.

UNIT-V: Introduction to Quantitative Techniques(18 Hours)

Meaning of Quantitative Techniques – Classification of quantitative techniques – Important operations research techniques – Role of quantitative techniques in business and industry – Limitations of quantitative techniques.

Note: Weightage of Marks - Theory 20% Problem 80%

Books for Study:

1. **Dr. S.P.Gupta**, Statistical Methods, Sultan Chand & Sons, New Delhi.
2. **C.R. Kothari**, Quantitative Techniques, Vikas Publishing House Pvt. Ltd., Noida.

Books for Reference:

1. **Dr. S.P.Gupta, and M.P.Gupta**, Business Statistics, Sultan Chand & Sons, New Delhi.
2. **R.S.N.Pillai and Bhagavathi**, Statistics-Theory & Practice, S.Chand & Co., New Delhi.
3. **P.R.Vittal**, Business Statistics & Operations Research, Margham Publications, Chennai.

CORE PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	BUSINESS ENVIRONMENT	Exam Hrs.	3
		P8CO1004	

Objective: To enable the students to have an overview of various factors influencing business and its prosperity.

UNIT - I: Introduction

Meaning of Business Environment – Nature and Significance – Types of Environment – Internal and External - Micro and Macro – Environmental Analysis - Techniques – Approaches - Environmental Forecasting – Types – Techniques.

UNIT - II: Societal Environment

Business and Society – Objectives and Importance of Business - Business Ethics and Business Culture – Social Responsibility of Business - Responsibilities to different sections – Arguments for and against Social Involvement – Social audit.

UNIT - III: Political and Legal Environment

Political and Government Environment – Regulations toward Trade, Taxation Policies – Priorities in Social Sector. New Industrial Policy Resolution – Privatization & Disinvestment – Patents and Trademarks – Monetary and Fiscal policies.

UNIT - IV: Labour Environment

Labour Legislations – Labour Welfare and Social Security – Trade Unions – Workers Participation in Management – Quality circles.

UNIT - V: Global Environment

Globalization of World Economy – Globalization of Business – Meaning and Dimensions – Pros and Cons of Globalization - Impact on Indian Business Environment – Foreign Market Entry Strategies - International trade – Free Trade Vs Protection – Differences between Internal and International Trade – Multinational Corporations – Meaning – Merits and Demerits of MNCs. GATT and WTO – Objectives GATT - Functions of WTO.

Books for Study:

1. **Francis Cherunilam**, Business Environment, Himalaya Publications, Mumbai.
2. **Sheikh Saleem**, Business Environment, Pearson Education, New Delhi.

Books for Reference:

1. **Suresh Bedi**, Business Environment, Exel, New Delhi.
2. **Shajahan**, International Business, Mac MilanIndia, New Delhi.
3. **P.K.Gosh & G.K. Kapoor**, Business Policy and Environment, Sultan Chand and Sons, New Delhi.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	BUSINESS & PROFESSIONAL COMMUNICATION	Exam Hrs.	3
		P8COEP11	

Objective: *To familiarize students with the principles of Business & Professional Communication and to enhance students' communication skills.*

UNIT - I: Introduction

(18 Hours)

Communication – Importance – Process - Verbal and Non-Verbal Communication – Types - Principles of Effective Communication – Communication Barriers – Types – Overcoming the Barriers of Communication.

UNIT - II: Business Communication

(18 Hours)

Business Communication – Meaning – Forms of Business Communication - Oral Communication – Benefits - Limitations - Written Communication – Benefits -

Limitations – Types of Letters – Job Application Letter – Office Correspondence – Meaning - Classification of Office Correspondence.

UNIT – III: Resume Writing, Interview Techniques and Group Discussion

(18 Hours)

Resume – Curriculum Vitae – Differences between Resume and Curriculum Vitae – Preparation of Resume and Curriculum Vitae. Interview - Meaning – Objectives – Limitations - Types of Interviews – Structured vs Unstructured Interviews - Job Interview Skills – Evaluating Job Interview Skills. Group Discussion – Meaning – Importance – Group Discussion Skills.

UNIT - IV: Professional Communication

(18 Hours)

Meaning – Definition – Objectives and Importance – Effective Listening – Guidelines for Effective Communication – Internal vs External Communication - Effective Written Communication.

UNIT - V: Modern Communication

(18 Hours)

E-Communication – Meaning – Benefits and Limitations – Modern Methods of Communication – E-Mail – Video Conferencing - Social Networks – Instant Messaging – Benefits and Limitations.

Books for Study:

1. Rajendra Pal & J.S. Korlahalli, Essentials of Business Communication, Sultan Chand & Sons, New Delhi.

2. Andrea Rutheford, Business Communication Skills for Technology, Pearson Educations.

Books for Reference:

1. Deborah Raorch & Elieen Perrigo, Allen & Becon, Business and Professional Communications for the 21st Century.

2. J. Penrose, Advanced Business Communicator, Thomson Asia Ltd.
Guffey, Thomson, Business Communication.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	CORPORATE LAWS	Exam Hrs.	3
		P8COEP12	

Objective: To make the students understand the legal framework in connection with the companies.

UNIT –I: Introduction (18 Hours)

Corporate Laws Importance – Objectives – Corporate Personality - Competition Act, 2002 – Objectives and Scope – Anti Competitive Agreements – Competition Commission of India – Competition Appellate Tribunal.

UNIT –II: The Consumer Protection Act, 1986 (18 Hours)

The Consumer Protection Act, 1986 – Objectives – Definition – Consumer Protection Councils – Consumer Dispute Redressal Agencies – Powers – Duties – District Forum – State Commission – National Commission – Appeals – Role of Consumers – Complaint Procedure.

UNIT –III: The Foreign Exchange Management Act, 2000 (18 Hours)

The Foreign Exchange Management Act, 2000 (FEMA) – Extent and Application – Current Account Transactions – Capital Account Transaction – Export of Goods and Services – Directorate of Enforcement - Powers.

UNIT –IV: The Information Technology Act, 2000 (18 Hours)

The Information Technology Act, 2000 – Definition u/s 2 – Digital Signature – Legal Recognition of Electronic Records – Controller of Certifying Authorities – Duties of Subscriber of DSC – Cybercrimes – Cyber Appellate Tribunal – Powers – Appeals.

UNIT – V: The Environment Protection Act, 1986 (18 Hours)

Environment Protection Act, 1986 – Definitions – Objectives – Scope – Powers of Central Government and State Government – Kinds of Pollution – Water & Air - Pollution Control Board – Central & State Constitution and Powers.

Books for Study:

1. N.D. Kapoor, Elements of Company Law, Sultan Chand & Sons Ltd. New Delhi.
Economic Laws, Taxmann Allied Service (P) Ltd., New Delhi.

Books for Reference:

1. **K.G. Garg, Mukesh Sharma**, et.al., Business and Corporate Law, Kalyani Publishers, New Delhi.
2. **S.S. Gulshan**, A Hand Books of Corporate Laws, S.Chand & Co. New Delhi.. Individual Bare Acts.

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	HUMAN RESOURCE MANAGEMENT	Exam Hrs.	3
		P8CO2001	

Objective: To make the students realize the significance of the Management of Human Resources in an Organisation.

UNIT – I: Human Resource Management (15 Hours)

Nature and scope of HRM – Concepts of HRM – Characteristics – Objectives – Importance – Functions – Emerging trends in HRM

UNIT – II: Human Resources Planning (15 Hours)

Need and importance of HR planning – HR forecasting – Job analysis – Job description – Job specification.

UNIT – III: Recruitment and Selection (15 Hours)

Meaning - Recruitment – Sources of recruitment – Techniques of recruitment – Selection methods - Testing – Interviewing – Placement and Induction.

UNIT – IV: Employees Training (15 Hours)

Concepts of training – Need and importance of training – Types of training – Methods and techniques of training – Evaluating effectiveness – Executive Development – Methods and techniques of ED.

UNIT – V: Performance Appraisal (15 Hours)

Concepts – Objectives – Importance – Methods of performance appraisal – Traditional and modern methods

Books for Study:

1. **C.B. Gupta**, Human Resource Management, Sultan Chand and Sons, New Delhi.
2. **Dr. K. Sundar & Dr. J. Srinivasan**, Human Resources Management, Vijay Nicole Publishers, Chennai.

Books for Reference:

1. **L.M. Prasad**, Human Resource Management – Sultan Chand and Sons, New Delhi.
2. **P.G. Aquinas**, Human Resources Management Principles and Practices, Vikas Publishers, New Delhi.
3. **David A. Decenzo & S.P. Robbins**, Personal / Human Resource Management, PrenticeHall India, New Delhi.

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED FINANCIAL MANAGEMENT	Exam Hrs.	3
		P8CO2002	

Objective: *To make the students to manage effectively all aspects of finance and investments.*

UNIT – I: Financial Management (18 Hours)

Financial Management - Functions – Goals – Maximization vs. Optimization – Risk- return trade-off.

UNIT – II: Fund Management (18 Hours)

Long term sources – Shares and Debentures – Convertible securities and term loans – Working capital financing – Sources and approaches - Bank credit – Basic principles and methods of assessment – Other sources of short term finance – Operating environment of working capital

UNIT – III: Capital Structure and Leverage (18 Hours)

Concepts of cost of capital – Cost of equity, debt, retained earning – Weighted average cost of capital – Capital structure theories – Net income, Net operating income, MM and Traditional Theories. Dividend Policy and Practices – Dividend policies – Factors affecting dividend decisions – Dividend theories – Gordon, Walter and MM theories

UNIT – IV: Working Capital Management (18 Hours)

Working capital cycle – Factors influencing working capital - Forecasting of working capital requirements - Management of inventory, cash and accounts receivable – Payables management – Credit and collection policies.

UNIT – V: Management of Fixed Asset (18 Hours)

Evaluation of capital investment decision – Payback Period – ARR – IRR – NPV.

Note: Weightage of Marks - Theory 40% Problem 60%

Books for Study:

- 1. I.M. Pandey**, Financial Management, Vikas Publishing House, New Delhi.
- 2. M.Y. Khan and P.K. Jain**, Financial Management, Tata McGraw Hill Publishing Company Limited. New Delhi.

Books for Reference:

- 1. S.N. Maheswari**, Fundamentals of Financial Management, Sultan Chand & Sons, New Delhi.
- 2. Prasanna Chandra**, Financial Management, Theory and Practice, Tata McGraw Hill Publishing Company, New Delhi.
- 3. P.V.Ratnam**, Financial Management Theory, Problems and Solutions, Kitab Mahal, New Delhi.

CORE PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	ADVANCED BUSINESS STATISTICS - II	Exam Hrs.	3
		P8CO2003	

Objective: To familiarize students with advanced statistical tools and techniques of data analysis in business and research.

UNIT-I: Probability

(18 Hours)

Addition and multiplication theorem – Conditional probability – Baye's theorem.

UNIT-II: Chi-square Test (18 Hours)

Uses – Properties of chi-square test – Procedure for testing the significance of the difference between the observed and expected frequencies – Cautions while applying chi-square test – Hypothesis framing – Hypothesis testing.

UNIT-III: F-test (18 Hours)

Properties of F-test – Analysis of variance (ANOVA) – One-way classification – Two-way classification – Testing of hypotheses.

UNIT-IV: Students' t-Distribution

(18 Hours)

Properties of t-distribution – Application of the t-distribution – Cautions while using t-test – Normal curve – Z test – Testing of hypotheses.

UNIT-V: Assignment Problems

(18 Hours)

Definition – Hungarian assignment method – Restricted or prohibited assignments. Transportation problems - Definition – North West corner rule – Least cost method – Vogel's approximation method - Degeneracy in a transportation problem – Unbalanced transportation problem - Optimality test.

Note: Weightage of Marks - Theory 20% Problem 80%

Books for Study:

- 1. Dr. S.P.Gupta**, Statistical Methods, Sultan Chand & Sons, New Delhi.
- 2. C.R. Kothari**, Quantitative Techniques, Vikas Publishing House Pvt. Ltd., Noida.

Books for Reference:

- 1. Dr. S.P.Gupta, and M.P.Gupta**, Business Statistics, Sultan Chand & Sons, New Delhi.
- 2. R.S.N.Pillai and Bhagavathi**, Statistics-Theory & Practice, S.Chand & Co., New Delhi.
- 3. P.R.Vittal**, Business Statistics & Operations Research, Margham Publications, Chennai.

CORE PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	FINANCIAL SERVICES	Exam Hrs.	3
		P8CO2004	

Objective: To familiarize students with widely used different financial services in the Corporate World.

UNIT – I: Financial Services (15 Hours)

Introduction – Concept – Significance – An overview of financial services in India – Financial services types – Asset based – Fund based – Advisory financial services – Financial services institutions – NBFC and other players.

UNIT – II: Leasing (15 Hours)

Introduction – Concept – Classification – Significance – Limitations – Lease documentations and agreements – Tax aspects of leasing. Hire purchase – Introduction – Concept – Significance – Leasing vs. Hire purchase – Legal framework – Taxation aspects.

UNIT – III: Factoring (15 Hours)

Introduction – Concept – Significance – Mechanism – Functions of a Factor – Types – Legal aspect of factoring – Factoring vs. Bill discounting. Forfeiting – Meaning – Salient Features of forfeiting – Advantages – Forfeiting vs. Factoring.

UNIT – IV: Venture Capital (15 Hours)

Introduction – Features – Selection of investment – Stages of financing – Evaluation methods – Conventional Method, First Chicago Method and Revenue Multiplier Method – Investment Nurturing – VCI debt instruments – Indian scenario.

UNIT – V: Fee Based & Advisory Financial Services (15 Hours)

Introduction – Types – Merchant bankers – Underwriters – Portfolio management – Issue management – Bankers to issue – Book building – Stock broking – Credit rating – Depository Services.

Books for Study:

- 1. M.Y. Khan**, Financial Services, McGraw Hill, New Delhi..
- 2. G Ramesh Babu**, Financial Services, Concept Publishing House, New Delhi.

Books for Reference:

1. **B S Bhatia and G S Batra**, Management of Financial Services, Deep & Deep Publications Pvt. Ltd., New Delhi.
2. **Rajesh Khothari**, Financial Service in India, Sage Publications, New Delhi.
3. **Clifford Gomez**, Financial Market, Institution and Financial Services, Prentice Hall, New Delhi.

COMMON PAPER	SEMESTER II	Credit	-
		Hrs./Week	2
COURSE TITLE	HUMAN RIGHTS	Exam Hrs.	3
		P8HR2001	

Objective: To make the students know the different dimensions in connection with the Human Rights.

UNIT – I

(5 Hours)

Definition of Human Rights – Nature, Content, Legitimacy and Priority – Theories on Human Rights – Historical Development of Human Rights.

UNIT – II

(5 Hours)

International Human Rights – Prescription and Enforcement till World War II – Human Rights and the U.N.O. – Universal Declaration of Human Rights – International Covenant on Civil and Political Rights – International Covenant on Economic, Social and Cultural Rights and Optional Protocol.

UNIT – III

(5 Hours)

Human Rights Declarations – U.N. Human Rights Declarations – U.N. Human Commissioner.

UNIT – IV

(5 Hours)

Amnesty International – Human Rights and Helsinki Process – Regional Developments – European Human Rights System – African Human Rights System – International Human Rights in Domestic courts.

UNIT – V

(5 Hours)

Contemporary Issues on Human Rights: Children's Rights – Women's Rights – Dalit's Rights – Bonded Labour and Wages – Refugees – Capital Punishment. Fundamental Rights in the Indian Constitution – Directive Principles of State Policy – Fundamental Duties – National Human Rights Commission.

Books for study:

1. **K. Mohanasundaram**, Human Rights: Theories and Practice, Concept Publishing Company (P) Ltd., New Delhi.
2. **Begum S**, Human Rights in the New Millennium, APH Publishing Corporation, New Delhi.

Books for Reference:

1. **Ram Ahuja**, Social Problems in India, Rawat Publications, Jaipur.
2. **B.Goswami, ed.**, Human Rights and Reforming the Law Raj Publishing House, Jaipur.
3. **Rekha Roy**, Women's Rights in India: A Feminist Perspective, Akasha Publishing House, New Delhi.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	CONSUMER BEHAVIOUR	Exam Hrs.	3
		P8COEP21	

Objective: To make the students understand the concepts of Consumer and his behaviour at diversified situations.

UNIT – I: Introduction to Consumer Behaviour (18 Hours)

Nature and Importance of consumer behaviour – Application of consumer behaviour in marketing – Factors influencing consumer behaviour – Consumer research process.

UNIT – II: Individual Determinants of Consumer Behaviour (18 Hours)

Motivation – Needs – Motives and goals – Dynamic nature of motivation – Arousal of motives – Personality – Nature – Theories – Self concept – Psychographic and life style. Perception – Process – Consumer imagery – Perceived risk. Learning – Principles – Theories – Attitude – Structural model of attitude – Attitude formation and change

UNIT – III: Group Determinants of Consumer Behaviour (18 Hours)

Reference group influence – Types of consumer relevant groups – Factors affecting group influence – Application of reference group – Concept of Family – Functions of family – Family decision making – Family life cycle – Opinion leadership and personal influence.

UNIT – IV: Environmental Influences on Consumer Behaviour (18 Hours)

Social class – Life style profile of social class application to consumer behaviour – Social class mobility. Culture – Meaning - Characteristics – Factors affecting culture – Role of customs – Values and beliefs in consumer behaviour. Sub-culture – Meaning – Sub-culture division and consumption pattern in India – Types of sub-culture – Cross cultural consumer analysis – Similarities and differences among people – Cross-cultural marketing problems in India – Strategies to overcome cross-cultural problems.

UNIT – V: Organisation and Consumers (18 Hours)

Factors influencing organisational buying behaviour – Consumer and marketer – Marketing communication and persuasion – Developing persuasive communication – Market regulation – Consumer dissatisfaction.

Books for Study:

1. **Gupta S L**, Consumer Behaviour, Sultan Chand & Sons, New Delhi.
2. **S. Ramesh Kumar**, Consumer Behaviour and Branding, Pearson Education, New Delhi.

Books for Reference:

1. **David L. Loudon and Albert J Della Bitta** , Consumer Behaviour, Tata McGraw Hill, New Delhi.
2. **Leon G. Schiffman and Leslie Lasar Kanuk**, Consumer Behaviour, Pearson Education, India.
3. **Jim Blythe**, Consumer Behaviour, Sage Publication, New Delhi.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	E-COMMERCE	Exam Hrs.	3
		P8COEP22	

Objective: *To familiarize students with the existence and applicability of electronic based Commerce.*

Unit - I: Introduction to E-Commerce (18 Hours)

Meaning and Definition of E-Commerce – Features of E-Commerce – Advantages and Disadvantages – Issues and Constraints – Traditional Commerce Vs. E-Commerce.

Unit – II: E-Business Models (18 Hours)

Introduction to E- Business - E-Commerce Models – Models based on Transaction Types – Brokerage Model, Aggregate Model, Community Model, Manufacturer Model and Marketplace Model.

Unit – III: Electronic Data Interchange (18 Hours)

Electronic Data Interchanges (EDI) – Meaning – Benefits of EDI – Process of EDI – Components of EDI – Applications of EDI in business.

Unit – IV: E-Marketing & E-CRM (18 Hours)

E-Marketing – Meaning – Traditional Marketing vs. E- Marketing – Online Marketing – Pros & Cons of Online Shopping – E- Advertising – E- Branding – Target Markets – Introduction to Customer Relationship Management – E- CRM.

Unit – V: E – Banking & E – Communication (18 Hours)

E-Banking – Meaning – Features – Mobile Banking - E-Payment System – Classification of E-Payment System – Risks in E-Payment System. E-Communication – Meaning – Types of E-Communication – E-Mail - Advantages and Disadvantages of E-Mail.

Books for Study:

1. **Elias M. Awad**, Electronic Commerce, Prentice Hall of India, New Delhi.
2. **K. Abirami Devi & Dr. M. Alagammai**, E-Commerce, Margham Publications, Chennai.

Books for Reference:

1. Gary P.Schneider, E-Commerce – Strategy, Technology and Implementation, Cengage Learning India Pvt. Ltd., New Delhi.
2. P.T.Joseph, S.J., E- Commerce – An Indian Perspective, Prentice Hall of India, New Delhi.
3. Greenstein & Merylin, Electronic Commerce, Tata Mc.Graw Hill, New Delhi.

CC01 (CORE)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	FINANCIAL ACCOUNTING – I	Exam Hrs.	3
		U8FA1001	

Objective: To equip the students to understand basic financial accounting concepts in the background of theoretical and practical knowledge.

UNIT–I: Introduction

Basic Accounting Concepts and Conventions – Journal – Ledger – Preparation of Trial Balance – Errors – Types and Rectification of Errors.

UNIT–II: Final Accounts

Preparation of Final Accounts – Trading Account – Profit and Loss Account Balance Sheet – Distinction between Capital and Revenue expenditure – Adjustments Entries – Bank Reconciliation Statement (BRS).

UNIT–III: Depreciation Accounting

Meaning of Depreciation – Causes of Depreciation – Methods of Providing Depreciation – Straight Line Method – Diminishing Balance Method – (Excluding Change in the Method of Depreciation) – Annuity Method– Sinking Fund Method – Concept of Depreciation under Companies Act 2013.

UNIT–IV: Average Due date and Insurance claims

Determination of Average Due Date – Account Current.

UNIT–V: Single Entry system

Single Entry – Objectives – Definition – Salient features – Limitations of Single Entry – Ascertainment of Profit – Statement of Affairs Method – Conversion Method – Difference between Statement of Affairs and Balance Sheet.

Note: Weightage of Marks: Theory 20% and Problems 80%

Book for Study:

1. T.S. Reddy & A. Murthy – Financial Accounting, Margham Publications, Chennai-2017

Books for Reference

1. M.C. Shukla, T.S. Grewal. Advanced Accounts [Volume I] S.Chand & Co. Ltd. New Delhi-2012
2. R.S.M. Pillai, Bagawathi & S.Uma – Advanced Accounting (Financial Accounting) Volume-I, S.Chand & Co. Ltd., New Delhi-2010
3. R. L. Gupta & V. K. Gupta, Financial Accounting, Sultan Chand & Sons, New Delhi-2010

CC02 (CORE)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	INDUSTRIAL LAW	Exam Hrs.	3
		U8FA1002	

Objective: To enable the students to gain knowledge on few enactments that governs working of industries and to labour force.

UNIT – I: Factories Act 1948

Factories Act 1948 – Definition and Meaning – Health, Safety and Welfare – Hazardous Process – Working Hours for Adults – Holidays – Employment of Young Persons and Women – Annual Leave with Wages.

UNIT – II: Workmen’s Compensation Act 1923

The Workmen’s Compensation Act 1923 – Definition and Scope – Rules Regarding Compensation – Amount and Distribution of Compensation – Fatal Accident – Insolvency of Employer – Returns as to Compensation – Contracting out – Penalties.

UNIT – III: Payment of Wages Act 1936, Minimum Wage Act 1948 & Payment of Gratuity Act 1972

The payment of Wages Act 1936 – Definition – Rules for payment of Wages – Deduction from wages – Registers and Records – Inspection – Appeal – Penalty of offence – Minimum Wage Act 1948 – Objectives – Scope – Applicability – Fixing minimum wages – Payment of Gratuity Act– Objectives – Applicability – Superannuation Vs. Retirement– Calculation of Gratuity – Forfeiture of Gratuity – Controlling Authority.

UNIT – IV: Industrial Dispute Act 1947

Industrial Dispute Act 1947 – Objects and Definitions – Industrial Dispute Meaning – Reference of Disputes to Grievance – Settlement Authorities – Authorities under the Act Conciliation and Adjudication Machinery – Procedure, Powers and Duties of Authorities – Strike, Lockout and Layoff – Retrenchment.

UNIT – V: ESI Act 1948, Employees Provident and Miscellaneous Provisions Act 1952

Constitutions of ESI – Power and Duties – ESI Fund – Contributions– General Provisions relating to Benefits – Employers Duties and Responsibilities – Theory of Notional Extension – EPS Scheme – Contribution, Advance, Advance/Withdrawal/Final Withdrawal – Employee Pension Scheme – Employees Deposit Linked Scheme.

Book for Study:

1. Legal Systems in Business– T.S.Ravi, Margham Publications, Chennai.2015

Books for Reference

1. Elements of Mercantile Law, N.D. Kapoor, Sultan Chand & Sons, New Delhi-2013
2. Legal Aspects of Business, Saravanavel & Sumathi, Kalyani Publishers, Delhi-2013
3. Commercial and Industrial Law, Dr. M.R. Srinivasan – Margham Publications, Chennai-2016.

EC03 (ALLIED I)	SEMESTER I	Credit	4
		Hrs./Week	5
COURSE TITLE	ALLIED-BUSINESS COMMUNICATION	Exam Hrs.	3
		U8FAAL11	

Objective: To familiarize students with the principles of Business Communication and to train them to draft various business letters.

UNIT – I: Communication

Communication – Meaning – Objectives -Principles -Importance of effective communication in business – Types of communication – Verbal and Non-verbal – Formal and Informal – Directions of Communication – Barriers of Communication.

UNIT – II: Business Letters

Business letter – Functions – Kinds of business letters – Essentials of an effective business letter – Lay-out of a business letter – Tips for writing an effective business letter – Etiquettes for E-Communication.

UNIT – III: Enquiries and Replies

Enquiries – Status Enquiry – Replies – Offers and Quotations – Important terms used

in offers and Quotations – Orders and their execution – Tenders – Guidelines for drafting tender notice – Specimen of tender notice.

UNIT – IV: Collection Letters

Collection letter – Effective collection letter – Collection series – Replies of debtors – Circular letters – Objectives of writing Circular Letters – Specimen of circular letter.

UNIT – V: Application Letters

Introduction – Contents – Specimen of Application Letter – Bio-Data – Curriculum Vitae – Resume – Interview Call Letter.

Book for Study:

1. CB Gupta, Basic Business Communication, Sultan Chand & Sons, New Delhi.- 2010

Books for Reference:

- 1.Rajendra Pal, J.S. Korlahalli, Essentials of Business Communication, Sultan Chand & ons, New Delhi-2012
- 2.Business Communication, S.Thameemulansari, Dr.N.Ragavan, Shri Sai Publishers Distributors-Chennai-2015
- 3.Dr. Sundar, Business Communication, Vijay Nicole Publishing Co., Chennai-2012.

EC04 (ALLIED I)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED-INDIAN ECONOMY	Exam Hrs.	3
		U8FAAL12	

Objective: To enable the students to understand the salient features of India and her occupational structure; to assess the relative share of agriculture, Industry and Service sector in the economy and to analyze the fruits of planning.

UNIT-I: Indian Economic Development: An Overview

Salient Features of Indian Economy – India as an Underdeveloped Economy – India as a Rapidly Emerging Developing Economy - Factors responsible for Development – Development as distinct from Growth – Obstacles to Economic Development.

UNIT-II: Planning & Development

Planning in India – Meaning – Economic Planning – Types of Planning– Major objective of Planning – Nithi Aayog.

UNIT – III: Agricultural Economy

Agriculture – Role in Indian Economy (Contribution to GNP & Employment) – Problems of Low Productivity – Land Reforms – Need and Scope – Green Revolution.

UNIT – IV: Industrial Economy

Industry – Importance – Role of Large Scale Industries – Role of Small and Micro Enterprises – Industrial Sickness – Causes and Measures.

UNIT – V: New Economic Policy

New Economic Policy and its impact on Indian Economy – Liberalisation – Privatization – Globalization - Advantages and Disadvantages

Book for Study:

1. Dhingra. I.C., Indian Economy, Sultan Chand & Sons, New Delhi-2017.

Reference Books:

1. Rudar Datt & Sundaram, Indian Economy, S. Chand & Co, New Delhi-2017.
2. Dr. S. Sankaran, Indian Economy, Margham Publications, Chennai-2017
3. M.L. Jhingan, Economics of Development & Planning, Konark Publishers, New Delhi-2012.

CC03 (CORE)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	FINANCIAL ACCOUNTING – II	Exam Hrs.	3
		U8FA2001	

Objective: To gain knowledge of accounting in general, to understand the system of Financial Accounting.

UNIT – I: Branch Accounts

Branch Accounts – Objectives of Branch Accounts – Types of Branches – Dependent Branch – Debtor system – Stock and Debtor system – Independent Branch (Foreign Branch Excluded) – Final Account System.

UNIT – II: Departmental Accounts

Departmental Accounts – Distinction between Department and Branches – Allocation of expenses – Interdepartmental department transfer at Cost or Selling Price. (Simple problems only).

UNIT – III: Hire Purchase System & Instalment System

Hire Purchase System – Accounting treatment – Calculation of Interest – Books of Hire Purchaser and Hire Vendor – Default and Repossession – Installment System Distinction between Hire Purchase System and Installment Purchase System – Accounting treatment – Books of Buyers and Sellers.

UNIT – IV: Partnership Accounts (Admission, Retirement)

Partnership– Meaning and Features– Types of Partners – Admission of a Partner – Profit & Loss Appropriation account – Adjustment in Profit Sharing Ratio– Treatment of Goodwill – Adjustment for Goodwill – Retirement of partner.

UNIT – V: Partnership Accounts (Retirement, Dissolution & Piecemeal Distribution)

Death of Partners– Dissolutions of Partnership Firm– Insolvency of a Partner and Partnership Firm– Garner vs. Murray– Gradual Realisation and Piecemeal Distribution. (Simple Problems only).

Note Weightage of Marks: Theory 20% and Problems 80%.

Book for Study:

1. T.S. Reddy & A. Murthy – Financial Accounting, Margham Publications, Chennai-2017.

Books for Reference:

1. M.C. Shukla, T.S. Grewal. Advanced Accounts [Volume I] S.Chand & Co. Ltd. New Delhi-2012.
2. R.S.M. Pillai, Bagawathi & S.Uma – Advanced Accounting (Financial Accounting) Volume–I S.Chand & Co. Ltd., New Delhi-2010.
3. R. L. Gupta & V. K. Gupta, Financial Accounting, Sultan Chand & Sons, New Delhi-2010.

CC04 (CORE)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	FINANCIAL MARKETS	Exam Hrs.	3
		U8FA2002	

Objective: To know the basic ideas of Indian capital market and understand the functioning of primary and secondary markets, further to familiarize the student about stock trading.

UNIT- I: Financial System

Introduction- Development of Financial System in India -Functions of Financial System– Introduction-Capital Markets – its Importance – Money Market — Weaknesses of Indian Financial System – Money Market Vs. Capital Market.

UNIT- II: Primary Market

Functions of New Issues Market – Methods of Floating New Issues – Guidelines – Steps – Instruments – Players – Recent trends – Advantages of New Issues- IPO, OTC

UNIT- III: Secondary Market

Control of Secondary Market –Function of Stock Exchange- SEBI- Recognition and Services of Stock Exchanges – Organisation of Stock Exchanges in India – Traditional Structure of Indian Stock Exchanges – Listing of Securities – A, B and C Group of Shares – Advantages, Drawbacks, Procedure, Criteria and Obligations of Listing.

UNIT- IV: Trading

Registration, Procedure, Code of Conduct and Functions of Brokers – Kinds of Brokers – Method of Trading in Stock Exchange – Online Trading – NSE–NEAT System – Carryover or Badla– Genuine Trading Vs. Speculative Transactions – Stock Indices – Recent Developments.

UNIT- V: Derivatives, Forward and Future Market

Meaning – Definition– Kinds of Financial Derivatives – Forwards, Futures (Options, Call options and Put Options and Swaps).

Book for Study:

1. Financial Markets and Services, E.Gordon,K.Natarajan, Himalaya Publishing House,Chennai-2015.

Books for Reference:

1. Financial Services, B.Santhanam, Margham Publication, Chennai, 2016.
2. Financial Services, M.Y.Khan,Tata Mcgraw hill ,New Delhi-2004.
3. Indian Financial System, P.N.Varshney, Dr.K.Mital, Sultan Chand & Sons,New Delhi-2015.

EC07 (ALLIED I)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	ALLIED-BUSINESS LAW	Exam Hrs.	3
		U8FAAL21	

Objective: *To provide students a comprehensive knowledge on all aspects of legal rules as to contracts & sale of goods.*

UNIT – I: Formation of Contracts

Essential Elements of Contracts – Types of Contract and Agreement, Rules as to offer, Acceptance and Consideration – Capacity to Contract.

UNIT – II: Performance of Contract

Performance of Contract – Discharge of Contract – Breach of Contract and Remedies – Quasi Contracts.

UNIT – III: Indemnity and Guarantee

Indemnity and Guarantee – Features and Distinctions – Extent of Surety's Liability, Rights and Discharge of Surety – Bailment and Pledge – Features – Difference – Right and Duties of Bailor and Bailee – Right and Duties of Pawnor and Pawnee.

UNIT – IV: Contract of Agency

Definition and Meaning – Creation – Ratification and Requisite – Rights of Principal and Agent – Personal Liability of Agent – Termination of Agency – Irrevocable Agency.

UNIT – V: Sale of Goods Act 1930

Definition of Sale – Sale Vs. Agreement to Sell – Subject Matter – Express and Implied Conditions and Warranties – Caveat Emptor and Exceptions.

Book for Study:

1. Business Laws, N.D.Kapoor, Sultan Chand & Sons, New Delhi-2014.

Books for Reference:

1. Business Laws, J.Jayasankar, Margham Publication, Chennai-2016.
2. Mercantile Law, M.C. Shukla, S.Chand & Co, New Delhi-2016.
3. Business Laws, R.S.N.Pillai & Bagavathi, S.Chand & Co, New Delhi-2015.

EC08 (ALLIED I)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	ALLIED-GOODS & SERVICE TAXES	Exam Hrs.	3
		U8FAAL22	

Objective: To gain a comprehensive knowledge on all aspects indirect taxes viz., central excise, customs, VAT and service taxes.

UNIT-I: Framework of Taxation of GST

Taxation – Definition, Meaning, Objectives – Canons of Taxation – Taxes: Direct & Indirect – GST: Definition & Classification and Benefits to stakeholder

UNIT-II: State Goods & Service Tax (SGST)

Value Added Tax, Luxurious Tax – Lottery Tax – Entry Tax – Purchase Tax – Stamp duty – Goods & Passenger Tax – Tax on Vehicle – Electricity and Banking & Real Estate. Aggregate turnover, Adjudicating authority, Agent, Business, Capital goods, Casual taxable person, Composite supply, Mixed supply, Exempt supply, Outward supply, Principal supply, Place of supply, Supplier, Goods

UNIT-III: Central and Integrated GST (CGST & IGST)

CGST: Central Excise duty – Additional Duties of Customs (CVD) – Service Tax – Surcharges and all accesses – Input service distributor, Job work, Manufacture, Input tax, Input tax credit, Person, Place of business, Reverse charge, Works contract, Casual taxable person, Non-resident person, Export of goods / services, Import of goods / services, Intermediary, Location of supplier of service, Location of recipient of service - IGST: Central Sale Tax & Classification.

UNIT-IV: GST Structure

Various Slabs & Rates under GST: 0%, 5%, 12%, 18%, 28% +Cess– Custom Duty– Credit Inputs

UNIT-V: Filing of Returns and GST Technology

E-Filing – Refund– HSN (Harmonized Commodity Code)– SAC (Servicing Accounting Code) & its implication under GST – Difference between HSN & SAC under GST in India - GST Network: Structure, Vision and Mission, Powers and Functions - Goods and Service Tax Suvidha Providers (GSP): Concept, Framework and Guidelines and architecture to integrate with GST system- GSP Eco system (Theory only).

Book for Study:

1. Ghousia Khatoun, Naveen kumar C.M, Venkatesh S.N, Goods and Service Tax, Himalaya Publishing house.

Reference Books

1. Anandady Mishra, GST - Law and Procedure, Taxman
2. Publication on cost by Institute of Chartered Accounts Of India (www.icia.org)
3. Publication on cost by Institute Central Board of Excise & Customs (www.cbec.org)

CC01 (CORE)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	FUNDAMENTALS OF ACCOUNTING - I	Exam Hrs.	3
		U8CA1001	

Objectives:

- *To Provide Knowledge on the fundamental aspects of Financial Accounting.*
- *To expose the students to various aspects of Financial Accounting and its current applications.*

UNIT- I INTRODUCTION

Definition of Accounting – Advantages and Limitations of accounting- Need, concepts and conventions - Accounting Equation –Journal, Ledger and Preparation of Trail Balance - Rectification of Errors - Self balancing ledgers.

UNIT- II - FINAL ACCOUNTS

Preparation of Final Accounts of a Sole Trading Concern – Adjustments Receipts and Payments Account, Income & Expenditure Account and Balance Sheet of Non-Trading Organizations.

UNIT-III - DEPRECIATION

Meaning of Depreciation, Reserves and Provisions - Depreciation, Depletion and Amortization - Objectives of Providing Depreciation - Causes of Depreciation - Methods of Recording Depreciation - Straight Line Method - Diminishing Balance Method

UNIT-IV- BANK RECONCILIATION STATEMENT

Meaning of Bank Reconciliation Statement - Average Due Date - Insurance claim - Loss of Stock - Average Clause

UNIT-V - SINGLE ENTRY SYSTEM

Meaning of Single Entry - Objectives - Definition - Salient Features - Limitations of Single Entry - Ascertainment of Profit - Statement of Affairs Method - Conversion Method - Difference between Statement of Affairs and Balance Sheet

TEXT BOOKS

1. Financial Accounting- R.L. Gupta & V.K. Gupta, Sultan Chand & Sons, New Delhi.
2. Advanced Accountancy- S.P. Jain & K.L. Naranj, Kalyani Publications, New Delhi, Ludhiana.
3. Financial Accounting- K Murugadoss, M Jaya, V Charulatha,D Basker, Vijay Nicole,Chennai.

REFERENCE BOOKS

1. Advanced Accounts (Volume I)- M.C.Shukla, T.S.Grewal. S.Chand & Co., Ltd., New Delhi.
2. Financial Accounting - T.S.Reddy & A.Murthy, Margham Publications, Chennai.
3. Advanced Accounting (Financial Accounting) volume I- R.S.N. Pillai, Bagawathi & S.Uma, S.Chand & Co. Ltd., New Delhi.

CC02 (CORE)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	PRINCIPLES OF MANAGEMENT	Exam Hrs.	3
		U8CA1002	

Objective:

- *To make the students acquaint with fundamental principles of management concepts*

UNIT- I - INTRODUCTION TO MANAGEMENT

Meaning and Definition - Characteristics of Management – Functions of Management - Levels of Management - Importance of Management - Scope of Management – Principles of Management - Management Vs Administration

UNIT-II – PLANNING AND DECISION MAKING

Meaning of Planning – Characteristics - Objectives and Importance of Planning - Types of Planning - Principles of Planning - Steps in Planning Process - Planning Premises - Forecasting - Decision Making – Steps in Decision Making

UNIT-III - ORGANIZING

Meaning of Organizing - Features and Principles of Organization - Departmentation - Authority and Responsibility - Organization Charts and Manual - Delegation Vs Decentralization- Supervision - Fundamentals of Effective Supervision

UNIT-IV - STAFFING

Meaning and Definition - Functions and Importance of Staffing - Directing - Features of Directing - Principles of Directing - Communication - Need of Communication- Leadership - Types of Leadership - Qualities of Good Leader

UNIT-V - CONTROL

Meaning and Definition of Control - Features of Control - Steps Involved in Control Process - Co-ordination – Features of Co-ordination – Principles of Co-ordination

TEXT BOOKS

1. Business Management - Dr. C .B. Gupta - Sultan Chand & Sons
2. Principles & Practice of Management - Dr.H.C. Das Gupta & Sahitya Bhawan Agra
3. Principles of Management- K Sundar, Vijay Nicole, Chennai

REFERENCE BOOKS

1. Business Management - Dr.C.B.Gupta - Sultan Chand & Sons
2. Management principles and Practices - Lallan Prasad & S.S.Gulshan & S.Chand & Co.
3. Principles of management - Koontz, Weihrich and Aryasri & Tata McGraw hill

EC03 (ALLIED I)	SEMESTER I	Credit	6
		Hrs./Week	7
COURSE TITLE	ALLIED- INTRODUCTION TO INFORMATION TECHNOLOGY	Exam Hrs.	3
		U8CAAL11	

Objective:

- *To provide basic knowledge of Information Technology and its Applications.*

UNIT – I – INTRODUCTION TO COMPUTER

Introduction – Meaning - History of Computer - Characteristics – Advantages and Limitations – Classification of Digital Computer Systems – Input Devices – Output Devices

UNIT – II – INFORMATION TECHNOLOGY AND COMPUTER SOFTWARE

Information Technology: Meaning, Scope and Developments in I.T, Opportunities in I.T Industries - **Computer Software:** Meaning – Types of software – **Operating Systems:** Meaning – Classification of Operating Systems

UNIT – III – INTERNET AND COMPUTER NETWORKS

Internet: Meaning, Merits and Demerits, Internet Protocols, Internet Addressing, World Wide Web – **Computer Networks:** Introduction, Types of Network, Network Topology, Communication Processors

UNIT – IV – APPLICATIONS OF INFORMATION TECHNOLOGY

E- Mail: Meaning, Uses, Advantages, Procedure for sending E-mail – **Management Information System (MIS):** Meaning, Needs, Design and Development – Computer in Business & Industry – Computers in Education and Training

UNIT – V – OFFICE APPLICATION

MS - Word: Starting Ms Word, Creation of word document, Text Formatting, Printing of a Document - **MS – Excel:** Starting Ms Excel, Working with workbook – **MS- PowerPoint:** Making presentation with Ms PowerPoint, Preparation of Organisational Charts, Designing Presentation

TEXT BOOKS

1. Alexis Leon and Mathews Leon, ‘Fundamentals of Information Technology’, Vikas Publishing House, 2000.

REFERENCE BOOKS

1. Introduction to Information Technology- Turban E, R.K. Rainner Jr., and R. E. Potter, , New Delhi: John Wiley – 2000.
2. Introduction to Information Technology- V. Rajaraman, , Prentice Hall of India, 2003
3. MS Office 2017- Sanjay Saxsena, Vikas Publishing House, 2000.

EC04 (ALLIED I)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED PRACTICAL- COMPUTER APPLICATIONS IN BUSINESS	Exam Hrs.	3
		U8CAAP11	

Objective:

• *To impart basic knowledge of MS-Office to the students so that the students can prepare text documents and Excel sheets and PowerPoint for presentation.*

(A) MS-WORD

1. Usage of Numbering, Bullets, Tools and Headers
2. Usage of Spell Check and Find and Replace
3. Text Formatting
4. Picture Insertion and Alignment
5. Mail Merge Concept
6. Creation of Tables, Formatting Tables
7. Splitting the Screen
8. Inserting Symbols in Documents

(B) MS-EXCEL

1. Changing of Column Width and Row Height (Column and Range of Column)
2. Moving, Copying, Inserting and Deleting Rows and Columns
3. Creating Chart.
4. Using Excel Functions

(C) MS-POWER POINT

1. Creating, Saving, Running Slides
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clipart
6. Preparation of Organisational Charts

CC03 (CORE)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	FUNDAMENTALS OF ACCOUNTING – II	Exam Hrs.	3
		U8CA2001	

Objectives:

- To understand the preparation of accounting for branch and departments
- To understand the treatment of partnership accounting.

UNIT-I - BRANCH ACCOUNTING

Meaning –Objectives –Types of Branch –Debtors System –Stock and Debtors System –Wholesale Branch –Independent Branch (Foreign Branches Excluded)

UNIT-II - DEPARTMENTAL ACCOUNTING

Meaning –Need –Advantages –Difference between Branch and Department Account- Apportionment of Expense- Inter Department Transfer

UNIT-III - HIRE PURCHASE AND INSTALLMENT SYSTEM

Meaning and Definition - Feature –Distinction –Accounting Treatment –Calculation of Interest and Cash Price-Default and Repossession –Hire Purchase Trading Account –Installment Purchase System –Meaning –Accounting Treatment

UNIT-IV - PARTNERSHIP ACCOUNT

Definition – Partnership Deed –Past Adjustments and Guarantee –Admission of a Partner –Profit Sharing Ratio and Sacrificing Ratio –Preparation of New Balances Sheet. Retirement of a partner. Death of Partner

UNIT-V - DISSOLUTION OF A FIRM

Meaning –Modes of Dissolution –Insolvency of a Partner –Garner Vs Murray's Principles –Insolvency of all partners –Piecemeal Distribution –Proportionate Capital Method –Maximum loss Method

TEXT BOOKS

1. Financial Accounting- R.L. Gupta & V.K. Gupta, Sultan Chand & Sons, New Delhi.
2. Advanced Accountancy- S.P. Jain & K.L. Naranj, Kalyani Publications, New Delhi, Ludhiana.
3. Financial Accounting- K Murugadoss, M Jaya, V Charulatha, D Basker, Vijay Nicole, Chennai.

