DEPARTMENT OF ENGLISH
MAHATMA GANDHI UNIVERSITY
NALGONDA
CBCS GENERAL ENGLISH SYLLABUS STRUCTURE FOR U.G. I YEAR

Prescribed General English Text Book for I Year (Sem -I & Sem -II) for B.A /B. Sc /B.Com and all other U.G. Courses
Title: English for Enhanced Competence Published by Orient Black swan
Editors: Prof. Sumita Roy, Prof. A. Karunakar and K. Aruna Priya

SEMESTER - I

UNIT - I(SHORT FICTION)	TEXT	**The Eyes are not Here - by Ruskin Bond**
	Pronunciation	Consonant Sounds
	Grammar	Nouns
	Vocabulary	Roots
	Spelling	Pick out the words which are wrongly spelt and correct them.
	Punctuation	Capitalization
	Conversation + Role Play	Introducing yourself in a formal or social context to the strangers
	Reading Passage	Historical place: Chayasomeshwaralayam (Nalgonda)
	Writing	Guided writing/expansion
	Soft Skills	Motivation and goal setting
	Value Orientation	Well begun is half done
UNIT - II (PROSE)	Text	**"Work Brings Solace" -Wings Of Fire - A.P.J. Abdul Kalam**
	Pronunciation	Vowel :Monophthongs
	Grammar	Pronoun
	Vocabulary	Prefix and suffix
	Spelling	Use 'Un' or 'dis' to complete the antonyms
	Punctuation	Capitalization
	Conversation + Role play	Starting a conversation/controlling a conversation
	Reading Passage	An important event of Telangana

		history: Telangana Formation Day
	Writing	Sequencing
	Soft skills	Self confidence
	Value Orientation	Doubt is the beginning of wisdom
UNIT - III (POETRY)	Text	**Bangle Sellers – Sarojini Naidu**
	Pronunciation	Vowel Diphthongs
	Grammar	Helping verbs
	Vocabulary	Homophones, homonyms, homographs
	Spelling	Complete the words using 'tion' on 'sion'
	Punctuation	Comma and full stop
	Conversation + role play	Describing your college and course of study
	Reading passage	A popular Telangana festival: Bathukamma Festival
	Writing	Paragraph/descriptive writing
	Soft skills	Body language/nonverbal communication
	Value orientation	Actions speak louder than words
UNIT - IV (DRAMA)	Text	**Merchant of Venice Act IV Scene –I William Shakespeare**
	Pronunciation	Varied pronunciation of some letters of the Alphabet
	Grammar	Main verbs and tenses
	Vocabulary	Collocation
	Spelling	Complete the following spellings using 'tion' or 'ment'
	Punctuation	Question mark and exclamation mark
	Conversation + Role play	Leaving a message on the answering maechine/ making an appointment on telephone
	Reading Passage	A famous tourist attraction in Nalgonda :Nagarjunsagar, Nalgonda
	Writing	Dialogue
	Soft skills	Inter personal skills
	Value Orientation	Faith will move mountains
UNIT -V- LAB	Language and Soft Skills - LAB	Pronunciation, Conversation, Reading, Soft Skills and Values
SEMESTER - II		
UNIT - I (FICTION AND	Text	**The Open Window – H.H.Munro**

SHORT FICTION)		**(saki)**
	Pronunciation	Plosives
	Grammar	Nonfinite verbs
	Vocabulary	Simile and metaphor
	Spelling	Complete the following using ‘ei’ or ‘ie’
	Punctuation	Semi colon
	Conversation + Role play	Asking for advice/ asking for information
	Reading Passage	Yagagirigutta: famous pilgrim place in Nalgonda
	Writing	Note Taking and Note Making
	Soft skills	Time Management
	Value Orientation	Time and tide wait for no one
UNIT - II (PROSE)	Text	**The voice of Humanity – Rabindranath Tagore**
	Pronunciation	Fricatives
	Grammar	Adjectives
	Vocabulary	Oxymoron and Hyperbole
	Spelling	Complete the following with ‘able’ or ‘ible’
	Punctuation	Colon and Long dash
	Conversation + Role play	Making a request/ accepting or refusing the request
	Reading Passage	Rural Telangana: Devarakonda Fort history
	Writing	Informal letter
	Soft skills	Leadership skills
	Value Orientation	‘The pen is mightier than the sword’
UNIT - III (POETRY)	Text	**If- by Rudyard Kipling**
	Pronunciation	Affricates and Nasals
	Grammar	Articles
	Vocabulary	Portmanteau words and loan words
	Spelling	Complete the following spellings using one of the following suffixes: ‘-ic’, ‘-ive’, ‘-ity’, ‘-al’, ‘-ance’, ‘-ence’
	Punctuation	Hyphen and Long dash
	Conversation + Role play	Conducting a meeting/seeking opinion of the team members
	Reading Passage	Cultural Identity of Telangana: Telangana Ballads
	Writing	Formal letter
	Soft skills	Stress management

	Value Orientation	Practice makes one perfect
UNIT - IV (DRAMA)	Text	**Riders to the Sea by J.M. Synge**
	Pronunciation	Lateral, frictionless continuants, semi vowels
	Grammar	Adverbs
	Vocabulary	palindromes
	Spelling	Complete the spellings in the following table Noun | Verb | Adjective | Adverb
	Punctuation	Inverted commas
	Conversation + Role play	Appearing for a job interview/conducting a job interview
	Reading Passage	Handicrafts of Telangana : Pochampally
	Writing	Business letter
	Soft skills	Etiquette and Grooming
	Value Orientation	Necessarily is the Mother of invention
UNIT - V LAB	Language and Soft Skills - LAB	Pronunciation, Conversation, Reading, Soft Skills and Values

MAHATMA GANDHI UNIVERSITY
NALGONDA
CBCS GENERAL ENGLISH SYLLABUS STRUCTURE FOR U.G. II YEAR - 2017

Prescribed General English Text Book for II Year (Semester -III & Semester-IV) for B.A /B. Sc /B.Com and all other U.G. Courses

Title: English for Enhanced Competence-II Published by Orient Black Swan

Editors: Prof. A. Karunakar and K. Aruna Priya

SEMESTER III		
UNIT I (SHORT FICTION)	**Text**	**The Man Who Saved Pumpelsdrop by W.J. Turner**
	Pronunciation	plural endings and past tense endings
	Grammar	Preposition
	Vocabulary	Anagrams
	Spelling	difficult words
	Punctuation	Capitalization
	Conversation	An argument between two/three people about the right way to approach life
	Reading	**Kasoj Srikanta Chary – Telangana Martyr**
	Writing	narrative writing/narrative essay
	Soft Skills	Negotiation
	Value Education	Hope for the best, but prepare for the worst
UNIT II (PROSE)	**Text**	**On the Pleasures of No Longer Being Very Young by G.K. Chesterton**
	Pronunciation	Syllable
	Grammar	conjunction
	Vocabulary	phrasal verbs
	Spelling	irregular verbs
	Punctuation	Comma
	Conversation	Friends sharing the experience of being caught in embarrassing situations
	Reading	**Raavi Narayana Reddy - Freedom Fighter-Son of Nalgonda**
	Writing	Debate writing/ argumentative essay
	Soft Skills	Decision making
	Value Education	Better late than never
UNIT III (POETRY)	**Text**	**An Irish Airman Foresees his Death by W.B Yeats**
	Pronunciation	consonant cluster

	Grammar	active and passive voice
	Vocabulary	Idioms
	Spelling	irregular verbs past tense
	Punctuation	Full stop
	Conversation	Learning to open an account in a bank and net banking
	Reading	**Munagala Kondala Rao - "Deverakonda Gandhi"**
	Writing	Rhyming couplets
	Soft Skills	Problem solving
	Value Education	Early bird catches the worm
UNIT IV (DRAMA)	**Text**	**With the Photographer by Stephen Leacock**
	Pronunciation	word stress—prefix
	Grammar	direct and indirect speech
	Vocabulary	Eponyms
	Spelling	words commonly used in cinema, TV, media
	Punctuation	15 lines of drama/dialogue for punctuation
	Conversation	5 friends discussing their unique hobbies
	Reading	**Aarutla Kamala Devi –Women Freedom fighter**
	Writing	Personal Diary/journal writing
	Soft Skills	Team work
	Value Education	God helps those who help themselves
UNIT V (letter)	**Text**	**Letter from a Father to a Daughter by Jawaharlal Nehru**
	Pronunciation	word stress—suffix
	Grammar	change of degrees of comparison
	Vocabulary	words often confused
	Spelling	silent letter words
	Punctuation	Short fiction passage with mistakes in punctuation for correction/editing
	Conversation	How people behave when unexpected/unwelcome guests arrive
	Reading	**Uppala Malsoor – A Man of Soil**
	Writing	Expository essay
	Soft Skills	emotional intelligence
	Value Education	Actions speak louder than words

SEMESTER IV

UNIT I (SHORT FICTION)	**Text**	**How Wealth Accumulates and Men Decay by G.B. Shaw**
	Pronunciation	Contractions
	Grammar	7 types/ structures of sentences
	Vocabulary	alliteration, rhyming words
	Spelling	doubling of consonants
	Punctuation	Short prose passage with mistakes in punctuation for correction/editing
	Conversation	A group of students share the experience of visiting different places during their vacation
	Reading	**Fluorosis – A curse to Nalgonda**
	Writing	Article for a magazine/newspaper
	Soft Skills	critical thinking
	Value Education	There is no time like the present
UNIT II (PROSE)	**Text**	**Playing the English Gentleman by M.K Gandhi**
	Pronunciation	strong and weak forms
	Grammar	Simple, compound and complex sentences
	Vocabulary	subject specific vocabulary—science, technology, medicine etc
	Spelling	commonly misspelt words
	Punctuation	Short poetry passage with mistakes in punctuation for correction/editing
	Conversation	The members of the Ecological Club of the college plan how to save plants
	Reading	Bhoodanpochampally – its nomenclature history
	Writing	Process writing
	Soft Skills	Recitation/presentation skills
	Value Education	A penny saved is a penny earned (Implications in other fields too – saving natural resources)
UUNIT III (POETRY)	**Text**	**Work by D. H. Lawrence**
	Pronunciation	intonation and rhythm
	Grammar	transformation of sentences (revision)
	Vocabulary	Picture vocabulary
	Spelling	academic words
	Punctuation	Short dialogue with mistakes in punctuation for correction/editing
	Conversation	Tell each other how you felt when you lost something precious
	Reading	**Mellachervu – Place of cultural Richness**
	Writing	Script writing/editing

	Soft Skills	Social Intelligence/People skills/ interview skills
	Value Education	You can't judge a book by its cover
UNIT IV (DRAMA)	**Text**	**Before Breakfast by Eugene O Neil**
	Pronunciation	Assimilation
	Grammar	Conditionals – If clauses
	Vocabulary	Situational Vocabulary
	Spelling	Abbreviations
	Punctuation	Exclamatory
	Conversation	Sharing their best moments
	Reading	**Lateef Saheb Dargah – Unity in Diversity**
	Writing	CV writing
	Soft Skills	Interpersonal Skills
	Value Education	Good things come to those who wait
UNIT V (Travelogue)	**Text**	**India Through a Traveller's Eye by Pearl Buck**
	Pronunciation	Elision
	Grammar	Common Errors
	Vocabulary	Acronyms
	Spelling	British & American Spelling
	Punctuation	Question mark
	Conversation	Sharing on the importance of English
	Reading	**Pedhagattu Jathara – Lingamanthula jathara**
	Writing	Report Writing
	Soft Skills	Time Management
	Value Education	No man is an island

Mahatma Gandhi University, Nalgonda

C.B.C.S Pattern of B.A, B.Sc &B.Com
Syllabus and Examination Method
TELUGU (SECOND LANGUAGE)
1st Semester

ప్రాచీన పద్యభాగం.

1.శకుంతలోపాఖ్యానము

2.గొడగూచి

3.త్యాగనిరతి

ఆధునిక కవిత్వం

1.కాసులు

2.రాజు – కవి

3.గంగిరెద్దు.

4.జయభేరి

1. ఉపవాచకం

రుద్రమదేవి (నవల)

భాషా విభాగం

భాషా భాగాలు, సాధుశబ్దాల గుర్తింపు

పర్యాయపదాలు, నానార్థాలు.

పాఠ్యగ్రంథం: తెలుగుఅకాడమీ ప్రచురించిన సాహితీమంజీర. దీనిలోని రెండు పాఠాలు- (సంవరణుని తపస్సు, శ్రీరంగక్షేత్ర మహిమ) ఉస్మానియావిశ్వవిద్యాలయ పరిధిలోని డిగ్రీ ద్వితీయభాష(తెలుగు), విద్యార్థులకు తొలగించి, వాటిని మాడర్న్ లాంగ్వేజ్ (తెలుగు)విద్యార్థులకు నిర్దేశించనైంది.

Code No. 1557

FACULTIES OF ARTS, COMMERCE, SCIENCE, MANAGEMENT & SOCIAL SCIENCES

B.A./B.Com./B.Sc./B.B.A./B.S.W I-Year I – Semester (CBCS) Examination, December 2016

Subject : Telugu

Paper – I

Time : 3 Hours **Max. Marks : 80**

భాగం — ఎ (5 x 4 = 20 Marks)

సూచన: ఏవేని ఐదు ప్రశ్నలకు సమాధానాలు వ్రాయుము.

1 ఈ క్రింది పదాలకు నానార్థాలు వ్రాయండి.

1. సిరి 2. రాజు 3. నారి 4. అంబరము

2 ఈ క్రింది పదాలకు పర్యాయ పదాలు వ్రాయండి.

1. సముద్రం 2. స్త్రీ 3. బంగారం 4. దేవాలయం

3 ఈ క్రింది వాక్యాలలో సూచించిన పదాలు **ఏభాషాభాగాలో** గుర్తించండి.

1. తెల్లని కలువ పూలతో గణపతిని పూజిస్తాము.
2. ఆమె మంచి గాయని.
3. రాముడు రావణాసురుని సంహరించాడు.
4. నన్నయ మహాభారతం రచించాడు.

4 ఈ క్రింది వానిలో నాలుగింటికి **సాధురూపాలు** వ్రాయండి.

1. కర్ణుడు 2. ఘడ్గము 3. రుషి 4. బావము

5 ఓరుగల్లు కోట గురించి వ్రాయండి.

6 నన్నయ గురించి వ్రాయండి.

7 జతపరచండి.

1. శకుంతల	( )	(a) శివదేవుడు
2. జాషువా	( )	(b) శ్రీశ్రీ
3. రుద్రమదేవి	( )	(c) దుష్యంతుడు
4. కాసులు	( )	(d) గణపతి దేవుడు
5. జయభేరి	( )	(e) బంగారు కొమ్ములు
6. ఏనుగు	( )	(f) గురజాడ
7. గొడగూచి	( )	(g) రాజు – కవి
8. గంగిరెద్దు	( )	(h) గజము

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Code No. 1557

8 ఈ క్రింది పద్యానికి **భావం** వ్రాయండి.

వెలయంగ నశ్వమేధం
బులు వేయును నొక్క సత్యమును నిరుగడలం
దుల నిడి తూ ఁ పగ సత్యము
వలనన ములు సూపు గౌరవంబున పేర్మిన్

భాగం — బి (5 x 12 = 60 Marks)

సూచన: అన్ని ప్రశ్నలకు జవాబులు వ్రాయుము.

9 ఈ క్రింది వానిలో **ఒక పద్యానికి** సమగ్రవ్యాఖ్యను వ్రాయండి.

(1) నుతజల పూరితంబులగు నూతులు నూటిటి కంటె సూనృత
వ్రత యొక బావిమేలు మటి బావులు నూటిటికంటె నొక్కస
త్క్రతువది మేలు తత్క్రతు శతంబున కంటె సుతుండు మేలుత
త్సుత శతకంబు కంటె నొక సూనృత వాక్యము మేలు సూడఁగన్

లేదా

(బి) అంబర రత్నబింబ మపరాంబుధిఁ జేరగ నెండ శైల శృం
గంబుల ధాతురాగముల కైవడి ఁ గెంపు వహించె ఁ జక్రవా
తంబులు తల్లడిల్లె విహగంబులు గూండ్లకు నేగ ఁ జాచ్చె ఁ బ
ద్మంబులు వాడబాఱె ఁ గుముదంబులు సొంపున కెక్కె నిక్కుచున్

10 ఈ క్రింది వానిలో **అ–భాగం** నుండి రెండింటికి, **ఆ–భాగం** నుండి రెండింటికి సందర్భసహిత వ్యాఖ్యలు వ్రాయండి.

అ – భాగం

1. తప్పబలుక నగునె ధార్మికులకు.
2. ప్రతిమ లేడు నిలిపె, బద్యమొకటి.
3. చాలవో యివి యాలపాలు గావనియె ?
4. హృద్యంబే కడున్ శీతమే.

ఆ – భాగం

1. నా పదవి వేల్పుల రేని కెక్కడ ?
2. వసుధ మీ ఆడు బిడ్డల వంటివారు.
3. బావుటానై పైకి లేస్తాను !
4. సుకవి జీవించె ప్రజల నాలుకల యందు.

Code No. 1557

11(ఎ) గొడగూచి ముగ్ధభక్తి గూర్చి తెలపండి.

లేదా

(బి) విక్రమార్కుని త్యాగనిరతిని గూర్చి తెలపండి.

12(ఎ) "కాసులు" పాఠ్యాంశంలో గురజాడ తెలియజేసిన ప్రేమతత్వాన్ని వివరించండి.

లేదా

(బి) శ్రీ శ్రీ ప్రాగింఛిన "జయభేరి" కవితలోని విప్లవాన్ని తెలపండి.

13 (ఎ) రుద్రమ దేవిని గురించి వివరించండి.

లేదా

(బి) గోనబుద్ధారెడ్డి వీరత్వాన్ని గురించి వ్రాయండి.

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Mahatma Gandhi University, Nalgonda

C.B.C.S Pattern of B.A, B.Sc &B.Com
Syllabus and Examination Method
TELUGU (SECOND LANGUAGE)
2nd Semester

ప్రాచీన పద్యభాగం.

1.గజేంద్ర మోక్షము

2.హనుమత్సందేశము

3. సుభాషితములు

ఆధునిక కవిత్వం

1.అంతర్నాదము

2..ప్రపంచ పదులు

3..రోడ్డురోలర్

4. అల్విదా

వచన విభాగం

1.యుగాంతం

2.ఎంకన్న

3. మామిడి పండు

4.మా ఊరు పోయింది.

5. ఇదీ ఒక కళే – పేరులు దారులు గుర్తుంచుకోవడం.

భాషా విభాగం

సంధులు, సమాసాలు

Code No. 1558

FACULTY OF ARTS, COMMERCE, SCIENCE, MANAGEMENT & SOCIAL SCIENCES

B.A./B.Com./B.Sc./B.B.A./B.S.W I-Year II – Semester (CBCS) Examination,
May / June 2017

Subject : Telugu

Paper – II

Time : 3 Hours **Max. Marks : 80**

భాగం — ఎ (5 x 4 = 20 Marks)

సూచన: ఏవేని ఐదు ప్రశ్నలకు సమాధానాములు రాయండి.

1 ఈ క్రింది **నాలుగు** పదాలను విడదీసి సంధి పేర్లు రాయండి.
1. ఏకైక 2. నాగేంద్రము 3. సీతమ్మ 4. పేదరాలు

2 ఈ క్రింది **రెండు** సంధులకు లక్ష్యలక్షణ సమన్వయం చేయండి.
1. సవర్ణదీర్ఘ సంధి 2. ఆమ్రేడిత సంధి

3 ఈ క్రింది **నాలుగు** సమాసాలకు విగ్రహవాక్యాలు రాసి ఏ సమాసాలో తెల్పండి
1. దొంగ భయము 2. నీచమానవులు 3. మంజీరానది 4. సీతారాములు

4 ఈ క్రింది **రెండు** సమాసాలకు లక్ష్యలక్షణ సమన్వయం చేయండి.
1. బహువ్రీహి సమాసం 2. ద్విగు సమాసం

5 "రోడ్డు రోలర్" కవిత సమాజానికి ఇచ్చిన సందేశాన్ని వివరించండి.

6 మామిడి పండుకు ఉన్న విభిన్నమైన పేర్లను, మామిడి పండ్లలో ఉన్న వివిధ రకాలను గురించి తెలుపండి.

7 జతపరచండి.

1 పోతన	( )	(a) సినారె
2 మొల్ల	( )	(b) ఫలరాజు
3 మామిడిపండు	( )	(c) అల్విదా
4 కృష్ణశాస్త్రి	( )	(d) యుగాంతం
5 ప్రపంచపదులు	( )	(e) ఏనుగులక్ష్మణకవి
6 దిలావర్	( )	(f) రామాయణం
7 మఖ్దూమ్	( )	(g) కృష్ణపక్షం
8 సుభాషితాలు	( )	(h) గజేంద్రుడు

8 ఈ క్రింది వాక్యాల ఆధారంగా ఒక చిన్న కథను ఊహిస్తూ రాయండి.

"పాపని చదివించాలి. ఎంత కష్టమైనా ఫరవాలేదు.
నాలాగా కాకుండా నాపాపకి మంచి భవిష్యత్తు
ఉండాలి అనుకుంది లక్ష్మి"

Code No. 1558

..2..

భాగం — బి (5 x 12 = 60 Marks)

సూచన: అన్ని ప్రశ్నలకు సమాధానాలు రాయండి.

9 ఈ క్రింది వానిలో **ఒక పద్యానికి** సమగ్రవ్యాఖ్యను వ్రాయండి.

(ఎ) రాముని డాఁ గురించి నిను రావణుడెత్తుక వచ్చువేళ నీ
హేమ విభూశణావళుల నేర్పడ ఋశ్య మహాద్రివైచినన్
మేవవి తీసి దాచితిమి మీపతి యచ్చటి కేగు దేరగా ఁ
దామర సాప్తనందనుడు తానవి సూపిన జూచి మెచ్చుచున్

లేదా

(బి) ఆకాశంబున నుండి శంభుని శిరంబందుండి శీతాద్రిసు
శ్లోకంబైన హిమాద్రినుండి భువి, భూలోకంబునందుండియ
స్తోకాంబోధి ఁ బయోధి నుండి పవనాం ధోలోకముం జేరెగం
గా కూలంకష పెక్కుభంగులు వివేక భ్రష్ట సంపాతముల్

10 ఈ క్రింది వానిలో అ-భాగం నుండి రెండింటికి, ఆ-భాగం నుండి రెండింటికి సందర్భసహిత వ్యాఖ్యలు రాయండి.

అ - భాగం

1. కలడు కలండనెడు వాడు కలడో లేడో
2. వసుధా స్థలి వర్ధిలు బ్రహ్మ కల్పముల్
3. విద్య నెరుంగని వాడు మర్త్యుడే
4. గజప్రాణావనోత్సాహియై

ఆ - భాగం

1. జలధారల్ చల్లి చల్లార్చెదన్
2. జన్మించిన సంచిని మరవకూడదు
3. గీత శిల్పి వెళ్ళిపోయాడు
4. మీది నుంచే దాటి పోతుంది

11 (ఎ) హనుమత్సందేశాన్ని గురించి వివరించండి.

లేదా

(బి) సుభాషితముల ప్రయోజనాన్ని తెలపండి.

12 (ఎ) సినారె తన కవిత ద్వారా అందించిన సందేశమేమి ?

లేదా

(బి) "అల్విదా"అన్న స్మృతిగీతంలో కౌముది మఖ్దూమ్‌ను చిత్రీకరించిన విధానాన్ని వివరించండి.

13 (ఎ) సీతక్క, ఎంకన్నల మూగప్రేమను వర్ణించండి.

లేదా

(బి) "పేర్లను గుర్తుంచుకోవడం ఒక కళ" అని ఇందిరాదేవి మనుషుల పేర్లను గరించి చెప్పిన విశేషాలేవి.

Mahatma Gandhi University, Nalgonda

CBCS SEMESTER - 3 (2017-18) TELUGU SYLLABUS

B.A., /B.Com.,/ B.Sc., / B.B.A., (ద్వితీయ భాష) తెలుగు – మూడవ సెమిస్టర్

సిలబస్ (మార్గదర్శి)

ప్రాచీన పద్యభాగం

1. ధర్మరాజు వాక్ చాతుర్యం .... తిక్కన
2. విభీషణ శరణాగతి .... గోన బుద్ధారెడ్డి
3. గుణనిధి కథ .... శ్రీనాథుడు

ఆధునిక పద్యభాగం

1. రైతు ప్రశస్తి ... వానమామలై జగన్నాథాచార్యులు
2. గురు దక్షిణ ... అంబటి లక్ష్మీనరసింహ రాజు
3. గుడిసెలు కాలిపోతున్నై ... బోయి భీమన్న

వచన విభాగం (నాటకం)

చలి చీమలు నాటకం ... పి.వి. రమణ

అలంకారాలు

శబ్దాలంకారాలు : వృత్త్యనుప్రాస, ఛేకానుప్రాస, లాటానుప్రాస, అంత్యానుప్రాస,
యమకం, ముక్తపదగ్రస్తాలంకారాలు.

అర్థాలంకారాలు : ఉపమ, ఉత్ప్రేక్ష, రూపక, స్వభావోక్తి, ఉల్లేఖ, అర్థాంతరన్యాస, శ్లేష, దృష్టాంతాలంకారాలు.

Translation

Mahatma Gandhi University, Nalgonda

CBCS SEMESTER - 4 (2017-18) TELUGU SYLLABUS

B.A., /B.Com.,/ B.Sc., / B.B.A., (ద్వితీయ భాష) తెలుగు – నాల్గవ సెమిస్టర్

సిలబస్ (మార్గదర్శి)

ప్రాచీన పద్యభాగం

1. నారద గాన మాత్సర్యం .... పింగళి సూరన
2. వాగ్దాన భంగం .... ఆసూరి మరింగంటి వేంకట నరసింహాచార్యులు
3. నారసింహ శతకం ... ధర్మపురి శేషప్ప

ఆధునిక పద్యభాగం

1. నరుడా నేను నరుడా నేను .... కాళోజీ
2. ఆర్తగీతం ... తిలక్
3. దేవరకొండ దుర్గం ... డా॥ ముకురాల రామారెడ్డి

వచన విభాగం

1. అర్ధరాత్రి అరుణోదయం ... దాశరథి
2. సి.పి.బ్రౌన్ సాహిత్య సేవ ... జానుమద్ది హనుమచ్ఛాస్త్రి
3. మన గ్రామనామాలు ... డా॥ కపిలవాయి లింగమూర్తి
4. నివురు తొలగిన నిప్పు ... పోల్కంపల్లి శాంతాదేవి
5. కొండ మల్లెలు ... ఇల్లిందల సరస్వతీ దేవి

ఛందస్సు

పాఠ్య గ్రంథము లోనివి.

సామాజిక వ్యాసం.

Mahatma Gandhi University, Nalgonda

CBCS SEMESTER - 3 (2017-18) TELUGU QUESTION PAPER

B.A., /B.Com.,/ B.Sc., / B.B.A., (ద్వితీయ భాష) తెలుగు – మూడవ సెమిస్టర్

అ – భాగం

ఏవేని ఐదు ప్రశ్నలకు సమాధానం రాయాలి. (5 × 4 = 20)

1. వలవ దధిక దీర్ఘ వైర వృత్తి ..... సందర్భ సహిత వ్యాఖ్య రాయండి.
2. మరియాదలిట్టివి మా కులంబు నకు .... సందర్భ సహిత వ్యాఖ్య రాయండి.
3. లేచి ఎదురు తిరిగెనేని ఎదురు లేదు .... సందర్భ సహిత వ్యాఖ్య రాయండి.
4. ఇది మనధర్మంలోని రహస్యం .... సందర్భ సహిత వ్యాఖ్య రాయండి.
5. అంత్యానుప్రాసాలంకారాన్ని ఉదాహరణతో వివరించండి.
6. తాతాచారి పాత్ర చిత్రణ
7. విభీషణుని గూర్చి రాయండి
8. ఈ క్రింది వాక్యాలను తెలుగులోనికి అనువదించండి.

To Terry Fox, the one-legged runner whose life was the antithesis of self-aggrand-izement, the thought he would be the first Canadian depicted on a circulating coin would be considered loony, Fox asked every Canadian for a dollar toward cancer research whern he dipped his prosthesis into the frigid of St.John's harbour on April 12, 1980 and began his cross Canada marathon.

ఆ – భాగం

ఈ క్రింది ప్రశ్నలకు సమాధానాలు రాయండి. (5 × 12 = 60)

9. ఈ క్రింది పద్యంలో ఒకదానికి సమగ్ర వ్యాఖ్యను రాయండి.

అ) కావున శాంతిబొందుటయు కర్జము, దా నది యట్టులుండె; శ్రీ
గావలె నంచు, బొంతము గామియు గోరెద; మెల్ల సొమ్ములుం
బోవుటయుం గులక్షయము పుట్టుటయున్ వెలిగాగ నొందుమై
నే విధి నైన జక్కబడు టెంతయు నొప్ప జుమీ జనార్దనా!

ఆ) విడువక నీవు పట్టణము వీధుల వీధుల వెట్టివాడ వై
చెడుగుల గూడి ధైర్యములు సేయ మహీ రమణుండెఱింగెనే
విడుచును సోమయాజి మును వృత్తులు చేకొను నెల్లభంగులన్
జెడుదుము నీకతంబు నను జీరయు గూడును లేక పుత్రకా

10. అర్జునుడు గురుదక్షిణ చెల్లించిన విధము వివరించండి.

లేదా

రైతు ప్రశస్తి పాఠ్యాంశ సారాంశాన్ని వివరించండి.

11. చలిచీమలు నాటక నామౌచిత్యాన్ని వివరించండి.

లేదా

చలిచీమలు నాటకంలో విశాలాక్షి పాత్రను విశ్లేషించండి.

12. చలిచీమలు నాటక కాలం నాటి సాంఘిక పరిస్థితులను తెలపండి.

లేదా

చలిచీమలు నాటకంలో సురేశ్ పాత్ర గుణగణాలను వివరించండి.

13. స్వభావోక్తి, రూపక, ఉత్ప్రేక్ష అలంకారాల లక్ష్య లక్షణ సమన్వయం చేయండి.

లేదా

ఈ క్రింది పద్య పాదాలలోని అలంకారాలను, లక్షణాలను వివరించండి.

అ) పగయు గలిగె నేని బామున్న యింటిలో నున్న యట్ల గాక యూరడిల్లి

ఆ) పరమాత్ముడవు నీవ పరమంబు నీవ పరమ విద్యయు నీవ పరికింప నెందు

ఇ) వదల లేదు మాధవ మాధవ స్మృతులను

Mahatma Gandhi University, Nalgonda

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B.A., /B.Com.,/ B.Sc., / B.B.A., (ద్వితీయ భాష) తెలుగు – నాల్గవ సెమిస్టర్

అ – భాగం

ఏవేని ఐదు ప్రశ్నలకు సమాధానం రాయాలి. (5 × 4 = 20)

1. ఉత్తముల మహిమ నీరుకొలది తామర సుమ్మీ ..... సందర్భ సహిత వ్యాఖ్య రాయండి.
2. తెగు నా పాండవుల తోడ నిక బాంధవమున్ .... సందర్భ సహిత వ్యాఖ్య రాయండి.
3. చావు రాక మున్నే పిరికి; చావు చావలేను నేను .... సందర్భ సహిత వ్యాఖ్య రాయండి.
4. విధి ఇన్ని కత్తులను దూసినదేమీ? .... సందర్భ సహిత వ్యాఖ్య రాయండి.
5. ఆటవెలది పద్యాన్ని ఉదాహరణతో వివరించండి.
6. ధర్మపురి శేషప్ప కవి గురించి వివరించండి.
7. కొండమల్లెలు కథానిక నుండి పోచాలు పాత్రను పరిచయం చేయండి.
8. స్వచ్ఛభారత్‌పై మీ అభిప్రాయాన్ని ఒక కవిత ద్వారా తెలపండి.

ఆ – భాగం

ఈ క్రింది ప్రశ్నలకు సమాధానాలు రాయండి. (5 × 12 = 60)

9. ఈ క్రింది పద్యంలో ఒకదానికి సమగ్ర వ్యాఖ్యను రాయండి.

   అ) వారిద పంక్తిలో వెడలివచ్చు మెఱుంగుల పిండి నా, సఖీ
   వారముతో రమారమణి వచ్చెను; హెగ్గెడి కత్తెలెందఱే
   గోరి భజింప, నా కొలువు కూటము ముందఱి వంక నొప్పు సం
   గారపు దోటనుండి యధికంబగు వైభవ మింప మీఱగన్.

   ఆ) కనుగవ కెంపు బార మది కళ్వళ మంతకు బెంపుదేర, హె
   చ్చిన తమి మీర జెక్కుగవ చెమ్మట జార ప్రలంబ వైరి పై
   తన కసిదీర పట్టువిడి తాలిమి దూర సరోష భీషణా
   నన మలరార, నా కమలనాభుని చెంతకు జేరి యిట్లనెన్.

10. దేవరకొండ దుర్గ వైభవాన్ని వివరించండి.

    లేదా

    తిలక్ ఆర్తగీతం ద్వారా వెలిబుచ్చిన అభిప్రాయాన్ని తెలపండి.

11. సి.పి.బ్రౌన్ సాహిత్య సేవను వివరించండి.

    లేదా

    1947 ఆగస్టు 15 కాలం నాటి హైదరాబాద్ పరిస్థితులను తెలపండి.

12. గ్రామానామాల అధ్యయనం వల్ల కలిగే ప్రయోజనాలను తెలపండి.

    లేదా

    నివురు తొలగిన నిప్పు కథానికలో రమణ పాత్ర గురించి రచయిత్రి భావాలు వివరించండి.

13. చంపకమాల, మత్తేభము, ద్విపద ఛందస్సుల లక్షణాలను ఉదాహరణతో వివరించండి.

    లేదా

ఈ క్రింది పద్య పాదాలలోని ఛందస్సును గుర్తించి లక్షణాలను రాయండి.

అ) ఏనును దుంబురుం డెచటి కేగె? గృహంబున నున్నవాడె? యం
ఆ) వైకుంఠంబున నొక్కనాడతులితైశ్వర్యుండు విష్ణుండు నా
ఇ) భరత ఖండంబు చక్కని పాడియావు.

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com FIRST YEAR -2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – I)

SEMESTER : I

PAPER – I

URDU PROSE & POETRY

UNIT: I

GHAZALS: Selected two Ghazals of every poet like Quli Qutub Shah – Wali Deccani – Siraj Aurangabadi – Meer Taqi Meer.

1.	QULI QUTUB SHAH	1.	Suno Aaqilan Sab Ke Dunai Hai Fani.
		2.	Meri Sanwli manki piyari dise.
2.	WALI DECCANI	1.	Pi ke hote Na Kar Too Mah Ki Sana.
		2.	Sajan ke bad Aalam mein Dagar nain.
3.	SIRAJ AURANGABADI	1.	Mujhku Ek dam kharar Nain Hargis.
		2.	Jo Tere gham ki Tamanna Na Kiya.
4.	MEER TAQI MEER	1.	Koei Nahin Jahan Mein Jo Andhogeen nahin.
		2.	Hum se tuk Aage Zaman-e-mein Huwa Kya Kya Kuch.

UNIT: II

POETRY:

1.	TAWHEED	By	Nazeer Akbarabadi.
2.	MUSTAQBIL	By	Akber Allahabadi.
3.	FUNOON – E – LATIFA	By	Allama Iqbal.
4.	BAARISH	By	Zafar Ali khan.

UNIT: III

HIKAYAAT : By Mazhar Ali Vila – Chand Muntaqab Hikayat.

UNIT: IV

DRAMA: By Imtiaz Ali Taaj & Begum Qudsia Zaida– Talash.

UNIT: V

SAFARNAMA: By Saleha Abed Hussain – Hindustan Jannat Nishan.

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in August 2008 by Urdu Academy – Hyderabad).

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com FIRST YEAR - 2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – I)

SEMESTER : II
PAPER – II

URDU PROSE & POETRY

UNIT : I

GHAZALS: Selected two Ghazals of every poet Hyder Ali Aatish – Mirza Ghalib – Khaja Altaf Hussain Hali – Maqboom Mohiuddin.

1.	HYDER ALI AATISH	1. Soon To Sahi Jahan Mein Hai Tera Fasana Kya. 2. Khusha wa dil ke ho jis dil mein Aarzoo Teri.
2.	MIRZA GHALIB	1. Koyi Din Gar Zindagani Aur hai. 2. Koi ko deke dil koi Nawasaje Fughan Kyun Ho.
3.	KHAJA ALTAF HUSSAIN HALI	1. Mujhe-wo Taab-e Zabt-e-shikayat kahan Hai. 2. Dekhna Her Tarafna Majlis main.
4.	MAQDOOM MOHIUDDIN	1. Aap ki Yaad Aati Rahi Raat bhar 2. Zindagi Moutiyoun ki Dhalakti ladi.

UNIT : II

POETRY:

1.	PREET KA GEET	By Hafeez Jalandhari
2.	AAY SHAREEF INSAANAU	By Sahir Ludhyanavi
3.	AB KE BARAS	By Shaaz Tamkanat

UNIT : III

SWANEH : By Khaja Altaf Hussain Hali– Mirza Ghalib ke Aqlaq – o – Adab.

UNIT : IV

INSHAIYA : By Mushtaq Ahmed Yousufi – Padhye Gar Beemar.

UNIT : V

AFSANA: By Qurratul ain Hyder – Yeh Ghazi Yeh Tere Purasrar Bande.
KHAKA : By Mujtaba Hussain – Sulaiman Areeb.

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in August 2008 by Urdu Academy – Hyderabad).

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com SECOND YEAR – 2016-2017
URDU SECOND LANGUAGE

"MUTALA – E – ADAB" (PART – II)

SEMESTER : III

PAPER – III

URDU POETRY & PROSE

UNIT :I

MASNAVI : - Amn Nama by Jaan Nisar Akhtar.

UNIT :II

QASIDA : - Dar Shaan – e – Hameedud Dawla by Zauq Dehelvi .

UNIT :III

DAASTAN : - Intequab – e – Sabras by Mulla Wajhi (Selected from "Sabras").

UNIT :IV

NOVEL : - Nasooh ki Saleem Se Guftagoo by Deputy Nazeer Ahmed (Selected from "Taubatun Nasooh").

UNIT :V

INSHAIYA : - Zauqu – e – chai Noshi – By Maulana Azad (Selected form "Ghubar – e – Khatir").

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in 2009 by Urdu Academy – Hyderabad).

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com SECOND YEAR – 2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – II)

SEMESTER : IV

PAPER – IV

URDU POETRY & PROSE

UNIT : I

MARISA - Garmi Ka Saman by Meer Anees.

UNIT : II

1. RUBAIYAT -
   1. Anees – Pursan Kue Kab Jawhar – e – Zati Ka hai.
      Anees – Duniya bhi Ajab Saray – e – Fani Dekhi.
   2. Hali – Duniya – e – Duniyako Naqshe Fani Samjho.
      Hali – Yaro Nahin Waqt Aaram ka Yeh.
   3. Rawaan – Iflas accha Na Fikr – e – Daulat acchi.
      Rawan – Aazad Zameer Huwa Fakhiri Yeh Hai.
   4. Amjad – Koshish hai apni Tamam Sataesh ke liye.
      Amjad – Kam Zarf Agar daulat – o – Zar Pata hai.
2. QATAAT -
   1. Akbar Allahabadi – Chod literature ko apni history ko bhool Ja.
   2. Allama Iqbal - Andaz – e – Bayan Gar che bahot shookh Nahin hai.

UNIT : III

1. KHUTOOT - Two Letters by Safia Akhtar (Selected from "Zere – Lab").
2. MAZMOON - Qadeem Urdu Mein Natural Shaeri – By Naseeruddin Hashmi. (Selected from "Qadeem Deccani ke Chand Tah queeqi mazameen").

UNIT : IV

SATIRE - Murda Badast Zinda – By Mirza Farhatulla Baig (Selected from Mazameen –e – Farath part II).

UNIT : V

REPORTAZ - Kulhind Conference By Izhar Asar.

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in 2009 by Urdu Academy – Hyderabad).