REFERENCE BOOKS:

1. Advanced Accounts (Volume I)- M.C.Shukla, T.S.Grewal. S.Chand & Co.,Ltd., New Delhi.
2. Financial Accounting - T.S.Reddy & A.Murthy, Marghan Publications, Chennai.
3. Advanced Accounting (Financial Accounting) volume I- R.S.N. Pillai, Bagawathi & S.Uma - S. Chand & Co. Ltd., New Delhi.

CC04 (CORE)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	MANAGERIAL ECONOMICS	Exam Hrs.	3
		U8CA2002	

Objective:

- *To make understand students about basic and fundamentals of applications of economics in managing business*

UNIT – I - INTRODUCTION

Meaning and Definition of Economics - Nature and Scope – Meaning of Managerial Economics - Objectives and Scope of Managerial Economics – Role and Responsibilities of a Managerial Economist

UNIT – II - LAW OF DEMAND

Meaning of Law of Demand – Exceptions, Changes in Demand – Demand Determinants – Importance – Elasticity of Demand – Types - Measurement – Demand Forecasting- Supply – Determinants

UNIT- III - PRODUCTION

Meaning of Production – Production Function – Short Run and Long Run – Economies and Diseconomies of Scale – Cost Concepts – Kinds of Cost – Cost and Output Relationship – Revenue – Total Revenue – Average Revenue – Marginal Revenue – Break Even Analysis

UNIT – IV - MARKET STRUCTURE

Market structure – Perfect Competition – Imperfect Competition – Monopoly – Monopolistic competition – Oligopoly – Duopoly

UNIT – V – INFLATION AND FISCAL POLICY

Inflation – Trade Cycle – Causes – Effects – Monetary Policy – Fiscal Policy

TEXT BOOKS

1. A text on Managerial Economics- Jhingan M L
2. Business Economics - P.N.Reddy and H.R.Appanniah
3. Managerial Economics- R. L. Varasheney and K.L.Maheswari

REFERENCE BOOKS

1. Business Economics - S.Sankaran
2. Modern Economic Theory- K.K.Dewett
3. Managerial Economics: Applications, Strategies and Tactics- R Moyer, James R Mcgaigan, Fredrick Harris

EC07 (ALLIED I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED- TALLY	Exam Hrs.	3
		U8CAAL21	

UNIT – I – INTRODUCTION OF TALLY

Introduction to Accounting: Features of Computerize Accounting-Introduction to Tally-Features of Tally -Creation, Alteration and Deletion of Company-Company Configurations-Accounting Features (F11) - **Accounting Groups:** User Defined Groups- Creation, Alteration and Deletion Groups- **Ledger:** Working with Ledger- Single and Multiple Ledger Creation

UNIT – II – ACCOUNTING VOUCHERS IN TALLY

Vouchers: Types of Accounting Vouchers and their Shortcut Keys – Creating, Displaying and Cancelling a Voucher - **Voucher Entries in Tally:** Contra Voucher, Purchases, Sales, Payment, Purchase Return, Sales Return - **Cost Center and Cost Categories:** Creating, Displaying and Altering

UNIT – III –INVENTORY MASTERS

Introduction of Inventory - Creation, Alteration and Deletion of Stock Groups - **Stock Categories:** Creating, Displaying, Altering and Deleting- Godowns and Stock items-Inventory Vouchers-Entries in Accounting and Inventory Vouchers using Stock Items-Purchase and Sales Order

UNIT – IV – INTRODUCTION TO TDS AND GST

Introduction of TDS - Configuration Enabling TDS in Tally- Creating TDS Vouchers types-TDS Reports- **Introduction to GST in Tally** - Configuration Creating Masters-Vouchers Creation - Preparation of GST Reports.

UNIT – V – CONFIGURATION AND DOCUMENTS PRINTING

Configuration – F12 Configuration - Accounting and Inventory Books - **Documents Printing:** Printing Configuration for Voucher - Printing Reports - Statement of Trial Balance - Trading and P&L a/c, Balance Sheet.

TEXT BOOK

1. AK Nadhani (2008), Simple Tally 9, BPB Publications, Chennai.
2. Tally GST Rates on Goods and Services With Act, Rules, Forms, Notifications and commentary- Arun Goyal

REFERENCE BOOKS

1. Srinivasa Vallaban (2006), Computer Applications in Business, Sultan Chand&Sons, New Delhi.
2. Vishnu P.Singh, “Tally-ERP9”-Computer, Publications Ltd, New Delhi.
3. Tally, Sridharan, Narmada Publications May 2003

EC08 (ALLIED I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED PRACTICAL - TALLY	Exam Hrs.	3
		U8CAAP21	

1. Creation, Alteration and Deletion of Companies.
2. Users define Accounting Groups.
3. Creation, Alteration and deletion of Ledgers and Vouchers entries
4. Accounting Voucher entries in single entry mode.
5. Accounting voucher entries using stock items.
6. Final accounts and Balance Sheet Preparations.
7. Printing of Accounting Statements - Final accounts Trading & Profit & Loss Account and Balance sheet.

CC01 (CORE)	SEMESTER I	Credit	7
		Hrs./Week	7
COURSE TITLE	ALGEBRA AND TRIGONOMETRY	Exam Hrs.	3
		U8MS1001	

Objectives: *Students are exposed to topics like Theory of Equations, Summation of Series, Matrices and Expansions of trigonometric functions, hyperbolic and inverse hyperbolic functions. It develops logical and systematic computational skills.*

UNIT– I THEORY OF EQUATION

21 Hours

Polynomial Equations – Imaginary and Irrational roots – Symmetric functions of roots in terms of Coefficients– Sum of r^{th} powers of roots – Reciprocal Equations – Transformation of Equations – Approximate Solutions of Polynomials by Newton’s method and Horner’s method.

Text Book 1: Volume I:Chapter 6: Sections: 8-13,15,16,30

Text Book 2: Chapter 1 Pages: 56 - 64

UNIT–II SUMMATION OF SERIES

21 Hours

Summation of series using Binomial, Exponential and Logarithmic series (Theorems without proof) – Approximations.

Text Book 2: Sections: 2,3,4

UNIT–II MATRICES

21 Hours

Symmetric, Skew Symmetric – Hermitian, Skew Hermitian – Orthogonal and Unitary Matrices – Cayley Hamilton Theorem (without proof) – Eigen Values – Eigen Vectors – Diagonalization – Simple Problems.

Text Book 1: Volume II: Sections 6.1 – 6.3, 9.1, 9.2, 16,16.3, 16.4.

UNIT–V EXPANSIONS

21 Hours

Expansions of $\sin n\theta$ and $\cos n\theta$ – Expansion of $\tan n\theta$ in terms of $\tan \theta$ – Powers of Sines and Cosines of θ in terms of functions of multiples of θ – Expansions of $\sin^n \theta$, $\cos^n \theta$ in a series of ascending powers of θ

Text Book 3: Chapter 3

**UNIT-V HYPERBOLIC AND INVERSE HYPERBOLIC
FUNCTIONS****21 Hours**

Definition – Relations between Hyperbolic functions and Circular functions – Inverse Hyperbolic functions – Simple Problems.

Text Book 3: Chapter 4

CONTENT AND TREATMENT AS IN:

1. T.K. Manickavachagom pillay, T. Natarajan and K. S. Ganapathy, ALGEBRA Vol. – I, II (2007), S. Viswanathan Printers & Publishers Pvt. Ltd, Chennai.
2. P. Kandasamy and K. Thilagavathy, MATHEMATICS FOR B.SC. Vol. – I (2004), S. Chand & Company Ltd, New Delhi.
3. S. Narayanan and T. K. Manickavachagom Pillay, TRIGONOMETRY (2004), S. Viswanathan Printers & Publishers Pvt. Ltd, Chennai.

REFERENCES:

1. S. Arumugam, ALGEBRA (2003), New Gamma Publishing House.
2. P.R. Vittal, MATHEMATICAL FOUNDATIONS, Margham Publication, Chennai.
3. A. Singaravelu Algebra and Trigonometry, Vol – I & II Meenakshi Agency, chennai

CC02 (CORE PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL I-COMPUTATIONAL LABORATORY I	Exam Hrs.	3
		U8MSPR11	

List of Exercises

1. Finding the roots of polynomial equations
2. Finding sum of infinite series
3. Matrix manipulation
4. Rank of a matrix
5. Evaluation of Determinant
6. Finding Eigen values
7. Finding Eigen vectors

REFERENCES:

1. Rudra Pratap, MATLAB, Oxford University Press (2013)
2. Brian R. Hunt, Ronald L. Lipsman and Jonathan M. Rosenberg, A. GUIDE TO MATLAB (Second Edition) Cambridge University Press.

Text Book 1: Chapter 2

Text Book 2: Chapter 12: Section 12.3.

CONTENT AND TREATMENT AS IN:

1. P. Kandasamy and K. Thilagavathy, CALCULUS OF FINITE DIFFERENCES AND NUMERICAL ANALYSIS (2003), S. Chand & Co Ltd., New Delhi.
2. B.D. Gupta, NUMERICAL ANALYSIS (2001), Konark Pub. Ltd., Delhi.

REFERENCES:

1. H.C. Saxena, FINITE DIFFERENCES AND NUMERICAL ANALYSIS (1991), S.Chand & Co Ltd., New Delhi.
2. S. Arumugham, NUMERICAL METHODS(2003), New Gamma Publishing, Palamkottai.
3. M.K. Vengataraman, NUMERICAL METHODS FOR SCIENCE AND ENGINEERING(1992), National Publishing Company, Chennai.

EC03 (ALLIED I PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED PRACTICAL – PROBLEM SOLVING TECHNIQUES I	Exam Hrs.	3
		U8MSAP11	

List of Exercises

1. Computing expressions
2. Operations on Vectors
3. Operations on Sets
4. Permutation and Combinations
5. Polynomial Interpolation.

REFERENCES:

1. Rudra Pratap, MATLAB, Oxford University Press (2013)
2. C. Steven, APPLIED NUMERICAL METHODS WITH MATLAB (2007), Tata McGraw Hill Publications.

and Gamma functions– Relation between Gamma and Beta function.

Text Book 1: Chapter 1: Sections 12, 13, 15

Chapter 5: Sections 2.1-2.2, 3.1, 4, 5.1-5.4

Chapter 7: Sections 2.1-2.3, 3, 4, 5

UNIT– V SOLID GEOMETRY

18 Hours

Planes and Straight lines – Symmetrical form of straight line, Coplanar lines, Skew lines, intersection of a plane and a line–Sphere: Section of a sphere by a plane – Tangent plane– Orthogonal Spheres – Cone : Equation of cone–Cone whose vertex is at the origin – Right circular cone.

Text Book 2: Chapter 4: Sections 3,5,6,7,8

Chapter 5: Sections 2, 2.1

CONTENT AND TREATMENT AS IN:

1. S. Narayanan and T.K. Manickavachagom Pillay, CALCULUS, (2004), S. Viswanathan Printers & Publishers, Chennai.
2. T.K. Manickavachagom Pillay & others, ANALYTICAL GEOMETRY (TWO ANDTHREE DIMENSIONS),(2007), S. Viswanathan Printers & Publishers,Chennai.

REFERENCES:

1. Shanti Narayan, DIFFERENTIAL CALCULUS, (2001), S. Chand & Co., NewDelhi.
2. G.B. Thomas and R.L. Finney, CALCULUS AND ANALYTICAL GEOMETRY,(1998), Addison Wesley (9thEdition).
3. P. Duraipandiyan and Laxmi Duraipandiyan, ANALYTICAL GEOMETRY (TWO AND THREE DIMENSIONS), Asia Publishing Company.
4. P. Kandasamy and K. Thilagavathy, MATHEMATICS FOR B.SC. Vol. I, II, III & IV (2004), S. Chand & Co., Ltd, New Delhi.

CC05 (CORE PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	COMPUTATIONAL LABORATORY II	Exam Hrs.	3
		U8MSPR21	

List of Exercises

1. Differentiation of single variable functions.
2. Integration of single variable functions.
3. Limits.
4. Radius of curvature.
5. GRAPHICS- Two Dimensional Plots.
6. GRAPHICS- Three Dimensional Plots.

REFERENCES:

1. Rudra Pratap, MATLAB, Oxford University Press (2013)
2. Brian R. Hunt, Ronald L. Lipsman and Jonathan M. Rosenberg, A. GUIDE TOMATLAB (Second Edition) Cambridge University Press.

CC06 (ALLIED I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED - NUMERICAL METHODS – II	Exam Hrs.	3
		U8MSAL21	

Objectives: This course will cover advanced methods for numerical differentiation, numerical integration and numerical solution of ordinary differential equations.

UNIT– I NUMERICAL DIFFERENTIATION 18 Hours

Newton's forward and backward differences to compute the derivatives – Derivative using divided difference formula – Maxima and Minima using the above formulae.

Chapter 7: Pages 187-204

UNIT–II NUMERICAL INTEGRATION 18 Hours

General Quadrature formula – Trapezoidal rule – Simpson's 1/3 rd rule – Simpson's 3/8th rule – Weddle's rule.

Chapter 7: Pages 205-212

UNIT–III DIFFERENCE EQUATIONS 18 Hours

Linear difference equations – Linear homogeneous difference equation with constants coefficient – Particular integrals of the form a^x , $x^m \sin ax$, $x^m \cos ax$.

Chapter 8: Pages 236-261

UNIT–IV SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS 18 Hours

Bisection method – Iteration method – Regula-falsi method – Newton Raphson's method.

Chapter 1: Pages 1-29.

UNIT–V NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS 18 Hours

Euler's method – Modified Euler's method – Picard's method – Taylor's method – Runge Kutta methods. (Chapter 9: Pages 266-300)

CONTENT AND TREATMENT AS IN:

1. P. Kandasamy and K. Thilagavathy, CALCULUS OF FINITE DIFFERENCES AND NUMERICAL ANALYSIS, (2003), S. Chand & Co Ltd., New Delhi.

REFERENCES:

1. H.C. Saxena, FINITE DIFFERENCES AND NUMERICAL ANALYSIS (1991), S. Chand & Co Ltd., New Delhi.
2. B.D. Gupta, NUMERICAL ANALYSIS, (2001), Konark Pub. Ltd., Delhi.
3. Gupta-Malik, CALCULUS OF FINITE DIFFERENCES AND NUMERICAL ANALYSIS, Krishba Prakashan Mandir, Meerut Seventh Edition.

EC06 (ALLIED-I PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED PRACTICAL - PROBLEM SOLVING TECHNIQUES II	Exam Hrs.	3
		U8MSAP21	

List of Exercises

1. Numerical Differentiation.
2. Numerical Integration
3. Numerical Solutions to Ordinary Differential Equations
4. Testing Consistency of System of Equations
5. Applications of Integration to Area and volume

REFERENCES:

1. Rudra Pratap, MATLAB, Oxford University Press (2013)
2. Brian R. Hunt, Ronald L. Lipsman and Jonathan M. Rosenberg, A GUIDE TOMATLAB (Second Edition) Cambridge University Press.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ALGEBRA I	Exam Hrs.	3
		P8MS1001	

Objectives: *To introduce the concept and to develop working knowledge on class equation, solvability of groups, finite abelian groups, linear transformations, real quadratic forms.*

UNIT-I ANOTHER COUNTING PRINCIPLE 18 hours

Another counting principle – Class equation for finite groups and its applications – Sylow's theorems (For theorem 2.12.1 only First proof).

Chapter 2: Sections 2.11 and 2.12 (omit Lemma 2.12.5).

UNIT-II DIRECT PRODUCTS 18 hours

Direct products – Finite abelian groups – Modules – Solvable groups.

Chapter 5: Sections 5.7 (Lemma 5.7.1, Lemma 5.7.2 theorem 5.7.1)

Chapter 2: Sections 2.13 and 2.14 (Theorem 2.14.1 only)

Chapter 4: Sections 4.5

UNIT-III LINEAR TRANSFORMATIONS 18 hours

Canonical forms – Triangular form – Nilpotent transformations.

Chapter 6: Sections 6.4 and 6.5.

UNIT-IV CANONICAL FORMS 18 hours

Jordan form – Rational canonical form.

Chapter 6: Sections 6.6 and 6.7.

UNIT-V TRACE AND TRANSPOSE 18 hours

Trace and transpose – Hermitian, Unitary, Normal transformation, real Quadratic form.

Chapter 6: Sections 6.8, 6.10 and 6.11 (Omit 6.9).

CONTENT AND TREATMENT AS IN:

I.N. Herstein, TOPICS IN ALGEBRA (Second Edition), Wiley Eastern Limited, New Delhi.

REFERENCES:

1. M. Artin, ALGEBRA(1991), Prentice Hall of India.
2. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, BASIC ABSTRACT ALGEBRA (Second Edition)(1997), Cambridge University Press.
3. I.S. Luther and I.B.S. Passi, ALGEBRA, Vol I – Groups, Vol II – Rings(1999), Narosa Publishing House, New Delhi.
4. D.S. Malik, J.N. Mordeson and M.K. Sen, FUNDAMENTALS OF ABSTRACT ALGEBRA (1997), McGraw Hill, New York.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	REAL ANALYSIS I	Exam Hrs.	3
		P8MS1002	

Objectives:*To work comfortably with functions of bounded variation, Riemann–Stieltjes integration, convergence of infinite series, infinite product and uniform convergence and its interplay between various limiting operations.*

UNIT–I FUNCTIONS OF BOUNDED VARIATION 18 hours

Introduction – Properties of monotonic functions – Functions of bounded variation – Total Variation – Additive property of total variation – Total variation on (a, x) as a function of x – Functions of bounded variation expressed as the difference of two increasing functions – Continuous functions of bounded variation.

INFINITE SERIES

Absolute and conditional convergence – Dirichlet's test and Abel's test – Rearrangement of series – Riemann's theorem on conditionally – Convergent series.

Chapter 6: Sections 6.1 to 6.8

Chapter 8: Sections 8.8, 8.15, 8.17, 8.18

UNIT–II THE RIEMANN–STIELTJES INTEGRAL 18 hours

Introduction – Notation – The definition of the Riemann –Stieltjes integral – Linear properties – Integration by parts – Change of variable in a Riemann –Stieltjes

integral – Reduction to a Riemann Integral – Euler's summation formula – Monotonically increasing integrators, Upper and lower integrals – Additive and linearity properties of upper and lower integrals– Riemann's condition – Comparison theorems.

Chapter 7: Sections 7.1 to 7.14

UNIT–III THE RIEMANN–STIELTJES INTEGRAL 18 hours

Integrators of bounded variation – Sufficient conditions for the existence of Riemann-Stieltjes Integrals– Necessary conditions for the existence of Riemann-Stieltjes integrals – Mean value theorems for Riemann –Stieltjes integrals –The integrals as a function of the interval – Second fundamental theorem of integral calculus – Change of variable in a Riemann integral– Second Mean Value Theorem for Riemann integral – Riemann-Stieltjes integrals depending on a parameter – Differentiation under the integral sign –Lebesgue criterion for the existence of Riemann integrals

Chapter 7: Sections 7.15 to 7.26

UNIT–IV INFINITE SERIES AND INFINITE PRODUCTS 18 hours

Double sequences – Double series – Rearrangement theorem for double series – A sufficient condition for equality of iterated series – Multiplication of series –Cesaro summability– Infinite products.

POWER SERIES

Multiplication of power series – The Taylor's series generated by a function– Bernstein's theorem – Abel's limit theorem –Tauber's theorem

Chapter 8: Sections 8.20, 8.21 to 8.26

Chapter 9: Sections 9.14, 9.15, 9.19 9.20, 9.22, 9.23

UNIT–V SEQUENCE OF FUNCTIONS 18 hours

Point wise convergence of sequence of functions –Examples of sequences of real – Valued functions – Definition of uniform convergence –Uniform convergence and continuity –The Cauchy condition for uniform convergence– Uniform Convergence

of infinite series of functions – Uniform convergence and Reimann–Stieltjes integration– Non-uniform convergence and term by term integration –Uniform convergence and Differentiation – Sufficient condition for uniform convergence of a series – Mean convergence.

Chapter 9: Sections 9.1 to 9.6, 9.8, 9.9, 9.10, 9.11, 9.13

CONTENT AND TREATMENT AS IN:

Tom M. Apostol, MATHEMATICAL ANALYSIS (Second Edition), Addison–Wesley Publishing Company Inc. New York.

REFERENCES:

1. R. G. Bartle, REAL ANALYSIS, (1976), John Wiley and sons Inc.
2. W. Rudin, PRINCIPLES OF MATHEMATICAL ANALYSIS, (3rd Edition)(1976), McGraw Hill Company, New York.
3. S. C. Malik and Savita Arora, MATHEMATICAL ANALYSIS, (1991), Wiley Eastern Limited. New Delhi.
4. Sanjay Arora and Bansi Lal, INTRODUCTION TO REAL ANALYSIS(1991), Satya Prakashan, New Delhi.
5. A.L. Gupta and N. R. Gupta, PRINCIPLES OF REAL ANALYSIS(2003), Pearson Education.

CORE PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	ORDINARY DIFFERENTIAL EQUATIONS	Exam Hrs.	3
		P8MS1003	

Objectives: *To develop strong background on finding solutions to linear differential equations with constant and variable coefficients and also with singular points, to study existence and uniqueness of the solutions of first order differential equations.*

UNIT-I LINEAR EQUATIONS WITH CONSTANT COEFFICIENTS

18 hours

Second order homogeneous equations – Initial value problems – Linear dependence and independence – Wronskian and a formula for Wronskian– Non-homogeneous equation of order two.

Chapter 2: Sections 1 to 6.

UNIT-II LINEAR EQUATIONS WITH CONSTANT COEFFICIENTS

18 hours

Homogeneous and non-homogeneous equation of order n – Initial value problems – Annihilator method to solve non-homogeneous equation – Algebra of constant coefficient operators.

Chapter 2: Sections 7 to 12.

UNIT-III LINEAR EQUATION WITH VARIABLE COEFFICIENTS

18 hours

Initial value Problems– Existence and uniqueness theorems – Solutions to solve a non-homogeneous equation – Wronskian and linear dependence – Reduction of the order of a homogeneous equation – Homogeneous equation with analytic coefficients – The Legendre equation.

Chapter 3: Sections 1 to 8 (Omit Section 9)

UNIT-IV LINEAR EQUATION WITH REGULAR SINGULAR POINTS

18 hours

Euler equation– Second order equations with regular singular points – Exceptional cases – Bessel Function.

Chapter 4: Sections 1 to 4 and 6 to 8 (Omit sections 5 and 9)

UNIT-V EXISTENCE AND UNIQUENESS OF SOLUTIONS TO FIRST ORDER EQUATIONS 18 hours

Equation with variable separated – Exact equation –Method of successive approximations – The Lipschitz condition – Convergence of the successive approximations and the existence theorem.

Chapter – 5: Sections 1 to 6 (Omit sections 7 to 9)

CONTENT AND TREATMENT AS IN:

E.A. Coddington, AN INTRODUCTION TO ORDINARY DIFFERENTIAL EQUATIONS (2007), Prentice – Hall of India Ltd., New Delhi.

REFERENCES:

1. W.T. Reid, ORDINARY DIFFERENTIAL EQUATIONS (1971), John Wiley and Sons, New York.
2. M.D. Raisinghania, ADVANCED DIFFERENTIAL EQUATIONS (2001), S.Chand & Company Ltd. New Delhi.
3. B. Rai, D.P. Choudary and H.I. Freedman, A COURSE IN ORDINARY DIFFERENTIAL EQUATIONS (2002), Narosa Publishing House, New Delhi.

CORE PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	MECHANICS	Exam Hrs.	3
		P8MS1004	

Objectives: *To study mechanical systems under generalized co-ordinate systems. Virtual work, energy and momentum. To study mechanics developed by Newton, Lagrange, Hamilton Jacobi and theory of relativity due to Einstein.*

UNIT-I MECHANICAL SYSTEMS 18 hours

The mechanical systems – Generalized co-ordinates – Constraints – Virtual work – Energy and Momentum.

Chapter 1: Sections 1.1 to 1.5

UNIT-II LAGRANGE'S EQUATIONS 18 hours

Derivation of Lagrange's equation – Examples – Integrals of motion.

Chapter 2: Sections 2.1 to 2.3

UNIT-III HAMILTON'S EQUATIONS 18 hours

Hamilton's Principle – Hamilton's equation – Other Variational Principle.

Chapter 4: Sections 4.1 to 4.3

UNIT-IV HAMILTON'S – JACOBI THEORY 18 hours

Hamilton's Principle Function – Hamilton–Jacobi Equation – Separability.

Chapter 5: Sections 5.1 to 5.3

UNIT-V CANONICAL TRANSFORMATION 18 hours

Differential forms and Generating functions – Special Transformations – Lagrange and Poisson brackets.

Chapter 6: Sections 6.1, 6.2 and 6.3

CONTENT AND TREATMENT AS IN:

D. T. Greenwood, CLASSICAL DYNAMICS (1985), Prentice Hall of India, New Delhi.

REFERENCES:

1. H. Goldstein, CLASSICAL MECHANICS (Second edition), Narosa Publishing House, New Delhi.
2. N.C. Rane and P.S.C. Joag, CLASSICAL MECHANICS (1991), Tata McGraw Hill.
3. J.L. Synge and B.A. Griffith, PRINCIPLES OF MECHANICS, McGraw Hill Book Co, New York, (1970).

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	RESOURCE MANAGEMENT TECHNIQUES	Exam Hrs.	3
		P8MSEP11	

Objectives: *This course introduces advanced topics in linear and non – linear programming.*

UNIT–I INTEGER LINEAR PROGRAMMING 18 hours

Types of Integer Linear Programming Problems – Concept of Cutting Plane – Gomory's All Integer Cutting Plane Method–Gomory's mixed Integer Cutting Plane Method – Branch and Bound Method –Zero - One Integer Programming.

Chapter 7. Sections: 7.1 – 7.7

UNIT–II CLASSICAL OPTIMIZATION METHODS 18 hours

Unconstrained Optimization – Constrained Multivariable Optimization with Equality Constraints – Constrained Multivariable Optimization with Inequality Constraints.

NON–LINEAR PROGRAMMING METHODS

Examples of NLPP – General NLPP – Graphical solution.

Chapter 23: Sections: 23.1 -23.4

Chapter 24: Sections: 24.1 – 24.3

UNIT–III THEORY OF SIMPLEX METHOD 18 hours

Canonical and Standard form of LP – Slack and Surplus Variables – Reduction of any Feasible solution to a Basic Feasible solution – Alternative optimal solution – Unbounded solution – Optimality conditions– Some complications and their resolutions – Degeneracy and its solutions (Theorems with proof).

Chapter 25: Sections: 25.1 – 25.9

UNIT-IV REVISED SIMPLEX METHOD 18 hours

Standard forms for revised simplex method –Computational procedure for Standard form I – Comparison of Simplex method and revised simplex Method.

BOUNDED VARIABLES LP PROBLEM

The Simplex Algorithm.

Chapter 26: Sections: 26.1 – 26.4

Chapter 28: Sections: 28.1 – 28.2

UNIT-V PARAMETRIC LINEAR PROGRAMMING 18 hours

Variation in the coefficients c_j , –Variations in the Right hand side b_i .

GOAL PROGRAMMING

Difference between LP and GP. approach – Concept of Goal Programming – Goal Programming Model Formulation–Graphical Solution Method of Goal programming – Modified Simplex method of goal Programming.

Chapter: 29: Sections: 29.1-29.3

Chapter: 08: Sections: 8.1-8.6

CONTENT AND TREATMENT AS IN:

J.K. Sharma, OPERATIONS RESEARCH (2003) (Second Edition), Macmillian(India), New Delhi.

REFERENCES:

1. Hamdy A. Taha, OPERATIONS RESEARCH (1997), Prentice Hall of Indiaprivate Limited, New Delhi.
2. F.S. Hiller and J. Lieberman, INTRODUCTION TO OPERATIONS RESEARCH (2001), Tata – McGraw Hill, New Delhi.
3. Beightler C.D. Philips and B. Wilde, FOUNDATIONS OF OPTIMIZATION (Second edition) (1979), Prentice Hall, New York.
4. S.S. Rao, OPTIMIZATION THEORY AND APPLICATIONS (1990), Wiley Eastern, New Delhi.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	GRAPH THEORY	Exam Hrs.	3
		P8MSEP12	

Objectives: *To study and develop the concepts of Graphs, sub graphs, Trees, connectivity, Euler's theorem, Hamilton Cycles, Matching, coloring of graphs, Independent sets, cliques, vertex coloring and planar graphs.*

UNIT-I GRAPHS, SUB GRAPHS AND TREES 18 hours

Graph and simple graphs –Graph isomorphism – The Incidence and adjacency matrices –Sub graph – Vertex degrees – Paths and connection –Cycles –Trees –Cut edges and bonds –Cut vertices.

Chapter 1: Sections 1.1 to 1.7, **Chapter 2:** Sections 2.1 to 2.3

UNIT-II CONNECTIVITY 18 hours

Euler's tours and Hamilton Cycles Connectivity – Blocks – Euler tours – Hamilton cycles.

Chapter 3: Section 3.1 to 3.2, **Chapter 4:** Section 4.1 to 4.2

UNIT-III MATCHINGS, EDGE COLORINGS 18 hours

Matching – Matching and coverings in Bipartite graphs – Edge chromatic number – Vizing's theorem.

Chapter 5: Sections 5.1 – 5.2, **Chapter 6:** Sections 6.1 – 6.2

UNIT-IV INDEPENDENT SETS AND CLIQUES, VERTEX COLORINGS
18 hours

Independent sets– Ramsey's theorem –Chromatic number – Brooks' theorem – Chromatic polynomials.

Chapter 7: Sections 7.1 – 7.2, **Chapter 8:** Sections 8.1, 8.2, 8.4

UNIT–V PLANAR GRAPHS18 hour

Plane and planar graphs –Dual graphs – Euler’s formula –The five color theorem and four color conjecture.

Chapter 9: Sections 9.1 – 9.3, 9.6

CONTENT AND TREATMENT AS IN:

J.A. Bondy and U. S. R. Murty, GRAPH THEORY AND APPLICATIONS(1976), McMillan, London.

REFERENCES:

1. J. Clark and D.A. Holton, A FIRST LOOK AT GRAPH THEORY (1995), Allied publishers, New Delhi.
2. R. Gould Benjamin Cummings, GRAPH THEORY (1989), Menlo Park.
3. A. Gibbons, ALGORITHMIC GRAPH THEORY (1989), Cambridge University Press, Cambridge.
4. R.J. Wilson and J.J. Watkins, GRAPHS: AN INTRODUCTORY APPROACH (1989), John Wiley and Sons, New York.
5. R.J. Wilson, INTRODUCTION TO GRAPH THEORY, (Fourth Edition)(2004), Pearson Education.

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	ALGEBRA II	Exam Hrs.	3
		P8MS2001	

Objectives: *To study field extension, roots of Polynomial, Galois Theory, finite fields, division rings, solvability by radical and to develop computational skill in abstract algebra.*

UNIT–I EXTENSION FIELDS 15 hours

Extension fields – Transcendence of e .

Chapter 5: Sections 5.1 and 5.2.

UNIT–II ROOTS OF POLYNOMIALS 15 hours

Roots of polynomials – More about roots.

Chapter 5: Sections 5.3 and 5.5

UNIT–III ELEMENTS OF GALOIS THEORY 15 hours

Elements of Galois theory.

Chapter 5: Sections 5.6.

UNIT–IV FINITE FIELDS 15 hours

Finite fields – Wedderburn's theorem on finite division rings.

Chapter 7: Sections 7.1 and 7.2 [Only theorem 7.2.1.]

UNIT–V SOLVABILITY BY RADICALS 15 hours

Solvability by radicals – A theorem of Frobenius– Integral Quaternions and the Four-Square theorem.

Chapter 5: Sections 5.7 [Omit Lemmas 5.7.1, 5.7.2 and Theorem 5.7.1]

Chapter 7: Sections 7.3 and 7.4.

CONTENT AND TREATMENT AS IN:

I.N. Herstein, TOPICS IN ALGEBRA, (Second Edition), Wiley Eastern Limited, New Delhi.

REFERENCES:

1. M. Artin, ALGEBRA (1991), Prentice Hall of India.
2. P.B. Bhattacharya, S.K. Jain, and S.R. Nagpaul, BASIC ABSTRACT ALGEBRA (1997)(First Edition) Cambridge University Press.
3. I.S. Luther and I.B.S. Passi, ALGEBRA (1996), Vol. I: Groups; Vol. II: Rings, Narosa Publishing House, New Delhi.
4. D.S. Malik, J.N. Mordeson and M.K. Sen, FUNDAMENTALS OF ABSTRACT ALGEBRA (1997), McGraw Hill, New York.
5. N. Jacobson, BASIC ALGEBRA (1980), Vol. I & II, W.H. Freeman; also published by Hindustan publishing company, New Delhi.

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	REAL ANALYSIS II	Exam Hrs.	3
		P8MS2002	

Objectives: *To introduce measure on the real line, Lebesgue measurability and integrability, Fourier Series and Integrals, in depth study in multivariable calculus.*

UNIT-I FOURIER SERIES AND FOURIER INTEGRALS 18 hours

Introduction – Orthogonal system of functions – The theorem on best approximation – The Fourier series of function relative to an orthonormal system – Properties of Fourier Coefficients – The Riesz-Fischer Theorem – The convergence and representation problems for trigonometric series – The Reimann-Lebesgue Lemma – The Dirichlet Integrals – An Integral representation for the partial sums of Fourier series – Reimann's localization theorem – Sufficient conditions for convergence of a Fourier Series at a particular point – Cesaro summability of Fourier series – Consequences of Fejes's theorem – The Weierstrass approximation theorem.

Chapter 11: Sections 11.1 to 11.15 (Tom M. Apostol)

UNIT-II MULTIVARIABLE DIFFERENTIAL CALCULUS18 hours

Introduction – The Directional derivative – Directional derivative and continuity – The total derivative – The total derivative expressed in terms of partial derivatives – An Applications to Complex – Valued Functions -The matrix of linear function– The Jacobian matrix – The chain rule – Matrix form of chain rule – The mean-value theorem for differentiable functions – A sufficient condition for differentiability– A sufficient condition for equality of mixed partial derivatives – Taylor's theorem for functions of \mathbb{R}^n to \mathbb{R}^1 .

Chapter 12: Sections 12.1 to 12.14 (Tom M. Apostol)

UNIT-III IMPLICIT FUNCTIONS AND EXTREMUM PROBLEMS18 hours

Introduction- Functions with non-zero Jacobian determinants – The inverse function theorem –The Implicit function Theorem –Extrema of real valued functions of one variable and several variables –Extremum problems with side conditions.

Chapter 13: Sections 13.1 to 13.7 (Tom M. Apostol)

UNIT-IV THE LEBESGUE INTEGRAL18 hours

Length of open sets and closed sets – Inner and outer measure : Measurable sets – Properties of measurable sets – Measurable functions – Definition and existence of the Lebesgue integral for bounded function.

Chapter 11: Sections 11.1 to 11.5 (R.R. Goldberg)

UNIT-V THE LEBESGUE INTEGRAL(Cont.)18 hours

Properties of the Lebesgue integral for bounded measurable functions – The Lebesgue integral for unbounded functions – Some fundamental theorems – The metric space $L^2[a, b]$.

Chapter 11: Sections 11.6 to 11.09 (R.R. Goldberg)

CONTENT AND TREATMENT AS IN:

1. Tom M. Apostol, MATHEMATICAL ANALYSIS (Second Edition), AddisonWesley Publishing Company Inc. New York, (for units I, II & III).
2. Richard R. Goldberg, METHODS OF REAL ANALYSIS (1975), Oxford & IBH Publishing, New Delhi (for Unit IV & V).

REFERENCES:

1. J. C. Burkill, THE LEBESGUE INTEGRAL (1951), Cambridge University Press.
2. M. E. Munroe, MEASURE AND INTEGRATION (1971), Addison–Wiley.
3. H. L. Roydon, REAL ANALYSIS (1988), Macmillan Pub. Company, New York.
4. W. Rudin, PRINCIPLES OF MATHEMATICAL ANALYSIS (1979), McGrawHill Company, New York.
5. S. C. Malik and Savita Arora, MATHEMATICAL ANALYSIS (1991), WileyEastern Limited, New Delhi.
6. Sanjay Arora and Bansi Lal, SatyaPrakashan, INTRODUCTION TO REAL ANALYSIS, (1991), New Delhi.

CORE PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PARTIAL DIFFERENTIAL EQUATIONS	Exam Hrs.	3
		P8MS2003	

Objectives: *The aim of the course is to introduce the various types of partial differential equations and obtaining solution of these equations.*

UNIT-I PARTIAL DIFFERENTIAL EQUATIONS OF FIRST ORDER
18 hours

Formation and solution of PDE – Integral surfaces – Cauchy problem order equation – Orthogonal surfaces – First order non-linear – Characteristics – Compatible system – Charpit method.

Chapter 0: Sections 0.4 to 0.11 (Omit 0.1, 0.2, 0.3 and 0.11.1)

UNIT-II FUNDAMENTALS 18 hours

Introduction – Classification of Second Order PDE – Canonical Forms – Adjoint Operators – Riemann's method.

Chapter 1: Sections 1.1 to 1.5

UNIT-III ELLIPTIC DIFFERENTIAL EQUATIONS 18 hours

Derivation of Laplace and Poisson equation – BVP – Separation of Variables – Dirichlet's Problem and Neumann problem for a rectangle – Solution of Laplace equation in Cylindrical and spherical coordinates – Examples.

Chapter 2: Sections 2.1, 2.2, 2.5 to 2.7, 2.10 to 2.13 (Omit 2.3, 2.4, 2.8 and 2.9)

UNIT-IV PARABOLIC DIFFERENTIAL EQUATIONS 18 hours

Formation and solution of Diffusion equation – Dirac-Delta function – Separation of variables method – Solution of Diffusion Equation in Cylindrical and spherical coordinates – Examples.

Chapter 3: Sections 3.1 to 3.7 and 3.9 (omit 3.8)

UNIT-V HYPERBOLIC DIFFERENTIAL EQUATIONS 18 hours

Formation and solution of one-dimensional wave equation – Canonical reduction – IVP – D'Alembert's solution – IVP and BVP for two-dimensional wave equation – Periodic solution of one-dimensional wave equation in cylindrical and spherical coordinate systems – Uniqueness of the solution for the wave equation – Duhamel's Principle – Examples.

Chapter 4: Sections 4.1 to 4.12 [omit 4.5, 4.6 and 4.10]

CONTENT AND TREATMENT AS IN:

K. Sankara Rao, INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS(2007), Second Edition, Prentice Hall of India, New Delhi.

REFERENCES:

1. R.C. Mc Owen, PARTIAL DIFFERENTIAL EQUATIONS, (Second Edition)(2005), Pearson Education, New Delhi.
2. I.N. Snedden, ELEMENTS OF PARTIAL DIFFERENTIAL EQUATIONS (1983), McGraw Hill, New Delhi.
3. M.D. Raisinghania, ADVANCED DIFFERENTIAL EQUATIONS (2001), S.Chand & Company LTD, New Delhi.

CORE PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	ADVANCED NUMERICAL ANALYSIS	Exam Hrs.	3
		P8MS2004	

Objectives:*To introduce the derivation of numerical methods with error analysis and give better understanding of the subject.*

UNIT-I TRANSCENDENTAL AND POLYNOMIAL EQUATIONS15 hours

Iteration methods based on second degree equation –Rate of convergence – Iteration methods – Methods for complex roots – Polynomial equations.

Chapter 2: Sections 2.4 to 2.8

UNIT-II SYSTEM OF LINEAR ALGEBRAIC EQUATIONS AND EIGEN VALUE PROBLEMS15 hours

Direct methods –Triangularisation, Cholesky and Partition methods – Error analysis– Iteration methods – Eigen values and Eigen vectors – Jacobi’s method, Given’s method, Rutishaugh method and Power method.

Chapter 3: Sections 3.2 to 3.5

UNIT-III INTERPOLATION AND APPROXIMATION15 hours

Hermite Interpolations – Piecewise and Spline Interpolation – Bivariate interpolation – Approximation – Least Square approximation – Uniform approximation.

Chapter 4: Sections 4.5 to 4.10

UNIT–IV DIFFERENTIATION AND INTEGRATION15 hours

Numerical Differentiation – Partial Differentiation – Numerical Integration methods based on undetermined coefficients– Double integration.

Chapter 5: Sections 5.2, 5.5, 5.6, 5.8, 5.11

UNIT–V ORDINARY DIFFERENTIAL EQUATIONS15 hours

Numerical methods – Single step methods –Multistep methods –Predictor–Corrector methods.

Chapter 6: Sections 6.2 to 6.5

CONTENT AND TREATMENT AS IN:

M.K. Jain, S.R.K. Iyengar and R.K. Jain, NUMERICAL METHODS FOR SCIENTIFIC AND ENGINEERING COMPUTATION (1993), 3rd Edition, New Age International.

REFERENCES:

1. S. D. Corte and de Boor, ELEMENTARY NUMERICAL ANALYSIS – An Algorithmic approach, 3rd Edition, McGraw Hill International Book Company, 1980.
2. James B. Scarborough, NUMERICAL MATHEMATICAL ANALYSIS, Oxford& IBH Publishing Company, New Delhi.
3. F.B. Hildebrand, INTRODUCTION TO NUMERICAL ANALYSIS, McGraw Hill, New York, 1956.

UNIT-IV QUEUEING THEORY 18 hours

Essential Features of Queuing System – Operating Characteristic of Queuing System – Probabilistic Distribution in Queuing Systems Classification of Queuing Models – Solution of Queuing Models – Probability Distribution of Arrivals and Departures – Erlangian Service time Distribution with k -phases.

Chapter 16: Sections 16.1 to 16.7, 16.9.

UNIT-V REPLACEMENT AND MAINTENANCE MODELS 18 hours

Failure Mechanism of items– Replacement of Items Deteriorates with Time – Replacement of items that fail completely – other Replacement Problems

Chapter 17: Sections 17.1 to 17.5

CONTENT AND TREATMENT AS IN:

J.K. Sharma, OPERATIONS RESEARCH (2003) (Second Edition), Macmillan (India), New Delhi.

REFERENCES:

1. F.S. Hillier and J. Lieberman, INTRODUCTION TO OPERATIONS RESEARCH, (Eighth edition)(2006), Tata McGraw Hill Publishing Company, New Delhi.
2. C. Beightler, D. Phillips, and B. Wilde, FOUNDATIONS OF OPTIMIZATION, (Second edition)(1979), Prentice Hall New York.
3. M.S. Bazaraa, J.J. Jarvis, and H.D. Sharall, (1990), John Wiley and sons, New York.
4. D. Gross and C.M. Harris, FUNDAMENTALS OF QUEUEING THEORY [3rd Edition], (1998), Wiley and Sons, New York.
5. Hamdy A.Taha, OPERATIONS RESEARCH, (Sixth edition), Prentice–Hall of India Private Limited, New Delhi.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	ALGEBRAIC NUMBER THEORY	Exam Hrs.	3
		P8MSEP22	

Objectives: *This course aims to provide a study on modules over rings, finite fields, algebraic extensions, number fields and cyclotomic fields, Noetherian rings modules and Dedekind rings.*

UNIT-I ALGEBRAIC BACKGROUND 18 hours

Rings and Fields – Factorization of Polynomials – Field Extensions – Symmetric Polynomials – Modules – Free Abelian Groups.

Chapter 1: Sections 1.1 to 1.6.

UNIT-II ALGEBRAIC NUMBERS 18 hours

Conjugates and Discriminants – Algebraic Integers – Integral Bases – Norms and Trace – Rings of Integers.

Chapter 2: Sections 2.1 to 2.6.

UNIT-III QUADRATIC AND CYCLOTOMIC FIELDS 18 hours

Quadratic fields and cyclotomic fields: Factorization into irreducibles: Trivial factorization – Factorization into irreducible – Examples of non unique factorization into irreducibles.

Chapter 3: Sections 3.1 to 3.2.

Chapter 4: Sections 4.2 to 4.4.

UNIT-IV QUADRATIC AND CYCLOTOMIC FIELDS(Cont.) 18 hours

Prime Factorization – Euclidean Domains – Euclidean Quadratic fields – Consequences of unique factorization – The Ramanujan–Nagell Theorem.

Chapter 4: Sections 4.5 to 4.9.

UNIT-V IDEALS 18 hours

Prime Factorization of ideals – The norms of an ideal – Non unique Factorization in Cyclotomic Fields.

Chapter 5: Sections 5.2 to 5.4.

CONTENT AND TREATMENT AS IN:

Steward and D. Tall, ALGEBRAIC NUMBER THEORY AND FERMAT'S THEOREM(2002), (Third Edition), A.K Peters Ltd, Natick, Mass.