Scheme for Choice Based Credit System in BA (Template) (2016-17)

First Year – Semester I				
Code	Course Title	Course Type	HPW	Credits
BA101	Environmental Studies	AECC-1	2	2
BA102	English	CC-1A	5	5
BA103	Second Language	CC-2A	5	5
BA104		DSC-1A	5	5
BA105		DSC-2A	5	5
BA106		DSC-3A	5	5
Total			27	27
First Year – Semester II				
BA201	Gender Sensitization	AECC-2	2	2
BA202	English	CC-1B	5	5
BA203	Second Language	CC-2B	5	5
BA204		DSC-1B	5	5
BA205		DSC-2B	5	5
BA206		DSC-3B	5	5
Total			27	27
Second Year – Semester III				
BA301		SEC-1	2	2
BA302	English	CC-1C	5	5
BA303	Second Language	CC-2C	5	5
BA304		DSC-1C	5	5
BA305		DSC-2C	5	5
BA306		DSC-3C	5	5
Total			27	27
Second Year – Semester IV				
BA401		SEC-2	2	2
BA402	English	CC-1D	5	5
BA403	Second Language	CC-2D	5	5
BA404		DSC-1D	5	5
BA405		DSC-2D	5	5
BA406		DSC-3D	5	5
Total			27	27

Third Year – Semester V				
BA501		SEC-3	2	2
BA502		GE -1	2	2
BA503		DSC-1E	4	4
BA504		DSC-2E	4	4
BA505		DSC-3E	4	4
BA506		DSE-1E	4	4
BA507		DSE-2E	4	4
BA508		DSE-3E	4	4
Total			28	28
Third Year – Semester VI				
BA601		SEC-4	2	2
BA602		GE -2	2	2
BA603		DSC-1F	4	4
BA604		DSC-2F	4	4
BA605		DSC-3F	4	4
BA606		DSE-1F	4	4
BA607		DSE-2F	4	4
BA608		DSE-3F	4	4
Total			28	28
Credits for the entire Course				164

Scheme for Choice Based Credit System in BSc (Template) (2016-17)

First Year – Semester I				
Code	Course Title	Course Type	HPW	Credits
BS101	Environmental Studies	AECC-1	2	2
BS102	English	CC-1A	5	5
BS103	Second Language	CC-2A	5	5
BS104	Option - I	DSC-1A	4+2P = 6	5
BS105	Option – II	DSC-2A	4+2P = 6	5
BS106	Option – III	DSC-3A	4+2P = 6	5
Total			30	27
First Year – Semester II				
BS201	Gender Sensitization	AECC-2	2	2
BS202	English	CC-1B	5	5
BS203	Second Language	CC-2B	5	5
BS204	Option - I	DSC-1B	4+2P = 6	5
BS205	Option – II	DSC-2B	4+2P = 6	5
BS206	Option – III	DSC-3B	4+2P = 6	5
Total			30	27
Second Year – Semester III				
BS301		SEC-1	2	2
BS302	English	CC-1C	5	5
BS303	Second Language	CC-2C	5	5
BS304	Option - I	DSC-1C	4+2P = 6	5
BS305	Option – II	DSC-2C	4+2P = 6	5
BS306	Option – III	DSC-3C	4+2P = 6	5
Total			30	27
Second Year – Semester IV				
BS401		SEC-2	2	2
BS402	English	CC-1D	5	5
BS403	Second Language	CC-2D	5	5
BS404	Option - I	DSC-1D	4+2P = 6	5
BS405	Option – II	DSC-2D	4+2P = 6	5
BS406	Option – III	DSC-3D	4+2P = 6	5
Total			30	27
Third Year – Semester V				
BS501		SEC-3	2	2
BS502		GE -1	2	2
BS503		DSC-1E	3T+2P = 5	4
BS504		DSC-2E	3T+2P = 5	4
BS505		DSC-3E	3T+2P = 5	4

BS506		DSE-1E	3T+2P = 5	4
BS507		DSE-2E	3T+2P = 5	4
BS508		DSE-3E	3T+2P = 5	4
Total			34	28
Third Year – Semester VI				
BS601		SEC-4	2	2
BS602		GE -2	2	2
BS603		DSC-1F	3T+2P = 5	4
BS604		DSC-2F	3T+2P = 5	4
BS605		DSC-3F	3T+2P = 5	4
BS606		DSE-1F	3T+2P = 5	4
BS607		DSE-2F	3T+2P = 5	4
BS608		DSE-3F	3T+2P = 5	4
Total			34	28
Credits for the entire Course				164

Summary of Credits:

S.No.	Course Category	No. of Courses	Credits per Course	Credits
1.	AECC	2	2	4
2.	SEC	4	2	8
3.	CC	8	5	40
4.	DSC	12	5	60
5.	DSC	6	4	24
6.	DSE	6	4	24
7.	GE	2	2	4
8.	Total	40		164
9.	Optionals	24		108

AECC- Ability Enhancement Compulsory Course
SEC – Skill Enhancement Course
DSC – Discipline Specific Course
DSE – Discipline Specific Elective
GE – Generic Elective

DEPARTMENT OF COMMERCE, M.G.U

Structure of B.Com (General) (CBCS) for
Mahatma Gandhi University, Nalgonda. (w.e.f. Academic Year 2016-17)

B.COM (General) PROGRAMME

FIRST YEAR:					
SEMESTER-I:					
Sl.No.	***Code***	***Course Title***	***Course Type***	***HPW***	***Credits***
(1)	(2)	(3)	(4)	(5)	(6)
1.	BC101	Environmental Studies	AECC-1	2	2
2.	BC102	English	CC-1A	5	5
3.	BC103	Second Language	CC-2A	5	5
4.	BC104	Financial Accounting – I	DSC-1A	5	5
5.	BC105	Business Economics	DSC-2A	5	5
6.	BC106	Business Organization	DSC-3A	4	4
7.	BC107	Information Technology	DSC-4A	3T+2P	4
		Total		**31**	**30**
SEMESTER-II:					
8.	BC201	Gender Sensitisation	AECC-2	2	2
9.	BC202	English	CC-1B	5	5
10.	BC203	Second Language	CC-2B	5	5
11.	BC204	Financial Accounting - II	DSC-1B	5	5
12.	BC205	Managerial Economics	DSC-2B	5	5
13.	BC206	Principles of Management	DSC-3B	4	4
14.	BC207	Foreign Trade	DSC-4B	4	4
		Total		**30**	**30**
SECOND YEAR:					
SEMESTER-III:					
15.	BC301	Principles of Insurance	SEC-1	2	2
16.	BC302	English	CC-1C	5	5
17.	BC303	Second Language	CC-2C	5	5
18.	BC304	Advanced Accounting	DSC-1C	5	5
19.	BC305	Income Tax-I	DSC-2C	5	5
20.	BC306	Business Statistics-I	DSC-3C	4	4
21.	BC307	Entrepreneurial Development & Business Ethics	DSC-4C	4	4
		Total		**30**	**30**
SEMESTER-IV:					
22.	BC401	Practice of Life Insurance	SEC-2	2	2
23.	BC402	English	CC -1D	5	5
24.	BC403	Second Language	CC-2D	5	5
25.	BC404	Corporate Accounting	DSC-1D	5	5
26.	BC405	Income Tax-II	DSC-2D	5	5
27.	BC406	Business Statistics-II	DSC-3D	4	4
28.	BC407	Financial Statement Analysis	DSC-4D	4	4
		Total		**30**	**30**

THIRD YEAR:					
SEMESTER-V					
29.	BC501	Practice of General Insurance	SEC-3	2	2
30.	BC502		GE-1	2	2
31.	BC503	Cost Accounting	DSC-1E	4	4
32.	BC504	Business Law	DSC-2E	4	4
33.	BC505	Banking Theory & Practice	DSC-3E	4	4
34.	BC506	Auditing	DSC-4E	4	4
35.	**BC507**	Computerised Accounting	**DSE-1A**	**4T+2P**	**5**
36.	**BC508**	Accounting Standards	**DSE-2A**	**5**	**5**
		Total		**31**	**30**
SEMESTER-VI					
37.	BC601	Regulation of Insurance Business	SEC-4	2	2
38.	BC602		GE-2	2	2
39.	BC603	Managerial Accounting	DSC-1F	4	4
40.	BC604	Company Law	DSC-2F	4	4
41.	BC605	Financial Institutions & Markets	DSC-3F	4	4
42.	BC606	Commerce Lab	DSC-4F	2T+4P	4
43.	**BC607**	Advanced Managerial Accounting	**DSE-1B**	**5**	**5**
44.	**BC608**	Advanced Corporate Accounting	**DSE-2B**	**5**	**5**
		Total		**32**	**30**
		GRAND TOTAL		**184**	**180**

AECC: **A**bility **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; T=Theory; P=Practicals;*

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC Language	8	5	40
	DSC	**8**	**5**	**40**
		16	**4**	**64**
4	**DSE**	**4**	**5**	**20**
5	GE	2	2	4
	TOTAL	**44**		**180**
	Commerce Total	**28**		**124**

With Effect from the Academic Year 2016-2017

Syllabus for Computer Applications

B.Sc. & B.A Programme under Choice Based Credit System

Code	Course Title	Course Type	HpW	Credits
	SEMESTER – I			
BS106	Programming in C	DSC–3A	4T+2P=6	4 + 1 =5
	SEMESTER – II			
BS206	Programming in C++	DSC–3B	4T+2P=6	4 + 1 =5
	SEMESTER – III			
BS301	SEC	SEC–1	2T	2
BS306	Relational Database Management Systems	DSC–3C	4T+2P=6	4 + 1 =5
	SEMESTER – IV			
BS401	SEC	SEC–2	2T	2
BS406	Computer Networks	DSC–3D	4T+2P=6	4 + 1 =5
	SEMESTER – V			
BS501	Information Technologies –1	GE–1	2	2
BS502	SEC	SEC–3	2	2
BS505	Multimedia Systems	DSC–3E	3T+2P=5	3 + 1 =4
BS506	Elective–A: Web Technologies	DSE–1E	3T+2P=5	3 + 1 =4
	Elective–B: Visual Programming	DSE–2E		
	SEMESTER – VI			
BS601	Information Technologies –2	GE–2	2T	2
BS602	SEC	SEC–4	2T	2
BS605	Mobile Applications	DSC–3F	3T+2P=5	3 + 1 =4
BS606	Elective–A: PHP Programming	DSE–1F	3T+2P=5	3 + 1 =4
	Elective–B: Information Security and Cyber Laws	DSE–2F		
			Total Number of Credits	**48**

DSC–3A **Programming in C** 106

Theory: 4 credits and Practical: 1 credit
Theory: 4 Hours/Week and Practical: 2 Hours/Week

Unit – I

Computer Fundamentals: Introduction of Computers, Classification of Computers, Anatomy of a Computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.
Program fundamentals: Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, Software Development.
Algorithms: Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.
Basics of C: Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

Unit – II

Input-Output: Non-formatted and Formatted Input and Output Functions, Escape Sequences,
Control Statements: Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements – while, for, do-while; Special Control Statement – goto, break, continue, return, exit.
Arrays and Strings: One and Two Dimensional Arrays, Character Arrays, Functions from ctype.h, string.h.

Unit – III

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Score of Variables, Storage Classes, Inline Functions, and Recursion.
Pointers: Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Dynamic Memory Allocation.

Unit – IV

User-defined Data Types: Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Structures Vs Unions, Enumeration Types.
Files: Introduction, Using Files, Working with Text Files and Binary Files, Other File Management Functions.

Text Pradip Dey, Manas Ghosh, *Computer Fundamentals and Programming in C* (2e)

References

1. Ivor Horton, *Beginning C*
2. Herbert Schildt, *The Complete Reference C*
3. Paul Deitel, Harvey Deitel, *C How To Program*
4. Byron S. Gottfried, *Theory and Problems of Programming with C*
5. Brian W. Kernighan, Dennis M. Ritchie, *The C Programming Language*
6. B. A. Forouzan, R. F. Gilberg, *A Structured Programming Approach Using C*

106 C Lab

Practical: 2 Hours/Week Credit: 1

1. Write a program to find the largest two numbers using if and conditional operator.
2. Write a program to calculate arithmetic operations of two numbers using switch.
3. Write a program to print the reverse of a given number.
4. Write a program to print whether the given number is a prime or not.
5. Write a program to find largest and smallest elements in a given list of numbers.
6. Write a program to find the sum of two matrices.
7. Write a program to find the product of two matrices.
8. Write a program to print the reverse of a given string.
9. Write a program to find the factorial of a positive integer using iteration and recursion.
10. Write a program to find the GCD of two positive integers using iteration and recursion.
11. Write a program to demonstrate the call by value and the call by reference concepts.
12. Write a program to illustrate the use of Enumeration data type.
13. Write a program to illustrate the use of structure concept.
14. Write a program to illustrate the use of union concept.
15. Write a program to write content into a file and display contents of a file
16. Write a program to copy content of one file into another file and display the content of new file.

Note:

1. Write the Pseudo code and draw Flow Chart for the above programs.
2. Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

DSC–3B **Programming in C++** 206

Theory: 4 credits and Practical: 1 credit
Theory: 4 Hours/Week and Practical: 2 Hours/Week

Unit – I

Introduction to C++: Applications, Example Programs, Tokens, Data Types, Variables, Operators, Expressions, Control Structures, Arrays, Strings, Pointers.
Functions: Introduction, Prototype, Passing Data by Value, Reference Variables, Using Reference Variables as Parameters, Inline Functions, Default Arguments, Overloading Functions, Passing Arrays to Functions.

Unit – II

Object Oriented Programming: Procedural Programming Vs Object-Oriented Programming, Terminology, Benefits, Languages, and Applications.
Classes: Introduction, Defining an Instance of a Class, Why Have Private Members? Separating Class Specification from Implementation, Inline Member Functions, Constructors, Passing Arguments to Constructors, Destructors, Overloading Constructors, Private Member Functions, Instance and Static Members, Friends of Classes, Member-wise Assignment, Copy Constructors, Operator Overloading.

Unit – III

Inheritance: Introduction, Protected Members and Class Access, Base Class Access Specification, Constructors and Destructors in Base and Derived Classes, Redefining Base Class Functions, Polymorphism and Virtual Member Functions, Abstract Base Classes and Pure Virtual Functions, Multiple Inheritance.
C++ Streams: Stream Classes, Unformatted I/O Operations, Formatted I/O Operations.

Unit – IV

Exceptions: Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Extracting Data from the Exception Class, Re-throwing an Exception.
Templates: Function Templates–Introduction, Function Templates with Multiple Type, Overloading with Function Templates, Class Templates – Introduction, Defining Objects of the Class Template, Class Templates and Inheritance.

Text Tony Gaddis, *Starting out with C++: from control structures through objects* (7e)

References

1. B. Lippman, *C++ Primer*
2. Bruce Eckel, *Thinking in C++*
3. K.R. Venugopal, *Mastering C++*
4. Herbert Schildt, *C++: The Complete Reference*
5. Bjarne Stroustrup, *The C++ Programming Language*
6. Sourav Sahay, *Object Oriented Programming with C++*

206 C++ Lab

Practical: 2 Hours/Week Credit: 1

1. Write a program to print the sum of digits of a given number
2. Write a program to check whether the given number is Armstrong or not
3. Write a program to check whether the given string is Palindrome or not
4. Write a program to read the student name, roll no, marks and display the same using class and object.
5. Write a program to find area of a rectangle, circle, and square using class and object.
6. Write a program to implement inline function inside and outside of a class for
   a. Finding the area of a square
   b. Finding the area of a cube
7. Write a program to implement friend function and friend class
8. Write a program to implement constructor and destructor with in a class.
9. Write a program to demonstrate hierarchical inheritance.
10. Write a program to demonstrate multiple inheritances.
11. Write a program to demonstrate the constructor overloading.
12. Write a program to demonstrate static polymorphism.
13. Write a program to demonstrate dynamic polymorphism.
14. Write a program to implement polymorphism using pure virtual functions.
15. Write a program to demonstrate the function templates and class templates.
16. Write a program to demonstrate exception handling using try, catch, and finally.

Note: Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

MOOCs (Massive Online Open Courses) Free Resources

E-Learning:

- NPTEL :nptel.ac.in [Core Subjects Certification]
- C++ INSTITUTE :cppinstitute.org [C++ Certification]
- ORACLEEDUCATION :education.oracle.com [Java, DBMS Certification]
- BIG DATA UNIVERSITY :bigdatauniversity.com [Big Data Certification]
- COURSERA :coursera.org [Core Subjects Certification]
- CODEACADEMY :codecademy.com [Coding Certification]
- KHANACADEMY :khanacademy.org [Core Subjects Certification]
- PIXAR IN A BOX :khanacademy.org/partner-content/pixar
- VIDEOLECTURES :videolectures.net
- YOUTUBEEDU :plus.google.com/+YouTubeEDU/posts
- DISNEY RESEARCH :disneyresearch.com
- ALISON :alison.com [Core Subjects Certification]
- INTERNET ARCHIVE :archive.org

Freeware:

- SCILAB : scilab.org [MatLab Equivalent]
- GEOGEBRA :geogebra.org [Software for Class Room Teaching]

Search Engine:

- WOLFRAM ALPHA :wolframalpha.com [Computing Engine]
- CITESEER :citeseerx.ist.psu.edu [Searching Research Articles]
- DOAJ :doaj.org [Open Access to Journals]

DSC–3C Relational Database Management Systems BS306

Theory	4 Hours/Week	4 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction to Databases: Introduction, Traditional File-Based Systems, Database Approach, Roles in the Database Environment, Advantages and Disadvantages of DBMSs, The Three-Level ANSI-SPARC Architecture, Database Languages, Data Models, Functions of a DBMS, Components of a DBMS.
Relational Model: Introduction, Terminology, Integrity Constraints, Views.

Unit – II

SQL: Introduction, Data Manipulation–Simple Queries, Sorting Results, Using the SQL Aggregate Functions, Grouping Results, Sub-queries, ANY and ALL, Multi-table Queries, EXISTS and NOT EXIST, Combining Result Tables, Database Updates.
SQL: The ISO SQL Data Types, Integrity Enhancement Feature–Domain Constraints, Entity Integrity, Referential Integrity, General Constraints, Data Definition–Creating a Database, Creating a Table, Changing a Table Definition, Removing a Table, Creating an Index, Removing an Index, Views–Creating a View, Removing a View, View Resolution, Restrictions on Views, View Updatability, WITH CHECK OPTION, Advantages and Disadvantages of Views, View Materialization, Transactions.

Unit – III

Advanced SQL: The SQL Programming Language–Declarations, Assignments, Control Statements, Exceptions, Cursors, Subprograms, Stored Procedures, Functions, and Packages, Triggers, Recursion.
Entity–Relationship Modeling: Entity Types, Relationship Types, Attributes, Keys, Strong and Weak Entity Types, Attributes on Relationships, Structural Constraints, Problems with ER Models–Fan Traps, Chasm Traps.
Enhanced Entity–Relationship Modeling: Specialization/Generalization, Aggregation, Composition.

Unit – IV

Functional–Dependencies: Anomalies, Partial Functional Dependency, Transitive Functional Dependency.
Normalization: The Purpose of Normalization, How Normalization Supports Database Design, Data Redundancy and Update Anomalies, Functional Dependencies in brief, The Process of Normalization,1NF, 2NF, 3NF, BCNF. The Database Design Methodology for Relational Databases (Appendix–D).
Transaction Management: Transaction Support–Properties of Transactions, Database Architecture, Concurrency Control–The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods.

Text

Thomas M. Connolly, Carolyn E. Begg, *Database Systems–A Practical Approach to Design, Implementation, and Management (6e)*

References

Sharon Allen, Evan Terry, *Beginning Relational Data Modeling*
Jeffrey A. Hoffer, V. Ramesh, Heikki Topi, *Modern Database Management*
Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*
Ramez Elmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*
Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*
Carlos Coronel, Steven Morris, Peter Rob, *Database Systems: Design, Implementation, and Management*

Relational Database Management Systems Lab BS306

Practical 2 Hours/Week 1 credit

Consider the relational schema for part of the **DreamHome** case study is:

Branch (branchNo, street, city, postcode)
Staff (staffNo, fName, IName, position, sex, DOB, salary, branchNo)
PropertyForRent (propertyNo, street, city, postcode, type, rooms, rent, ownerNo, staffNo, branchNo)
Client (clientNo, fName, IName, telNo, prefType, maxRent, eMail)
PrivateOwner (ownerNo, fName, IName, address, telNo, eMail, password)
Viewing (clientNo, propertyNo, viewDate, comment)
Registration (clientNo, branchNo, staffNo, dateJoined)

1. Create a database with name "DreamHome" and now create all the tables listed above with constraints.
2. Insert a new row into the table supplying data for all columns.
3. Modify data in the database using UPDATE
4. Delete data from the database using DELETE
5. Changing a table definition using ALTER
6. Removing a table using DROP
7. Removing rows in table using TRUNCATE
8. Create an index and removing an index
9. Practice other standard SQL commands for creating, modifying, displaying data of tables.
10. List full details of all staff.
11. List all staff with a salary greater than £10000.
12. List the property numbers of all properties that have been viewed.
13. Produce a list of salaries for all staff, showing only the staffNo, fName, IName, and salary details.
14. List all cities where there is either a branch office or a property for rent.
15. List all cities where there is a branch office but no properties for rent.
16. List all cities where there is both a branch office and at least one property for rent.
17. List the names and comments of all clients who have viewed a property for rent.
18. Produce a status report on property viewings.
19. List complete details of all staff who work at the branch in Glasgow.
20. List the addresses of all branch offices in London or Glasgow
21. List all staff with a salary between £20,000 and £30,000.
22. Identify all clients who have viewed all properties with three rooms.
23. How many properties cost more than £350 per month to rent?
24. How many different properties were viewed in May 2013?
25. Find the total number of Managers and the sum of their salaries.
26. Find the minimum, maximum, and average staff salary.
27. Find the number of staff working in each branch and the sum of their salaries.
28. List all managers and supervisors.
29. Find all owners with the string 'Glasgow' in their address.
30. List the details of all viewings on property PG4 where a comment has not been supplied.
31. Produce a list of salaries for all staff, arranged in descending order of salary.
32. Produce an abbreviated list of properties arranged in order of property type.
33. Find the number of staff working in each branch and the sum of their salaries.
34. For each branch office with more than one member of staff, find the number of staff working in each branch and the sum of their salaries.
35. List the staff who work in the branch at '163 Main St'.
36. List all staff whose salary is greater than the average salary, and show by how much their salary is greater than the average.
37. List the properties that are handled by staff who work in the branch at '163 Main St'.
38. Find all staff whose salary is larger than the salary of at least one member of staff at branch B003.
39. Find all staff whose salary is larger than the salary of every member of staff at branch B003
40. List the names of all clients who have viewed a property, along with any comments supplied.
41. For each branch office, list the staff numbers and names of staff who manage properties and the properties that they manage.
42. For each branch, list the staff numbers and names of staff who manage properties, including the city in which the branch is located and the properties that the staff manage.
43. Find the number of properties handled by each staff member, along with the branch number of the

member of staff.

44. List all branch offices and any properties that are in the same city.
45. List all properties and any branch offices that are in the same city.
46. List the branch offices and properties that are in the same city along with any unmatched branches or properties.
47. Find all staff who work in a London branch office.
48. Construct a list of all cities where there is either a branch office or a property.
49. Construct a list of all cities where there is both a branch office and a property.
50. Create a view so that the manager at branch B003 can see the details only for staff who work in his or her branch office.
51. Create a view of the staff details at branch B003 that excludes salary information, so that only managers can access the salary details for staff who work at their branch.
52. Create a view of staff who manage properties for rent, which includes the branch number they work at, their staff number, and the number of properties they manage.
53. Removing a view using DROP VIEW
54. Give the user with authorization identifier Manager all privileges on the Staff table.
55. Give users Personnel and Director the privileges SELECT and UPDATE on column salary of the Staff table.
56. Revoke the privilege SELECT on the Branch table from all users.
57. Revoke all privileges you have given to Director on the Staff table.
58. Demonstrate exceptions in PL/SQL
59. Demonstrate cursors in PL/SQL
60. Write PL/SQL queries to create procedures.
61. Write PL/SQL queries to create functions.
62. Write PL/SQL queries to create package.
63. Write PL/SQL queries to create triggers.
64. Write PL/SQL queries using recursion.

Consider the relational schema for part of the **Hotel** case study is:

Hotel (hotelNo, hotelName, city)
Room (roomNo, hotelNo, type, price)
Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)
Guest (guestNo, guestName, guestAddress)

65. Create a database with name “Hotel” and now create all the tables listed above with constraints.
66. Insert a new row into the table supplying data for all columns.
67. Modify data in the database using UPDATE
68. Delete data from the database using DELETE
69. Changing a table definition using ALTER
70. Removing a table using DROP
71. Removing rows in table using TRUNCATE
72. Practice other standard SQL commands for creating, modifying, displaying data of tables.
73. List full details of all hotels.
74. List full details of all hotels in London.
75. List the names and addresses of all guests living in London, alphabetically ordered by name.
76. List all double or family rooms with a price below £40.00 per night, in ascending order of price.
77. List the bookings for which no dateTo has been specified.
78. How many hotels are there?
79. What is the average price of a room?
80. What is the total revenue per night from all double rooms?
81. How many different guests have made bookings for August?
82. List the price and type of all rooms at the Grosvenor Hotel.
83. List all guests currently staying at the Grosvenor Hotel.
84. List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room, if the room is occupied.
85. What is the total income from bookings for the Grosvenor Hotel today?
86. List the rooms that are currently unoccupied at the Grosvenor Hotel.
87. What is the lost income from unoccupied rooms at the Grosvenor Hotel?
88. List the number of rooms in each hotel.
89. List the number of rooms in each hotel in London.
90. What is the average number of bookings for each hotel in August?
91. What is the most commonly booked room type for each hotel in London?
92. What is the lost income from unoccupied rooms at each hotel today?
93. Insert rows into each of these tables.

94. Update the price of all rooms by 5%.
95. Investigate the SQL dialect on any DBMS that you are currently using. Determine the system's compliance with the DML statements of the ISO standard. Investigate the functionality of any extensions that the DBMS supports. Are there any functions not supported?
96. Demonstrate that queries written using the UNION operator can be rewritten using the OR operator to produce the same result.
97. Apply the syntax for inserting data into a table.
98. Create a view containing the cheapest hotels in the world.
99. Create the Hotel table using the integrity enhancement features of SQL.
100. Create a database trigger for the following situations:
    (a) The price of all double rooms must be greater than £100.
    (b) The price of double rooms must be greater than the price of the highest single room.
    (c) A booking cannot be for a hotel room that is already booked for any of the specified dates.
    (d) A guest cannot make two bookings with overlapping dates.
    (e) Maintain an audit table with the names and addresses of all guests who make bookings for hotels in London (do not store duplicate guest details).

Note:

Recommended to use open source database software like MySQl, MongoDB, PostgreSQL, etc…

In practical examination, students have to

- Create database
- Create tables with their integrity constraints.
- Insert the data into tables and then execute the queries.
- Answer any **six** queries from **ten** queries given by the examiner.

DSC–3D Computer Networks BS406

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction: Computer-System Architecture, Computing Environments.
Operating-System Structures: Operating-System Services, User Interface for Operating-System, System Calls, Types of System Calls, Operating System Structure.
Process Concept, CPU Scheduling Concepts, Scheduling Criteria, Overview of Main Memory, Virtual Memory, Mass-Storage Structure, File Systems and File System Implementation.

Unit – II

Introduction: Data Communication Components, Line Configuration, Topologies, Transmission Mode, Categories of Networks, ISO Reference Model–Layered Architecture, TCP/IP Reference Model.
Transmission Media: Guided Media–Twisted Pair Cable, Coaxial Cable, Optical Fiber, Unguided Media–Satellite Communication, and Cellular Telephony.

Unit – III

Data Link Layer: Error Detection–VRC, LRC, CRC, Checksum, Error Correction–Hamming Code, Burst Error Correction, Line Discipline–ENQ/ACK, Poll/Select, Flow Control–Stop-and-Wait, Sliding Window, Error Control–Stop-and-Wait ARQ, Sliding Window ARQ Go-Back-n ARQ, Selective-Reject ARQ.
Local Area Networks: Introduction to IEEE 802, Ethernet-CSMA/CD, Implementation, Token Ring,-Token Passing, Implementation. Overview of Multiplexing and Switching.

Unit – IV

Networking and Internetworking Devices: Repeaters, Bridges, Routers, Gateways, Brouters, Switches, Distance Vector Routing Algorithm. Transport Layer: Duties of Transport Layer, Connection.
Upper OSI Layers; Session Layer, Presentation Layer, Application Layer.

Text

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Concepts (9e)*
Behrouz A. Forouzan, *Data Communication and Networking (2e Update)*

References

Andrew S. Tanenbaum, *Modern Operating Systems*
Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*
S.S. Shinde, *Computer Networks*
William Stallings, *Data and Computer Communications*
Andrew S. Tanenbaum, David J Wetherall, *Computer Networks*
Behrouz A Forouzan, Firouz Mosharraf, *Computer Networks A Top-Down Approach*
James F. Kurose, Keith W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*

Computer Networks Lab BS406

Practical 2 Hours/Week 1 credit

1. Use vi editor to create different files, writing data into files, modifying data in files.
2. Use different types of Unix commands on the files created in first program.
3. Write shell programs using 'case', 'then' and 'if' & 'else' statements.
4. Write shell programs using while, do-while and for loop statements.
5. Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.
6. Write a shell script that takes a command–line argument and reports on whether it is directory, a file, or something else.
7. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
8. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
9. Write a program to create a socket and implement connect function.
10. Write a program to display hello world using signals.
11. Write a program to implement the sliding window protocol.
12. Write a program to implement listener and talker.
13. Write a program to implement TCP echo using client–server program
14. Write a program to implement UDP echo using client–server program.
15. Write a TCP client–server program to convert a given string into reverse.
16. Write a UDP client–server program to convert a given string into reverse.

Note: Recommended to use Open Source Software like Fedora, Ubuntu, CentOS, etc...

Write above program using C language on Unix/Linux Systems.

GE–1 Information Technologies – 1 BS501

Theory 2 Hours/Week 2 credits

Unit – I

Introduction to Computers: What is a Computer? Characteristics of Computers, Generations of Computers, Classification of Computers, Basic Computer Organization, Applications of Computers.
Input and Output Devices: Input Devices, Output Devices, Soft Copy Devices, Hard Copy Devices.
Computer Memory and Processors: introduction, Memory Hierarchy, Processor Registers, Cache Memory, Primary Memory, Secondary Storage Devices, Hard Disks, Optical Drives, USB Flash Drives, Memory Cards.

Unit – II

Computer Software: Introduction, Classification of Computer Software, System Software, Applications Software, Firmware, Middleware, Acquiring Computer Software.
Operating Systems: Introduction, Evolution of OS, Process Management, Memory Management, File Management, Device Management, Security Management, Command Interpreter, Windows, Linux.

Text Reema Thareja, *Fundamentals of Computers*

References

P. K. sinha, *Computer Fundamentals*
Anita Goel, *Computer Fundamentals*
V. Rajaraman, *Fundamentals of Computers*
E. Balagurusamy, *Fundamentals of Computers*
J. Glenn Brookshear, Dennis Brylow, *Computer Science An Overview*

Note: Student friendly video lecturers pertaining to this course are available at http://spoken-tutorial.org/
Teachers are advised to teach this courses in the computer lab itself, so that the interested students may derive some time to perform few programs their own.

DSC–3E Multimedia Systems BS505

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Multimedia: Introduction, Definitions, Where to Use Multimedia- Multimedia in Business, Schools, Home, Public Places, Virtual Reality; Delivering Multimedia.
Text: Meaning, Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hypertext.
Images: Before You Start to Create, Making Still Images, Color.

Unit – II

Sound: The Power of Sound, Digital Audio, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Audio File Formats. Adding Sound to Your Multimedia Project.
Animation: The Power of Motion, Principles of Animation, Animation by Computer, Making Animations.
Video: Using Video, How Video Works and Is Displayed, Digital Video Containers, Obtaining Video Clips, Shooting and Editing Video.

Unit – III

Making Multimedia: The Stages of a Multimedia Project, the Intangibles, Hardware, Software, Authoring Systems.
The Internet and Multimedia: Internet History, Internetworking, Multimedia on the Web.
Designing for the World Wide Web: Developing for the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web, Video for the Web.

Text Tay Vaughan, *Multimedia: Making it work (8e)*

References
Keyes, *Multimedia Handbook*
K. Andleigh, K. Thakkar, *Multimedia System Design*
Ralf Steinmetz, Klara Naharstedt, *Multimedia: Computing, Communications Applications*
Student friendly video lecturers pertaining to this course are available at
http://spoken-tutorial.org/

Multimedia Systems Lab BS505

Practical 2 Hours/Week 1 credit

Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, oval, circle, pencil, brush, lasso tool etc...
2. Create an animation using the tools panel and the properties panel to draw the following – rectangle, square, triangle, diamond, octagon etc...
3. Create an animation using text tool to set the font, size, color etc.
4. Create an animation using free transform tool that should use followings-
   Move Objects, Skew Objects, Stretch Objects, Rotate Objects,
   Stretch Objects while maintaining proportion, Rotate Objects after relocating the center dot
5. Create an animation using layers having following features-
   Insert layer, Delete layer, Guide layer, Mask layer.
6. Modify the document (changing background color etc.)using the following tools
   Eraser tool, Hand tool, Ink bottle tool, Zoom tool, Paint Bucket tool, Eyedropper tool
7. Create an animation for bus car race in which both starts from the same point and car wins the race.
8. Create an animation for bus car race in which both starts from the same point and bus wins the race.
9. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
10. Create an animation in which text gets converted into digits (like hello is 85121215).
11. Create an animation having five images having fade-in fade-out effect.
12. Create an scene to show the sunrise (using multiple layers and motion tweening)
13. Create an scene to show the sunset (using multiple layers and motion tweening)
14. Create an animation to show the ripple effect.
15. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
16. Create an animation for bouncing ball (you may use motion guide layer).

Note: Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

DSE–1E Web Technologies BS506

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups
Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links.
Images, Audio, and Video: Adding Images Using the <img> Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your web pages.
Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables
Forms: Introducing Forms, Form Controls, Sending Form Data to the Server
Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

Unit – II

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules.
CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the Box Model.
More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout with CSS
Page Layout: Understating the Site's Audience, Page Size, Designing Pages, Coding your Design, Developing for Mobile Devices.
Design Issues: Typography, Navigation, Tables, Forms.

Unit – III

Learning JavaScript: How to Add Script to Your Pages, the Document Object Model, Variables, Operators, Functions, Control Statements, Looping, Events, Built- In Objects,
Working with JavaScript: Practical Tips for Writing Scripts, Form Validation, Form Enhancements, JavaScript Libraries.
Putting Your site on the web: Meta tags, Testing your site, Talking the Leap to Live, Telling the World about your site, Understanding your visitors.

Text

Jon Duckett, *Beginning HTML, XTML, CSS and JavaScript*

References

Chris Bates, *Web Programming*
M. Srinivasan, *Web Technology: Theory and Practice*
Achyut S. Godbole, Atul Kahate, *Web Technologies*
Kogent Learning Solutions Inc, *Web Technologies Black Book*
Ralph Moseley and M. T. Savaliya, *Developing Web Applications*
P.J. Deitel & H.M. Deitel, *Internet and World Wide Web How to program*

Web Technologies Lab BS506

Practical 2 Hours/Week 1 credit

1	a. Write a HTML program using basic text formatting tags, <hn>, <p>,
	, <pre>.
	b. Write a HTML page for Example Cafe using above text formatting tags.

2	a. Write a HTML program using presentational element tags <b>, <i>, <strike>, <sup>, <sub>, <big>, <small>, <hr> b. Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <kbd>, <address>
3	a. Write a HTML program using different list types. b. Write a HTML page that displays ingredients and instructions to prepare a recipe.
4	a. Write a HTML program using grouping elements and . b. Write a HTML Menu page for Example cafe site.
5	a. Write a HTML program using images, audios, videos. b. Write a HTML program to create your time table.
6	Write a HTML program to create a form using text inputs, password inputs, multiple line text input, buttons, check boxes, radio buttons, select boxes, file select boxes.
7	Write a HTML program to create a frames and links between frames.
8	Write a HTML program to create different types of style sheets.
9	Write a HTML program to create CSS on links, lists, tables and generated content.
10	Write a HTML program to create your college web site using multi column layouts.
11	Write a HTML program to create your college web site using for mobile device.
12	Write a HTML program to create login form and verify username and password using DOM
13	a. Write a JavaScript program to calculate area of rectangle using function. b. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
14	a. Write a JavaScript program using switch case?. b. Write a JavaScript program to print multiplication table of given number using loop.
15	a. Write a JavaScript programs using any 5 events. b. Write a JavaScript program using JavaScript built in objects.
16	Write a JavaScript program to create registration form and validate all fields using form validation

DSE–2E Visual Programming BS506

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction to VB: Writing windows application with VB, Programming languages -procedural, object oriented, event driven; VB Environment, Writing first VB project, compiling, debugging, and running the programs.

Controls : Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

Variables, constants, and Calculation: Data types, naming rules and conversion, constants-named and intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data Counting and accumulating Sums.

Unit – II

Decisions and Conditions : If statement, Conditions-comparing numeric variables and constants, comparing strings, compound conditions (and, or, not), nested if statements, using if statements with option buttons & check boxes, displaying message in message box, input validation. Calling event procedures, debugging VB projects, Debugging Step-by-Step Tutorial.

Modular programming: Menus, using common dialog box, writing general procedure. Forms Handling : Multiple forms, creating, adding, removing forms, hide, show method, load, unload statement, me keyword, referring to objects on a different forms, Variables and constants in Multiple-Forms.

Iteration Handling: Lists Boxes and Combo Boxes, Do/loops, for/next loops, using msgbox function, using string function.

Unit – III

Arrays: control Arrays, the case structure, single-dimension arrays, for Each/Next statement, table lookup, using list boxes with array, multidimensional arrays.

Database Connectivity: VB and database, using the data control, viewing a database file- step-by-step, Navigating the Database in code, using list boxes and comboboxes as data-bound controls, adding a lookup table and navigation-stepby-step, updating a database file, Recordsets, working with database fields, creating a new Dynaset.

Advanced topics in VB: ActiveX controls, Dynamic link libraries (DLL), Multiple Document interface (MDI).

Text

Julia Case Bradley, Anita C. Millspaugh, *Programming in Visual Basic 6.0 (TMHE 2000–14th Reprint 2004)*

References

Diane Zak, *Programming with Microsoft Visual Basic 2012*

Tony Gaddis, Kip Irvine, *Starting Out With Visual Basic 2012*

Visual Programming Lab BS506

Practical 2 Hours/Week 1 credit

1 Write a program to print a table of numbers from 5 to 15 and their squares and cubes.

2 Write a program to print the largest of three numbers.

3 Write a program to print the factional of a number.

4 Write a program to print the GCD of any two positive integers.

5 Write a program to print the given number in reverse order of digits.

6 Write a program to print the given number is prime or not.

7 Create an application that prompts the user to enter today's sales for five stores. The program should then display a simple bar graph comparing each store's sales.

8 Create an application that allows the user to enter each month's amount of rainfall and calculates the total and average rainfall for a year.

9 Write code that declares a string array with three elements and then stores your first, middle, and last names in the array's elements.

10 Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.

11 A person deposits Rs. 1000 in a fixed account yielding 5% interest.
Complete the amount in the account at the end of each year for n years.

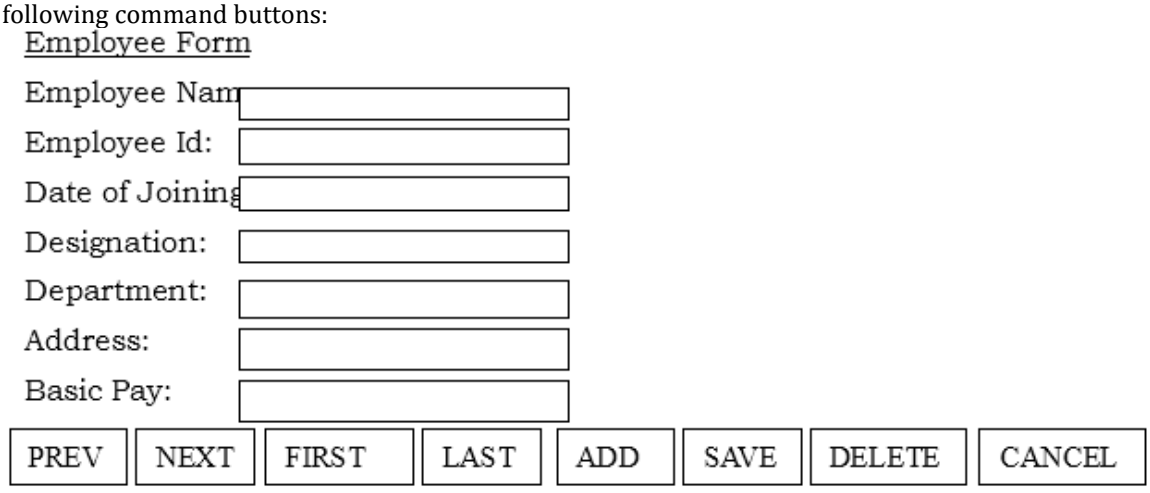
12 Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

13 Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list. (Use arrays.)

14 Read a single dimension array. Find the sum and average of these numbers.

15 Read a two dimension array. Find the sum of two 2D Array.

16 Create a database Employee and Make a form to allow data entry to Employee Form with the following command buttons:



GE–2 Information Technologies – 2 BS601

Theory 2 Hours/Week 2 credits

Unit – I

Introduction to Algorithms and Programming Languages: Algorithm, Control Structures, Flowcharts, Pseudo code, Programming Languages, Generations of Programming Languages.
Database Systems: File Oriented Approach, Database Oriented Approach, Database Views, Three-Schema Architecture, Database Models, Components of DBMS, Introduction of SQL Queries.

Unit – II

Computer Networks: Introduction, Connection Media, Data Transmission Mode, Data Multiplexing, Data Switching, Network Topologies, Types of Networks, Networking Devices, OSI Model.
The Internet: Internet Services, Types of Internet Connections, Internet Security.
Emerging Computer Technologies: Distributed Networking, Peer-to-peer Computing, Grid Computing, Cloud Computing, Utility Computing, On0demand Computing, Wireless Network, Bluetooth, Artificial Intelligence.

Text

Reema Thareja, *Fundamentals of Computers*

References

P. K. sinha, *Computer Fundamentals*
Anita Goel, *Computer Fundamentals*
V. Rajaraman, *Fundamentals of Computers*
E. Balagurusamy, *Fundamentals of Computers*
J. Glenn Brookshear, Dennis Brylow, *Computer Science An Overview*

Note: Student friendly video lecturers pertaining to this course are available at http://spoken-tutorial.org/
Teachers are advised to teach this courses in the computer lab itself, so that the interested students may derive some time to perform few programs their own.

DSC–3F Mobile Applications BS605

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction to Programming and App Inventor: Introduction, What Is a Computer Program? Introducing App Inventor, Getting Hands-On with App, Tutorial 1-1,1-2,1-3,1-4 Working with Media: Displaying Images, Tutorial 2-1,2-2,2-3,Duplicating Blocks and Using Dropdowns, Sounds, Color Blocks, Layout Components, Tutorial 2-7 Input, Variables, and Calculations: The Text Box Component, Performing Calculations, Tutorial 3-1, 3-2 ,Storing Data with Variables Tutorial 3-3, Creating Blocks with Type blocking, Math Functions.

Unit – II

Decision Blocks and Boolean: Introduction to Decision Blocks, Relational Operators and the if Block, Tutorial 4-1, The if then else Block Tutorial 4-2, A First Look At Comparing Strings, Logical Operators, Tutorial 4-4, Nested Decision Blocks, Tutorial 4-5 The if then else if Block, The Screen's Initialize Event, The ListPickerComponent, The CheckBox Component, Repetition Blocks, Times, and Dates: The Notifier Component, The while Loop, Tutorial 5-1, The for each Loop Tutorial 5-2, The Clock Component, The DatePicker Component Procedures and Functions.

Unit – III

Lists -Graphics and Animation: The Canvas Component, Tutorial 9-1, The Ball and ImageSprite Component, Tutorial 9-2, 9-3,Using the Clock Component to Create AnimationsWorking with Text: Concatenating Strings, Comparing Strings, Trimming a String, Converting Case, Finding a Substring Tutorial 10-3,Replacing a Substring , Extracting a Substring, Splitting a Substring Text to Speech and Text Messaging.

Text

Tony Gaddis, Rebecca Halsey, *Starting Out with App Inventor for Android (1e)*

References

Mark L. Murphy, *Beginning Android*

J.F. DiMarzio, *Android – A Programmer's Guide*

W Frank Ableson, Robi Sen, Chris King, *Android in Action*

Lucas Jordan, Pieter Greyling, *Practical Android Projects*

http://appinventor.mit.edu/

Mobile Applications Lab BS605

Practical 2 Hours/Week 1 credit

1. Create the Screen for the Hello World App
2. Develop a mobile app to Create Good Morning Translator App
3. Design a mobile app to change the Screen's Background Image
4. Create a mobile app for layout components and Color Blocks
5. Design the mobile app for the Kilometer Converter
6. Create mobile app to calculate Test Average
7. Develop a mobile app to demonstrate Range Checker
8. Develop a mobile app for Grader App
9. Design a mobile app to demonstrate checkbox components
10. Demonstrate a mobile app for while loop
11. Design a mobile app to Calculate Sum of Consecutive Numbers
12. Design a mobile app to create Lights
13. Design a mobile app to demonstrate lists
14. Design a mobile app to validate an Email Address
15. Design a mobile app to display images of all states and union territories in India
16. Design a mobile app of your college having college information, features, events and placements

DSE–1F PHP Programming BS606

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introducing PHP – What is PHP? Why use PHP? Evolution of PHP, Installing PHP, Other ways to run PHP, Creating your first script. PHP Language Basics – Using variables, Understanding Data Types, Operators and Expressions, Constants. Decisions and Loops – Making Decisions, Doing Repetitive Tasks with Looping, Mixing Decisions and Looping with HTML. Strings – Creating and Accessing Strings, Searching Strings, Replacing Text with Strings, Dealing with Upper and Lowercase, Formatting Strings. Arrays – Creating Arrays, Accessing Array Elements, Looping Through Arrays with for-each, Working with Multidimensional Arrays, Manipulating Arrays.

Unit – II

Functions – What is a Function? Why Functions are useful? Calling Functions, Working with Variable Functions, Writing your own Functions, Working with References, Writing Recursive Functions. Objects – Introduction OOP Concepts, Creating Classes and Objects in PHP, Creating and using Properties, Working with Methods, Object Overloading with _get(), _set() and _call(), Using Inheritance to Extend Power of Objects, Constructors and Destructors, Automatically Loading Class Files, Storing as Strings. Handling HTML Forms with PHP – How HTML form works, Capturing Form Data with PHP, Dealing with Multi-Value Fields, Generating Web Forms with PHP, Storing PHP Variables in Forms, Creating File Upload Forms, Redirecting After a Form Submission.

Unit – III

Working with Files and Directories - Getting Information on Files, Opening and Closing Files, Reading and Writing to Files, Copying, Renaming, and Deleting Files, Working with Directories. Introducing Databases and SQL – Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL from PHP. Retrieving Data from MySQL with PHP –Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records.