REFERENCES:

1. Z.I. Bosevic and I.R. Safarevic, NUMBER THEORY (1966), Academic Press, New York.

2. J.W.S Cassels and A. Frohlich, ALGEBRAIC NUMBER THEORY (1967), Academic Press, New York.
3. P. Ribenbiom, ALGEBRAIC NUMBER (1972), Wiley, New York.
4. P.Samuel, ALGEBRAIC THEORY OF NUMBERS (1970), Houghton MifflinCompany, Boston.
5. A. Well, BASIC NUMBER THEORY (1967), Springer, New York.

CC01 (CORE PAPER)	SEMESTER I	Credit	5
		Hrs./Week	5
COURSE TITLE	PROPERTIES OF MATTER AND ACOUSTICS	Exam Hrs.	3
		U8PY1001	

Objective: It is aimed at exposing the undergraduate students to study the physical properties of materials and the fundamentals of acoustics

Unit I –Elasticity

(13Hours)

Hooke's law – Modulus of Elasticity – Relation between elastic constants – Poisson's Ratio–Expression for Poisson's ratio in terms of elastic constants – Work done in stretching and work done in twisting a wire – Torsional pendulum (with & without masses) – Bending of beams - Expression for bending moment – Cantilever – Expression for depression at the loaded end - oscillations of a Cantilever – Expression for time period- Determination of Young's modulus by Koenig's method – non-uniform bending

Unit II – Viscosity

(13Hours)

Streamline and turbulent motion- Reynold's number -Newton's law of viscous flow - Terminal velocity –Stoke's law -Poiseuille's formula for the flow of liquid through a capillary tube – Experimental determination of coefficient of liquid by Poiseuille's method- Comparison of viscosity of two liquids using Ostwald's Viscometer – Viscosity of gas Meyer's modification of Poiseuille's formula-Rankine's method – Effect of temperature and pressure on viscosity.

Unit III - Surface Tension

(13Hours)

Definition- Molecular interpretation - Surface energy –Work done on increasing the area of a surface- Pressure difference across curved surface – Excess of pressure in liquid drops and air bubbles – Angle of contact – Experimental determination of surface tension – Jaegar's method - Drop- weight method - Capillary rise method - Variation of surface tension with temperature.

Unit IV - Waves and oscillations**(13Hours)**

Simple harmonic motion – Free, damped, forced vibrations and resonance – Velocity of Transverse wave in a stretched string – Energy in wave motion – Superposition of waves – Interference, reflection and transmission of wave – Sound waves in gases – Beats – Doppler effect and its special cases- Fourier theorem- Application to Square and Saw-tooth wave.

Unit V – Ultrasonics and Acoustics**(13Hours)**

Ultrasonic waves – Piezo-electric effect – Piezo-electric generator - Magnetostriction Oscillator – Detection and applications of Ultrasonics – Acoustics – Reverberation time and its measurements - Sabine's formula - Absorption coefficient and its determination – Conditions for good acoustical design of auditorium – Noise and its measurements - Noise reduction- Acoustic grating.

BOOKS FOR STUDY

1. Properties of matter by Murugesan R, S Chand & Co. Pvt. Ltd., New Delhi
2. Properties of matter by BrijLal&Subramaniam, N Eurasia publishing Co., New Delhi, 1989
3. Text book of sound by BrijLal&Subramaniam, N Vikas Publishing House, New Delhi, 1982
4. Text book of sound by M N Srinivasan – Himalaya Publications (1991)
5. Science and technology of Ultrasonics by Bladdevraj, Narosa (2004)

BOOKS FOR REFERENCE

1. Elements of Properties of Matter by Mathur D S, Shyam Lal Charitable Trust, New Delhi, 1993
2. Fundamentals of General Properties of Matter by Gulati H R, R Chand & Co. New Delhi, 1982
3. Waves & Oscillations by Subrahmanyam N & BrijLal, Vikas Publishing House Pvt. Ltd., New Delhi, 1994
4. A Textbook of Sound by Khanna D R & Bedi R S, Atma Ram & Sons, New Delhi 1985
5. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY 2001.

CC02 (CORE PRACTICAL PAPER)	SEMESTER I	Credit	3
		Hrs./Week	4
COURSE TITLE	GENERAL PHYSICS PRACTICAL I	Exam Hrs.	3
		U8PYPR11	

Objective: It is aimed at exposing the undergraduate students to the technique of handling simple measuring instruments and also makes them measure certain mechanical and thermal properties of matter.

List of Experiments (All ten experiments compulsory)

1. Non-uniform Bending – Determination of Young's modulus by pin and microscope.
2. Non-uniform Bending – Determination of Young's modulus by optic lever (Scale and Telescope)
3. Surface tension and interfacial surface tension by drop weight method.
4. Sonometer – Determination of frequency of a tuning fork.
5. Sonometer – Determination of AC frequency Using steel wire (Electromagnet)
6. Specific Heat Capacity of a liquid – Method of Mixtures.
7. Determination of Focal length of a convex lens.
8. Spectrometer – Hollow prism - Determination of refractive index of a liquid.
9. Potentiometer – Calibration of low range voltmeter.
10. Study of Characteristics of a Junction diode

BOOKS FOR REFERENCE

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Textbook of practical Physics, Sultan Chand & Sons
2. C.C Ouseph, G. Rangarajan, R. Balakrishnan- A Textbook of practical Physics- S. Viswanathan Publisher-PartII (1996)

BOOKS FOR STUDY

1. C.C Ouseph, G. Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part I (1990)
2. C.C Ouseph, C. Rangarajan, R. Balakrishnan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part II (1996)

(For I year B.Sc. Physics & Bio-Chemistry)			
CC02 (ALLIED I)	SEMESTER I	Credit	6
		Hrs./Week	7
COURSE TITLE	ALLIED CHEMISTRY I	Exam Hrs.	3
		U8PYAL11/ U8BIAL11	

Objective: *To learn the concepts of organic inorganic and physical chemistry.*

UNIT – I

21Hours

1.1 Extraction of Metals. Mineral and ore difference – Minerals of Iron, Aluminum and Copper – Ore Dressing – Types of Ore Dressing Froth Floatation and Magnetic separation.

1.2 Refining of Metals – Types of Refining – Electrolytic, Van Arkel and Zone Refining. Extraction of Uranium and Thorium.

1.3 Periodic properties – ionization potential, electron affinity and electronegativity–variation in the periodic table.

UNIT – II

21 Hours

2.1 Aromaticity – Conditions – Huckel's rule – aromaticity of benzene.

2.2 Cyclo-alkanes preparation properties of Cyclohexane – Bayers strain theory. Polarization – Inductive effect, mesomeric effect and steric effect – Acidity and Basicity of organic compounds.

2.3 Stereo isomerism – Types, Causes of optical activity of Lactic acid and tartaric acid – Racemisation – Resolution – Geometrical isomerism – maleic and fumaric acid.

UNIT – III

21 Hours

3.1 Chemical Kinetics – Distinction between Order and Molecularity – derivation of First order rate equation – half life period of first order reaction – determination of rate constant of hydrolysis of ester.

3.2 Catalysis – catalyst – auto catalyst – enzyme catalyst – Promoters – catalytic poisoning – Active center – Distinction between homogeneous and heterogeneous catalysts – Industrial application of catalysts.

3.3 Photochemistry – Grothus Drapers law, Stark Einsteine's law – quantum yield– phosphorescence – fluorescence – chemiluminescence – photosensitization Photosynthesis.

UNIT – IV

21 Hours

- 4.1 VSEPR Theory – Shapes of simple Molecules BF_3 , PCl_5 SF_6 and XeF_6 .
- 4.2 Naphthalene – Preparations, Properties and uses of Naphthalene – Structure of Naphthalene.
- 4.3 Phase Rule: Phase, Component, Degree of freedom, Phase Rule – Definition. One component system – Water system. Osmosis - Osmotic pressure – reverse osmosis – desalination of sea water.

UNIT – V

21 Hours

- 5.1 Nuclear Chemistry – Definition of Half life period – Group displacement law Radioactive series. Nuclear Fission and Fusion – Applications of nuclear Chemistry in Medicine, agriculture and industries – ^{14}C dating.
- 5.2 Crude Oil – Petroleum – Petroleum Refining - Cracking – Applications of Cracking. Fuels – Calorific value of fuels – Non-conventional fuels – need of Solar energy – Applications – Bio-fuels.
- 5.3 Elements of symmetry – unit cell – crystal lattice – types of cubic lattice – one example for each.

Text Book:

- Allied Chemistry by Dr. S. Sundaram
- Allied Chemistry by R. Gopalan

Reference Book

- Advance Organic Chemistry by Bahl and Arun Bahl. 19th Edition., 2005 - Sulthan Chand company, New Delhi.
- Principles of Inorganic Chemistry by B.R. Puri and L.R. Sharma. Shoban Lal Nagin Chand and Co. New Delhi 2000.
- Principles of Physical Chemistry by B.R. Puri, L.R. Sharma and S. Pathania. Shoban Lal Nagin Chand and Co. New Delhi 2001.

(For I year B.Sc. Physics & Bio-Chemistry)			
CC02 (ALLIED I PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED CHEMISTRY PRACTICAL I	Exam Hrs.	3
		U8PYAP11/U8BIAP11	

Objective: to learn the techniques of Volumetric Analysis

30 Hours

VOLUMETRIC ANALYSIS 1

1. Estimation of Sodium Hydroxide std. Sodium Carbonate.
2. Estimation of hydrochloric acid using std. Sulphuric acid.
3. Estimation of Borax using std. Sodium carbonate.
4. Estimation of FeSO_4 using Std. Mohr Salt Solution.
5. Estimation of Oxalic acid using Std. KMnO_4 Solution.
6. Estimation of CuSO_4 using Std. $\text{K}_2\text{Cr}_2\text{O}_7$.

Reference Book:

1. Inorganic Quantitative Analysis by Vogel.

Practical Book:

2. Practical Book by Thomas.

Marks 75

- | | | |
|----|-----------------|----------|
| 1. | Short procedure | 10 Marks |
| 2. | Titration 1 | 15 Marks |
| 3. | Titration 2 | 15 Marks |
| 4. | Result | 20 Marks |
| 5. | Record | 10 Marks |
| 6. | Viva-voce | 05 Marks |

Error Calculation:

< 2%	-	20 Marks
2 – 3%	-	15 Marks
3 – 4%	-	10 Marks
>4%	-	05 Marks

CC04 (CORE PAPER)	SEMESTER II	Credit	4
		Hrs./Week	4
COURSE TITLE	THERMAL PHYSICS	Exam Hrs.	3
		U8PY2001	

Objective: This paper aims to impart the understanding of heat flow, its related Phenomenon and the distribution of particles in the systems

Unit I -Thermometry and Calorimetry (10 Hours)

Platinum resistance thermometer – Callender & Griffith's bridge - Thermistor - Specific heat capacity of solids –Dulong & Petit's law - Specific heat capacity of liquid - method of mixtures - Barton's correction – Newton's law of cooling and verification - Specific heat of capacity of gases – Meyer's relation - C_p and C_v by Regnault's method, Callender and Barne's method.

Unit II –Thermodynamics (11Hours)

Zeroth law of thermodynamics-First law of thermodynamics - Heat engines - petrol and diesel engines - reversible and irreversible processes - second law of thermodynamics - thermodynamic scale of temperature - entropy- change of entropy in reversible and irreversible processes - temperature - entropy diagram - third law of thermodynamics - Maxwell's thermo dynamical relations - derivation - Clausius - Clapeyron equation - Specific heat relation.

Unit III - Low temperature Physics (11Hours)

Joule Kelvin effect – Liquefaction of hydrogen- Liquefaction of helium – Kammerling and Onnes method – Helium I and II- Lambda point - Joule-Thomson effect - porous plug experiment: - liquefaction of gases –Production of low temperature by adiabatic demagnetisation - applications of low temperatures - refrigerating machines - Superconductors – Type I and Type II – Meissner effect – Super conducting magnets.

Unit IV -Conduction

(10Hours)

Definition and dimension of thermal conductivity – Definition of Thermal diffusivity Principle of rectilinear flow of Heat along a bar - Steady state - Thermal conductivity of a good conductor- Forbes method- Thermal conductivity of a bad conductor - Lee's disc method- Principle of cylindrical flow of heat-Thermal conductivity of rubber - Wiedmann Franz law – Some practical application of heat conduction

Unit V -Radiation

(10Hours)

Black body radiation - Wien's law, Rayleigh-Jean's law and Planck's law - Stefan's law - Determination of Stefan's constant - Newton's law of cooling from Stefan's law – Planck's quantum theory of radiations- solar constant and determination - solar energy- Angstrom pyroheliometer –Temperature of Sun- applications

BOOKS FOR STUDY

1. Heat and Thermodynamics - D.S.Mathur
2. Heat and Thermodynamics - BrijLal and Subramaniam, S Chand & Co 16th Edition
3. Elementary statistics - Gupta and Kumar

BOOKS FOR REFERENCE

1. Heat and Thermodynamics - J. B. Rajam& C. L. Arora
2. Thermodynamics and statistical Physics - Sharma &Sarkar
3. Statistical Mechanics - SathyaPrakash&C.Agarwal
4. Fundamentals of Physics, 6th Edition, by D.Halliday, R.Resnick and J.Walker, Wiley,NY, 2001.
5. Thermal Physics, A.B. Gupta and H. Roy, Books and Allied (P) Ltd., (2002.)
6. Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane,Wiley, NY, 1994..
7. CRC Handbook of Physics & Chemistry, 80th Ed., CRS Press, NY, 1999.
8. The Feynman Lectures on Physics, VoIs. I, II, and III, by R P. Feynman, R B Leighton and M Sands, Narosa, New Delhi, 1998.

CC05 (CORE PRACTICAL PAPER)	SEMESTER II	Credit	3
		Hrs./Week	4
COURSE TITLE	GENERAL PHYSICS PRACTICAL II	Exam Hrs.	3
		U8PYPR21	

Objective: It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical and thermal properties of matter.

List of Experiments (All ten experiments compulsory)

1. Rigidity modulus – Torsional pendulum – without masses.
2. Rigidity modulus and moment of inertia – Torsional pendulum – with identical masses
3. Coefficient of viscosity of a liquid – graduated burette - Radius of capillary tube by mercury pellet method.
4. Joules calorimeter-Determination of Specific heat capacity of a liquid
5. Specific heat capacity of a liquid – Newton’s law of cooling.
6. Sonometer – Determination of AC frequency Using brass wire (Barmagnet)
7. Sonometer – Comparison of radii of the given wires.
8. Spectrometer – Determination of Refractive index of the material of the glass prism(minimum deviation)
9. Post office box – Determination of Temperature coefficient of resistance of the coil.
10. Unregulated and Zener regulated power supply(full wave).

BOOKS FOR STUDY

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part I (1990)
2. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.ViswanathanPublisher-Part II (1996)

BOOKS FOR REFERENCE

1. S.L Gupta and V.Kumar- Practical Physics- PragatiPrakashan – 250th Edition (2002)
2. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan,A Textbook of practical Physics, Sultan Chand & Sons

(For I year B.Sc. Physics & Bio-Chemistry)			
CC06 (ALLIED I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED CHEMISTRY II	Exam Hrs.	3
		U8PYAL21/ U8BIAL21	

Objective: *To learn concepts of organic inorganic and physical chemistry.*

UNIT – I

21 Hours

1.1 Nomenclature of coordination compounds – Werner Theory of Coordination Compound – Chelation – Functions and structure of Haemoglobin and Chlorophyll.

1.2 Fertilizers and manures – Bio-fertilizers – Organic Manures and their importance– Role of NPK in plants – preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.

1.3 Composition of Match sticks and match box – Industrial making of safety matches. Preparation and uses of chloroform, DDT, Gamhexane and Freon.

UNIT – II

21 Hours

2.1 Classification – Structure of glucose – Properties and uses of starch – uses of Cellulose Nitrate – Cellulose acetate.

2.2 Classification of Amino Acids – preparation and properties of Glycine – Classification of Protein based on physical properties and biological functions. Primary and Secondary structures of protein [Elementary Treatment only] composition of RNA and DNA and their biological role.

2.3 Substitution reaction – Nitration, halogenation, sulphonation and Friedel Crafts alkylation of benzene.

UNIT – III

21 Hours

3.1 Specific and equivalent conductance – their determination – effect of dilution.

3.2 Kohlrausch's law – Determination of equivalent conductance of weak electrolyte–Conduct metric Titrations - HCl Vs NaOH and CH₃COOH Vs NaOH. Electrochemical corrosion and its prevention.

3.3 p^H and its determination by indicator method – Buffer solutions – Buffer action-importance of buffer in the living system – Derivation of Henderson equation.

UNIT – IV

21 Hours

4.1 Paints – Pigments – Components of Paint – Requisites of a good paint. Colour and Dyes – Classification based on constitution and application.

4.2 Biological activities and deficiency, diseases of Vitamin A, B, C, D, E and K Hormones – Functions of insulin and adrenalin.

4.3 Chromatography – Principles and application of Column, paper and thin layer chromatography.

UNIT – V

21 Hours

5.1 Drugs - Sulpha Drugs – Uses and Mode of action of Sulpha Drugs – Antibiotics Uses of Penicillin, Chloramphenicol, Streptomycin. Drug abuse and their implication.

5.2 General and Local Anaesthetics – Antiseptics – Example and their application. Definition and one example each for analgesics antipyretics, tranquilizers and sedatives - causes for diabetes, cancer and AIDS.

5.3 Colloids - Types and classification of colloidal system, Lyophilic and Lyophobic Sols – Dialysis, Electro-dialysis, Ultrafiltration. Emulsion – types – preparation.

References:

- Advance Organic Chemistry by Bahl and Arun Bahl. 19th Edition., 2005 - Sulthan and Chand company, New Delhi.
- Principles of Inorganic Chemistry by B.R. Puri and L.R. Sharma. Shoban Lal Nagin Chand and Co. New Delhi 2000.
- Principles of Physical Chemistry by B.R. Puri, L.R. Sharma and S. Pathania. Shoban Lal Nagin Chand and Co. New Delhi 2001.
- P.L. Soni – “Text book of inorganic Chemistry. S. Chand & Co., New Delhi 1999.

(For I year B.Sc. Physics & Bio-Chemistry)			
CC06 (ALLIED I PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED CHEMISTRY PRACTICAL II	Exam Hrs.	3
		U8PYAP21/U8BIAP21	

Objective: To learn the techniques in Organic Analysis

ORGANIC ANALYSIS:

Reactions of aldehyde [aromatic], carbohydrate, carboxylic acid [mono and dicarboxylic], phenol, aromatic primary amine, amide and diamide. Systematic analysis of organic compounds containing one functional group and characterisation by confirmatory tests.

Reference Book:

1. Advance Practical Chemistry by R. Mukhopadhyay.

Practical Book:

1. Practical Book by Thomas.

Marks 75

- | | | |
|----|---------------------------|----------|
| 1. | Procedure | 20 Marks |
| 2. | Elements | 10 Marks |
| 3. | Aromatic, Aliphatic | 10 Marks |
| 4. | Saturation & Unsaturation | 10 Marks |
| 5. | Functional Group | 10 Marks |
| 6. | Record | 10 Marks |
| 7. | Viva-voce | 05Marks |

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	MATHEMATICAL PHYSICS	Exam Hrs.	3
		P8PY1001	

Objective: To provide an insight into tensors, complex analysis, transforms techniques, Differential equations and Greens function which form the back bone of all higher physics and to apply these techniques to solve Physics problems

UNIT- I: LINEAR VECTOR SPACES AND TENSORS (15Hours)

Linear operators – Representation of vectors and operators in a basis – Linear independence, dimension – Inner Product – Schwartz inequality – Orthonormal basis – Gram –Schmidt Process.

Tensors: Definition of scalars – Contravariant Vectors and Covariant Vectors – Einstein's summation convention – Definition of tensors – Second rank Cartesian tensor as operator – Symmetric and antisymmetric tensors.

UNIT -II: LINEAR DIFFERENTIAL EQUATIONS (15Hours)

Second order linear differential equations – Wronskian - Sturm- Liouville theory - Orthogonality of eigenfunctions - Illustration with Legendre, Laguerre, and Hermite differential equations – generating function- recurrence relation- Rodrigue formula – Expansion of polynomials.

UNIT -III: COMPLEX VARIABLES (15Hours)

Functions of a complex variable - Single and multivalued functions - Analytic functions - Cauchy - Riemann conditions - Singular points - Cauchy's theorem and integral formulae - Taylor and Laurent expansions - Zeros and poles - Residue theorem and its applications

UNIT-IV: LAPLACE, FOURIER TRANSFORMS AND GREEN'S FUNCTION

(15Hours)

Laplace transforms - Solution of linear differential equations with constant coefficients - Fourier integral - Fourier transforms (Infinite), Fourier sine and cosine transforms - Convolution theorems-One-dimensional Green's function -

Eigenfunction expansion of the Green's function - Reciprocity theorem - Sturm - Liouville type equations in one dimension and their Green's functions.

UNIT- V: GROUP THEORY

(15Hours)

Definition of groups, subgroups and conjugate classes – Symmetry elements transformation, Matrix representation – point groups – representation of group – reducible and irreducible representations -Schur's lemmas I & II – Orthogonality theorem – character of a representation – character table C_{2V} and C_{3V} – Application to infrared and Raman active vibrations of XY_3 type molecules.

BOOKS FOR STUDY:

1. **P. K. Chattopadhyay, 1990**, *Mathematical Physics*, Wiley Eastern, Madras.
2. **G. Arfken and H. J. Weber, 2001**, *Mathematical Methods for Physicists*, 5th Edition, Harcourt (India), New Delhi.
3. **A. W. Joshi, 1997**, *Elements of Group Theory for Physicists*, 4th Edition, New Age International, New Delhi.
4. **A. W. Joshi, 1995**, *Matrices and Tensors in Physics*, 3rd Edition, Wiley Eastern, Madras.
5. **E. Kreyszig, 1999**, *Advanced Engineering Mathematics*, 8th Edition, Wiley, New York.
6. **M. D. Greenberg, 1998**, *Advanced Engineering Mathematics*, 2nd Edition, International Ed., Prentice - Hall International, New Jersey.

BOOK FOR REFERENCE:

1. **Tulsi Dass and S. K. Sharma, 1998**, *Mathematical Methods in Classical and Quantum Physics*, Universities Press(INDIA), Hyderabad.
2. **S. Lipschutz, 1987**, *Linear Algebra*, Schaum's Series, McGraw - Hill, New York
3. **E. Butkov, 1968**, *Mathematical Physics* Addison - Wesley, Reading, Massachusetts.
4. **P. R. Halmos, 1965**, *Finite Dimensional Vector Spaces*, 2nd Edition, Affiliated East-West, New Delhi.
5. **M. Hamermesh, 1962**, *Group Theory and Its application to Physical Problems*, Addison Wesley, Reading.
6. **C. R. Wylie and L.C. Barrett, 1995**, *Advanced Engineering Mathematics*, 6th Edition, International Edition, McGraw-Hill, New York.
6. **W. W. Bell, 1968**, *Special Functions for Scientists and Engineers*, Van Nostrand, London.
7. **M. A. Abramowitz and I. Stegun (Editors), 1972**, *Handbook of Mathematical Functions* Dover, New York.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	CLASSICAL MECHANICS AND RELATIVITY	Exam Hrs.	3
		P8PY1002	

Objectives: To introduce the classical formulation approaches like Lagrangian and Hamiltonian dynamics and to study their application in mechanical systems and solving of problems. Also To review the fundamental concepts of relativity and to create an understanding of their applications

UNIT-I: Lagrangian Formulations (15Hours)

Mechanics of a system of particles – Constraints - Lagrange's equations of motion – velocity dependent potentials – variation principle – Hamilton's principle – Non-holonomic system – conservation theorems and symmetry properties - Principle of least action-Two-body central force problem –Kepler Problem and Kepler's laws

UNIT-II: Mechanics of Rigid Bodies (15Hours)

Rigid body motion – Kinematics – Euler angles – Infinitesimal rotations –principal axes – Coriolis force - Dynamics - Angular momentum and rotational kinetic energy - Moment of inertia tensor - Euler's equations of motion – Poinot method - Symmetrical top.

UNIT-III: Hamilton's Formulation (15Hours)

Legendre transformation and Hamiltonian equations – Cyclic coordinates and conservation theorems – Hamiltonian equations from Variational principle – Canonical transformations – simple examples - Poisson brackets – equation of motion - Hamilton-Jacobi equation – Action and Angle variables - Application to harmonic oscillator problem.

UNIT-IV: Small Oscillations (15Hours)

Small Oscillations – Normal mode - Diatomic molecule - Formulation of the problem - double pendulum - Transformation to normal coordinates - Frequencies of normal modes - Linear triatomic molecule.

UNIT-V: Relativity

(15Hours)

Review of basic ideas of special relativity – Energy momentum four vector – Minkowski's four dimensional space – Lorentz transformation as rotation in Minkowski's space – Equation of force in relativistic mechanics in terms of Variation of mass with velocity and mass energy relation – Elements of general theory of relativity.

BOOKS FOR STUDY:

1. **H. Goldstein**, 2002, *Classical Mechanics*. 3rd Edition, C. Poole and J. Safko, Pearson Education, Asia, New Delhi.
2. **B.D Gupta and SatyaPrakash**, 1997, *Classical Mechanics* 5th Edition. KedarnathRamath, Meerut and New Delhi.
3. **S. N. Biswas**, 1998, *Classical Mechanics*, Books and Allied Ltd., Kolkata.
4. **Upadhyaya**, 1999, *ClassicalMechanics*, Himalaya Publishing Co., New Delhi.
5. **P. V, Panat**, 2005 *Classical Mechanics* 5th Edition alpha Science International.
6. **R. Douglas Gregory**, 2006 *An Undergraduate Text of Classical Mechanics*, Cambridge University Press.

BOOKS FOR REFERENCE:

1. **D. Landau and E. M. Lifshitz**, 1969, *Mechanics*, PergomonPress, Oxford.
2. **K. R. Symon**, 1971, *Mechanics*, Addison Wesley, London.
3. **J. L. Synge and B. A. Griffith**, 1949, *Principles of Classical Mechanics*, McGraw-Hill, New York.
4. **C. R. Mondal**, *Classical Mechanics*, Prentice-Hall of India, New Delhi.
5. **R. Resnick**, 1968, *Introduction to Special Theory of Relativity*, Wiley Eastern, New Delhi.
6. **R. P. Feynman**, 1962, *Quantum Electrodynamics*, Benjamin, Reading, MA.
7. **M. Glazer and J. Wark**, 2001, *Statistical Mechanics*, Oxford University Press, Oxford.

CORE PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	QUANTUM MECHANICS I	Exam Hrs.	3
		P8PY1003	

Objective: To provide an understanding of fundamental principles of quantum mechanics and to introduce to the basic ideas of Dirac formulation, Time-independent perturbation theory, and approximation methods in Quantum Mechanics.

UNIT-I: BASIC FORMALISM (15Hours)

Interpretation and conditions on the wave function - Postulates of quantum mechanics and the Schrodinger equation - Ehrenfest's theorem- Stationary states- Linear operators and self adjoint operators, Expectation values- Orthonormality - Hermitian operators for dynamical variables - Eigenvalues and eigenfunctions - Uncertainty principle - Illustrations.

UNIT-II: ONE AND THREE DIMENSIONAL PROBLEMS (15Hours)

Particle in a box - Square-well potential - Barrier penetration - Simple harmonic oscillator - Ladder operator method – Rigid Rotator.

Orbital angular momentum and spherical harmonics - Central forces and reduction of two-body problem - Particle in a spherical well - Hydrogen atom.

UNIT-III: GENERAL FORMALISM (15Hours)

Hilbert space - Dirac notation - Representation theory - Co-ordinate and momentum representations - Time evolution - Schrödinger, Heisenberg and Interaction pictures- Symmetries and conservation laws - Unitary transformations associated with translations and rotations - Parity and time reversal.

UNIT-IV: APPROXIMATION METHODS (15Hours)

Time-independent perturbation theory for non-degenerate and degenerate levels - Variation method, simple applications - WKB approximation - Connection formulae

(no derivation) - WKB quantization rule - Application to simple harmonic oscillator
- Hydrogen molecule, covalent bond and hybridization.

UNIT-V: ANGULAR MOMENTUM AND IDENTICAL PARTICLES (15Hours)

Eigenvalue spectrum from angular momentum algebra - Matrix representation - Spin angular momentum - Non-relativistic Hamiltonian including spin - Addition of angular momenta - Clebsch - Gordan Coefficients.

Symmetry and anti-symmetry of wave functions – construction - Pauli's spin matrices.

BOOKS FOR STUDY:

1. **P. M. Mathews and K. Venkatesan**, 1976, *A Text book of Quantum Mechanics*, Tata McGraw-Hill, New Delhi.
2. **L. I. Schiff**, 1968, *Quantum Mechanics*, 3rd Edition, International Student Edition, MacGraw-Hill Kogakusha, Tokyo.
3. **V. Devanathan**, 2005, *Quantum Mechanics*, Narosa Publishing House, New Delhi.
4. **V. Devanathan**, 1999, *Angular Momentum Techniques in Quantum Mechanics*, Kluwer Academic Publishers, Dordrecht.

BOOKS FOR REFERENCE:

1. **E. Merzbacher**, 1970, *Quantum Mechanics* 2nd edition, John Wiley and Sons, New York.
2. **P. A. M. Dirac**, 1973, *The Principles of Quantum Mechanics*, Oxford University Press, London.
3. **L. D. Landau and E. M. Lifshitz**, 1976, *Quantum Mechanics* Pergamon Press, Oxford.
4. **S. N. Biswas**, 1999, *Quantum Mechanics*, Books and Allied Ltd., Kolkata.
5. **G. Aruldas**, 2002, *Quantum Mechanics*, Prentice Hall of India, New Delhi.
6. **A. Ghatak and S. Lokanathan**, *Quantum Mechanics: Theory and Applications*, 4th Edition, Macmillan India.
7. **J. S. Bell, Gottfried and M. Veltman**, 2001, *The Foundations of Quantum Mechanics* World Scientific, Singapore.
8. **R. P. Feynman, R. B. Leighton, and M. Sands**, 1998, *The Feynman Lectures on Physics*, Vols. 3, Narosa, New Delhi.

CORE PAPER VI	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	GENERAL PHYSICS EXPERIMENTS I	Exam Hrs.	3
		P8PYPR11	

LIST OF EXPERIMENTS

(Any 15 out of the given 25)

1. Cornu's method – Young's modulus by elliptical fringes.
2. Cornu's method – Young's modulus by hyperbolic fringes.
3. Determination of Stefan's constant.
4. Band gap energy – Thermister.
5. Hydrogen spectrum – Rydberg's.
6. Co-efficient of linear expansion-Air wedge method.
7. Permittivity of a liquid using RFO.
8. Viscosity of liquid – Meyer's disc.
9. Solar spectrum – Hartmann's interpolation formula
10. F.P. Etalon using spectrometer.
11. Iron /Copper arc spectrum.
12. Brass /Alloy arc spectrum.
13. B-H Loop using Anchor ring.
14. Specific charge of an electron – Thomson's method /Magnetron method.
15. Electrical resistance of a metal /alloy by four probe method.
16. Edser and Butler fringes – Thickness of air film.
17. Spectrometer – Polarisability of liquids.
18. Spectrometer – Charge of an electron.
19. Determination of strain hardening coefficient.
20. Thickness of the enamel coating on a wire – by diffraction.
21. Lasers - Study of laser beam parameters.
22. Measurement of Numerical aperture (NA) of a telecommunication graded opticfibre.
23. Fibre attenuation of given optical fibre.
24. Determination of solar constant.
25. Bi prism – Wavelength of monochromatic source – Refractive index of a liquid.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Optional Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	ELECTRONIC DEVICES AND APPLICATIONS	Exam Hrs.	3
		P8PYEP11	

Objective: To provide an exposure to the wide application of integrated circuit logic, Optoelectronics devices, Operational amplifiers, 555timer, Phase Locked Loop and Pulse related communication circuits.

UNIT-I: FABRICATION OF IC AND LOGIC FAMILIES (15Hours)

Fabrication of IC – Monolithic integrated circuit fabrication- IC pressure transducers – Monolithic RMS –Voltage Measuring device – Monolithic voltage regulators – Integrated circuit multipliers – Integrated circuit logic – Schottky TTL – ECL – I^2L – P and NMOS Logic – CMOS logic – Tristate logic circuits.

UNIT II: OPTO ELECTRONIC DEVICES (15Hours)

Basics of Photometry - Light sources and Displays - Light emitting Diodes – Surface emitting LED – Edge emitting LED – Seven segment display – Organic LED (OLED) – LDR – Diode lasers – Photo detectors – CCD - Basic parameters – Photo diodes – p-i-n - Photo diode – Photo transistors – IR and UV detectors.

UNIT- III: 555 TIMER AND ITS APPLICATIONS (15Hours)

555 Timer – Description – Monostable operation – Frequency divider – Astable operation – Schmitt trigger – Phase Locked Loops – Basic principles – Analog phase detector – Voltage controlled oscillator – Voltage to frequency conversion – PLL IC 565 – Description – Lock in range – Capture range – Application – Frequency multiplication.

UNIT- IV: OP-AMP APPLICATIONS (15Hours)

Instrumentation amplifier – V to I and I to V converter – Op-amp circuits using diodes – Sample and hold circuits – Log and Antilog amplifiers – Multiplier and Divider – Electronic analog computation – Schmitt Trigger – Astable, Monostable Multivibrator – Triangular wave generators – Sine wave generators – RC Active filters.

UNIT- V: PULSE RELATED DIGITAL COMMUNICATION (15Hours)

Pulse communications – Introduction – Types – Pulse – Amplitude Modulation [PAM] – Pulse Time modulation – Pulse Width Modulation [PWM] – Pulse Position Modulation [PPM] – Pulse Code Modulation [PCM] – Principles of PCM –

Quantizing noise – Generation and Demodulation of PCM – Effects of noise – Advantages and applications of PCM – Pulse systems – Telegraphy – Frequency – shift keying.

BOOKS FOR STUDY:

1. S.M.Sze, 1985, Semiconductor Devices – Physics and Technology, Wiley, New York.
2. Milman and Halkias Integrated Electronics, Mc-Graw – Hill, New Delhi.
3. R.A.Gaekwad, 1994, Op-Amps and integrated circuits EEE.
4. Taub and Shilling, 1983, Digital Integrated Electronics, McGraw Hill, New Delhi.
5. J.Millman, 1979, Digital and Analog Circuits and Systems, McGraw Hill, London.
6. George Kennedy, 1987, Electronic communication systems 3rd Edition, McGrawHill, London.

BOOKS FOR REFERENCE:

1. R.F. Coughlin and F.F.Driscoll, 1996, Op-Amp and linear Integrated circuits, Prentice Hall of India, New Delhi.
2. M.S.Tyagi, Introduction to Semiconductor Devices, Wiley, New York.
3. P.Bhattacharya, 2002, Semiconductor Optoelectronic Devices, 2nd Edition, Prentice Hall of India, New Delhi.
4. D.RoyChoudhury, 1991, Linear Integrated circuits, Wiley Eastern, New Delhi.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Optional Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	COMPUTATIONAL METHODS AND PROGRAMMING	Exam Hrs.	3
		P8PYEP12	

Objective: To inculcate a flair for scientific research with moral, ethical and social values and also to expose the students to the foundations of various Computational methods and C programming.

UNIT - 1: SOLUTIONS OF EQUATIONS (13Hours)

Determination of zeros of polynomials - Roots of nonlinear algebraic equations and transcendental equations - Bisection and Newton-Raphson methods - Convergence of solutions.

UNIT - 2: LINEAR SYSTEMS (10Hours)

Solution of Simultaneous linear equations - Gaussian elimination - Matrix inversion – Eigenvalues and Eigenvectors of matrices - Power and Jacobi Methods.

UNIT - 3: INTERPOLATION AND CURVE FITTING (15Hours)

Interpolation with equally spaced and unevenly spaced points (Newton forward and backward interpolations, Lagrange interpolation) - Curve fitting - Polynomial least squares fitting - Cubic line fitting.

UNIT- 4: DIFFERENTIATION, INTEGRATION AND SOLUTION OF DIFFERENTIAL EQUATIONS (18Hours)

Numerical differentiation - Numerical integration - Trapezoidal rule - Simpson's rule - Error estimates – GaussLegendre, Gauss-Legendre, Gauss-Hermite and GaussChebyshevquadratures - Numerical solution of ordinary differential equations - Euler and RungeKutta methods

UNIT - 5: PROGRAMMING WITH FORTRAN / C (19Hours)

Flow-Charts - Integer and floating point arithmetic expressions - Built-in functions - Executable and non-executable statements - Subroutines and functions - Programs for the following computational methods : (a) Zeros of polynomials by the bisection method, (b) Zeros of polynomials/non-linear equations by the Newton-Raphson

method, (c) Lagrange Interpolation, (d) Trapezoidal and Simpson's Rules, (a) Solution of first order differential equations by Euler's Method.

BOOKS FOR STUDY

1. Sastry, Introductory Methods of Numerical Analysis.
2. V. Rajaraman, Computer Oriented Numerical Methods, 3rd Ed. (Prentice-Hall, New Delhi, 1993).
3. M.K. Jain, S.r.Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 3rd Ed. (New Age International, New Delhi, 1995).
4. F. Scheid, Numerical Analysis, 2nd Edition (Schaum's Series McGraw-Hill, NY, 1998).
5. W.H. Press, S.A. Teukolsky, W.T. Vetterling and B.P. Flannery, Numerical Recipes in FORTRAN, 2nd Edition (Cambridge University Press, 1992); First Indian Edition (Foundation Books, New Delhi, 1993).

BOOKS FOR REFERENCE

1. M.A. Abramowitz and I. Stegun (Editors), , 1996).
2. W.H. Press, S.A. Teukolsky, W.T. Vetterling and B.P. Flannery, Numerical Recipes in C, 2nd Edition, (Cambridge University Press, 1992); First Indian Edition (Foundation Books, New Delhi, 1993).
3. Rajaraman, Fortran Programming.
4. E. Kreyszig, Advanced Engineering Mathematics, 8th Ed. (Wiley, NY, 1999).

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	STATISTICAL PHYSICS	Exam Hrs.	3
		P8PY2001	

Objective: To review the fundamental concepts of thermodynamics, micro and macro ensembles, Bose-Einstein, Fermi Dirac Statistics, Ising model and Fluctuations and their problems

UNIT- I: THERMODYNAMICS AND PHASE TRANSITION (13Hours)

First law, second law Entropy –Thermodynamic potentials- Third law- consequences of third law- Phase equilibria- Gibb’s phase rule- transition and Ehrenfest classification (I & II ORDER) Landau’s theory of phase transition- critical indices- scale transformation and dimension analysis.

UNIT-II: ENSEMBLES (13Hours)

Micro and macro states- density of distribution- density of states- Liouville’s theorem- postulates of statistical mechanics – Ensembles micro, canonical and grand canonical ensembles – partition function and thermodynamic quantities of microcanonical ensemble- Equipartition theorem- partition and thermodynamic function for grand canonical ensembles- Perfect gas in grand canonical ensembles- Comparison of various ensembles- Gibbs paradox and its resolution.

UNIT-III: BOSE-EINSTEIN STATISTICS (13Hours)

Ideal Bose gas – Thermodynamic properties – statistics of ensembles – black body radiation – phonons – Debye’s theory of specific heat – BE condensation – Liquid helium – super fluidity.

UNIT-IV: FERMI DIRAC STATISTICS (13Hours)

Ideal Fermi gas – Fermi Dirac distribution – thermodynamic properties – electron in metals – electronic heat capacity – Pauli’s paramagnetic susceptibility – white dwarf – Chandrasekhar limit – nuclear matter

UNIT- V: ISING MODEL AND FLUCTUATIONS (13Hours)

Ising model- mean field theories- exact solution of Ising model in one dimension- matrix method- correlation of space time dependent fluctuations- fluctuations and

transport phenomena- Brownian motion- Langevin theory- Fluctuation- Dissipation theorem- The Fokker –planck equation.

BOOKS FOR STUDY:

1. B.K. Agarwal and M. Eisner, 1998, Statistical Mechanics, 2nd Edition, New Age International, New Delhi.
2. SathyaPrakash and J.P Agarwal, 1994, Statistical Mechanics, 7th Edition, Kedar Nath and Ram Nath & Co, Meerut.
3. J.K.Bhattacharjee, 1996, Statistical Mechanics: An Introductory Text, Allied Publication, New Delhi.
4. S.K.Sinha Statistical Mechanics, theory and application Tata McGraw Hill.

BOOKS FOR REFERENCE

1. K. Huang, 1975, Statistical Mechanics, Wiley Eastern Ltd., New Delhi.
2. H.B.Callen, John Wiley Thermodynamics and An Introduction to Thermostat

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	ELECTROMAGNETIC THEORY	Exam Hrs.	3
		P8PY2002	

Objective: To introduce the laws governing the distribution and propagation of electromagnetic fields created by static and dynamic charges of distributions and their interaction with matters.

UNIT-I: ELECTROSTATICS

(15Hours)

Boundary value problems and Laplace equation – Boundary conditions and uniqueness theorem – Laplace equation in three dimension – Solution in Cartesian and spherical polar coordinates – Examples of solutions for boundary value problems.

Polarization and displacement vectors - Boundary conditions - Dielectric sphere in a uniform field – Molecular polarisability and electrical susceptibility – Electrostatic energy in the presence of dielectric – Multipole expansion.

UNIT- II: MAGNETOSTATICS

(15Hours)

Biot-Savart Law - Ampere's law – Magnetic scalar and vector potential and magnetic field of a localised current distribution - Magnetic moment, force and torque on a current distribution in an external field - Magnetostatic energy - Magnetic induction and magnetic field in macroscopic media - Boundary conditions - Uniformly magnetised sphere.

UNIT- III: MAXWELL EQUATIONS

(15Hours)

Faraday's laws of Induction - Maxwell's displacement current - Maxwell's equations - Vector and Scalar potentials - Gauge invariance - Wave equation and plane wave solution- Coulomb and Lorentz gauges - Energy and momentum of the field - Poynting's theorem - Lorentz force - Conservation laws for a system of charges and electromagnetic fields.

UNIT- IV: APPLICATION OF MAXWELL'S EQUATIONS (15Hours)

Fields and radiation of localized sources – Oscillating electric dipole – Radiation from an Oscillating electric dipole – Poynting vector and radiated power – Radiation resistance – Radiation from a linear antenna – Antenna arrays – Radiation pressure and electromagnetic momentum – Electromagnetic Oscillators.

UNIT- V: GUIDED WAVES (15Hours)

Essential conditions for guided waves - TEM waves in coaxial cables - TE waves - rectangular wave guide -electric and magnetic fields on the surface and inside rectangular wave guide - TE and TM waves in rectangular wave guide - cut - off frequency and wavelength - circular waveguides - energy flow and attenuation in wave guides - cavity resonators - phase and group velocity

BOOKS FOR STUDY:

1. **J. Griffiths**, 2002, *Introduction to Electrodynamics*, 3rd Edition, Prentice-Hall of India, New Delhi.
2. **J. R. Reitz, F. J. Milford and R. W. Christy**, 1986, *Foundations of Electromagnetic Theory*, 3rd edition, Narosa Publication, New Delhi.
3. **J. D. Jackson**, 1975, *Classical Electrodynamics*, Wiley Eastern Ltd. New Delhi.
4. **J. A. Bittencourt**, 1988, *Fundamentals of Plasma Physics*, Pergamon Press, Oxford.

BOOKS FOR REFERENCE:

1. **W. Panofsky and M. Phillips**, 1962, *Classical Electricity and Magnetism*, Addison Wesley, London.
2. **D. Kraus and D. A. Fleisch**, 1999, *Electromagnetics with Applications*, 5th Edition, WCB McGraw-Hill, New York.
3. **B. Chakraborty**, 2002, *Principles of Electrodynamics*, Books and Allied, Kolkata.
4. **R. P. Feynman, R. B. Leighton and M. Sands**, 1998, *The Feynman Lectures on Physics*, Vols. 2, Narosa, New Delhi.

CORE PAPER VI	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	QUANTUM MECHANICS- II	Exam Hrs.	3
		P8PY2003	

Objective: To introduce the physical concepts and mathematical formalism of scattering theory, time dependent perturbation theory, its applications, Relativistic Quantum Mechanics, Dirac equation and Quantization of Schrodinger's and Dirac field.

UNIT-I: SCATTERING THEORY

(15Hours)

Scattering amplitude - Cross sections - Born approximation - Partial wave analysis - Effective range theory for S-wave - Transformation from centre of mass to laboratory frame – Phase shift –scattering length and effective range – Low energy scattering.