Text

Matt Doyle, *Beginning PHP 5.3* (Wrox – Wiley Publishing)

References

Ellie Quigley, *PHP and MySQL by Example*
Joel Murach, Ray Harris, *Murach's PHP and MySQL*
Brett McLaughlin, *PHP & MySQL: The Missing Manual*
Luke Welling, Laura Thomson, *PHP and MySQL Web Development*
W. Jason Gilmore, *Beginning PHP and MySQL From Novice to Professional*
Andrew Curioso, Ronald Bradford, Patrick Galbraith, *Expert PHP and MySQL*

PHP Programming BS606

Practical 2 Hours/Week 1 credit

1	a) Write a PHP script to find the factorial of a given number. b) Write a PHP script to find the sum of digits of a given number.
2	a) Write a PHP script to find whether the given number is a prime or not. b) Write a PHP script to demonstrate the use of break, continue statements using nested loops.
3	a) Write a PHP script to display the Fibonacci sequence with HTML page. b) Write a PHP script to create a chess board.
4	a) Write a PHP script using built-in string function like strstr(), strops(), substr_count(), etc... b) Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first character uppercase.
5	a) Write a PHP script that inserts a new item in an array in any position. b) Write a PHP function to check whether all array values are strings or not.
6	a) Write a PHP script to count number of elements in an array and display a range of array elements. b) Write a PHP script to sort a multi-dimensional array set by a specific key.
7	a) Write a PHP script using a function to display the entered string in reverse. b) Write a PHP script using function for sorting words in a block of text by length.
8	a) Write a PHP script for creating the Fibonacci sequence with recursive function. b) Write a PHP script using pass by value and pass by reference mechanisms in passing arguments to functions.
9	a) Write a PHP script to demonstrate the defining and using object properties. b) Write a PHP script to demonstrate the inheritance.
10	a) Write a PHP script to demonstrate the object overloading with _get(), _set(), and _call(). b) Write a PHP script to demonstrate the overloading property accesses with _get() and _set().
11	a) Write a PHP script to demonstrate the method overloading and method overriding mechanisms. b) Write a PHP script to demonstrate the use of final classes and final methods.
12	a) Write a PHP script to demonstrate the use interfaces. b) Write a PHP script using constructors and destructors.
13	Write a PHP application to handling HTML forms with PHP script.
14	a) Write a PHP script to create a file, write data into file and display the file's data. b) Write a PHP script to check and change file permissions, copying, renaming and deleting files.
15	a) Write a PHP application for connecting to MySQL and reading data from database table. b) Write a PHP application for inserting, updating, deleting records in the database table.
16	Write a PHP application for student registration form.

DSE–2F Information Security and Cyber Laws BS606

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction to Information Systems and Security – Information Systems, Types of IS, Development of IS, Introduction to Information Security, Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security.
Introduction to Application Security and Counter Measures – Introduction to Application Security, Data Security Considerations, Security Technologies, Security Threats, Security Threats to E-Commerce.

Unit – II

E-Cash and Electronic Payment System, Credit/Debit/Smart Cards, Digital Signature, Cryptography and Encryption.
Introduction to Security Measures – Secure Information System Development, Application Development Security, Information Security Governance and Risk Management, Security Architecture and Design, Security Issues in Hardware, Data Storage, and Downloadable Devices, Physical Security of IT Assets, Backup Security Measures.

Unit – III

Introduction to Security Policies and Cyber Laws – Need for an Information Security Policy, Information Security Standards – ISO, Introducing Various Security Policies and Their Review Process, Introduction to Indian Cyber Law, Objective and Scope of the IT Act, 2000, Intellectual Property Issues, Overview of Intellectual-Property- Related Legislation in India, Patent, Copyright, Law Related to Semiconductor Layout and Design, Software License.

Text

Dr. Surya Prakash T, Ritendra G, Praveen Kumar S, KLSI, *Introduction to information security and cyber laws (Dreamtech Publication)*

References

Anderson, Ross, *Security Engineering*
G.R.F. Snyder, T. Pardoe, *Network Security*
Mark Stamp, *Information Security: Principles and Practice*
A. Basta, W.Halton, *Computer Security: Concepts, Issues and Implementation*
Mark S. Merkow, Jim Breithaupt, *Information Security: Principles and Practice*

Information Security and Cyber Laws Lab BS606

Practical 2 Hours/Week 1 credit

1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig etc…
2. Demonstrate the use of Network tools: tracert, arp, netstat, whois etc…
3. Use of Password cracking tools: John the Ripper, Ophcrack.
   Verify the strength of passwords using these tools.
4. Write a program for performing encryption and decryption operations of Caesar cipher.
5. Write a program for performing encryption and decryption operations of Rail cipher.
6. Write a program for performing encryption and decryption operations of Monoalphabetic cipher.
7. Write a program for performing encryption and decryption operations of Playfair cipher.
8. Write a program for performing encryption and decryption operations using Transposition technique.
9. Use nmap to analyze a remote machine.
10. Use zenmap to analyze a remote machine.
11. Use Burp proxy to capture and modify the message.
12. Demonstrate sending of a protected word document.
13. Demonstrate sending of a digitally signed document.
14. Demonstrate sending of a protected worksheet.
15. Demonstrate use of steganography tools.
16. Demonstrate use of gpg utility for signing and encrypting purposes.

MOOCs [Massive Online Open Courses] Free Resources

E-Learning:

- NPTEL :nptel.ac.in [Core Subjects Certification]
- C++ INSTITUTE :cppinstitute.org [C++ Certification]
- ORACLEEDUCATION :education.oracle.com [Java, DBMS Certification]
- BIG DATA UNIVERSITY :bigdatauniversity.com [Big Data Certification]
- COURSERA :coursera.org [Core Subjects Certification]
- CODEACADEMY :codecademy.com [Coding Certification]
- KHANACADEMY :khanacademy.org [Core Subjects Certification]
- PIXAR IN A BOX :khanacademy.org/partner-content/pixar
- VIDEOLECTURES :videolectures.net
- YOUTUBEEDU :plus.google.com/+YouTubeEDU/posts
- DISNEY RESEARCH :disneyresearch.com
- ALISON :alison.com [Core Subjects Certification]
- INTERNET ARCHIVE :archive.org

Freeware:

- SCILAB : scilab.org [MatLab Equivalent]
- GEOGEBRA :geogebra.org [Software for Class Room Teaching]

Search Engine:

- WOLFRAM ALPHA :wolframalpha.com [Computing Engine]
- CITESEER :citeseerx.ist.psu.edu [Searching Research Articles]
- DOAJ :doaj.org [Open Access to Journals]

MAHATMA GANDHI UNIVERSITY

NALGONDA

U.G. ECONOMICS (STRUCTURE & SYLLABUS)

Under Choice Based Credit System (CBCS)

BA 1st Year (Core Courses) W.E.F. Academic Year 2016-17 Batch

Semester	Course Title	Credits
Semester - I	Course - I Micro Economics	5
Semester - II	Course - II Macro Economics	5
B.A II Year	(Core Courses)	
Semester - III	Course - III Quantitative Methods for Economic Analysis	5
Semester - IV	Course - IV Public Finance and International Economics	5
B.A III Year		
Semester - V	Course - V Indian Economy (Core Course)	5
Semester - V	Course - VI (Discipline Specific Electives)	5
	(a) Economics of Development and Planning (b) Financial Institutions & Markets (c) Agricultural Economics	
Semester - VI	Course - VII Telangana Economy (Core Course)	5
Semester- VI	Course- VIII (Discipline Specific Electives)	5
	a) Computer Applications in Economics b) Economics of Environment c) Economics of Rural Development	

MAHATMA GANDHI UNIVERSITY

NALGONDA

U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. I YEAR (w.e.f. Academic Year 2016-17 Batch)

SEMESTER – I: CORE COURSE (Credits - 5)

COURSE – I: MICRO ECONOMICS

Unit – I: Demand Analysis

Introduction to Economics – Definition, Nature and Scope of Economics – Micro and Macro Economic Analyses – Concept of Demand and Law of Demand – Determinants of Demand – Types of Demand – Demand Function – Shifts in Demand – Concept of Supply and Law of Supply – Market Equilibrium – Elasticity of Demand – Price, Income and Cross Elasticities of Demand – Measurement Methods of Price Elasticity of Demand

Unit – II: Utility Analysis

Cardinal and Ordinal Utility Approaches – Law of Diminishing Marginal Utility – Law of Equi-Marginal Utility – Consumer Surplus – Indifference Curve Analysis: Assumptions, Properties, Budget Line and Consumer's Equilibrium – Derivation of Demand Curve with the help of Indifference Curves – Price Effect, Income Effect and Substitution Effect

Unit – III: Production Analysis

Concepts of Production, Production Function and Factors of Production – Law of Variable Proportions – Isoquant, Iso-cost Curves and Producer's Equilibrium – Laws of Returns to Scale – Economies and Diseconomies of Scale – Cost Analysis: Total, Average and Marginal Cost Curves in Short Run and Long Run – Revenue Analysis: Total, Average and Marginal Revenue Curves – Relationship among Average Revenue, Marginal Revenue and Elasticity of Demand

Unit – IV: Market Structure Analysis – I

Concepts of Firm, Industry and Market – Classification of Markets – Objectives of the Firm – Equilibrium of a Firm – Perfect Competition: Concept, Characteristics, Equilibrium of Firm and Industry during Short Run and Long Run – Monopoly: Concept, Types, Characteristics and Equilibrium of the Firm – Price Discrimination – Comparison between Perfect Competition and Monopoly

Unit – V: Market Structure Analysis – II

Monopolistic Competition: Concept, Characteristics, Equilibrium of the Firm and Selling Costs – Oligopoly: Concept, Characteristics and Price Rigidity – Kinky Demand Curve – Duopoly: Concept and Characteristics – Cournot Model

Reference Books:

A Koutsoyiannis	:	Modern Micro Economics
Stonier and Hague	:	A Text Book of Economic Theory
Salvatore	:	Micro Economics
Schaum Series	:	Micro Economics
Pyndick	:	Micro Economics
Gregory Mankiw	:	Principles of Micro Economics
M L Seth	:	Micro Economics
M L Jhingan	:	Micro Economics
H L Ahuja	:	Modern Micro Economics
HS Agarwal	:	Principles of Economics

MAHATMA GANDHI UNIVERSITY

NALGONDA

U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. I YEAR (w.e.f. Academic Year 2016-17 Batch

SEMESTER – II: CORE COURSE (Credits - 5)

COURSE – II: MACRO ECONOMICS

Unit – I: Introduction

Meaning, Nature & Scope and Importance of Macro Economics – Concept of Circular Flow of Incomes – National Income Analysis: Concepts and Components – Methods of Measurement – Importance and Difficulties in the Estimation of National Income – Limitations of National Income as a Measure of Welfare – Social Accounting

Unit – II: Theories of Income and Employment

Classical Theory of Employment: Say's Law of Markets and Pigou's Wage Cut Policy – Keynesian Theory of Income and Employment: Effective Demand, Aggregate Demand Function and Aggregate Supply Function – Consumption Function: Average Propensity to Consume (APC) and Marginal Propensity to Consume (MPC) – Factors Determining Consumption Function – Savings Function: Average Propensity to Save and Marginal Propensity to Save – Concepts of Multiplier, Accelerator and Super-Multiplier

Unit – III: Investment & Theories of Interest Rate

Capital and Investment: Types of Investment, Determinants of Investment – Marginal Efficiency of Capital – Ex-Post and Ex- Ante Investment and Savings – Classical, Neo-Classical and Keynesian Theories of Interest – Simultaneous Determination of Interest and Real Income through IS-LM Framework in a Closed Economy

Unit – IV: Supply of Money & Demand for Money

Meaning, Functions and Classification of Money – Money Supply: Measures – Measures of Money Supply with reference to India: M1, M2, M3 and M4 – Classical Theories of Money: Fisher's and Cambridge Versions of Quantity Theory of Money – Keynes' Theory of Money and Prices.

Unit – V: Inflation & Trade Cycles

Inflation: Concept, Types, Causes and Measurement –Effects (Consequences) of Inflation – Measures to Control Inflation – Concepts of Phillips Curve, Deflation and Stagflation – Trade Cycles: Concept, Nature, Causes, Phases and Remedial Measures.

Reference Books:

Ackley, G (1976) : Macro Economics: Theory and Policy, Macmillan, New York
Shapiro, E (1996) : Macro Economic Analysis, Galgotia Publications, New Delhi
J R Hicks : Social Frame Work
Becan Man Wilfred : Introduction to National Income Analysis
Hansen A H (1953) : A Guide to Keynes, McGraw Hill, New York
Keynes JM (1936) : The General Theory of Employment, Interest and Money,
MC Vaish : Macro Economic Theory
HL Ahuja : Macro Economic Theory & Policy
Vanitha Agarwal : Macro Economic Theory & Policy, Pearson Education
HL Ahuja : Macro Economic Analysis
Branson : Macro Economics
Gupta, SB : Monetary Economics: Institutions, Theory and Policy
Rakshit, M : Studies in Macro Economics of Developing Countries, Oxford University Press, New York
R. Dorn Busch et al : Macro Economics, Tata McGraw Hill, 2004
M.L. Seth : Macro Economics, Lakshmi Narain Agarwal, Agra, 2006

MAHATMA GANDHI UNIVERSITY

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. II YEAR

SEMESTER – III: CORE COURSE (Credits - 5)

COURSE – III: QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS

Unit – I: Mathematical Foundations of Economic Analysis

Importance of Quantitative Methods in Economics- Meaning and Basic Concepts of Mathematics: Constants and Variables – Functions: Linear, Non-Linear Functions –Equations and Graphs of Linear, Quadratic and Cubic Functions

Unit – II: Introduction to Statistics

Meaning and Basic Concepts of Statistics – Population and Sample, Frequency Distribution, Cumulative Frequency – Graphic and Diagrammatic Representation of Data – Types of Data: Primary and Secondary Data – Methods of Collecting Data: Census and Sampling Methods (Random, Non-random Sampling Methods)

Unit – III: Measures of Central Tendency and Dispersion

Measures of Central Tendency: Mean, Median, Mode,– Properties of Good Average – Measures of Dispersion – Absolute and Relative Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation and Variance

Unit – IV: Correlation and Regression

Correlation: Meaning and Types – Karl Pearson's Correlation Co-efficient – Spearmen's Rank Correlation and concept of Regression.

Unit – V: Index Numbers and Time Series Analysis

Index Numbers: Meaning and Uses – Types of Index Numbers – Methods of Index Numbers: Laspayer, Paasche and Fisher – Analysis of Time-Series: Meaning and Uses – Components of Time Series Analysis: Secular, Seasonal, Cyclical and Irregular Variations – Methods of Measurement of Secular Trends: Graphic, Semi-Averages, Moving Averages.

Reference Books

Allen, RGD	:	Mathematical Analysis for Economists, Macmillan Press, London.
Bhardwaj RS	:	Mathematics for Economics and Business, Excel Books, New Delhi
Bose	:	Mathematics for Economics, Himalaya Publishing, New Delhi
Chiang, AC	:	Fundamental Methods of Mathematical Economics McGraw Hill, New Delhi
Nagar & Das:		Basic Statistics
S.P. Gupta	:	Statistics

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NALGONDA

U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. II YEAR

SEMESTER – IV: CORE COURSE (Credits - 5)

COURSE – IV: PUBLIC FINANCE AND INTERNATIONAL ECONOMICS

Unit – I: Public Revenue

Nature and Scope of Public Finance – Public Revenue: Sources and Classification –Direct and Indirect Taxes: Progressive, Proportional and Regressive Taxes – Canons of Taxation – Characteristics of a Good Tax System – Impact and Incidence of Taxation – Effects of Taxation

Unit – II: Public Expenditure and Public Debt

Public Expenditure: Classification and Principles – Determinants of Public Expenditure – Effects of Public Expenditure – Public Debt: Nature, Sources, Classification, Effects and Redemption – Debt Trap

Unit – III: Indian Public Finance

Indian Tax System – Public Expenditure and Public Debt in India - Federal Finance – Centre-State Financial Relations – Functions of Finance Commission – Budget: Concepts & Types – Revenue Account – Capital Account – Types of Budget Deficits – Fiscal Responsibility and Budget Management (FRBM) Act.

Unit – IV: International Trade

Introduction to International Trade – Classical, Neoclassical and Modern (H-O) theory-Gains from Trade – Role of International Trade in Economic Development - Concept of Terms of Trade – Factors Affecting Terms of Trade – Tariffs – Quotas – Balance of Trade – Exports and Imports in India.

Unit – V: Balance of Payments and Exchange Rates

Concept – Components and Determinants of Balance of Payments – Equilibrium and Disequilibrium in Balance of Payments – Measures to Correct Disequilibrium in Balance of Payments – Recent Trends in India’s Balance of Payments – Exchange Rates: Concept and Types

Reference Books

1	Houghton, J M (1970)	The Public Finance: Selected Readings, Penguin, Harmondsworth
2	Jha, R (1998)	Modern Public Economics, Routledge, London
3	Menutt, P (1996)	The Economics of Public Choice, Edward Elgar, U.K.
4	Musgrave, R A (1959)	The Theory of Public Finance, McGraw Hill, Kogakusha, Tokyo
5	RA Musgrave & PB Musgrave	Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyo
6	S K Singh	Public Economics
7	Om Prakash	Public Economics
8	M L Jhingan	Public Economics
9	H L Bhatia	Public Economics
10	Sodersten Bo	International Economics, Macmillan Press Ltd., London
11	Vaish MC and Sudhama Singh	International Economics, Himalaya Publishing, House, New Delhi
12	Salvatore, D L	International Economics, Prentice Hall
13	Mithani DM	International Economics, Himalaya, Mumbai
14	Mannar HG	International Economics, Vikas, Delhi
15	Desai	International Economics, Himalaya, New Delhi

16. Kenan, P.B. (1994) : The International Economy, Cambridge University Press, London
17. Kindlberger, C.P. (1973) : International Economics, R.D. Irwin, Homewood
18. Krugman, P.R. and M. Obstgeld (1994): International Economics: Theory and Policy, Glenview, Foresman
19. Bhargava, R.N. (1971) : The Theory and Working of Union Finance in India, Chaitanya Publishing House, Allahbad
21. Houghton, E.W. (Ed.) (1988) : Public Finance, Penguin, Baltimore
22. Mithani, D.M. (1998) : Modern Public Finance, Himalaya Publishing House, Mumbai
23. Vaish & Sundaram : Public Finance , Himalaya Publishing House, Mumbai
24. Hugh Dalton : Principles of Public Finance

MAHATMA GANDHI UNIVERSITY
NALGONDA

U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – V: CORE COURSE (Credits - 5)

COURSE – V: INDIAN ECONOMY

Unit – I: Basic Structure of the Indian Economy

Basic Features of Indian Economy: Growth and Structural Changes in Indian Economy – Demographic Features – Population: Size, Growth, Composition and their Implications on Indian Economy – Concept of Demographic Dividend – Occupational Distribution of Population in India – Population Policy of India – Development of Socio-Economic Infrastructure: Education and Health

Unit – II: National Income, Poverty and Unemployment

Trends and Composition of National Income in India – Income Inequalities in India: Poverty and Unemployment in India: Concept, Types, Trends, Causes and Consequences — Poverty Alleviation and Employment Generation Programmes (MGNREGS, PMRY, PMEGP etc.) in India

Unit – III: Agricultural Sector

Structure of Indian Agriculture Sector– Trends in Agricultural Production and Productivity – Land Reforms – Green Revolution – Agricultural Inputs, Finance, Sources of Irrigation– Agricultural Marketing – Agricultural Price Policy-

Unit – IV: Industrial and Service Sector

Structure, Growth, Importance and Problems of Indian Industry – Large, MSME– Industrial Policies of 1948, 1956 and 1991 – FEMA and Competition Commission of India – Disinvestment Policy and Recent Industrial Policy – Structure of Service Sector – Infrastructural Development: Transport, Banking, Insurance, Information Technology, Communication and Tourism – Foreign Direct Investment

Unit – V: Planning and Public Policy

Five Year Plans: Concept and Objectives – Review of Five Year Plans – 12^{th} Five Year Plan – NITI Aayog – Economic Reforms: Liberalization, Privatization and Globalization– Impact of GATT and WTO on Indian Economy

Reference Books

SK Misra and Puri : Indian Economy, Himalaya Publishing House

Ishwar C Dhigra : The Indian Economy: Environment and Policy, SC Chand & Sons, New Delhi

Dutt and Sundaram : Indian Economy

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – V: DISCIPLINE SPECIFIC ELECTIVES(Credits-5)

COURSE-VI (a): ECONOMICS OF DEVELOPMENT AND PLANNING

Unit-I: Economic Development and Growth

Concepts of Economic Growth and Development – Differences between growth and development- Measurement of Economic Development: Per Capita Income, Basic Needs, Physical Quality of Life Index, Human Development Index and other indices

Unit-II: Determinants of Economic Development

Factors determining Economic Development – Economic Factors- Market Economy, Trust, Property rights, Economic stability, National income, Population and capital formation- Non-economic factors-Education, Health, Urbanization, Migration, political factors, quality of leadership, Good governance, Law and Order, social justice etc.

Unit-III: Theories of Economic Development

Nurkse's Balanced Growth Strategy, Hirsch Man's Un-balanced Growth Strategy – Lewis' Theory of Unlimited Supply of Labour – Rodan's Big-push Theory - Schumpeterian Theory of Innovations - Choice of Techniques.

Unit-IV: Planning for Economic Development

Concept of Planning, Objectives of planning, process of planning, Types of planning-Democratic planning and socialist planning, Indicative planning and Imperative planning, Perspective planning and short term planning, National planning and Regional planning(Micro planning), Sectoral planning and Area planning.

Unit-V: Planning for under developed countries

Obstacles of economic development-Social and cultural factors, Religious factors, political factors, Market imperfections, factor immobility, price rigidity, ignorance of market conditions, vicious circle and International factors- Characteristics of Developed and Under Developed Countries - Need for planning in under developed countries and Role of state.

References:

Mier, Gerald, M : Leading issues in Economic Development, OUP, Delhi
Todaro, Micheal P : Economic Development in the third world, Orient Longman.

Ghatak Subrata : Introduction to development economics
Sukumoy chakravarthy : Development Planning- Indian Experience, OUP, Delhi
Misra & Puri : Economic Development and Planning, theory and practice
Taneja & Myer :Economics of Development and Planning, Vishal Publishing.

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – V: DISCIPLINE SPECIFIC ELECTIVES

COURSE-VI (b): FINANCIAL INSTITUTIONS AND MARKETS

Unit - I: Financial System – An Introduction

Financial System: Concept, Nature – Functions of the Financial System – The Structure of the Financial System - Financial Market Development: Indicators – Equilibrium in Financial Markets – Financial System and Economic Development

Unit - II: Banking in India

Commercial banks: Types, Functions, Principles and Balance Sheet – Process of Credit Creation - Functions of Central Bank - The Aims and Objectives of the Monetary Policy - Instruments of Monetary Policy - Definition and Types of Non-bank Financial Institutions: Measures taken to Control their Operations - Financial Sector Reforms in India

Unit - III: Development Banking

Development Bank: Concept, Functions and Importance – Different Development Banks – Investment Banking – Merchant Banking, World Bank – IDA, ADB – BRICS

Unit -IV: Money Markets in India

Money Market: Concept, Components and Functions –- Call Money Market – Treasury Bill Market - Commercial Bill Market – Commercial Paper and Certificate of Deposits- Discount Market.

Unit - V: Capital Market in India

Capital Market: Concept, Components and Functions – Primary and secondary Markets- Stock Exchange: Concepts and Functions – SEBI: Functions - Recent Changes in stock market

Reference Books

Bhole, L.M. (1999) : Financial Institutions and Markets, Tata McGraw Hill Company Ltd., New Delhi.

Bhole, L.M. (2000) : Indian Financial System, Chugh Publications, Allahabad.

Chandra, P. (1997) : Financial Markets,(4th Edition),Tata McGraw Hill, New Delhi.

Edminster, R.O. (1986) : Financial Institutions, Markets and Management, McGraw Hill, New York.

Fisher, G.E. and R.J. Jordan (1992) : Security Analysis and Portfolio Management, Eastern Economy Edition, New Delhi.

Goldsmith, R.W. (1969) : Financial Structure and Development, Yale, London.

Hanson, J.A. and S. Kathuria (Eds.) (1999) : India: A Financial Sector for the Twenty-first Century, Oxford University Press, New Delhi.

Harker, P.T. and S.A. Zenios (ed.), (2000) : Performance of Financial Institutions, Cambridge University Press, Cambridge.

Johnson, H.J (1996) : Financial Institutions and Markets, Tata McGraw Hill, Delhi.

Khan, M.Y. (1996) : Indian Financial System, Tata Mc Graw Hill, New Delhi.

Machiraju, H.R. (1997) : International Financial Markets in India, Wheeler Publishing, Allahbad.

Machiraju, M.R. (1999) : Indian Financial Systems, Vikas Publishing House,New Delhi.

Ohlson, J.A. (1987) : The Theory of Financial Markets and Institutions, North Holland, Amsterdam.

Prasad, K.N. (2001) : Development of India's Financial System, Sarup & Sons, Delhi.

Rangarajan, C. (1999) : Indian Economics: Essays on Money and Finance, UBS Publication, New Delhi.

Robinson, R.I and (1981) : Financial Markets, McGraw Hill, London D. Wightman

Smith, P.F. (1978) Structure : Money and Financial Intermediation: The Theory and of Financial System, Prentice Hall, Englewood - Cliff, New Jersey.

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – VI: DISCIPLINE SPECIFIC ELECTIVES

COURSE – VI (c): Agricultural Economics

Unit-I: Agricultural Economics Nature and significance

Concept, Scope, nature and features of Agricultural economics – role of Agriculture in economic development and other social sciences, inter dependence between Agriculture and Industry– - Agriculture and allied activities

Unit-II: Production:

Production function – Farm size and productivity, Concept and Measurement, Returns to scale, Law of diminishing returns scale.–, Economies of Scale. Cropping pattern and factors affecting it, Agricultural inputs-Land, Water, Labour, Seed, Fertilizer and pesticides. Input subsidies.

Unit-III: Demand and Supply analysis:

Demand for Agricultural goods and its determinists – Price, Income, Weather, Population and Industrialization – supply of Agricultural goods in short term and Long term. Supply determinants– Price, factor prices, Technology, Government policy.

Unit-IV: – Agriculture Prices:

Price determination of agriculture produce in market and by Government- Agricultural price policy in India: Negative price policy, Positive price policy, Role of Government in determination of support price in India, causes and remedies for Instability of agricultural prices.

Unit-V: Agricultural Finance and Marketing:

Sources of agriculture finance in India. Role of commercial banks, Co-operative societies, RRBs and NABARD in providing of agricultural Finance.

Concept and types of agricultural markets – marketed and marketable surplus, Role of Regulated markets – NAFED, TRIFEDs.

References:

1. Leading issues in Agricultural Economics, R.N. Soni & S. Malhothra, Vishal Publishers
2. Agricultural Economics, Bilgrame,
3. Agricultural Economics, Singh and Sahu,

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – VI: CORE COURSE

COURSE – VII- TELANGANA ECONOMY

UNIT – I: Telangana Economy: Human Resources

Economic History of Telangana – Demographic Features of Telangana – Occupational Distribution of Population in Telangana – Sectoral Distribution of Population – Migration and factors affecting it- Social Infrastructural Development: Education and Health

UNIT – II: Gross Domestic Product, Poverty and Unemployment

Trends in Gross State Domestic Product and Per Capita Income in Telangana – Sectoral Contribution to Gross State Domestic Product – Inequalities in the Distribution of Income and Wealth – Poverty & Unemployment in Telangana: Trends, Causes & Consequences –in Telangana– Poverty Alleviation & Employment Generation Programmes in Telangana – Other Welfare Programmes in Telangana

UNIT – III: Agricultural Sector

Growth of Agriculture in Telangana Economy – Trends in Agricultural Production and Productivity – Determinants of Agricultural Productivity – Cropping Pattern- Agrarian Structure and Land Reforms – Irrigation: Sources and Trends – Mission Kakatiya - Agricultural Credit and Rural Indebtedness, crop insurance– Agricultural Marketing.

UNIT – IV: Industrial Sector

Structure of Telangana Industry – Growth and Pattern of Industrial Development in Telangana – Industrial Policy of Telangana – Special Economic Zones (SEZ) – Role of MSME in Telangana Economy – Problems & Remedial Measures of Small Scale Industries: Industrial Sickness – Industrial Finance in Telangana

UNIT – V: Service and Infrastructural Sectors

Importance of Tertiary Sector in Telangana – Infrastructural Development in Telangana: Transport, Energy, Communication and Information Technology – Science & Technology – Banking & Insurance – Tourism Development – Regional Imbalances: Causes, Consequences & Remedial Measures

Reference

1. Telangana Economy, Telugu Academy
2. Socio Economic survey of Telangana, Government of Telangana
3. Outlook of Telangana, Government of Telangana

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NALGONDA

U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – VI : DISCIPLINARY SPECIFIC ELECTIVE

COURSE-VIII (a): COMPUTER APPLICATIONS IN ECONOMIC ANALYSIS

Unit I: Fundamentals of Computers

Fundamentals of Computers – Components – Input-Output Devices – Central Processing Unit (CPU) – Types of Memory: RAM, ROM – Storage Devices – Software and Hardware – Operating System – Windows User Interface – Importance of Computers in Economic Analysis

Unit II: Word Processing with MS-Word

Starting MS-Word – Main Menu - Text Manipulations: Editing, Formatting, Copy, Cut and Paste – Working with Tables – Checking Spelling and Grammar – Saving and Retrieving Documents – Printing a Document

Unit III: Spreadsheets with MS-Excel

Opening Menu of MS-Excel – Rows and Columns of Spread Sheet - Types of Data – Entering Data – Formatting Data – Data Analysis with Excel: Sorting – Formulas and Functions – Basic Statistical Functions – Statistical and Business Charts – Saving, Retrieving and Printing

Unit IV: MS-Power Point

Opening Menu – Selecting a Slide – Inserting Objects into the Slide – Text, Graphical Shapes, Videos etc., Setting Attributes – Animation Effects – Setting Slide Show – Slide Transition – Delay – Presenters Pen – Saving, Retrieving and Printing Power Point Files

Unit V: Internet Basics

Internet Basics – Computer Networking – Local Area Networking, Wide Area Networking – World Wide Web – Getting Connected to Internet – Wireless Internet – Services Available in WWW – E-mail: Creating an Account – Sending and Receiving Mails – Attaching and Downloading Documents – Search – Searching Documents Over the Internet and Downloading – Social Networking

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. III YEAR

SEMESTER – VI : DISCIPLINE SPECIFIC ELECTIVE COURSE (5-Credits)

COURSE – VIII (b): ECONOMICS OF ENVIRONMENT

Unit - I: Introduction

Definition, Concept of Ecology and Environment - Micro Economic Theory of Environment - The Pricing of the Environmental Variables - Pareto Optimality and Market Failure in the Presence of Externalities - The Theory of Externality and Public Good - Pigouvian Case and Material Balance Approach.

Unit - II: Resource Allocation

Problems of Resource Allocation - Economics of Exhaustible, Non-Exhaustible Resources - Theory of Natural Resources Depletion - Problems of Common Property Resources - Conservation of Resources - Implications of Ecological Imbalances - Optimal Rate of Depletion.

Unit –III: Environmental Valuation

Valuation of Non-market Goods and Services - Theory and Practice; Measurement Methods; Causes of Environmental Degradation - Valuation of Environmental Degradation – Direct and Indirect Methods – Cost-benefit Analysis of Environmental Policies and Regulations.

Unit – IV: Sustainable Development

Impact of Environment on GNP - Limits to Growth - Sustainable Development - Modern and Neo-Classical Views of Sustainable Development - Peoples Movement for Sustainable Development - Development vs Sustainable Development.

Unit - V: Environmental Pollution and Policies

Environment and Economy Interaction - Industrial and Agricultural Technology - its Impact on Environment – Different Types of Pollution- Environmental Policy and Protection of Eco-system - Implementation of Environmental Policies in India- Global Environmental Issues.

References:

Baumol, W.J (1979) : Economics and Environmental Policy and Quality of life – Prentice Hall.

Baumol, W.J (1989) : Theory of Environmental Policy - Cambridge University Press.

Bhattacharya,R.N (2001) : Environmental Economics: An Indian Perspective, Oxford University Press, New Delhi.

Chopra, K., Kadekodi G.K. and M.N. Murthy(1990) : The Management of Common Property Resources, SAGE, New Delhi.

Das Gupta, P.S & G.M. Heal (1989) : The Economic Theory of exhaustible resources Cambridge University Press.

Dasgupta, P.S & K.G. Maler (1991) : The Environment and Emerging development Issues Cambridge University Press.

Freedom, A.M (1979) : The Benefits of Environment improvement, John Hopkins University Press.

Hussen, A.M (1999) : Principles of Environmental Economics, Routledge, London.

Joshi, Y.G. & D.K. Verma (1998) : Social Environment for Sustainable Development, Rawat Publications.

Karpagam.M (1999) : Environmental Economics- A Textbook, Sterling Publishers Pvt. Ltd.

Pearse, D. (1977) : Economics of Environment: London.

Rajyalaxmi, V (2004) : Environment and Sustainable Development, Aph Publishing Corporation.

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U.G. ECONOMICS SYLLABUS (Under CBCS)

B.A. I YEAR (w.e.f. Academic Year 2016-17 Batch)

SEMESTER – VI: DISCIPLINE SPECIFIC ELECTIVE COURSE (5-Credits)

COURSE – VIII (C)**: Economics of Rural Development**

Unit – I: Introduction of Rural Development:

Rural Development: - Nature and scope – Importance and objectives of Rural Development, Role of NGO.- Rural Economy of India: size and structure of Rural Economy - The characteristics of the Rural Sector - Role of Agricultural and Allied Sector- Role of the Non-Agricultural sub-sector – Nature of changes since Independence - Challenges and opportunities.

Unit – II: Measurement of Rural Development:

Measures of Development: Measures of the level of Rural Development - Measures of Distribution of Income - Measures of Development simplified - Some Measures of Rural Poverty

Unit – III: Some Paradigms of Rural Development:

Some Paradigms of Rural Development: Introduction - The Modernization Theory - Rosenstein - Rodan's Theory of the 'Big Push' - Leibenstein's critical minimum Effort Thesis - Lewis Model of Economic Development with unlimited supply of Labor force - Gunnar Myrdal’s Thesis of Spread and Back ward Effects - The Human Capital model of Development -Gandhian Model of Rural Development - Development theories from other social sciences.

Unit – IV: Determinants of Rural Development:

Determinants of Rural Development: Change in Output - Changes in the Utilization of Natural Resources – Employment, Capital, Technology and Industrial framework

Unit – V: Approaches to Rural Development:

Approaches to Rural Development: C.D. Program - Intensive Agricultural Districts Program - S.F.D.A. and MF.A.L.A.- D.P.A.P. - D.D.P. - I.R.D.P., D.W.C.R.A. - S.G.S.Y., Self help groups in Rural Development, other programmes for Rural Development.

References:

1. Katar Singh (1999), "Rural Development - principles policies and Management" Sage Publications, New Delhi.

2. I. Satyasundaram (1999) “Rural Development" Himalaya Publishing House, New Delhi.

3. Bhalla. G. S. (1994) "Economic Liberalization and Indian Agriculture" (Ed)

4. John Mellor and Gunvant Desai (1986) “Agricultural Change and Rural Poverty”, Oxford University Press, Bombay.

5. NABARD (1999) “Review of working of Regional Rural Banks”, Mumbai.

6. Ministry of Rural area and Employment “Programs for Change” GoI, New Delhi.

7. Plan Documents, GoI, New Delhi.

Restructuring of Syllabus according to Choice Based Credit System (CBCS) &

Scheme of Instruction and Examination

for

B.A. HISTORY (Regular)

w.e.f. 2016-2017

DEPARTMENT OF HISTORY
MAHATMA GANDHI UNIVERSITY
NALGONDA, TELANGANA.

MAHATMA GANDHI UNIVERSITY, NALGONDA

Model

Scheme of Instruction and Examination

B.A. History (Regular)

Choice Based Credit System (CBCS) Syllabus - w.e.f. 2016-2017

Year	Semester	DSC/GE/ DSE/SEC	Paper	Title	Credits	Hours
I	I	DSC*	Paper - I	History of India (From Earliest Times to c.700 CE)	5	5
	II	DSC*	Paper - II	History of India (c.700 -1526 CE)	5	5
II	III	SEC*	Paper - I	SEC	2	2
		DSC*	Paper - III	History of India (1526-1857 CE)	5	5
	IV	SEC*	Paper - II	SEC	2	2
		DSC*	Paper - IV	History of India (1858-1964 CE)	5	5
III	V	SEC*	Paper - III	SEC	2	2
		GE**	Paper - I	Indian National Movement (1857-1947 CE)	2	2
		DSC*	Paper - V	World History (1453-1815 CE)	4	4
		DSE*	Paper - I A	History of Telangana (From Earliest Times to 1724 CE)	4	4
		DSE*	Paper - I B	Islamic History and Culture (From Earliest Times to the Fall of Ummayads)		
		DSE*	Paper - I C	History of USA (1776-1991 CE)		
	VI	SEC*	Paper - IV	SEC	2	2
		GE**	Paper - II	History of Telangana Movement and State Formation (1948-2014 CE)	2	2
		DSC*	Paper - VI	World History (1815-1950 CE)	4	4
		DSE*	Paper - II A	History of Telangana (1724-2014 CE)	4	4
		DSE*	Paper - II B	Islamic History and Culture (Rise of Abbasids to Crusades)		
		DSE*	Paper - II C	Introduction to Indian Art and Architecture		

* DSC (Discipline Specific Course), SEC (Skill Enhancement Course) & DSE (Discipline Specific Elective) for Students of History.

B.A. (HISTORY) SYLLABUS
Semester - I
History of India (From Earliest Times to c.700 CE)
Discipline Specific Course - Paper - I

Module-I: Definitions - Nature and Scope of History - History and Its Relationship with other Social Sciences - Geographical Features of India – Sources of Indian History: Pre-History – Paleolithic, Mesolithic, Neolithic, Chalcolithic and Megalithic Cultures.

Module-II: Indus Valley Civilization - Its Features & Decline; Early Vedic and Later Vedic Civilizations – Vedic Literature – Society – Economy - Polity – Religion.

Module-III: Rise of New Religious Movements – Charvakas, Lokayathas, Jainism and Buddhism; Mahajanapadas - Rise of Magadha; Alexander's Invasion and Its Impact.

Module-IV: Foundation of the Mauryan Dynasty; Ashoka and His Dharma – Polity – Administration - Society – Economy – Religion – Literature - Art and Architecture; Disintegration of the Mauryan Empire; Post-Mauryan Kingdoms - Indo-Greeks - Kushanas and Kanishka - Society – Economy – Literature – Art and Architecture; The Satavahanas; Sangam Age – Literary Development.

Module-V: Gupta Empire: A Brief Political Survey - Polity and Administration, Social and Economic Conditions, Agriculture and Land Grants - Feudalism, Caste System, Position of Women, Education, Literature, Science and Technology, Art and Architecture - Harshavardana and His Achievements.

Recommended Books:

A.L. Basham, *The Wonder that was India*, Rupa & Co., New Delhi, 2001.
Allchin, Bridget & Raymond, *The Rise of Civilization in India and Pakistan*, CUP, New Delhi, 1996.
E.H. Carr, *What is History*? Penguin Books, England, 1990.
Majumdar, R.C., *History and Culture of the Indian People*, Vols. I, II & & III.
Romila Thapar, *Asoka and the Decline of the Mauryas*, OUP, New Delhi, 1995.
Romila Thapar, *Early India (From the earliest to AD 1300)*.
Romila Thapar, *A History of India*, Vol. I, Penguin Books, New Delhi, 1990.
Upinder Singh, *A History of Ancient and Medieval India*.

B.A. (HISTORY) SYLLABUS
Semester - II
History of India (c.700-1526 CE)
Discipline Specific Course - Paper - II

Module-I: Rise of Regional States: Pallavas, Chalukyas of Badami, Rashtrakutas, Cholas; Local Self Government under Cholas; Society, Economy, Literature, Art and Architecture; Bhakti Movement in South India: Shaiva Nayanars and Vaishnava Alwars.

Module-II: Arab Conquest of Sind, Ghaznavids and Ghoris; Foundation of Delhi Sultanate: Slave, Khaljis, Tughlaqs, Sayyids and Lodis – Polity, Administration, Society and Economy - Art and Architecture - Growth of Education and Literature - Religious Conditions.

Module-III: Bhakti and Sufi Movements and their Impact on Society and Culture - Emergence of Composite Culture.

Module-IV: Kakatiyas – Polity – Administration - Society and Economy - Literature and Religion – Art and Architecture – Yadavas – Hoysalas and Pandyas – Brief History.

Module-V: Vijayanagara – Polity – Administration - Society and Economy – Religion – Art and Architecture – Language and Literature – Bahamanis and their Contribution to the Deccan Culture.

Recommended Books:

A.L. Basham, *The Wonder that was India*, Rupa & Co., New Delhi, 2001.
Irfan Habib, *Medieval India-I*, OUP, Delhi, 1999.
K.A. Nilakanta Sastri, *A History of South India*.
Majumdar, R.C., *History and Culture of the Indian People*, Vols. I, II & & III.
Romila Thapar, *Early India (From the earliest to AD 1300)*.
Satish Chandra, *Medieval India (From Sultanate to the Mughals)*, Part-I, Har-Anand Publications, New Delhi, 1997.
Upinder Singh, *A History of Ancient and Medieval India*.
Vipul Singh, *Interpreting Early and Medieval India*.

Telugu:

A. Bobbili and others, *Bharatha Desha Charitra upto A.D. 1526*, Telugu Academy, Hyderabad, 2003.
D.D. Kosambi, *Bharatha Desha Charitra Parichaya Vyasalu*, Hyderabad Book Trust, Hyderabad, 1996.

B.A. (HISTORY) SYLLABUS
Semester - III
History of India (1526-1857 CE)
Discipline Specific Course - Paper - III

Module-I: Establishment of Mughal Dynasty - Sources – Shershah Sur and His Reforms - Brief Survey of Political History of Mughals – Akbar, Shah Jahan and Aurangzeb - Polity - Administration – Society – Economy – Technological Developments - Religion – Hindu-Muslim Relations – Emergence of Composite Culture – Education – Language and Literature – Art and Architecture - Disintegration of Mughal Empire.

Module-II: Rise of Regional Powers - Marathas – Shivaji and His Administration – Peshwas - Sikhs.

Module-III: Advent of European Powers - Portuguese, Dutch, English and French, Anglo-French Rivalry - Expansion and Consolidation of British Power – Wellesley's Subsidiary Alliance – Dalhousie's Doctrine of Lapse.

Module-IV: Three Stages of Colonialism – Mercantilism - Free Trade Policies – Finance Capital - Land Revenue Settlements – Cornwallis and Permanent Revenue Settlement; Thomas Munroe and Ryotwari; Mahalwari System – Changes in the Agrarian Economy and Condition of Peasantry – Famines.

Module-V: Decline of Rural Cottage Industries and Urban Handicrafts - Growth of Railways, Roads, Communication – Modern Industries – Coal Mines, Textiles, Iron and Steel, etc. - Anti-Colonial Upsurge - 1857 Revolt – Nature, Causes and Results.

Recommended Books:

A.L. Srivastava, *History of India from A.D. 1000 to 1707*.
A.R. Desai, *Social Background of Indian Nationalism*.
Bipan Chandra, *A History of Modern India*.
Harbans Mukhia, *The Mughals*.
John F. Richards, *The Mughal Empire*, CUP, New Delhi, 1995.
R.C. Majumdar (ed.), *A History and Culture of India People*, Bharatiya Vidya Bhavan Series (Relevant Vols.).
R.C. Majumdar, H.C. Raychaudhuri & K. Datta, *An Advanced History of India*, Macmillan, Madras, 1995.
Satish Chandra, *Medieval India*, Vol. II.
Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.
Tarachand, *A History of the Freedom Movement in India*, Four Volumes.
V.D. Mahajan, *History of Medieval India (Sultanate Period and Mughal Period)*.
V.D. Mahajan, *Modern Indian History*.