UNIT-II: PERTURBATION THEORY

(15Hours)

Time dependent perturbation theory - Constant and harmonic perturbations - Transition probabilities - Adiabatic approximation - Sudden approximation - The density matrix - Spin density matrix and magnetic resonance - Semi-classical treatment of an atom with electromagnetic radiation - Selection rule for dipole radiation.

UNIT-III: RELATIVISTIC QUANTUM MECHANICS

(15Hours)

Klein-Gordon equation - Dirac equation – Plane wave solutions - Interpretation of negative energy states - Antiparticles - Spin of electrons - Magnetic moment of an electron due to spin - Energy values in a Coulomb potential.

UNIT-IV: DIRAC EQUATION

(15Hours)

Covariant form of Dirac equation - Properties of the gamma Matrices - Traces - Relativistic invariance of Dirac equation – Probability density-current four vector – Bilinear Covariant - Feynman's theory of positron (Elementary ideas only without propagation formalism).

UNIT-V: SECOND QUANTIZATION

(15Hours)

Second quantization of Klein-Gordon field - Creation and annihilation operators - Commutation relations - Quantization of electromagnetic field - Quantization of Schrodinger's and Dirac field

BOOKS FOR STUDY:

1. **L. I. Schiff**, 1968, *Quantum Mechanics*, 3rd Edition, International Student Edition, MacGraw-Hill Kogakusha, Tokyo.
2. **E. Merzbacher**, 1970, *Quantum Mechanics*, 2nd edition, John Wiley and Sons, New York.
3. **V. K. Thankappan**, 1985, *Quantum Mechanics*, 2nd Edition, Wiley Eastern Ltd, New Delhi.
4. **J.D. Bjorken** and **S.D. Drell**, 1964, *Relativistic Quantum Mechanics*, MacGraw-Hill New York.
5. **V. Devanathan**, 2005, *Quantum Mechanics*, Narosa Publishing House, New Delhi.
7. S.L. Gupta and I.D. Gupta - Quantum Mechanics.
8. **P. M. Mathews** and **K. Venkatesan**, 1976, *A Text book of Quantum Mechanics*, Tata McGraw-Hill, New Delhi.

BOOKS FOR REFERENCE:

1. **P. A. M. Dirac**, 1973, *The Principles of Quantum Mechanics*, Oxford University Press, London.
2. **L. D. Landau** and **E. M. Lifshitz**, 1958 *Quantum Mechanics*, Pergamon Press, London.
3. **Bell, Gottfried** and **M. Veltman**, 2001, *The Foundations of Quantum Mechanics*, World Scientific.
4. **V. Devanathan**, 1999, *Angular Momentum Techniques in Quantum Mechanics*, Kluwer Academic Publishers, Dordrecht.

CORE PRACTICAL PAPER VI	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	ELECTRONICS EXPERIMENTS I	Exam Hrs.	3
		P8PYPR21	

LIST OF EXPERIMENTS

(Any 15 out of the given 25)

1. Characteristics of UJT and Relaxation Oscillator.
2. FET Characteristics and FET amplifier.
3. Op-Amp – Inverting, Non-inverting amplifier – Voltage follower summing, difference, average amplifier – differentiator and integrator,
4. Op-Amp – Study of the attenuation characteristics and design of the phase shift-Oscillator.
5. Op-Amp –Study of the attenuation characteristics and design of the Wien Bridge Oscillator.
6. Op-Amp – Solving Simultaneous equations.
7. Op-Amp – Design of Square wave, Saw-tooth wave and Triangular wave generators.
8. Op-Amp – Design of Schmitt Trigger and construction of monostable multivibrator.
9. Op-Amp – Design of active filters – second order –Low pass, high pass, band pass and band rejecter.
10. Op-Amp – D/A converter - Binary weighted method - R-2R Ladder method.
11. IC7400 – Half adder, Half subtractor, Full adder and Full subtractor.
12. IC 7490 – modulus counters- Using Seven segment with IC 7447
13. Up-down counters – Design of modulus counters.
14. 4 bit Shift Registers – Ring counter – Twisted Ring counter.
15. IC 7483 – Arithmetic Operations.
16. IC 555 – Astable multivibrator and Voltage Controlled Oscillator.
17. IC 555 – Monostable multivibrator, Frequency Divider.
18. IC 555 – Schmitt Trigger and Hysteresis.
19. IC 7400 & IC 7413 - Clock generators.
20. Temperature co-efficient using 555 timers.
21. Instrumentation Amplifier – using IC 741.
22. Pulse width modulator using IC 741.
23. A/D converter using comparator LM 336.
24. Phase locked loop.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	ADVANCED SPECTROSCOPY	Exam Hrs.	3
		P8PYEP21	

Objective: To expose to the fundamental principles of various spectroscopic techniques for structural applications.

UNIT-I: INFRARED SPECTROSCOPY (15 Hours)

Vibrations of diatomic and simple polyatomic molecules - Anharmonicity – Fermi Resonance – Hydrogen Bonding – Normal Modes of Vibration in a crystal – Solid State Effects – Interpretation of Vibrational Spectra – Instrumentation techniques – FTIR spectroscopy

UNIT-II: RAMAN SPECTROSCOPY (15 Hours)

Vibrational and Rotational Raman spectra – Mutual Exclusion principle – Raman spectrometer – Polarization of Raman Scattering light. Structure Determination through IR and Raman spectroscopy – Phase transitions – Resonance Raman Scattering

UNIT-III: NMR AND NQR SPECTROSCOPY (15 Hours)

Quantum theory of NMR – Bloch equations – Design of NMR Spectrometer — Chemical Shift – Application to molecular structure.

Theory of NQR – Nuclear Quadrupole energy levels for axial and non axial symmetry – Experimental techniques and applications.

UNIT-IV: ESR AND MOSSBAUER SPECTROSCOPY (15 Hours)

Quantum Theory of ESR – Design of ESR Spectrometer – Hyperfine Structure – Anisotropic systems – Triplet state study of ESR – Applications – Crystal defects - Biological studies

Mossbauer Effect – Recoilless emission and absorption – Mossbauer spectrum – Experimental methods – Mossbauer spectrometer- Hyperfine interactions –Chemical Isomer shift.

UNIT-V: LASER SPECTROSCOPY

(15 Hours)

Nonlinear optical effects- frequency generation by NOT- sources – Supersonic beams and jet cooling – hyper Raman effect- stimulated Raman scattering- Inverse Raman Scattering- Coherent anti stoke Raman Scattering- Photo acoustic Raman Scattering – LMR.

BOOKS FOR STUDY:

1. **C. N. Banwell** and **E. M. McCash**, 1994, Fundamentals of Molecular Spectroscopy, 4th Edition TMH, New Delhi.
2. **G. Aruldas**, 2001, Molecular Structure and Spectroscopy, Prentice Hall of India Pvt.Ltd.New Delhi.
3. **D. N. Satyanarayana**, 2004, Vibrational Spectroscopy and Applications, New Age International Publication
4. **Gurdeep Chatwal & Sham Anand**, Spectroscopy (Atomic and Molecular) Himalaya Publishing house

BOOKS FOR REFERENCE:

1. **D. D. Jyaji** and **M. D Yadav** 1991, Spectroscopy, Amol Publications
2. **Atta ur Rahman**, 1986, Nuclear Magnetic Resonance, Springer Verlag.
3. **D. A. Lang**, Raman Spectroscopy, McGraw-Hill International
4. **Raymond Chang**, 1980, Basic Principles of Spectroscopy McGraw-Hill Kogakusha, Tokyo.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	ASTROPHYSICS	Exam Hrs.	3
		P8PYEP22	

Objective: To provide an introduction to stellar structure and evolution, and to enhance the knowledge about Nuclear Astro Physics, Stellar objects & Stellar explosions, Gravitational collapse and relativistic astrophysics and formation of Accretion disks

UNIT-I: STELLAR STRUCTURE AND EVOLUTION (15 Hours)

Star formation, Stellar Magnitudes, Classification of stars, H-D classification, Saha Equation of ionization, Hertzsprung-Russel (H-R) diagram. i) Gravitational energy, Virial theorem, Equations of stellar structure and evolution. ii) Pre-main sequence evolution, Jeans criteria for star formation, fragmentation and adiabatic contraction, Evolution on the main sequence, Post main sequence evolution, Polytropic Models: Lane-Emden equation, simple stellar models: Eddington's model and Homologous model, Convective and Radiative stars, Pre-main sequence contraction: Hayashi and Henyey tracks.

UNIT- II: NUCLEAR ASTROPHYSICS (15Hours) Thermonuclear

reactions in stars, pp chains and CNO cycle, Solar Neutrino problem, subsequent thermonuclear reactions, Helium burning and onwards, nucleosynthesis beyond iron, r- and s- processes.

UNIT- III: STELLAR OBJECTS & STELLAR EXPLOSIONS(15 Hours)

Qualitative discussions on: Galaxies, Nabulae, Quasars, Brown dwarfs, Red Giant Stars, Nova, Supernova.

UNIT-IV: GRAVITATIONAL COLLAPSE AND RELATIVISTIC ASTROPHYSICS (15 Hours)

Newtonian theory of stellar equilibrium, White Dwarfs, Electron degeneracy and equation of States, Chandrasekhar Limit, Mass-Radius relation of WD. Neutron Stars, Spherically symmetric distribution of perfect fluid in equilibrium. Tolman-Oppenheimer-Volkoff (TOV) equation, Mass-Radius relations of NS. Pulsars,

Magnetars, Gamma ray bursts. Black holes, Collapse to a black hole (Oppenheimer and Snyder), event horizon, singularity.

UNIT-V:ACCRETION DISKS

(15 Hours)

Formation of Accretion Disks, Differentially rotation systems in Astrophysics, Disk dynamics, Steady Disks, Disk formation in close binary systems through mass transfer, Accretion onto compact objects (Black Holes and Neutron Stars).

BOOKS FOR STUDY

1. Textbook of astronomy and astrophysics with elements of cosmology, V.B.Bhatia, Narosa publishing house, 2001.
2. Astrophysics – Stars and Galaxies, K. D. Abhyankar, University Press, 2001.
3. Theoretical Astrophysics (Vols.I,II,III) – T. Padmanavan (CUP)
4. Black Holes, White Dwarfs and Neutron Stars – S.L.Shapiro and S.A.Teukolsky (John Wiley, 1983)

BOOKS FOR REFERENCE:

1. The Early Universe – E.W.Kolb and M.S.Turner (Addison-Wesley Reading, 1990)
2. Introduction to Cosmology – J.V.Narlikar (Cambridge University Press)
3. General Relativity, Astrophysics and Cosmology – A.K.Raychaudhuri, S.Banerji and A.Banerjee (Springer-Verlag, 1992)
4. General Relativity and Cosmology – S. Banerji and A. Banerjee (Elsevier, 2007)
5. The Structure of the Universe – J.V.Narlikar (OUP, 1978)

CC01 (CORE PAPER)	SEMESTER I	Credit	7
		Hrs./Week	7
COURSE TITLE	GENERAL CHEMISTRY – I	Exam Hrs.	3
		U8CH1001	

OBJECTIVE:

Basic concepts regarding atomic structure, periodic properties, bonding concepts, quantum chemistry, solids, liquids, gases, hydrocarbons, nomenclature, reactions, principles of volumetric analysis derivation of equations, related problems, and applications wherever necessary are to be taught for I-Semester.

UNIT – 1

21 Hours

1.1 Atomic structure – Quantum number n, l, m and s – Pauli's exclusion principle – Energy distribution and orbitals – Hund's rule of maximum multiplicity – Aufbau's Principle – Electronic configurations of elements – Stability of half – filled and completely filled orbitals.

1.2 s, p, d and f block elements – Classification and characteristic properties – Periodicity of properties – Definition and periodicity of the following properties – Atomic and ionic radii – factors affecting atomic and ionic radii.

1.3 Ionization potential – factors affecting ionization potential – Electron affinity – factors affecting electron affinity – Electronegativity – factors affecting electronegativity – Pauling scale – Mulliken electro negativity scale – Alfred and Roschow scale – Diagonal relationship with examples – Summary of horizontal, vertical and diagonal relationships in the periodic table.

UNIT – II

21 Hours

2.1 Classification of organic compounds – Nomenclature of organic compounds – Functional groups – Homologous series – IUPAC recommendations for naming simple aliphatic – Alicyclic and aromatic compounds – Polyfunctional compounds – Heterocyclic compounds.

2.2 Basic concepts of bonding in organic chemistry – Hybridisation – tetravalency of carbon – geometry of molecules – methane, ethane, ethylene,

acetylene and benzene – Factors affecting covalent bond. Electron displacement affects – inductive – mesomeric – electromeric – resonance – hyperconjugation and steric effects.

2.3 Alkanes – Methods of preparation of alkanes – Physical and chemical properties of alkanes – Mechanism of free radical substitution in alkanes - Alkenes – Properties of alkenes – Electrophilic and Free radical addition.

UNIT – III

21 Hours

3.1 Quantum chemistry – Quantum theory of radiation – Planck's theory – Photoelectric effect - Compton effect – Wave mechanical concept of the atom – de Broglie's relationship – wave nature of electron – Heisenberg's uncertainty principle – Schrodinger wave equation [without derivation] – Significance of wave functions, ψ and ψ^2 – probability distribution of electrons – radial probability distribution curves.

3.2 Gaseous state – Kinetic gas equation – derivation – Gas laws from the kinetic gas equation – kinds of velocities – mean, RMS and most probable velocities – calculation of molecular velocities – transport properties- viscosity – thermal conductivity – diffusion.

3.3 Maxwell's distribution of molecular velocities [no derivation] – Effect of temperature on velocity distribution – equipartition of energy – heat capacity on molecular basis - Virial equation of state - Boyle temperature – coefficient of compressibility and thermal expansion.

UNIT – IV

21 Hours

4.1 Principles of Inorganic analysis – Reactions involved in the separation and identification of cations and anions in the analysis – Spot test reagents-Aluminon, Cupferon, DMG, Thiourea, Magneson, Alizarin and Nessler's reagent.

4.2 Addition reactions of alkenes with hydrogen and halogens - Mechanism – hydrogen halide [Markownikoff's rule] and Mechanism – hydrogen bromide [peroxide effect] and Mechanism – sulphuric acid – water and Mechanism – hydroboration – ozonolysis – hydroxylation with KMnO_4 – allylic substitution by NBS - Epoxidation and Mechanism – Oxidation – reduction – Self-addition.

4.3 Liquid crystals – classification and molecular arrangements – liquid state – density – diffusion – Viscosity – evaporation. Surface tension – effect of temperature on surface tension – parachor – definition and applications only – Coefficient of viscosity – effect of temperature – effect of pressure.

UNIT – V

21 Hours

5.1 Semimicro techniques – Principles of acid-base equilibria – common ion effect – Solubility product and their applications in qualitative analysis.

5.2 Types of organic reactions – Cleavage of bonds - Homolytic and Heterolytic fission of carbon-carbon bond – Methods for determining reaction mechanism – Reaction intermediates – Structure and stability of Carbocations, Carbanions and Free radicals.

5.3 Solid State – Crystal lattices – Laws of crystallography – Elements of symmetry – crystal systems – unit cell – space lattice – Bravis's lattices – structure of NaCl - structure of CsCl – Miller's indices.

Text Books:

- ❖ Text book of Organic Chemistry by ArunBahl& B.S. Bahl - S.Chand.
- ❖ Text book of Inorganic Chemistry by P.L. Soni – S. Chand.
- ❖ Principles of Physical Chemistry by Puri, Sharma – Vishal Publication.
- ❖ Advanced Organic Chemistry by Morrison & Boyd.
- ❖ Text book of Inorganic Chemistry by R.D. Madan

Reference Book

- ❖ Advance Organic Chemistry by I.L. Finor.
- ❖ Advance Inorganic Chemistry by J. D. Lee.
- ❖ Physical Chemistry by RajaramKuriakose.

CC01 (CORE PRACTICAL PAPER)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL I: INORGANIC QUALITATIVE ANALYSIS – I & COMPLEX PREPARATION	Exam Hrs.	3
		U8CHPR11	

OBJECTIVE:

Analysis of Inorganic salt containing one anion and one cation. Semi-micro method using the conventional scheme to be adopted.

Anions to be Studied - I

Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide.

Cations to be Analysed – II

Lead, Copper, Cadmium, Bismuth, Aluminium, Iron, Nickel, Zinc and Ammonium.

Preparation of Inorganic Compounds - II

1. Tetrammine copper II sulphate
2. Tris (thiourea) copper I chloride
3. Potassium trioxalato ferrate (II)
4. Chloropentammine cobalt (III) chloride
5. Ferrous ammonium sulphate
6. Microcosmic salt

ACID RADICAL	15 MARKS
BASIC RADICAL	15 MARKS
PREPARATION	15 MARKS
RECORD	10 MARKS
VIVA VOCE	15 MARKS
PROCEDURE	<u>05 MARKS</u>
TOTAL	<u>75 MARKS</u>

REFERENCE:

1. Basic Principles of Practical Chemistry.
V. Venkateswaran, R. Veerasamy, A.R. Kulandaivelu. S. Chand & Sons publications.

CC03 (ALLIED I)	SEMESTER I	Credit	6
		Hrs./Week	7
COURSE TITLE	ALLIED PHYSICS I	Exam Hrs.	3
		U8CHAL11	

Objective: This paper is offered to the students of mathematics, Chemistry and Computer Science as allied Subjects. The logical reasoning behind the description of the physics problem and obtaining the solution to such problems are taught in this paper.

UNIT I - PROPERTIES OF MATTER (18Hours)

Elasticity: Hooke's law-Elastic constants – bending of beam – Bending moment – cantilever Depression at the loaded end of a cantilever – determination of Young's modulus by non-uniform bending.

Torsion: Torsion couple – Potential energy in a twisted wire – Torsional pendulum – Time period – Rigidity Modulus – Determination of rigidity modulus by Torsional oscillation (without masses).

Viscosity: viscosity of a liquid – Viscous force – Co-efficient of viscosity of a liquid – comparison of viscosities of two liquids by graduated burette method.

Surface Tension: Surface Tension –interfacial tension – determination of surface tension and interfacial tension by the method of drops.

UNIT II – Heat (08Hours)

Specific heat – Callender's and Barne's method to determine the specific heat of a liquid – Newton's law of cooling – determination of specific heat of a liquid using Newton's law of cooling – Emissivity and Emissive power- Kirchhoff's laws of radiation

UNIT – III – Electricity and Magnetism (15Hours)

Electricity: Potentiometer – Principle – Calibration of low range voltmeter - Measurement of internal resistance of cell – measurement of an unknown resistance- Capacitance of a conductor - Capacitance of spherical and parallel plate capacitor – energy of a charge capacitor - Loss of energy due to sharing of charges

Magnetic effect of electric current: Biot- Savart law – Magnetic flux- Magnetic Induction at a point due to a straight conductor carrying current –Moving coil ballistic galvanometer.

Magnetism –Moment and pole strength of a magnet – Deflection magnetometer – Tan C position – Vibration magnetometer – Theory – period of oscillation

UNIT IV- SOUND AND ACOUSTICS OF BUILDING

(13Hours)

Sound: Transverse vibration of strings – Vibration of strings – Velocity and frequency of vibrations of a stretched string – laws of vibrations along a stretched string – Sonometer – A.C. Frequency - Steel wire – Brass wire. Ultrasonics – Production by Piezo – electric method – properties and uses

Acoustics of buildings: Reverberation – Reverberation time – Sabine's formula [definition only] – Sound absorption co-efficient of surface – conditions for the perfect acoustics.

UNIT V- OPTICS

(13Hours)

Physical Optics: Interference –Air Wedge –description - Determination of diameter of a thin wire by air wedge.

Diffraction: Theory of transmission grating – Normal Incidence – Determination of Wavelength of monochromatic source and Wavelength of mercury lines using a grating by normal Incidence.

Polarisation: Optical activity –specific rotatory power – Polarimeter – Determination of specific rotatory power of a solution using the polarimeter.

BOOKS FOR STUDY:

1. Allied Physics – R. Murugesan S. Chand & Co. First Edition (2005)
2. Allied Physics- Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book department, Chennai.
3. Elements of Properties of Matter – D.S Mathur, S. Chand & Co. (1999).
4. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
5. A text book of Sound – by M. Narayanamoorthy and other National Publishing companies (1986).

BOOKS FOR REFERENCE:

1. Modern Physics –R. Murugesan S. Chand & Co.(2004)
2. Electronic Principles and applications – A. B. Bhattacharya, New Central Book Agency, Culcutta.
3. Introduction to Solid state Physics – C. Kittel, 5th Edition Wiley Eastern Ltd.
4. Renewable & sustainable energy sources – Agarwal.
5. Introduction to Fiber optics by K. Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999)

EC03 (ALLIED I PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED PHYSICS PRACTICAL I	Exam Hrs.	3
		U8CHAP11	

Objective: It is aimed at exposing the Allied students to the technique of handling simple measuring instruments and also makes them measure certain mechanical and thermal properties of matter.

List of Experiments (All ten experiments compulsory)

1. Young's Modulus – Non-uniform bending method using Pin and Microscope.
2. Rigidity Modulus – Torsional oscillation method (without symmetric masses)
3. Surface tension and interfacial surface tension – by drop weight method.
4. Determination of Co-efficient of viscosity – Graduated Burette.
5. Specific heat capacity of a liquid – Method of mixtures.
6. Sonometer — Determination of frequency of tuning fork (Screw Gauge is given)
7. Newton's Rings – Radius of curvature of the convex lens.
8. Spectrometer- Refractive index of a glass prism (minimum deviation)
9. Potentiometer – calibration of low range voltmeter.
10. Determination of M and B_H using Deflection magnetometer in Tan C position and Vibration magnetometer.

BOOKS FOR REFERENCE

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Textbook of practical Physics, Sultan Chand & Sons
2. C.C Ouseph, G. Rangarajan, R. Balakrishnan- A Textbook of practical Physics- S. Viswanathan Publisher-PartII (1996)

BOOKS FOR STUDY

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part I (1990)
2. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.ViswanathanPublisher-Part II (1996)

CC04 (CORE PAPER)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	GENERAL CHEMISTRY – II	Exam Hrs.	3
		U8CH2001	

OBJECTIVES:

Basic concepts regarding ionic bond, covalent bond, cyclo alkanes, dienes, thermochemistry, thermodynamics, derivation of equations, related problems, s-block elements, group study, polymerisation, mechanism and applications.

UNIT – I

21 Hours

1.1 Ionic bond – Electronic theory of valence – Conditions for the formation of ionic bond – General properties - Radius ratio rule and its limitations – Energetics of formation of NaCl from Na and Cl – Hydration energy and lattice energy and their applications – Born - Haber cycle. Fajan's rules – Characteristics of electrovalent compounds – Valence bond theory – Conditions for the formation of covalent bond – General properties – Polarity of bonds – Orbital overlap - Bond lengths and bond energies – hybridization – sigma and pi bonds.

1.2 Werner theory – Primary and secondary Valencies – geometry of the Complexes- Sidwig theory – EAN rule – Theory of bonding.

1.3 VSEPR theory geometries of BO_3^{3-} , NH_4^+ , ClF_3 , PCl_5 , IF_7 , and XeF_6 molecules – partial ionic character of covalent bond – percentage of ionic character.

UNIT – II

21 Hours

2.1 Alkynes – Acidity of alkynes – Addition of hydrogen – Hydroboration – Hydrohalogenation – Addition of hypohalous acid - Hydration – addition of water with HgSO_4 catalyst – Addition of alcohols and carboxylic acids.

2.2 Formation of acetylides – alkylation of alkynes with mechanism – oxidation with KMnO_4 – ozonolysis – Formation of benzene – Oxidative coupling – Isomerization.

2.3 Cycloalkanes – preparation using Wurtz's reaction – Dieckmann's ring closure and reduction of aromatic hydrocarbons – Substitution and ring opening reactions.

UNIT – III

21 Hours

3.1 Thermodynamics – Definition and explanation of terms – System, boundary, surroundings – Homogeneous and heterogeneous system – Isolated system – Closed system – Open system – Intensive and extensive properties – State of a system – Independent state variables – Dependent state variables - Thermodynamic functions – State and path functions. Exact and inexact differentials.

3.2 Thermodynamic processes – types of processes – cyclic – reversible – irreversible – isothermal – adiabatic. Cyclic rule – concept of heat and work - Zeroth law of thermodynamics.

3.3 First law of thermodynamics – Statement and equation – relationship – Calculation of w , q , ΔE and ΔH for the expansion of ideal gases under reversible – isothermal and adiabatic conditions.

UNIT – IV

21 Hours

4.1 Alkali metals – Li, Na, K, Rb and Cs – Occurrence – Comparative study of elements – oxides, halides, hydroxides and carbonates – Exceptional property of Lithium – Diagonal relationship of Li with Mg.

4.2 1,2 and 1,4 additions with mechanism – Free radical addition – polymerization of dienes – Synthesis of dienes – 1,3 butadiene – Isoprene and chloroprene – Allenes.

4.3 Joule's law – Joule-Thomson effect – Joule-Thomson coefficient and its derivation – inversion temperature, its significance and its derivation and significance.

UNIT – V

21 Hours

5.1 Alkaline earth metals – Be, Mg, Ca, Sr and Ba – Occurrence – comparative study of the elements with respect to oxides, hydroxides, halides, sulphates and carbonates - Exceptional property of Beryllium – Diagonal relationship of Be with Al – Comparison of alkaline earth metals with alkali metals – Magnesium resemblance with zinc.

5.2 Polymerisation – Types of polymerisation – mechanism of polymerisation - Distinction between addition and condensation polymerisation – free radical – Cationic and anionic polymerisations - addition polymers and condensation polymers with examples – thermoplastic and thermosetting polymers.

5.3 Thermochemistry – Heat of reaction – Exothermic and endothermic reaction – Calculation of ΔH from ΔE and vice versa – Thermochemical equations – bond dissociation energy – Calculation from thermochemical data - variation of heat of a reaction with temperature – Kirchoff's equation and its significance.

Text Book:

- ❖ Text book of Organic Chemistry by ArunBahl & B.S. Bahl- S.Chand.
- ❖ Text book of Inorganic Chemistry by P.L. Soni – S. Chand.
- ❖ Principles of Physical Chemistry by Puri, Sharma – Vishal Publication.
- ❖ Advanced Organic Chemistry by Morrison & Boyd.
- ❖ Text book of Inorganic Chemistry by R.D. Madan

Reference Book

1. Advance Organic Chemistry by I.L. Finor.
2. Advance Inorganic Chemistry by J.D. Lee.
3. Physical Chemistry by RajaramKuriakose.

CC04 (CORE PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL II:QUALITATIVE ANALYSIS OF INORGANIC SALT MIXTURE	Exam Hrs.	3
		U8CHPR21	

Objective:

Analysis of mixture containing two cations and two anions of which one will be an Interfering ion. Semi-micro methods using the conventional scheme to be adopted.

Cations to be studied

Lead, Copper, Bismuth, Cadmium, Iron, Aluminium Zinc, Manganese, Cobalt, Nickel, Barium, Calcium, Strontium, Magnesium and Ammonium.

Anions to be studied

Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

RECORD	10 Marks
VIVA VOCE	15 Marks
ACID RADICALS	20 Marks
BASIC RADICALS	<u>30 Marks</u>
Total	<u>75 Marks</u>

REFERENCE BOOKS:

1. Basic Principles of Practical Chemistry.
2. V. Venkateswaran, R. Veerasamy, A.R. Kulandaivelu. S. Chand & Sons publications.

CC06 (ALLIED I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED PHYSICS II	Exam Hrs.	3
		U8CHAL21	

Objective: This paper is offered to the students of mathematics, Chemistry and Computer Science as allied Subjects. The logical reasoning behind the description of the physics problem and obtaining the solution to such problems are taught in this paper.

Unit I - Atomic physics

(12 Hours)

Discovery of cathode Rays- Properties – Determination of e/m by Thomson's parabola method- Positive Rays – Discovery – Properties – Dempster's mass Spectrograph

Atom model - vector Atom model- electron spin and spatial quantization - quantum numbers - Pauli's exclusion principle - excitation and ionization potentials- experimental determination-Franck and Hertz method

Unit II - Nuclear Physics

(15Hours)

Particle Accelerator- Linear accelerator, cyclotron – Particle detectors – GM counter – Transmutation – Types – The Q value equation for a nuclear reaction – Types of nuclear reaction – Basic concepts of fission and fusion – Nuclear reactor (General elements only)– Harmful effects of nuclear radiation - Prevention. Discovery of cosmic rays – origin of cosmic rays -primary cosmic rays – secondary cosmic rays – cosmic rays showers - Latitude effect – The east west effect – Altitude effect- Discovery of Positrons and mesons.

Unit III –Electromagnetism and Transient current(13Hours)

Faraday's laws of electromagnetic induction - vector form – Lenz's law – self and mutual inductance – Determination of coefficient of self-inductance – Rayleigh's method – Induction coil – Growth and Decay of current in LR circuit – Growth and Decay of charge in RC circuit – Determination of High Resistance by Leakage method.

Unit IV - Crystallography and Fibre Optics (12Hours)

Types of Solids - Crystalline - amorphous - Periodic Array of Atoms - Unit cell - Miller indices - The crystal systems – cubic crystal structures - Bragg's law and derivation. - Types of bonding in crystal - Principle and propagation of light through the fiber – Fiber loss - classification of optical fiber - fiber optic communication system block diagram.

Unit V – Electronics

(12Hours)

Basic Electronics: Junction Diode - LED - Zener diode - voltage regulator - Junction transistor - Characteristics of Transistor - common base - common emitter mode

Digital electronics: AND, OR, NOT gates - construction using diodes and transistors - NAND and NOR gates - Universal building Blocks - Boolean algebra - Demorgan's theorem and verification.

BOOKS FOR STUDY:

1. Allied Physics by Dr.R.Sabesan and Dr.Mrs.Dhanalakshmi
2. Allied Physics by Mr. Kamalakkannan and Jayraman.
3. Text book of optics by Brijal and Subramanian
4. Modern Physics by R. Murugesan S.Chand & Co.

BOOKS FOR REFERENCE:

1. Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY, 1994.
2. Digital Principles and Application - Malvino & Leach.
3. Basic Electronics, 6th Edition by B. Grob, McGraw- Hill, NY, 1989.

EC06 (ALLIED I PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2

COURSE TITLE	ALLIED PHYSICS PRACTICALII	Exam Hrs.	3
		U8CHAP21	

Objective: It is aimed at exposing the Allied students to the technique of handling simple measuring instruments and also makes them measure certain mechanical and thermal properties of matter

List of Experiments (All ten experiments compulsory)

1. Non-uniform Bending – Determination of Young’s Modulus using Scale and Telescope.
2. Rigidity Modulus – Torsional oscillation method (with symmetric masses)
3. Specific Heat Capacity of a liquid – by Newton’s law of cooling
4. Sonometer – Determination of AC frequency Using steel wire (Electromagnet)
5. Spectrometer Grating – Normal incidence – Wavelength of mercury spectral lines.
6. Potentiometer – Calibration of low range Ammeter.
7. Figure of merit – Determination of Current Sensitiveness and Voltage Sensitiveness of a galvanometer.
8. Construction of AND, OR gates using diodes and NOT by transistor.
9. Characteristics of Zener diode.
10. Verification of Demorgan’s Theorem.

Books for Reference

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Textbook of practical Physics, Sultan Chand & Sons
2. C.C Ouseph, G. Rangarajan, R. Balakrishnan- A Textbook of practical Physics-S. Viswanathan Publisher-PartII (1996)

Books for Study

1. Allied Physics by Dr.R.Sabesan and Dr.Mrs.Dhanalakshmi
2. Allied Physics by Mr. Kamalakkannan and Jayraman.
3. Text book of optics by Brijal and Subramanian
4. Modern Physics by R. Murugesan S.Chand & Co.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	INORGANIC CHEMISTRY I	Exam Hrs.	3
		P8CH1001	

OBJECTIVES: To make students acquainted with basics of crystallography, structure and bonding involved in Inorganic Chemistry and their basics.

UNIT – I SOLID STATE

18 Hours

Structure of solids – Comparison of X-ray and neutron diffraction, structure of Cadmium Iodide and Nickel Arsenide, Pervoskite; spinels; defects in solids (Frenkel, Schottky types); Non-stoichiometric compounds. Electrical, magnetic and optical properties of solids- Band theory, semi-conductors, super conductors, Solid state lasers. Types of magnetic behaviour – dia, para, ferro, antiferro and ferrimagnetism; hysteresis, magnetic susceptibility and measurements – Guoy and Faraday methods.

UNIT – II STRUCTURE AND BONDING

18 Hours

Polyacids: Isopolyacids and heteropolyacids of Vanadium, Chromium, Molybdenum and Tungsten – properties and structure. Inorganic polymers: General properties, Phosphorous based polymers – polyphosphazenes ; Sulphur based polymers – Sulphur Nitrides – synthesis, structure and applications. Silicates: Types, structure, properties and applications; Molecular sieves. Inorganic phosphors, Ferrites, Garnets.

UNIT – III METAL CLUSTERS & BORON HYDRIDES

18 Hours

Metal clusters: Carbonyl clusters and halide clusters – upto tri-nuclear metal clusters, quadruple bond; naked clusters. Boron hydrides: Polyhedral boranes, carboranes, metallocarboranes – preparation, properties and structure.

UNIT – IV COORDINATION CHEMISTRY

18 Hours

Stability of complexes – factors affecting the stability of complexes, thermodynamic aspects of complex formation, determination of stability constants – spectrophotometric, polarographic and potentiometric methods. SHAB approach – Pearson's principle, Applications in metallurgy.

UNIT – V STEREOCHEMISTRY OF COORDINATION COMPOUNDS

18 Hours

Stereochemical aspects– Stereoisomerism in inorganic complexes, isomerism arising out of ligand conformation and absolute configuration of the complex, chirality and the nomenclature of the chiral complexes – Optical rotatory dispersion (ORD) and Circular Dichroism (CD). Macrocyclic ligands – Crown ethers, Porphyrins, Corrins, Cryptands and Schiff's bases.

Reference Book:

1. J.E. Huheey, Inorganic Chemistry – Principles, Structure and Reactivity, Harper Collins, New York, IV Edition (1993)
2. F.A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry – A Comprehensive Text, John Wiley and Sons, V Edition (1988)
3. K.F. Purcell and J.C. Kotz, Inorganic Chemistry – WB Saunders Co., USA (1977)
4. M.C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., New York (1974)
5. J.E. Huheey, Inorganic Chemistry, Harper Collins NY IV Edition, (1993)
6. G.S. Manku, Inorganic Chemistry (1984)
7. D.F. Shrivvers, Pw. Atkins and C.H. Langford, Inorganic Chemistry, OUP (1990)

Recommended Books

1. N.N. Greenwood and Earnshaw, Chemistry of the Elements, Pergamon Press, New York (1984)
2. EL. Muttarties, Polyhedral Boranes, Academic Press, New York (1975)
3. NH Ray, Inorganic Polymers, Academic Press, (1978)
4. S.F.A. Kettle, Coordination Chemistry, EIBS (1973)
5. K. Burger, Coordination Chemistry, Burter Worthy (1973)
6. F. Basolo and R.G. Pearson, Mechanism of Inorganic Reaction, Wiley NY (1967)
7. R. Sarkar, General and Inorganic chemistry, (Parts I and II), New Book Agency, Calcutta.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ORGANIC CHEMISTRY I	Exam Hrs.	3
		P8CH1002	

OBJECTIVE : *To learn the concepts of stereochemistry, conformational analysis and their application in the determination of reaction mechanism. To understand the mechanism of nucleophilic and electrophilic substitution reactions.*

UNIT I – STEREOCHEMISTRY

18 Hours

Optical activity and chirality, Classification of chiral molecules as asymmetric and dissymmetric. A brief Study of dissymmetry of allenes, biphenyls, spiro compounds, trans cyclooctene and cyclononene, absolute configuration –R, S notation of biphenyls and allenes. Fischer projection. Inter conversion of Sawhorse, Newman and Fischer projections. Molecules with more than one asymmetric center (restricted to five carbons). e.g. Erythro and threo compounds. Asymmetric synthesis. Cram's rule.

Geometrical isomerism, E, Z - nomenclature of olefins, Geometrical and optical isomerism (if shown) of disubstituted cyclopropane, cyclobutane and cyclopentanes. Stereo specific and stereo selective reactions, Identification of enantiotopic, homotopic, diastereotopic hydrogens and Prochiral compounds in carbon compounds.

UNIT II – CONFORMATIONAL ANALYSIS

18 Hours

Conformation of some simple 1, 2 – disubstituted ethane derivatives. Conformational analysis of disubstituted cyclohexane. Conformation of substituted cyclohexanol, cyclohexanone and cyclohexane carboxylic acid derivatives. Conformation and stereochemistry of cis and trans decalin and 9 – methyldecalin.

UNIT III – ALIPHATIC SUBSTITUTION REACTION

18 Hours

S_N1, S_N2 and S_Ni mechanisms – Neighbouring group participation – reactivity, structural and solvent effects – substitution in norbornyl and bridgehead systems – substitution at allylic and vinylic carbons – substitution by ambident nucleophiles – substitution at carbon doubly bonded to oxygen and nitrogen – alkylation and acylation of amines, halogen exchange, Von-Braun reaction, alkylation and acylation of active methylene carbon compounds, hydrolysis of esters, Claisen and Dieckmann condensation.

S_E1, S_E2 and S_Ei mechanism, double bond shift – Reactivity. Migration of double bond, keto-enol interconversion, HVZ reaction, Stark-Enamine reaction, halogenation of aldehydes and ketones and decarboxylation of aliphatic acids.

UNIT IV – AROMATIC ELECTROPHILIC SUBSTITUTION REACTIONS **18 Hours**

The arenium ion mechanism. Orientation and reactivity (ortho, meta and para directing groups). Typical reactions – nitration, halogenation, alkylation, acylation and diazonium coupling, Formylation, Reimer – Tieman reaction, Vilsmeier – Haack, Gattermann, Gattermann – Koch, Kolbe reaction, Synthesis of di and tri substituted benzene (symmetrical tribromo benzene, 2-amino 5-methylphenol, 3-nitro 4-bromobenzoic acid, 3, 4-dibromonitrobenzene, 1,2,3 – trimethylbenzene) starting from benzene or any monosubstituted benzene. Electrophilic substitution of furan, pyrrole, thiophene and pyridine-N-oxide.

UNIT V – AROMATIC NUCLEOPHILIC SUBSTITUTIONS & DETERMINATION OF REACTION MECHANISM **18 Hours**

Methods for the generation of benzyne intermediate and reactions of aryl anion intermediate. Nucleophilic substitution involving diazonium ions. Aromatic Nucleophilic substitution of activated halides. Ziegler alkylation. Chichibabin reaction. Kinetic and non-kinetic methods of determining organic reaction mechanism. Hammett and Taft equations – Simple Problems.

RECOMMENDED BOOKS

1. Organic Synthesis by R.O.C. Norman, Chapman and Hall, NY, (1980)
2. Physical Organic Chemistry by Niel Isaacs, ELBS Publications (1987)
3. Organic Reaction Mechanism by S.M. Mukherji and S.P. Singh, MacMillan India Ltd., Chennai (1990)
4. Organic Chemistry IV Edition by Stanley Pines
5. Structures and Mechanism by E.S. Gould
6. Advanced Organic Chemistry, Part A and B, by Francis A. Carey and Richard Sundberg, 3rd Edition (1990), Plenum Press.
7. Aromatic Nucleophilic Substitution by J. Miller
8. Advanced Organic Chemistry III Edition by J. Miller
9. Reactive Molecules, C. Wentrup, John Wiley and Sons, New York (1984)
10. Advanced organic reaction mechanism and structure by J. March, Tata McGraw Hill.
11. Stereochemistry, Conformation analysis and Mechanism by P.S. Kalsi, 2nd Edition (1993), Wiley Eastern Limited, Chennai.
12. Stereochemistry of carbon compounds by Ernest Eliel

Reference Books:

1. Organic Chemistry, Marc London
2. Organic Chemistry, Mc Murray

3. Organic Chemistry, Graham Solomons
4. Carbenes, Nitrenes and Arynes by T.L. Gilchrist and C.W. Rees, Thomas Nelson and Sons Ltd., London.
5. Stereochemistry and Mechanism through solved problems by P.S. Kalsi.
6. Wiley Eastern Ltd., (1994)
7. Basic principles of Organic Stereochemistry by P. Ramesh – Madurai Kamaraj University.
8. Organic Reaction Mechanism by R.K. Bansal.
9. A Guide book to mechanism in organic chemistry by Longman.
10. Structure and mechanism in organic chemistry by C.K. Ingold, cornell University press.

CORE PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PHYSICAL CHEMISTRY I	Exam Hrs.	3
		P8CH1003	

OBJECTIVE: *To study the chemical potential and its significance. To study the effect of temperature on reaction rate. To study the elements of group theory and the Applications of group theory.*

UNIT I – THERMODYNAMICS

18 Hours

Partial molar properties-Partial molar free energy (Chemical potential) - Partial molar volume and Partial molar heat content - Significance and determination of these quantities. Variation of chemical potential with temperature and pressure.

Thermodynamics of real gases – definition of fugacity - determination of fugacity - variation of fugacity with temperature and pressure – thermodynamics of ideal and non ideal binary solutions –Lewis – Randall rule – Duhem Margulus equations.

UNIT II –THERMODYNAMICS AND THEORIES OF CHEMICAL KINETICS

18 Hours

Excess functions for non ideal solutions and their determination – the concept of activity and activity coefficients – determination of standard free energies – choice of standard states - determination of activity and activity coefficients for non electrolytes.

Effect of temperature on reaction rates – collision theory of reaction rate – molecular beams – collision cross sections – effectiveness of collisions – Steric factor – Limitations of collision theory. Significance of enthalpy of activation and entropy of activation – Absolute reaction rate theory (ARRT), activated complex to simple unimolecular and bimolecular processes. Eyring equation Comparison of ARRT theory and collision theory.

UNIT III –CHEMICAL KINETICS

18 Hours

Potential energy surfaces – kinetic isotopic effects - Reactions in solutions – effect of pressure, dielectric constant and ionic strength on reactions in solutions – (Bjerrum – Bronsted equation) – Kinetic isotope effects – Linear free energy relationships – Hammett and Taft equations.

UNIT IV– ELEMENTS OF GROUP THEORY**18 Hours**

Symmetry elements and symmetry operations – Groups – rules for forming a group, cyclic group, abelian group, sub group- group multiplication table – sub groups, similarity transformation and classes – identifications of symmetry operations and determination of point groups – Matrix representations - reducible and irreducible representations – direct product representation – Mulliken's Notations.

UNIT V – APPLICATIONS OF GROUP THEORY**18 Hours**

Great Orthogonality theorem (GOT) and its consequences – construction of character table for C_{2v} and C_{3v} – hybrid orbitals in non linear molecules (CH_4 , BF_3 , SF_6 and NH_3). Determination of representations of vibrational mode analysis in non linear molecules (H_2O , CH_4 , BF_3 , and NH_3). Symmetry selection rules of infra-red and Raman spectra – application of group theory for the electronic spectra of ethylene and formaldehyde.

TEXT BOOKS

1. S.Glasstone, Thermodynamics For Chemists, Affiliated East West Press ,New Delhi, 1950.
2. J.Rajaram and J.C.Kuriacose, Thermodynamics For Students Of Chemistry, Lal Nagin Chand, New Delhi, 1986.
3. G.K.Vemulapalli, Physical Chemistry, Prentice-Hall, 2000.
4. Thomas Engel and Philip Reid, Physical Chemistry, Pearson Education, 2006.
5. J.Rajaram and J.C.Kuriacose, Kinetics And Mechanism Of Chemical Transformations. Macmillan India Ltd, 1993.
6. K.J.Laidler, Chemical Kinetics, Harper And Row, New York, 1987.
7. K.L.Kapoor, A text Book Of Physical Chemistry Macmillan India Ltd, 2001.
8. V.Ramakrishnan and M.S.Gopinathan, Group Theory In Chemistry, Vishal Publications, 1998.
9. K.V.Raman, Group Theory and Its Applications To Chemistry, Tata Mcgraw Hill Publishing. Co, 1990.
10. Bhattacharya: Group Theory And Its Applications.

SUGGESTED REFERENCE BOOKS

1. W.J.Moore Chemistry, Orient Longman, London. 1972.
2. K.G.Denbigh, Thermodynamics Of Steady State, Methuen And Co.Ltd, London, 1951.
3. L.K. Nash, Elements Of Chemical Thermodynamics, Addison Wesley, 1962.
4. G.M.Barrow, Physical Chemistry, Mcgraw Hill, 1988.
5. R.G.Frost and Pearson, Kinetics And Mechanism, Wiley, New York, 1961.
6. C.Capellos and B.H.J.Bielski, Kinetics Systems, Wiley Interscience, New York, 1972.
7. Amdur and G.G.Hammett, Chemical Kinetics, Principles And Selected Topics, Mcgraw Hill, New York, 1968.