Telugu:

B. Laxminarayana Rao, *Bharatadesa Swathantra Charitra* (Part-3), (Trans.), Telugu Academy, 2005.
Bipan Chandra, *Adhunika Bharatadesa Charitra* (Translation Sahavasi), Hyderabad Book Trust.
J. Durga Prasad and Others, *Bharatadesa Charitra (1526-1964 A.D.)*, Telugu Academy, 2006.
V. Rama Krishna Reddy, *Bharatadesa Charitralo Mukhya Ghattalu*, Telugu Academy, 2005.

B.A. (HISTORY) SYLLABUS
Semester - IV
History of India (1858-1964 CE)
Discipline Specific Course - Paper - IV

Module-I: Queen's Proclamation – Beginning of Colonial Rule – Introduction of Western Education – Role of Christian Missionaries – Press, Communication and Emergence of Middle Classes - Lytton and Rippon: Impact of their Policies.

Module-II: Socio-Religions Reform Movements – Brahma Samaj - Arya Samaj - Theosophical Society - Ramakrishna Mission - Aligarh Movement; Anti-Caste Movements - Jyotibha Phule - Narayana Guru - Periyar Ramaswamy Naicker and Dr. B.R. Ambedkar.

Module-III: Factors for the Rise of Nationalism – Formation of Indian National Congress – Three Phases of Freedom Struggle: Moderate Phase, Extremist Phase and Gandhian Era - Non-Cooperation, Civil Disobedience and Quit Indian Movement; Indian National Army and Subhash Chandra Bose.

Module-IV: Revolutionary Movement: Gadhar Party – Bhagath Singh – Chandra Sekhar Azad and Others; Left-Wing Movement – Rise of Socialist and Communist Parties - Peasant and Workers Movements.

Module-V: Emergence of Communal Politics and Mohd. Ali Jinnah – Prelude to Partition of India - Sardar Vallabhai Patel and Integration of Princely States into Indian Union – Republic of India – Jawaharlal Nehru and His Policies.

Recommended Books:

A.R. Desai, *Social Background of Indian Nationalism*, Popular Prakashan Pvt. Ltd., Mumbai, 2002.

Bipan Chandra (et.al.), *India's Struggle for Independence*, Penguin Books, Kolkata, 2001.

Bipan Chandra, *A History of Modern India*.

Kenneth Jones, *Social and Religious Reform Movements in India*.

R.C. Majumdar (ed.), *A History and Culture of India People*, Bharatiya Vidya Bhavan Series (Relevant Vols.).

R.C. Majumdar, H.C. Raychaudhuri & K. Datta, *An Advanced History of India*, Macmillan, Madras, 1995.

S. Gopal, *Jawaharlal Nehru – A Biography*.

Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.

Tarachand, *A History of the Freedom Movement in India*, Four Volumes.

V.D. Mahajan, *Modern Indian History*.

Telugu:

B. Vijaya Bharati, *Mahatma Jyothirao Phule* (Translation), Hyderabad Book Trust, 2004.

Bhoopati Laxminarayana Rao, *Bharatadesa Swathantra Charitra* (Part – 3), (Translation), Telugu Academy, 2005.

Bipan Chandra, *Adhunika Bharatadesa Charitra* (Translation Sahavasi), Hyderabad Book Trust.

J. Durga Prasad and Others, *Bharatadesa Charitra (upto 1526-1964 A.D.)*, Telugu Academy, 2006.

V. Rama Krishna Reddy, *Bharatadesa Charitralo Mukhya Ghattalu*, Telugu Academy, 2005.

B.A. (HISTORY) SYLLABUS
Semester - V
Indian National Movement (1857-1947 CE)
Generic Elective - Paper - I

Module-I: 1857 Revolt – Causes – Consequences - Factors for the Rise of Nationalism – English Education – Communications, News Papers – Economic Exploitation – Socio-Religious Reform Movements – Political and Administrative Unity - Emergence of Educated Intelligentsia.

Module-II: Formation of Indian National Congress – Its Aims & Objectives - Three Phases of India's Freedom Struggle – Moderates and Extremists – Their Ideology**:** Constitutional Type of Agitation – Vandemataram and Home Rule Agitations.

Module-III: Emergence of Gandhi – His Ideology, Non-Cooperation and Civil Disobedience Movements – Role played by Women - The Militant Nationalists – Their Ideology – Bhagath Singh – Rise of Left Ideology.

Module-IV: Origin of Peasant and Tribal Movements – Growth of Working Class Movement - Azad Hind Fauz – Subash Chandra Bose - Origins of Communalism – Factors for the Rise of Communalism – All India Muslim League and Hindu Mahasabha – Their Activities.

Module-V: Second World War – Quit India Movement - Cripps Proposals; Cabinet Mission; Partition and Indian Independence.

Recommended Books:

A.R. Desai, *Social Background of Indian Nationalism*, Popular Prakashan Pvt. Ltd., Mumbai, 2002.
Bipan Chandra, *Nationalism and Colonialism in Modern India*, Orient Longman, New Delhi, 1979.
Bipan Chandra, *India's Struggle for Independence*, Penguin Books, Kolkata, 2001
Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.
Sekhar Bandyopadhyay, *National Movement in India*, Oxford University Press, New York, 2009.
Sekhar Bandyopadhyay, *From Plassey to Partition*, Orient Longman Pvt. Ltd., New Delhi, 2004.
Amles Tripathi, Barun De and Bipin Chandra, *Freedom Struggle*, National Book Trust, 2007.
D. Rothermund, *The Phases of Indian Nationalism and Other Essays*, Nachiketa Publications, Bombay, 1970.
R. Suntherlingam, *Indian Nationalism – An Historical Analysis*, Vikas Publishing House, New Delhi, 1983.
D.N. Dhanagare, *Peasant Movements in India, 1920-1950*, Oxford University Press, New Delhi, 1991.
Ahmed, *Jinnah, Pakistan and Islamic Identity – The Search for Saladin*, Routledge, London, New York, 1997.
Mushirul Hasan (Ed.)., *India's Partition - Process, Strategy and Mobilization*, Oxford University Press, Delhi, 1993.
Kapil Kumar (Ed.)., *Congress and Classes: Nationalism Workers and Peasants*, Manohar Publishers, New Delhi, 1988.
D. Argov, *Moderates and Extremists in Indian Nationalist Movement, 1883-1920*, Asia Publishing House, London, 1967.

B.A. (HISTORY) SYLLABUS
Semester - V
World History (1453-1815 CE)
Discipline Specific Course – Paper - V

Module-I: Fall of Constantinople (1453 C.E.) – Beginning of Modern Age in Europe – Geographical Discoveries and Scientific Inventions and their impact on Society – Rise of New Ideas – Spirit of Humanism – Renaissance – Meaning-Causes and Results – Impact of Renaissance on Europe.

Module-II: Reformation Movement – Causes – Martin Luther, John Calvin and Zwingli; Counter Reformation Movement and Ignatius Loyola – Results of Reformation and Counter Reformation.

Module-III: Emergence of Nation States – Causes – Spain – Charles V; England – Henry VIII - Glorious Revolution (1688); France under Bourbons – Louis XIV; Era of Enlightened Despotism – Peter the Great and his Policies – Frederick the Great and his Achievements.

Module-IV: End of Feudalism – Industrial Revolution – Causes for Industrialization in England and Europe – Textile Industry – Working Class Movement – American War of Independence (1776) – French Revolution (1789) – Causes, Course, Results and its Impact. Factors for the Rise of Napoleon – Domestic and Foreign Policies – Fall of Napoleon.

Recommended Books:

V.H.H. Green., *Renaissance and Reformation*.
C.J.H. Hayes., *Modern Europe to 1870*.
H.A.L. Fisher., *A History of Europe*, Vol. I, II and III.
B.V. Rao., *World History*.
K.L Khurana., *Modern Europe*.
L. Mukherjee., *A Study of Europe History 1453-1815*.
Arjun Dev, *History of the World: From the Late Nineteenth to the Early Twenty-First Century*.
Timothy, C.W. Blanning, *The Pursuit of Glory: Europe 1648-1815*.
Eric Hobsbawm, *The Age of Revolutions: 1789-1848*.

Telugu:

Adhunika Prapancha Charitra, Telugu Academy.
Adhunika Eiropa Charitra, Telugu Academy.
History of Modern World, Telugu Academy.
Adhunika Yugaarambham, Telugu Academy.

B.A. (HISTORY) SYLLABUS
Semester - V
History of Telangana (From Earliest Times to 1724 CE)
Discipline Specific Elective - Paper - I (A)

Module-I: Sources – Archaeological and Literary Sources - Geographical Features of Telangana - Pre History – The Age of Satavahanas – Origin – Administration - Society and Economy – Religion - Language & Literature - Art & Architecture

Module-II: Post-Satavahana Period - Ikshvakus – Vishnukundins – A Brief Political History – Society – Economy – Religion - Language & Literature - Art & Architecture – Origin and Early History of Chalukyas of Badami and their Contribution to Culture - Chalukyas of Vemulavada & Mudigonda - Political History – Society – Economy – Religion - Language & Literature - Art & Architecture.

Module-III: Kakatiyas – Origin and Early History – Ganapatideva, Rudramadevi and Prataparudra - Administration - Society – Economy – Language & Literature - Art & Architecture – Sammakka-Sarakka Revolt - Post-Kakatiya Political Developments – Musunuri Nayakas, Recherla Rulers – Their Contribution to Culture.

Module-IV: Qutb Shahis of Golconda – Origin and Political History – Society – Economy - Agriculture – Irrigation – Trade & Commerce – Religion – Language & Literature – Art & Architecture – Political Conditions in Telangana from 1687 to 1724 – Life and Times of Sarvai Papanna.

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Recommended Books:

G. Yazdani, *Early History of Deccan*, 2 Vols.
D. Raja Reddy, *The Study of Satavahana History: The Source Material*.
K. Satyanarayana, *A Study of History and Culture of Andhras*, Vol. I & II.
----------, *History of Minor Chalukyan Families in Andhra Desa*.
Balendru Sekharam, *Andhras through the Ages*.
M. Rama Rao, *Andhra through the Ages*.
K. Gopalachary, *Early History of Andhra Country*.
Parabrahma Sastry, *The Kakatiyas*.
H.K. Sherwani, *History of Qutb Shahis*.
Comprehensive History of Andhra Pradesh, Vol. I to V.
Richard, M. Eaton, *Social History of Deccan*.

Telugu:

Suravaram Pratapa Reddy, *Andhrula Sanghika Charitra*.
P. Sree Rama Sarma, *Andhrula Charitra upto 1330 A.D.*
B.S.L. Hanumantha Rao, *Andhrula Charitra*.
B.N. Sastry, *Recharla Padmanayukulu*.
Comprehensive History of Andhra Pradesh, Vol. I to V.

B.A. (HISTORY) SYLLABUS
Semester - V
Islamic History and Culture (From Earliest Times to the Fall of Ummayads)
Discipline Specific Elective - Paper - I (B)

Module-I: The Scope of Islamic History – Geographical Conditions of Arabic – Pagan Civilization and Islam – Political and Social Conditions before the Prophet.

Module-II: Early Life of Prophet Muhammad – Mecca period – Migration to Madina – the Holy Quran – the Battle of Badr-Conquest of Mecca – Conditions of Arabic at the death of Prophet-Prophet Muhammad as Politician, Social Reformer and Leader.

Module-III: The Era of Pious Khalifas – Abu-Bakr, Umar – Further expansion – Osman Ali their achievements – The Struggle for power between Syria and Al-Iraq and Hijaz Administrative System under Khalifas.

Module-IV: The Ummayad Khalifas – Mua' Wiyah-Yazid-I-Battle of Karbala-Marwan-I, Abdul Malik and his achievements – Causes for the fall of Khalifas - Al-Walid-I – Suleman-Ibn-ul-Azi-Hisham and his relations with Byzantine-Conquests in East and West-Development of Society and growth of Fine Arts – Marwan-II and the fall of Ummayads – Administrative System under Ummayads – Society under Ummayads.

Recommended Books:

Amir Ali., *History of Islamic People*.
P. Hitti., *History of Arabs.*
K. Ali., *A Study of Islamic History*.
H.G. Wells., *The Outlines of History*.
Carom Aamstrong., *History of Prophet Mohammad*.
Huart, C.J., *History of Arabic Literature*.
Lane Poole (ed.)., *Speeches and Table Talk of Prophet Mohammad*.
Lamb, H., *The Crusades, Iron Men and Saints*.
Stevenson, W.B., *The crusades in the East*.
Barness., *The History of Western Civilization*, Vol. I & II.

B.A. (HISTORY) SYLLABUS
Semester - V
History of USA (1776-1991 CE)
Discipline Specific Elective - Paper - I (C)

Module-I: American Revolution – Causes – Consequences – Formation of U.S.A. – Confederation of States – George Washington, Alexander Hamilton – Thomas Jefferson - Administration – War of 1812 and Its Revolts.

Module-II: Nation Building Process 1815-1865 - The Monroe Doctrine – Jacksonian Democracy - West Ward Movement – South and North Divergence – The Missouri Compromise – Civil War 1861-65; President Abraham Lincoln - Reconstruction of the South America – The Economic Revolution – Industrialization - American Labour Movement - Agrarian Revolution.

Module-III: Emergence of Modern America 1890-1919 - The Populist Party and Its Programmes – Progressive Movement – Imperialism in Cuba – Panama Canal Issue – Woodrow Wilson – USA in World War-I - USA and League of Nations.

Module-IV: Inter War Period 1919-1939 –Washington Disarmament Conference – Kellogg Briand Pact – The Great Depression – Franklin Roosevelt and the New Deal - U.S.A. in the World War-II – Emergence of USA as World Power – Cold War – Collapse of USSR, 1991 – Emergence of Uni-Polar World.

Recommended Books:

Charles, A. Beard & Mary R. Beard, *The Rise of American Civilization*.
Merle Curti, *The History of the United States of America*, (Two volumes).
----------, *The Growth of American Thought*.
Henry William Elson, *History of the United States of America*.
Richard Hofstadter, *The Age of Reform*.
K.V. Feulkne, *American Economic Theory*.
Sanford, *History of the United States of America*.
Samuel Eliot Morison & Henry Steele Commager, *Growth of the American Republic*.
F.J. Turner, *The Frontier in American History*.
Henry Steele Commager, *Documents of American History*.
Dexter Parkins, *A History of Munroe Doctrine*.
Glintron Ressitar, *Conservatism*.
Howall, *History of the U.S.A. (From Wilderness to World Power).*
Bombord Parks, *History of America*.
B.P. Dalal, *Glimpses of American History*, Vol. I & II.
Arjun Dev, *History of the World: From the Late Nineteenth to the Early Twenty-First Century*.

B.A. (HISTORY) SYLLABUS
Semester - VI
History of Telangana Movement and State Formation (1948-2014 CE)
Generic Elective - Paper - II

Module-I: Historical Background: Telangana its Geographical features, Social, Political, Economical and Cultural Conditions – Origin of Mulki-Non-Mulki issue - Farman of 1919 – Merger of Hyderabad State into Indian Union in 1948; Employment Policies under Military Rule and Vellodi, 1948-52; Violation of Mulki-Rules and Its Implications.

Module-II: Hyderabad State – Formation of Popular Ministry under Burgula Ramakrishna Rao and 1952 Mulki-Agitation; City College Incident – Its importance, Jagan Mohan Reddy Committee Report, 1953 – Demand for Telangana State – States Reorganization Commission (SRC) and its Recommendations – Dr. Ambedkar's views on smaller states – Formation of Andhra Pradesh, 1956; Gentlemen's Agreement and its Provisions Telangana Regional Committee, Composition, Functions and Performance – Violation of Safeguards – Post – 1970 Socio-Economic Scenario in Telangana – Origins of Telangana Agitation – 1969 Agitation for Separate Telangana, Role of Intellectuals, Students and Employees.

Module-III: Formation of Telangana Praja Samithi and Spread of Telangana Movement – All Party Accord – GO 36 – Suppression of 1969 Telangana Movement and its Consequences – The Eight Point and Five-Point Formulas – Implications – Six Point Formula 1973, and its Provisions; Article 371-D, Presidential Order, 1975 Officers Committee Report – GO-610 (1985), its Provisions and Violations Anti-Landlord Struggles in North Telangana – Alienation of Tribal Lands and Adivasi Resistance – Komaram Bheem.

Module-IV: Rise of Regional Parties in 1980's and Changes in the Political, Socio-Economic and Cultural fabric of Telangana, Liberalization and Privatization Policies and their consequences – Regional disparities and imbalances – Public awakening and Intellectual reaction against discrimination – formation of Civil Society Organizations Articulation of separate Telangana Identity; Telangana Information Trust – Telangana Aikya Vedika, Telangana Maha Sabha – Warangal Declaration – Role of Osmania and Kakatiya University Students and Others.

Module-V: Formation of Telangana Rashtra Samithi in 2001 TRS in UPA – Girglani Committee – Telangana Employees Joint Action Committee – Telangana in Election Manifestos – Political Parties - Dalit-Bahujan Sanghams and Grass root organizations for the cause of Telangana – Role of Telangana Political Joint Action Committee – Cultural expressions in Telangana Movement – Role of various social groups in the transformation of the agitation into a mass movement – Forms of Protest Sakala Janula Samme, Non-Cooperation Movement; Million March, etc. – All Party Meeting – Sri Krishna Committee and its Recommendations, Parliamentary proceedings, Declaration of Telangana State, Andhra Pradesh State Reorganization Act, 2014 – Formation of Telangana State.

Recommended Books:

Karen Leonard, *Hyderabad and Hyderabadis*.
V.K. Bawa, *The Last Nizam.*
Lucien Benichow, *From Autocracy to Integration: Hyderabad, 1038-48*.
K.V. Narayan Rao, *Emergence of Andhra Pradesh*.
A.V. Ramana Rao, *Economic Development of Andhra Pradesh*, 2 Volumes.
Ananda Rao, Thota, *Proceedings of the Telangana University Colleges Teachers Convention*.
Ch. Hanumantha Rao, *Regional Imbalances – Telangana*.
Gautham Pingle, *Fall and Rise of Telangana*.
K. Jayashankar, *Telangana Rashtram – Oka Demand* (**Telugu**).
V. Prakash, *Telangana: Udyamalacharitra Rashtra Avirbhavam*, (**Telugu**).

B.A. (HISTORY) SYLLABUS
Semester - VI
World History (1815-1950 CE)
Discipline Specific Course - Paper - VI

Module-I: Congress of Vienna (1815) – Principles and Impact; Metternich and his System – 1830 and 1848 French Revolutions: Unification of Italy – Role of Joseph Mazzini, Count Cavour and Garibaldi; Unification of Germany – Role of Bismarck; Significance of the Unification Movements.

Module-II: Factors responsible for the outbreak of First World War (1914-18) – Results – Treaty of Versailles – Its Provisions and Consequences; Russian Revolution (1917) – Causes – The role of Lenin – Results; League of Nations (1920) – Its Achievements and Failures.

Module-III: Europe between World Wars: Turkey under Mustafa Kamal Pasha - The Great Economic Depression and its Impact - Mussolini and the Rise of Fascism in Italy - Hitler and Nazism in Germany - Militarism in Japan.

Module-IV: Second World War – Causes and Results; Establishment of United Nations Organization (1945) – Its Aims and Achievements; Cold War and Its Impact; Colonization of Asia - India and China under Colonial Rule, Role of Gandhi in Indian National Movement (1920-1947); Sun-Yat-Sen and His Ideas; Role of Mao-Tse-Tung in Chinese Revolution – 1949.

Recommended Books:

David Thompson., *Europe since Napoleon*.
C.D.M. Kettleby., *History of Modern Times*.
H.A.L. Fisher., *A History of Europe*, Vol. I, II, and III.
C.J.H. Hayes., *Contemporary Europe since 1870*.
L. Mukherjee., *A Study of Europe History 1453-1815*.
B.V. Rao., *World History*.
K.L Khurana., *Modern Europe*.
Tony Judt, *Postwar: A History of Europe since 1945*.
Eric Hobsbawm, *The Age of Revolutions: 1789-1848*.
Arjun Dev, *History of the World: From the Late Nineteenth to the Early Twenty-First Century*.

Telugu:
Adhunika Prapancha Charitra, Telugu Academy.
Adhunika Eiropa Charitra, Telugu Academy.

B.A. (HISTORY) SYLLABUS
Semester - VI
History of Telangana (1724-2014 CE)
Discipline Specific Elective - Paper - II (A)

Module-I: Foundation of Asaf Jahi Dynasty – Nizam-ul-Mulk to Mir Mahaboob Ali Khan – Nizam-British Relations – Salarjung Reforms - Modernization of Hyderabad – 1857 Revolt and Adivasi Rebellion – Ramji Gond – Rekapalli Revolt - The Rule of Mir Osman Ali Khan – Agriculture, Irrigation, Modern Industries and Economic Development – Coal Mines, Railways, Roads, Posts and Telegraph – Educational Reforms – Osmania University – Public Health.

Module-II: Social, Cultural and Political Awakening in Telangana – Press, Journalism and Library Movements – Arya Samaj and Its Activities – Ittehad-ul-Muslimeen – Bhagya Reddy Verma and Dalit Movements - The Role of Andhra Maha Sabha – Hyderabad State Congress – Political Developments in Hyderabad State – Administrative and Constitutional Reforms – Mulki-Non-Mulki Issue 1930 – Vandemataram Movement – Communist Party and Its Activities – Andhra Mahila Sabha and Women's Movement.

Module-III: Anti-Nizam and Anti-Feudal Struggles – Telangana Peasants Armed Struggle 1946-51 – Revolt by Kumaram Bheem – Razakars and Their Activities – Police Action, 1948 – Formation of Popular Ministry in 1952 – Assertion of Mulki Identity and the City College Incident 1952 – Merger of Telangana and the Formation of Andhra Pradesh 1956.

Module-IV: Discrimination, Dissent and Protest – Violation of Gentlemen's Agreement – Agitation for Separate Telangana State: Formation of Telangana Praja Samithi – Role of Intellectuals, Students and Employees in 1969 Movement - Second Phase Movement for Separate Telangana – Formation of Various Associations – Telangana Aikhya Vedika – Telangana Jana Sabha - Telangana Rashtra Samithi 2001 - Role of Osmania and Kakatiya University Students and Others - Formation of Telangana Political Joint Action Committee and Its Role in the Movement - Mass Mobilization – Sakala Janula Samme – Million March – Sagara Haram, Chalo Assembly – Sri Krishna Committee and Its Recommendations – December 2009 Declaration and Later Developments - The Formation of Telangana State, June 2014.

Suggested Readings:

V.K. Bawa, *The Last Nizam.*
Sarojini Regani, *Nizam British Relations*.
----------, *Highlights of the Freedom Movement in Andhra Pradesh*.
Bharati Ray, *Hyderabad and British Paramountacy*.
N. Ramesan, *Hyderabad Freedom Struggle*, Vol. I to IV.
Barry Pavier, *The Telangana Movement 1944-51*.
B.S. Venkat Rao, *Our Struggle for Emancipation*, Vol. I & II.
I. Tirumali, *Against Lord and Dora*.
C.V. Subba Rao, *The Social Context of Industrialization, Hyderabad, 1875-1948*.
Gautam Pingle, *The Fall and Rise of Telangana*.
Comprehensive History of Andhra Pradesh, Vol. VI & VII.

Telugu:

Telangana Charitra – Sanskruti, Telugu Academy.
B.N. Sastry, *Bharatadesa Charitra – Sanskruthi – Sansthanamulu*.
Veldurthi Manikya Rao, *Hyderabad Swathantrodyama Charitra*.
Karra Ella Reddy, *Telangana Sarvaswam.*
Raavi Narayana Reddy, *Veera Telangana Anubhavalu - Gnapakalu*.
Madapati Hanumanth Rao, *Telangana Andhrodyama Charitra*, Vol. I & II.
M. Narsing Rao, *50 Sanwathsarala Hyderabad*.
Comprehensive History of Andhra Pradesh, Vol. VI & VII.

B.A. (HISTORY) SYLLABUS
Semester - VI
Islamic History and Culture (Rise of Abbasids to Crusades)
Discipline Specific Elective - Paper - II (B)

Module-I: The Advent of Abbasids – Al-Saffah and Al-Mansur Al-Mahdi-Revolt-in Khurasan – Byzantine Raid-Al-Hasi – his Achievements – Haroon-Al-Rasheed-His Political and Neo-Political Achievements – Rise and fall of Baramkids – Estimate of Haroon – Al-Rasheed's Character.

Module-II: Al-Amin – Civil War between Al-Amin and Al-Mamun-Achievements of Al-Mamun-later Khalifa of Abbasid Dynasty-Al-Mustas – War with the Byzantine Empire-Revolt of Tabaristan – the Buwaids – Azad-ud-Daula – the Seljuqs – Malekshah.

Module-III: The Crusades – Causes – Course of Crusades – Imaduddin – Zengi-Nuruddin – Mahmud – The Results of Crusades – Fall of Abbasid Dynasty - The Abbasid State – Political and Military system – Judicial Reforms – Education – Socio-Economic Conditions – Growth of Arts and Architecture under Abbasids – Significance of Scientific Spirit.

Module-IV: The Ummayads in Spain – Abdur – Rahman – Hisham I-War with the franks – Cultural progress in Muslim Spain – Fatimids of Egypt-Al-Mahsi-Al-Qaim-Al-Fal of Fatimids (1171 C.E.) – Administration and Society under Fatimids.

Recommended Books:

Amir Ali., *History of Islamic People*.
P. Hitti., *History of Arabs*.
K. Ali., *A Study of Islamic History*.
H.G. Wells., *The Outlines of History*.
Carom Aamstrong., *History of Prophet Mohammad*.
Huart, C.J., *History of Arabic Literature*.
Lane Poole (ed.)., *Speeches and Table Talk of Prophet Mohammad*.
Lamb, H., *The Crusades, Iron Men and Saints*.
Stevenson, W.B., *The Crusades in the East*.
Barness., *The History of Western Civilization*, Vol. I & II.

B.A. (HISTORY) SYLLABUS
Semester - VI
Introduction to Indian Art and Architecture
Discipline Specific Elective - Paper - II (C)

Module-I: Introduction to Art and Architecture - Pre-Historic and Proto-Historic Art – Harappan Arts and Crafts - Indian Art and Architecture (c.600 BCE-1200 CE) – Major Developments in Stupa and Cave architecture - Temple Art & Architecture – Early Indian Sculpture – Style and Iconography – Early Illustrated Manuscripts and Mural Painting Traditions - Numismatic Art.

Module-II: Indian Art & Architecture (c.1200 CE-1800 CE) - Sultanate and Mughal Architecture – Miniature Painting Traditions – Mughal – Rajasthani – Pahari - Introduction to Fort – Palace - Haveli Architecture.

Module-III: South Indian Art & Architecture – Unique Features – Satavahana, Pallava, Chalukyan, Hoyasala, Kakatiya, Vijayanagara, Bahmani and Qutb Shahis – Amaravathi, Mahabalipuram, Badami, Warangal, Hampi, Gulbarga and Hyderabad – Influence of Islam on Indian Art & Architecture.

Module-IV: Modern and Contemporary Indian Art & Architecture - Colonial Period – Art Movements – Bengal School of Art – Progressive Artists Group, etc. – Major Artists and Their Art Works – Popular Art Forms (Folk Art Traditions) - Indo-European architecture.

Recommended Books:

Mitter, Partha, *Indian Art*, Oxford History of Art Series, OUP, 2001.
Dhar, Parul Pandya (ed.), *Indian Art History: Changing Perspectives*, D.K. Printworld, New Delhi, 2011.
Beach, M.C., *The New Cambridge History of India: Mughal and Rajput Painting*, Vol. I, Part-3, CUP, 1992.
Ray, Niharranjan, *An Approach to Indian Art*, Calcutta, 1970.
A.K. Coomaraswamy, *Introduction to India Art*, Kessinger Publishing, 2007.
----------, *Early India Architecture: Cities and City Gates*, South Asian Books, 2002
Bindia Thapar, *An Introduction to Indian Architecture*, Periplus Asian Architecture Series, 2005.
Devangana Desai, *The Religious Imagery of Khajuraho*, Munshiram Manoharlal Publishers Pvt. Ltd., 2006.

MAHATMA GANDHI UNIVERSITY, NALGONDA
MODEL QUESTION PAPER FOR
B.A. HISTORY (CBCS) EXAMINATION w.e.f. 2016-2017
(For All Semesters)

Time: 2 Hours Max. Marks : 40

Section – A **(5 x 2 = 10 Marks)**
(Short Answer Type)

I. Answer any five of the following Questions:

1.
2.
3.
4.
5.
6.
7.

Section – B **(5 x 6 = 30 Marks)**
(Essay Answer Type)

II. Answer all the Questions:

8 (a)

or

(b)

9 (a)

or

(b)

10 (a)

or

(b)

11 (a)

or

(b)

12 (a)

or

(b)

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MODEL QUESTION PAPER FOR
B.A. HISTORY (CBCS) w.e.f. 2016-2017
Internal Assessment Test
(For All Semesters)

Time: 30 Minutes Max. Marks : 10

I. Map-Pointing and Assignment. (5 Marks)

(a) Assignment Topic should be from the Syllabus.

(b) One aspect from each Module (Total 5).

II. Reporting on Local History. (5 Marks)

Visit, prepare a brief report on any aspect of local history.

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DEPARTMENT OF COMMERCE, M.G.U.

Structure of B.A.(O.M.) (CBCS) FOR

Mahatma Gandhi University Nalgonda (w.e.f. Academic year 2016-17)

B.A. OFFICE MANAGEMENT PROGRAMME

SI.NO	CODE	COURSE TITLE	COURSE TYPE	HPW	CREDITS
FIRST YEAR					
SEMESTER -I					
1	BAOM 101	OFFICE MANAGEMENT & CORRESPONDENCE-I	DSC-1A	6	6
		TOTAL		**6**	**6**
SEMESTER-II					
2	BAOM102	OFFICE MANAGEMENT & CORRESPONDENCE-II	DSC-1B	6	6
		TOTAL		**6**	**6**
SECOND YEAR					
SEMESTER - III					
3	BAOM103	ACCOUNTING AND OFFICE MANAGEMENT-I	DSC-2C	6	6
		TOTAL		**6**	**6**
SEMESTER -IV					
4	BAOM104	ACCOUNTING AND OFFICE MANAGEMENT-II	DSC-2D	6	6
		TOTAL		**6**	**6**
THIRDYEAR					
SEMESTER - V					
5	BAOM105	FUNDMENTAL OF IT-I		5	5
6	BAOM106	FRONT OFFICE MANAGEMENT-I	DSC-1E	5	5
		TOTAL		**10**	**10**
SEMESTER - VI					
7	BAOM107	FUNDMENTAL OF IT-II		5	5
8	BAOM108	FRONT OFFICE MANAGEMENT-II	DSC-1F	5	5
		TOTAL		10	10
		GRAND TOTAL		44	44

SEMESTER –I

BA (OM) CBCS Syllabus **Faculty of commerce**

Paper code- BAOM-101 **Maximum Marks 50**

PPW: 6 **Exam duration: 3hours**

PAPER B.A.(OM)-OFFICE MANAGEMENT& CORRESPONDENCE-I

Objective: to help students to acquire basic knowledge of office Management and commercial correspondence.

UNIT-I-Introduction to office management

Introduction: Meaning of office – Function of office –relation of office with other departments-Importance of office- Elements of office management-role of office manager.

UNIT-II-OFFICE ACCOMMODATION

Location of office –office layout-office Environment-office building-working conditions-furniture and fitting-safety arrangements-Security and Secrecy –open and private office.

UNIT-III-OFFICE SYSTEMS

Office forms-stationary-continuous stationary-office Stationary and supplies- systems and procedures. Records management-Filing –Essential of good filling systems.

UNIT IV-OPERATIONAL ASPECTS

Definition of indexing- essentials of a good indexing systems-Selection of suitable indexing systems-Types of index-Records retention and micro filling.

UNIT –V-Principles of office Organization

Office organization: Steps of organizing –Benefits of sound organization-principle of organizing an office-Process of organizing-Methods of departmentalization-Organization structure

Suggested Readings:

1. B.N.Tandon: Manual of office Management and correspondence S:chand&co
2. R.K.Chopra: Office Management, Himalaya Publishing House.

SEMESTER –II

BA (OM) CBCS Syllabus **Faculty of commerce**
Paper code- BAOM-102 **Maximum Marks 50**
PPW: 6 **Exam duration: 3hours**

PAPER B.A. (OM)-OFFICE MANAGEMENT& CORRESPONDENCE-II

Objective: to help students to acquire basic knowledge of office Management and commercial correspondence.

UNIT-I Introduction to office correspondence

Introduction: Meaning of Office correspondence-Internal – Essential Characteristic and structure of good commercial letters- Different types of circular letters.

Unit –II OFFICE TRADE

Trade inquiries –Quotations-Purchase order- important terms used in office like advisory note ,Memorandum, cash on delivery, cash and carry etc.

UNIT-III COMMERICAL CORRESPONDENCE

Commercial Correspondence with outside the film-Electing information about Customers-Complaints letters from customers –Status inquires –Correspondence with banks Correspondence with government Departments correspondence with the Insurance Firm - Insurance claim.

UNIT –IV CURRICULUM VITAE

Preparation of curriculum vitae-Scrutinizing applications-Letters relating to calling for a post – Calling for interview-Appointment order-Termination orders.

UNIT-V DELEGATION OF AUTHORITY

Meaning –Significance- Elements of delegation –importance of delegation- Principle of Delegation of authority -Difficulties in delegating-–Centralization of authority-Decentralization of authority

Suggested Readings:

1. B.N.Tandon: Manual of office Management and correspondence S:chand&co
2. R.K.Chopra: Office Management, Himalaya Publishing House.

SEMESTER –III

BA (OM) CBCS Syllabus **Faculty of commerce**

Paper code- BAOM-103 **Maximum Marks 50**

PPW: 6 **Exam duration: 3hours**

ACCOUNTING AND OFFICE MANAGEMENT -I

Objective: to help students to acquire basic knowledge of office Accounting.

UNIT –I Basic of Accounting

Need for Accounting- types of accounts – Rules of Debit and Credit-Accounting Principles – Accounting Standards –Accounting concepts and conventions.

UNIT –II Accounting system

Definitions and terms- recording Transitions in a journal from the given vouchers- filing, Numbering and arranging vouchers

UNIT-III LEDGER AND SUBSIDIARY BOOKS

Posting tractions' ledger accounts –Preparation of cash Book single Colum, two Colum and three Colum cash book-Preparation of Receipts and payment account Purchase Book, sales book Returns Inwards, Returns out wards and journal proper.

UNIT –IV Bank Reconciliation statement

Bank Reconciliation statement-Need-Reasons for difference between cash book and pass book balances -Problems on favorable and overdrafts.

UNIT –V TRIAL BALANCE AND FINAL ACCOUNTS

Balancing the ledger accounts – Preparation of trial Balance – Preparation of trading and profit and loss account and balance sheet –Adjustment entries –Preparation of Income and Expenditure account from Receipts and Payment Account for Non Business Organization.

Suggested Readings:

Sharma and shashi Kumar gupta: Accountancy, Kalyani Publishers
R.L. Gupta: Accountancy Sultan chand and sons

SEMESTER –IV

BA (OM) CBCS Syllabus **Faculty of commerce**

Paper code- BAOM-104 **Maximum Marks 50**

PPW: 6 **Exam duration: 3hours**

ACCOUNTING AND OFFICE MANAGEMENT –II

Objective: to help students to acquire basic knowledge of office compurtized Accounting.

UNIT-I: Introduction to Tally

Installing Tally –Requirements for installing Tally –procedures for installing Tally –Education mode-chaining Default settings through Tally introductions to tally –opening screen of tally 0creating Company –configuring company.

UNIT-II: Computerized Accounting

Accounting –Menu related to accounts managing Groups –Working with ledger –cost Categories and cost centers vouchers in Tally-Inventory information-stock groups, stock categories multiple stock categories Go down purchase sales orders invoice reports.

UNIT-III:AccountingInformation

Agreeement,offer,acceptance-tender ,quotation purchase order, sales invoice, debit note credit note, cash bill, credit bill acknowledgement –promissory note,chque and bill of exchange crossing a cheque account payee cheque ,sending a cheque for collection , Noting a cheque,Electronic transfer of money

UNIT-IV: Introduction to Auditing

Introduction-Meaning –Definition nature-objective-types-Advantages-Limitations-Internal check-Internal control Internal Audit-Verification of assets and liabilities- Investigations of audit

UNIT-V: Office Accounting

Mortgage-pledge-Bailment Leasing Hire Purchase and Installment –Stock Register-Attendance Register-Pay Roll –Investment Registers –cheque Register Salary Register –Inward Book and outward Book-File Index and other related items.

SEMESTER –V

BA (OM) CBCS Syllabus **Faculty of commerce**

Paper code- BAOM-105 **Maximum Marks 50**

PPW:6 **Exam duration**

FUNDAMENTALS OF INFORMATION TECHNOLOGY-I

Objective: objective of this paper student to acquire fundamental Knowledge of Information technology

UNIT-I: INTRODUCTION INFORMATION TECHONOLOGY

Information Technology-Introduction –Information systems-software and Data-Information technology in Business.

UNIT-II Computer Systems

Computer Systems-Anatomy of computers-Binary Numbers-CPU-Memory-input and putput-Secondary storage.

UNIT-III Operating Systems

Software-types of software-User interface-operating systems-Introduction-Types of Operating Systems-File management –Utilities.

UNIT-IV Ms word and Its use in Office

M.S. Word -Entering and Editing- Search formatting- spell check- mail Merge

UNIT-V Ms EXCEL and its use in office

SPREAD Sheet (Ms-Excel)-Introduction – Application-data-formula-references-formats functions-templates-charts and graphs-database applications-database-Organizations-forms-data validity-checks-reports-Queries

Suggested Readings:

Dennis P.curtain Kim foley, junal sen, Cathleen morin, Informations technology the Breaking wave Tata McGraw hill

SEMESTER –V

BA (OM) CBCS Syllabus **Faculty of commerce**

Paper code- BAOM-106 **Maximum Marks 50**

PPW:6 **Exam duration**

FRONT OFFICE MANAGEMENT-I

Objective: purpose of the paper is to acquaint the student about the front Office management

UN IT –I INTRODUCTION TO BUSINESS

Concepts of plant, firm, Industry, Trade, commerce, Role of Business and Industry in Economic Development –From commerce to E-commerce.

UNIT –II FORMS OF BUSINESS ORGANIZATION

Sole Trade and Hindu Undivided family, Partnership, Joint Stock Company, Cooperative Society-Features, Relative merits and demerits in each of the Business Organization.

UNIT-III INTRODUCTION TO MANAGEMENT

Concepts of Management and administration –Functions of Management-Planning: types of planning Levels of planning.

UNIT –IV Organization MANAGEMENT

Organization: concept of Organization-importance of organization-elements of organization- formal and informal, Organizational hierarchy-Directing –coordination-Controlling.

UNIT -V FRONT OFFICE OPERATION

Importance of front Office (Front Office Manifests the standard of the office) –Staff in Front Office_ Functions of Receptionist. Telephone operation.

Suggested Readings:

Richard H.Hall: Organizations –Strucutures, Process and out comes, person Education

Arias Ramachandra.A and Ramana Murthy.V.V: Industrial Organization management, Tata McGraw Hill

SEMESTER –VI

BA (OM) CBCS Syllabus **Faculty of commerce**
Paper code- BAOM-107 **Maximum Marks 50**
PPW:6 **Exam duration**

FUNDAMENTALS OF INFORMATION TECHNOLOGY-II

Objective: objective of this paper student to acquire fundamental Knowledge of Information technology

UNIT-I Office Equipment and its use in office

Communication-Fax-voice and Information Services-Electronics mail –Group Communication-File exchange –Understanding Band width.

UNIT-II Office networking

Local area networking (LAN)- Architecture – System- Wide Area Network (WAN)- Introduction-Media protocols –Dialup access 0 High Bandwidth Personal communication.

UNIT-III INTERNET and its use in Office

Internet –World wide web- Multimedia-Images, Graphics, Sounds and Music and Video Presentation Devices-MS Power point-Multimedia on web.

UNIT-IV Use of Information Technology in Business

Information Technology in Business –Corporate computing-Transaction processing-IT tool bar management controls-Marketing- Advertising and sales –Design, Production and Manufacturing.

UNIT –V Business on Internet

Business on Internet – Life outside office personal and ethical Issues –Ergonomics-viruses-Intellectual property rights – computer crime –Cryptology.

Suggested Readings:

Dennis P.Curtain kim foley,junal sen ,Cathleen Morin :Information techonology,the Breaking Wave Tata McGraw-Hill

SEMESTER –VI

BA (OM) CBCS Syllabus **Faculty of commerce**

Paper code- BAOM-108 **Maximum Marks 50**

PPW:6 **Exam duration**

FRONT OFFICE MANAGEMENT-II

Objective: purpose of the paper is to acquaint the student about the front Office management

UNIT-I Introduction to FRONT OFFICE MANAGEMENT

Front office & interior management – Security& Fire fighting management – Office Equipment maintains- Annual Maintains Contracts if different equipment in the office

UNIT-II FRONT OFFICE MANAGEMENT Operations

Office locking and key management – Staff Attendance & Punch card management –Transport Management-Hotel Reservations & Accommodation Arrangements – Travel Arrangements.

UNIT –III FRONT OFFICE Operations

Electronic Telephone Exchange - Mail receiving & dispatching _ Receiving the Guests & Hospitality-Maintenance of Visitors log Book – First aid maintenance – Organizing Business Meetings – petty Cash Management

UNIT –IV BASICS OF FINANAICIAL MANAGEMENT

CONCEPT OF Finance – Objectives of finance function – Types of Capital –fixed and working capital estimating the working capital requirements concepts of financial planning and capital structures-Methods and sources of fiancé –Long term fiancé and short term finance.

UNIT –V Introduction to Stock Exchanges

Concept of a Stock exchange –Functions of stock exchange – National stock Exchange of India limited (NSE)- National Association of Securities Dealers Automated Quotation (NASDAQ)-Credit Rating Agencies :CRISIL and ICRA

Suggested Readings:

Richard H.Hall: Organizations –Strucutures, Process and out comes, person Education

Arias Ramachandra.A and Ramana Murthy.V.V: Industrial Organization management, Tata McGraw Hill

MAHATMA GANDHI UNIVERSITY
NALGONDA, TELANGANA STATE
Model Scheme of Instructions and Examination
B.A Political Science (Regular)
Choice Based Credit System (CBCS) Syllabus-for the Academic Year 2016-17

Year	Semester	DSC/DSE/ SEC/GE	Paper	Title	Credits	Hours
I	I	DSC	Paper-I	Political Concepts and Theories	5	5
	II	DSC	Paper-II	Political Concepts and Institutions	5	5
II	III	DSC	Paper-III	Indian Government and Politics	5	5
	IV	DSC	Paper-IV	Indian Government and Politics - II	5	5
III	V	DSC	Paper-V	Indian Political Thought	4	4
		DSE	Paper I-A (Optional)	International Relations	4	4
			Paper I-B (Optional)	Government & Politics in Telangana - I		
	VI	DSC	Paper-VI	Western Political Thought	4	4
		DSE	Paper II-A (Optional)	Contemporary International Relations	4	4
			Paper II-B (Optional)	Government & Politics in Telangana - II		

DSC - Discipline Specific Course
DSE - Discipline Specific Elective

MAHATMA GANDHI UNIVERSITY,NALGONDA

Syllabus for B.A 1st Year
Sub: Political Science, Paper – 1
Political Concepts and Theory
Semester – I

Unit – I: Introduction

A.Political Science: Introduction, Definition, Scope and Importance of Political Science

B. Evolution of Political Science.

C.Political Science as a Science.

Unit-II : Political Science Relations with other Socail Sciences

A. History.
B. Economics
C. Sociology.

Unit - III :Approaches to the study of Political Science:

A. Liberal
B. Marxist
C. Behaviouralism and Post Behaviouralism.

Unit – VI :State :

A.State.
B.Nation.
C.Civil Society.

UNIT-5 : Sovereinty :

A : Kinds,Characteristics.
B : Monism.
C : Pluralism

Books Recommended

1. Principles of Political Science : Prof.A.C. Kapoor
2. Grammar of Politics : Laski H.J.
3. Political Theory : Ashirvadam
4. Political Theory : O.P Gauba
5. Introduction to Political Science : Gettel R.S
6. Theories of Rights : J.Waldron E.D
7. Substance of Politics : A. Appadorai
8. Political Theory : Rajiv Bhargava
9. Political Theory : P.G.Das

MAHATMA GANDHI UNIVERSITY,NALGONDA

Syllabus for B.A 1st Year

Political Concepts and Institutions, Paper – 1

Semester – 2

Unit – 1 : Theories of Origin of State :

A. Divine theory.

B. Evolutionary (Historical) theory.

C. Social Contract theory(Hobbes,Locke,Roussau).

Unit – 2 : Concepts and Institutions

A: Law,Liberty,Eqality.

B : Rights,

C : Power,Authority and Legitimacy.

Unit – 3 : Ideologies

A :Individualism,Anarchism

B :Fascism.

C : Socialism

Unit – 4 : Forms of Governament

A : Democracy.

B : Unitary and Federal

C : Parliamentary and Presidential

Unit-V : Organs of Government

A : Theory of Separation of Powers (Montesquieu)

B: Legislature and Executive.

C: Judiciary: Powers and Functions, Independence of Judiciary, Judicial Review.

Books Recommended

1. Principles of Political Science : Prof.A.C. Kapoor
2. Grammar of Politics : Laski H.J.
3. Political Theory : Ashirvadam
4. Political Theory : O.P Gauba
5. Introduction to Political Science : Gettel R.S
6. Theories of Rights : J.Waldron E.D
7. Substance of Politics : A. Appadorai
8. Political Theory : Rajiv Bhargava
9. Political Theory : P.G.Das

MAHATMA GANDHI UNIVERSITY,NALGONDA.

Syllabus for B.A II Year
Political Science, Paper – II
Indian Government and Politics
Semester – III

Unit - I : Nationalist Movement and Constitutional Development

A : Colonial Rule and Indian National Movement.

B : Making of Indian Constitution.

C:Philosophical Foundations and Salient Features of the Indian Constitution.

Unit - II : Fundamental Rights and Directive Principles

A : Fundamental Rights and Duties

B : Directive Principles of State Policy.

C : Relationship between Fundamental Rights and Directive Principles of State Policy.

Unit - III Union Government

A : President: Elections, Powers and Functions.

B :Parliament: Composition, Powers and Functions.

C. Prime Minister and Council of Minister-Powers and Functions.

D. Supreme Court: Composition, Powers and Functions, Judicial Review, Judicial Activism.

Unit -VI Political Process : A.Nature of Indian Party System.

B.Political Parties : National – Indian National Congress ,BJP,CPI, CPM,BSP.

C .Political Parties : Regional – TRS, TDP, YSRC.

D.Pressure Groups and Media.

Unit - V : Eloctoral Politics - A :Election Commission : Powers and Functions.

B.Voting Behaviour.

C.Electoral Reforms.

A. Books for Reference

B. Prescribed Books

C. 1. Politics in India **:** Rajini Kotari

D. 2. Indian Constitution : M.V.Pylee

E. 3. Indian Government and politics : S.S Awasti

F. 4. Indian Government and politics : K.R.Acharya

G. **Suggested Reading**

H. 1. Indian Government and politics : A.S. Awasthy

MAHATMA GHANDHI UNIVERSITY,NALGONDA.

Syllabus for B.A II Year
Political Science, Paper – 2
Indian Government and Politics- II
Semester- IV

Unit - I : Statutory Commissions for Protection of Rights

A. National Human Rights Commission (NHRC): Emergence, Evolution and Functioning

B. National Commission for Women (NCW) and National Minorities Commission.

C.National SC Commission.

D.National ST Commission

Unit – II : State Government

A. Governor- Powers and Functions.

B. Chief Minister and Council of Ministers: Powers and Functions.

C. Legislature and Judiciary(High Court)

Unit – III : Governament and Politics in Telangana

A : Nizam rule To Emergence of Hyderabad state.

B : State Reorganisation : 1) Fazal Ali Commission 2)Formation of AP

C : Gentlemens Agreement ,Mulki Rules,Six Point Formula.

Unit –IV : Phases of Telangana Movement

A :Telangana Agitation – 1969.

B : Second phase Telangana Agitation -2001-2014.

Unit – V : Role of Political Parties and Joint Action Committees

A : Role of National Parties –INC,BJP,CPI,CPM,NCP,BSP.

B : Role of Regional Parties – TRS,TDP,MIM,YSRCP.

C : Role of JAS's – Political JAC,Student JAC and Other JAC's.

MAHATMA GHANDHI UNIVERSITY,NALGONDA.

Syllabus for B.A. III Year
Political Science, Paper – 3
Indian Political Thought
Semester - V

Unit – I Ancient Indian Political Thought

A :Sources, Features.

B:Manu : Varnadharma and Dandaneeti

Unit – II

A. Kautilya : Saptanga Theory, Statecraft, Mandala Theory.

B. Gautama Budha : Social and Political Ideas, Dhamma and Sangha.

Unit – III Modern Indian Political Thought

A. Raja Ram Mohan Roy and Swamy Dayananda Saraswathi.

B. Mahatma Jyothi Rao Phule

Unit – IV

A. Mohandas Karamchand Gandhi: Ahimsa and Satyagraha.

B. Jawaharlal Nehru: Democratic Socialism.

Unit - V

A. Dr.B.R.Ambedkar: Theory of Caste Annihilation of Caste and State Socialism.

B. Jaya Prakash Narayan : Total Revolution.

Books for Reference

Prescribed Books

1. Political Ideas in Ancient India - R.S Sharma
2. Annihilation of Caste - Ambedkar B.R
3. Indian Political Tradition - D.K. Mehata

Suggested Reading

1. Indian Thought - C. P. Bambri
2. Political Ideologies: Their Origins and Impact – Baradat, Prentice Hall of India

MAHATMA GHANDHI UNIVERSITY,NALGONDA

Syllabus for B.A III Year
Political Science, Paper – 3
Western Political Thought
Semester – VI

Unit – I

A. Plato.

B. Aristotle.

Unit – II

A. St.Thomas Aquinas.

B.Nicolo Machiavelli.

Unit- III Social Contractualists

A.Thomas Hobbes .

B. John Locke .

C. Jean Jacque Rousseau.

Unit - IV Utilitarian's

A. Jeremy Bentham

B. John Stuart Mill

Unit – V Marxist Philosophy

A. GWF Hegel

B. Karl Marx

Books for Reference

Prescribed Books

1. Western Political Thought - Amal Kumar Mukopadhyay
2. A History of political Thought: Plato to Marx, - Mukherjee & Ramaswamy.
3. Western Political Thought - J.P.Sudha

Suggested Reading

1. A history of political Thought - Sabine G.H
2. History of European Political Philosophy - Bandari

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MAHATMA GHANGHI UNIVERSITY,NALGONDA

Syllabus for B.A III Year

Political Science, Paper - IV
International Relations

Semester-V

Unit – I Introduction

A.International Relations: Introduction, Evolution, Nature, Scope and Significance.
B.Emergence of Sovereign State System.

Unit – II History of International Relations

A.Colonialism : Causes, Phases and Impact
B.First World War and Second World War – Causes and Consequences.

Unit – III Post War Developments

A.Decolonization
B.Emergence of Third World : Problems and Prospects.
C.Cold War: Causes, Phases and Impact.

Unit- IV Concepts

A.Power: National Power.
B.Super Power, Bipolarity, Unipolarity, Multipolarity. Regional Power.

Unit – V International Organizations

A.United Nations Organization: Structure and role, Need for Reform
Regional Organizations
B. European Union.
C. South Asian Association for Regional Cooperation (SAARC).

Books for Reference
Prescribed Books

1. International Relations - Vinay Kumar Malhotra.
2. International relations - V. N. Khanna
3. Politics among Nations - Hans J. Margentheu
4. Globalization & India's Foreign Policy - Ravinder Babu

Suggested Reading

1. The Analysis of International Relations - Karl W, Deusch
2. International Relations - Palmer and Parkins
3. International Relations between the two world wars - Carr E. H

MAHATMA GHANDHI UNIVERSITY,NALGONDA.

Syllabus for B.A III Year

Political Science, Paper – IV

Contemporary International Relations

Semester –VI

Unit – I **International Political Economy**

A.Neo Colonialism: North South Dialogue, South – South Cooperation.

B.IBRD, IMF, World Trade Organization (WTO) and MNSs.

C.Globalization

Unit- II International Security

A.Arms Race, Arms Control, Disarmament.

B. Issues in Nuclear Politics.

Unit –III Emerging Areas in International Relations

A.Environment. B.Human Rights. C.Terrorism.

Unit-IV India and World – Foreign Policy

A.India's Foreign Policy- Determinants and Features, Issues, Recent Trends.

B.Non- Alignment: Evaluation, Relevance and Recent Trends.

Unit-V India's Bilateral Relations

A.Ind**ia and** U.S.A**. B.India and** Russia.

C.India and China and Pakistan.

Books for Reference

Prescribed Books

1. International Relations - Vinay Kumar Malhotra.
2. International relations - V. N. Khanna
3. Politics among Nations - Hans J. Margentheu
4. Globalization & India's Foreign Policy - Ravinder Babu

Suggested Reading

1. The Analysis of International Relations - Karl W, Deusch
2. International Relations - Palmer and Parkins
3. International Relations between the two world wars - Carr E. H
4. India Foreign Policy Foreign Service Institute New Delhi India

MAHATMA GANDHI UNIVERSITY

NALGONDA

UNDERGRADUATE PROGRAMME IN PUBLIC ADMINISTRATION

Courses

SYLLABUS OF UNDER GRADUATE PROGRAMME - CBCS IN PUBLIC ADMINISTRATION

1. Name of the Department : Public Administration
2. Name of the Programme : BA (Public Administration)
3. Programme ID : BA-107; BA-207; BA-307; BA-407;
   BA- 502, 507, 507/A/B/C
   BA 602, 607, 608/A/B/C
4. Duration : Three Years
5. AIM of the course :
   - Make the learner to understand the nature and role of Public Administration in the changing socio-economic and political context and in the historical background
   - Understand the impact of political dynamics on administrative processes;
   - Relate the role of public administration to the dynamics of global context;
   - Motivate the students to appear for civil service examinations.

6. Programme Objective

The board objectives of the Undergraduate Programme in Public Administration include:

- Understand public administration theory and concepts from multiple perspectives;
- Acquaint with the functioning of the Indian administration, at central, state and local levels and the responses of these systems in addressing the concerns of the people;
- Acquaint with India's development experience and changing role of administration;
- Understand the interface of theory and practice in Public Administration;
- Develop conceptual, analytical and problem solving abilities among the learners;
- Acquaint the learner with the required knowledge of administrative science and government in action and the contemporary issues in public affairs management and,
- Understand the world of public administration from the public perspective and provide foundation for further studies in Public Administration
- Understand the role of Public Services in the new State of Telangana.

UNDERGRADUATE PROGRAMME IN PUBLIC ADMINISTRATION

PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN B.A. PROGRAMME IN PUBLIC ADMINISTRATION

FIRST YEAR SEMESTER –I				
Code	Course Title	Course Type	HPW	Credits
BA 107	Basics of Public Administration	DSC	5	5

FIRST YEAR SEMESTER –II				
Code	Course Title	Course Type	HPW	Credits
BA 207	Development Dynamics and Emerging Trends	DSC	5	5

SECOND YEAR SEMESTER –III				
Code	Course Title	Course Type	HPW	Credits
BA 307	Union Administration	DSC	5	5

SECOND YEAR SEMESTER –IV				
Code	Course Title	Course Type	HPW	Credits
BA 407	Union Administration	DSC	5	5

THIRD YEAR SEMESTER –V				
Code	Course Title	Course Type	HPW	Credits
BA 502	Indian Constitution and Administration	GE	5+1	6
BA 507	Human Resources Management	DSC	4	4
BA508/A	Rural Governance	DSE	4	4
BA508/B	E-Governance- Concepts	DSE	4	4
BA 508/C	Public Office Administration	DSE	4	4

THIRD YEAR SEMESTER –VI				
Code	Course Title	Course Type	HPW	Credits
BA602	Good Governance	GE	5+1	6
BA 607	Financial and Material Resources Management	DSC	4	4
BA608/A	Urban Governance	DSE	4	4
BA608/B	E-Governance- Case Studies	DSE	4	4
BA608/C	Technology and Office Administration	DSE	4	4

The following Courses are suggested keeping in view the guidelines of the Council for Higher Education, Government of Telangana regarding the common core syllabus. However, to begin with, the **First Four Courses** are suggested to launch the programme and the decision to launch the other **optional course/s** depends on the policy of the University/guidelines of SCHET/enabling provisions in the respective colleges.

Syllabus of the Courses

After broad discussion on the Courses to be offered in the first and second year of undergraduate study (UG) of Public Administration, it is resolved to outline the **Course Objectives and Expected Outcomes** of each course. Accordingly, the course objectives, the expected outcomes and the course content of all the courses are prepared and the details are given in the following pages. The expert committee also emphasized the need for orientation to the resource persons involved in preparation of learning material and the teachers on the new thrust of Public Administration teaching and learning.

1. **Introduction to Public Administration (Compulsory)- DSC**
   Semester-I: Basics of Public Administration
   Semester-II: Development Dynamics and Emerging Trends
2. **Indian Administration (Compulsory)- DSC**
   Semester-III: Union Administration
   Semester-IV: State Administration
3. **Management of Resources (Compulsory)-DSC**
   Semester-V: Human Resources Management
   Semester-VI: Financial and Material Resources Management
4. A**. Local Governance and Development in India (Optional)-DSE**
   Semester-V: Rural Governance
   Semester - VI: Urban Governance

   Or

   B. **E-Governance (Optional)-DSE**

Semester-V: E-Governance: Concepts, Institutions and Methods
Semester - VI: E-Governance: Case Studies

Or

C. **Public Office Administration (Optional)-DSE**

Semester - V: Office Management
Semester - VI: Technology and Office Administration

Summary of Credits

Sl. No	Course Category	No. Of Courses	Credits per Course	Credits
1	DSC	4	5	20

2	DSC	2	4	08
3	DSE	2 (Among ThreeOptional)	4	08
4	Total	4		36
5	GE	2	6	12

BA I Year

Course-1: Introduction to Public Administration

The Objectives of the Course are:

1. To understand the nature and scope of Public Administration;
2. To appreciate the methodological pluralism and synthesizing nature of knowledge in Public Administration;
3. To comprehend the changing paradigms of Public Administration;
4. To acquaint with the theories, approaches, concepts and principles of Public Administration;
5. To understand the administrative theories and concepts to make sense of administrative practices.
6. To understand the role of public services in the emergence and development of Telangana state

BA 107Semester-I: Basics of Public Administration

Module- I: Nature of Public Administration

a. Meaning and Importance of Public Administration
b. State and Evolution of Public Administration

Module-II: Relationship with other Social Sciences

a. Law
b. Political Science
c. Economics
d. Psychology

Module-III: Oriental and Classical Approaches

a. Oriental Approach -Kautilya
b. Classical Approach: HenriFayol, Luther Gulick and LyndallUrwick
c. Scientific Management Approach: F.W.Taylor
d. Bureaucratic Approach: Max Weber and Karl Marx

Module-IV: Human Relations and Behavioural Approaches

a. Human Relations Approach –Elton Mayo
b. Behavioural Approach: Herbert A. Simon
c. Socio- Psychological Approach: Abraham Maslow; Mc Gregor, RensisLikert

Module-V: Ecological and Social Justice Approaches

a. Administrative Ecology: F.W.Riggs
b. Social Justice Approach –B.R.Ambedkar
c. Jyothirao Pule

BA 207 Semester-II: Development Dynamics and Emerging Trends

Module- I: Comparative & Development Administration

a. Comparative Administration
b. Development Administration
c. Changing Dynamics of Development Administration

Module-II: Emerging Trends-I

a. New Public Administration – Minnowbrook-I
b. New Public Administration – Minnowbrook-II
c. New Public Administration – Minnowbrook-III

Module-III: Market Theories

a. Public Choice Approach
b. New Public Management

Module-IV: Emerging Trends-I

a. Public Policy and Governance
b. Role of Public Services in the Emergence and Development of New State of Telangana

Module-V: Emerging Trends-II

a. Globalization and Public Administration
b. Present Status of Public Administration in the context of Globalization

Expected Outcomes

After study of the Course-1, the learner should be able to:

- Appreciate the nature, scope and changing paradigms of Public Administration;
- Understand the synthesizing nature of knowledge of public administration from public perspective;
- Grasp the administrative theories, concepts and principles to make sense of administrative practices.

BA II Year

Course-II: Indian Administration

The Objectives of the Course are:

1. To understand the historical evolution and socio-economic, political, cultural and global context of Indian Administration;
2. To identify the transformative role of Indian Administration;
3. To make out the multi-dimensionality of problems and processes of Indian Administration;
4. To understand the form and substance of Indian Administration; and
5. To appreciate the emerging issues in Indian Administration in the context of changing role of state, market and civil society.

BA 307 Semester-III: Union Administration

Module- I: Historical Background

a. Evolution of Indian Administration
b. Indian Administration after Independence: Continuity and Change
c. Indian Constitutional Moorings and Administration.

Module- II: Union Administration: Structure and Processes

a. Political Executive at Central Level
   i.Presidentii. Prime Ministeriii. Council of Ministers
b. Central Secretariat and other Offices

Module-III:Center-State Relations

a. Centre-State Administrative Relations
b. Central Personnel Agencies-All India Services

Module-IV:Constitutional and Other National Bodies

a. Union Public Service Commission
b. Election Commission and Comptroller and Auditor General of India (C&AG)
c. NITIAayog

Module-V: Public Enterprises in India

a. Forms of Public Enterprises - Department, Corporation, Company
b. Performance and Disinvestment

BA 407 Semester-IV: State Administration and Emerging Issues

Module-I: State Administration: Structure and Processes

a. Administrative History of Telangana
b. Political Executive at State Level, Governor& Chief Minister

Module-II: State Administrative Mechanisms

a. State Secretariat & Directorates
b. Local Governance & District Administration in Telangana

Module- III: Emerging Issues

a. Administrative Reforms: Need and Importance
b. 2nd Administrative Reforms Commission – Features and Recommendations

Module-IV: Technology and Integrity in Government

a. e-Government
b. Values and Ethics in Administration

Module-V: Control over Administration

a. Redressal of Citizen Grievances: Transparency, Accountabilityand Right to Information Act
b. Administrative Accountability: Legislative and Judicial Control

Expected Outcomes

After study of the course, the learner should be able to:

- discern the connects and disconnects between structure, purpose and process and results in Indian Administration;
- Understand the Indian Administration role as the main instrument of State to achieve its developmental goals;
- Appreciate the varying historical, socio-economic, political and other conditioning factors that gave Indian Administration its distinct nature to the learner

BA III Year
Course-II: Indian Constitution and Administration (GE)

BA 502 Semester-V: Indian Constitution and Administration

Course Objective

The Constitution of India defines the basic objectives and functioning of the government. It has provisions for bringing about social change and defining the relationship between individual citizen and the state. It lays out certain ideals that form the basis of the kind of country that we as a citizen aspire to live in. An in-depth analysis of various basic areas of constitution is the main objective of this inter disciplinary course. This helps the students to strengthen their understanding of Indian constitution and functioning of government.

Module 1: Indian Constitution

a) Nature of the Constitution Salient features – Preamble
b) Fundamental Rights, Directive Principles - Fundamental Duties
c) Amendments of the Constitution: Procedure for Amendment– Emergency Provisions

Module II: Centre – State Relations and Local Self Government

a) Distinctive features of Indian Federation
b) Legislative, Administrative and Financial relations between the Union and the States
c) Decentralization Experiments in India – 73rd and 74th Amendments

Module III: State Government

a) Governor, Chief Minister and Council of Ministers
b) Secretariat and Directorates
c) Changing Nature of District Administration and the role of District Collector

Module IV: Accountability & Control

a) Legislative, and Executive Control
b) Judicial control and Judicial Review
c) Right to Information Act

Module V: Social and Welfare Administration in India

a) Reservations for SC, ST and Backward classes
b) National SC and ST Commission; Women's Commission
c) Minorities Commission and Human Rights Commission

BA III Year

Course-III: Human Resources Management

The Objectives of the Course are:

1. To comprehend the nature, scope, structure & processes of human resource management;
2. To identify the systems and processes of financial and material management;
3. To appreciate institutional capacity building strategies and programmes; and
4. To understand the changing paradigms of Resources management.

BA 507 Semester-V: Human Resources Management

Module-I: Nature of Human Resource Management

a. Meaning and Significance of Human Resource Management
b. Human Resource Planning

Module-II: Office Management

a. Concept and Principles of Office Management
b. Job Analysis, Job Description, Recruitment and Promotion
c. Compensation Administration - Wage, Pay and Pay Commissions

Module- III: Human Resource Development

a. Performance and Competency Mapping System
b. Employee Capacity Building Strategies-Training
c. Total Quality Management and Productivity Management

Module-IV: Emerging Trends

a. Reddressal of Employee Grievances
b. Right sizing, Outsourcing and Consultancies
c. Interpersonal Skills

BA III Year
Course-II: Good Governance (GE)

BA 602 Semester-VI: Good Governance

Course Objective

The word 'Governance' appears in diverse academic disciplines. At general level, governance refers to theories and issues of social coordination and the nature of all patterns of rule. The theories of governance have changed the understanding of various concepts of state and its institutions. New jargon of words emerged into the social science literature with different connotations. In this background, the present course is aimed to provide an in-depth understanding of the basic tenets and trends of Good Governance.

Module - I: Introduction

a) Meaning and Definitions of Governance
b) Government and Governance
c) Concepts of Good Governance

Module - II: State and Governance

a) Origin and types of State
b) Democratic State and Democratic Administration
c) Neo-Liberalism and Rolling Back State
d) Reforming Institutions: The State, Market and Civil Society

Module – III: Citizen and Governance

a) Rule of Law and Human Rights
b) Accountability
c) Participation

Module - IV: Techniques of Good Governance

a) Openness and Transparency
b) Citizen Charter
c) Social Audit

Module - V: Emerging Trends

a) Public and Private Governance
b) Good Governance and Civil Society
c) ICT and Good Governance

BA 607 Semester-VI: Financial and Material Resources Management

Module- I: Financial Management

a. Meaning and Scope
b. Importance of Financial Management

Module-II: Budget

a. Concept and Principles of Budget
b. Preparation of Budget
c. Enactment and Execution of Budget

Module-III: Financial Institutions

a. Organization and Functioning of Finance Ministry
b. Union – State Financial Relations and the role of Finance Commission
c. Parliamentary Financial Committees: Public Accounts Committee, Estimates Committee and Committee on Public Undertakings

Module- IV: Materials Management

a. Meaning and Concept of Materials Management
b. Procurement, Storage and Distribution
c. Inventory Control and Management

Expected Outcomes

After study of the course, the learner should be able to:

- Understand the way in which the public power is exercised and public resources are managed and expanded;
- Unravel the varying methods of performance assessment of public institutions; and
- Appreciate the changing paradigms of human resource management.

BA III Year

Course-IV A: Local Governance and Development in India (Optional)

The Objectives of the Course are:

1. To understand the concept of democratic decentralisation;
2. To trace the evolution of local self-government in India;
3. To comprehend the institutional arrangements and processes of rural and urban governance;
4. To identify the challenges of development and the administrative responses.
5. To sketch out the new organisational arrangements for delivery of public welfare programmes.

BA 508/A Semester-V: Rural Local Governance

Module-I: Introduction

a. Democratic Decentralization and Local Organisations
b. Evolution of Rural Governance Institutions-BalwanthRaiMehtha
c. Ashok Mehtha Committee

Module:-II

a. Third Generation Panchayaths
b. Constitutional Status of Rural Local Government- with special reference to 73rd CAA

Module-III: Local Organisations for Rural Development

a. Panchayati Raj: Patterns, Functions and Performance
b. Finances of Panchayati Raj Institutions --- State Finance Commission

Module-IV: Rural Development Strategies and Services

a. Rural Development: Strategies, Programs and Issues
b. Co-operatives: Structure, Functions and Performance
c. Basic Services and Welfare Measures in Rural Areas
d. State Control over Rural Local Governments

BA 608/A BASemester-VI: Urban Local Governance

Module-I: Local Organisations for Urban Development

a. Evolution of Urban Local Bodies- Pattern, Functions and Performance
b. Constitutional Status of Urban Local Governments with special reference to 74th CAA

Module-II: Strategies for Urban Development

a. Urban Development: Strategies, Programs and Issues
b. Finances of Urban Local Governments

Module-III: Urban Services

a. Basic Services and Welfare Measures in Urban Areas
b. Urban Development Authorities and Parastatals
c. Sustainable Development and Future of Local Governance

Module-IV: Agencies and Programs for Rural and Urban Sector

a. Development Planning, District Planning Committee
b. Special Agencies for Rural and Urban Development
c. Voluntary Agencies for Rural and Urban Development
d. Elimination of Poverty Initiatives in Rural and Urban Areas

Expected Outcomes

After study of the course, the learner should be able to:

- Critically appreciate the relationship of local governance and development;
- Appreciate the rural and urban institutional arrangements for development;
- Understand the processes and results of systems of delivery of welfare programmes

BA III Year

Course-IV-B E- GOVERNANCE (OPTIONAL)

Objectives of the Course are:

1. To explain the meaning and importance of e-governance;
2. To provide the students with the analytical skills to comprehend the e-governance initiatives in India;
3. To make the learner understand e-governance initiatives at national and international level;
4. To inform the learner about the e-Governance measures initiated in Telangana state.

BA 508/B Semester-V: E-Governance: Concepts, Institutions and Methods

Module-I: Introduction

a. Concept of Governance and Good Governance
b. Meaning, Evolution and Importance of E-Governance

Module-II: Acts and Initiatives

a. Information Society and Community Empowerment
b. IT Acts and National E-Governance Plan
c. E-Governance Initiatives in India

Module-III: Methods of E-Governance

a. GIS Based Management Systems
b. Citizen Database and Human Development
c. National Informatics Centre (NIC)

Module-IV E-Governance in Public Office

a. Back Office Operations and Front Office Delivery
b. Business Process Reengineering (BPR)

BA 608/B SEMESTER-VI: E-GOVERNANCE: CASE STUDIES

Module-I: Case Studies: National Level

a. AkshayaProgramme in Kerala
b. Bhoomi in Karnataka

Module-II: Citizen Services

a. UID- Adhaar Project
b. Citizen Service Centers

Module–III: E-Governance in Telangana

a. E-Governance in Telangana
b. Telangana Remote Sensing Application Centre.

Module-IV: Case Studies: State level

a. Computer- Aided Administration of Registration Department (CARD)
b. E-Seva and MeeSeva
c. Opportunities and Challenges for E-Governance

Expected Outcomes

After study of the course, the learner is expected:

- Understand the meaning and related concepts of e-governance;
- Explain the e-Governance processes vis-à-vis its application to different stakeholders;
- Identify the issues and challenges in e-Governance applications.

BA III Year

Course-IV C: Public Office Administration (DSE-C)

The Objectives of the Course are:

1. To understand the concept of Office;
2. To comprehend the administrative process in office;
3. To identify the challenges of public office administration in the background of ICT
4. To sketch out the impact of technology in office administration

BA 508/C Semester-V: Public Office Administration

Module I: Introduction

a) Office Administration: Nature and Scope
b) Importance of Office Importance
c) Basic Principles of Office Organization

Module II: Office Organization and Management

a) Office Planning
b) Office Accommodation and Lay-out
c) Office Environment

Module III: Office Filing System

a) Forms: Management and Control
b) Filing System and Classification
c) Management of Office Records

Module IV: Office Communication

a) Periodical Reports
b) Office Communication, Correspondence
c) Office Stationery

BA 608/C Semester-VI: Technology and Office Administration

Module I: Introduction to Technology

a) Introduction to ICT
b) Management by Office Computerization
c) Internet and Intranet

Module II: Trends in Office Administration

a) Office Automation
b) Back Office Operations and Front Office Delivery
c) Paperless Office

Module III: Techniques of Office Administration

a) Work Study, Work Measurement, Work Simplification
b) Management by Objectives
c) Office Supervision

Module IV: Issues in Office Administration

a) Social System and Public Office Administration
b) Staff Welfare
c) Office Management in Government: Issues

Expected Outcomes

After study of the course, the learner is expected:

- Understand the meaning and related concepts of Office and office management;
- Explain the filing and record management
- Identify the issues and challenges in functioning of public office.

MAHATMA GANDHI UNIVERSITY

FACULTY OF SOCIAL SCIENCE

B.A. MODEL QUESTION PAPER UNDER CBCS

PUBLIC ADMINISTRATION

Time: 2 ½ hours **Max Marks: 80**

This paper contains TWO Parts – Part A and Part B. Part A – Long Answers, Part B – Short Answers

PART A: (3 X 15 = 45 marks)

Answer any **three** of the following in about 30 lines each.

1. Explain the chief characteristics of administration during British period in India.
2. Examine various forms of public enterprises in India.
3. Explain the powers and functions of President of India.
4. Explain the important features of 73rd Constitutional Amendment.
5. Discuss the Central – State administrative relations.
6. Write an essay on SC, ST welfare programmes in India.

PART B: (4 X 5 = 20 marks)

Answer any **four** of the following in about 20 lines each.

7. Explain the appointment and functions of Indian Prime Minister.
8. Discuss the social context of Indian Administration.
9. Explain the construction and functions of Union Public Service Commission.
10. Discuss the salient features of District Administration.
11. What are the functions of Cabinet Secretariat?
12. Write an essay on Right to Information Act.

Syllabus

for

B.Sc. Botany

Department of Botany

Mahatma Gandhi University

Under Choice Based Credit System

2016

Mahatma Gandhi University, Nalgonda

B.Sc Botany CBCS Common Core Syllabus (wef 2016-2017).

PROPOSED SCHEME FOR B.Sc BOTANY PROGRAMME UNDER CHOICE BASED CREDIT SYSTERM				
FIRST YEAR SEMESTER-I				
Code	*Course Title*	*Course Type*	*HPW*	*Crdeits*
BS 101	Environmental Studies	AECC-1	2	2
BS 104	Optional I	DSC I-A	4 T 2 P = 6	4 + 1 = 5
Paper-I Microbial Diversity of Lower Plants				
SEMESTER-II				
Code	*Course Title*	*Course Type*	*HPW*	*Crdeits*
BS204	Optional-I	DSC-1B	4 T + 2P = 6	4 + 1 = 5
Paper-II Bryophytes Pteridophytes, Gymnosperms and Palaeobotany				
SECOND YEAR SEMESTER-III				
Code	*Course Title*	*Course Type*	*HPW*	*Crdeits*
BS304	Optional-I	DSC-IC	4 T + 2 P = 6	4 + 1 = 5
Paper-III Taxonomy of Angiosperms and Medicinal Botany				

SEMESTER-IV				
Code	*Course Title*	*Course Type*	*HPW*	*Crdeits*
BS404	Optional - I	DSC-ID	4 T + 2P = 6	4 + 1 = 5
Paper-IV Plant Anatomy, Embryology and Palynology				
THIRD YEAR SEMESTER-V				
Code	*Course Title*	*Course Type*	*HPW*	*Crdeits*
BS 503	Optional-I	DSC - IE	3 T + 2P = 5	3 + 1 = 4
Paper-V: Cell Biology and Genetics				
BS 506	Optional I A/B	DSE-I#	3T + 2P = 5	3 + 1 = 4
Paper-VI Elective-I Ecology and Biodiversity / Elective II: Horticulture				
SEMESTER-VI				
Code	*Course Title*	*Course Type*	*HPW*	*Crdeits*
BS 603	Optional-I	DSC - 1F	3 T + 2P = 5	3 + 1 = 4
Paper-VII : Plant Physiology				
BS 606	Optional A/B/	DSE - IF	3 T + 2P = 5	3 + 1 = 4
Paper-VIII Elective III Tissue Culture and Biotechnology / Elective-IV: Seed Technology				

AECC: Ability Enhancement Compulsory Course: DSC: Discipline Specific Course:

DSE : Discipline Specific Elective

B.Sc (CBCS) Botany- I year
Semester-I - Paper-I
Microbial Diversity of Lower Plants

DSC - 1A (4 hrs./week) **Theory Syllabus**

Credits- 4
(60 hours)

UNIT - I

1. Brief account of Archaebacteria, Actinomycetes. (4h)

2. Cyanobacteria: General characters, cell structure, thallus organisation and their significance as biofertilizers with special reference to *Oscillatoria, Nostoc* and *Anabaena*.(6h)

3. Lichens: Structure and reproduction; ecological and economic importance. (5h)

UNIT- II

4. Viruses: Structure, replication and transmission; plant diseases caused by viruses and their control with reference to Tobacco Mosaic and Rice Tungro. (7h)

5.. Bacteria**:** Structure, nutrition, reproduction and economic importance. An outline of plant diseases of important crop plants caused by bacteria and their control with reference to Angular leaf spot of cotton and Bacterial blight of Rice. (8h)

6. General account of Mycoplasma with reference to Little leaf of brinjal and Papaya leaf curl

UNIT-III

7. General characters, structure, reproduction and classification of algae (Fritsch) and thallus organization in algae. (3h)

8. Structure and reproduction of the following:
   Chlorophyceae- *Volvox, Oedogonium* and *Chara*. (5h)
   Phaeophyceae- *Ectocarpus* (2h)
   Rhodophyceae- *Polysiphonia*. (3h)

9. Economic importance of algae in Agriculture and Industry. (2h)

UNIT-IV

10. General characters and classification of fungi (Ainsworth). (3h)

11. Structure and reproduction of the following:
   (a)Mastigimycotina- *Albugo*
   (b) Zygomycotina- *Mucor*
   (c) Ascomycotina- *Saccharomyces* and *Penicillium*.
   (d) Basidiomycotina- *Puccinia*
   (e) Deuteromycotina- *Cercospora*. (10h)

12. Economic importance of fungi in relation to mycorrhizae and mushrooms. General account of mushroom cultivation

(2h)

References:

1. Alexopolous, J. and W. M. Charles. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.

2. Mckane, L. and K. Judy. 1996. Microbiology – Essentials and Applications. McGraw Hill, New York.

3. Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.

4. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.

5. Sambamurthy, A. V. S. S. 2006. A Textbook of Plant Pathology. I. K. International Pvt. Ltd., New Delhi.

6. Sambamurthy, A. V. S. S. 2006. A Textbook of Algae. I. K. International Pvt. Ltd., New Delhi.

7. Sharma, O. P. 1992. Textbook of Thallophyta. McGraw Hill Publishing Co., New Delhi.

8. Thakur, A. K. and S. K. Bassi**.** 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.

9. Vashishta, B. R., A. K. Sinha and V. P. Singh. 2008. Botany for Degree Students: Algae. S. Chand& Company Ltd, New Delhi.

10. Vashishta, B. R. 1990. Botany for Degree Students: Fungi, S. Chand & Company Ltd, New Delhi.

11. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

B.Sc (CBCS) Botany-I year
Semester-I - Paper-I
Microbial Diversity of Lower Plants

Theory Model Question Paper

Time : 2 hrs **Max. Marks: 40**

Draw well-labeled diagrams wherever necessary.

1. Write short notes on any FOUR of the following: - **4 X 2 = 8M**

a. Heterocyst.

b. Citrus Canker.

c. Nucule

d. Cleistothecium.

e. Mycoplasma

f. *Mucor*

II. Essay Questions: **4 X 8 = 32M**

1. a. Briefly describe the structure and reproduction of *Oscillatoria*.
(OR)
b. Describe the cyanophycean cell structure.

2. a. Describe the structure and modes of transmission of plant viruses.
(OR)
b. Write an essay on economic importance of Bacteria.

3. a. Describe the life cycle of *Oedogonium* with the help of well- labelled diagram .
(OR)
b. Give an account on thallus organization in algae.

4. a. Describe the life cycle of *Albugo* with the help of well-labelled diagram .
(OR)
b. Give a brief account on Mushroom cultivation.

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B.Sc (CBCS) Botany-I year
Semester-I - Paper-I
Microbial Diversity of Lower Plants

Practical Syllabus

(45 hours)

1. Study of viruses and bacteria using electron micrographs (photographs). (3h)
2. Gram staining of Bacteria. (3h)
3. Study of symptoms of plant diseases caused by viruses, bacteria, Mycoplasma and fungi:
   Viruses: Tobacco mosaic
   Bacteria: Angular leaf spot of cotton and Rice tumgro.
   Mycoplasma**:** Little leaf of Brinjal and Leaf curl of papaya (3h)
   Fungi: White rust on Crucifers, Rust on wheat & Tikka disease of Groundnut. (6h)
4. Vegetative and reproductive structures of the following taxa:
   Algae: *Oscillatoria*, *Nostoc, Volvox, Oedogonium*,*Chara* ,*Ectocarpus* and *Polysiphonia*. (6 h)
   Fungi: *Albugo, Mucor*,*Saccharomyces, Penicillium*, *Puccinia* and *Cercospora* (6h)
5. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus. White rust of Crucifers, Rust on wheat & Tikka disease of Groundnut. (9h)
6. Lichens: Different types of thalli and their external morphology (3 h).
7. Examination of important microbial, fungal and algal products:
   Biofertilizers, protein capsules, antibiotics, mushrooms, Agar-agar etc. (3h)
8. Field visits to places of algal / microbial / fungal interest (e.g. Mushroom cultivation, water bodies). (3h)

B.Sc (CBCS) Botany- I year
Semester-I - Paper-I
Microbial Diversity of Lower Plants

Practical Model Paper

Time : 2 $^{1}/_{2}$ hrs **Max. Marks: 25**

1. Identify the given components 'A' , 'B' & 'C' in the algal mixture .

   Describe with neat labeled diagrams & give reasons for the classifications. **3 X 3 = 9M**

2. Classify the given bacterial culture 'D' using Gram – staining technique. **4M**

3. Take a thin transverse section of given diseased material 'E'.

   Identify & describe the symptoms caused by the pathogen. 5**M**

4. Identify the given specimens 'F', 'G' & 'H' by giving reasons .

   (Fungal-1, Bacteria-1 & Viral-1) **3 X 1 = 3M**

5. Comment on the given slides 'I' & 'J' .

   (Algae-1 , Fungi-1) **2 X 1 = 2M**

6. Record **2M**

B.Sc (CBCS) Botany- I year
Semester-II - Paper-II
Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

DSC-1B (4 hrs./week) Theory Syllabus

Credits- 4
(60 hours)

UNIT-I

1. Bryophytes**:** General characters and classification. (3h)
2. Structure, reproduction, life cycle and systematic position of *Marchantia, Anthoceros* and *Polytrichum*. (Development stages are not required). (10h)
3. Evolution of Sporophyte in Bryophytes. (2h)

UNIT-II

4. Pteridophytes: General characters and classification (Sporne's) (3h)
5. Structure, reproduction, life cycle and systematic position of *Rhynia, Lycopodium, Equisetum* and *Marsilea*. (10h)
6. Stelar evolution, heterospory and seed habit in Pteridophytes. (2h)

UNIT-III

7. Gymnosperms: General characters, structure, reproduction and classification (Sporne's). (4h)
8. Distribution and economic importance of Gymnosperms. (3h)
9. Morphology of vegetative and reproductive parts, systematic position and life cycle of *Pinus* and *Gnetum* . (8 h)

UNIT-IV.

10. Palaeobotany: Introduction, Fossils and fossilization ; Importance of fossils. (8 h)
11. Geological time scale; (4 h)
12. Bennettitales: General account. (3 h)

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1. Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.

2. Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany.

S. Chand & Company Ltd, New Delhi.

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5. Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.

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9. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany for Degree Students: Gymnosperms. Chand & Company Ltd, New Delhi.

10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

B.Sc (CBCS) Botany- I year
Semester-II - Paper-II
Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Theory Model Question Paper

Time : 2 hrs **Max. Marks: 40**

Draw well-labeled diagrams wherever necessary.

1 . Write short notes on any FOUR of the following: - **4 X 2 = 8M**

a. Gemma cup.

b. Protostele .

c. Pinus pollen grain.

d. *Ptilophyllum*.

e. *Anthoceros* thallus

f. Fossilization

II . Essay Questions: **4 X 8 = 32M**

1. a.Write about the structure & evolution of sporophyte in *Anthoceros* .

(OR)

b. Describe the gametophores of *Marchantia* .

2. a. Describe the anatomy of *Equisetum* stem & add a note on its ecological adaptations .

(OR)

b. Discuss in detail the internal structure of the sporocarp of *Marsilea* .

3.a. Describe the anatomy of *Pinus* needle with a well labeled diagram.

(OR)

b. Give an account of general characters of Gymnosperms.

4. a. Describe the general characters of Bennettitales .

(OR)

b. Write about economic importance of Gymnosperms.

B.Sc (CBCS) Botany- I year
Semester-II - Paper-II
Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

(45 hours)

Practical Syllabus – 2016

1.Study of Morphology (vegetative and reproductive structures) and anatomy of the following Bryophytes: *Marchantia, Anthoceros* and *Polytrichum*. (9 h)

2. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Pteridophytes: *Lycopodium*, *Equisetum* and *Marsilea*. (9 h)

3. Study of Anatomical features of *Lycopodium* stem, *Equisetum* stem and *Marsilea* petiole & rhizome by preparing double stained permanent mounts. (12h)

4. Study of Morphology (vegetative and reproductive structures) of the following taxa: Gymnosperms: *Pinus* and *Gnetum*. (6 h)

5. Study of Anatomical features of *Pinus* needle and *Gnetum* stem by preparing double stained permanent mounts. (6h)

6. Fossil forms using permanent slides / photographs: *Rhynia* and *Cycadeoidea*. (3h)

B.Sc (CBCS) Botany- I year
Semester-II - Paper-II
Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Practical Model Paper

Time : 2 $^{1}/_{2}$ hrs **Max. Marks: 25**

1 . Prepare a double stained permanent mount of the given material ' A ' (Pteridophyte)

Draw diagram & give reasons for identification. **7M**

2 . Prepare a double stained permanent mount of the given material ' B ' (Gymnosperms)

Draw diagram & give reasons for identification. **8M**

3 . Identify the given specimens C , D , E & F (Bryophyte – 2 , Pteridophyte – 1 & Gymnosperm – 1) **4 X 1 =4M**

4 . Identify the given slides G , H , I & J (Bryophyte – 2 , Pteridophyte – 1 & Gymnosperm – 1) **4 X 1 =4M**

5 . Record **2M**

B.Sc (CBCS) BOTANY- II YEAR
Semester-III - Paper-III
Taxonomy of Angiosperms and Medicinal Botany

DSC-1C (4 hrs./week) Theory syllabus

Credits-4
(60 hours)

UNIT - I

1. Introduction: Principles of plant systematics, Types of classification: Artificial, Natural and Phylogenetic; Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantle. An introduction to Angiosperm Phylogeny Group (APG). (7h)
2.. Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy, Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy. (4 h)
3.. Nomenclature and Taxonomic resources: An introduction to ICBN, Vienna code - a brief account. Herbarium: Concept, techniques and applications. (4 h)

UNIT-II

4.. Systematic study and economic importance of plants belonging to the following families: Polypetalae : Annonaceae, Capparidaceae, Rutaceae, Fabaceae (Faboideae/papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae
5. Gamopetalae: Apiaceae, Asteraceae, Asclepiadaceae, Lamiaceae
6. Monochalmydeae: Amaranthaceae, Euphorbiaceae, Monocotyledons: Orchidaceae and Poaceae. (15h)

UNIT - III

7.. Ethnomedicine: Scope, interdisciplinary nature, distinction of Ethnomedicine from Folklore medicine. (3h)
8. Outlines of Ayurveda, Sidda, Unani and Homeopathic systems of traditional medicine. Role of AYUSH, NMPB, CIMAP and CDRI. (5 h)
9.. Plants in primary health care: Common medicinal plants – Tippateega (*Tinospora cordifolia*), tulasi (*Ocimum sanctum*), pippallu (*Piper longum*), Karakaya (*Terminalia chebula*), Kalabanda (*Aloe vera*), Turmeric (*Curcuma longa*).
Evaluation of crude drugs. (7h)

UNIT-IV

10. Traditional medicine vs Modern medicine: Study of selected plant examples used in traditional medicine as resource (active principles, structure, usage and pharmacological action of modern medicine: Aswagandha (*Withania somnifera*), Sarpagandha (*Rauwolfia serpentina*), Nela usiri *(Phyllanthus amarus),* Amla (*Phyllanthus emblica*) and Brahmi (*Bacopa monnieri*). (8h)
11.Pharmacognosy: Introduction and scope. Adulteration of plant crude drugs and methods of identification - some examples. Indian Pharmacopoeia. (4h)
12. Plant crude drugs: Types, methods of collection, processing and storage practices. (3h)

References:

Pandey, B. P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.