8. G.M.Harris, Chemical Kinetics, D.C. Health And Co., 1966.
9. F.A. Cotton, Chemical applications of Group Theory, John Wiley And Sons Inc., New York, 1971.
10. N. Thinkham, Group Theory and Quantum Mechanics, Mc Graw Hill Book Company, New York, 1964.
11. Strietweiser, Molecular Orbital Theory For Organic Chemists John Wiley And Sons, New York, 1961.
12. D.S. Schonland, Molecular Symmetry, Vannorstrand, London, 1965.
13. Alan Vincent, Molecular Symmetry and Symmetry and Group Theory- Programme 14. Introduction To Chemical Application, Wiley, New York, 1977.
- Sandony, Electronic Spectra And Quantum Chemistry, Prentice Hall, 1964.

CORE PRACTICAL PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL I: ORGANIC CHEMISTRY PRACTICAL –I	Exam Hrs.	6
		P8CHPR11	

Objective: To learn the preparation techniques and Extraction and Analytical methods

Any Six preparations from the following

- (i) Preparation of o-benzyl benzoic acid
- (ii) p-Nitrobenzoic acid from p-nitrotoluene
- (iii) Anthraquinone from anthracene
- (iv) Benzhydrol from Benzophenone
- (v) m-Nitroaniline from m-dinitrobenzene
- (vi) 1,2,3,4 – Tetrahydrocarbazole from cyclohexanone
- (vii) p-chlorotoluene from p-toluidine
- (viii) 2,3 – Dimethylindole from phenyl hydrazine and 2 – butanone
- (ix) Methyl orange from sulphanilic acid
- (x) Diphenyl methane from benzyl chloride

1) A) Extraction.

- (i) Caffeine from Tea Dust,
- (ii) Lactic Acid from Milk
- (iii) Citric Acid from Lemon
- (iv) Jasmine from Rose

(OR)

B) Instrumental Analysis. (Any one of the following)

- i) Identification of Chromophores using FTIR/ UV Spectroscopy
- ii) Analysing simple organic substances using Gas Chromatography.

- iii) Analysing the purity of the prepared organic compounds given in the section-1 using TLC and Coloum Chromatography.

Preparation	25 Marks
Recrystallisation	10 Marks
Extraction or Inst.Analy	20 Marks
Practical Viva	10 Marks
Record	10 Marks
Total	75Marks

REFERENCE:

1. Practical Organic Chemistry by Vogel.

RECOMMENDED BOOKS

1. Practical Organic Chemistry by Gnanaprakasam.

CORE BASED ELECTIVE PAPER I	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL II: COLORIMETRY & KINETIC STUDIES	Exam Hrs.	6
		P8CHEP11	

Objective: *To learn Inorganic Complex preparation and Colorimetric techniques and to Study the experiments in chemical equilibrium and chemical kinetics.*

I) Preparation of the following:

- (a) Potassium tris (oxalato) aluminate (III) trihydrate
- (b) Tris (thiourea) copper (I) chloride
- (c) Potassium tris (oxalato) chromate (III) trihydrate
- (d) Sodium bi (thiosulphato) cuprate (I)
- (e) Tris (thiourea) copper (I) sulphate
- (f) Sodium hexanitrocobaltate (II)
- (g) Chloropentammine cobalt (III) chloride
- (h) Bis (acetylacetonato) copper (II)
- (i) Hexammine nickel (II) chloride
- (j) Bis (thiocyanato) pyridine manganese (II)

II) Colourimetric analysis of Iron, Nickel, Manganese and Copper

- a) Using 1,10 Phenanthrene - Suggestion
- b) Flame Photometry – Suggestion

III) Kinetics Studies

1. Determination of the relative acidity ratio for the hydrolysis of ester in presence of two different acids.
2. Determination of the temperature coefficient and Activation energy of hydrolysis of Ethyl Acetate.
3. Study the kinetics of inversion of cane sugar in the presence of acid using Polarimeter.
4. Study of the kinetics of persulphate oxidation.
5. Study of the kinetics of Iodination of Acetone.

Practical 55 Marks

1. Viva-Voce 10 Marks
2. Record 10 Marks

Total: 75 Marks

RECOMMENDED BOOK:

1. Qualitative Inorganic Analysis by V.V. Ramanujam
2. Practical Inorganic Chemistry by Vogel.
3. Physical Practical Experiments by Palit.
4. Advance Practical Chemistry by R. Mukhopadhyay & P. Chatterjee.
5. Practical Physical Chemistry by Findler Findler.
6. Practical Physical Chemistry by B. Viswanathan & P.S. Raghavan

CORE BASED ELECTIVE PAPER I	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	APPLIED CATALYSIS	Exam Hrs.	6
		P8CHEP12	

OBJECTIVES: To make students acquainted with basics of catalysis, and its biological importance.

UNIT – I REACTION RATES**18 Hours**

Activation energy concepts – Arrhenius theory, collision theory – bimolecular and unimolecular reaction, ARR theory, influence of ΔS , ΔH and ΔG on reaction rates with and without catalyst.

UNIT – II HOMOGENEOUS CATALYSIS**18 Hours**

Concepts of acidity – Bronsted – Lewis acids. Concept of base – Bronsted – Lewis bases. Acid base strength. Application of acid - Base catalysis – Alkylation, oxidation and reduction of organic molecules. Advantage and disadvantages of homogeneous catalysts.

UNIT – III HETEROGENEOUS CATALYSIS**18 Hours**

Metal and metal oxide catalyst – Metal oxide supported catalyst, polymer supported catalyst. Solid acid and base catalyst – molecular sieves – neutral catalyst – aluminophosphate molecular sieves. Isomorphous substitution. High temperature reaction. Product selectivity concept – pore size, reactant ratio, time on stream, coke deposition and conversion.

UNIT – IV PHOTOCATALYSTS**18 Hours**

Light absorption, laws of photochemistry, quantum yield, semiconductor concept, photo chemical application of dye degradation, molecular sieves based photo chemical applications.

UNIT – V ENZYME CATALYSIS

18 Hours

Reaction specificity, enzyme catalysis mechanism – induced fit, lock and key. Coenzyme – mechanism. Factors influencing enzyme action – temperature, pH, enzyme concentration and substrate concentration. Michaelis – Menton theory and Lineweaver – Burk plot.

Text Books:

1. K.J. Laidler, Chemical Kinetics, IIIrd edn., Harper and Row publisher, New York, 1987.
2. B.Viswanathan, Catalysis: Principles and application, Narosa Publ., New Delhi 2004.
3. V. Ramamurthy, Photochemistry in organized and constrained media, VCH Edn. New York, 1991.

Reference Books:

1. V. Murugesan, Recent trends in catalysis, Narosa Publ., New Delhi, 2004.
2. K. Kalyanasundara, Photochemistry in microheterogenous systems, Academic Press, New York, 1987.
3. Samuel H. Maron, Principles of Physical Chemistry, Mac Millan, Publ., New York 1972.
4. E. Conn and K. Stump, Outlines of Biochemistry, John Wiley and Sons, 1987.
5. Friedlich Liebau, Structural Chemistry of Silicates, Springer – Verlag, Berlin, 1985.

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	INORGANIC CHEMISTRY - II	Exam Hrs.	3
		P8CH2001	

OBJECTIVES: *To make the students acquaint themselves with Nuclear Chemistry now-how, Stellar and cosmic phenomenon and also about coordination and bonding in transition metals and other compounds*

UNIT I: THEORIES OF COORDINATION CHEMISTRY 18 Hours

Crystal field theory (CFT) – d orbital splitting in octahedral, tetrahedral and square planar complexes, Ligand field stabilization energy (LFSE), Spectrochemical series, Spectral and magnetic characteristics of transition metal complexes, Jahn – Teller distortion, Limitations of CFT.

UNIT II: COORDINATION CHEMISTRY M.O. THEORY 18 Hours

Molecular orbital theory – evidence for Metal- Ligand orbital overlap, energy level diagrams; Nephelauxetic effect. Term states of d ions – term symbols, spin orbit coupling (LS coupling or RS coupling), d-d transition, selection rules for transition, Orgel and Tanabe-Sugano diagrams. Charge transfer spectra – features and comparison with d-d spectra.

UNIT III: COORDINATION CHEMISTRY REACTION MECHANISM 18 Hours

Electron transfer reactions – outer and inner sphere mechanisms, atom transfer reactions, precursor and successor complexes, Marcus theory, bridging ligands, complementary and non-complementary electron transfer reactions. Substitution reactions in square planar complexes – mechanism of substitution, Trans effect, Cis effect, effect of Entering and Leaving ligands and the effect of metal ions on the rate of Substitution, theory and applications of Trans effect.

UNIT IV: NUCLEAR CHEMISTRY – I 18 Hours

Nuclear properties – Nuclear spin and moments, origin of nuclear forces, salient features of the liquid drop and shell models of the nucleus. Modes of radioactive decay: Orbital electron capture; nuclear isomerism, internal conversion Isomeric Transition, detection and determination of activity by cloud chamber, Nuclear emulsion, Bubble chamber, G.M. counter Scintillation and Cherenkov counters. Compound Nucleus theory, high energy nuclear reactions, nuclear fission and fusion reactions as energy sources: direct reactions: photonuclear and thermo nuclear reactions.

UNIT V: NUCLEAR CHEMISTRY – II**18 Hours**

Nuclear Reaction types, reaction, cross section, Q-value, threshold energy, Stellar energy: synthesis of elements, Hydrogen burning, Carbon burning. The e, s, r, p and x processes. Nuclear reactors: fast breeder reactors, particle accelerators, cyclotron and synchrotron. Radio analytical methods: Isotope dilution analysis, Radiometric titrations, Radio immuno assay, Neutron activation analysis.

REFERENCE BOOKS:

1. J.E. Huheey, Inorganic Chemistry – Principles, Structure and Reactivity, Harper Collins, New York, IV Edition (1993)
2. F.A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry – A Comprehensive Text, John Wiley and Sons, V Edition (1988)
3. K.F. Purcell and J.C. Kotz, Inorganic Chemistry – WB Saunders Co., USA (1977)
4. M.C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., New York (1974)
5. J.E. Huheey, Inorganic Chemistry, Harper Collins NY IV Edition, (1993)
6. G.S. Manku, Inorganic Chemistry (1984)
7. D.F. Shrivvers, Pw. Atkins and C.H. Langford, Inorganic Chemistry, OUP (1990)
8. N.N. Greenwood and Earnshaw, Chemistry of the Elements, Pergamon Press, New York (1984)
9. EL. Muttarties, Polyhedral Boranes, Academic Press, New York (1975)
10. NH Ray, Inorganic Polymers, Academic Press, (1978)
11. S.F.A. Kettle, Coordination Chemistry, EIBS (1973)

RECOMMEND BOOKS:

1. K. Burger, Coordination Chemistry, Burtter Worthy (1973)
2. F. Basolo and R.G. Pearson, Mechanism of Inorganic Reaction, Wiley NY (1967)
3. R. Sarkar, General and Inorganic chemistry, (Parts I and II), New Book Agency, Calcutta.
4. H.J. Arnika, Nuclear Chemistry, Wiley Eastern Co., II Edition, 1987.
5. S. Glasstone, Source Book on Atomic Energy, Van Nostrand Co., 1969
6. G. Frielander, J.w. Kennedy and J.M. Miller, Nuclear and Radiochemistry, John Wiley and Sons, 1964.

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	ORGANIC CHEMISTRY – II	Exam Hrs.	3
		P8CH2002	

OBJECTIVE: *To learn the various types of reactions, rearrangements and their synthetic utility.*

**UNIT I – ADDITION TO CARBON – CARBON AND CARBON –
HETERO MULTIPLE BONDS 18 Hours**

Electrophilic, nucleophilic and neighbouring group participation mechanisms – addition of halogen and nitrosyl chloride to olefins. Hydration of olefins and acetylenes. Hydroboration, hydroxylations, Michael addition, 1, 3 – dipolar additions – Simmon and Simmon Smith reaction. Mannich, Stobbe, Darzen, Wittig, Wittig – Horner and Benzoin reactions. Stereochemical aspects to be studied wherever applicable.

UNIT II – ELIMINATION REACTIONS 18 Hours

E₁, E₂ and E₁CB mechanism – E₁, E₂ and E₁CB spectrum – Orientation of the double bond – Hoffman and Saytzeff rules – Competition between elimination and substitution. Typical eliminations reactions – dehydration, dehydrohalogenation and dehalogenation. Stereochemistry of E₂ eliminations in cyclohexane systems. Mechanism of pyrolytic eliminations. Chugaev and Cope eliminations.

UNIT III – MOLECULAR REARRANGEMENTS 18 Hours

A detailed study with suitable examples of the mechanism of the following rearrangements: Pinacol – Pinacolone (examples other than tetramethylethylene glycol) – Wagner – Meerwein, Demjanov, dienone – phenol, Favorski, Baeyer – Villiger, Wolf, Stevens (in cyclic systems) and Von Richter rearrangements.

UNIT IV – OXIDATION 18 Hours

Mechanism – study of the following oxidation reactions – oxidation of alcohols – use of DMSO in combination with DCC or acetic anhydride in oxidising alcohols – oxidation of methylene to carbonyl, oxidation of aryl methanes – allylic oxidation of olefins. Formation of C=C, C-C bonds by dehydrogenation, dehydrogenation by quinones, SeO₂, Hg(OAc)₂ and Pb(OAc)₄, Formation of C-C bond in phenol coupling –acetylene coupling-allylic oxidation-oxidation of alcohol, glycols, halides and amines to aldehydes and ketones- Ozonolysis-oxidation of Olefinic double bonds and unsaturated carbonyl compounds-oxidative cleavage of C-C bond.

UNIT V – REDUCTION, CARBENES AND NITRENES

18 Hours

Reduction : Selectivity in reduction 4-t-butylcyclohexanone using selective hydride reducing agents – Synthetic importance of Clemmenson and Wolf-Kishner reductions – Modification of Wolff-Kishner reduction – Birch reduction, MPV reduction. Catalytic hydrogenation, Sommelet reaction. Reduction with LiAlH_4 , NaBH_4 , tritertiarybutoxyaluminium hydride, sodium Cyanoborohydride, trialkyltin hydride, hydrazines. Carbenes and nitrenes : Methods of generation , structure, addition reactions with alkenes –insertion reactions.

RECOMMENDED BOOKS

1. Principles of organic synthesis R.O.C. Norman, Chapman and Hall, London. 1980.
2. Structure and Mechanism by E.S. Gould
3. Advanced Organic Chemistry – Part B by Francis A. Carey and Richard J, Sundberg, 3rd Edition 1990.
4. Organic Reaction Mechanism by S.M. Mukherji and S.P. Singh, MacMillan India Ltd., Chennai – 1990.
5. Organic synthesis by Michael Smith.
6. Carbenes, Nitrenes and Arynes by T.L. Gilchrist and C.W. Rees, Thomas Nelson and Sons Ltd., London.
7. Molecular Rearrangements Vol-I and Vol-II by Paul de Mayo.
8. Advanced Organic Chemistry III Edition by J. March.

REFERENCE BOOKS

1. Stereochemistry and Mechanism through solved problems by P.S. Kalsi, WileyEastern Ltd., 1994.
2. Some Modern Methods of Organic Synthesis by W Carruthers, III Edition, Cambridge University Press, 1993.
3. Modern Synthetic Reactions by H.O. House, The Benjamin Cummings Publishing Company, London, 1972
4. Advanced organic chemistry, Mc Murray, Thomas Pvt. Ltd., Organic reaction mechanisms: Parmer and Chawla, S. Chand and Co.,

CORE PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PHYSICAL CHEMISTRY – II	Exam Hrs.	3
		P8CH2003	

OBJECTIVE: *To study the different types of molecular spectroscopy, and kinetics of complex reactions. To study the fundamental principles of Quantum Chemistry, Schrodinger wave equation and its applications.*

UNIT I – SPECTROSCOPY

18 Hours

Interaction of matter with radiation – Einstein’s theory of transition probability – rotational spectroscopy of a rigid rotator – non rigid rotator – diatomic and polyatomic molecules. Vibrational spectroscopy – harmonic oscillator – anharmonicity – vibrational spectra of poly atomic molecules – vibrational frequencies – group frequencies – vibrational coupling overtones – Fermi resonance. Raman Spectra- elastic and inelastic scattering – pure rotational raman spectra – mutual exclusion principle.

UNIT II – SURFACE CHEMISTRY

18 Hours

Adsorption and free energy reaction at interfaces – physisorption and chemisorptions – study of surfaces adsorption isotherms - Langmuir and BET adsorption isotherms- surface area determinations – Heat of adsorption, determination of adsorption from solutions – Gibbs adsorption isotherm- study of kinetics of surface reactions- catalysis by metals, semiconductor oxides-mechanism of heterogeneous catalytic reactions-the adsorption coefficient and its significance.

UNIT III – CHEMICAL KINETICS

18 Hours

Kinetics of complex reactions, reversible reactions, consecutive reactions, parallel reactions, chain reactions, general treatment of chain reactions-chain length-Rice Herzfeld mechanism-explosion limits.

Study of fast reactions- relaxation methods-temperature and pressure jump methods-stopped flow and flash photolysis method.

UNIT IV – INTRODUCTION TO QUANTUM CHEMISTRY 18 Hours

Inadequacy of classical theory – Planck’s quantum theory – photoelectric effect- Bohr’s theory of atom - Compton effect-wave particle duality- Heisenberg’s uncertainty principle – quantum mechanical postulates-the operators – Hermitian property

Schrodinger equation application of Schrodinger’s equation-the particle in a box (one, two and three dimensional cases),

UNIT V – APPLICATIONS OF QUANTUM CHEMISTRY 18 Hours

The harmonic oscillator-the rigid rotor-particle in a ring, Schrodinger equation for hydrogen atom (no derivation is required) and the solution - the origin of quantum numbers (angular momentum and spin) - their physical significance.

TEXT BOOKS:

1. C.N.Banwell and E.M.McCash, Fundamentals of Molecular spectroscopy IV Edition, Tata McGraw Hill, 2005.
2. D.N.Sathyanarayana, Vibrational Spectroscopy, New Age International publishers,2004.
3. J.Rajaram and J.C.Kuriacose,Kinetics and Mechanism Of Chemical Transformations.Macmillan India Ltd,1993.
4. R.J.Laidler,Chemical Kinetics,Harpet And Row,New York,1987.
5. D.A. Mcquarrie,Quantum Chemistry,University Science Books,Mil Valley,California,1983.
6. Quantum Chemistry,Allyn And Bacon,Boston,1983.
7. R.Anantharaman,Fundamentals Of Quantum Chemistry,Mamillan India Limited,2001.

SUGGESTED REFERENCE BOOKS

1. Raymond Chang,Basic Priciples Of Spectroscopy,Mcgraw Hill Ltd.,New York,1971.
2. P.W.Atkins,Advanced Physical Chemistry,Oxford Press,1990.
3. G.Arul Doss,Molecular Structure and Spectroscopy,Prentice Hall,2002.
4. R.G.Frost and Pearson,Kinetics And Mechanism,Wiley,New York,1961.
5. W.J.Moore and R.G.Pearson,Kinetics And Mechanism,1981.
6. C.Capellos and B.J.J.Bielski,Kinetics Systems,Wisely Inter Science,New York,1972.
7. Ambur and G.G.Hammes, Chemical Kinetics, Principlesand Selected Topics, Mcgraw Hill, New York, 1968.
8. G.M.Harris, Chemical Kinetics, D.C.Heat And Co., 1966.
9. R.K.Prasad, Quantum Chemistry, University Science Books, Mil Valley, California, 1983.
10. J.Goodisman, Contemporary Quantum Chemistry, An Introduction, Plenum Press,New York, 1997.
11. R.Mcweeny, Coulon's Valence, Elbs Oxford University Press, 1979.

12. F.J.Bockhoff, Elements of Quantum Theory, Addison Wesley, Reading Mass, 1976.
13. P.W.Atkins, Physical Chemistry, Oxford University Press, 1990.
14. H.Eyring, J.Walter and G.Gimball Quantum Chemistry, John Wiley and Sons, New York, 1944.
15. Linus Pauling and Wilson Introduction to Quantum Mechanics, McGraw Hill Book Company, New York, 1935
16. P.W.Atkins, Molecular Quantum Mechanics, Oxford University Press, Oxford, 1983.
17. Principles of Quantum Chemistry, by R.K. Prasad.

CORE PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	PRACTICAL III: PHYSICAL PRACTICAL I	Exam Hrs.	6
		P8CHPR21	

Aim: To learn the experiments in phase equilibrium.

1. Construct the phase diagram for a simple binary system naphthalene – Biphenyl and benzophenone - Diphenyl amine.
2. Study the simultaneous distribution of benzoic acid in benzene – water system.
3. Determine the equilibrium constant of the reaction between iodine and potassium iodide by partition method and determine the concentration of the given unknown KI solution
4. Study the adsorption of acetic acid by charcoal.
5. Determination of molecular weight of the substance by Rast method.
6. Effect of NaCl on CST of phenol-water system and determination of the strength of NaCl.

Total 75 Marks

- | | |
|--------------|----------|
| 1. Practical | 55 Marks |
| 2. Viva-Voce | 10 Marks |
| 3. Record | 10 Marks |

Recommended Books:

1. Physical Practical Experiments by Palit

Reference Books;

1. Practical Physical Chemistry by Findler and Findler

CORE BASED ELECTIVE PAPER II	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL IV: ANALYSIS OF ORGANIC & INORGANIC MIXTURE I	Exam Hrs.	6
		P8CHEP21	

Objective:

- 1) *To learn how to separate inorganic radicals & identify them.*
- 2) *To learn separation, identification of components in a two component organic mixture, and preparation of their derivatives.*
- 3) *To determine b.p. / m.p. for components and m.p. for the derivatives.*

I) INORGANIC

- a) Semimicro qualitative analysis of mixture containing two common and two rare cations.
- b) The following are the rare cations to be included. W, Ti, Te, Se, Ce, Th, Zr, V, U, Li, Mo.
- c) Estimation of hardness of water using EDTA.

II) ORGANIC

- a) Identification of components in a two component mixture and preparation of their derivatives.
- b) Determination of b.p. / m.p. for components and m.p. for the derivatives.

Total	75Marks
Experiment	55 Marks
Practical Viva	10 Marks
Record	10 Marks

RECOMMENDED BOOKS

1. Qualitative Inorganic Analysis by V.V. Ramanujam
2. Practical Inorganic Chemistry by Vogel.
3. Practical Organic Chemistry by Vogel.
4. Practical Organic Chemistry by Gnanaprakasam.

CORE BASED ELECTIVE PAPER II	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	MEDICINAL CHEMISTRY	Exam Hrs.	6
		P8CHEP22	

OBJECTIVES: To make students acquainted with basics of catalysis, and its biological importance.

UNIT – I BASIC CONCEPTS

18 Hours

Drug design – analogues and pro-drugs, factors governing drug design, rational approach, method of variation and tailoring of drugs; physical properties – factors governing drug action at active site, factors governing ability of drugs to reach active site, dissociation constraints, isosterism and bioisosterism; general anaesthetics – inhalation anaesthetics, intravenous anaesthetics and basal anaesthetics; mode of action; local anaesthetics – classification and synthesis, sedatives and hypnotics – classification, synthesis, mode of action and structure – activity relationship.

UNIT – II ANTICONVULSANTS, STIMULANTS AND ANTIPYRETIC ANALGESICS

18 Hours

Anticonvulsants – Classification, synthesis and mode of action; Muscle relaxants – classification, synthesis and mode of action. Central nervous system stimulant – Classification, synthesis and mode of action; Antipyretic analgesics – classification, synthesis and mode of action.

UNIT – III OTHER ANALGESICS

18 Hours

Narcotic or Opiate analgesics – classification, preparation and mode of action; Narcotic antagonists; Cardiovascular drug – classification, synthesis and mode of action; Autonomic drugs – synthesis and mode of action of sympathomimetic drugs, antiadrenergic drugs, cholinomimetic drugs, antimuscarinic drugs, ganglionic blocking agents and adrenergic neurone blocking agents; Diuretics – synthesis and mode of action of mercurial and non-mercurial diuretics.

UNIT – IV ANTIHISTAMINES, ANTI-INFLAMMATORY AND ANTIPARKINSON DRUG

18 Hours

Antihistaminics – synthesis and mode of action of histamine H₁ receptor antagonists and histamine H₂-receptor blockers; prevention of histamine release; structure-activity relationships amongst H₁-receptor blockers. Non-steroidal anti-inflammatory drugs (NSAID) – synthesis and mode of action of heteroarylacetic acid analogues, arylacetic acid analogues, arylpropionic acid analogues, naphthalene acetic acid analogues, gold compounds, salicylic acid analogues and pyrazolones and

pyrazolodiones; Antiparkinsonism agents – synthesis and mode of action of piperidine analogues, pyrrolidine analogues and phenothiazine analogues.

UNIT – V OTHER DRUGS

18 Hours

Expectorants and antitussives – synthesis and mode of action of sedative expectorants, stimulant expectorants and centrally acting antitussive agents. Sulphonamides – Preparation and mode of action of sulphonamides for general, urinary, intestinal and local infection; sulphonamide inhibition. Antimalarials – synthesis and mode of action of aminoquinoline analogues, aminoacridine analogues, guanidine analogues, pyrimidine analogues, sulfone and quinine analogues; Steroids – synthesis and mode of action of sterols, sex hormones, cardiac glycosides, bile acids and sapogenins. Antibiotics – synthesis and mode of action of penicillins, aminoglycoside antibiotics, chloramphenicol and tetracyclines.

Text Books:

1. Ashutosh Kar, Medicinal Chemistry, New age International, 1996.
2. W.O. Foye, Principles of medicinal chemistry, 2nd Edn. Lea & Febiger, Philadelphia, 1981.

Reference Books:

1. M.E. Wolff, Burger's Medicinal Chemistry, 4th Edn., John Wiley & Sons, New York, 1981.
2. F.F. Blicke and R.H. Cox, Medicinal Chemistry, John Wiley & Sons, New York, 1959.
3. D. Lednicher and L.A. Mitscher, Organic Chemistry of drug synthesis, John Wiley & Sons, New York, 1959.
4. J.E. Hoover, Remington's Pharmaceutical Sciences, 15th Edn. Mack Publ. Company, Easton. 1975.

CC01 (CORE)	SEMESTER I	Credit	7
		Hrs./Week	7
COURSE TITLE	BIO-ORGANIC CHEMISTRY	Exam Hrs.	3
		U8BI1001	

Objectives: *To understand structure, properties and functions of various biomolecules.*

UNIT - I: Carbohydrates

Classification (mono-, di-, oligo- & polysaccharides). Chiral carbon atoms & rule of 'n'. Isomerism in carbohydrates (DL, +/-, $\alpha\beta$, epimers, aldose-ketose, pyranose-furanose). Mutarotation. Structure, occurrence & biomedical importance of some carbohydrates (glc, man, gal, fru, fuc, mal, lac, suc, cellulose, starch, glycogen, agar, chitin). Glycosaminoglycans (chondroitin sulphate, hyaluronic acid, heparin).

UNIT - II: Lipids

Classification fatty acids (saturated/unsaturated, odd/even carbon, chain length, essential).

Classification lipids (simple, complex, derived and precursor lipids).

Structure & biomedical importance of some lipids (lecithin, phosphatidylinositol, cardiolipin, lysolecithin, plasmalogen, sphingomyelins, galactosylceramide, ergosterol and cholesterol).

UNIT - III: Amino acids & Proteins

Classification, structure and Isomerism of standard amino acids. Zwitter ion. Essential & non- essential amino acids.

IUPAC, nutritional & functional classification of proteins. Primary, secondary, tertiary and quaternary structures of proteins.

UNIT - IV: Nucleic Acids

Structure of nitrogenous bases (A, T, G, C, U), ribose & deoxyribose, phosphoric acid, nucleosides & nucleotides. Watson & Crick model of DNA. Structure and types of RNA.

UNIT – V: Porphyrins

Heterocyclic rings of biological importance - Pyridine, Pyrrole, Quinolone, Thiazole, Imidazole, Indole. Biologically significant Metalloporphyrins- Chlorophyll, Heme and Cytochrome.

TEXTBOOKS:

1. Harper's Biochemistry –Rober K.Murray, 28th edition, McGraw Hill, Lange Medical Books.
2. Biochemistry- U. Satyanarayana, Revised 3rd edition, Books & Allied Pvt. Ltd.

REFERENCES:

1. Biochemistry- Lubert Stryer, 6th edition, W. H. Freeman & Company.
2. Fundamentals of Biochemistry, D.J. Voet, J.G. Voet, C.W. Pratt, Upgrade edition, John Wiley & Sons.
3. Lehningers Biochemistry - Nelson & Cox, 6th edition, W. H. Freeman Company.

CC02 (CORE PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL I: QUANTITATIVE & QUALITATIVE ANALYSIS – I	Exam Hrs.	3
		U8BIPR11	

OBJECTIVES

1. Student should know the principles, theory and calculation of each experiment.
2. They should know to prepare all the solutions by themselves. They should standardize their solutions individually.

I. QUANTITATIVE ANALYSIS

- i) Estimation of amino acids by formal titration method.
- ii) Determination of Saponification value of edible oil.
- iii) Determination of Acid number of edible oil.
- iv) Iodine value of oil.

II. QUALITATIVE ANALYSIS

- i) Reaction of simple sugars including glucose, fructose, galactose, mannose, pentose, maltose, sucrose, lactose, starch, glycogen and dextrin.

TEXT BOOKS

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

REFERENCES

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam

(For I year B.Sc. Physics & Bio-Chemistry)			
CC03 (ALLIED I)	SEMESTER I	Credit	6
		Hrs./Week	7
COURSE TITLE	ALLIED CHEMISTRY I	Exam Hrs.	3
		U8BIAL11/U8PYAL11	

Objective: To learn the concepts of organic inorganic and physical chemistry.

UNIT – I

21Hours

1.4 Extraction of Metals. Mineral and ore difference – Minerals of Iron, Aluminum and Copper – Ore Dressing – Types of Ore Dressing Froth Floatation and Magnetic separation.

1.5 Refining of Metals – Types of Refining – Electrolytic, Van Arkel and Zone Refining. Extraction of Uranium and Thorium.

1.6 Periodic properties – ionization potential, electron affinity and electro negativity variation in the periodic table.

UNIT – II

21 Hours

2.1 Aromaticity – Conditions – Huckel's rule – aromaticity of benzene.

2.2 Cyclo-alkanes preparation properties of Cyclohexane – Bayers strain theory. Polarization – Inductive effect, mesomeric effect and steric effect - [Acidity and Basicity of organic compounds.

2.3 Stereo isomerism – Types, Causes of optical activity of Lactic acid and tartaric acid – Racemisation – Resolution – Geometrical isomerism – maleic and fumaric acid.

UNIT – III

21 Hours

3.1 Chemical Kinetics – Distinction between Order and Molecularity – derivation of First order rate equation – half life period of first order reaction – determination of rate constant of hydrolysis of ester.

3.2 Catalysis – catalyst – auto catalyst – enzyme catalyst – Promoters – catalytic poisoning – Active center – Distinction between homogeneous and heterogeneous catalysts – Industrial application of catalysts.

3.3 Photochemistry – Grothus Drapers law, Stark Einstein's law – quantum yield phosphorescence – fluorescence – chemiluminescence – photosensitization – Photosynthesis.

UNIT – IV

21 Hours

4.2 VSEPR Theory – Shapes of simple Molecules BF_3 , PCl_5 , SF_6 and XeF_6 .

4.2 Naphthalene – Preparations, Properties and uses of Naphthalene – Structure of Naphthalene.

4.3 Phase Rule: Phase, Component, Degree of freedom, Phase Rule – Definition. One component system – Water system. Osmosis - Osmotic pressure – reverse osmosis – desalination of sea water.

UNIT – V

21 Hours

5.1 Nuclear Chemistry – Definition of Half life period – Group displacement law Radioactive series. Nuclear Fission and Fusion – Applications of nuclear Chemistry in Medicine, agriculture and industries – ^{14}C dating.

5.2 Crude Oil – Petroleum – Petroleum Refining - Cracking – Applications of Cracking. Fuels – Calorific value of fuels – Non-conventional fuels – need of Solar energy – Applications – Bio-fuels.

5.3 Elements of symmetry – unit cell – crystal lattice – types of cubic lattice – one example for each.

Text Book:

- Allied Chemistry by Dr. S. Sundaram
- Allied Chemistry by R. Gopalan

Reference Book

- Advance Organic Chemistry by Bahl and Arun Bahl. 19th Edition., 2005 - Sulthan Chand company, New Delhi.
- Principles of Inorganic Chemistry by B.R. Puri and L.R. Sharma. Shoban Lal Nagin Chand and Co. New Delhi 2000.

- Principles of Physical Chemistry by B.R. Puri, L.R. Sharma and S. Pathania. ShobanLalNagin Chand and Co. New Delhi 2001.

(For I year B.Sc. Physics & Bio-Chemistry)			
EC03 (ALLIED I PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED CHEMISTRY PRACTICAL I	Exam Hrs.	3
		U8BIAP11/U8PYAP11	

Objective: to learn the techniques of Volumetric Analysis

30 Hours

VOLUMETRIC ANALYSIS 1

1. Estimation of Sodium Hydroxide std. Sodium Carbonate.
2. Estimation of hydrochloric acid using std. Sulphuric acid.
3. Estimation of Borax using std. Sodium carbonate.
4. Estimation of FeSO_4 using Std. Mohr Salt Solution.
5. Estimation of Oxalic acid using Std. KMnO_4 Solution.
6. Estimation of CuSO_4 using Std. $\text{K}_2\text{Cr}_2\text{O}_7$.

Reference Book:

1. Inorganic Quantitative Analysis by Vogel.

Practical Book:

1. Practical Book by Thomas.

Marks 75

- | | | |
|----|-----------------|----------|
| 1. | Short procedure | 10 Marks |
| 2. | Titration 1 | 15 Marks |
| 3. | Titration 2 | 15 Marks |
| 4. | Result | 20 Marks |
| 5. | Record | 10 Marks |
| 6. | Viva-voce | 05 Marks |

Error Calculation:

< 2%	-	20 Marks
2 – 3%	-	15 Marks
3 – 4%	-	10 Marks
>4%	-	05 Marks

CC04 (CORE)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	CELL BIOLOGY	Exam Hrs.	3
		U8BI2001	

Objectives:

- *To understand various types of cells.*
- *To understand cellular architecture and organization.*
- *To understand functions of various cell organelles.*

UNIT –I : CELL ORGANIZATION

An overall view of cells. Schleiden and Schwann cell theory. Classifications of cell - Prokaryotic and Eukaryotic cells – virus, archea, eubacteria, plant and animal cells. Differentiate prokaryote , eukaryote, plant and animal cells. Molecular composition of cells. cell – cell communications, cell recognition, cell adhesion and cell functions.

UNIT – II : CELL MEMBRANE

Fluid Mosaic Model of cell membrane. Membrane lipids, proteins and carbohydrate their properties. Functions of biological membrane. Transport across membranes- diffusion, active and passive transport. Uniport, symport and antiport. Exocytosis and Endocytosis.

UNIT – III : CELL ORGANELLES

Endoplasmic reticulum – types structure and functions. Golgi apparatus- structures and fuctions. Lysosomes- structures and functions, morphology & functions of peroxisomes and glyoxysomes, ribosomes-types, structure and functions.

UNIT –IV : CELL RESPIRATION AND MOTILITY

Mitochondria : Structure and function. Cytoskeleton: Types of filaments and their functions. Microtubules - structure and functions of cilia and flagella.

UNIT –V : NUCLEUS AND CELL DIVISION

Nucleus – structure and functions of nuclear membrane and nucleolus. Chromosome-chromatin structure, autosomes and allosomes. Cell cycle - phases of cell cycle. Meiotic and mitotic cell divisions.

TEXTBOOKS:

1. Cytology- P.S. Verma, V.K.Agaraval, S. Chand Publications.
2. The Cell – M. Cooper, 7th edition, Sinauer Associates Publications.

REFERENCES:

1. Biochemistry – H. Garrett Grisham. 6th edition, Mary Finch Publishers.
2. Molecular Cell Biology – Lodish, Berk, Zipursky, Baltimore, Freeman Publisher. Cell and Molecular Biology – E.D.P. De Robertis, 8th edition, Lea & Febiger Publisher.

CC05 (CORE PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL II: QUANTITATIVE & QUALITATIVE ANALYSIS – II	Exam Hrs.	3
		U8BIPR21	

OBJECTIVES

1. *Student should know the principles, theory and calculation of each experiment.*
2. *They should know to prepare all the solutions by themselves. They should standardize their solutions individually.*

I. QUANTITATIVE ANALYSIS

- i. Estimation of ascorbic acid by titrimetric method using 2, 6 – Dichlorophenol indophenol.
- ii. Estimation of reducing sugar from biological fluids by Benedict's titrimetric method.
- iii. Estimation of reducing sugar by iodimetry

II. QUALITATIVE ANALYSIS

- i. Reaction of Proteins – Solubility, Denaturation, precipitation by acidic reagents, pH change. Biuret, Millons, Xanthoproteic test. Colour reaction of amino acids like typtophan. Tyrosine, cystine, Methonine. Arginine, Proline and histidine.
- ii. Reactions of lipids – Solubility, Saponification test for unsaturation, Liebermann Burchard test for cholesterol.

TEXT BOOKS

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

REFERENCES

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam

(For I year B.Sc. Physics & Bio-Chemistry)			
CC06 (ALLIED I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED CHEMISTRY II	Exam Hrs.	3
		U8PYAL21/ U8BIAL21	

Objective: *To learn concepts of organic inorganic and physical chemistry.*

UNIT – I

21 Hours

1.1 Nomenclature of coordination compounds – Werner Theory of Coordination Compound – Chelation – Functions and structure of Haemoglobin and Chlorophyll.

1.2 Fertilizers and manures – Bio-fertilizers – Organic Manures and their importance– Role of NPK in plants – preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.

1.3 Composition of Match sticks and match box – Industrial making of safety matches. Preparation and uses of chloroform, DDT, Gamhexane and Freon.

UNIT – II

21 Hours

2.1 Classification – Structure of glucose – Properties and uses of starch – uses of Cellulose Nitrate – Cellulose acetate.

2.2 Classification of Amino Acids – preparation and properties of Glycine – Classification of Protein based on physical properties and biological functions. Primary and Secondary structures of protein [Elementary Treatment only] composition of RNA and DNA and their biological role.

2.3 Substitution reaction – Nitration, halogenation, sulphonation and Friedel Crafts alkylation of benzene.

UNIT – III

21 Hours

3.1 Specific and equivalent conductance – their determination – effect of dilution.

3.2 Kohlrausch's law – Determination of equivalent conductance of weak electrolyte–Conduct metric Titrations - HCl Vs NaOH and CH₃COOH Vs NaOH. Electrochemical corrosion and its prevention.

3.3 p^H and its determination by indicator method – Buffer solutions – Buffer action-importance of buffer in the living system – Derivation of Henderson equation.

UNIT – IV

21 Hours

4.1 Paints – Pigments – Components of Paint – Requisites of a good paint. Colour and Dyes – Classification based on constitution and application.

4.2 Biological activities and deficiency, diseases of Vitamin A, B, C, D, E and K Hormones – Functions of insulin and adrenalin.

4.3 Chromatography – Principles and application of Column, paper and thin layer chromatography.

UNIT – V

21 Hours

5.1 Drugs - Sulpha Drugs – Uses and Mode of action of Sulpha Drugs – Antibiotics Uses of Penicillin, Chloramphenicol, Streptomycin. Drug abuse and their implication.

5.2 General and Local Anaesthetics – Antiseptics – Example and their application. Definition and one example each for analgesics antipyretics, tranquilizers and sedatives - causes for diabetes, cancer and AIDS.

5.3 Colloids - Types and classification of colloidal system, Lyophilic and Lyophobic Sols – Dialysis, Electro-dialysis, Ultrafiltration. Emulsion – types – preparation.

References:

- Advance Organic Chemistry by Bahl and Arun Bahl. 19th Edition., 2005 - Sulthan and Chand company, New Delhi.
- Principles of Inorganic Chemistry by B.R. Puri and L.R. Sharma. Shoban Lal Nagin Chand and Co. New Delhi 2000.
- Principles of Physical Chemistry by B.R. Puri, L.R. Sharma and S. Pathania. Shoban Lal Nagin Chand and Co. New Delhi 2001.
- P.L. Soni – “Text book of inorganic Chemistry. S. Chand & Co., New Delhi 1999.

(For I year B.Sc. Physics & Bio-Chemistry)			
CC06 (ALLIED I PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED CHEMISTRY PRACTICAL II	Exam Hrs.	3
		U8PYAP21/U8BIAP21	

Objective: To learn the techniques in Organic Analysis

ORGANIC ANALYSIS:

Reactions of aldehyde [aromatic], carbohydrate, carboxylic acid [mono and dicarboxylic], phenol, aromatic primary amine, amide and diamide. Systematic analysis of organic compounds containing one functional group and characterisation by confirmatory tests.

Reference Book:

1. Advance Practical Chemistry by R. Mukhopadhyay.

Practical Book:

1. Practical Book by Thomas.

Marks 75

1.	Procedure	20 Marks
2.	Elements	10 Marks
3.	Aromatic, Aliphatic	10 Marks
4.	Saturation & Unsaturation	10 Marks
5.	Functional Group	10 Marks
6.	Record	10 Marks
7.	Viva-voce	05Marks

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	BIOMOLECULES	Exam Hrs.	3
		P8BI1001	

Objectives:

The objective is to impart knowledge on the structure and functions of biomolecules.

UNIT I - PROTEINS

20 Hrs

Amino acids - structure and properties. The peptide bond: The Ramachandran plot - Orders of protein structure. Primary structure- Determination of amino acid sequence of proteins. Secondary structures- α -helix, β -sheet and β -turns. Collagen triple helix. Super secondary structure- helix-loop-helix, hairpin β motif, Greek key motif and β - α - β motif. Structural classification of proteins based on protein motifs. Tertiary structure- All α , all β , α/β , $\alpha+\beta$ domains. Structural motifs- protein family and superfamily. Quaternary structure – protomers, multimers – rotational and helical symmetry.

UNIT II - GLYCOSAMINOGLYCANS AND GLYCOCONJUGATES

15 Hrs

Glycosaminoglycans, structure, location and biological role of hyaluronic acid, chondroitin sulphate, keratin sulfate, heparin sulfate, dermatan sulfate and heparin. Sialic acid- structure and significance. Proteoglycans. Glycoproteins and their biological importance, Major classes of glycoproteins. Lectins - structure, function, applications. Blood group antigens and bacterial cell wall polysaccharides.

UNIT III - NUCLEIC ACIDS

20 Hrs

DNA double helical structure- Watson and Crick model. A, B and Z forms of DNA. Unusual structures – palindrome, inverted repeats, cruciform and hairpins. DNA supercoiling and linking number. Properties of DNA: buoyant density, viscosity, UV absorption, hypochromic effect, denaturation and renaturation, the cot curve. Differences between DNA and RNA. Major classes of RNA - mRNA, rRNA, tRNA: structure and biological functions. Minor classes of RNA [snRNA, miRNA and siRNA]. Nucleic acid- binding proteins- DNA and RNA binding motifs in proteins.

UNIT IV – LIPIDS

15 Hrs

Fatty acids- saturated, unsaturated and hydroxy fatty acids. Eicosanoids- structure and biological actions of prostaglandins, prostacyclins, thromboxanes, leukotrienes and lipoxins. Phospholipids and glycosphingolipids- structure and biological functions. Steroids- plant and animal sterols. Structure, properties and functions of cholesterol.

Lipoproteins- classification and composition. Amphipathic lipids (membranes, micelles, emulsions and liposomes). Lipid and protein composition of biomembranes.

UNIT IV – VITAMINS & MINERALS

20 Hrs

Vitamins - water soluble - thiamine, riboflavin, niacin, pyridoxine, folic acid, ascorbic acid- sources, structure, biochemical functions, deficiency diseases, daily requirements; fat soluble - vitamin A, vitamin D2, vitamin E and vitamin K - sources, structure, biochemical functions, deficiency diseases, daily requirements. Minerals - Sources, daily allowance, absorption, metabolism, biological role and clinical significance of calcium, phosphorus, iron, magnesium Copper, zinc, selenium, cobalt, manganese and fluoride.

TEXT BOOKS:

1. Fundamentals of Biochemistry – Voet and Voet. 3rd edition, Wiley 2008.
2. Harper's illustrated Biochemistry 27th edition 2006, McGraw Hill.

REFERENCES:

1. Principles of Biochemistry. Lehninger Nelson Cox Freeman Publishers, 2008, 5th ed.
2. Biochemistry Zubay 4th edition 1998 William C.Brown Publication.
3. Fundamentals of Biochemistry by U.Sathyanarayana Revised 3rd Edition Books and allied Pvt Ltd.
4. Biochemistry Stryer 6th edition Freeman, 2006.
5. Text books of Biochemistry by R.C. Dubey

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ENZYMES	Exam Hrs.	3
		P8BI1002	

Objectives: To understand the structure, properties, biological action and industrial applications of enzymes.

UNIT I: INTRODUCTION & CLASSIFICATION 20Hrs

History, classification and nomenclature, methods of isolation and purification. Enzyme units- Katal, specific activity, turnover number. Intracellular localization of enzymes. Active site - investigation of active site structure. A brief account of non-protein enzymes- ribozymes and DNA enzyme. Enzyme Specificity- Lock & Key and Induced Fit hypothesis.

UNIT II : ENZYME KINETICS 20 Hrs

Kinetics of single substrate enzyme catalyzed reactions. - Michaelis Menten equation- significance, Derivation and significance K_m . Lineweaver-burke plot, Eadie-Hofstee plot & Hanes plot. Pre-steady state kinetics. Kinetics of multi-substrate enzyme catalyzed reaction –ping-pong bi-bi, random order and compulsory order mechanism.

UNIT III: ENZYME CATALYSIS AND INHIBITION 20 Hrs

Mechanism of catalysis-general acid-base, electrostatic and covalent catalysis. Mechanism of enzyme catalysis without cofactors- chymotrypsin, ribonuclease and lysozyme. Enzyme inhibition- reversible inhibition-Competitive, uncompetitive, noncompetitive and allosteric inhibition. Irreversible inhibition. Applications of inhibitors.

UNIT IV: COENZYMES & ISOENZYMES 15 Hrs

Structure and functions of- nicotiamide nucleotides (NAD^+ , $NADP^+$), flavin nucleotides (FMN, FAD), adenosine triphosphate, Coenzyme A, thiamine pyrophosphate, pyridoxyl phosphate, tetrahydrofolate and biotin. Lactate dehydrogenase (LDH), creatinine kinase (CK).

UNIT V: ENZYMES IN INDUSTRIES

15 Hrs

Industrial uses of enzymes – detergent, textile, leather and food industries (amylase, cellulase, protease, lipase, peroxidase, invertase, pectinase, catalase, rennin. Immobilization of enzymes and their applications.

TEXT BOOKS:

1. Understanding enzymes by Palmer, Prentice Hall, 4 sub edition (1995)
2. Harper's Biochemistry, Murray, Granner, Mayes, Rodwell 25th Edition. McGrawhill Co.

REFERENCES:

1. Biochemistry by Metzler. Academic press (2000)
2. Biochemistry by Stryer. W.H. Freeman 6th edition (2006)
3. Enzymes by Boyer. Academic press 3rd edition (Nov 1983)
4. Enzymes by Dixon and Webb, Academic Press (1964)

CORE PRACTICAL PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL I: ISOLATION AND ESTIMATION OF BIOMOLECULES	Exam Hrs.	6
		P8BIPR11	

Objectives:

To introduce the principles and protocols of spectrophotometric determination. Calculate quantities and concentration of biomolecules from standard curve

1. Isolation and estimation of DNA from liver
2. Isolation and estimation of RNA from yeast
3. Isolation and estimation of Glycogen from liver
4. Isolation and estimation of Ascorbic acid from lemon
5. Estimation of Pyruvate.
6. Estimation of lactate.
7. Estimation of Tryptophan.
8. Estimation of Protein by Lowry's method.
9. Estimation of Protein by Bradford method.
10. Estimation of Inorganic Phosphorus by Fiske and Subba Rao method.

TEXT BOOKS:

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

REFERENCES:

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam

CORE PRACTICAL PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL II: ENZYME ASSAYS	Exam Hrs.	6
		P8BIPR12	

Objectives: *To make the students understand the basic steps involved in extraction and determination of enzyme activities and Learning the techniques concerned with clinically important enzyme detection in blood.*

1. Assay of Alkaline Phosphatase from Kidney
2. Determination of Optimum pH on Alkaline phosphatase
3. Determination of Optimum Temperature on Alkaline phosphatase
4. Effect of Substrate Concentration on Alkaline Phosphatase Activity
5. Assay of Acid Phosphatase activity from Potato
6. Determination of Optimum pH on Acid phosphatase activity
7. Determination of Optimum Temperature on Acid phosphatase activity
8. Effect of Substrate Concentration on Acid Phosphatase Activity
9. Assay of Urease from Horse gram
10. Determination of Optimum pH on Urease
11. Determination of Optimum Temperature on Urease
12. Effect of Substrate Concentration on Urease Activity

Text Books:

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S. Sadasivan and Manickam

Reference:

1. Medical Laboratory technology – kanai L. Mukherjee, Tata McGraw Hill Publication and Co. ltd., vol. I, II, III.
2. Practical clinical biochemistry – Harold Varley, CBS, New Delhi.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	CELL BIOLOGY	Exam Hrs.	3
		P8BIEP11	

Objective: To understand the structure, functions and dynamics of cells.

UNIT I MEMBRANE STRUCTURE AND FUNCTION 20 hrs

Structure of model membrane, lipid bilayer and membrane protein diffusion, osmosis, ion channels, active transport, membrane pumps, mechanism of sorting and regulation of intracellular transport, electrical properties of membranes.

UNIT II STRUCTURAL ORGANIZATION AND FUNCTION 20 hrs

Structural organization and function of intracellular organelles (Cell wall, nucleus, mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum, peroxisomes, plastids, vacuoles, chloroplast, structure & function of cytoskeleton and its role in motility).

UNIT III ORGANIZATION OF GENES AND CHROMOSOMES 20 hrs

Organization of genes and chromosomes - structure of chromatin and chromosomes, heterochromatin, euchromatin, transposons. Unusual chromosomes – polytene and Lampbrush chromosome. Mechanism of chromosome formation.

UNIT IV CELL CYCLE AND CELL DEATH 15 hrs

Eukaryotic cell cycle and its regulation. Phases of cell cycle. Mitosis and its regulation and control mechanisms. Meiosis and its regulation and control mechanisms. Cell death – necrosis and apoptosis.

UNIT-V : STEM CELL BIOLOGY

Stem cell biology – concept, methods, isolation, identification, expansion, differentiation and applications. Stem cell engineering - applications in medicine - tissue engineering and transplantation. Stem cell therapy.

TEXT BOOKS

1. Stansfield et al. Molecular Cell Biology. Schaum's Series. McGraw Hill, 1996.
2. Nelson Cox. Lehninger's Principles of Biochemistry. Freeman Worth Publ. 4th ed. 2005.

REFERENCES

1. De Robertis and De Robertis. Cell and Molecular Biology. Lea and Febiger. 8th Ed.
2. Lodish et al. Molecular Cell Biology. Scientific 5th ed. Freeman.
3. Karp G. Cell and Molecular Biology. 3rd ed. John Wiley and Sons. 2002.
4. Wilson and Walker. Practical Biochemistry. Cambridge University Press. 2000

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	ANIMAL CELL SCIENCE AND TECHNOLOGY	Exam Hrs.	3
		P8BIEP12	

Objectives: To understand the basics of animal cell culture and maintenance

UNIT I ANIMAL CELL CULTURE 20 hrs

Animal cell and tissue culture – History and scope – advantages and disadvantages, laboratory facilities, the substrate, culture media and culture procedures. Primary culture, cell lines, maintenance of cultures, cell lines. Cloning of cell lines. Cancer cell lines.

UNIT II STERILIZATION AND PREPARATION OF MEDIA 20 hrs

Preparation and Sterilization of cell culture media and reagents. Introduction to the balance salt solutions and simple growth medium. Chemical, physical and metabolic functions of different constituents of culture media. Role of carbon dioxide in animal cell culture.

UNIT III : TISSUE CULTURE 20 hrs

Tissue culture- slide, flask and test tube culture. Embryo culture, Organ culture, Somatic cell hybridization and expression of cloned genes in cultured cells. Stem cells – isolation, identification, expansion, differentiation and uses. Stem cell engineering.

UNIT IV CHARACTERIZATION OF CULTURED CELLS 15 hrs

Role of serum and supplements, Serum & protein free defined media and their applications. Measurement of viability and cytotoxicity. Biology and characterization of cultured cells, measuring parameters of growth.

UNIT V TRANSGENIC ANIMALS 15 hrs

Methods for producing transgenic mice, Retroviral, DNA microinjection and engineered stem cell methods. Applications of transgenic mice. Transgenic cattle, sheep, goats, pigs and fish. Transgenic animals as models of human disease.

TEXT BOOKS

1. Animal Cell Culture Techniques. Ed. Martin Clynes, Springer.
2. Animal Biotechnology, M. M. Ranga, III Revised edition, Agrobios (India), Jodhpur.
3. Animal Cell Culture- Practical Approach. John, R.W.Masters. 2000. 3rd Edi.

REFERENCES:

1. Freshney. Culture of Animal Cells: A manual of basic techniques. 4th ed. Wiley – Liss 2000.
2. Culture of Animal cells, 3rd Edition, R. Ian Freshney. A John Wiley & Sons, Inc., Publications.
3. Animal Cell Culture- Practical Approach, R.W. Masters, Oxford.
4. Animal Cell Biotechnology, Methods and protocols, Nigel Jenkins, Humana Press.
5. Biotechnology of Animal Tissue. P.R.Yadav & Rajiv Tyagi. 2006. Discovery Publishing House. New Delhi.

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	ANALYTICAL TECHNIQUES	Exam Hrs.	3
		P8BI2001	

Objectives:

The objective is to educate the students on the basic principles, instrumentation and applications of the analytical tools of biochemistry

UNIT I – SPECTROSCOPY

15 Hrs

Laws of absorption and absorption spectrum. Principle, instrumentation and applications of UV-visible, spectro-fluorimetry, Luminometry, Turbidometry & Nephelometry. Atomic absorption spectroscopy. Flame emission spectrophotometry. Basic principles of NMR, ESR and mass spectrometry and their biological applications. X-ray diffraction, ORD and CD-elementary details.

UNIT II - RADIOISOTOPE TECHNIQUES & MICROSCOPY

15 Hrs

Nature and units of radioactivity. Detection and measurement of radioactivity- Geiger-Muller counter, solid and liquid scintillation counting. Autoradiography. Applications of radioisotopes in biology- Radiation hazards.

Microscopy – Basic principles. Light, bright field, phase – contrast and fluorescence microscopy. Electron microscopy – preparation of specimens. TEM and SEM. Microtomy Fixation and staining. Flow cytometry, FACS.

UNIT III - ELECTROPHORESIS AND BLOTTING TECHNIQUES

15 Hrs

Electrophoresis: General principles. Electrophoresis of proteins- SDS-PAGE, native gels, isoelectric focusing, Cellulose acetate electrophoresis. Electrophoresis of nucleic acids- agarose gel electrophoresis, pulsed-field gel electrophoresis.

Blotting techniques: Southern, Northern and Western blotting techniques. DNA fingerprinting.

UNIT IV – CHROMATOGRAPHY

15 Hrs

Principle, instrumentation and applications of thin layer chromatography, gas liquid chromatography, ion-exchange chromatography, Molecular exclusion chromatography and Affinity chromatography. Principle, instrumentation and applications – HPLC, Capillary electro-chromatography.

UNIT V - CENTRIFUGATION & TISSUE FRACTIONATION

15 Hrs

Basic principles of sedimentation. Ultracentrifuge: analytical and preparative ultracentrifuge- instrumentation and applications. Subcellular fractionation by differential centrifugation. Density-gradient centrifugation- rate zonal and isopycnic. Cell disruption, homogenization and extraction of membrane bound proteins-cell disruption methods – organ and tissue slice techniques.

TEXT BOOKS:

1. Practical Biochemistry by Wilson and Walker. 5th edition Cambridge Univ 2005.
2. Introductory Practical Biochemistry (Narosa, 2000) by Shawney & Randhir Singh.

REFERENCES:

1. Physical Biochemistry by David Friefelder, W.H. Freeman 2nd edition (1982).
2. Introduction to Medical Laboratory Techniques by Mukherjee, Volume I, II & III.
3. Introduction to instrumental analysis by Robert D.Brown, Pharma Book Syndicate (2006).
4. Boyer, R. Modern Experimental Biochemistry. 3rd ed. Addison Wesley Longman, 2000.
5. Upadhyay, Upadhyay and Nath. Biophysical Chemistry Principles and Techniques. Himalaya Publ. 1997
6. Sambrook. Molecular Cloning. 2nd edition. Cold Spring Harbor Laboratory, 2001.
7. David Freifelder Physical Biochemistry – Applications to Biochemistry and Molecular Biology. WH Freeman & Co. 2nd edition 1999.

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	BIOENERGETICS AND METABOLISM	Exam Hrs.	3
		P8BI2002	

Objectives:

The objective of this paper is to make the students learn metabolic pathways of biomolecules and understand the interrelationship between the pathways and the mechanisms of regulation.

UNIT I – BIOENERGETICS AND BIOLOGICAL OXIDATION 15 Hrs

Definition – Laws of Thermodynamics and its Applications, Free energy, Enthalpy and entropy, endergonic and exergonic reactions, Calculation of Free energy change in Biological Reactions. High-energy phosphates. Enzymes involved in redox reactions. The electron transport chain- organization of respiratory chain complexes I, II, III, IV and electron flow. Oxidative phosphorylation- electron transfer reactions in mitochondria. F₁F₀ ATPase- structure and mechanism of action. The chemiosmotic theory. Inhibitors of respiratory chain and oxidative phosphorylation- poisons, uncouplers and ionophores. Regulation of oxidative phosphorylation.

UNIT II - CARBOHYDRATE METABOLISM 15 Hrs

Overview of glycolysis. The citric acid cycle and regulation. The pentose phosphate pathway and uronic acid pathway. Glycogenesis, gluconeogenesis, Glycogenolysis its Regulation. Metabolism of glycogen and regulation. The glyoxylate cycle. Cori cycle.

UNIT III LIPID METABOLISM 15 Hrs

Oxidation of fatty acids- role of carnitine in fatty acid transport, α , β and ω -oxidation. Biosynthesis of fatty acids - Fattyacid synthase complex – regulation of lipogenesis. Metabolism of triglycerides, phospholipids and sphingolipids. Cholesterol- biosynthesis, regulation, transport and excretion.

UNIT IV AMINO ACID AND PROTEIN METABOLISM, 15 Hrs

Overview of Biosynthesis of the nutritionally essential and nonessential amino Acids. Conversion of amino acids to specialized products. Catabolism of amino acid nitrogen- transamination, deamination, ammonia formation and the urea cycle.

UNIT V - PURINE AND PYRIMIDINE METABOLISM 15 Hrs

Metabolism of purines- de novo and salvage pathways for biosynthesis. Purine catabolism. Biosynthesis and catabolism of pyrimidines. Regulation of purine and pyrimidine metabolism.

TEXT BOOKS:

1. Harper's Biochemistry, Murray, Granner, Mayes, Rodwell 25th Edition. McGrawhill Co.
2. Davidson and Sittman 1999. Biochemistry NMS 4th edition. Lippincott. Williams and Wilkins.

REFERENCES:

1. Stryer. Biochemistry. Freeman. 6th ed. 2006.
2. Nelson Cox. Lehninger's Principles of Biochemistry. 5th ed. Freeman, 2008.
3. Donald Voet, J.G. Voet, John Wiley, Biochemistry, 3rd edition 2008.
4. Kuchel and Ralston. Biochemistry. 2nd ed. Schaum's Outlines Mc Graw Hill, 2006.
5. Davidson and Sittman. Biochemistry NMS. 4th ed. Lippincott. Willams and Wilkins, 1999.
6. Campbell and Farrell. Biochemistry 4th ed. Brooks/Cole Pub Co. 2002.
7. Elliot and Elliot. Biochemistry and Molecular biology 3rd edition Oxford University Press Inc, 2005.
8. Zubey Biochemistry 4th edition, WCB Publishers, 1998.

CORE PRACTICAL PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL III: BIOCHEMICAL ANALYSIS OF BLOOD	Exam Hrs.	6
		P8BIPR21	

Objectives: To have knowledge about the normal and abnormal biochemical constituent of blood.

1. Estimation of glucose by GOD & POD method
2. Estimation of Glucose by Orthotoulidine (OT) method.
3. Estimation of protein by Bradford's method
4. Estimation of blood urea by DAM method
5. Estimation of serum creatinine alkaline picrate method.
6. Estimation of serum triglycerides.
7. Estimation of serum cholesterol.
8. Estimation of serum bilirubin.
9. Estimation of serum phospholipids.
10. Demonstration of Auto Analyser.

Text Books:

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

References:

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S. Sadasivan and Manickam

CORE PRACTICAL PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	PRACTICAL IV: HEMATOLOGY AND SEROLOGY	Exam Hrs.	6
		P8BIPR22	

Objectives: To have knowledge of blood cells count and investigation of human viral diseases.

HEMATOLOGICAL STUDIES

1. Collection preservation and storage of Blood
2. Total RBC count.
3. Total WBC count.
4. Calculation of RBC indices : MCV, MCH, MCHC
5. Differential WBC count (DC).
6. Estimation of hemoglobin content.
7. Determination of Packed Cell Volume.
8. Absolute Eosinophil count (AEC).
9. Total platelet count.
10. Determination of bleeding time.
11. Determination of clotting time.
12. Determination of Prothrombin time.
13. Determination of ESR.
14. Pathological examination of blood film.
15. Demonstration of cell counter.

SEROLOGICAL STUDIES

1. Grouping of blood and Rh typing
2. Widal Test.
3. VDRL Test.
4. CRP Test.
5. Rheumatoid arthritis Test.
6. HIV Test.
7. HBsAg Test.
8. Pregnancy Test
9. HbA1c Test
10. Demonstration of ELISA reader

Text Books:

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

References:

1. Laboratory manual in Biochemistry – Jayaraman

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	CELL SIGNALING AND COMMUNICATION	Exam Hrs.	3
		P8BIEP21	

Objective: to understand various signaling pathways.

UNIT – I SIGNALING COMPONENTS

20 hrs

Fundamental concepts and definitions of signal, ligands, and receptors, Endocrine, paracrine and autocrine signaling. Receptors and signaling pathways – cell surface receptors, ion channels, G – protein coupled receptors, receptor kinases (tyr, ser/thr). Signal transduction through cytoplasmic and nuclear receptors. The Ras – raf – MAP kinase cascade. Second messengers – cyclic nucleotides, lipids and calcium ions. Crosstalk in signaling pathways.

UNIT – II CELL SIGNALING

20 hrs

Hormones and their receptors, regulation of signaling pathways, bacterial and plant two-component systems, light signaling in plants, bacterial chemotaxis and quorum sensing. Signal cascade, inhibitors of signal cascade.

UNIT – III HOST PARASITE INTERACTION

20 hrs

Recognition and entry processes of different pathogens like bacteria, viruses into animal and plant host cells, alteration of host cell behavior by pathogens, virus-induced cell transformation, pathogen-induced diseases in animals and plants, cell-cell fusion in both normal and abnormal cells.

UNIT – IV CELLULAR COMMUNICATION

15 hrs

Regulation of hematopoiesis, general principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix, integrins, neurotransmission and its regulation.

UNIT – V CANCER

15 hrs

Genetic rearrangements in progenitor cells, oncogenes, tumor suppressor genes, cancer and the cell cycle, virus-induced cancer, metastasis, interaction of cancer cells with normal cells, apoptosis, therapeutic interventions of uncontrolled cell growth.

TEXT BOOKS

1. De Robertis and De Robertis. Cell and Molecular Biology. Lea and Febiger. 8th ed.
2. Cell biology Second edition – CA Smith & EJ Wood, Chapman & Hall publications
3. Murphy. Fundamentals of light microscopy and electron imaging. Wiley – Liss, 2001

REFERENCES

1. The biochemistry of cell signaling, Helmreich JM, Oxford press
2. Cell signaling – John T, Hancock Oxford University press
3. Lodish et al. Molecular Cell Biology. Scientific 5th ed. Freeman.
4. Molecular cell biology 4th Edition Harvey Lodish, Amold berk, Newyork.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	NANO BIOCHEMISTRY	Exam Hrs.	3
		P8BIEP22	

Objectives: This helps the students to understand the various nanomaterials, their construction and biological approach of the same in medical field.

UNIT I - INTRODUCTION

15 Hrs

Nanotechnology – definition and scope, nanobiotechnology- recent development and applications, Bioconjugation mediated drug delivery, carbon nanotubes – types and their biomedical applications. Immunotoxin are targeted cell killers. General medicine is changing into personalized nanomedicine.

UNIT II - BIOPOLYMER

15 Hrs

Biopolymer- classification and types, polymer nanofibers - electrospinning method and their biomedical applications, biocompatible polymer and their application in tissue engineering, polymer nanocomposite- bone and dental restorations, polymer controlled drug delivery for the treatment of cancer and other diseases. Biodegradable polymer derived from amino acid.

UNIT III - BIOCOMPATIBLE NANOMATERIALS

15 Hrs

Metal Microbes interaction, Biological metal nanoparticle synthesis and biomedical application – Dendrimers, quantum dots, Biodegradable optical nanoparticles for tumor diagnosis and treatment. PLA and PLGA Based nanoparticulate delivery system.

UNIT IV - NUCLEIC ACID BASED NANOMATERIALS

15 Hrs

DNA based artificial nanostructures; Fabrication, properties and application-Nucleic acid engineered nanomaterials and their applications. Protein patterning for applications in biomaterials. DNA lipoplexes – Lipofection efficiency In Vitro and In Vivo, Polymer controlled delivery of therapeutic nucleic acid.

UNIT V - LIOSPHERE IN DRUG TARGET AND DELIVERY

15 Hrs

Liposome - liposomes in sensor technology, polymeric Micelles – Production of Lipospheres for Bioactive compound delivery – Melt dispersion technique, Solvent evaporation technique and InVitro drug release - Polymeric biodegradable liposphere for vaccine delivery.

TEXT BOOKS:

1. Pradeep T, 2007, NANO: The Essentials – Understanding Nanoscience and Nanotechnology, TATA Mc Graw – Hill Education.
2. Nano Biology Veenita Singh
3. A Hand Book of Nano biotechnology Rita Khare.
4. Nano Biotechnology Subbiah Balaji.

REFERENCES:

1. Challa S.S.R. Kumar (Ed). 2006. Biological and pharmaceutical nonmaterial's. Wiley-VCH Verlag GmbH & Co., KgaA.
2. K.K. Jain 2006 Nanobiotechnology in Molecular Diagnostics: Current Techniques and Application Horizon Biosciences.
3. Niemeyer, C.M. Mirking C.A., (Eds.) 2004 . Nano biotechnology concepts.
4. Applications and Perspectives, Wiley- VCH, Weinheim-2004
5. Claudio Nastruzzi – 2005 (Ed) Liposphere in drug targets and delivery, CRC press.
6. Molecular Design and Synthesis of Biomaterials Biological Engineering Division, MIT OpenCourse Ware, 27th May 2005
7. Biomaterials Sciences: An Introduction to Materials 2nd Edition, Buddy D.Ratner, Allan S.Hoffman, Frederick J.Schoen and Jack E.Lemons
8. Nanotechnology: A General Introduction to the Next Big Idea Mark Ratner and Daniel Ratner: Pearson Education Publishers, 2002
9. Encyclopedia of Nanoscience & Nanotechnology, H.S.Nalwa (Ed.,) American Scientific Publishers, California, 2004.
10. Nano Biotechnology: Concepts, applications and perspectives. Christofer M.Niemayer,ChadA.Mirkin, Wiley VCH Publishers 2004.
11. Bionanotechnology: Lessons from Nature, David S.Goodsell, Jhon Wiley, 2006.
12. Nano-Biotechnology concepts, Application & Perspectives, Edited by C.M. Niemeyer, C.A.Mirkin, Wiley-VCH India Pvt. Ltd.

CC01 (CORE PAPER)	SEMESTER I	Credit	7
		Hrs./Week	7
COURSE TITLE	MOLECULAR BIOLOGY AND GENETICS	Exam Hrs.	3
		U8BT1001	

OBJECTIVE

To understand the basic knowledge and complexity of DNA. Learning basic Genetics

UNIT – I

Basic concepts of Cell - General structure of prokaryotic and eukaryotic cells, cell organelles and functions, cell types. Cell Division – Cell cycle, Mitosis and Meiosis.

UNIT – II

RNA – Types, Transcription, RNA processing. Genetic code – Characteristics. Protein synthesis.

UNIT – III

DNA – Physical and chemical structure, Replication in prokaryotes and Eukaryotes. Plasmids – General properties and types.

UNIT – IV

Mendelian principles – Introduction to genetics, Mendel's laws. Modification of Mendel's laws. Multiple alleles. Sex linkages and Crossing over.

UNIT – V

Microbes and Microbial Genetics - Model Organisms – Virus, *Escherichia coli* and Yeast. Mutation – Types and Significance. Bacteria – Transformation, Transduction, Conjugation.

BOOK FOR STUDY

1. Sathyanarayana. (2010). Biotechnology, India.
2. Molecular Biology – Channarayappa – Universities Press, Hyderabad, India.
3. Cell Biology - Channarayappa – Universities Press, Hyderabad, India.
4. Molecular Biology – Saras Publication.

BOOK FOR REFERENCES

1. Molecular Biology – David Freifelder (2nd Edition), Narosa Publishing House, New Delhi.
2. Genetics – Irwin H. Herskowitz, Agri – Blovet Press, New Delhi, India.
3. Molecular Biology of Gene by Watson JD, Hopkins NH, Roberts JW, Steitz JA, Weiner A.M. (2004). The Benjamin / Cummings Publishing Company.
- 4.

CC02 (CORE PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL I: MOLECULAR BIOLOGY AND GENETICS	Exam Hrs.	3
		U8BTPr11	

OBJECTIVE – *To learn basic techniques and cell types, observation of chromosomal DNA.*

MOLECULAR BIOLOGY

1. Microscopy – Simple, Compound microscope.
2. Cell types – Viruses, *Escherichia coli* & Yeast
3. Micrometry – Cell size measurement.
4. Observation of mitotic cell division.
5. Isolation of DNA from animal/plant tissue.

GENETICS

1. Recording genetic traits among students.
2. Chromosomal observation – Chironomous larva.

SPOTTERS

1. DNA
2. RNA
3. Micrometer
4. Centrifuge
5. UV- Transilluminator

BOOK FOR STUDY

1. Laboratory manual on Biotechnology – Rastogi Publication, Meerut.
2. Experimental procedures in Life sciences by Dr. S. Rajan & Mrs. R. Selvi Christy, Anjana Book house, Chennai.
3. Sathyanarayana. (2010). Biotechnology, India.

BOOK FOR REFERENCES

1. Molecular Biology – Channarayappa – Universities Press, Hyderabad, India. Molecular Biology – David Freifelder (2nd Edition), Narosa Publishing House, New Delhi.
2. Genetics – Irwin H. Herskowitz, Agri – Blovet Press, New Delhi, India.
- 3.

CC03 (ALLIED I)	SEMESTER I	Credit	6
		Hrs./Week	7
COURSE TITLE	ALLIED - PRINCIPLES OF BIOCHEMISTRY	Exam Hrs.	3
		U8BTAL11	

OBJECTIVES

To make the students to understand the basics of biochemistry. To impart the knowledge of structural and functional properties of carbohydrates, proteins, lipids and nucleic acids.

UNIT 1

Introduction to Biochemistry - pH and Buffers- Atom and Chemical bonds. Definition, classification and biochemical properties of carbohydrates, epimers, anomers, glycolysis, TCA cycle.

UNIT-II

Amino acids and peptides - Definition, amino acids as ampholytes. Structure and classification of amino acids based on chemical nature, Essential and non essential amino acid. Protein structure and functions – Primary, Secondary, Tertiary and Quaternary Structures.

UNIT-III

Lipid and fats - Definition, classification of lipids. Simple lipids – Physical, chemical and biochemical properties of fats. Compound lipids - Structure and function of phospholipids, glycolipids and lipoproteins. Derived lipids.

UNIT-IV

Nucleic Acid - Structure of Purines and Pyrimidines; Nucleotides and Nucleosides. DNA-double helix: Types of DNA. Types of RNA and its structure.

UNIT- V

Vitamins - Definition and Classifications of Fat soluble vitamins - sources, structure and physiological functions; Water soluble vitamins-sources, structure and physiological functions. General Property and classification of Enzymes.

BOOK FOR STUDY

1. Fundamentals of Biochemistry, S. Chand & company, J.L. Jain, 2007
2. Biochemistry, 4th edition, G. Zubay, 1998. Mc Millan Publishing Co, New York.
3. Murray et al 2003 Harper's Biochemistry 26th edition McGraw Hills.

BOOK FOR REFERENCES

1. Biochemistry, 4th edition, L. Stryer., 1999. W.H, Freeman& company, New York.
2. Principles of Biochemistry, AL. Leninger, D.L. Nelson and M.M. Cox., 1993.Worth Publishers, New York.
3. Donald Voet , J.G and John Wiley, 1995 Biochemistry

CC03 (ALLIED I PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED PRACTICAL: - PRINCIPLES OF BIOCHEMISTRY	Exam Hrs.	3
		U8BTAP11	

OBJECTIVE - *To learn buffer preparation and basic techniques of Biochemistry.*

1. Estimation of pH using pH paper in various biological samples.
2. Estimation of pH using pH meter in various biological samples.
3. Preparation of Phosphate buffer and Citrate buffer.
4. Qualitative analysis of Glucose.
5. Qualitative analysis of Protein.
6. Qualitative analysis of Lipid.
7. Estimation of Blood glucose level.
8. Separation of Amino acids by Thin Layer Chromatography.
9. Estimation of Protein by Lowry's method.

BOOK FOR STUDY

1. Introductory Practical Biochemistry. Sawhney, Narosa Publishers, 1999.
2. Principles and techniques of Practical Biochemistry. 5th Ed. Wilson K, Walker J, Cambridge University Press, Cambridge. 2000.
3. Practical Biochemistry – Tata McGraw hill education, 2006 by David Plummer.

BOOK FOR REFERENCES

1. Biochemistry, 4th edition, L. Stryer., 1999. W.H, Freeman& company, New York.
2. Principles of Biochemistry, AL. Leninger, D.L. Nelson and M.M. Cox., 1993. Worth Publishers, New York.
3. Fundamentals of Biochemistry, S. Chand & company, J.L. Jain, 2007

CC04 (CORE)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	MICROBIOLOGY	Exam Hrs.	3
		U8BT2001	

OBJECTIVE

To understand the basics about microbes with reference to classification and structure. To get familiar in various microbiology techniques like sterilization, culture techniques and staining process.

UNIT-I

History of Microbiology - Contributions of Antoni Van Leeuwenhoek, Spallanzani, Louis Pasteur, Tyndal, Joseph Lister, Robert Koch, Edward Jenner and Flemming. Scope of Microbiology. Classification of Microbes – Five kingdom concept, three kingdom concept.

UNIT-II

Bacteriology– gram positive and gram negative bacteria, morphology, Ultra structure of bacteria – culture characteristics, biochemical confirmation test (IMVIC).

UNIT-III

Virus, Fungus and algae- Virus – Structure &classification of virus and Virus host interactions – bacteriophages – Fungi– general characteristics of fungi–structure and functions of yeast. Algae – Structure &classification of Economic importance of algae (Single cell protein).

UNIT-IV

Growth and multiplication of bacteria – bacterial growth curve, bacterial nutrition, factors affecting bacterial growth. Different types of bacterial culture-Batch, Synchronous, continuous, fed batch – types of bacterial culture media.

UNIT-V

Sterilization and staining techniques– Sterilization technique – Definition, Physical methods – heat, radiation, ultrasonication, filtration. Chemical methods - disinfection, sanitization, antiseptic sterilants and fumigation.

Staining techniques– Classification of stainsmechanism of gram staining, acid fast staining, negative staining, capsule staining, flagella staining, endospore staining.

BOOK FOR STUDY

1. General Microbiology, Stanier, RY et al., 5th ed. Macmillan Press.
2. Microbiology, Pelczar. M., et al., 5th ed., 2000, Tata - McGraw Hill.
3. Principles of Microbiology, Atlas, RM., 2nd ed., 1997, McGraw-Hill.
4. Microbiology, N. Arumugam et al., Saras Publication, Nagercoil, India. 2010.

BOOK FOR REFERENCES

1. Microbiology-concept and applications Pelzer, M.J.J.Chang and N.R.Krieg 1993, McGraw Hill, NY.
2. Microbiology, Fundamentals and Applications, Ronald, M. Atlas, 1986.
3. General Microbiology, Stainer, 1986. Mc. Millan Pub.Co.
4. Microbiology. Davis, Dulbeco, R. Einstein, Gibsbergs – Herpers and Row Publications, SG.

CC04 (CORE PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL II: MICROBIOLOGY	Exam Hrs.	3
		U8BTPr21	

OBJECTIVES

To learn basic microbiology techniques with principles and procedures that is widely used by Biotechnology students and also to get familiar in use of common microbiology equipment and tools.

1. Sterilization techniques – Demo (Moist heat-autoclave, dry heat – hot air oven, radiation– Laminar air flow).
2. Preparation of Nutrient agar plates, broth, slants and butts
3. Observation of bacterial morphology – shape and arrangement of cells
4. Sampling and quantification of bacteria in air and water [serial dilution]
5. Isolation of bacteria [Streak plate, spread plate, pour plate]
6. Identification of bacteria [simple staining and Grams staining]
7. Lactophenol cotton blue mounting of fungi
8. Methylene blue reduction test for milk

BOOK FOR STUDY

1. Laboratory Manual of Microbiology for Biotechnology Students, Kanakam Elizabeth Thomas, Ane Books Pvt, Ltd. Chennai, 2011.
2. Experiments in Microbiology, Rajan & Christy, Anjanaa Book House, Chennai, 2015.
3. Microbiology by A. Mani et al, Saras Publication 2007.

BOOK FOR REFERENCES

1. Microbiology – A laboratory Manual, Cappuccino and Sherman 6thEdn. Pearson Education (Singapore) Pvt Ltd, Indian Branch, New Delhi. 2004.
2. Practical Microbiology, Dubey RC and Maheshwari DK, S. Chand and Company Ltd, New Delhi 2002.
3. Microbiology and Biotechnology, A laboratory Manual, Kalaichelvan, Lab Man Series, MJP publishers, Chennai, 2006.

CC06 (ALLIED)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED - BIODIVERSITY	Exam Hrs.	3
		U8BTAL21	

OBJECTIVE

To study about general aspects of biodiversity and its values.

UNIT-I

Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity.

UNIT-II

Global climate change factors – Human impact on earth and biodiversity; Invasive species, exotic species – Threat to animal biodiversity; Ecology of transgenic crops and animal interaction.

UNIT - III

Biodiversity in Ecosystem – Classification – Ecosystem mapping, tropical forests, grasslands, wet lands, Habitat loss: Habitat destruction – Fragmentation and degradation – desertification, Habitat restoration.

UNIT - IV

Conservation and Management –National and International Protected Areas – Current Practices in Conservation - in situ Conservation and ex situ Conservation of Threatened Species – Species Diversity –Deciduous Forests.

UNIT - V

National Legislation – Protection of Wild flora and Fauna -Protection of National Habitats - Biodiversity Economics, Environmental Policies for managing Agro-biodiversity. Biodiversity legislation and Conventions.

BOOK FOR STUDY

1. Biodiversity by Dr. V. Singh et al. 2016.
2. Animal Diversity by R. L. Kotpal 2017.
3. The Biology of Biodiversity, Kato, M (1999), Springer Verlag, Tokyo.
4. Biodiversity Conservation – In Managed forest and protected areas, Kotwal, P.C. and S. Banerjee (2002). Agrobios, India.
5. Global Biodiversity, Sinha, R. K(1997), INA Shree Publishers, Jaipur.

BOOK FOR REFERENCES

1. Ecology of Natural Resources, Ferancois Ramade (1991), John Wiley.
2. Global Biodiversity and Strategy, IUCN (1992).
3. Biodiversity, Science and Development, Francesco di castri (1996), Backhuys Publishers, The Netherlands.

EC06 (ALLIED I PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED PRACTICAL - BIODIVERSITY	Exam Hrs.	3
		U8BTAP21	

OBJECTIVE - *Learn to understand basic concepts of biodiversity and its economical values.*

1. Plant diversity in campus
2. Animal diversity in campus
3. Microbial diversity in campus
4. Identification of Phyto and zoo planktons
5. Observation of mouth parts of honey bee and mosquito.
6. Economically importance of plants and animal
7. Herbarium.
8. Field visit of biodiversity hotspot

BOOK FOR STUDY

1. Biodiversity by Dr. V. Singh et al. 2016
2. Mega diversity Conservation, flora, Fauna and Medicinal Plants of India's hot spots,
3. Chaudhari, A. B. and D. D. Sarkar (2003), Daya Publishing House, Delhi.

4. Conservation of Biodiversity and Natural Resources. Singh, M.P., B.S. Singh and Soma S. Dey (2004), Daya Publishing House, Delhi.
5. Biodiversity –Strategies for Conservation, Dadhich L. K. and A.P. Sharma (2002), APH Publishing Corporation, New Delhi.

BOOK FOR REFERENCES

1. Ecology of Natural Resources, Ferancois Ramade (1991), John Wiley.
2. Global Biodiversity and Strategy, IUCN (1992).
3. Biodiversity, Science and Development, Francesco di castri (1996), Backhuys Publishers, The Netherlands.
4. Comparative Vertebrate, Zoology waterman et. Al. Mac Millan Co. 1971.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED BIOCHEMISTRY	Exam Hrs.	3
		P8BT1001	

OBJECTIVES

To make the students understand the basics of biochemistry. To impart the knowledge of Chemistry and Classification of carbohydrates, lipids, proteins, nucleic acids and Enzymes and its mechanism of action.

UNIT – 1

Carbohydrates and metabolism - Carbohydrate structure, Biochemical properties and Classification – Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Glycogenesis, Glycogenolysis, Glycolysis, TCA cycle, Gluconeogenesis and HMP shunt.

UNIT – II

Lipids and Metabolism - Lipids, Fatty acids, Glycerol, Triacylglycerol structure and Classification of Lipids. B oxidation of lipids, Ketogenesis, Fatty acid synthesis, Cholesterol biosynthesis.

UNIT – III

Aminoacids and Metabolism - Amino acid structure and Classification of Protein, Structure – Primary, secondary, tertiary and quarternary. Amino acid metabolism – Transamination, Deamination, Decarboxylation, ammonia formation and Urea cycle.

UNIT – IV

Nucleic acid Metabolism - Nucleic acid structure – Purine, Pyrimidine bases, DNA, RNA types – ABZ forms of DNA, ribosomal RNA, messenger RNA and transfer RNA. Purine, Pyrimidine biosynthesis – Denovo and salvage pathways.

UNIT – V

Enzymes and Electron Transport Chain - Enzyme classification, Mechanism of action, kinetics – Michaelis Menten equation. ATP structure. Mitochondrial Electron Transport Chain, Inhibitors of ETC.

BOOKS FOR STUDY

1. Harper's Biochemistry – Murray et al 26th edition
2. A Text Book of Biochemistry – S N Gupta 2016
3. Text Book of Biochemistry for medical students – 7th edition – DM Vasudevan

BOOKS FOR REFERENCE

1. Harper's Biochemistry, 26th edition, Murray et al 2003, McGraw Hills.
2. Principles of Biochemistry, Leninger et al, 1993, Worth Publishers, New York.
3. Text Book of Medical Biochemistry, 4th edition, 2000 Chatterjee and Shinde, Jaypee Publishers, New Delhi.
4. Fundamentals of Biochemistry, J.L Jain. 2010. S. Chand Publishers.
5. Biochemistry, Stryer 8th Edition, 2015 WH Freeman Publishers.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	MOLECULAR BIOLOGY	Exam Hrs.	3
		P8BT1002	

OBJECTIVES

To study about the genome and its organization in prokaryotic and eukaryotic organism. To impart the knowledge about the regulation of genes.

UNIT-I

Chromosome and DNA - Introduction to Molecular Biology, DNA – Denaturation and Renaturation. Genome organization – Prokaryotic and Eukaryotic; Chromosome structure and function, chromatin; Chloroplast DNA; Mitochondrial DNA.

UNIT-II

Replication types and mechanism - Replication, Modes of Replication - Conservative, Semi conservative, dispersive methods and its experimental evidences. Prokaryotic and Eukaryotic replication - Polymerase, Primers and mechanism.

UNIT-III

Transcription and regulatory mechanism - Transcription - Prokaryotic and Eukaryotic transcription, mechanism of transcription, RNA polymerase and its types, transcription factors, Post transcriptional modifications – capping, polyadenylation, introns, exons, splicing, Alternate splicing. Transcriptional and post Transcriptional gene silencing.

UNIT-IV

Translation and protein biosynthesis - Translation – Genetic code, Deciphering of genetic code, Prokaryotic and Eukaryotic translation, Ribosomes, aminoacyl synthetase, post translational modification.

UNIT-V

Gene expression and regulation - DNA repair and Regulation of Gene expression – DNA repair and recombination. Introduction to Gene Regulation, The lactose Operon model, The Galactose Operon, The Arabinose Operon, The Tryptophan Operon, Relative positions of Promoters and Operators, Feedback Inhibition.

BOOKS FOR STUDY

1. Molecular biology – P.K Gupta 2016
2. Cell & Molecular biology – P.K Gupta 2017
3. Cell & Molecular biology – Arumugam 2010

BOOKS FOR REFERENCE

1. Molecular Cell Biology, Media connected W.H. Freeman and company.
2. Molecular Biology of Gene by Watson JD, Hopkins NH, Roberts JW, Steitz JA, Weiner AM. (2004). The Benjamin / Cummings Publishing Company.
3. Cell and molecular biology – concept and experiment. 2ndedn, Harris, D[ed], Karp,G.1999. John wiley& sons, sons, New York.
4. Microbial Genetics by S.R. Maloy, J.E. Cronan and D. Friefelder (1994) Jones and Bartlett publishers.
5. Genes VII by Levin. (2004) Oxford University press.
6. An introduction to genetic Analysis by A.J Griffiths, J.H Miller, D.T. Suzuki, R.C Lewontin and W.M Gelbart (2000) W.H Freeman Company.
7. Principles of Genetics by D.P Snustad, M.J. Simmons and J.B. Jenkins. (1997) John wiley and sons.
8. Principle of cell and molecular biology. 2ndedn.,Mclaughlin,S., Trost, K., Mac Elree, E.[eds]., Kleinsmith, L.j.& Kish, V.M., 1995. Harper Collins Publisher, New York.
9. Molecular biology of the cell. 3rdedn.,Alberts, B., Bray, D., Lawis, J., Raff, M., Roberta, K., Watson, J.d[eds], 1994. Garland Publication, Inc., New York.
- 10.Cell and Molecular Biology, Peter Paoella, m 1998. McGraw- Hill.

CORE PRACTICAL PAPER II	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL I - ADVANCED BIOCHEMISTRY	Exam Hrs.	4
		P8BTPR11	

OBJECTIVES

To analyze, characterize and identify the biomolecules.

1. Estimation of carbohydrates by ortho - toluidine method.
2. Estimation of DNA by diphenylamine method.
3. Estimation of RNA by orcinol method.
4. Estimation of protein by Biuret method
5. Extraction of total nucleic acid from plant tissue.
6. Separation and identification of sugars by TLC.
7. Separation and identification of amino acids by TLC.
8. Qualitative analysis of carbohydrates
9. Qualitative analysis of Aminoacids.
10. Qualitative analysis of urine.

BOOKS FOR STUDY

1. Fundamentals of Biochemistry, J.L Jain. 2010. S. Chand Publishers.
2. A Text Book of Biochemistry – S N Gupta 2016
3. Harper's Biochemistry – Murray et al 26th edition

BOOKS FOR REFERENCE

1. Introductory Practical Biochemistry. Sawhney, Narosa Publishers, 1999.
2. Principles and techniques of Practical Biochemistry. 5th Ed. Wilson K, Walker J, Cambridge University Press, Cambridge. 2000.
3. Practical Biochemistry – Tata McGraw hill education, 2006 by David Plummer.

CORE PRACTICAL PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL II –MOLECULAR BIOLOGY	Exam Hrs.	4
		P8BTPR12	

OBJECTIVES

To learn important techniques using molecular biological tools.

1. Squash preparation and observation of mitosis in onion root tip.
2. Squash preparation and observation of meiosis in grasshopper's testis.
3. Sub cellular fractionation using differential centrifugation.
4. Isolation of Chromosomal DNA from bacteria.
5. Quantitative analysis of DNA and RNA.
6. Agarose gel electrophoresis.
7. Bacterial Conjugation – Demonstration.
8. Restriction Digestion - Demonstration
9. Bacterial Transformation – Demonstration.