Rastogi, R. R. and B. N. Mehrotra. 1993. Compendium of Indian Medicinal Plants. Vol. I & Vol. II. CSIR, Publication and Information Directorate, New Delhi.

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Jain, S. K. and V. Mudgal. 1999. A Handbook of Ethnobotany. Bishen Singh Mahendra Pal Singh, Dehradun.

Jeffrey, C. 1982. An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge. London.

Joshi, S. G. 2000. Medicinal Plants. Oxford and IBH, New Delhi.

Kokate, C. and Gokeale- Pharmocognacy- Nirali Prakashan, NewDelhi.

Lad, V. 1984. Ayurveda – The Science of Self-healing. Motilal Banarasidass, New Delhi.

Lewis, W. H. and M. P. F. Elwin Lewis. 1976. Medical Botany. Plants Affecting Man's Health. A Wiley Inter science Publication. John Wiley and Sons, New York.

B.Sc (CBCS) BOTANY- II YEAR
Semester-III - Paper-III
Taxonomy of Angiosperms and Medicinal Botany

Theory Model Question Paper

Time: 2 hrs **Max. Marks: 40**

Draw well-labeled diagrams wherever necessary.

1. Write short notes on any FOUR of the following: - **4 X 2 = 8M**

a. Artificial system of classification.

b. Floral structure of Cucurbitaceae .

c. Role of AYUSH and CIMAP.

d. Active principles of *Phyllanthus niruri*.

e. Herbarium

f. *Aloe vira*

II. Essay Questions:

4 X 8 = 32M

1 a. Discuss in detail the Bentham and Hooker's system of classification and add a note on its merits and de-merits .

(OR)

b. Write an account on Chemotaxonomy.

2 a. Write salient features of the sub-family Fabaceae with a note on its economic importance .

(OR)

b. Discuss in detail the important characters of Asteraceae family with a note on its advanced characters.

3 a. Discuss the outline of Ayurvedic system of medicine.

(OR)

b. Write in detail organicleptic evaluation of *Ocimum sanctum* and its medicinal importance .

4 a. Discuss the morphological aspects of *Rauwolfia serpentina* and Discuss its medicinal importance .

(OR)

b. Write an account on methods of collection, processing and storage practices associated with Crude drugs.

B.Sc (CBCS) BOTANY- II YEAR
Semester-III - Paper-III
Taxonomy of Angiosperms and Medicinal Botany

Practical syllabus

(45 hours)

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus
   (Minimum of one plant representative for each family) (24h)
2. Demonstration of herbarium techniques. (3 h)
3. Identification, medicinal value & active principle present in the following plants : Tulasi (*Ocimum sanctum*), Karakaya (*Terminalia chebula*), Kalabanda (*Aloe vera*). (6 h)
4. Ethnomedicinal value/practice of the following plants :
   Aswagandha (*Withania somnifera*), Sarpagandha (*Rauwolfia serpentina***)**, Amla (*Phyllanthus emblica*) and
   Brahmi (*Bacopa monnieri*). (6h)
5. Pharmacognosy:
   Powder analysis : Pippalu (*Piper longam)*, Nela usiri (*Phyllanthus niruri*),
   Study of Organoleptic (sectional study) of the following:
   Tippateega (*Tinospora cordifolia*)and Turmeric (*Curcuma longa*). (6h)
6. Candidate have to submit at least 30 herbarium sheets

B.Sc (CBCS) BOTANY- II YEAR
Semester-III - Paper-III
Taxonomy of Angiosperms and Medicinal Botany

Practical Model Paper

Time: 2 $^{1}/_{2}$ hrs **Max. Marks: 25**

1. Technical description of the given plant twig ' A ' 9M

2. Identify the given material ' B ' & write its medicinal properties **3M**

3. Identify the specimen ' C ' & write organoleptic evaluation 3M

4. Identify the given material D ' & discuss the ethno medicinal value of it. **3M**

5. Identify the given material ' E ' . Write the active principle and uses **3M**

6. Herbarium **2M**

7. Record **2M**

B.SC (CBCS) BOTANY- II YEAR
Semester-IV- Paper IV
Plant Anatomy, Embryology and Palynology

DSC-1D (4 hrs./week) Theory syllabus

Credits-4
(60 hours)

UNIT - I:

1. Meristems*:* Types, histological organization of shoot and root apices and theories. (3h)
2. Tissues and Tissue Systems*:* Simple, complex and special tissues. (6 h)
3. Leaf: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths. (6 h)

UNIT-II

4. Stem and root anatomy*:* Vascular cambium - Formation and function. (3h)
5. Anomalous secondary growth of Stem - *Achyranthes, Boerhaavia, Bignonia, Dracaena;* Root– *Beta vulgaris* (5h)
6. Wood structure*:* General account. Study of local timbers – Teak (*Tectona grandis*), Rosewood, (*Dalbergia latefolia*), Red sanders, (*Pterocarpus santalinus*) Nallamaddi (*Terminalia tomentosa*) and Neem (*Azadirachta indica*). (7h)

UNIT - III

7. Introduction: History and importance of Embryology. (2h)
8. Anther structure, Microsporogenesis and development of male gametophyte. (6h)
9. Ovule structure and types; Megasporogenesis; types and development of female gametophyte. (7h)

UNIT-IV

10. Pollination - Types; Pollen - pistil interaction. Fertilization. (4h)
11. Endosperm - Development and types. Embryo - development and types; Polyembryony and Apomixis - an outline. (5h)
12.. Palynology- Pollen morphology, NPC system and application of Palynology. (6h)

References:

Bhattacharya et. al. 2007. A textbook of Palynology, Central, New Delhi.

Bhojwani, S. S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.), Vikas Publishing House, Delhi.

M.R.Saxena- A textbook of Palynology.

Vashista- A textbook of Anatomy.

P.K.K.Nair- A textbook of Palynology.

Esau, K. 1971. Anatomy of Seed Plants. John Wiley and Son, USA.

Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verleg, Berlin.

Kapil, R. P. 1986. Pollination Biology. Inter India Publishers, New Delhi.

Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.

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B.SC (CBCS) BOTANY- II YEAR
Semester-IV- Paper IV
Plant Anatomy, Embryology and Palynology

Theory Model Question Paper

Time: 2 hrs **Max. Marks: 40**

Draw well labeled diagrams wherever necessary.

I. Write short notes on any FOUR of the following: - **4 X 2 = 8M**

a. Types of Stomata.

b. parenchyma.

c. Different types of Ovules.

d. Exine stratification.

e. Rose Wood

f. Polyembryony

II . Essay Questions: **4 X 8 = 32M**

1 a .Classify Meristems ? Discuss in detail the various types of meristems.

(OR)

b. Theories associated with root apices.

2 a. Primary and secondary structure of *Boerhaavia diffusa* stem.

(OR)

b . Describe in detail the wood structure of *Pterocarpus santalinus*.

3 a . Discuss different Embryo sacs studied by you.

(OR)

b. Describe the development of Male Gametophyte.

4 a. Describe in detail various steps in Fertilization.

(OR)

b. Discuss in detail the various applications of Palynology.

B.SC (CBCS) BOTANY- II YEAR
Semester-IV- Paper IV
Plant Anatomy, Embryology and Palynology

Practical syllabus

(45 hours)

Suggested Laboratory Exercises:

1. Demonstration of double staining technique. (3 h)
2. Tissue organization in root and shoot apices using permanent slides (3 h)
3. Preparation of double stained Permanent slides

Primary structure: Root - *Cicer, Canna*; Stem – *Tridax, Sorghum* (6 h)

Secondary structure: Root – *Tridax* sp.; Stem –*Pongamia*

Anomalous secondary structure: Examples as given in theory syllabus. (6 h)

4. Stomatal types using epidermal peels. (3 h)
5. Microscopic study of wood in T.S., T.L.S. and R.L.S. (6 h)
6. Structure of anther and microsporogenesis using permanent slides. (3 h)
7. Structure of pollen grains using whole mounts - *Hibiscus, Acacia* and Grass). (3 h)
8. Pollen viability test using Evans Blue – *Hibiscus* (3 h)
9. Study of ovule types and developmental stages of embryosac. (3 h)
10. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot embryos using permanent slides. (3 h)
11. Isolation and mounting of embryo (using *Cymopsis / Senna* / *Crotalaria*) (3 h)

B.SC (CBCS) BOTANY- II YEAR
Semester-IV- Paper IV
Plant Anatomy, Embryology and Palynology

Practical Model Paper

Time: 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1. Prepare a double stained permanent mount of transverse section of given material " A " . **9M**

2. Prepare a temporary mount of epidermal peel of the given leaf material " B " and identify the stomatal type . **4M**

3. Conduct the pollen viability test " C " (OR) Isolate the embryo from the given material . **4M**

4. Identify and describe the specimens / slides with well labelled diagrams

(a) Embryology – D (b) Palynology – E (c) Anatomy – F **3 X 2 = 6M**

5. Record **2M**

B.Sc Botany- III Year
Semester-V - Paper-V
Cell Biology and Genetics

DSC-1E (3 hrs./week) Theory Syllabus

Credits-3

Unit - I: **45 hours**

1. Plant cell envelops: Ultra structure of cell wall, molecular organization of cell membranes.(4h)

2. Nucleus: Ultra structure, Nucleic acids - Structure of DNA, types and functions of RNA. (4 h)

3. Chromosomes: Morphology, organization of DNA in a chromosome, Euchromatin and Heterochromatin, Karyotype. DNA Replication. Special types of chromosomes: Lampbrush Polytene and B - chromosomes. (7h)

4. Extra nuclear genome: Mitochondrial and plastid DNA, plasmids. (3 h)

Unit - II:

5. Cell division: Cell and its regulation; mitosis, meiosis and their significance (3h)

6. Mendelism: Laws of inheritance. Genetic interactions - Epistasis, Complementary, Supplementary and inhibitory genes. (5h)

7. Linkage: A brief account and theories of Linkage. Crossing over: Mechanism and theories of crossing over. (4 h)

8. Genetic maps: Construction of genetic maps with Two point and Three point test cross data. (3h)

Unit - III:

9. Mutations: Chromosomal aberrations - structural and numerical changes; Gene mutations, Transposable elements. (3 h)

10.Gene Organization- Structure of gene, Genetic code, Method of Replication of DNA in Eukaryotes & Prokaryotes (3h)

11.Mechanism of transcription in Prokaryotes and Eukaryotes, translation (4h)

12. Regulation of gene expression in prokaryotes (Lac and Trp. Operons). (2h)

References:

1. Sharma, A. K. and A. Sharma. 1999. Plant Chromosomes: Analysis, Manipulation and Engineering. Harward Academic Publishers, Australia.

2. Shukla, R. S. and P. S. Chandel. 2007. Cytogenetics, Evolution, Biostatistics and Plant Breeding. S.Chand & Company Ltd., New Delhi.

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B.Sc Botany- III Year
Semester-V - Paper-V
Cell Biology and Genetics

Theory Model Question Paper

Time : 2 hrs Max. Marks: 40

Draw well-labeled diagrams wherever necessary.

I. Write short notes on any FOUR of the following: - 4 X $2^1/_2$ = 10 M

a. t-RNA

b. Crossing over

c. Transversions

d. Cistron

e. Karyotype

f. Plasmids

II . Essay Questions: 3 X 10 = 30 M

1 a.Give a brief account of Heterochromatin and Euchromatin.

(OR)

b.Explain in detail the membrane model with reference to Fluid mosaic.

2 a. Discuss in detail Mendel's law of Inheritance.

(OR)

b.Explain Mitosis in detail with significance.

3 a. Discuss in brief account of construction of genetic maps.

(OR)

b. What is Mutations? Explain chromosomal abberrations.

B.Sc (CBCS) Botany- III Year
Semester-V - Paper-V
Cell Biology and Genetics

Practical Syllabus

(45 hours)

1. Demonstration of cytochemical methods: Fixation of plant material and nuclear staining for mitotic and meiotic studies. (6 h)
2. Study of various stages of mitosis using cytological preparation of Onion root tips. (6 h)
3. Study of various stages of meiosis using cytological preparation of Onion flower buds. (3 h)
5. Solving genetic problems related to monohybrid, dihybrid ratio incomplete dominance and interaction of genes (minimum of six problems in each topic). (12h)
6. Construction of linkage maps; two and three point test cross. (6 h)
7. Study of ultra structure of cell organelles using photographers. (6h)
8. Study of Special types of Chromosomes (6h)

B.Sc Botany- III Year
Semester-V - Paper-V
Cell Biology and Genetics

Practical Model Question Paper

Time : 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1. Prepare a cytological slide of given material A and identify & describe any two stages with well labeled diagrams. (8 marks)
2. Solve genetic problems B related to dihybrid ratio or incomplete dominance (6marks)
3. Solve the genetic problem C related to interaction of genes. (5 Marks)
4. Slides C-Cell organelles (2+2=4 marks)
   D-Chromosomes
5. Record (2 marks)

B.Sc (CBCS) Botany-III Year
Semester-V - Paper VI
Elective I
Ecology & Biodiversity

DSE-1E (3 hrs./week) Theory Syllabus

Credits-3
(45 hours)

UNIT - I

1. Concept and components of Ecosystem. Energy flow, food chains, food webs, ecological pyramids, Biogeochemical cycles - Carbon Cycle (4h)
2. Definition of Environment: Atmosphere (Troposphere, Stratosphere , Mesosphere , Ionosphere), Hydrosphere, Lithosphere & Biosphere. (3h)
3. Plants and environment: Ecological factors - Climatic (Light and Temperature), and biotic. Ecological adaptations of plants. (5h)
4. Edaphic Factors: Soil- Formation- Weathering, mode of formation-residual;Transported: Colluvial, Alluvial, Glacial & Eolian. Soil erosion & Conservation. (4h)

UNIT - II

5. Population ecology: Natality, Mortality, Growth curves, Ecotypes & Ecads. (4h)
6. Community ecology: Frequency, density cover, Life forms &Biological spectrum. (4h)
7. Community Dynamics: Succession - Serial stages, Modification of physical environment, Climax formation with reference to Hydrosere and Xerosere. (4h)
8. Production ecology: Concepts of productivity - Primary and Secondary Productivity. (4h)

UNIT- III

9. Biodiversity: Concepts, Convention of Biodiversity - Earth Summit (Copenhagan). (4h)
10. Biodiversity- Levels, threats and value (3h)
11. Hot spots of India - North Eastern Himalayas, Western Ghats; Endemism. (3 h)
    IUCN categories, RED data book
12. Principles of conservation – *Insitu* and *Exsitu*. Role of organizations in the conservation of Biodiversity - WWF and NBPGR. (3h)

References:

1. Bharucha, E. 2005. Textbook of Environmental Studies for Undergraduate Courses. Universities Press (India) Private Limited, Hyderabad.
2. Khitoliya, R. K. 2007. Environmental Pollution – Management and Control for Sustainable Development. S. Chand & Company Ltd., New Delhi.
3. Michael, S. 1996. Ecology. Oxford University Press, London.
4. Mishra. D. D. 2008. Fundamental Concepts in Environmental Studies. S. Chand & Company Ltd.,New Delhi.
5. Odum, E. P. 1983. Basics of Ecology. Saunder's International Students Edition, Philadelphia.
6. Sharma, P. D. 1989. Elements of Ecology. Rastogi Publications, Meerut.
7. Verma, P. S. and V. K. Agrawal. 2006. Genetics. S. Chand & Company Ltd., New Delhi

B.Sc (CBCS) Botany-III Year
Semester-V - Paper VI
Elective I
Ecology & Biodiversity

Practical Syllabus

45 hours

1. Study of plant communities by Quadrat Method (9h)
2. Estimation of carbonates and bicarbonates in the given water sample. (6h)
3. Determination of soil texture (composition of clay, sand silt etc.) and pH. (6h)
4. Study of morphological and anatomical characteristics of plant communities using locally available plant species: Hydrophytes (*Eichhornia, Hydrilla, Pistia, Nymphaea, Vallisneria*), Xerophytes: (*Asparagus,Opuntia, Euphorbia spp*), Halophytes (*Rhizophora, Avicennia*) . (12h)
5. Value of biodiversity a) Medicinal value: *Catharanthus, Tinospora* and *Emblica* (12h)

   b) Timber Value: *Acacia, Tectona* and *Azardirachta*

   c) Aesthetic Value: *Mangifera, Ficus, Ocimun*

B.Sc (CBCS) Botany-III Year
Semester-V - Paper VI
Elective I
Ecology & Biodiversity

Theory Model Question Paper

Time : 2 hrs **Max. marks : 40**

Draw well-labelled diagrams wherever necessary.

I. Write short notes on any FOUR of the following: - **4 X $2^{1}/_{2}$ = 10 M**

a. Food chain.

b. Ecad.

c. Ecesis.

d. Endemism.

e. RED data book

f. Zoo park

II . Essay Questions: **3 X 10= 30 M**

1 a. Describe the structure and function of Ecosystem.

(OR)

b.What is Biogeochemical cycle? Explain in detail Nitrogen cycle.

2 a. .Explain soil erosion, its types and methods of soil conservation

(OR)

b. Explain Raunkier's life forms.

3 a.Define succession. Explain Hydrarch succession in detail.

(OR)

b.Give a detail account on Productivity.

B.Sc (CBCS) Botany-III Year
Semester-V - Paper VI
Elective I
Ecology & Biodiversity

Practical Model Question Paper

Time: 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1. Calculate the frequency and density of the given Quadrate A 8M
2. Estimate the amount of Carbonates/Bicarbonates present in the given water sample B. 5m
3. Comment on the specimens C, D & E (3+2=6m)
4. Identify the given slides F & G (Halophytes, Hydrophytes & Xerophytes) (2+2=4m)
5. Record (2m)

B.Sc (CBCS) BOTANY: III YEAR
Semester-V - Paper VII
Elective II
Horticulture

DSE-1E (3 hrs./week) Theory Syllabus

Credits-3
(45 hours)

UNIT - I

1. Definition, branches, scope and economic importance of horticultural crops (4h)
2. Classification of horticultural crops based on -Climatic requirements, Season of growth, (6h)
3. Manures: Definition, importance of manures FYM (compost), oil cakes, green manure, Organic manures and vermi-compost. (5h)

UNIT - II

4.. Natural Propagation : By seeds, Vegetative Structures like Bulbs, Tubers, Corms, Rhizomes, Root stock, runners, Offsets and suckers . (4h)

5.. Artificial Propagation: Cutting, Layering, Grafting and Budding (4h)

6. Application of the following plant growth regulators in horticulture - Auxins**,** Gibberellins, Cytokinins, Ethylene and Brassinosteroids. (4h)
7. Green house technology- definition, types, layout, construction, irrigation systems, care and attention, hardening of plants. (3h)

UNIT - III

8. Soil and climatic requirements of horticultural crops, Selection of site, planning, training, pruning and Cropping system; Garden implements and their uses. (5h)
9. Management: Orchard management, Nutrition management, Water management and Weed Management. (4h)
10. Organic Farming; Bonsai techniques. (6h)

References:

1. Bhattacharjee.S.K. 2006. Amenity Horticulture, Biotechnology and Post harvest technology. Pointer publishers. Jaipur
2. Chadha, K.L. 2001, Handbook of Horticulture, ICAR, New Delhi.
3. Chandra, R. and M. Mishra. 2003. Micropropagation of horticultural crops. International Book Distributing Co., Lucknow.
4. Chattopadhyaya, P.K.2001. A text book on Pomology (Fundamentals of fruit growing) Kalyani Publication, New Delhi
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8. Hartman, H.T. and Kester, D.E. 1986. Plant propagation – Principles and Practices – Prentice Hall of India Ltd., New Delhi.
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13. Singh, D.K. 2008. Hi-tech horticulture. Agrotech publishers, Udaipur
14. Singh, N.P. 2005. Basic concepts of fruit science. International Book Distributing Co., Lucknow.
15. Surendra Prasad and U. Kumar. 1999. Principles of horticulture, Agro-botanica, Bikaner, India.
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17. Utpal Banerjee. 2008. Horticulture. Mangal Deep publishers
18. Vijaikumar UmRao. 2008. Horticulture terms – Definitions and Terminology. IBD publishers, Dehradun
19. Adams, C.R. and M. P. Early. 2004. Principles of horticulture. Butterworth –Heinemam, Oxford University Press.
20. Bansil. P.C. 2008. Horticulture in India. CBS Publishers and Distributors, New Delhi.
21. Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.

B.Sc (CBCS) BOTANY: III YEAR
Semester-V - Paper VII
Elective II
Horticulture

Practical Syllabus

(45 hours)

1. Garden tools and implements. (3h)
2. Identification and description of any two varieties/hybrids of tropical and subtropical vegetable, fruit, flower and ornamental crops. (3h)
3. Propagation practices by seed, Vegetative propagation (Rhizome, bulb, corm), cutting, layering, budding, grafting with two examples. (9h)
4. Seed propagation- seed treatments, sowing and seedling production. (6h)
5. Nursery practices, transplanting, field preparation, sowing/planting, use of herbicides, top dressing of fertilizers and use of growth regulators. (6h)
6. Nursery containers, media, potting and repotting of plants, hardening of plants in nursery, shade regulation in nursery, plant protection in nursery plants (Demonstration) (6h)
7. Packing nursery plants for local and long distance markets. (Demonstration) (3h)
8. Making of organic-compost. (9h)

B.Sc (CBCS) BOTANY: III YEAR
Semester-V - Paper VII
Elective II
Horticulture

Practical Model Paper

Time: 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1. Major Experiment A (8marks)

   Air Layering

   (OR)

   Grafting

2. Minor Experiment B (6marks)

   Nutritive value of vegetable or fruit

   (OR)

   Making of organic compost

3. Spotters (3x3=9marks)

   C. Vegetative propagative organ

   D. Horticulture- Garden tools

   E. Floriculture- Bonsai

4. Record (2marks)

B.Sc (CBCS) Botany: III Year
Semester-VI - Paper-VIII
Plant Physiology

DSC-1F (3hrs./week) Theory Syllabus

Credits-3
(45 hours)

UNIT - I

1. Water Relations*:* Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis; water, osmotic and pressure potentials; absorption, transport of water, ascent of sap; transpiration; Stomatal structure and movements. (7h)
2. Mineral Nutrition*:* Essential macro and micro mineral nutrients and their role; symptoms of mineral deficiency. (3h)
3. Stress physiology: concept and plant responses to water, salt and temperature stresses (2h)
4. Translocation of organic substances: Mechanism of phloem transport; source-sink relationships. (2h)

UNIT- II

5. Enzymes: Nomenclature, characteristics, mechanism and regulation of enzyme action, enzyme kinetics, factors regulating enzyme action. (4h)
6. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect; concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; Factors effecting Photosynthesis, photophosphorylation. (4h)
7. Carbon assimilation pathways: C3, C4 and CAM. (4h)
8. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway. (6h)

UNIT - III

9. Nitrogen Metabolism*:* Biological nitrogen fixation, nitrate reduction, ammonia assimilation, (GS-GOGAT, transamination) (4h)
10. Lipid Metabolism: Structure and function of lipids. (3h)
11. Growth and Development: Physiological effects of phytoharmones–Auxins, gibberellins, cytokinins, ABA, ethylene and Brassinosteroids (3h)
12. Physiology of flowering and photoperiodism. Role of Phytochrome in flowering. (3h)

References:

1. Hopkins, W. G. 1995. Introduction to Plant Physiology. John Wiley & Sons Inc., New York, USA
2. Jain, J.L., S. Jain and Nitin Jain. 2008. Fundamentals of Biochemistry. S. Chand & Company Ltd., New Delhi.
3. Pandey, B. P. 2007. Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S. Chand & Company Ltd., New Delhi.
4. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc.,USA.
5. Taiz, L. and E. Zeiger. 1998. Plant Physiology (2nd Ed.). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
6. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

B.Sc (CBCS) Botany: III Year
Semester-VI - Paper-VIII
Plant Physiology

Theory Model Question Paper

Time : 2 hrs **Max. Marks: 40**

Draw well labeled diagrams wherever necessary.

I. Write short notes on any FOUR of the following: - **4 X $2^{1}/_{2}$ = 10 M**

a. Plasmolysis

b. Role of Zinc

c. Respiratory quotient

d. Red drop Effect

e. Types of stomata

f. Auxins

II . Essay Questions: **3 X 10 = 30 M**

1 a. Write a note on theories of stomatal movement regarding transpiration.

(OR)

b. Describe plant responses to water, salt and temperature.

2 a. Give an account of IUB system of classification, with a note on enzyme action.

(OR)

b. Discuss Calvin cycle.

3 a. Give an account on Kreb's cycle.

(OR)

b. Give a brief account on Nitrogen Fixation.

B.Sc (CBCS) Botany: III Year
Semester-VI - Paper-VIII
Plant Physiology

Practical Syllabus

(45 hours)

1. Determination of osmotic potential of vacuolar sap by Plasmolytic method using leaves of *Rheodiscolor* / *Tradescantia*. (6h)
2. Determination of rate of transpiration using Cobalt chloride method (3h)
3. Determination of stomatal frequency using leaf epidermal peelings / impressions (6h)
4. Determination of catalase activity using potato tubers by titration method (6h)
5. Separation of chloroplast pigments using paper chromatography technique (12h)
6. Estimation of protein by Biurette method (6h)
7. Mineral deficiency- Detail study of Micronutrients and Macro nutrients (3h)
8. Identification of C_3, C_4 and CAM plants (3h)

B.Sc (CBCS) Botany: III Year
Semester-VI - Paper-VIII
Plant Physiology

Practical Model paper

Time : $2^{1/2}$ hrs Max. marks: 25

I. Major Experiment: **A**
(9marks)

1. Determination of Osmotic potential of vascular sap- plasmolytic method.
2. Determination of Catalase activity – Potato, tubers by titration method.
3. Separation of Chloroplast pigments by paper chromatography.
4. Estimation of proteins by Biuret Method.

II. Minor Experiment: **B** (7marks)

1. Determination of Stomatal frequency using leaf epidermal peel/impressions.
2. Determination of Rate of transpiration by Cobalt chloride method.

III. Identify and Comment on: C, D & E (3x2=6)

Micronutrient Deficiency / Macronutrients Deficiency /C3, C4 and CAM plants.

IV. Record (2marks)

B.Sc (CBCS) Botany-III Year
Semester-VI – Paper-IX
Elective III
Tissue Culture and Biotechnology

DSE-1F (3 hrs./week) Theory Syllabus

Credits-3

UNIT - I **(45 hours)**

1. Tissue culture: Introduction, sterilization procedures, explants, culture media – composition and preparation; Micropropagation. (5h)
2. Organ culture: Vegetative Organs-Root, Shoot, Leaf culture (6h)
   Reproductive Organs-Anther, Ovary, Ovule, Embryo culture
3. Callus culture, Cell and Protoplast culture (4h)
4. Somatic hybrids and Cybrids. (4h)

UNIT- II

5. Applications of tissue culture: Production of pathogen free plants and somaclonal variants, production of stress resistance plants, secondary metabolites and synthetic seeds. (6h)
6. Production of hairy roots and its applications in production of secondary metabolites. (2h)
7. Biotechnology: Introduction, history, scope and applications. (3h)
8. rDNA technology: Basic aspect of of gene cloning, Enzymes used in gene cloning-Restriction enzymes, Ligases, Polymerases. (4h)

UNIT- III

9. Gene cloning-Vectors – cloning vehicles (Plasmid , Cosmids, Bacteriophages , & Phasmids) application of r DNA technology. (5h)
10. Gene Libraries: Genomic Libraries, cDNA Libraries, Polymerase chain reaction and its applications. (4h)
11. Method of gene transfer in plants (*Agrobacterium* and Microprojectile) (4h)
12. Production of transgenic plants, Bt –application in cotton and brinjal. Application of Transgenic in crop improvement. (3h)

References:

1. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004.
2. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press
4. (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company,
6. New Delhi.
7. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
8. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India)
10. Private Limited, Hyderabad..
11. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
12. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth,
13. Thomson Learning Inc., USA..

B.Sc (CBCS) Botany-III Year
Semester-VI – Paper-IX
Elective III
Tissue Culture and Biotechnology

Theory Model Paper

Time: 2 hrs **Max. marks: 40**

Draw well labeled diagrams wherever necessary.

I. Write short notes on any FOUR of the following: - **4 X $2^{1}/_{2}$ = 10 M**

a. Explant.

b. Somatic cybrid.

c. Plasmid.

d. Bt- Cotton

e. Synthetic seeds

f. Shoot culture

II . Essay Questions: **3X 10= 30 M**

1a.Write a note on Anther culture and its application.

(OR)

b.Give an account on technique in plant Tissue culture.

2 a. Describe the process of protoplast culture and its applications.

(OR)

b.Explain the *invitro* production of secondary metabolites.

3 a. Describe the procedure of r-DNA technology.

(OR)

b. Discuss in detail the various applications of Biotechnology

B.Sc (CBCS) Botany-III Year
Semester-VI – Paper-IX
Elective III
Tissue Culture and Biotechnology

Practical Syllabus

Major Experiments:

1. Estimation of plant DNA. (Tomato) (6h)
2. Production of synthetic seeds /Encapsulation of embryo (3 h)
3. Preparation of plant tissue culture medium. (6h)

Minor Experiments:

4. Callus Micropropagation (3h)
5. Demonstration of Micropropagation/ multiple shoots (6h)
6. Anther culture (3 h)
7. PCR –Demonstration (3h)
8. Study of biotechnology products: Samples of antibiotics and vaccines (6h)
9. Photographs of transgenic plants – Bt Cotton, Bt –Brinjal. (3h)
10. Instruments used in Biotechnology lab- Autoclave, Laminar air flow, Hot air oven and Incubator. (6h)

B.Sc (CBCS) Botany-III Year
Semester-VI – Paper-IX
Elective III
Tissue Culture and Biotechnology

Practical Model Paper

Time: 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1.. Major Experiment **A** (9 marks)

Estimation of DNA

(OR)

Production of synthetic seeds /Encapsulation of embryo

2.. Minor Experiment **B** (5 marks)

Callus/ Micropropagation/Multiple shoots

3. Spotters (3x3=9 marks)

C. Vaccines

D. Antibiotics

E. Transgenic/ instruments

4. Record (2 marks)

B.Sc (CBCS) BOTANY: III YEAR
Semester-VI – Paper-X
Elective IV
Seed Technology

DSE- 1F (3 hrs./week) **Theory Syllabus**

Credits-3
(45 hours)

UNIT- I

1. Seed: Structure and types. Seed dormancy: causes and methods of breaking dormancy. (4h)
2. Seed storage: Long term and short term storage. Orthodox and recalcitrant seeds. Packing of seeds – Principles, practices, bagging and labelling. (3h)
3. Physico and Bio-chemical changes during seed storage. (2h)
4. Seed viability, factors affecting seed viability and genetic erosion. (3h)

UNIT-II

5. Cultural practices and harvesting of Seed: Isolation, Sowing, Cultural practices, harvesting and threshing of the following crops: (9h)
   a) Rice b) Cotton c) Sunflower
6. Seed Treatment to control seed borne disease –General account (3h)
7. Structure of pollen and ovule-Types of ovules, Collection and storage of pollen (3h)
8. Principles of hybrid seed production-Cross pollination, Emasculation, Self pollination, role of pollinators and their management. (6h)

UNIT-III

9. Seed development in cultivated plants, seed quality concept, importance of genetic purity of seed. Hybrid seed production and Heterosis. (4h)
10. Seed production technology; seed testing- Procedures of seed testing, seed testing laboratories and importance of seed testing.
11. Seed certification- History, Seed certification agency, Indian minimum, general and specific seed certification standard. (3h)
12. Seed banks- National, International and Millennium seed banks. (3h)

References:

1. Agrawal, P. K. 1993. Hand Book of Seed Technology. Dept. of Agriculture and Cooperation. National Seed Corporation Ltd., New Delhi
2. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Bedell, Y. E. Seed Science and Technology. Indian Forest Species. Allied Publishers Limited, New Delhi.
4. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
6. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
7. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
8. Hartman, H. T. and D. E. Kestler. 1976. Plant Propagation: Principles and Practices. Prentice & Hall of India, New Delhi.
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India) Private Limited, Hyderabad..
10. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
11. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA..
12. Tiwari, G. N. and R. K. Goal. Green House Technology – Fundamentals, Design, Modelling and Application. Narosa Publishing House, New Delhi.
13. Tunwar, N. S. and S. V. Singh. 1988. Indian Minimum Seed Certification Standards. The Central Seed Certification Board, Govt. of India, New Delhi.

B.Sc (CBCS) BOTANY: III YEAR
Semester-VI – Paper-X
Elective IV
Seed Technology

Theory Model Paper

Max. Marks: 40

Note: Answer all questions. Draw well labeled diagrams wherever necessary.

1. Short notes: Answer all questions: **4 X $2^{1}/_{2}$ = 10 M**

a. Horticulture

b. Organic farming

c. Ethylene

d. Pruning

Essays: Answer all questions: **3 X 10=30 M**

1 a. Scope and importance of Horticultural crops

(OR)

b. Give an account on Nutritive Value of any two vegetable crops.

2.a. What is vegetative propagation? Describe briefly the various methods of vegetative propagation.

(OR)

b. Write a note on different types of manures and its application.

3.a. Define phytoharmones and discuss the role of auxins and gibberlins as plant growth harmones

(OR)

b. Write an essay on green house, poly house and mist chamber.

B.Sc (CBCS) BOTANY: III YEAR
Semester-VI – Paper-X
Elective IV
Seed Technology

Practical syllabus

(45 hours)

Major Experiment

1. Testing of seed viability using 2, 3, 5-triphenyl tetrazolium chloride (TTC). (3h)
2. Estimation of amylase activity of germinating seeds (Qualitatively). (3h)
3. Demonstration of seed dressing using fungicides to control plant diseases. (3h)
4. Demonstration of seed dressing using Biofertilizers (BGA) to enrich nutrient supply. (3h)

Minor Experiments

5. Emasculation, bagging of flower for hybrid seed production. (6h)
6. Dissection of Dicot embryo (bean) and Monocot embryo (maize). (6h)
7. Pollen viability test using Evan's blue staining. (*Hibiscus*). (3h)
8. Harvesting and Importance of following seeds:
   Rice,
   Maize,
   Cotton,
   Groundnut and
   Sunflower. (6h)
9. Types of ovules: Orthotropous, Anatropous and Campylotropous. (3h)
10. Structure of pollen grains: *Hibiscus* and grass. (3h)
11. Study visits to research institutes, seed tests and certification laboratories and places seed banks. (6h)

B.Sc (CBCS) BOTANY: III YEAR
Semester-VI – Paper-X
Elective IV
Seed Technology

Practical Model paper

Time: 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1. Major Experiment A. (9marks)

   a. Estimation of amylase activity in germinating seeds.

   (OR)

   b. Seed viability test by triphenyl tetrazolium chloride (TTC)

2. Minor Experiment B. (5marks)

   a. Dissection of Dicot/ Monocot embryo.

   (OR)

   b. Emasculation/ bagging of flower.

3. Spotters (3x3=9marks)

   C. Types of ovules.

   D. Types of pollen grains.

   E. Importance of following seeds: rice, cotton and sunflower.

4. Record (2marks)

DEPARTMENT OF CHEMISTRY
MAHATMA GANDHI UNIVERSITY-NALGONDA, B.Sc.Chemistry, 2016-17

YEAR	SEM	PAPER TITLE WITH CODE	HRS/PER WEEK	CREDITS	MARKS
FIRST	FIRST	Th: paper I: chemistry I	4	4	100
		Lab: paper I : Qualitative analysis I	2	1	50
	SECOND	Th: paper II: Chemistry II	4	4	100
		Lab: paper II: Qualitative analysis II	2	1	50
SECOND	THIRD	Th: paper III : chemistry III	4	4	100
		Lab: paper III : Quantitative analysis I	2	1	50
	FOURTH	Th: paper IV: Chemistry IV	4	4	100
		Lab: paper IV : Quantitative analysis I	2	1	50
THIRD	FIFTH	Th: paper V : chemistry V	3	3	100
		Lab: paper V :org chem.(chem551)	2	1	50
		Th: paper VI : Theory Paper A/B/C (Electives)	3	3	100
		Lab: paper VI :phy chem.(chem. 552)	2	1	50
	SIXTH	Th: paper VII: chemistry VI	3	3	100
		Lab: Paper-VII (Organic) (Chem 651)	2	1	50
		Th: paper VIII: Theory Paper A/B/C (Electives)	3	3	100
		Lab: Paper- VIII (Physical) (Chem 652**)**	2	1	50

B.Sc I yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER I
Paper – I
Chemistry - I

Unit-I (Inorganic Chemistry) 15h(1 hr/week)

S1-I-1. s-block elements:

General Characteristics of groups I and II elements, Diagonal relationship between Li and Mg, Be and Al **2 h**

S1-I-2. p-block elements 1: 7 h

Group–13: Synthesis and structure of diborane and higher Boranes (B_4H_{10} and B_5H_9), Boron nitrogen compounds ($B_3N_3H_6$ and BN), Lewis acid nature of BX_3

Group – 14: Carbides-Classification – ionic, covalent, interstitial – synthesis. Structures and reactivity. Industrial application. Silicones – Preapartion – a) direct silicon process b) use of Grignard reagent c) aromatic silylation. Classification – straight chain, cyclic and cross-linked.

Group – 15: Nitrides – Classification – ionic, covalent and interstitial. Reactivity – hydrolysis. Preparation and reactions of hydrazine, hydroxyl amine, phosphazenes.

S1-I-3. General Principles of Inorganic qualitative analysis 6 h

Anion analysis: Theory of sodium carbonate extract, classification and reactions of anions-CO_3^{2-}, Cl^-, Br^-, SO_4^{2-}, PO_4^{3-}, BO_3^{3-}, CH_3COO^-, NO_3^-.

Cation Analysis: Principles involved - Solubility product, common ion effect, general discussion for the separation and identification of group I individual cations (Hg_2^{2+}, Ag+, Pb+) with flow chart and chemical equations. Principle involved in separation of group II & IV cations.

General discussion for the separation and identification of group II (Hg^{2+}, Pb^{2+}, Bi^{3+}, Cd^{2+}, Sb^{2+}), III (Al^{3+}, Fe^{3+}), IV ((Mn^{2+}, Zn^{2+}) individual cations with flow chart and chemical equations. Application of concept of hydrolysis in group V cation analysis. General discussion for the separation and identification of group V individual cations (Ba^{2+}, Sr^{2+}, Ca^{2+}) with flow chart and chemical equations. Theory of flame test. Identification of Group VI cations (Mg^{2+}, NH_4^+).

Unit - II (Organic Chemistry) 15h (1 hr/week)

S1-O-1: Structural Theory in Organic Chemistry 6 h

***Bond polarization*:** Factors influencing the polarization of covalent bonds, electro negativity – inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance - Mesomeric effect, application to (a) acidity of phenol. (b) acidity of carboxylic acids and basicity of anilines. Stability of carbo cations, carbanions and free radicals. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes.

***Types of organic reactions*:** Addition reactions- electrophilic, nucleophilic and free radical. Substitution reactions – electrophilic, nucleophilic and free radical. Elimination and Rearrangement reactions– Examples.

S1-O-2: Acyclic Hydrocarbons 6 h

Alkane*s* – Methods of preparation: Corey-House reaction, Wurtz reaction, from Grignard reagent, Kolbe synthesis. Chemical reactivity - inert nature, free radical substitution, Halogenation example- reactivity, selectivity and orientation.

Alkenes - Preparation of alkenes (with mechanism) (a) by dehydration of alcohols (b) dehydrohalogenation of alkyl halides (c) by dehalogenation of 1,2 dihalides, Zaitsev's rule. Properties: Addition of Hydrogen – heat of hydrogenation and stability of alkenes. trans-addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O, HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti – Markonikov's addition). Oxidation (cis – additions) – hydroxylation by $KMnO_4$, OsO_4, trans addition- peracids (via epoxidation), hydroboration, ozonolysis – location of double bond. Dienes – Types of dienes, reactions of conjugated dienes – 1,2 and 1,4 addition of HBr to 1,3 – butadiene and Diels – Alder reaction.

Alkynes – Preparation by dehydrohalogenation of vicinal dihalides, dehalogenation of tetrahalides. Physical Properties: Acidity of terminal alkynes (formation of metal acetylides) preparation of higher alkynes, Chemical reactivity – electrophilic addition of X_2, HX, H_2O (tautomerism), Oxidation (formation of enediol, 1,2 diones and carboxylic acids) and reduction (Metal-ammonia reduction, catalytic hydrogenation)

S1-O-3: Alicyclic Hydrocarbons 3 h

Nomenclature, preapartion by Freunds method, Dickmann, heating dicarboxylic metal salts. Properties – reactivity of cyclo propane and cyclo butane by comparing with alkanes. Stability of cycloalkanes – Baeyer strain theory, Sachse and Mohr predictions and Pitzer strain theory. Conformational structures of cyclopentane, cyclohexane.

Unit-III (Physical Chemistry) 15 h (1 hr/week)

S1-P-1: Atomic structure and elementary quantum mechanics 6 h

Black body radiation, heat capacities of solids, Rayleigh Jeans law, Planck's radiation law, photoelectric effect, Limitations of classical mechanics, Compton effect, De Broglie's hypothesis. Heisenberg's uncertainty principle, Schrodinger's wave equation and its importance. Physical interpretation of the wave function, significance of ψ and ψ^2, a particle in a box, energy levels, wave functions and probability densities. Schrodinger wave equation for H-atom. Separation of variables, radial and angular functions (only equation), hydrogen like wave functions, quantum numbers and their importance.

S1-P-2: Gaseous State 5 h

Deviation of real gases from ideal behavior. van der Waals equation of state. Critical phenomenon. PV isotherms of real gases, continuity of state. Andrew's isotherms of CO_2. The van der Waal's equation and critical state. Derivation of relationship between critical constants and van der Waal's constants. The law of corresponding states, reduced equation of states. Joule Thomson effect and inversion temperature of a gas. Liquifaction of gases: i) Linde's method based on Joule Thomson effect ii) Claude's method based on adiabatic expansion of a gas.