BOOKS FOR STUDY

1. Laboratory manual on biotechnology- swamy 2016.
2. Biotechniques theory and practicals – s.v.s rana2015.
3. A manual of practical biotechnology – Ignacimuthu.

BOOKS FOR REFERENCE

1. Molecular Cell Biology, Media connected W.H. Freeman and company.
2. Molecular Biology of Gene by Watson JD, Hopkins NH, Roberts JW, Steitz JA, Weiner AM. (2004). The Benjamin / Cummings Publishing Company.
3. Cell and molecular biology – concept and experiment. 2ndedn, Harris, D[ed], Karp, G.1999. John wiley& sons, sons, New York

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper I)	Credit	4
		Hrs./Week	6
COURSE TITLE	BIOPROSPECTING TECHNOLOGY	Exam Hrs.	4
		P8BTEP11	

OBJECTIVES

To create complete knowledge about the drug adulteration, herbal drug and its evaluation. To provide complete knowledge about the IPR and patent right.

UNIT-I

Drug Classification and phytopharmacology - Classification of crude drugs – Schemes for pharmacognostic studies of a crude drug; Phytopharmaceuticals – commercial significance of herbal products – current trend of market.

UNIT-II

Herbal products – primary and secondary metabolites - Herbal products: carbohydrates and derived products – drugs containing glycosides, tannins, lipids [fixed oils, fats and waxes], volatile oils and terpenoids, enzymes and proteins, alkaloids – Marine drugs.

UNIT-III

Analytical Pharmacognosy - Drug adulteration – types – methods of drug evaluation; Biological testing of herbal drugs – preliminary phytochemical screening for plant products tests – Chromatography [TLC, GLC, and HPLC]

UNIT-IV

Intellectual property rights – TRIP international conventions patents and methods of application of patents – legal implications biodiversity and farmer rights – beneficial application and development of research focus of the need of the poor – identification of direction for yield effects in agriculture – IPR an WTO regime- consumer protection an plant generic resources – GATT and TRIPS.

UNIT-V

Patent principles and laws - Objectives of the patent system – basis principle and general requirements of patent law- biotechnological inventions and patent law- legal development – patentable subjects and protection in biotechnology – The patentability of microorganisms.

BOOKS FOR STUDY

1. Principles of biotechnology – R.C Dubey.
2. Biotechnology – U Sathyanarayanan.
3. Herbal plants and drugs – Agnes Arber, 1999.

BOOKS FOR REFERENCE

1. A Lexicon of medical plants in India, D.N. Guhabakshi, P.Sensarma and D.C.Pal, 1999. Nayaprokash – publications.
2. Ethnobotany the Renaissance of Traditional Herbal Medicine, Rajiv K.Sinha, 1996. INASHREE publishers.
3. The indigenous drugs of India, Kanny, Lall, Dey and Raj Bahadur, 1984 International Book Distributors.
4. Herbal plants and Drugs, Agnes Arber, 1999. Mangal Deep Publications.
5. Contribution to India Ethnobotany by Editor S.K.Jain, 1991 Scientific Publishers.
6. New Natural products and Plants drugs with Pharmacological, Biological (or) Therapeutical activity, H.Wagner and P. Wolff, 1979. Springer, New Delhi.
7. Ayurvedic drugs and their plant source, V.V.Sivarajan and Balachandran India 1994. Oxford IBH publishing Co.
8. Ayurveda and Aromatherapy, Miller, Light and Miller, Bryan, 1988. Banarsidass Delhi.
9. Principles of Ayurveda, Anne Green, 2000. Thorsons, London.
10. Pharmacognosy, Dr.C.K.Kokate et al. 1999. NiraliPrakashan.
11. Biotechnology and Patent protection, Beier, F.K., Crespi, R.S. and Straus, 1980. Oxford and IBH Publishing Co, New Delhi.

CORE BASED ELECTIVE PAPER I	SEMESTER I (Option Paper II)	Credit	4
		Hrs./Week	6
COURSE TITLE	BIOINSTRUMENTATION	Exam Hrs.	4
		P8BTEP12	

OBJECTIVE

To make familiar and handling ability of the instrumentation among the students.

UNIT – I

Introduction to Biophysics & Biomolecular Techniques: Principles, working and application of PCR, Reverse Transcriptase PCR, Real Time PCR, RAPD, RFLP, AFLP, DNA Fingerprinting, Automated DNA - sequencer, ELISA, Western blotting, Southern Blotting, Northern Blotting, GEL Documentation unit. Biomedical instrument – ECG, EEG, CT and MRI.

UNIT – II

Microscopic Techniques and Principles - Principles of Microscopy – Light microscope, phase contrast, fluorescence, dark field, confocal, Inverted, Scanning Electron Microscope, Transmission Electron Microscope. Genetic Engineering Tools - Microinjection, Electroporation, Particle Bombardment.

UNIT – III

Radioactivity principles and techniques - Pulse – chase techniques: Radioactive isotope and Half-life & isotope; Meselson and Stahl experiment, autoradiography. Cerenkov radiation. Counting techniques – solid scintillating counter, liquid scintillating counter, photomultiplier tubes, phosphor imaging. Green Fluorescence protein. FACS.

UNIT – IV

Chromatographic and electrophoretic techniques - Separation Techniques: Chromatography - Principles and application of ion exchange chromatography, affinity chromatography, column chromatography, gas chromatography, gel exclusion chromatography, FPLC and HPLC. Electrophoresis – types, AGE, SDS PAGE, Gradient Gel Electrophoresis, Capillary Electrophoresis and MALDI TOF. Centrifugation (Velocity and buoyant density) and its types – Ultra centrifugation, Differential, Density gradient centrifugation.

UNIT – V

Spectroscopic techniques - Principles and application of UV – Vis, Infra - red, FTIR, Laser, Electromagnetic, Nuclear Magnetic Resonance, Mass spectrometry, GC- MS, LC – MS. X –ray Diffraction, CD, Dynamic Light Scattering techniques.

BOOKS FOR STUDY

1. Biotechniques theory and practicals – Rana 2016.
2. Principles of Biophysics – palanichamy.
3. Biophysics - Thiravia Raj- Saras publication 2005

BOOKS FOR REFERENCE

1. Biophysical Chemistry by Canter and Canter (1996).
2. Molecular Biotechnology by Glick and Pasternak. ASM Press (1994).
3. Biophysical Chemistry, David Friefelder
4. Bioanalytical Techniques by M.L Srivastava. (2008)
5. Physical Chemistry by Puri & Sharma
6. Physical Chemistry by P.L Soni, S. Chand Publication

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	PLANT BIOTECHNOLOGY	Exam Hrs.	3
		P8BT2001	

OBJECTIVE

To study the principles and techniques involved in plant tissue culture. To learn the concepts of transformation and other achievements in Plant Biotechnology.

UNIT - I

Plant Tissue Culture - History of Plant tissue culture - Tissue culture media (composition and preparation), Callus and suspension culture; Somaclonal variation; Micropropagation; Organogenesis; Somatic embryogenesis; Hardening and acclimatization; Embryo culture and embryo rescue; Artificial seeds; Protoplast isolation and culture, somatic hybridization; cybrids; haploid and triploids plant production; Cryopreservation and germplasm conservation.

UNIT - II

Techniques in plant transformation - Gene transfer methods - Vector mediated gene transfer – Agrobacterium mediated gene transfer – crown gall disease and Ti plasmid – Hairy root disease of A.rhizogenes (Ri plasmid); Virus mediated gene transfer: Caulimovirus as vector and Gemini virus as vector, RNA plant virus as vector; Direct gene transfer: Physical and chemical method; Marker gene for Plant transformation: Antibiotic resistant gene – Herbicide resistant gene.

UNIT -III

Transgenic plants: Herbicide resistance - Phosphinothricin, glyphosate-sulfonyl urea and atrazine. Insect resistance: Bt genes, non-Bt genes like protease inhibitors, alpha amylase inhibitor. Plant disease resistance: plant pathogen

interaction, existing approaches to combating disease, Natural disease resistant pathways. Biotechnological approaches to disease resistant. Abiotic stress: Drought, cold and salt.

UNIT- IV

Metabolic Engineering and Industrial Products - Plant secondary metabolites, control mechanisms and manipulation of phenyl propanoid pathway, shikimate pathway; alkaloids, industrial enzymes, bioplastics, custom made antibodies, edible vaccines, nif and nod genes.

UNIT- V

Molecular Marker-aided plant breeding - Molecular markers – Basic principle of molecular marker detection – marker based on DNA hybridization – RFLP – Markers based on PCR amplification – RAPD – AFLP – STS.

BOOKS FOR STUDY

1. Biotechnology – U Sathyanarayanan.
2. Plant Biotechnology – PK Gupta 2016
3. Biotechnology – Kumaresan 2016.

BOOKS FOR REFERENCES

1. Kalyankumar D. An Introduction to Plant Tissue Culture Techniques. New Central Book Agency, Kolkata. 2007
2. Sathyanarayana. U. Biotechnology. 2010.
3. Gilmartin and Bowler. Molecular Plant Biology: A practical approach (Vol.I and II), Oxford University press, UK. 2002.
4. Mathews and Mickee. An introduction to genetic engineering in plants, Blackwell Scientific Publishers. London. 1985.
5. Donald Grierson and S.V. Convey.. Plant Molecular Biology. Blackie and Son Limited. New York. 1984.

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	ANIMAL BIOTECHNOLOGY	Exam Hrs.	3
		P8BT2002	

OBJECTIVES

This course deals with the Animal breeds, Animal cell culture, Embryo transfer and Recombinant vaccines. To impart the students to understand the concepts of gene therapy and ethical issues in animal biotechnology.

UNIT - I

Breeding and genetic disorders - Introduction: Breed: Species-different types of breeding, upgrading, Economic traits- Genetic characterization of livestock breeds - Quantitative trait loci- Marker assisted selection. Genetic disorders - Chromosomal aberrations in farm animals.

UNIT -II

Embryo Transfer and transgenic animals –Artificial insemination, Super ovulation, Embryo transfer, In vitro fertilization-Pregnancy diagnosis-Sexing of embryos, Embryo splitting; Cryopreservation of embryo; transgenic animals- Transgenic fish; Animal as bioreactors.

UNIT -III

Animal Cell Culture -Principles of sterile techniques and cell propagation- Chemically defined and serum free media for cell culture; Scaling up of animal cell cultures; Preservation and characterization of animal cells, organ culture; Cytotoxicity and viability assays. Preservation and maintenance of animal cell lines, cryo - preservation and transport of animal germplasm (i.e. semen, ova and embryos).

UNIT -IV

Recombinant vaccines - Common viral, bacterial and parasitic diseases affecting animals- Types of Vaccines - Live vaccines, killed vaccines- Conjugate vaccines – Anti-Idiotypicvaccine - Subunit vaccines- Recombinant vaccines - DNA vaccines.

UNIT -V

Molecular biology in disease diagnosis and therapy - Molecular biologytechniques for rapid diagnosis of genetic diseases and gene therapy. Ethical issues in animal biotechnology.

BOOKS FOR STUDY

1. Animal Biotechnology –PK Gupta 2017.
2. Biotechnology – U Sathyanarayanan 2017

3. Biotechnology – Kumaresan 2016.

BOOKS FOR REFERENCES

1. The Animal Cell Culture and Technology - Butler M
2. Culture of Animal Cells -Freshney RT.
3. *Animal cell culture* by R.I. Freshney.
4. *Animal Biotechnology* by P.Ramadas.
5. *In vitro cultivation of Animal cells* by Dr.C.K.Leach, Butterworth and Heinemann Ltd.1994.
6. *Hand book of Animal Husbandry* by Gopalakrishnan.

CORE PRACTICAL PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL III: PLANT BIOTECHNOLOGY	Exam Hrs.	3
		P8BTPR21	

OBJECTIVE

To prepare tissue culture media and learn the techniques of plant propagation.

1. Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo).
2. Aseptic culture techniques for establishment and maintenance of cultures.
3. Tissue culture media preparation: Preparation of stock solutions of Murashige & Skoog basal medium and plant growth regulator stocks.
4. Propagation of plantlets and rapid multiplication by direct organogenesis.
5. Propagation of plantlets and rapid multiplication by indirect organogenesis.
6. Haploid plant production - Anther and Pollen culture
7. Mechanical isolation of protoplast and enzymatic isolation of protoplast and culture.
8. Production of synthetic seeds.
9. Transformation of leaf discs with Agrobacterium.
10. In vitro Seed Germination.

BOOKS FOR STUDY

1. Biotechniques theory and practice – Rana – 2016
2. Plant Biotechnology practical manual by Archana giri and C.C Giri -2007.
3. Plant tissue culture – T. Pullaiah , M.V. Subba Rao -2009.

BOOKS FOR REFERENCES

1. Kalyankumar De. An Introduction to Plant Tissue Culture Techniques. New Central Book Agency, Kolkata. 2007.
2. Plant Biotechnology – A Practical Approach – H.S Chawla – 2003
3. Practical Biotechnology – H.N Thatoi - 2017

CORE PRACTICAL PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL IV: ANIMAL BIOTECHNOLOGY	Exam Hrs.	3
		P8BTPR22	

OBJECTIVE

To learn techniques for culture and cell viability.

1. Sterilization Techniques.
2. Preparation of cell culture media and Sub culturing of cell lines
3. Sub culturing of cell lines.
4. Isolation of Liver Parenchyma cells by enzymatic methods.
5. Cryopreservation of cells
6. Determining cell toxicity using MTT assay
7. Silver staining of protein.
8. Isolation of DNA from animal source.
9. Isolation of RNA from animal source.

BOOKS FOR STUDY

1. Experimental Biotechnology – Practical manual – Sunitha dutta – 2011.
2. Practical manual – Biotechnology – K M Thara -2009.
3. Laboratory procedure in Biotechnology (Volume I) – Dr RK Mishra 2015.

BOOKS FOR REFERENCES

1. The Animal Cell Culture and Technology - Butler M
2. Culture of Animal Cells -Freshney RT.
3. *Hand book of Animal Husbandry* by Gopalakrishnan.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper I)	Credit	4
		Hrs./Week	5
COURSE TITLE	MOLECULAR GENETICS	Exam Hrs.	3
		P8BTEP21	

OBJECTIVES

This course deals with the gene transfer, plasmids and its types, Transposable Elements and Mutations. To impart the students to understand the concepts of genetics in molecular level.

UNIT - I

Gene transfer methods – transformation, conjugation, transduction and sex-duction, mapping genes by interrupted mating, fine analysis of genes.

UNIT - II

Plasmids - General properties and types. Transfer of Plasmid DNA- Transfer process, plasmid replication. Properties of bacterial plasmids- Sex plasmids F and derivatives, drug resistance (R) plasmids, Col plasmids, Agrobacterium plasmids (Ti)plasmids in eukaryotes.

UNIT - III

Transposable Elements - Overview of transposition, Terminology. Types of Bacterial transposons. Transposition- duplication, structure of transposons, replication of transposons. Deletions and inversions by transposons, role of IS elements in Hfr formation. Transposable elements in eukaryotes-transposition in eukaryotes.

UNIT - IV

Pedigree analysis - load score for linkage testing, karyotypes, genetic disorders. Polygenic inheritance, heritability and its measurements, QTL mapping.

UNIT - V

Mutation – types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal versus somatic mutants, insertional mutagenesis.

BOOKS FOR STUDY

1. Molecular Genetics - Sambamurthy
2. Genetics by Gardner.
3. Human genetics- SD Gangani-2000.

BOOKS FOR REFERENCES

1. Molecular Biology IInd edition- David Freifelder, Narosa publishing house, Newdelhi
2. Genes VIII- Benjamin Lewin
3. Molecular Biology & Biotechnology- HD kumar, Vikas publishing house PVT. Ltd, New Delhi.

CORE BASED ELECTIVE PAPER II	SEMESTER II (Option Paper II)	Credit	4
		Hrs./Week	5
COURSE TITLE	HERBAL BIOTECHNOLOGY	Exam Hrs.	3
		P8BTEP22	

OBJECTIVE: To explore and exploit the medicinal value of herbal products.

UNIT- I

Introduction to herbal drugs - Definition, source of herbal raw materials, identification, authentication, standardization of medicinal plants as per WHO guidelines & different herbal pharmacopoeias. Collection and processing of herbal drugs. Seasonal & geographical variations; natural & artificial drying methods. Packaging & labeling of herbal drugs prior to extraction.

UNIT - II

Herbal drug characterization and standardizations - Determination of physical and chemical constants such as extractive values, moisture content, volatile oil content, ash values, bitterness value and foreign matters applicable to the various herbal drugs.

UNIT- III

Herbal Formulations - Principle, methods, single herb formulation, poly-herbal formulation & their merits and demerits. Standardization of various herbal formulations.

UNIT -IV:

Plant Tissue Culture Techniques- Introduction, techniques of initiation and maintenance of various types of cultures. Immobilized cell techniques & biotransformation studies including recent developments in production of biological active constituents in static, suspension and hairy root cultures.

UNIT - V:

Techniques and analysis of bioactive components - Analysis of Bioactive Components of Natural Sources - Phyto-chemical standardization of raw herbal extracts and their formulation by using TLC, HPTLC, GC, HPLC, UV& IR techniques.

BOOKS FOR STUDY

1. Herbal Drug Technology by S.S. Agrawal & M. Paridhavi
2. Modern Methods of Plant Analysis by Peach & Tracey
3. Biotechnology by S.S. Purohit

BOOKS FOR REFERENCES

1. Quality control of herbal drugs: an approach to evaluation of botanicals by Pulok K. Mukherjee.
2. Pharmacognosy by C.K. Kokate, A.P. Purohit and S.B. Gokhale.
3. Bioinformatics by Mount.

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)			
CC01 (CORE)	SEMESTER I	Credit	7
		Hrs./Week	7
COURSE TITLE	DIGITAL LOGIC FUNDAMENTALS	Exam Hrs.	3
		U8CC1001	

OBJECTIVES:

To understand number systems, logic fundamentals and circuits, organization of computers, operating systems such as Windows and Linux.

UNIT – I**10 Hours**

Digital Systems and Binary Numbers – Boolean Algebra and Logic Gates. (Chapters 1 & 2)

UNIT – II**10 Hours**

Gate – Level Minimization (Chapter : 3)

UNIT – III**15 Hours**

Combinational Logic (Chapter: 4)

UNIT – IV**15 Hours**

Synchronous Sequential Logic (Chapters: 5, Sections 5.1 to 5.5)

UNIT – V**10 Hours**

Register and Counters. (Chapter 6: Sections 6.1 to 6.5)

Total Hours: 60

TEXT BOOK:

Digital Design With an Introduction to the Verilog HDL, M. Morris Mano & Michael D. Ciletti, 5th Edition, Person Education, 2013.

REFERENCE BOOKS:

1. Morris Mano M, Kime .R.Charles, "Logic And Computer Design Fundamentals"(2nd Edition Updated)
2. Morris Mano M – "Computer System Architecture – PHI Third Edition.

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)			
CC02 (CORE PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACICAL I: OFFICE SOFTWARE LAB	Exam Hrs.	3
		U8CCPR11	

a) Excel

1. Using formulae (Numeric, String, Date, Financial etc) to compute Simple Compound Interest, EMI, FV etc
2. Drawing various graphs Chart - Line, XY, Bar and Pie for a given set of data.
3. Conditional Formatting
4. Sorting and Import / Export features.
5. Macros and VBA

b) Access

- 6) Creation of table / primary key /
- 7) Query / Parameter Query / Relations
- 8) Filtering Records
- 9) Left / Right / Equi / Cross Joins
- 10) Design of forms / Reports / Modules

c) HTML

- 11) Creating web page with simple & advanced tags.
- 12) Drawing Tables
- 13) Web Page with Frames and Links (internal & external)
- 14) Creating Simple forms
- 15) Applying CSS to HTML

REFERENCE BOOK:

LAB MANUAL

B.Sc. (Computer Science), B.Sc(Software Computer Science) and B.C.A.			
CC03 (ALLIED-I)	SEMESTER I	Credit	6
		Hrs./Week	7
COURSE TITLE	ALLIED-MATHEMATICAL FOUNDATIONS I	Exam Hrs.	3
		U8CSAL11	

Objectives: *To Explore the Fundamental Concept of Mathematics*

UNIT– I SYMBOLIC LOGIC 21 Hours

Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi – conditional operators, converse, inverse, contra positive, logically equivalent, tautology and contradiction, Arguments and validity of argument.

Chapter 1: Sections 1.1 – 1.5

UNIT–I SET THEORY 21 Hours

Set, Set operations, Venn diagram, Properties of sets, number of elements in a set, Cartesian product, relation & functions, Relation: Equivalence relation. Equivalence class, Partially and Totally ordered sets, Functions: Types of Functions, Composition of Functions.

Chapter 2: Sections 2.1 – 2.8

UNIT–II BINARY OPERATORS 21 Hours

Types of Binary operations: Commutative, Associative, Distributive and identity, Boolean algebra: properties, Permutations and combinations.

Chapter 3: Sections 3.1 – 3.3

UNIT-IV DIFFERENTIATION**21 Hours**

Simple problem using standard limits, $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$, $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow 0} \frac{\tan x}{x}$, $\lim_{x \rightarrow 0} e^x$, $\lim_{n \rightarrow 0} (1 + 1/n)^n$, $\lim_{n \rightarrow 0} (1 + 1/n)^{1/n}$, Differentiation, successive differentiation, Leibnitz theorem, partial differentiation Applications of differentiation, Tangent and normal, angle between two curves, Maximum and minimum values [second derivative test], curvature and radius of curvature [Cartesian coordinates], Envelops.

Chapter 4: Sections 4.1 – 4.9**UNIT-V TWO DIMENSIONAL ANALYTICAL GEOMETRY 21 Hours**

Straight lines – pair of straight lines – circles – System of Circles – conics [parabola, Ellipse and Hyperbola].

Chapter 5: Sections 5.1 – 5.5**CONTENT AND TREATMENT AS IN:**

U. Rizwan, MATHEMATICAL FOUNDATIONS Volume I, Nelliappar Publications, Chennai. 2012

REFERENCES

1. P.R Vittal, MATHEMATICAL FOUNDATIONS, Margham Publication, Chennai.
2. V.Sundaram & others, DISCRETE MATHEMATICAL FOUNDATIONS, A.P. Publication, Sirkali
3. P. Duraipandia & Others, ANALYTICAL GEOMETRY OF 2 AND 3 DIMENSIONS, Emerald Publication 1992 Reprint.

B.Sc. (Computer Science), B.Sc(Software Computer Science) and B.C.A.			
EC03 (ALLIED-I PRACTICAL)	SEMESTER I	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED -COMPUTATIONAL MATHEMATICS PRACTICAL I	Exam Hrs.	3
		U8CSAP11	

List of Exercises

1. Computing expressions
2. Operations on Vectors
3. Operations on Sets
4. Permutation and Combinations
5. Differentiation of single and double variable functions.

REFERENCES:

1. Rudra Pratap, MATLAB, Oxford University Press (2013)
2. Brian R. Hunt, Ronald L. Lipsman and Jonathan M. Rosenberg, A GUIDE TO MATLAB (Second Edition) Cambridge University Press.

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)			
CC04 (CORE)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	PROGRAMMING IN C	Exam Hrs.	3
		U8CC2001	

OBJECTIVES:

To understand simple algorithms, language constructs and to develop programming skills in C.

UNIT – I

10 Hours

Overview of C - Constants, Variables, and Data Types - Operators and Expressions. (Chapters: 1,2 & 3)

UNIT – II

10 Hours

Managing Input and Output Operations - Decision Making and Branching - Decision Making and Looping. (Chapters: 4,5 & 6)

UNIT – III

15 Hours

Arrays - Character Arrays and Strings - User Defined Functions. (Chapters: 7,8 & 9)

UNIT – IV

15 Hours

Structure and Unions – Pointers - File Management in C. (Chapters: 10,11,12)

UNIT – V

10 Hours

Fundamental Algorithms - Factoring Methods (Chapters: 2 & 3)

Total Hours: 60

Hours

TEXT BOOK:

1. E. Balagurusamy, "Programming in C", Tata McGrawhill Education, 6th Edition, 2013. (Unit I to IV)
2. How to solve it by computer by R.G.Dromey, PHI International (Unit V)

REFERENCE BOOKS:

1. Kernighan, B.W. and Ritchie, D.M., "The C Programming Language (ANSIC)", PHI.
2. Foster & Foster, "C by Discovery", Penram International Publishers, Mumbai.

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)			
CC04 (CORE PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	PRACTICAL II: PROGRAMMING IN C – LAB	Exam Hrs.	3
		U8CC2001	

Control Statements:

1. Print n Fibonacci numbers – (using for)
2. Print n Prime numbers – (using while)
3. Simple arithmetic on two numbers – (using switch/case)

Functions:

4. Swap two values using call by value / call by reference.

Recursion:

5. To compute NcR and NpR
6. To Compute GCD and LCM

String Manipulation.

7. Operations on string such as length, concatenation, reverse, counting, and copy of a string to another.

Matrices:

8. Matrix Addition, Subtraction, Multiplication, Transpose of n x m matrices.
9. Inverse of a square matrix.

Searching:

10. Binary Search.

Sorting:

11. Bubble Sort
12. Insertion Sort

Structures:

13. Students Mark statement

Pointers:

14. Arithmetic operations on pointers.

Files

15. Creating/ Reading/ Writing a text/binary file.

REFERENCE BOOK:

1. LAB MANUAL

B.Sc. (Computer Science), B.Sc(Software Computer Science) and B.C.A.			
CC06 (ALLIED-I)	SEMESTER II	Credit	6
		Hrs./Week	6
COURSE TITLE	ALLIED-MATHEMATICAL FOUNDATIONS II	Exam Hrs.	3
		U8CSAL21	

Objectives: To Explore the Fundamental Concept of Mathematics

UNIT– I MATRICES – I

21 Hours

Multiplication of matrices, singular and Non singular matrices, Adjoint of a Matrix, inverse of a matrix, symmetric and skew symmetric, Hermitian and skew Hermitian, orthogonal and unitary matrices, Rank of a matrix, solution of simultaneous linear equations by [i] Cramer's rule [ii] Matrix inversion Method. (Upto Three equations and Three unknowns)

Sections 1.1 – 1.8

UNIT– II MATRICES – II

21 Hours

Tests for consistency of linear equations, (Rank Method), characteristic roots and characteristic vectors, Cayley – Hamilton theorem, matrix of linear transformations: reflection about the x , y axes and the line $y = x$, rotation about the origin through an

angle, expansion or compression, shears, translation.

Sections 2.1 – 2.4

UNIT–III INTEGRAL CALCULUS – I

21 Hours

Integration simple problem, integration of rational function involving algebraic expressions of the form $\frac{1}{ax^2+bx+c}$, $\frac{1}{\sqrt{ax^2+bx+c}}$, $\sqrt{ax^2+bx+c}$, $\frac{px+q}{ax^2+bx+c}$, $\frac{px+q}{\sqrt{ax^2+bx+c}}$, Integrations using simple substitutions – integration involving trigonometric functions of the form $\frac{1}{a+b\cos x}$, $\frac{1}{a^2\sin^2 x + b^2\cos^2 x}$ – integration by parts.

Sections 3.1

UNIT–IV INTEGRAL CALCULUS – II

21 Hours

Properties of definite integrals. Reduction formulae for $\int x^n e^{ax} dx$, $\int \sin^n x dx$, $\int \cos^n x dx$, $\int x^m (1-x)^n dx$, Applications of integration for [i] Area under plane curves, [ii] Volume of solid of revolution.

Sections 4.1 – 4.3

UNIT–V ANALYTICAL GEOMETRY OF THREE DIMENSIONS

21 Hours

Planes, Straight Lines, Spheres and Cones (simple problems only)

Sections 5.1 – 5.4

CONTENT AND TREATMENT AS IN:

U. Rizwan, MATHEMATICAL FOUNDATIONS Volume II, Nelliappar Publications, Chennai. 2012

REFERENCES

1. P.R Vittal, MATHEMATICAL FOUNDATIONS, Margham Publication, Chennai.
2. V. Sundaram & others, DISCRETE MATHEMATICAL FOUNDATIONS, A.P. Publication, Sirkali
3. P. Duraipandia & Others, ANALYTICAL GEOMETRY OF 2 AND 3 DIMENSIONS, Emerald Publication 1992 Reprint.

B.Sc. (Computer Science), B.Sc(Software Computer Science) and B.C.A.			
EC06 (ALLIED-I PRACTICAL)	SEMESTER II	Credit	1
		Hrs./Week	2
COURSE TITLE	ALLIED -COMPUTATIONAL MATHEMATICS PRACTICALII	Exam Hrs.	3
		U8CSAP21	

List of Exercises

1. Matrix Manipulation
2. Testing Consistency of System of Equations
3. Integration of single variable functions
4. Applications of Integration to Area and volume
5. Plotting of 2D and 3D objects.

REFERENCES:

1. Rudra Pratap, MATLAB, Oxford University Press (2013)
2. Brian R. Hunt, Ronald L. Lipsman and Jonathan M. Rosenberg, A GUIDE TO MATLAB (Second Edition) Cambridge University Press.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED JAVA PROGRAMMING	Exam Hrs.	3
		P8CS1001	

OBJECTIVES:

The course covers several general-purpose topics: using and building generic types, writing multi-threaded applications, the Reflection API and annotations, and network programming using sockets. It combines with various other topics like JDBC, secure coding, Swing GUI programming, design patterns, and so on.

UNIT – I

5 Hours

Java utilities: collections - I/O Streams - Networking - Exception Handling.(Chapter 17,14,15,12)

UNIT _ II

7 Hours

AWT: Windows, Controls, Layout languages and Menus - Swing. Multi Threading - JDBC.(Chapter 9,10,11,30,18)

UNIT – III

9 Hours

Java Servlets: Design - Life Cycle - Constituents of javax.servlet package - cookies – session tracking –Java Language Packages.(Chapter 19,16)

UNIT - IV

9 Hours

Remote Method Invocation: Remote Interface - The Naming Class - RMI Security Manager Class - RMI Exceptions - Creating RMI Client and Server classes - RMI - I IOP. (Chapter 20)

UNIT - V

10 Hours

Java Beans: Events - Customization - Introspection - Persistence - EJB: Introduction – EJB Container - Classes - Interfaces - Deployment description - Session Bean - Entity Java Bean - Jar file.(Chapter 21)

TEXT/REFERENCE BOOKS

1. Muthu, Programming with Java, vijay Nicole Imprints private Ltd.,2004
2. Herbert Schildt, The complete Reference – JAVA 2 , Fourth Edition,2001
3. Deitel H.M. & Deital P.J, Java How To Program, Prentice-Hall of India, Fifth Edition,2003.
4. Cay.S. Horstmann, Gary Cornel, Core Java 2 - Vol. II- Advanced Features, PearsonEducation,2004.
5. Tom Valsky, Enterprise JavaBeans - Developing component based Distibuted puplications,Pearson 1999.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED SOFTWARE ENGINEERING	Exam Hrs.	3
		P8CS1002	

OBJECTIVES:

This course introduces the concepts and methods required for the construction of large software intensive systems. It seeks to complement this with a detailed knowledge of techniques for the analysis and design of complex software intensive systems.

UNIT - I: INTRODUCTION TO SOFTWARE ENGINEERING 10 Hours

Definition and size factors – Quality and productivity factors – Managerial issue- Planning a Software Project: Defining the problem – Developing a solution strategy – planning the development process – planning an organization structure – other planning activities (Chapter: 1 Section 1.1 to 1.4 , Chapter: 2 Section 2.1 to 2.5)

UNIT - II: SOFTWARE COST ESTIMATION

10 Hours

Software – Cost factors – Software cost estimation techniques – specification techniques – level estimation – estimating software maintenance costs. (Chapter: 3 Section 3.1 to 3.4)

UNIT - III: SOFTWARE REQUIREMENTS DEFINITION**8 Hours**

The software requirements specification – formal languages and processors for requirements specification. (Chapter; 4 Section 4.1 to 4.3)

UNIT - IV: SOFTWARE DESIGN**10 Hours**

Fundamental Design concepts – Modules and modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection – Design guide lines (Chapter: 5 Section 5.1 to 5.9)

UNIT - V: SOFTWARE TESTING AND MAINTENANCE**10 Hours**

Quality assurance – Static analysis – symbolic exception – Unit testing and Debugging – System testing – Integration testing-White box testing-Black box testing –Managua aspects of software maintenance – Configuration management – source code metrics – other maintenance tools and techniques. (Chapter: 8 Section 8.1 to 8.6, Chapter: 9 Section 9.2 to 9.5)

TEXT / REFERENCE BOOK**Total Hours:48**

1. Software Engineering Concepts, Richard E. Fairly, McGraw-Hill book Company.
2. A concise introduction to software engineering –Pankaj Jalote- TMH ,2004.
3. **Software Engineering – A Practioner's Approach, Roger S.Pressman, 6th Edition, Mc Graw Hill,2005**

CORE PRACTICAL PAPER III	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL I: ADVANCED JAVAPROGRAMMING LAB	Exam Hrs.	3
		P8CSPR11	

1. Servlets.
2. RMI
3. Sockets.
4. Create a simple java bean and demonstrate it using Bean Box.
5. Create a Java bean that demonstrates
 - a. Indexed Property.
 - b. Bound Property.
 - c. Constrained Property.
 - d. Event Handling and communication between two beans.
6. Write a Java program that demonstrates JDBC.
7. Write a Java program that demonstrates JSP.
8. Write a Java program that demonstrates different types of EJB.

REFERENCE BOOK:

- 1.LAB MANUAL

CORE PRACTICAL PAPER IV	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL II: SOFTWARE ENGINEERING LAB	Exam Hrs.	6
		P8CSPR12	

SOFTWARE REQUIRED: Open source Tools: StarUML / UMLGraph / Topcased

Prepare the following documents for each experiment and develop the software using software engineering methodology.

- 1. Problem Analysis and Project Planning**-Thorough study of the problem– Identify Project scope, Objectives and Infrastructure.
- 2. Software Requirement Analysis**-Describe the individual Phases/modules of the project and Identify deliverables.
- 3. Data Modelling**- Usework products–data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
- 4. Software Development and Debugging**–implement the design by coding
- 5. Software Testing**-Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

LAB EXPERIMENTS

Academic domain

1. Course Registration System
2. Student marks analysing system

Railway domain

3. Online ticket reservation system
4. Platform assignment system for the trains in a railway station

Medicine domain

5. Expert system to prescribe the medicines for the given symptoms
6. Remote computer monitoring

Finance domain

7. ATM system
8. Stock maintenance

Human Resource management

9. Quiz System

10. E-mail Client system

REFERENCE BOOK:

1.LAB MANUAL

CORE BASED ELECTIVE PAPER I	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	THEORY OF COMPUTATION	Exam Hrs.	6
		P8CSEP11	

OBJECTIVES:

To provide a study about Finite Automata and Non-Finite Automata, To understand regular expressions, context free grammars and languages and Realize some simple mathematical functions as turing machines

UNIT I : AUTOMATA

9 Hours

Introduction to formal proof – Additional forms of proof–Inductive proofs–Finite Automata(FA) –Deterministic Finite Automata(DFA) – Non-deterministic Finite Automata(NFA)–Finite Automata with Epsilon on transitions.(Chapter: 1 Section 1.2 to 1.4, Chapter: 2 Section 2.1 to 2.3, 2.5)

UNIT II : REGULAR EXPRESSIONS AND LANGUAGES

9 Hours

Regular Expression – FA and Regular Expressions – Proving languages not to be regular –Closure properties of regular languages–Equivalence and minimization of Automata.(Chapter: 3 Section 3.1 to 3.2, Chapter: 4 Section 4.1 to 4.2, 4.4)

UNIT III : CONTEXT-FREE GRAMMARS AND LANGUAGE

9 Hours

Context-Free Grammar(CFG) – Parse Trees–Ambiguity in grammars and languages– Definition of the Push down automata–Languages of a Pushdown Automata– Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.(Chapter: 5 Section 5.1 to 5.2, 5.4, Chapter: 6 Section 6.1 to 6.4)

UNIT IV : PROPERTIES OF CONTEXT-FREE LANGUAGES **9 Hours**

Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM. (Chapter: 7 Section 7.1 to 7.3, Chapter: 8 Section 8.2 to 8.3)

UNIT V : UNDECIDABILITY **9 Hours**

A language that is not Recursively Enumerable (RE) – A non-decidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP. (Chapter: 9 Section: 9.1 to 9.4, Chapter: 10 Section 10.1)

TEXT / REFERENCE BOOKS

Total Hours: 45

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.
2. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education, 2007.
3. Raymond Greenlaw, H. James Hoover, "Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.
4. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.
5. Michael Sipser, "Introduction of the Theory and Computation", Thomson Brooks/Cole, 1997.
6. J. Martin, "Introduction to Languages and the Theory of computation" Third Edition, Tata Mc Graw Hill, 2007

CORE BASED ELECTIVE PAPER I	SEMESTER I	Credit	4
		Hrs./Week	6
COURSE TITLE	PRINCIPLES OF PROGRAMMING LANGUAGE	Exam Hrs.	6
		P8CSEP12	

OBJECTIVES:

To build a solid foundation of the most important fundamental subject in computer science. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

UNIT I: INTRODUCTION

The role of programming languages, Language Description: Syntactic Structure

UNIT II: IMPERATIVE PROGRAMMING

Statements-Structured Programming, Types: Data Representation-Procedure Activations

UNIT III: OBJECT ORIENTED PROGRAMMING

Groupings of data and operations, Object oriented Programming

UNIT IV: FUNCTIONAL PROGRAMMING

Elements of Functional programming-Functional programming in a typed language, Functional programming with Lists

UNIT V: OTHER PARADIGMS

Logic programming-An introduction to concurrent programming: Language Descriptions-Semantic Methods, static types and the Lamda Calculus

TEXT BOOK

1. Ravi Sethi, “ Programming Languages: Concepts and Constructs”, 2nd Edition, Pearson Education , 2006.

REFERENCES

1. Terrence W. Pratt and Marvin V. Zelkowitz, “Programming Language Design and Implementation”, 4th Edition, Prentice Hall of India, 2005.
2. Peter Van Roy and Seif Haridi, “Concepts, Techniques and Models of Computer Programming, Prentice Hall of India, 2004.

CORE PAPER V	SEMESTER II	Credit	5
		Hrs./Week	5
COURSE TITLE	DESIGN AND ANALYSIS OF ALGORITHMS	Exam Hrs.	3
		P8CS2001	

OBJECTIVES:

To build a solid foundation of the most important fundamental subject in computer science. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

UNIT I :DIVIDE AND CONQUER METHOD

8 Hours

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Heap sort, Strassen's matrix multiplication(Chapter 3: Section 3.1,3.2,3.4,3.5,3.7)

UNIT II :GREEDY METHOD

10 Hours

Greedy method: Single source shortest path problem-Knapsack problem-Flow shop scheduling- Minimum spanning trees-. Search techniques-Code optimization, Depth first search, breadth first search. (Chapter 4: Section 4.1,4.2,4.5,4.8, Chapter 5: Section 5.10, Chapter 6: Section 6.1,6.2)

UNIT III : DYNAMIC PROGRAMMING

10 Hours

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, All pairs shortest path problem-0/1 knapsack problem-Travelling sales person problem.(Chapter 5: Section 5.1,5.3,5.5,5.7,5.9)

UNIT IV : BACKTRACKING

10 Hours

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. Branch and Bound: General method, applications - Travelling sales person problem.(Chapter 7: Section 7.1 to 7.5, Chapter 8: Section 8.1,8.3)

UNIT V : NP-COMPLETENESS

10 Hours

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.(Chapter 11: Section 11.1, 11.2)

TEXT / REFERENCEBOOKS :**TotalHours:48**

- 1.Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam,Galgotia publications pvt. Ltd.
- 2.Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia,John wiley and sons.
3. Introduction to Algorithms, secondedition,T.H.Cormen,C.E.Leiserson, R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education.

CORE PAPER VI	SEMESTER II	Credit	5
		Hrs./Week	6
COURSE TITLE	MOBILE COMPUTING	Exam Hrs.	3
		P8CS2002	

OBJECTIVES :

To understand the concept of mobile communication and various issues related with mobile networks and WCDMA technology

UNIT - I

Intoduction: Advantages of Digital Information - Intoduction to Telephone Systems – Mobile communication: Need for Mobile Communication - Requirements of Mobile Communication - History of Mobile Communication.(Chapter 1:1.1,Chapter 2,Chapter 3:3.1 to 3.3)

UNIT - II

Intoduction to Cellular Mobile Communication - Mobile Communication Standards - Mobility Management - Frequency Management - Cordless Mobile Communication Systems.(Chapter 4 to 8)

UNIT - III

Mobile Computing: History of data networks - Classification of Mobile data networks – CDPD System - Satellites in Mobile Communication: Satellite classification - Global Satellite Communication - Changeover from one satellite to other - Global Mobile Communication - Interferences in Cellular Mobile Communication.(Chapter 9:9.1 to 9.3,Chapter 10:10.1 to 10.3,Chapter 11,12)

UNIT - IV

Important Parameters of Mobile Communication System - Mobile Internet: Working of Mobile IP - Wireless Network Security - Wireless Local Loop Architecture: Components in WLL - Problems in WLL - Modern Wireless Local Loop - Local Multipoint Distribution Service - Wireless Application protocol.(Chapter13,14:14.1,Chapter 15,16:16.1 to 16.4,Chapter 17)

UNIT - V

WCDMA Technology and Fibre Optic Microcellular Mobile Communication - Ad hoc Network and Bluetooth technology - Intelligent Mobile Communication system - Fourth Generation Mobile Communication systems.(Chapter 18 to 21)

TEXT BOOK:

1. T'G. Palanivelu, R. Nakkeeran, Wireless and Mobile Communication, PHI Learning Private Limited.2009

CORE PRACTICAL PAPER VII	SEMESTER II	Credit	4
		Hrs./Week	6
COURSE TITLE	PRACTICAL III:OPEN SOURCE PROGRAMMING LAB	Exam Hrs.	3
		P8CSPR21	

1. Develop a PHP program using controls and functions
2. Develop a PHP program and check message passing mechanism between pages.
3. Develop a PHP program using String function and Arrays.
4. Develop a PHP program to display student information using MYSQL table.
5. Develop a college application form using MYSQL table.
6. Develop a PHP program using parsing functions (use Tokenizing)
7. Develop a PHP program and check Regular Expression- HTML functions- Hashing functions.
8. Develop a PHP program and check File System functions- Network functions- Date and time functions.
9. Develop a PHP program using session.
10. Develop a PHP program using cookie and session.

REFERENCE BOOK:

- 1.LAB MANUAL

CORE PRACTICAL PAPER VIII	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	PRACTICAL IV:MOBILE APPLICATION DEVELOPMENT LAB	Exam Hrs.	6
		P8CSPR22	

- 1.EditText-Button-OnClickListener-Counter
- 2.Edittext-RadioGroup-OncheckChangeListener-Discount Calculator
- 3.Background-SetColor-RadioButton-Coloring
- 4.Intent-MediaPlayer-Thread-Splash Screen with sound
- 5.SeekBar-OnSeekbarchangeListener-Coloring Layout
- 6.TabWidget-onInitListener-Talking Clock
- 7.ListView-onItemClick/onItemLongclick/AlertDialog
- 8.GridView-ImageView-BaseAdapter-SetLayout
- 9.Reading/Writing file in SDCard
- 10.Menu Inflate

REFERENCE BOOK:

1. LAB MANUAL

CORE BASED ELECTIVE PAPER II	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	FUZZY LOGIC AND NEURAL NETWORKS	Exam Hrs.	6
		P8CSEP21	

OBJECTIVES:

This course provides the details and structure of biological and artificial neuron and the applications of artificial neural networks- including the fuzzy systems and fuzzy logic controls.