S1-P-3: Liquid State 4 h

Intermolecular forces, structure of liquids (qualitative description). Structural differences between solids, liquids and gases. Surface tension and its determination using stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only). Liquid crystals, the mesomorphic state: Classification of liquid crystals in to Smectic and Nematic, differences between liquid crystal and solid / liquid. Application of liquid crystals as LCD devices.

Unit – IV (General Chemistry) 15 h (1 hr/week)

S1-G-1 Chemical Bonding 11 h

Ionic solids- lattice and solvation energy, solubility of ionic solids, Fajan's rule, polarity and polarizability of ions, covalent nature of ionic bond, covalent bond - Common hybridization and shapes of molecules.

Molecular orbital theory: Shapes and sign convention of atomic orbitals. Modes of overlapping. Concept of σ and π bonds. Criteria for orbital overlap. LCAO concept. Types of molecular orbitals- bonding, antibonding and non bonding. MOED of homonuclear diatomics - H_2, N_2, O_2 , O_2^-, O_2^{2-}, F_2 (unhybridized diagrams only) and heteronuclear diatomics CO, CN^- NO, NO^+ and HF. Bond order, stability and magnetic properties.

S1-G-2 Evaluation of analytical data 4 h

Significant figures, accuracy and precision. Errors-classification of errors- determinate and indeterminate errors, absolute and relative errors, propagation of errors in mathematical operations – addition, substraction, division and multiplication (with respect to determinate errors).

References:

Unit- I

1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications 1996.
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn.
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers 2001. Chem.
4. Vogel's Qualitative Inorganic Analysis by Svehla
5. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4th edn.
6. Chemistry of the elements by N.N.Greenwood and A. Earnshaw Pergamon Press 1989.
7. Inorganic Chemistry by Shriver and Atkins 3rd edn Oxford Press 1999.
8. Qualitative analysis by Welcher and Hahn.
9. Textbook of Inorganic Chemistry by R Gopalan
10. College Practical chemistry by V K Ahluwalia, Sunitha Dhingra and Adarsh Gulati

Unit- II

1. Text book of organic chemistry by Morrison and Boyd.
2. Text book of organic chemistry by Graham Solomons.
3. Text book of organic chemistry by Bruice Yuranis Powla.
4. Text book of organic chemistry by Soni.
5. General Organic chemistry by Sachin Kumar Ghosh.
6. Text book of organic chemistry by C N pillai

Unit III

1. Principles of physical chemistry by Prutton and Marron.
2. Text Book of Physical Chemistry by Soni and Dharmahara..
3. Text Book of Physical Chemistry by Puri and Sharma.
4. Text Book of Physical Chemistry by K. L. Kapoor.
5. Physical Chemistry through problems by S.K. Dogra.
6. Text Book of Physical Chemistry by R.P. Verma.
7. Elements of Physical Chemistry by Lewis Glasstone.

Unit IV

1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications 1996.
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn.
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers 2001. Chem
4. Analytical chemistry by G. L. David Krupadanam, D. Vijaya Prasad, K. Varaprasada Rao, K.L.N. Reddy and C. Sudhakar

Laboratory Course **45h (3 h / week)**

Paper I Qualitative Analysis - I

I. Preparations:

1. Tetrammine copper (II) sulphate,
2. Potash alum $KAl(SO_4)_2.\ 12H_2O$,
3. Bis (dimethylglyoximato) nickel(II)

II. Analysis of two anions (one simple and one interfering)

B.Sc I yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER II
Paper II
Chemistry - II

Unit-I (Inorganic Chemistry) 15 h (1 hr/week)

S2-I-1 p-block Elements -II 7 h

Oxides: Types of oxides (a) Normal- acidic, basic amphoteric and neutral (b) Mixed (c) sub oxide d) peroxide e) superoxide. Structure of oxides of C, N, P, S and Cl - reactivity, thermal stability, hydrolysis.

Oxy acids: Structure and acidic nature of oxyacids of B, C, N, P, S and Cl. Redox properties of oxyacids of Nitrogen: HNO_2 (reaction with $FeSO_4$, $KMnO_4$, $K_2Cr_2O_7$), HNO_3 (reaction with H_2S, Cu), HNO_4 (reaction with KBr, Aniline), $H_2N_2O_2$ (reaction with $KMnO_4$). Redox properties of oxyacids of Potasium: H_3PO_2 (reaction with $HgCl_2$), H_3PO_3 (reaction with $AgNO_3$, $CuSO_4$). Redox properties of oxyacids of Sulphur: H_2SO_3 (reaction with $KMnO_4$, $K_2Cr_2O_7$), H_2SO_4 (reaction with Zn, Fe, Cu), $H_2S_2O_3$ (reaction with Cu, Au), H_2SO_5 (reaction with KI, $FeSO_4$), $H_2S_2O_8$ (reaction with $FeSO_4$, KI)

Interhalogens **-** classification- general preparation- structures of AB,AB_3, AB_5 and AB_7 type and reactivity. Poly halides - definition and structure of ICl_2^-, ICl_4^- and I_3^-. Comparison of Pseudohalogens with halogens.

S2-I-2 Chemistry of Zero group elements 2 h

General preparation, structure, bonding and reactivity of Xenon compounds – Oxides, Halides and Oxy-halides. Clatherate compounds and Anomalous behavior of He (II)

S2-I-3 Chemistry of d-block elements 6 h

Characteristics of d-block elements with special reference to electronic configuration variable valence, ability to form complexes, magnetic properties & catalytic properties. Stability of various oxidation states and SRP Comparative treatment of second and third transition series with their 3d analogues. Study of Ti, Cr and Cu traids. Titanium triad – electronic configuration and reactivity of +3 and +4 states – oxides and halides. Chromium triad – reactivity of +3 and +6 states. Copper triad – reactivity of +1, +2 and +3 states.

Unit - II (Organic chemistry) 15 h (1 hr/week)

S2-O-1: Aromatic Hydrocarbons 7 h

Concept of aromaticity – definition, Huckel's rule – application to Benzenoids and Non – Benzenoids (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation).

Preapartions: From acetylene, phenols, benzene carboxylic acids and sulphonic acids

Reactions - General mechanism of electrophilic substitution, mechanism of nitration, sulphonation, and halogenation, Friedel Craft's alkylation (polyalkylation) and acylation. Orientation of aromatic substitution - Definition of ortho, para, and meta directing groups. Ring activating and deactivating groups with examples. Orientation – (i) activating groups: Amino, methoxy and alkyl groups. (ii) Deactivating groups - carboxy, nitro, nitrile, carbonyl and sulphonic acid & halo groups.

S2-O-2: Arenes and Polynuclear Aromatic Hydrocarbons 3 h

Preparation of alkyl benzenes by Friedel Craft's alkylation, Friedel Craft's acylation followed by reduction, Wurtz-Fittig reaction. Chemical reactivity: Ring substitution reactions,side chain substitution reactions and oxidation.

Polynuclear hydrocarbons – Structure of naphthalene and anthracene (Molecular Orbital diagram and resonance energy) Reactivity towards electrophilic substitution. Nitration and sulphonation as examples.

S2-O-3: Halogen compounds 5 hrs

Nomenclature and classification: alkyl (primary, secondary, tertiary), aryl, aralkyl, allyl, vinyl, benzyl. Chemical reactivity - reduction, formation of RMgX, Nucleophilic substitution reactions – classification into S_N^1 and S_N^2. Mechanism and energy profile diagrams of S_N^1 and S_N^2 reactions. Stereochemistry of S_N^2 (Walden Inversion) 2-bromobutane, S_N^1 (Racemisation) 1-bromo-1-phenylpropane explanation of both by taking the example of optically active alkyl halide. Structure and reactivity – Ease hydrolysis - comparison of alkyl, vinyl, allyl, aryl, and benzyl halides.

Unit – III (Physical Chemistry) 15 h (1 hr/week)

S2-P-1: Solutions 5 h

Liquid - liquid mixtures, ideal liquid mixtures**,** Raoult's and Henry's laws. Non ideal systems. Azeotropes HCl-H_2O and C_2H_5OH - H_2O systems. Fractional distillation,. Partially miscible liquids- Phenol – Water, Trimethyl amine – Water and Nicotine –Water systems. Lower upper consolute temperatures. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law with solvent extraction.

S2-P-2: Dilute Solutions & Colligative Properties 5 h

Dilute Solutions, Colligative Properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis - laws of osmotic pressure, its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, Van't hoff factor, degree of dissociation and assocoation of solutes.

S2-P-3: Solid state Chemistry 5 h

Laws of Crystallography – (i) Law of Constancy of interfacial angles (ii) Law of Symmetry, Symmetry elements in crystals (iii) Law of rationality of indices. Definition of space lattice, unit cell. Bravais Lattices and Seven Crystal systems (a brief review). X-ray diffraction by crystals; Derivation of Bragg's equation, Determination of structure of NaCl, KCl & CsCl (Bragg's method and Powder method).

Unit – IV (General Chemistry) 15 h (1 hr/week)

S2-G-1: Theory of Quantitative Analysis 5 hours

Volumetric Analysis: Introduction, standard solutions, indicators, end point, titration curves, Types of titrations: i)neutralization titration- principle, theory of acid base indicators, titration curves and selection of indicators- strong acid - strong base, strong acid –weak base, weak acid-strong base and weak acid –weak base.

Gravimetric analysis- Introduction, nucleation, precipitation, growth of precipitate, filtration and washing, drying and incineration of precipitate, coprecipitation and post precipitation. Determination of Ni^{2+}

S3-G-2: Theories of bonding in metals: 5 h

Valence bond theory, Explanation of metallic properties and its limitations, Free electron theory, thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors n-type and p-type, extrinsic & intrinsic semiconductors, and insulators.

S2-G-3: Material Science 5 h

Classification of materials- classification as metals, ceramics, organic polymers, composites, biological materials etc. The property of super conductivity of materials.

Super conducting materials- elements, alloys and compounds. Properties of super conductors-zero resistivity, Meisener effect and thermal properties. Composites- meaning of composites, advanced composites, classification –particle rein forced fiber reinforced and structural composites general characters of composite materials-Particle- reinforced composites – large particle and dispersion- strengthened composite. Fiber reinforced composites (continuous and discontinuous fiber composites).

References

Unit I

1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications 1996.
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn.
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn
4. Wiley Publishers 2001. Chem
5. Chemistry of the elements by N.N.Greenwood and A. Earnshaw Pergamon Press 1989.
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5. Physical Chemistry through problems by S.K. Dogra.
6. Elements of Physical Chemistry by Lewis and Glasstone.
7. Material science by Kakani & Kakani

Unit IV

1. Vogel's Text Book of Quantitative Analysis by G.H.Jeffery, J.Bassett, J.Mendham and R.C. Denney 5th edn Addison Wesley Longman Inc. 1999.
2. Quantitative Analysis by Day and Underwood Prentice Hall (India) VI Edn..
3. Nano: The Essentials by T. Pradeep, McGraw-Hill Education.
4. Chemistry of nanomaterials: Synthesis, Properties and applications by CNR Rao et.al.
5. Nanostructured Materials and Nanotechnology, edited by Hari Singh Nalwa, Academic Press
6. College Practical chemistry by V K Ahluwalia, Sunitha Dhingra and Adarsh Gulati

Laboratory Course **45hrs (3 h / week)**

Paper II - Qualitative Analysis - II

I Semi micro analysis of mixtures

Analysis of two anions and two cations in the given mixture.

Anions: CO_3^{2-}, SO_3^{2-}, $.S^{2-}$ Cl^-, Br^-, I^- CH_3COO^-, NO_3^- PO_4^{3-}, BO_3^{3-}, SO_4^{2-}

Cations: Ag^+, Pb^{2+}, Hg^+, Hg^{2+}
Pb^{2+}, Bi^{3+}, Cd^{2+}, Cu^{2+}, $As^{3+/5+}$, $Sb^{3+/5+}$, $Sn^{2+/4+}$
Al^{3+}, Cr^{3+}, Fe^{3+}
Zn^{2+}, Ni^{2+}, Co^{2+}, Mn^{2+}
Ca^{2+}, Sr^{2+}, Ba^{2+}
Mg^{2+}, NH_4^+

B.Sc II yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER III
Paper-III
Chemistry - III

Unit-I (Inorganic Chemistry) 15 h (1 hr/week)

S3-I-1: Chemistry of f-block elements: 6 h

Chemistry of Lanthanides**:** Position in periodic table, Electronic structure, oxidation state, ionic and atomic radii- lanthanide contraction- cause and consequences, anomalous behavior of post lanthanides-complexation- type of donor ligands preferred. Magnetic properties- paramagnetism. Colour and spectra, f-f transitions –occurrence and separation – ion exchange method, solvent extraction.

Chemistry of actinides- general features – electronic configuration, oxidation state, actinide contraction, colour and complex formation. Comparison with lanthanides.

S3-I-2: Symmetry of molecules 5 h

Symmetry operations and symmetry elements in molecules. Definition of Axis of symmetry types of C_n, Plane of symmetry (σh, σv, σd) Center of symmetry and improper rotational axis of symmetry (S_n). Explanation with examples.

S3-I-3: Non – aqueous solvents 4 h

Classification and characteristics of a solvent. Reactions in liquid ammonia – physical properties, auto-ionisation, examples of ammono acids and ammono bases. Reactions in liquid ammonia – precipitation, neutralization, solvolysis, solvation - solutions of metals in ammonia, complex formation, redox reactions. Reactions in HF – autoionisation, reactions in HF – precipitation, acid – base reactions, protonation.

Unit - II (Organic chemistry) 15 h (1 hr/week)

S3-O-1: Alcohols 6 hrs

Preaparation: 1°, 2° and 3° alchols using Griganard reagent, Ester hydrolysis, Reduction of Carbonyl compounds, carboxylic acids and esters. Physical properties: H-bonding, Boiling point and Solubility. Reactions with Sodium, HX/$ZnCl_2$ (Lucas reagent), esterification, oxidation with PCC, alk. $KMnO_4$, acidic dichromates, conc. HNO_3 and Oppenauer oxidation.
Diols: Pinacol - pinacolone rearrangement
Phenols: Preapartion: (i) from diazonium salts of anilines, (ii) from benzene sulphonic acids and (iii) Cumene hydroperoxide method.
Properties: Acidic nature, formation of phenoxide and reaction with R-X, electrophilic substitution nitration, halogenation and sulphonation. Riemer Tiemann reaction, Gattermann-Koch reaction, Azo-coupling reaction, Schotton-Boumann raction, Houben-Hoesch condensation, $FeCl_3$ reaction.

S3-O-2: Ethers and epoxides **2 hrs**

Nomenclature, preparation by (a) Williamson's synthesis (b) from alkenes by the action of conc. H_2SO_4. Physical properties – Absence of Hydrogen bonding, insoluble in water, low boiling point. Chemical properties – inert nature, action of conc. H_2SO_4 and HI.

S3-O-3 Carbonyl compounds **7 h**

Nomenclature of aliphatic and aromatic carbonyl compounds and isomerism.

Praparation of aldehydes & ketones from acid chloride, 1,3-dithianes, nitriles and from carboxylic acids. Special methods of preparing aromatic aldehydes and ketones by (a) Oxidation of arenes (b) Hydrolysis of benzal halides Physical properties – absence of Hydrogen bonding. Keto-enol tautomerism, polarisability of carbonyl groups, reactivity of the carbonyl groups in aldehydes and ketones. Chemical reactivity: Addition of [a] $NaHSO_3$ (b) HCN (c) RMgX (d) NH_3 (e) RNH_2 (f) NH_2OH(g) $PhNHNH_2$ (h) 2,4DNP (Schiff bases). Addition of H_2O to form hydrate (unstable), comparison with chloral hydrate (stable), addition of alcohols - hemi acetal and acetal formation. Base catalysed reactions with mechanism- Aldol, Cannizaro reaction, Perkin reaction, Benzoin condensation, haloform reaction, Knoevengeal condensation. Oxidation reactions –$KMnO_4$ oxidation and auto oxidation, reduction – catalytic hydrogenation, Clemmenson's reduction, Wolf- kishner reduction, Meerwein Pondoff Verly reduction, reduction with LAH, $NaBH_4$. Analysis – 2,4 –DNP test, Tollen's test, Fehlings test, Scihff's test, haloform test (with equations).

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UNIT – III (Physical Chemistry) **15 hr (1h / week)**

S3-P-1: Phase Rule **6 h**

Statement and meaning of the terms – Phase, Component and degrees of freedom, Gibb's Phase rule, phase equilibria of one component system – water system. Phase equilibria of two-component system – Solid-Liquid equilibria, simple eutectic – Pb-Ag system, desilverisation of lead. Solid solutions – compound with congruent melting point – Mg-Zn system and incongruent melting point – NaCl-H_2O system.

S3-P-2: Colloids & surface chemistry **9 h**

Definition of colloids. Classification of colloids. Solids in liquids (sols): preparations and properties – (including Kinetic, Optical and Electrical stability of colloids) Protective action. Hardy–Schultz law, Gold number. Liquids in liquids (emulsions): Types of emulsions, preparation and emusifier. Liquids in solids (gels); Classification, preparations and properties, General applications of colloids.

Micelles: Classification of surface active agents. Surfactant action, micellization and micellar interactions, Structure of micelles – spherical and laminar. Critical micellar concentration (CMC). Factors affecting the CMC of surfactants. Counter ion binding to micelles.

Adsorption: Types of adsorption, Factors influencing adsorption. Freundlich adsorption isotherm. Langmuir theory of unilayer adsorption isotherm. Applications**.**

Unit –IV (General Chemistry) 15 h (1h/week)

S3-G-1: *Nanomaterials:* 3h

Nano structured materials – Definition, size, description of graphene, fullerenes, carbon nano tubes. Synthetic techniques, bottom-up-sol-gel method, top-down, electro deposition method. Production of carbon nano tubes – arc discharge, laser vaporization methods. General applications of nano materials.

S3-G-2: Stereochemistry of carbon compounds 10 h

Isomerism: Definition of isomers. Classification of isomers: Constitutional and Stereoisomers - definition and examples. Constitutional isomers: chain, functional and positional isomers. Stereoisomers: enantiomers and diastereomers – definitions and examples.

Optical activity: Definition, wave nature of light, plane polarised light, optical rotation and specific rotation, chiral centers. Chiral molecules: definition and criteria - absence of plane, center and S_n axis of symmetry – asymmetric and dissymmetric molecules. Examples of asymmetric molecules (Glyceraldehyde, Lactic acid, Alanine) and disymmetric molecules (trans-1,2-dichlorocyclopropane). Molecules with constitutionally symmetrical chiral carbons (Tartaric acid) Molecules with constitutionally unsymmetrical chiral carbons (2,3-dibromopentane) Number of enantiomers and mesomers - calculation. D, L &, R, S configuration for asymmetric and disymmetric molecules (Allenes, spiro compounds and biphenyls), Cahn-Ingold-Prelog rules. Racemic mixture, Racemisation and Resolution techniques. Geometrical isomerism with reference to alkenes and cyclo alkanes– cis, trans and E, Z configuration.

S3-G-3: Conformational analysis 2 h

Classification of stereoisomers based on energy. Definition and examples of conformational and configurational isomers. Conformational analysis of ethane, n-butane, 1,2-dichloroethane,2-chloroethanol and methylcyclohexane

Referances:

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1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications 1996.
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5. Colloidal and surface chemistry , M. Satake, Y. Hayashi, Y.Mido, S.A.Iqbal and M.S.sethi
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5. General Organic chemistry by Sachin kumar Ghosh

Laboratory Course

Paper III - Quantitative Analysis - I **45hrs (3 h / week)**

Acid - Base titrations

1. Estimation of Carbonate in Washing Soda.
2. Estimation of Bicarbonate in Baking Soda.
3. Estimation of Carbonate and Bicarbonate in the Mixture.
4. Estimation of Alkali content in Antacid using HCl.

Redox Titrations

1. Determination of Fe(II) using $K_2Cr_2O_7$
2. Determination of Fe(II) using $KMnO_4$ with sodium oxalate as primary standard.
3. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard

B.Sc II yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER IV
Paper-IV
Chemistry - IV

Unit-I (Inorganic Chemistry) 15h (1 h/week)

S4-I-1: Coordination Compounds-I 7 h

Simple inorganic molecules and coordination complexes. Nomenclature – IUPAC rules, 1. Brief review of Werner's theory, Sidgwick's electronic interpretation and EAN rule and their limitations. (Valence bond theory (VBT) – postulates and application to (a) tetrahedral complexes $[Ni(NH_3)_4]^{2+}$, $[NiCl_4]^{2-}$ and $[Ni(CO)_4]$ **(**b) square planar complexes $[Ni(CN)_4]^{2-}$, $[Cu(NH_3)_4]^{2+}$, $[PtCl_4]^{2-}$ (c) octahedral complexes $[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{-3}$, $[FeF_6]^{4-}$, $[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-}$. Limitations of VBT). 2. Coordination number, coordination geometries of metal ions, types of ligands. 3. Isomerism in coordination compounds, stereo isomerism – (a) geometrical isomerism in (i) square planar metal complexes of the type $[MA_2B_2]$, $[MA_2BC]$, $[M(AB)_2]$, [MABCD]. (ii) Octahedral metal complexes of the type $[MA_4B_2]$, $[M(AA)_2B_2]$, $[MA_3B_3]$ using suitable examples, (b) Optical isomerism in (i). tetrahedral complexes [MABCD], (ii). Octahedral complexes $[M(AA)_2B_2]$, $[M(AA)_3]$ using suitable examples. Structural isomerism: ionization, linkage, coordination ligand isomerism using suitable examples.

S4-I-2:Organometallic Chemistry 4 h

Definition, nomenclature and classification of organometallic compounds. Methods of preparation, properties and applications of alkyl and aryl compounds of Li, Mg & Al. Preparation and properties of ferrocene.

S4-I-3: Metal carbonyls and related compounds 4 h

18 valence electron rule, classification of metal carbonyls: $Ni(CO)_4$, $Fe(CO)_5$, $Fe_2(CO)_9$, $Fe_3(CO)_{12}$ and $Cr(CO)_6$, Preparation and properties of Ni(CO)4.

UNIT - II (Organic chemistry) 15 h (1 hr/week)

S4-O-1: Carboxylic acids and derivatives 6 h

Nomenclature, classification and methods of preparation a) Hydrolysis of Nitriles, amides and esters. b) Carbonation of Grignard reagents. Special methods of preparation of Aromatic Acids. Oxidation of the side chain of Arenes. Hydrolysis of benzotrichlorides. Kolbe reaction. Physical properties- hydrogen bonding, dimeric association, acidity – strength of acids with the examples of trimethyl acetic acid and trichloro acetic acid, Relative differences in the acidity of Aromatic, aliphatic acids & phenols. Chemical properties – Reactions involving H, OH and COOH groups - salt formation, anhydride formation, Acid halide formation, Esterification (mechanism) & Amide formation. Reduction of acid to the corresponding primary alcohol - via ester or acid chloride. Degradation of carboxylic acids by Huns Diecker reaction, Schmidt reaction (Decarboxylation). Arndt – Eistert synthesis, Halogenation by Hell – Volhard - Zelensky reaction. Carboxylic acid Derivatives – Reactions of acid halides, Acid anhydrides, acid amides and esters (mechanism of ester hydrolysis by base and acid).

S4-O-2: Synthesis based on Carbanions 3 h

Acidity of α-Hydrogens of withdrawing groups, structure of carbanion. Preparation of Aceto acetic ester (ethylacetoester) by Claisen condensation and synthetic application of Aceto acetic ester. (a) Acid hydrolysis and ketonic hydrolysis: Butanone, 3-Methyl 2-butanone. Preparation of (i) monocarboxylic acids ii) dicarboxylic acids (b) malonic ester – synthetic applications. Preparation of (i) substituted mono carboxylic acids and (ii) substituted dicarboxylic acids.

S4-O-3 Nitro hydrocarbons: 6 h

Nomenclature and classification of nitro hydrocarbons. Structure. Tautomerism of nitroalkanes leading to aci and keto form. Preparation of Nitroalkanes. Reactivity - halogenation, reaction with HNO_2 (Nitrous acid), Nef reaction, Mannich reaction, Michael addition and reduction. Aromatic Nitro hydrocarbons: Nomenclature, Preparation of Nitrobenzene by Nitration. Physical properties, chemical reactivity – orientation of electrophilic substitution on nitrobenzene. Reduction reaction of Nitrobenzenes in different media.

Unit – III (Physical Chemistry) 15 hr (1h / week)

S4-P-1: Electrochemistry & EMF 15 h

Electrical transport – conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of specific and equivalent conductance with dilution. Migration of ions and Kholrausch's law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf's method for attackable electrodes. Applications of conductivity measurements: Determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

Electrolyte and Galvanic cells – reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurement. Computation of EMF. Types of reversible electrodes- the gas electrode, metal-metal ion, metal-insoluble salt and redox electrodes. Electrode reactions, Nernst equation, cell EMF and single electrode potential, standard Hydrogen electrode – reference electrodes (calamel electrode) – standard electrode potential, sign conventions, electrochemical series and its significance.

Applications of EMF measurements, Calculation of thermodynamic quantities of cell reactions (ΔG, ΔH and K). Determination of pH using hydrogen electrode, glass electrode and quinhydrone electrode, Solubility product of AgCl. Potentiometric titrations.

Unit –IV (General Chemistry) 15 h (1h/week)

S4-G-1: Pericyclic Reactions 5 h

Concerted reactions, Molecular orbitals of ethene, 1,3-butadiene and allyl radical. Symmetry properties, HOMO, LUMO, Thermal and photochemical pericyclic reactions. Types of pericyclic reactions – electrocyclic, cycloaddition and sigmatropic reactions – one example each and their explanation by FMO theory.

S4-G-2: Synthetic Strategies 5 h

Terminology – Target molecule (TM), Disconnection approach – Retrosynthesis, Synthon, Synthetic equivalent (SE), Functional group interconversion (FGI), Linear, Convergent synthesis. Retrosynthetic analysis of the following molecules: 1) acetophenone 2) cyclohexene and 3) phenylethylbromide.

S4-G-3: **Asymmetric synthesis 5 h**

Definition and classification of stereoslective reactions: substrate, product stereoselective reactions, enantio and diastereo selective reactions. Stereospecific reaction – definition – example – dehalogenation of 1,2-dibromides induced by iodide ion. Enantoselective reactions – definition – example –Reduction of Ethylacetoacetate by Yeast. Diastereoselective reaction-definition-example: Acid catalysed dehydration of 1-phenylproponal and Grignard addition to 2-phenyl propanal. Definition and explanation of enantiomeric excess and diastereomeric excess.

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6. Text Book of Physical Chemistry by R.P. Verma.
7. Elements of Physical Chemistry byLewis Glasstone.
8. Industrial Electrochemistry, D. Pletcher, Chapman & Hall

Unit IV

1. Text book of organic chemistry by Morrison and Boyd
2. Text book of organic chemistry by Graham solomons
3. Fundamentals of organic synthesis and retrosynthetic analysis
4. by Ratna Kumar Kar
5. Organic synthesis by Dr. Jagadamba Singh and Dr. L.D.S. Yadav
6. Stereochemistry of organic compounds by D. Nasipuri
7. Organic chemistry by Clayden, Greeves, Warren and Wothers
8. Fundamentals of Asymmetric Synthesis by G. L. David Krupadanam

Laboratory Course

Paper IV - Quantitative Analysis - II **45hrs (3h/ week))**

1. Conductometry titrations:
   i) Strong acid Vs Strong base;
   ii) Weak acid Vs Strong base.
2. Potentiometry titration:
   i) Strong acid Vs Strong base;
   ii) Weak acid Vs Strong base.
3. Estimation of Nickel by back titration (Standard $MgSO_4$ solution will be given)
4. Estimation of Barium as Barium Sulphate

B.Sc III yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER V
Paper-V
Chemistry - V

Unit-I (Inorganic Chemistry) 11 h

S5-I-1: Coordination compounds –II 9 h

Crystal field theory (CFT)- Postulates of CFT, splitting patterns of d-orbitals in octahedral, tetrahedral, square planer with suitable examples. Crystalfield stabilization energies and its calculations for various d^n configurations in octahedral complexes. High Spin Low Spin complexes.

Magnetic properties of transition metal complexes- para, dia, ferro , anti ferromagnetic properties, determination of magnetic susceptibility (Guoy method), spin only formula, calculations of magnetic moments.

Electronic spectra of metal complexes – colour of transtion metal aqua complexes– d-d transitions.Detection of complex formation - basic principles of various methods- change in chemical properties, solubility, colour, pH, conductivity, magnetic susceptibility.

Thermodynamic and kinetic stability of transition of metal complexes . Stability of metal complexes –stepwise and overall stability constant andf their relationship.Factors effecting the stability constants. Chelate effect, determination of composition of complex by Job's method and mole ratio method.

Applications of coordination compounds

Applications of coordination compounds a) in quantitative and qualitative analysis with suitable examples b) in medicine for removal of toxic metal ions and cancer therapy c) in industry as catalysts polymerization – Ziegler Natta catalyst d) water softening .

S5-I-2: Boranes and Carboranes: 2 h

Definition of clusters. Structures of boranes and carboranes- Wade's rules, closo, nido arachno Boranes and carboranes.

Unit-II (Organic Chemistry) 11 h

S5-O-1: Amines, Cyanides and Isocyanides 7 h

Amines:

Nomenclature, classification into 1^0, 2^0, 3^0 Amines and Quarternary ammonium compounds. Preparative methods – 1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism). Reduction of Amides and Schmidt reaction. Physical properties and basic character – Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline- comparative basic strength of aniline, N-methylaniline and N,N- dimethyl aniline (in aqueous and non- aqueous medium), steric effects and substituent effects. Use of amine salts as phase transfer catalysts. 4. Chemical Properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation. 5. Reaction with Nitrous acid of 1^0, 2^0, 3^0 (Aliphatic and aromatic amines). Electophilic substitutions of

Aromatic amines – Bromination and Nitration, oxidation of aryl and 3^0 Amines, diazotisation. 6. Diazonium salts: Preparation with mechanism. Synthetic importance – a) Replacement of diazonium group by – OH, X (Cl)- Sandmeyer and Gatterman reaction, by fluorine (Schiemann's reaction), by iodine, CN, NO_2, H and aryl groups. Coupling Reaction of diazonium salts. i) with phenols ii) with anilines. Reduction to phenyl hydrazines.

Cyanides and isocyanides:

Nomenclature (aliphatic and aromatic) structure. Preparation of cyanides from a) Alkyl halides b) from amides c) from aldoximes. Preparation of isocyanides from Alkyl halides and Amines. 2. Properties of cyanides and isocyanides, a)hydrolysis b) addition of Grignard reagent iii) reduction iv) oxidation.

S5-O-2: Heterocyclic Compounds 4 h

Introduction and definition: Simple 5 membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole. Importance of ring systems – presence in important natural products like hemoglobin and chlorophyll. Numbering the ring systems as per Greek letter and Numbers. Aromatic character – 6- electron system (four-electrons from two double bonds and a pair of non-bonded electrons from the hetero atom). Tendency to undergo substitution reactions.
Resonance structures: Indicating electron surplus carbons and electron deficient hetero atom. Explanation of feebly acidic character of pyrrol, electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions. Reactivity of furan as 1,3-diene, Diels Alder reactions (one example). Sulphonation of thiophene purification of Benzene obtained from coal tar). Preparation of furan, Pyrrole and thiophene from 1,4,- dicarbonyl compounds only, Paul-Knorr synthesis, structure of pyridine, Basicity – Aromaticity – Comparison with pyrrole – one method of preparation and properties – Reactivity towards Nucleophilic substitution reaction – chichibabin reaction.

Unit-III(Physical Chemistry)

S5-P-1: Chemical Kinetics 11 h

Introduction to chemical kinetics, rate of reaction, variation of concentration with time, rate laws and rate constant. Specific reaction rate. Factors influencing reaction rates: effect of concentration of reactants, effect of temperature, effect of pressure, effect of reaction medium, effect of radiation, effect of catalyst with simple examples, order of reaction.
First order reaction, derivation of equation for rate constant. Characteristics of first order reaction. Units for rate constant. Half- life period, graph of 1^{st} order reaction, examples. Decomposition of H_2O_2 and decomposition of oxalic acid.
Pseudo first order reaction, Hydrolysis of methyl acetate, inversion of cane sugar, problems.
Second order reaction, derivation of expression for 2^{nd} order rate constant, examples- Saponification of ester, $2O_3$ ---→ $3O_2$, $C_2H_4 + H_2$ ------.> C_2H_6. characteristics of second order reaction, units for rate constants, half- life period and second order plots.
Zero order reaction: derivation of rate expression, examples i)combination of H_2 and Cl_2 to form HCl, ii) thermal decomposition of HI on gold surface characteristics of Zero order reaction units of k, half-life period and graph, problems.
Determination of order of reaction: i) method of integration, ii) half life method, iii) vant-Hoff differential method iv) Ostwald's isolation method. Problems

Kinetics of complex reactions (first order only): opposing reactions, parallel reactions, consecutive reactions and chain reactions. Problems.

Effect of temperature on reaction rate, Arrhenius equation. Temperature coefficient. Concept of energy of activation, determination of energy of activation from Arrhenius equation and by graphical method, problems. Simple collision theory based on hard sphere model explanation of frequency factor, orientation or steric factor. The transition state theory (elementary treatment).

Unit-IV (General Chemistry) 12 h

S5-G-2: Molecular spectroscopy 8 h

Introduction to electromagnetic radiation, interaction of electromagnetic rations with molecules, various types of molecular spectra.

Rotational spectroscopy (Microwave spectroscopy)

Rotational axis, moment of inertia, classification of molecules (based on moment of inertia), rotational energies, selection rules, determination of bond length of rigid diatomic molecules eg. HCl.

Infra red spectroscopy

Energy levels of simple harmonic oscillator, molecular vibration spectrum, selection rules. Determination of force constant. Qualitative relation of force constant to bond energies. Anharmonic motion of real molecules and energy levels. Modes of vibrations in polyatomic molecules. Characteristic absorption bands of various functional groups. Finger print nature of infrared spectrum.

Electronic spectroscopy:

Bonding and antibonding molecular orbitals, electronic energy levels of molecules (σ, π, n), types of electronic transitions: σ-σ^*, n-σ^*, n-π^*, π-π^* with suitable examples. Selection rules, Terminology of chromophore, auxochrome, bathochromic and hypsochromic shifts. Absorption of characteristics of chromophones: diene, enone and aromatic chromophores. Representation of UV-visible spectra.

S5-G-3: Photochemistry 4 h

Introduction to photochemical reactions, Difference between thermal and photochemical reactions, Laws of photo chemistry- Grotthus - Drapper law, Stark – Einsteins Law of photo chemical equivalence.Quantum yield. Examples of photo chemical reactions with different quantum yields. Photo chemical combinations of $H_2 – Cl_2$ and $H_2 – Br_2$ reactions, reasons for the high and low quantum yield. Problems based on quantum efficiency, Consequences of light absorptions. Singlet and triplet states. Jablonski diagram Explanation of internal conversion, inter- system crossing, Phosphorescence, fluorescence.

References :

Unit- I

1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications 1996.
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn.
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers 2001. Chem.

4. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A.
5. Keiter and R.L. Keiter 4th edn.
6. Chemistry of the elements by N.N.Greenwood and A. Earnshaw Pergamon Press
7. 1989.
8. Inorganic Chemistry by Shriver and Atkins 3rd edn Oxford Press 1999.

Unit- II

1. Text book of organic chemistry by Soni.
2. General Organic chemistry by Sachin Kumar Ghosh.
3. Text book of organic chemistry by Morrison and Boyd.
4. Text book of organic chemistry by Graham Solomons.
5. Text book of organic chemistry by Bruice Yuranis Powla.

Unit III

1. Principles of physical chemistry by Prutton and Marron.
2. Text Book of Physical Chemistry by Soni and Dharmahara..
3. Text Book of Physical Chemistry by Puri, Sharma and Pattania.
4. Physical Chemistry by Atkins & De Paula, 8th Edition
5. Text Book of Physical Chemistry by K. L. Kapoor.
6. Physical Chemistry through problems by S.K. Dogra.
7. Text Book of Physical Chemistry by R.P. Verma.
8. Elements of Physical Chemistry byLewis Glasstone.
9. Basics of Chemical Kinetics by G.L. Agarwal
10. Kinetics and mechanism of chemical transformations by Rajaram & Kuriacose

Unit IV

1. Bioinorganic Chemistry, M.N.Huges
2. Organic spectroscopy, William Kemp
3. Text Book of Physical Chemistry by Puri, Sharma and Pattania.
4. Photochemistry by Gurdeep Raj, Goel publishing house, 5th edition

Laboratory Course:

Paper V(Organic Chemistry) 45 h (3h/w)

1. Synthesis of Organic compounds:

Acetylation: Acetylation of salicylic acid, Benzoylation of Aniline.

Aromatic electrophilic substitution: Nitration: Preparation of nitro benzene and m-dinitro benzene.

Halogenation: Preparation of p-bromo acetanilide, Preparation of 2,4,6-tribromo phenol

Oxidation: Preparation of benzoic acid from benzyl chloride.

Esterification: Preparation of n-butyl acetate from acetic acid.

Methylation: Preparation of β- naphthyl methyl ether.

Condensation: Preparation of benzilidine aniline and Benzaldehyde and aniline.

Diazotisation: Azocoupling of β-Naphthol.

2. Thin layer Chromatography

Determination of Rf values and identification of organic compounds: preparation and separation of 2,4-dinitrophenyl hydrazones of acetione and 2-butanone using toluene and light petroleum(40:60)

Separation of ortho & para nitro aniline mixtures

3. Microwave assisted synthesis of organic compounds – DEMO (demonstration only)

B.Sc. Chemistry III Year
Semester-V, Paper-VI
Elective- A (3 Credits)
Instrumental Methods of Analysis 45Hrs

Unit I: Chromatography I 11Hrs

S5-E-A-I: Solvent Extraction- Principle, Methods of extraction: Batch extraction, continuous extraction and counter current extraction. Application – Determination of Iron (III).

Chromatography: Classification of chromatographic methods, principles of differential migration, adsorption phenomenon, nature of adsorbents, solvent systems.

Thin layer Chromatography (TLC): Advantages, preparation of plates, development of the chromatogram, Detection of the spots, factors effecting Rf values and applications.

Paper Chromatography: Principle, choice of paper and solvent systems, development of chromatogram – ascending, descending, radial and two dimensional chromatography and applications.

Unit II: Chromatography II 11Hrs S5-E-A-I: Column Chromatography- Principle, Types of stationary phases, Column packing – Wet packing technique, Dry packing technique. Selection criteria of mobile phase solvents for eluting polar, non-polar compounds and its applications.

Ion exchange chromatography: Principle, cation and anion exchange resins, its application in separation of ions.

Gas Chromatography: Theory and instrumentation (Block Diagram), Types of stationary phases and carrier gases (mobile phase).

High performance liquid chromatography: Theory and instrumentation, stationary phases and mobile phases. Analysis of paracetamol.

Unit III: Colorimetry and Spectrophotometry 12Hrs S5-E-A-III: General features of absorption – spectroscopy, transmittance, absorbance, and molar absorptivity. Beer Lambert's law and its limitations, difference between Colorimetry and Spectrophotometry.

Instruments – Single beam UV- Visible Spectrophotometer, Double beam UV- Visible Spectrophotometer. Lamps used as energy sources. Verification of Beer's law. Estimation of iron in water samples by thiocyanate method. Estimation of (i) Chromium and (ii) Manganese in steel.

IR Spectrophotometer: Principle, Sources of Radiations, Sampling, Block diagram of FT-IR Spectrophotometer.

Unit IV: Electroanalytical methods 11Hrs

S5-E-A-IV: Types of Electroanalytical Methods.

I) Interfacial methods – a) Potentiometry: Principle, Electrochemical cell, Electrodes- (i) Indicator and (ii) Reference electrodes – Normal Hydrogen Electrode, Quinhydrone Electrode, Saturated Calomel Electrode. Numerical Problems. Application of Potentiometry – Assay of Sulphanilamide

b) Voltametry – three electrode assembly; Intoduction to types of voltametric techniques, micro electrodes, Over potential and Polarization.

II) Bulk methods – Conductometry, Conductivity Cell, Specific Conductivity, Equivalent Conductivity. Numerical Problems. Applications of conductometry. Estimation of Cl^- using $AgNO_3$. Determination of Aspirin with KOH.

Recommended Text Books and Reference Books

1. Analytical Chemistry by David Krupadanam, Universities Press (India) Limited.
2. D.A. Skoog, F.J. Holler, T.A. Nieman, Principles of Instrumental Analysis, Engage earning India Ed.
3. D. A. Skoog, D.M. West, F.J. Holler, Fundamentals of Analytical Chemistry 6^{th} Ed., Saunders College Publishing, Fort worth (1992).
4. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. Instrumental Methods of Analysis. 7th Ed. Wadsworth Publishing Co. Ltd., Belmont, California, USA, 1988.
5. Harris, D. C. Quantitative Chemical Analysis, W. H. Freeman.2007.
6. Dean, J. A. Analytical Chemistry Notebook, McGraw Hill.
7. Day, R. A. & Underwood, A. L. Quantitative Analysis, Prentice Hall of India.
8. Freifelder, D. Physical Biochemistry 2nd Ed., W.H. Freeman and Co., N.Y. USA, 1982.
9. Cooper, T.G. The Tools of Biochemistry, John Wiley and Sons, N.Y. USA. 16, 1977.
10. Vogel, A. I. Vogel's Qualitative Inorganic Analysis 7th Ed., Prentice Hall.
11. Vogel, A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Prentice Hall.
12. Robinson, J.W. Undergraduate Instrumental Analysis 5th Ed., Marcel Dekker, Inc, New York (1995).
13. Analytical Chemistry 7^{th} edition by Gary D. Christian (2004).
14. B. K. Sharma, Industrial Chemistry (including Chemical Engineering). Edn. (1997).
15. M.N Sastry, Separation Methods, Paperback (2004), Himalaya Publications.
16. Usharani Analytical Chemistry Paperback (2000) Narosa Publications.

B.Sc. Chemistry III Year
Semester-V, Paper-VI
Elective-B(3 Credits)
Industrial Chemistry and Catalysis **45 Hrs**

Unit I: General Principles of Metallurgy and Production of Non Ferrous Metals 11 Hrs

S5-E-B-I: Pyrometallurgy: Drying and calcination, roasting, smelting, products of smelting, **Hydrometallurgy:** Leaching methods, leaching agents, leaching of metals, oxides and sulphides.

Separation of liquid and solid phases and processing of aqueous solutions
Electrometallurgy: Electrolysis, Refining electrolysis, electrolysis from aqueous solutions, fused-salt electrolysis
Refining processes: Chemical and physical refining processes

Production of selected non-ferrous metals (Copper, Nickel, Zinc): Properties, raw materials, production (flow charts presentations and chemical reactions involved) and uses.

Unit II: Natural and Synthetic Dyes 12Hrs

S5-E-B-II: Classification of dyes. Sources of natural dyes: Indigoid, Anthraquinone, Naphthoquinone, Benzoquinone, Flavonoid, Carotenoid and Tannin-based dyes.

Synthetic Dyes: Acidic, basic, dispersive, direct, reactive and vat dyes with examples. Extraction of natural dyes and their sustainability: The different methods for extraction of coloring materials from natural dyes. Aqueous extraction, alkali or acid extraction, microwave and ultrasonic assisted extraction, fermentation, solvent extraction, super critical fluid extraction. Drying methods. Application of natural dyes on textiles, Mordanting- types of mordanting - metallic mordants, oil mordants, Tannins and Tannic acid. Present scenario and sustainability issues in usage of natural dyes and cost considerations.

Unit III: Catalysis I 11Hrs S5-E-B-III: Homogeneous and heterogeneous catalysis - Definition of a catalyst and catalysis. Comparison of homogeneous and heterogeneous catalysis with specific examples. General characteristics of catalytic reactions.