UNIT-I: ARCHITECTURES

10 Hours

Introduction – Biological neuron – Artificial neuron – Neuron modeling – Learning rules – Single layer – Multi layer feed forward network – Back propagation – Rule based Neural Network.(Chapter 1: 1.3,Chapter 2:2.1 to 2.4,Chapter 3:3.5,Chapter 4:4.2)

UNIT-II: NEURAL NETWORKS FOR CONTROL

10 Hours

Expert Systems Heuristics– Discrete time hop field networks –Supervised and Unsupervised Learning – Applications of artificial neural network – Self Organization Models– Fuzzy Logic and Neural Network (Chapter 2:2.5,2.6,2.7 Chapter 3:3.2,Chapter 6:6.3,Chapter 7:7.2,Chapter 11:11.7,11.7.1)

UNIT-III: FUZZY SYSTEMS

8 Hours

Classical sets – Fuzzy sets – Fuzzy relations – Fuzzification – Defuzzification – Fuzzy rules.(Chapter 3:3.1 to 3.4)

UNIT-IV: FUZZY LOGIC CONTROL

10 Hours

Membership function – Knowledge base – Decision-making logic – Optimization of membership function using neural networks – Adaptive Networks – Hybrid Learning Rules (Chapter 2:2.1 to 2.4,Chapter 8:8.1 to 8.5)

UNIT-V: APPLICATION OF FLC

10 Hours

Fuzzy logic control – Inverse Learning–ANFIS Applications –Auto mobile MPG Prediction-Channel Equalization– Introduction to neuro fuzzy controller.(Chapter 17:17.1 to 17.4,Chapter 19:19.1 to 19.6)

TEXT BOOKS

Total Hours: 48

- 1.Neuro Fuzzy And Soft Computing – J.S.R. Jang, C.T. Sun,E. Mizutani – PHI Learning 2014 (Unit III to Unit V)
- 2.Neural Networks in Computer Intelligence – LiMin Fu – Tata McGraw-Hill Edition 2011 (Unit I and Unit II)

REFERENCE BOOKS

1. Laurance Fausett- Englewood cliffs- N.J.- ‘Fundamentals of Neural Networks’- Pearson Education- 1992.
2. H.J. Zimmermann- ‘Fuzzy Set Theory & its Applications’- Allied Publication Ltd.-1996.
3. Simon Haykin- ‘Neural Networks’- Pearson Education- 2003.
4. John Yen & Reza Langari- ‘Fuzzy Logic – Intelligence Control & Information’- Pearson Education- New Delhi- 2003.

CORE BASED ELECTIVE PAPER II	SEMESTER II	Credit	4
		Hrs./Week	5
COURSE TITLE	DATA MINING	Exam Hrs.	6
		P8CSEP22	

OBJECTIVES:

To expose the students to the concepts of Data warehousing Architecture and Implementation and to Understand Data mining principles and techniques

UNIT I INTRODUCTION AND DATA WAREHOUSING **15 Hours**

Introduction- Data Warehouse- Multidimensional Data Model- Data Warehouse Architecture- Implementation- Further Development- Data Warehousing to Data Mining

UNIT II DATA PREPROCESSING- LANGUAGE- ARCHITECTURES- CONCEPT DESCRIPTION

15 Hours

Why Preprocessing- Cleaning- Integration- Transformation- Reduction- Discretization- Concept Hierarchy Generation- Data Mining Primitives- Query Language- Graphical User Interfaces- Architectures- Concept Description- Data Generalization- Characterizations- Class Comparisons- Descriptive Statistical Measures.

UNIT III ASSOCIATION RULES

15 Hours

Association Rule Mining- Single-Dimensional Boolean Association Rules from Transactional Databases- Multi-Level Association Rules from Transaction Databases

UNIT IV CLASSIFICATION AND CLUSTERING

15 Hours

Classification and Prediction- Issues- Decision Tree Induction- Bayesian Classification- Association Rule Based- Other Classification Methods- Prediction- Classifier Accuracy- Cluster Analysis- Types of data- Categorisation of methods- Partitioning methods- Outlier Analysis.

UNIT V RECENT TRENDS

15 Hours

Multidimensional Analysis and Descriptive Mining of Complex Data Objects- Spatial Databases- Multimedia Databases- Time Series and Sequence Data- Text Databases- World Wide Web- Applications and Trends in Data Mining

Total : 75 Hours

REFERENCES

1. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India / Morgan Kauffman, 2001.
2. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
3. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
4. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
5. W.H.Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
6. Alex Bezon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", McGraw- Hill Edition, 2001.
7. Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication,2003.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8HI01	

Objectives:

- 1.To introduce the scholars to the latest trends of research methodology*
- 2. To promote a spirit of inquiry among the scholars*
- 3. To inform the scholars about various sources and methods of Data Collection*
- 4. To train the scholars to analyse and document the data*

Unit - I: Trends In Methodology: Scientific Method as applied in History-
Heuristics Hermeneutics – Quantitative and Qualitative Methods – Textual
Analysis – Oral Traditions Semiotics and Studies of Symbols – Inter –
Disciplinary Approaches

Research Ethics

Ethics and Research Aims - Moral Justifications of Research -
Responsibilities of Researchers - Areas of research which raise ethical issues -
Ethical issues in the use of information and communication technology - Code of
Ethics

Unit - II: Research Process: Problems in Existing Research – Selection of
Topic – Feasibility – Methods of authentication – Research Plan and Working
Hypothesis

Unit - III: Data Collection: Sources – Repositories of Sources – Libraries
and Archives – Digital Information – Possibilities of field Research – Data
Arrangement – Manual Card system – Word Processor – Files and Folders

Unit - IV: Data Analysis: Source Analysis – Content Analysis-
Objectivity and Bias reasoning – Fallacies- Generalizations and Explanations –
Ordering of the Data – Conceptual Linkages – Method of Explanation -
Verification of Hypothesis – Formulation of the final argument

Unit - V: Documentation: Chapterisation – Logical Arrangement of
chapters – Citations – Acknowledgement of sources – References and functions
of Bibliography – Use of Tables, Charts and Maps –Analytical Writing –
Language – Need for consistency and terminological clarity – Glossary and Index

Books for Study:

1. Kate Turabian: A manual for the writers of term papers, theses and dissertations
2. William Good and Paul Hatt : The methods of Social Research
3. March Bloch: The Historians Craft.

Books for Reference:

1. Roderick Floud, An Introduction to Quantitative Methods for Historians, London, 1993
2. Paul Oliver, The Students guide to research ethics, McGraw Hill Open University Press, Second Edition, 2010
3. Malcolm Williams, Science and Social Science: An Introduction, London, New York and Routledge, 2000
4. M.L.A. Hand Book for Researchers Thesis & Assignment Writing Wiley Eastern, New Delhi, 1990.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	HISTORIOGRAPHY	Exam Hrs.	3
		MPH8HI02	

Objectives:

5. *To introduce the scholars the nature and scope of History*
6. *To relate the connectivity between History and other disciplines*
7. *To study the use and abuse of History*
8. *To study the various trends of Historiography*

Unit - I: Introduction: Definition, Nature, Scope, Functions

Unit - II: History and Allied Disciplines: Economics, Sociology, Geography, Literature and Auxillary Sciences

Unit - III: Value and Subject matter of History: Use and abuse of History, History Art or Science

Unit - IV: Early Trends: Greco-Roman- Ancient Indian-Medieval, Church and Arab- Enlightenment

Unit - V:Modern Trends:Romanticist – Scientific theory-Materialist theory – Structuralism – Poststructuralism-post modernism

Books for Study:

1. E.H. Carr: What is History
2. R.G. Collingwood: The Idea of History
3. B.Sheikh Ali: History its theory and Method

Books for Reference:

1. Harvey kay, The British Marxist Historians (Polity)
2. Stein, Burton, History of India
3. Champakalakshmi, R. Trade,Ideology and Urbanization: South 300 B.C. to A.D 1300

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8CO01	

Objective: To infuse research flair among research scholars by developing their research aptitude.

UNIT – I: Introduction

(18 Hours)

Meaning of Research and Scope of Research Methodology – Stakeholders of Social Research – Significance of Research in Social Science – Identification of Research Problem – Formulation of Research Questions – Pilot Study – Meaning and Components of Research Design – Review of Literature (Theory only)

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT – II: Hypothesis

(18 Hours)

Hypothesis – Meaning and role – Structure – Relationship between variables – Types – Strong and Weak – Sampling Theory – Sampling Methods and Techniques – Sampling size – Sampling error (Theory only)

UNIT – III: Data Collection

(18 Hours)

Data Collection – Sources – Primary and Secondary – Data matrix – Unit of data collection – Methods and tools of data collection – Interview and questionnaires and their types – Scaling and Testing Techniques – Reliability and validity of instruments – Uses of Information Technology in data collection (Theory only)

UNIT – IV: Data Analysis

(18 Hours)

Data Analysis – Analysis of quantitative data – Descriptive statistics – Test of significance – Parametric tests and non-parametric test – Chi-square Test – ANOVA test – Interpretation – Application of SPSS for Data Analysis (Both Theory & Problems)

UNIT – V: Report Writing**(18 Hours)**

Report writing – Significance of report writing – Different steps in writing report – Layout of Research Report – Types – Technical report – Popular report – Mechanics of writing a report (Theory only)

Weightage of marks: Theory 50 marks & Problem 25 marks**Reference Books:**

1. R. Kothari, Research Methodology, Methods and Techniques, Wiley Eastern Ltd. New Delhi.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. D. Amarchand, Research Methods in Commerce, Emerald Publishers, Chennai.
4. R. L. Anderson., H. D. Berry., M. Poole, Thesis and Assignment Writing, Wiley Eastern Ltd.,New Delhi.
5. H. Bernard Russel, Social Research Methods (London: Sage)
6. S. P. Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED FINANCIAL MANAGEMENT	Exam Hrs.	3
		MPH8CO02	

Objective: To enhance the ability of research scholars in analysing and managing the financial aspects of an organisation.

UNIT – I: Introduction (15 Hours)

Financial Management – Meaning, scope, objectives and functions – Relationship between financial management and other areas of management. (Theory only)

UNIT – II: Accounting Ratios (15 Hours)

Accounting Ratios – Classification of Ratios – Profitability – Turnover – Financial – Advantages and limitations – Interpretation of results – Intra Firm Comparisons. (Both Theory and Problem)

UNIT – III: Capital Structure (15 Hours)

Capital Structure – Meaning – Theories of Capital Structure – Net Income Approach – Net Operating Income Approach – MM Approach and Traditional Approach (Both Theory and Problem)

UNIT – IV: Capital Budgeting (15 Hours)

Capital Budgeting – Meaning, Importance, Kinds of capital investment proposals – Factors affecting capital investment decisions – Capital budget appraisal methods (Both Theory and Problem)

UNIT – V: Working Capital Management (15 Hours)

Working Capital Management – Meaning, need and types of working capital – Sources of working capital – Determinants of working capital needs. (Both Theory and Problem)

Weightage of marks: Theory 50 marks & Problem 25 marks

Reference Books:

1. I.M. Pandey, Financial Management, Vikas Publishing House, New Delhi.
2. S.N. Maheswari, Fundamentals of Financial Management, Sultan Chand & Sons, New Delhi.
3. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw Hill Publishing Company, New Delhi.
4. M.Y. Khan and P.K. Jain, Financial Management, Tata McGraw Hill Publishing Company Limited. New Delhi.
5. P.V.Ratnam, Financial Management Theory, Problems and Solutions, Kitab Mahal, New Delhi.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ALGEBRA AND ANALYSIS	Exam Hrs.	3
		MPH8MS01	

- To learn Moral Justification of Research, Information & communication technology issues and code of ethics.
- To study rings, nilpotent elements, direct sum and tensor product of algebras.
- To acquire the knowledge of ideals in rings of fractions and primary decomposition.
- To understand the concept of measurability and L^p spaces.
- To learn concept of Fourier transforms in various spaces.

UNIT– I :

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

RINGS, IDEAL AND MODULES

Rings and ring homomorphisms – Ideals, Quotient rings – Zero divisors, Nilpotent elements, Units – Prime ideals and maximal ideals – Nilradical and Jacobson radical – Operations on ideals – Extension and contraction – Exercise – Modules and module homomorphisms – Submodules and quotient modules – Operations on submodules – Direct sum and product – Finitely generated modules – Exact sequences – Tensor product of modules – Restriction and extension of scalars – Exactness properties of the tensor product – Algebras – Tensor product of algebras – Exercises.

Chapter 1: (pp. 1 – 10)

Chapter 2: (pp. 17 – 31).

UNIT–II: RINGS, MODULES OF FRACTIONS AND PRIMARY DECOMPOSITION

Local properties – Extended and contracted ideals in rings of fractions – Exercise – Primary Decomposition – Exercise.

Chapter 3: (pp. 36 – 43)

Chapter 4: (pp. 50 – 55).

UNIT–III: CHAIN CONDITIONS, NOETHERIAN RINGS AND ARTIN RINGS

Chain conditions – Exercises – Primary Decomposition in Noetherian rings – Exercises –
Artin Rings – Exercises.

Chapter 6: (pp. 74 – 78)

Chapter 7: (pp. 80 – 84)

Chapter 8: (pp. 89 – 91).

UNIT– IV : ABSTRACT INTEGRATION AND L^p SPACE

The concept of measurability – simple functions – Elementary properties of
measures integration of positive functions – Integration of complex functions – The
role played by sets of measure zero – Convex functions and inequality – L^p spaces.

Chapter 1: (pp. 5 – 31)

Chapter 3: (pp. 61 – 69).

UNIT – V: FOURIER TRANSFORMS AND HOLOMORPHIC FOURIER TRANSFORMS

Formal properties – The Inversion Theorem – The Plancherel Theorem – The
Banach algebra L^1 – Introduction – Two Theorems of Paley and Wiener Quasi –
Analytic classes – The Denjoy – Carleman theorem.

Chapter 9: (pp. 178 – 193)

Chapter 19: (pp. 371 – 383).

Content and Treatment as in:

1. INTRODUCTION TO COMMUTATIVE ALGEBRA, *M.F. Atiyah and I.G. Macdonald*, (1969), Addison – Wesley.
2. Paul Oliver, The Students guide to research ethics, McGraw Hill Open University Press, Second Edition, 2010
3. REAL AND COMPLEX ANALYSIS, (Third Edition), *Walter Rudin*, (1986), McGraw Hill.

References:

1. ABSTRACT ALGEBRA, *R.S. Pierce*, Springer Verlag.
2. REAL ANALYSIS, *R.G. Bartle*, (1976), John Wiley and Sons.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	TOPOLOGY AND DIFFERENTIAL EQUATIONS	Exam Hrs.	3
		MPH8MS02	

- To understand concept in algebraic structures of topological spaces.
- To know structure of the fundamental groups of a simplicial complex.
- To acquire the knowledge the stability of the dynamical system using stability manifold theorems.

UNIT – I : FUNDAMENTAL GROUP AND COVERING SPACES

Homotopy – Fundamental group – Covering spaces.

Chapter 3: (pp. 49 – 77)

UNIT – II : SIMPLICIAL COMPLEXES

Geometry of simplicial Complexes – Bary centric subdivisions – simplicial approximation

Theorem – Fundamental Group of a simplicial complex.

Chapter 4 : (pp. 78 – 108)

UNIT – III : LINEAR SYSTEMS

Uncoupled Linear system – Diagonalization – Exponential operators – The Fundamental

Theorem for linear system – Linear system in \mathbb{R}^2 – Complex Eigen Values –

Multiple Eigen Values – Non Homogeneous Linear System.

Chapter 1 : Sections 1.1 to 1.7 and 1.10 (pp. 1 – 39, 60 – 63)

UNIT – IV : NONLINEAR SYSTEMS : LOCAL THEORY

Some preliminary concepts & definitions – The Fundamental Existence – Uniqueness

Theorem – Dependence on initial conditions and parameters – The Maximum

interval of Existence – The Flow defined by a Differential Equation.

Chapter 2 : Sections 2.1 and 2.5 (pp. 65 – 101)

UNIT – V : NONLINEAR SYSTEMS

Linearization – The Stable Manifold Theorem – Dynamical Systems and Global Existence

Theorems – Limits Sets and Attractors.

Chapter 2 : Sections 2.6 and 2.7 (pp. 101 – 118)

Chapter 3 : Sections 3.1 and 3.2 (pp. 181 – 199)

Content and Treatment as in :

1. LECTURE NOTES ON ELEMENTARY TOPOLOGY AND GEOMETRY, *I.M. Singer and J.A. Thorpe*, (1967), Springer Verlag, New York.
2. DIFFERENTIAL EQUATION AND DYNAMICAL SYSTEM, *L. Perko*, (2006), Third Edition, Springer Verlag, New York.

References:

1. INTRODUCTION TO TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), McGraw Hill.
2. COUNTER EXAMPLES IN TOPOLOGY, *L. Sten and J. Subash*, Holt, Rinehart and Winston.
3. ADVANCED DIFFERENTIAL EQUATIONS, *M.D. Raisinghania*, (2001), S. Chand & Co., New Delhi.

SEMESTER – I

Elective	PROBABILITY MODELS AND APPLICATIONS	
Theory		Hrs/Week
Paper – EC01		Credit

UNIT – I : INTRODUCTION TO PROBABILITY THEORY

Introduction – Sample space and Events – Probability defined on events – Conditional probabilities – Independents – Baye's formula.

RANDOM VARIABLES

Random variables – Discrete and Continuous Random variables – Expectation of a random variable – Limit Theorems – Stochastic Process.

UNIT – II : CONDITIONAL PROBABILITY AND CONDITIONAL EXPECTATION

Introduction – The discrete case – The Continuous case – Computing expectations by conditioning – Computing probabilities by conditioning – Some applications.

THE EXPONENTIAL DISTRIBUTION AND THE POISSON PROCESS

Introduction – The Exponential distribution – The Poisson process – Generalizations of the Poisson process.

UNIT – III : RENEWAL THEORY AND ITS APPLICATIONS

Introduction – Distribution of $N(t)$ – Limit theorems and their applications – Renewal Reward process – Regenerative process – Computing the renewal function – Application of patterns.

UNIT – IV : PARAMETRIC FAMILIES OF DISTRIBUTIONS OF DIRECT IMPORTANCE IN RELIABILITY THEORY

A notation of aging – The exponential distribution – The poisson process – The poisson distribution – Parametric families of the life distributions – with monotone failure rate.

UNIT – V : CLASS OF LIFE DISTRIBUTION BASED ON NOTATION OF AGING

Introduction – distribution with IFRA arising from shock models – Preservation of life distribution classes under reliability operations – Partial orderings of life distributions – Reliability bounds – Mean life of series and parallel systems.

Content and treatment as in:

1. INTRODUCTION OF PROBABILITY MODELS, *Sheldon M. Ross*.
2. STATISTICAL THEORY OF RELIABILITY AND LIFE TESTING MODELS, To Begin With *R.E. Barlow and F. Proshan*, (1975).

References:

1. PROBABILITY THEORY AND MATHEMATICAL STATISTICS, *M. Fisz*, (1963), John Wiley and Sons, New York.
2. STOCHASTIC PROCESSES, *Sheldon M. Ross*, (2001).

SEMESTER – I

Elective	BANACH ALGEBRA	
Theory		Hrs/Week
Paper – EC02		Credit

UNIT – I : FINITE DIMENSIONAL SPECTRAL THEORY:

Matrices – Determinants and the spectrum of an operator – The spectral theorem – A survey of the situation.

Chapter 11: (pp. 278 – 297)

UNIT – II : BANACH ALGEBRA:

The definition and some examples – Regular and singular elements – Topological divisors of zero – The spectrum – The formula for the spectral radius – The radial and semi – simplicity.

Chapter 12 : (pp. 301 – 311)

UNIT – III : BANACH ALGEBRA:

The Gelfand mapping – Application of the formula $r(x) = \lim_{n \rightarrow \infty} \|x^n\|^{1/n}$ – Involution in Banach algebras – The Gelfand–Neumark theorem.

Chapter 13 : (pp. 318 – 325)

UNIT – IV : COMMUTATIVE BANACH ALGEBRA:

Ideal in $C(X)$ and the Banach stone theorem – The Stone cech compactification (continued) – Commutative C^* – Algebra

Chapter 14 : (pp. 327 – 332)

Content and Treatment as in :

1. TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), McGraw Hill.

References:

1. FUNCTIONAL ANALYSIS, *W. Rudin*, (1973), McGraw Hill, New Delhi.

2. FUNCTIONAL ANALYSIS, *G. Baurhman and L. Narici*, (1966), Academic press, New Delhi.

SEMESTER – I

Elective	FUZZY SETS AND THEIR APPLICATIONS	
Theory		Hrs/Week
Paper – EC01		Credit

UNIT – I : FUZZY SETS

Fuzzy sets – Basic concepts – Characteristics – significance of the paradigm shift – Additional properties of – Cuts.

Chapter 1: Sections 1.3 to 1.5

Chapter 2: Sections 2.1

UNIT – II : FUZZY SETS VERSUS CRISP SETS

Representation of Fuzzy sets – Extension principle of Fuzzy sets – Operation on Fuzzy sets –Types of Operation – Fuzzy complements.

Chapter 2: Sections 2.2 to 2.3

Chapter 3: Sections 3.1 to 3.2

UNIT – III : OPERATIONS ON FUZZY SETS

Fuzzy intersection – t-norms, Fuzzy unions – t-conorms – Combinations of operations – Aggregation operations.

Chapter 3: Sections 3.3 to 3.6

UNIT – IV : FUZZY ARITHMETIC

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Lattice of Fuzzy numbers

Chapter 4: Sections 4.1 to 4.4

UNIT – V : CONSTRUCTION FUZZY SETS

An overview – Direct methods with one expert – Direct methods with multiple experts –

Indirect method with multiple experts and one expert – Construction from sample data.

Chapter 10: Sections 10.1 to 10.7

Content and Treatment as in:

FUZZY SETS AND FUZZY LOGIC: THEORY AND APPLICATIONS, *G.J. Klir, and Bo Yuan*, Prentice Hall of India Ltd, New Delhi, 2005.

References:

1. FUZZY SET THEORY AND ITS APPLICATIONS, *H.J. Zimmermann*, Allied Publishers, Chennai, 1996.
2. INTRODUCTION TO THE THEORY OF FUZZY SUBSETS, *A. Kaufman*, Academic Press, New York.
3. FUZZY SETS AND THEIR APPLICATION, *V. Novak*, Adam Hilger, Bristol, 1969.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8PY01	

Course Learning Outcomes:

- research, ethical vetting, and scientific misconduct.
- Develop awareness on ethically use, document and integrated sources for logical format of writing thesis, paper and drafting report.

The aim of the course is to provide participants with an introduction to research methods and report writing. Upon successful completion of the course you are expected to

- Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
- Develop skills on qualitative and quantitative research data analysis and presentation.
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Have basic awareness of data analysis-and hypothesis testing procedure.
- know the various funding agencies for research in India.

acquire an overview of important issues in research ethics, like responsibility for

UNIT – I: RESEARCH METHODOLOGY

Meaning of research – Objectives of research – motivation of research – Types, approaches and significance – Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT – II: RESEARCH DESIGN

Research Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and feature of good design – Different research design – Basic principles of experimental design.

UNIT – III: DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and internet – Uses of search engines – virtual libraries - common software for documentation and presentation.

UNIT – IV: DATA AND ERROR ANALYSIS

Statistical analysis of data – standard deviation – Correlation – Comparison of sets of data – Chi squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve fitting – Measurement of errors – Types and sources of errors – Determination and control errors.

UNIT – V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essential of scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report – Effective illustrations: tables and figures – Reference styles : Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research Methodology, Methods and techniques – C.R. Kothari – Wishwa Prakasam Publications, II Edition.
2. Paul Oliver, The Student's guide to research ethics, McGraw Hill Open University Press, Second Edition, 2010
3. Research: An introduction – Robert Ross – Harper and Row Publications.
4. Research Methodology – P.Saravanel – Kitlab Mahal, Sixth Edition.
5. A Hand book of Methodology of Research – Rajammal P.A.Devadass - Vidyalaya Press.
6. Statistical methods – G.W. Snedecor and W.Cochran – Oxford and IBH, New Delhi.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED PHYSICS	Exam Hrs.	3
		MPH8PY02	

ADVANCED PHYSICS

Course Learning Outcomes:

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

- explain the relativistic quantum mechanical equations, namely, Klein-Gordon equation and Dirac equation
- describe second quantization and related concepts.
- explain the formalism of relativistic quantum field theory.
- Understands the quark, the strong nuclear force, and the underlying symmetries
- Students will understand the types of problems that may be solved using Monte Carlo and Molecular Dynamics, and those where these methods are ineffective
- Students will develop insights into typical considerations needed in a computational physics project, including parameter space exploration, estimation of run time, etc
- Classify solid state matter according to their band gaps.
- Understand how electrons and holes behave in semiconductors, and explain how they conduct current.
- Explain and give simple models for Schottky and PN-junctions.
- Impart knowledge on Onsager, Debye equation and calculate dielectric relaxation time and to draw the plane diagram using Cole-Cole, Cole-Davidson plots.
- be able to outline the importance of solid-state physics in the modern society.

UNIT-I: QUANTUM MECHANICS

Second quantization of schrodinger and Klein-Gordon fields- Creation and annihilation operators – Commutation relations – Second quatization of Dirac field – Covariant and anti-commutation relations for Dirac field.

UNIT-II: NUCLEAR AND PARTICLE PHYSICS

Compound nucleus and statistical theory – Experimental evidence – Statistical assumption – Average cross section – Angular distribution – Transmission coefficients – Level density – Decay of the statistical compound nucleus – Emission of charged particles. Symmetries and conservation laws – Gell Mann Nishijima formula – CPT invariance – Quark model.

UNIT-III: NON-LINEAR AND MOLECULAR MECHANICS

Basics of nonlinearity – Linear and nonlinear oscillators – Autonomous and non- autonomous system – Dynamical system.

The energy calculations – Energy minimization – Force field paramertization – Conformation analysis – Solvation – Montecarlo methods – Molecular dynamics – Free energy calculation.

UNIT-IV: SOLID STATE PHYSICS-I

Band structure theory – Band structure for some semiconductors – Semiconductor transport theory – Basics of continuity equation – Theory of generation and recombination – Theory of PN junction – PN junction solar cells – ionic conductivity – Normal and super ionic conductors – Application of super ionic solids: Battery, Fuel cells, Electrochromic display.

UNIT-V: SOLID STATE PHYSICS-II

Basic concepts of dielectrics: Static fields- Time dependent fields- Static dielectric constant: Dipolar interaction - Dipolar molecules in gases and dilute solutions- Onsager equation-Debye equations- Dielectric relaxation and loss-Distribution of relaxation time – Complex plane diagrams-Cole-Cole, Cole-Davidson plots.

REFERENCE BOOKS:

1. Advanced Quantum Mechanics – B.S. Rajput- Pragathi Praksan
2. Physics of the Nucleus – M.A.Preston – Addison – Wesley
3. Elementary particles – D.Griffiths.
4. Nonlinear dynamics – M.Lakshmanan and S.Rajasekar – Springer International.
5. Computational Chemistry – Guy H.Grant and W.Graham Richards –Oxford University press.
6. Semiconductor Devices –S.M.Sze.
7. Electronic properties of materials – Rolf E. Hummel –Springer.
8. Super ionic solids – S.Chandra – North Holland Publishing Company Ltd.
9. Theory of Dielectric – H.Frohlich- Oxford University press.
10. Theory of electric polarization Vol.I and Vol.II – C.J.F. Botcher – Elsevier scientific publication.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8CH01	

COURSE OUTCOME :

CO1: Justifies research and identifies areas of research based on ethical issues.

CO2: Able to design the research work by selecting a suitable problem.

CO3: Learns the methods the data collection and the techniques of data presentation.

CO4: Able to carry out the error analysis and also design methods to control error.

CO5: Learns how to write a research paper and thesis.

UNIT-I: RESEARCH METHODOLOGY

Meaning of research – Objectives of research - motivation of research – Types, approaches and significance – Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT-II: RESEARCH DESIGN

Research Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT-III: DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and Internet – Uses of search engines – virtual libraries – common software for documentation and presentation.

UNIT-IV: DATA AND ERROR ANALYSIS

Statistical analysis of data – Standard deviation – Correlation – Comparison of set of data – Chi squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve Fitting – Measurement of errors – Types and sources errors – Determination and Control of errors.

UNIT-V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essential of Scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report – Effective Illustrations tables and figures – Reference styles: Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research Methodology, Methods and Techniques – C.R Kothari – Wishwa Prakasam Publications, II Edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research: An introduction – Robert Ross – Harper and Row Publications.
4. Research methodology – P. Saravanavel – Kitlab Mahal, Sixth Edition.
5. A Hand book of Methodology of Research – Rajammal P.A. Devadass Vidyalaya Press.
6. Introduction to Computers – N. Subramanian
7. Statistical methods – G.W Snedecor and W. Cochran – Oxford and IBH, New Delhi.
8. Research Methodology Methods and Statistical Techniques – Santosh Gupta.
9. Statistical Methods – S.P Gupta
10. Scientific social surveys and research – P.Young – Asia Publishers, Bombay.
11. How to write and publish a scientific paper – R.A Day – Cambridge CollegePress.
12. Thesis and Assignment writing – Anderson – Wiley Eastern Ltd.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED CHEMICAL ANALYSIS	Exam Hrs.	3
		MPH8CH02	

COURSE OUTCOME :

CO1: Gains knowledge on the principle and functioning of various instruments used in analytical chemistry.

CO2: Learns the principle of various spectroscopic techniques and apply them in the structural elucidation.

CO3: Gains knowledge on the applications of spectroscopy in chemistry.

CO4: Able to elucidate the structure of Organic and Inorganic molecules by correlating the data from various spectroscopic techniques.

CO5: Learns the application of spectroscopy in stereochemistry.

UNIT-I

Instrumental methods of analysis: Atomic absorption and emission spectroscopy chromatography including GC and HPLC and electro-analytical methods (Colorimetry, cyclic voltammetry, polarography, amperometry, and ion selective electrodes).

UNIT-II

Spectroscopy:

Principle and applications in structure elucidation:

- (i) Rotational Diatomic molecules; isotopic substitution and rotational constants.
- (ii) Vibrational: Diatomic molecules, linear tritomic molecules, specific frequencies of functional groups in polyatomic molecules.
- (iii) Electronic: Singlet and triplet states; $n \rightarrow p^*$ and $\pi \rightarrow \pi^*$ transitions; application to conjugated double bonds and conjugated carbonyls – Woodward-Fieser rules; Charge transfer spectra.
- (iv) Nuclear Magnetic Resonance (1H NMR): Basic principle; chemical shift and spin-spin interaction and coupling constant.

- (v) Mass Spectrometry: Parent peak, base peak, metastable peak, McLafferty rearrangement.

UNIT-III

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of organic molecules.

UNIT-IV

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of inorganic molecules.

UNIT-V

Symmetry elements: point groups; (ii) optical activity its origin, atomic and conformation asymmetry; (iii) Variation of optical activity with wave length. Optical rotatory dispersion and circular dichroism curves and their application, In determining the configuration and conformation of different compounds. (iv) conformational analysis.

REFERENCE BOOKS:

1. H.H. Willand, L.L Merrit and j.A.Dean, Instrumental Methods of Analysis –D. Ven. Nostround Co.
2. H.A. Stobel, Chemical Instrumentalism – Addition – Wesley Publishing Co.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8BI01	

Course outcome:

By the end of the course students will be able to:

COs	Sub Code : P8BI3001	Subject: Molecular Endocrinology
CO1	Understand the basic principles, types, methods and strategies of isolation, separation, purification and characterization of biological molecules.	
CO2	Correlate various analytical techniques in biochemistry.	
CO3	Acquire problem solving and troubleshooting skills in analytical techniques in biochemistry.	
CO4	Demonstrate methods, instrumentation and applications of chromatographic and electrophoretic methods.	
CO5	Understand the principles, methods, instrumentation and applications of spectroscopic and radio isotopic techniques.	
CO6	Apply immunological techniques for analytical purpose.	

Objectives:

The objective is to educate the students on the basic research, research design, and principle in scientific research, data collection and analysis of significance data.

UNIT - I RESEARCH METHODOLOGY

Meaning of research –Objectives of research –motivation of research- Types, approaches and significance-Methods versus methodology – Research in scientific

methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT - II RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design- Needs and features of good design – Different research design- Basic principles of experimental designs.

UNIT III – DATA COLLECTION AND DOCUMENTATION

Data collection methods- Data types- Processing and presentation of data- Techniques of ordering data-Meaning of primary and secondary data-The uses of computers in research- The library and internet-Uses of search engines-virtual libraries – common software for documentation and presentation.

UNIT IV – DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-Comparison of sets of data-Chi square analysis of data-Characteristics of Probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting- Measurement of Errors- Types and sources of errors- Determination and control of errors.

UNIT V – RESEARCH COMMUNICATION

Meaning of research report – logical format for writing thesis and paper- Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations ; Tables and figures – Reference styles; Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research methodology, Methods and techniques- C.R.Kothari-Vishwapragasam Publications, 2nd edition.
2. Paul Oliver, The Student's guide to research ethics, McGraw Hill Open University Press, Second Edition, 2010

3. Research ; An introduction – Robert Ross – Harper and Row Publications
4. Research methodology – P.Saravanel – Kitlab mahal, 6th edition.
5. A hand book of methodology of Research – Rajammal P.A.Devadas-Vidhalaya press.
6. Introduction to computers – N.Subramanian
7. Statistical methods – G.W.Snedecor and W.Cocharan- Oxford and IBH, New Delhi
8. Research methodology methods and statistical techniques –Santhosh gupta.
9. Statistical methods- S.P.Gupta
10. Scientific social survey and research – P.Young –Asia publisher, Bombay.
11. How to write and publish a scientific paper – R.A.Day, Cambridge University Press.
12. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ANALYTICAL METHODS	Exam Hrs.	3
		MPH8BI02	

Course outcome:

By the end of the course students will be able to:

COs	Sub Code : P8BI3001	Subject: Molecular Endocrinology
CO1	Understand the fundamentals of research, research problems and methodology.	
CO2	Learn the principles of scientific research and research design.	
CO3	Acquire problem solving and troubleshooting skills in analytical techniques in biochemistry.	
CO4	Understand research design and research ethics.	
CO5	Learn research data collection, statistical methods and analysis.	
CO6	Develop research writing skills and thesis writing.	

Objectives:

The objective is to educate the students on the basic principles, instrumentation and applications of the analytical tools of biochemistry

UNIT I SEPARATION & CHROMATOGRAPHIC TECHNIQUES

Centrifuge techniques, Preparative centrifugation, Density gradient, Analysis of subcellular fractions. Determination of molecular weight macromolecules, Analytical ultra centrifugation.

Absorption chromatography, Partition chromatography, Ion exchange chromatography, Exclusion chromatography, Affinity chromatography, HPLC, Application of these techniques.

UNIT II ELECTROPHORETIC & RADIO ISOTOPE TECHNIQUES

General techniques, High voltage electrophoresis, Disc electrophoresis, Iso electric, focusing, Application of these techniques.

Nature of radio activity, Detection and measurements of radioactivity, Application in biological science, Safety Aspects.

UNIT III SPECTROSCOPIC TECHNIQUES

Basic principle, Spectrophotometry, Fluorometry, Flame photometry, ESR, NMR Mass Spec & Application of these techniques.

UNIT IV MANOMETRIC & IMMUNOLOGICAL TECHNIQUES

Types of manometry, Warburgs constant volume, Oxygen electrode, Applications.

Introduction, Production of antisera and precipitation reaction, Precipitation in free solution, Precipitation in gel immuno diffusion, RIA, ELISA, Immuno fluorescence

UNIT V STATISTICAL METHODS

Basic concepts, Law of chance, probability, mean, SD, binomial expression, Hardy Weinberg laws, Test analysis of variance, co-efficient of correlation.

Text Books:

1. Practical Biochemistry by K.Wilson and J.Walker. 5th edition Cambridge Univ 2005.

2. Introductory Practical Biochemistry (Narosa,2000) by K.Shawney & Randhir Singh.
3. Practical Biochemistry by Shawney

Reference:

1. Physical Biochemistry by David Friefielder, W.H.Freeman 2nd edition (1982)
2. Introduction to Medical Laboratory Techniques by Mukherjee, Volume I,II & III
3. Introduction to instrumental analysis by Robert D.Brown, Pharma Book Syndicate(2006)

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8BT01	

PROGRAMME OUTCOMES (PO's): M.Phil. BIO-TECH.

M.Phil. scholars will acquire the following spectrum of knowledge...

PO1 - Develop the understanding of Theory and Research

PO2 - Gain experience in Experimental or Case Study design, Scientific Data Analysis, Writing and communication, Ethical Practices and Effective Collaboration.

PO3 - Communicate effectively with scientific community and with Society at large.

PO4 - Comprehend and write effective report documentation.

PO5 - Effectively disseminate technical information using written progress report, strategic report, scientific communication and operations.

PROGRAMME SPECIFIC OUTCOMES (PSO's): M.Phil. BIOTECHNOLOGY

M.Phil. Biotechnology scholars will be able to

PSO1 - Understand the current state of Biotechnology in their area of specialization.

PSO2 - Formulate a hypothesis and conduct research using appropriate tools and techniques within their focused area of Study.

PSO3 – Communicate research results in Written and Oral Format.

PSO4 - Effective Teaching and mentor of others.

PSO5 - Recognize the need for the preparation and ability to carry out an independence research in broadest context of Biotechnological relevance.

CO's	Sub Code: MPH8BT01	Subject: RESEARCH METHODOLOGY
CO1	Understand the objective and problems encountered by research in India	
CO2	To understand the responsibilities of researchers	

CO3	To study and understand the code of ethics involved in research
CO4	Design the research problems, techniques and experimental design.
CO5	Understand the technique of data collection and ordering for documentation and presentation.
CO6	Apply the research data for statistical analysis
CO7	Determine the measurement of errors and control of research data
CO8	Logical format for writing thesis research report
CO9	Draft reports based on the research data derived and effective illustration by tables and figures.

CO's	Sub Code: MPH8BT02	Subject: ADVANCED BIOTECHNOLOGY
CO1	Strategize protocols for amenable gene transfer, vectors used in gene transfer in plants.	
CO2	Develop and characterize and maintenance of cell lines and production of human animal viral vaccines.	
CO3	Demonstrate, DNA based diseases diagnosis and stem cell biology and regenerative medicines	
CO4	Develop the knowledge of production of Bioactive compounds and recombinant vaccine.	
CO5	Demonstrate the knowledge of downstream processing of enzyme production	
CO6	Describe the biosensors, biofuel, biopolymers and the application of nanotechnology	
CO7	Analyse the solutions for industrial effluents, nuclear wastes and bioremediations.	

UNIT- I RESEARCH METHODOLOGY

Meaning of research-Objectives of research-motivation of research- Types, approaches and significance-Methods versus methodology- Research in scientific methods- research process- Criteria for good research- Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT - II RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research designs- Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT- III DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types- Processing and presenting of data- Techniques of ordering data- Meaning of primary and secondary data- The uses of computers in research- The library and internet – uses of search engines – virtual libraries-common software for documentation and presentation.

UNIT - IV DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-comparison of sets of data- Chi square analysis of data-Characteristics of probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting- Measurement of Errors – Types and source of errors- Determination and control of errors.

UNIT - V RESEARCH COMMUNICATION

Meaning of research report- logical format for writing thesis and paper – Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations; Tables and figures - Reference styles; Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research methodology, Methods and techniques- C.R.Kothari - Vishwapragasam publications, 2nd edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research ; An introduction - Robert Ross – Harper and Row publications
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5. A hand book of methodology of research- Rajmmal P.A.Devadas- Vidhalaya press.
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8. Research methodology methods and statistical techniques – Santhosh gupta.
9. Statistical methods – S.P.Gupta.
10. Scientific social survey and research – P.young – Asia publisher, Bombay
11. How to write and publish a scientific paper – R.A.Day, Cambridge University press.
12. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED BIOTECHNOLOGY	Exam Hrs.	3
		MPH8BT02	

UNIT - I Plant Biotechnology

In-vitro regeneration protocols amenable for gene transfer, Vectors used in gene transfer in plants. Ti plasmids, Biolistic gun. Antisense and RNAi strategies for metabolic engineering . Transgenic crops for herbicide, pest and abiotic stress resistance. Terminator gene technology. Biosafety issues, IPR and Bioethics.

UNIT – II: Animal Biotechnology

Different cell culture techniques ; Development of cell lines; Characterization and maintenance of cell lines; cryopreservation, Cell cloning and selection; transfection and transformation of cells; Application of animal cell culture for in vitro testing of drugs; Applications of cell culture technology in production of human and animal viral vaccines. Transgenic animal models: gene knock-outs; Cre-lox systems-applications.

UNIT – III: Medical Biotechnology

Human health care, genetic disorder, gene therapy, Infectious diseases, DNA-based disease diagnosis, Stem cell biology: stem cell types-

haematopoietic and embryonic- cord blood cells- regenerative medicines. Production of Bioactive Compounds, Drug delivery, Development of recombinant vaccines, Herbal medicine.

UNIT – IV: Industrial Biotechnology

Production of enzymes & organic acids, downstream processing, Solid state fermentation, Bioprocess monitoring, modeling and control, Biocatalysis & Biotransformation, Bioconversion of biomass, Biosensors, Biofuel- bioethanol and biohydrogen, Biopolymers. Principles and applications of Nano biotechnology.

UNIT – V: Environmental Biotechnology

Global environmental issues and biotechnological solutions. Treatment of industrial effluents- solid waste management- Management of nuclear waste. Bioremediation- *in situ* and *ex situ* bioremediation. Biodegradation of xenobiotics. Biomonitoring. Biodiversity conservation.

REFERENCES:

1. Sathyanarayana. (2010). Biotechnology, India.
2. Slater, A. Scot, N. and Fowler, M. (2007) Plant Biotechnology-the genetic manipulation of plants. Oxford press,
3. Watson,J.D; Gilman, M; Witkowshi,J and M.Zoller, 1992. Recombinant DNA, 2nd edition. Scientific American Books, W.H. Freeman and Co; New york, USA
4. Glick, B.R and J.J. Pasternak. 2005. Molecular Biotechnology- Principles and application of recombinant DNA, 3rd edition. ASM press. Washington, USA
5. Environmental Biotechnology, principles and applications, Bruce Rittman, Perry Mccarty, McGraw- Hill, 2nd edition, 2000.
6. Therapeutic Immunology, K. Frank Austen, Steven J. Burakoff, Fred.S.Rosen (2nd edi.) 2001.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	6
		MPH8CS01	

COURSE OUTCOME :

CO1: Justifies research and identifies areas of research based on ethical issues.

CO2: Able to design the research work by selecting a suitable problem.

CO3: Learns the methods the data collection and the techniques of data presentation.

CO4: Able to carry out the error analysis and also design methods to control error.

CO5: Learns how to write a research paper and thesis.

UNIT-I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process-Problem Identification & Formulation – Research Question – Investigation Question –Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance.

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilities of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT-II

Research Design: Concept and Importance in Research – Features of a good research design –Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT-III

Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio. -Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size.

UNIT-IV

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

UNIT-V

Use of Encyclopedias, Research Guides, Handbook: Academic Databases for Computer Science Discipline -Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism.

REFERENCES:

1. Donald Cooper & Pamela Schindler , “Business Research Methods”, Tata McGraw Hill, 9th edition.
2. Paul Oliver, The Students guide to research ethics, McGraw Hill Open University Press, Second Edition, 2010
3. Alan Bryman & Emma Bell , “Business Research Methods”, Oxford University Press.
4. C.R. Kothari, “Research Methodology: Methods and Techniques”, New Age International Publishers.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	COMPUTER GRAPHICS AND IMAGE PROCESSING	Exam Hrs.	6
		MPH8CS02	

UNIT I

Scan conversion – lines, circles and Ellipses; Filling polygons and clipping

algorithms: Scan Converting Lines, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Scan Converting Ellipses, Filling Polygons, edge data structure, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky.

UNIT II

Visible-Surface Determination: Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting)

Illumination and Shading: Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenuation, Phong's model, Gouraud shading.

UNIT III

Image Enhancement and Image Restoration

Image Enhancement in the Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Spatial Filtering, Fuzzy sets for spatial filters – Image Enhancement in the Frequency Domain: Frequency Domain Filters – Image Restoration: Model of Image Degradation/Restoration Process, Noise Models, Linear and non linear image restoration techniques, Blind Deconvolution

UNIT IV

Multiresolution analysis and Image Compression

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Fast Wavelet Transforms, Lifting scheme. Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy

Compression-wavelet based image compression techniques –Compression standards-JPEG/MPEG, Video compression.

UNIT V

Image Segmentation and Description

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection,

Thresholding, Region Based Segmentation, Basic Morphological Algorithms, Morphological Water

Sheds - Description: Boundary Descriptors, Regional Descriptors.

REFERENCES:

1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education, 2003.
2. Farina Madita Dobrick, Jana Fischer. Lutz M. Hagen (Editors) Research Ethics in the Digital Age : Ethics for the Social Science and Humanities in Times of Mediatization and Digitization, Springer, 2018.
3. D. Hearn and M. Pauline Baker, Computer Graphics (C Version), Pearson Education, 2nd Edition, 2004.
4. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition, 1990.
5. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Pearson Education, Third Edition, 2008.
6. Anil K.Jain, “Fundamentals of Digital Image Processing”, PHI, 2006.
7. Rafael C.Gonzalez, Richard E.Woods, and Eddins, “Digital Image Processing Using MATLAB”, Tata McGraw-Hill, Second Edition, 2009.