Acid-base catalysis- Examples of acid and base catalysed reactions, hydrolysis of esters. Kinetics of acid catalysed reactions. Specific acid and general acid catalysis, Kinetics of base catalysed reactions. Specific base and general base catalysis. Examples-Aldol condensation and decomposition of nitramide, base catalysed conversion of acetone to di acetone alcohol. Effect of P^H on reaction rate of acid and base catalysed reactions.

Phase transfer catalysis: Principle of phase transfer catalysis, classification of phase transfer catalysts. Factors influencing the rate of PTC reactions.

Unit IV: Catalysis II 11Hrs S5-E-B-IV: Enzyme catalysis- Characteristics of enzyme catalysis, Examples: (i) Invertase in inversion of cane sugar (ii) Maltase in conversion of maltose to glucose (iii) Urease in decomposition of urea and (iv) Zymase in conversion of glucose to ethanol. Factors affecting enzyme catalysis. Effect of temperature, pH, concentration and inhibitor on enzyme catalysed reactions.

Kinetics of enzyme catalysed reactions: Michaelis-Menton Equation. Mechanism of enzyme catalysed reactions. Significance of Michaelis constant (K_m) and maximum velocity (V_{max}), Lineweaver-Burk plot.

References

1. E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.
2. R.M. Felder, R.W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.
3. J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.
4. **Kateřina Skotnicová, Monika Losertová, Miroslav Kursa, Theo**ry of production of non-ferrous metals and alloys Study.
5. K Venkataraman, the Chemistry of Synthetic Dyes, Volume 4, Elsevier, Technology & Engineering.
6. Sujata Saxena and A. S. M. Raja by Natural Dyes: Sources, Chemistry, Application and Sustainability Issues.
7. Physical Chemistry by Atkins and De Paula, 8th Edn.
8. Physical Chemistry by Puri, Sharma and Pattania, 2017.
9. Kinetics and mechanism of chemical transformations by Rajarajm and Kuraiacose, Published by Macmillan India Ltd.
10. Text book of Physical Chemistry by K.L. Kapoor Macmillan, 1999.
11. Catalysis by J.C. Kuriacose, Macmillan Macmillan Publishers India Limited, 1980.

Semester - V

Laboratory Course

Experiments in Physical Chemistry-I

Paper VI (Physical Chemistry) **45hrs (3 h / w)**

1. Distribution law

a) Determination of distribution coefficient of iodine between water and carbon Tetrachloride/determination of molecular status and partition coefficient of benzoic acid in Toluene and water.

b) Determination of distribution coefficient of acetic acid between n-butanol and water.

2. Electrochemistry

a) Determination of cell constant of conductivity cell.

b) Determination Of dissociation constant (Ka) Of aceticacid by conductivity measurements.

3. Colorimetry

Verification of Beer's law using $KMnO_4$ and determination of the concentration of the given solution.

4. Adsorption

Adsorption of acetic acid on animal charcoal, Verification of Freundlich adsorption isotherm.

5. Physical constants

Surface tension and viscosity of liquids. (Demonstration Experiment)

B.Sc. III yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER VI
Paper-VII
Chemistry - VI

Unit-I (Inorganic Chemistry) 11 h

S6-I-1:Inorganic reaction mechanisms 4h

Labile and inert complexes, Thermodynamic and kinetic stability based on VBT & CFT: ligand substitution reactions – S_N1 and S_N2 in Octahedral complexes; substitution reactions of square planar complexes – Trans effect and applications of trans effect.

Reactions of tetrahedral complexes - Hydrolysis of silicon halides and phosphorous oxides.

S6-I-2:Bioinorganic chemistry 5h

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and chloride (Cl^-). Toxic metal ions As, Hg & Pb

Oxygen transport and storage – structure of hemoglobin, binding and transport of oxygen.

Fixation of CO_2 in photosynthesis- overview of light and dark reactions in photosynthesis. Structure of chlorophyll and coordination of magnesium. Electron transport in light reactions from water to $NADP^+$ (Z – scheme).

S6-I-3:Hard and soft acids bases (HSAB) 2h

Classification, Pearson's concept of hardness and softness, application of HSAB principles – Stability of compounds / complexes, predicting the feasibility of reaction

UNIT - II (Organic Chemistry) 11 h

S6-O-1: Carbohydrates 6 h

Introduction: Classification and nomenclature – classification into mono, oligo and polysacchrides, into pentoses, hexoses *etc*., into aldoses and ketoses.

Monosaccharides: All discussion to be confined to (+) glucose as an example of aldo hexoses and (-) fructose as example of ketohexoses. Chemical properties and structural elucidation: Evidences for straight chain pentahydroxy aldehyde structure (Acetylation, reduction to n-hexane, cyanohydrin formation, reduction of Tollen's and Fehling's reagents and oxidation to gluconic and saccharic acids). Number of optically active, isomers possible for the structure, configuration of glucose based on D-glyceraldehyde as primary standard (No proof for configuration is required). Evidence for cyclic structure of glucose (some negative aldehyde tests and mutarotation). Cyclic structure of glucose: Proposition of cyclic structure (Pyranose structure, anomeric Carbon and anomers). Proof for the ring size (methylation, hydrolysis and oxidation reactions). Different ways of writing pyranose structure (Haworth formula and chair conformational formula). Structure of fructose: Evidence of 2 – ketohexose structure (formation of penta acetate, formation of cyanohydrin its hydrolysis and reduction by HI to give 2-Carboxy-n-hexane) Same osazone formation from glucose and fructose, Hydrogen bonding in osazones, cyclic structure for fructose (Furanose structure, Haworth formula).

Inter Conversion of Monosaccharides: Aldopentose to aldo hexose – eg: Arabinose to D-glucose, D- mannose (kiliani – Fischer method). Epimers, Epimerisation- Lobry de bruyn van Ekenstein rearrangement. Aldohexose – Aldopentose eg: D-glucose to D-arabinose by Ruff's degradation. Aldohexose(+) (glucose) to ketohexose
(–)(fructose) and Ketohexose(Fructose) to aldohexose (Glucose).

S6-O-2 Amino acids and proteins 5 h

5 hrs

Introduction: Definition of Amino Acids, classification of Amino acids into alpha, beta and gama amino acids. Natural and essential amino acids – definition and examples, Classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples – Glycine, Alanine, valine and Leucene) by following methods: a) From halogenated Carboxylic acid b)Malonic ester synthesis c) strecker's synthesis.Physical properties: Optical activity of naturally occurring amino acids: L – configuration, irrespective of sign of rotation. Zwitter ion structure – salt like character, solubility, melting points, amphoteric character, definition of isoelectric point.
Chemical properties: General reactions due to amino and carboxyl groups – Lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins, peptide synthesis

Unit-III (Physical Chemistry) 11 h

S6-P-1:Thermodynamics -I 11h

A brief review of - Energy, work and heat units, mechanical equivalent of heat, definition of system, surroundings. I law of thermodynamics statement- various forms mathematical expression. Thermodynamic quantities- extensive properties and intensive properties, state function, path functions energy as a state function, and exact differential. Work of expansion and heat absorbed as path function.
Expression for work of expansion, sign convention problems on I law. Heat changes at constant pressure and heat changes at constant volume. Enthalpy. Heat capacities at constant pressure and constant volume. Derivation Cp-Cv = R.
Isothermal adiabatic processes. Reversible and irreversible processes. Reversible change and maximum work. Derivation of expression for maximum work for isothermal reversible process. Problems. Internal energy of an ideal gas. Joules experiment and Joule-Thompson coefficient. Adiabatic changes in ideal gas derivation of equation, PV^{γ} = constant. P-V curves for isothermal and adiabatic processes.
Heat of a reaction at constant volume and at constant pressure, relation between ΔH and ΔV. Variation of heat of reaction with temperature. Kirchoff's equation and problems. Limitations of I law and need for II law. Statement of II law of thermodynamics. Cyclic process. Heat engine, Carnot's theorem, Carnot's cycle. Derivation of efficiency of heat engine problems. Thermodynamic scale of temperature.

Unit-IV **12 h**

S6-G-1: Proton Magnetic Resonance Spectroscopy **4h**

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals – spin-spin coupling, representation of proton NMR spectrum – Integrations. ^{1}H NMR spectrum of – ethyl bromide, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate and acetophenone.

S6-G-2: Mass Spectrometry **4 h**

Electron Impact Mass: Basic principles, Nitrogen rule, types of ions: Molecular ion, fragment ion and isotopic ions, representation of mass spectrum, types of peaks (molecular ion, fragment and isotopic ion peaks). Determination of molecular weight Mass spectrum of ethyl chloride, ethyl bromide and acetophenone.

S6-G-3: Thermodynamics- II **4 hrs**

Entropy: Definition from Carnot's cycle. Entropy as a state function. Entropy as a measure of disorder. Sign of entropy change for spontaneous and non- spontaneous processes& equilibrium processes. Entropy changes in i). Reversible isothermal process, ii). reversible adiabatic process, iii). phase change, iv). reversible change of state of an ideal gas. Problems. Entropy of mixing inert perfect gases. Free energy Gibb's function (G) and Helmholtz's function (A) as thermodynamic quantities. Concept of maximum work and net work ΔG as criteria for spontaneity. Derivation of equation $\Delta G = \Delta H - T\Delta S$. significance of the equation. Gibbs equations and the Maxwell relations. Variation of G with P, V and T.

References :

Unit- I

1. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers 2001.
2. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4th edn.
3. Reaction mechanisms, K.Veera Reddy.

Unit- II

1. Text book of organic chemistry by Soni.
2. General Organic chemistry by Sachin Kumar Ghosh.
3. Text book of organic chemistry by Morrison and Boyd.
4. Text book of organic chemistry by Graham Solomons.
5. Text book of organic chemistry by Bruice Yuranis Powla.

Unit III

1. Principles of physical chemistry by Prutton and Marron.
2. Text Book of Physical Chemistry by Soni and Dharmahara..
3. Text Book of Physical Chemistry by Puri, Sharma and Pattania.
4. Physical Chemistry by Atkins & De Paula, 8th Edition

5. Text Book of Physical Chemistry by K. L. Kapoor.
6. Physical Chemistry through problems by S.K. Dogra.
7. Text Book of Physical Chemistry by R.P. Verma.
8. Elements of Physical Chemistry byLewis Glasstone.
9. Thermodynamics by Rajaram

Unit IV

1. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers 2001.
2. Organic Spectroscopy, William Kemp
3. Principles of physical chemistry by Prutton and Marron.
4. Text Book of Physical Chemistry by Soni and Dharmahara..
5. Text Book of Physical Chemistry by Puri, Sharma and Pattania.
6. Thermodynamics by Rajaram

Semester - VI

Laboratory Course

Paper VII

Qualitative and Spectral Analysis of Organic Compounds: 45hrs (3 h/w)

Qualitative analysis: Identification of an Organic compound through the functional group analysis, determination of melting points/boiling points, functional group tests and preparation of suitable derivatives of the following:

Carboxylic acids, phenols, amines, urea, thiourea, carbohydrates, aldehydes, ketones, amides, nitro hydrocarbons, ester and naphthalene.

Spectral analysis Determination of structures from combined spectral data (IR, ^{1}H-NMR and Mass): Minimum of five problems.

B.Sc. Chemistry III Year
Semester-VI, Paper-VIII
Elective-A (3 Credits)
Medicinal Chemistry **45Hrs**

Unit- I:Introduction and Terminology **11Hrs**

S6-E-A-I: Diseases: Common diseases, infective diseases–insect borne, air-borne, water-borne and hereditary diseases.

Terminology in Medicinal Chemistry: Drug, Pharmacology, Pharmacophore, Pharmacodyna-mics, Pharmacokinetics, metabolites, anti metabolites and therapeutic index.

Drugs: Nomenclature: Chemical name, Generic name and Trade names with examples; Classification: Classification based on structures and therapeutic activity with examples.

ADME: a) Absorption: Definition, absorption of drugs across the membrane – active and passive absorption, routes of administration of drugs. b) Distribution: definition and effect of plasma protein binding. c) Metabolism: definition, phase I and phase II reactions.
d) Elimination: definition and renal elimination.

Unit-II: Enzymes and Receptors 11Hrs S6-E-A-II: Enzymes: Introduction. Mechanism and factors affecting enzyme action, Specificity of enzyme action (including stereo specificity), Enzyme inhibitors and their importance. Types of inhibition - reversible, irreversible and their subtypes with examples.

Receptors: Introduction, Drug action-receptor theory, Mechanism of drug action, concept of agonists and antagonists with examples. Drug receptor interactions involved in drug receptor complex. binding role of –OH group, $-NH_2$ group, quaternary ammonium salts and double bond.
Structure – activity relationships of drug molecules, explanation with sulfonamides.

Unit- III: Synthesis and Therapeutic Activity of Drugs **12Hrs**

S6-E-A-III: Introduction, synthesis and therapeutic activity of :

Chemotherapeutics: Sulphanilamide, dapsone, Pencillin-G (semi synthesis), Chloroquin, Isoniazid, Cisplatin and AZT.

Drugs to treat metabolic disorders: Anti diabetic - Tolbutamide; Antiinflammatiory – Ibuprofen; Cardiovascular- Glyceryl trinitrate; Antipyretic (paracetamol, aspirin) and Antacid- Omeprazole.

Drugs acting on nervous system: Anesthetics-definition, Classification-local and general. Volatile- Nitrous oxide, chloroform uses and disadvantages. Local anesthetics – benzocaine.

Unit- IV: Molecular Messengers and Health Promoting Drugs 11Hrs S6-E-A-IV: Molecular Messengers: Introduction to hormones and neurotransmitters, Thyroid hormones, Antithyroid drug-Carbimazol. Adrenaline: Adrenergic drugs- salbutamol, atenelol. Serotonin: SSRIs- fluoxetine. Dopamine: Antiparkinson drug- Levodopa .

Health promoting drugs: Introduction, sources, Deficiency disorders and remedy of Vitamins A,B, C, D, E K and micronutrients – Na, K, Ca, Cu, Zn and I .

Reference books

1. G.L. Patrick: Introduction to Medicinal Chemistry, Oxford University Press, New York. 2013.
2. Thomas Nogrady, Medicinal Chemistry, Oxford Univ. Press, New York.2005.

3. David William and Thomas Lemke, Foye's Principles of Medicinal Chemistry, Lippincott Williams & Wilkins, 2008.
4. Ashutosh Kar Medicinal Chemistry, New Age International, 2005.
5. O.D.Tyagi & M.Yadav Synthetic Drugs by, Anmol Publications,1998.
6. Medicinal Chemistry by Alka L. Gupta, Pragati Prakashan.
7.G. L. David Krupadanam, D.Vijaya Prasad, K.Varaprasad Rao, K. L. N. Reddy, C. Sudhakar, Drugs, Universities Press (India) Ltd. 2012.

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B.Sc. Chemistry III Year
Semester –VI, Paper-VIII
Elective-B (3 Credits)
Agricultural and Fuel Chemistry 45 Hrs

Unit I: – Pesticides 12Hrs

S6-E-B-I: Introduction, Definition, classification of pesticides based on use (target). Toxicity and chemical structure with examples. Adverse effects of pesticides and its impact on environmental pollution.

Synthesis, technical manufacture and uses of representative pesticides in the following classes: Organochlorines (Cypermethrin); Organophosphates (Parathion); Carbamates (carbaryl); Quinones (Chloranil), Anilides (Alachlor).

Pesticide formulations: Dusts, Granules, Wettable powders, Emulsions and Aerosols. **Biopestcides :** Introduction: Potential pesticidal plants of India, Role of Neem in plant protection-constituents, Azadirachtin and its role in pest control, Structure and mode of action of Pyrethrins(pyrethrin-1) and Pyrethroids (permethrin) and nicotinoids (Imidacloprid).

Unit II: – Fertilizers 11Hrs

S6-E-B-II: Introduction: (need of fertilizers), functions of essential plant nutrients (N, P, K), Classification formula and uses of fertilizers:

Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide, Calcium Ammonium Nitrate, Sodium Nitrate, Ammonium Chloride and their uses.

Phosphate fertilizers: Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate and their uses.

Potassium fertilizers: Potassium chloride, potassium nitrate, potassium sulphate and uses.
Complex fertilisers: Diaammonium Phosphate and mixed fertilizers their uses. Manufacture of urea and Super phosphate of lime and their reactions in the soil.
Biofertilizers – Introduction, definition, classification, Rhizobium, Azatobactor, Azospirillium, Azolla, Blue Green Algae, Vermicomposting and uses.

Organic farming: The principal methods, crop rotation, green manures and compost, biological pest control, and mechanical cultivation and uses.

Unit III: Energy Sources and Coal 11Hrs. S6-E-B-III: Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.

Coal: Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas—composition and uses. Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

Unit IV: Petroleum, Petrochemical Industry and Lubricants 11Hrs. S6-E-B-IV: Petroleum and Petrochemical Industry: Composition of crude petroleum, Refining and different types of petroleum products and their applications.

Fractional Distillation - Principle and process, Cracking -Thermal and catalytic cracking, Reforming of Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from

biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels. Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene and their uses.

Lubricants: Classification of lubricants, Properties and functions of lubricants (viscosity index, cloud point, pour point) and their determination. Lubricating oils (conducting and non-conducting) Solid and semisolid lubricants, synthetic lubricants.

Reference books

1. N. N. Melnikov, Chemistry of pesticides; Springer-Verlag- Technology & Engineering (2012).
2. Thomas A. Unger Pesticide Synthesis Handbook; Elsevier, (2000).
3. R. Cremlyn Pesticides; John Wiley, 1980.
4. A. K. Kolay Manures and Fetrtilisers; Published by Atlantic (2007).
5. Stocchi, E. Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK (1990).
6. Jain, P.C. & Jain, M. Engineering Chemistry Dhanpat Rai & Sons, Delhi.
7. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)

Semester - VI

Laboratory course

Experiments in Physical Chemistry-II

Paper VIII (Physical Chemistry) **45hrs (3 h/w)**

1. Kinetics

a) Determination of specific reaction rate of the hydrolysis of methyl acetate catalyzed by hydrogen ion at room temperature.

b) Determination of rate of decomposition of hydrogen peroxide catalyzed by $FeCl_3$.

2. Electrochemistry

A. Potentiometry

a) Determination of redox potential of Fe^{2+}/Fe^{3+} by potentiometric titration of ferrous ammonium sulphate vs. potassium dichromate.

b) Precipitation titration of KCl vs. $AgNO_3$ -Determination of given concentration of silver nitrate.

B. pH metry:

a) pH metric titration of strong acid (HCl) vs. strong base- Determination of the concentration of the given acid.

b) pH metric titration of weak acid(acetic acid) with strong base(NaOH).- Determination of acid dissociation constant (K_a) of weak acid.

3. Conductometry:

Determination of overall order: Saponification of ethyl acetate with NaOH by conductance measurements.

DEPARTMENT OF COMPUTER SCIENCE
MAHATMA GANDHI UNIVERSITY

B.Sc/BA Computer Applications (Voc)
Choice Based Credit System (CBCS)

Semester I			**Marks**					
Paper Code	**Course Title**	**Course Type**	**Theory**	**Internals**	**Practical /Lab**	**Total**	**HPW**	**Credits**
CAVO101	Fundamentals of Computers	DSC-1A	80	20	50	150	3T+6P=9	3+3=6
CAVO 102	Programming Methodology (C language)	DSC-2A	80	20	50	150	3T+6P=9	3+3=6
Semester-II								
CAVO 201	Computer Organization	DSC-1B	80	20	50	150	3T+6P=9	3+3=6
CAVO 202	Internet Technologies	DSC-2B	80	20	50	150	3T+6P=9	3+3=6
Semester-III								
CAVO301	SEC	SEC-1	50			50	2	2
CAVO302	Object Oriented Programming in C++	DSC-1C	80	20	50	150	3T+6P=9	3+3=6
CAVO303	Multimedia and Internet Applications	DSC-2C	80	20	50	150	3T+6P=9	3+3=6
Semester-IV								
CAVO401	SEC	SEC-2	50			50	2	2
CAVO402	Database Management System	DSC-1D	80	20	50	150	3T+6P=9	3+3=6
CAVO403	Data Structures in C	DSC-2D	80	20	50	150	3T+6P=9	3+3=6

- *DSC (Discipline Specific Course)*
- *SEC (Skill Enhancement Course)*

Semester-V			**Marks**					
Paper Code	**Course Title**	**Course Type**	**Theory**	**Internals**	**Practical /Lab**	**Total**	**HPW**	**Credits**
CAVO 501	SEC	SEC-3	50			50	2	2
CAVO 502	Operating System	DSC-1E	80	20	50	150	3T+6P=9	3+3=6
CAVO 503	Electronic Commerce	DSC-2E	80	20	50	150	3T+6P=9	3+3=6
CAVO 504	Software Engineering	DSC-3F	80	20		100	4T	4
Semester-VI								
CAVO 601	SEC	SEC-4	80	20	50	150	2	2
CAVO 602	Software Testing & Maintenance	DSC-2F	80	20		100	4T	4
CAVO 603	Programming in Java	DSC-3F	80	20	50	150	3T+6P=9	3+3=6
CAVO 604	Project Work	DSC-4F			150	150	6P	3
CAVO 605	Seminar	DSC-5F			50	50	2T	2

- *DSC (Discipline Specific Course)*
- *SEC (Skill Enhancement Course)*

SYLLABUS

I Year :Semester-I
CAVO 101: Fundamentals of Computers

Unit:-I : Introduction, Characteristics and limitations of computer, Block Diagram of Computers, Types of Computers, Types of Programming languages (Machine languages , Assembly Language, High level Language), Types of Memory(Primary and Secondary), Input and Output devices,

Unit –II: Operating Systems: Definition, Functions and Types of Operating Systems– Disk Operating System: Internal and External Commands-Computer Virus, Windows operating system - Desktop, Start menu, Control panel, Windows accessories

Unit –III

MS Word: Features of word processing – disadvantages and applications of word processing - Parts of MS Word application window –Creating, Saving and closing a document Opening and editing a document – Cut, Copy Paste Working with Tables.

Unit-IV

MS EXCEL: Features of MS Excel – Spread sheet / worksheet, cell, cell address - Parts of MS Excel window – Saving, Opening and Closing workbook –Formulas and its advantages – different types of functions available in Excel –Charts –Data Sorting

Practical :

Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

1. MS DOS & Windows Operating System
2. MS Excel or Libre Office Calc).
3. MS Word or Libre Office Writer):

I Year: Semester-I
CAVO 102: PROGRAMMING METHODOLOGY (in 'c' Language)

Unit-I : Introduction to C, History of Language, Data Types, Operators(Arithmetic, Increment & Decrement, Modulo Division, Relational, Logical, Bitwise , conditional and assignment Operators)

Unit-II: Decision Making & Looping: Introduction - If statements - If-else statements - Switch statements - Conditional statements - While & Do while statements - For Statements.

UNIT-III: **ARRAYS AND STRINGS**: Arrays: Introduction - Defining an array - Initializing an array - One dimensional array – Two dimensional array - Dynamic array. Strings: Introduction - Reading and Writing strings - String handling functions.

UNIT-IV: Built-in functions and user-defined functions-function calls - Recursive functions,
Structures: Introduction - Declaring structures variables - Functions and Structures - Array of structures - Enumerated Data types - Introduction to Unions.
Pointers: Fundamentals - Understanding pointers - Address - Declaration of Pointers

PRACTICAL:
Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

Programming Lab in 'c'

1. Operators, Expressions.
2. Functions and program Structure
3. Pointers and Arrays
4. Structure and files.

I Year: Semester-II
CAVO 201: Computer Organization

Unit-I
Block Diagram of Computers, Micro Processor & Micro Computer, Types of Buses, Computer Software (System and application software)

Unit-II
Number Systems: Introduction, Decimal, Binary, Octal, Hexadecimal System, Conversions, Simple addition, Complements.

Unit-III
Introduction Logic Gates: Basic Gates (AND, OR , NOT), Universal Gates (NAND, NOR). Introduction to Boolean algebra: Boolean Laws , Product of Sums, Sum of Product, Minimization of Boolean Algebra.

Unit-IV
Memory Organization: Memory Hierarchy, Main Memory, RAM, ROM Chips, Cache Memory, I/O mapped I/O, Memory Mapped I/O, Stack.

Practical:
Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

By using simulator S/W.

- Logic gates (AND, OR, NOT)
- Universal building blocks
- De Morgan Laws

I Year: Semester-II
CAVO 202: Internet Technologies

Unit-I :
Introduction to Hypertext Markup Language (HTML),creating web pages, Basic Tags of HTML: HTML, HEAD, TITLE, BODY , Formatting tags, Lists, Hyperlinks, Tables, Web Forms, Inserting Images, Frames.

Unit-II:
VBScript: Introduction, Adding VBScript code to HTML page, Data types, operators, functions, control structures, user interaction in VB script and arrays.

Unit-III: DHTML, Programming in DHTML, DOM, CSS (cascading Style Sheet), Creating multimedia Effects with Filters, event handling.

Unit-IV: Introduction to XML, Features of XML, and Creating XML documents, XML Vocabularies, Markup language s and extensible style sheet language, XSL Transformation, Document Object Model(DOM).

PRACTICAL:

Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

A topic based homepage has to be to be developed by each student using various commands covered in HTML and VBScript

Web page should be designed with following features.

- HTML Basic Tags (html/head/title/body/B/I/U/BR/HR)
- Anchor/Image insertion/Linking
- Tables/Frame/Form
- CSS
- XML Markup / Declarations / Element Content Model

II Year: Semester III
CAVO 302 : OBJECT ORIENTED PROGRAMMING IN C++(Theory).

Unit-I: Data types, operators and statements, Control statements, Functions, Arrays, Pointers, Structures and Unions.
Unit-II: Classes and objects, Constructors and destructors, object life times. The Meta class, Inheritance and Classification hierarchies.
Unit-III: Introduction to polymorphism, Function overloading, Operator overloading, polymorphism by parameter.
Unit-IV: Method polymorphism, Run-time Polymorphism, Container classes, Multiple Inheritance.

PRACTICALS
Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

PROGRAMMING LAB-C++

1. Implementation of Classes and objects.
2. Implementation of the concepts Encapsulation, Inheritance and Polymorphism.
3. Implementation of the concepts including dynamic objects, operator overloading, multiple inheritance. Polymorphism, Aggregation, Templates, data containers, file handling.

II Year :Semester-III

CAVO 303: MULTIMEDIA AND INTERNET APPLICATIONS

UNIT I: Multimedia introduction, Definition, Multimedia applications (Business, Schools, home, Public Places)

Text : Meaning , Fonts and Faces, Using text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hyper Text

UNIT II :
Images : Create images , Making still images , color.
Sound : The power of Sound , Digital Audio, MIDI Audio, MDI vs Digital Audio, Multimedia Systems Sounds, Audio File Formats

UNIT III
Animations: The power of motion, Principles of Animation, Animation by Computer
Video: Uses of Video Shooting and Editing Video, Types of video signals, analog video, digital video

UNIT IV : The internet Multimedia : Internet History , Multimedia on Web, Multimedia components, World Wide Web, Multimedia File formats, Social Media, Internet Applications, Flash Player, Visual Effects.

Practical:
Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

Practical exercises based on concepts listed in theory using presentation tools in office automation tool/GIMP/Blender/Audacity/Animation Tools/Image Editors/Video Editors.
1.Create an animation using the tools panel and the properties panel to draw the following –
Line, oval, circle, rectangle, square, pencil, brush, lasso tool.
2.create an animation using text tool to set the font , size, color etc.
3. Create an animation using Free transform tool that should use the following.
Move objects, skew objects, stretch objects, rotate objects, stretch objects while maintaining
4.create an animation using layers having following features.
Insert layer, delete layer, mask layer

II Year: Semester-IV
CAVO 402: DATABASE MANAGEMENT SYSTEM (Theory):

Unit-I : Introduction and E-R model, purpose of a database system. Data models, Data abstraction, Data independence, DDL, DML, DCL, DBA, Entities and entity sets.

Unit-II: Relation ship Definition –Degrees of relationship –Unary Relationship, Binary Relationship, Ternary Relationship, specialization – Generalization –Aggregation. Relational Algebra-Union, Intersection, Difference, Product, Project, Join, Select, divide, assignment, Functional dependency, Normalization –Meaning of Normalization, uses of Normalization, steps in Normalization, First normal form (1NF), second normal form (2NF), third normal form,(3NF), Boyce Codd Normal Form (BCNF), Comparison of BCNF and 3NF.

Unit-III: File and system structure, Physical Storage media, File Organization. Buffer management, B-tree Indexed files, static and dynamic hash functions.

Unit-IV Distributed database system: Distributed data storage-Replication, fragmentation. Concurrency control, Deadlock Handling and coordination.

Practical
Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

Practical

Programming Lab (Oracle)

1. Creation of databases (Exercising the commands form creation).
2. Simple to complex condition query creation using SQL Plus.
3. Using Triggers.
4. Creation of Forms for student information, library information, pay roll etc., Writing PL/SQL procedures form data validation.
5. Forms designing, database control through forms Report generation.

II Year: Semester-IV
CAVO 403 :Data structures in 'c'

UNIT-I

Lists: Concepts and terminology, arrays, storage structure for arrays. Static and dynamic structures, Stacks definitions, operations and applications. Array implementation of stacks. Queues definitions, and Limitation of queues, circular queues, application of queues.

UNIT-II

Table and information retrieval: rectangle arrays, tables of sequential search, binary search, hashing, sorting, selection sort, shell sort, merge sort, quick sort.

UNIT-III

Trees Definitions and Concepts: binary tree: operations on binary tree, and representation of binary trees, AVL trees and Operations on AVL trees.

UNIT-IV

Graphs: definitions and representations of graphs, graph traversals, B trees: operation on B trees.

Practical:

Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

Programming Lab-(Data Structures in 'C')

Implementation of Stacks, Queues.

Infix to Post fix conversing, evaluation of postfix expression .

Polynomial arithmetic using linked lists .

Implementation of binary search and hashing

Implementation of traversal on binary tree .

Implementation of heap sort .

Implementation of operations on AVL trees .

Implementation of traversal on graph .

Implementation of B-tree .

III Year : Semester-V
CAVO 502: OPERATING SYSTEMS

UNIT-I
Operating Systems
Operating system, classifications of operating, Architecture for O.S
Unit-II
Processor Management: multiprogramming, multitasking, Process Synchronization - Critical section and mutual exclusion problem, classical synchronization problems,
Unit-III:
Deadlock - conditions for deadlock, deadlock prevention, Multithreading, client-server
Unit –IV
Memory Management: Classical memory management techniques, paging, segmentation, virtual memory, Architecture the **memory hierarchy**
File Management: Overview of file management system, disk space management, directory structures. Protection domains, access control lists, protection models.

Suggested Reading
1. Charles Crowley - Operating Systems - A design Oriented Approach, McGraw 1997

PRACTICAL:
Note :
- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

(Windows-xp/7/8)
1. Installation of Windows.
2. Creation of users
3. Adding printers.
4. Configuring TCP/IP, DHCP
5. Backup and restoration of files
6. Configuring windows and other PC clients to the network

III Year : Semester-V
CAVO 503: Electronic Commerce

Unit-I
E-commerce Introduction, internet and networking technologies, Internet and network protocols, Classification of E-commerce,

Unit –II E-Commerce Applications: Entertainment, E-Marketing, E-Advertising, Search Engines, E-Banking, Mobile Commerce, Online Trading, E-Learning, E-Shopping.

Unit-III: Electronic Payment Systems: Advantages and risks, Types of Payment System (Credit Card, Debit Card, Smart Card, E-Money, And Electronic Fund Transfer (EFT)

Unit IV: Electronic Data Interchange: Prerequisites for EDI, Issues of EDI: Legal issues, Security issues and Privacy issues

Practical:
Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30
- In the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary
- External Viva-voce is compulsory

Web page should be designed with following features.
• HTML Basic Tags (html/head/title/body/B/I/U/BR/HR)
• Anchor/Image insertion/Linking
• Tables/Frame/Form

III Year : Semester -V
CAVO 504: Software Engineering

UNIT-I
Introduction to software engineering: Project size and its categories. Planning a software project. Software development life cycle .Resources needed in software projects .

UNIT-II
Software cost estimation: Cost factor, Cost estimation techniques-Expert judgment, Delphi cost estimation, Work break down structures, Algorithmic Cost Models (COCOMO), Software requirement specification, Data flow diagram

UNIT-III
Software design: Fundamental design concepts and relations-(information hiding, structure, modularity, concurrency, verification).Module design techniques-(Cohesion, Coupling). Levels of design(architectural design, Data design, procedural design), Structured coding techniques. Documentation.

UNIT-IV
Verification and Validation techniques. Quality assurance. Testing .Software Reliability: Software errors. Faults. Repair and availability. Software maintenance, Maintenance tools techniques.

III Year :Semester-VI
CAVO 602 :SOFTWARE TESTING & MAINTENANCE)

Unit I: - Example test series – First, second, sequential cycles; Objectives and limitations of testing; Testing Software development process – planning stage, design stage, glass box, code testing, regression testing, black box testing, software errors. Reporting and analyzing bugs – problem report, contents, characteristics, analysis of reproducible bug and making a bug reproducible.

Unit II: - Establishing a software testing strategy & methodology, determining software testing techniques, eleven steps of software testing process – overview, Assess project management.

Unit III: - Development of a test plan, requirement of phase testing, design of phase testing, program phase testing, execution and accepting of testing.

Unit IV - Software maintenance – definition, characteristics, tasks, side effects, maintainability, reverse and reengineering. Configuration items, SCM process, version control, change control, configuration audit, status reporting.

III Year :Semester-VI

CAVO 603: Programming in Java

UNIT-I

Introduction: The java programming language, downloading the java development kit, installing the JDK, Creating and running a program in Microsoft windows, Analysis of the Hello world program. Data types, Comments, programs with input. Variables and objects. Arithmetic and assignment operators.

Strings: The string class. Substring, changing case, concatenation, locating a character within a string. Replacing characters in a string. . The string buffer class.

UNIT-II

Selection: The if statement, if-else statement, if-else-if statement combination, Nested conditionals, Compound statement. Switch statement. Iteration: While statement, do-while statement and for statement.

UNIT-III

Methods: Simple examples, local variables, methods often invoke other methods, methods that invoke themselves, overloading.

Class: Class declarations. Modifiers, Constructors, Copy constructors, Default constructors.

UNIT-IV

Array and Vectors: Character arrays, properties of arrays in java, copying an array, the vector class, the size and capacity of a vector object, changes to the vector class in java 1.2, two-dimensional arrays.

Graphics: the AWT libraries, the frame class, the color class, components, the button class, managing layouts, applets, threads, exceptions.

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PRACTICAL:

Note :

- All the concepts of program from text book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25-30 in the external lab examination student has to execute at least two programs with compilation and deployment steps are necessary

Programming Lab-

programming Lab-(java)(100 Hours).

1. Running java applications and applets
2. Creating an application using java AWT
3. Creating an application using java AWT image .
4. Creating an application using java . Peer for M/S –windows .
5. Creating an applet user interfaces .
6. A simple network client applet .
7. Handing error using expectations .
8. Deadlock and dinning philosopher problems using threads.
9. Creating an application with URLs.
10. Creating an data gram client and view

III Year: Semester-VI
CAVO 604: Project Work

SOFTWARE DEVELOPMENT LAB II (Main Project)

The project topic shall be chosen from areas of current day interest using latest packages/ languages running on appropriate platforms, so that the student can be trained to meet the requirements of the Industry. A project report shall be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals

- Software selection is Student choice
- Designing-coding Documentation-presentation-System Study and Record
- Submission.

III Year :Semester-VI

CAVO 605: SEMINAR

(STUDENT CHOICE)

MODEL PAPER
FACULTIES OF ARTS &SCIENCE
B.A/B.Sc (Vocational) I - Year Examination-2016
Semester-I
Subject: **Computer Applications – CAVO102**
Paper –II : Programming Methodology(C language)

Time: 3 Hours Max.Marks:80

Part-A (4 x 5=20)

Note: Answer four of the following questions

1. Define expression? Explain type casting with examples
2. Describe the Increment and Decrement operators
3. Difference between while and do-while?
4. Write a c program to find the given number is prime or not?
5. Explain about switch ( ) statement with example
6. Explain call-by-value and call-by-reference.

Part-B(4X15=60 Marks)

Note: Answer all questions choosing one from each unit.

7. a) Explain Bitwise operators with examples.
   OR
   b) Explain data types with examples.

8. a) Give syntax of while loop and for loop with examples ?
   OR
   b) Give syntax of if and if-else statement with examples.

9. a) Define functions with examples.
   OR
   b) Write a recursive function to find the factorial of a given number

10. a) Explain Two-Dimensional arrays with examples
    OR
    b) Explain pointers with examples.

With Effect from the Academic Year 2016-2017

Syllabus for Computer Science

B.Sc. Programme under Choice Based Credit System

Code	Course Title	Course Type	HpW	Credits
	SEMESTER – I			
BS106	Programming in C	DSC–3A	4T+2P=6	4 + 1 =5
	SEMESTER – II			
BS206	Programming in C++	DSC–3B	4T+2P=6	4 + 1 =5
	SEMESTER – III			
BS301	SEC	SEC–1	2T	2
BS306	Data Structures	DSC–3C	4T+2P=6	4 + 1 =5
	SEMESTER – IV			
BS401	SEC	SEC–2	2T	2
BS406	Database Management Systems	DSC–3D	4T+2P=6	4 + 1 =5
	SEMESTER – V			
BS501	Generic Elective	GE–1	2	2
BS502	SEC	SEC–3	2	2
BS505	Programming in Java	DSC–3E	3T+2P=5	3 + 1 =4
BS506	Elective–A: Operating Systems	DSE–1E	3T+2P=5	3 + 1 =4
	Elective–B: Software Engineering	DSE–2E		
	SEMESTER – VI			
BS601	Generic Elective	GE–2	2T	2
BS602	SEC	SEC–4	2T	2
BS605	Computer Networks	DSC–3F	3T+2P=5	3 + 1 =4
BS606	Elective–A: PHP with MySQL	DSE–1F	3T+2P=5	3 + 1 =4
	Elective–B: Web Technologies	DSE–2F		
			Total Number of Credits	**48**

DSC–3A **Programming in C** BS106

Theory: 4 credits and Practical: 1 credit
Theory: 4 Hours/Week and Practical: 2 Hours/Week

Unit – I

Computer Fundamentals: Introduction of Computers, Classification of Computers, Anatomy of a Computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.
Program Fundamentals: Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, SoftwareDevelopment.
Algorithms: Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.
Basics of C: Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

Unit – II

Input-Output: Non-formatted and Formatted Input and Output Functions, Escape Sequences,
Control Statements: Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements–while, for, do-while; Special Control Statement–goto, break, continue, return, exit.
Arrays and Strings: One-dimensional Arrays, Character Arrays, Functions from ctype.h, string.h, Multidimensional Arrays.

Unit – III

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Score of Variables, Storage Classes, Inline Functions, and Recursion.
Pointers: Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Pointers to Pointers, Array of Pointers, Pointer to Array, Dynamic Memory Allocation.

Unit – IV

User-defined Data Types: Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Array of Structures (Union), Structures Vs Unions, Enumeration Types.
Files: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text PradipDey, ManasGhosh,*Computer Fundamentals and Programming in C*(2e)

References

1. Ivor Horton,*Beginning C*
2. Herbert Schildt,*The Complete Reference C*
3. Paul Deitel, Harvey Deitel,*C How To Program*
4. Byron S. Gottfried,*Theory and Problems of Programming with C*
5. Brian W. Kernighan, Dennis M. Ritchie,*The C Programming Language*
6. B. A. Forouzan, R. F. Gilberg, *A Structured Programming Approach Using C*

BS106 **C Lab**

Practical: 2 Hours/Week Credit: 1

1. Write a program to find the largest two (three) numbers using if and conditional operator.
2. Write a program to print the reverse of a given number.
3. Write a program to print the prime number from 2 to n where n is given by user.
4. Write a program to find the roots of a quadratic equation using switch statement.
5. Write a program to print a triangle of stars as follows (take number of lines from user):

```
    *
   ***
  *****
 *******
*********
```

6. Write a program to find largest and smallest elements in a given list of numbers.
7. Write a program to find the product of two matrices..
8. Write a program to find the GCD of two numbers using iteration and recursion.
9. Write a program to illustrate use of storage classes.
10. Write a program to demonstrate the call by value and the call by reference concepts.
11. Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program to illustrate use of data type enum.
13. Write a program to demonstrate use of string functions string.h header file.
14. Write a program that opens a file and counts the number of characters in a file.
15. Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
16. Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note:

1. Write the Pseudo Code and draw Flow Chart for the above programs.
2. Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

With Effect from the Academic Year 2016-2017

DSC–3B **Programming in C++** BS206

Theory: 4 credits and Practical: 1 credit
Theory: 4 Hours/Week and Practical: 2 Hours/Week

Unit – I

Introduction to C++: Applications, Example Programs, Tokens, Data Types, Operators, Expressions, Control Structures, Arrays, Strings, Pointers, Searching and Sorting Arrays.
Functions: Introduction, Prototype, Passing Data by Value,Reference Variables, Using Reference Variables as Parameters, Inline Functions, Default Arguments, Overloading Functions, Passing Arrays to Functions.
ObjectOriented Programming: Procedural and Object-Oriented Programming, Terminology, Benefits, OOP Languages, and OOP Applications.

Unit – II

Classes: Introduction, Defining an Instance of a Class, Why Have Private Members?Separating Class Specification from Implementation, Inline Member Functions, Constructors, Passing Arguments to Constructors, Destructors, Overloading Constructors, Private Member Functions, Arrays of Objects, Instance and Static Members, Friends of Classes, Member-wise Assignment, Copy Constructors, Operator Overloading, Object Conversion, Aggregation.

Unit – III

Inheritance: Introduction, Protected Members and Class Access, Base Class Access Specification, Constructors and Destructors in Base and Derived Classes, Redefining Base Class Functions, Class Hierarchies, Polymorphism and Virtual Member Functions, Abstract Base Classes and Pure Virtual Functions, Multiple Inheritance.
C++ Streams: Stream Classes, Unformatted I/O Operations, Formatted I/O Operations.

Unit – IV

Exceptions: Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Extracting Data from the Exception Class, Re-throwing an Exception, Handling the bad_alloc Exception.
Templates:Function Templates–Introduction, Function Templates with Multiple Type, Overloading with Function Templates, Class Templates – Introduction, Defining Objects of the Class Template, Class Templates and Inheritance, Introduction to the STL.

Text TonyGaddis, *Starting out with C++: from control structures through objects*(7e)

References

1. B. Lippman, *C++ Primer*
2. Bruce Eckel, *Thinking in C++*
3. K.R. Venugopal, *Mastering C++*
4. Herbert Schildt, *C++: The Complete Reference*
5. BjarneStroustrup, *The C++ Programming Language*
6. SouravSahay, *Object Oriented Programming with C++*

With Effect from the Academic Year 2016-2017

BS206 **C++ Lab**

Practical: 2 Hours/Week Credit: 1

1. Write a program to.
   a. Print the sum of digits of a given number.
   b. Check whether the given number is Armstrong or not
   c. Print the prime number from 2 to n where n is natural number given.
2. Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
3. Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible).
   a. Compare two strings for equality (== operator)
   b. Check whether first string is smaller than the second (<= operator)
   c. Copy the string to another.
   d. Extract a character from the string (overload [])
   e. Reverse the string.
   f. Concatenate two strings (+ operator)
4. Write a program using friend functions and inline functions.
5. Write a program to find area of a rectangle,circle, and square using constructors.
6. Write a program to implement copy constructor.
7. Write a program to demonstrate single inheritance and multiple inheritances.
8. Write a program to demonstrate hierarchical inheritance and multipath inheritance(using virtual functions)
9. Write a program to demonstrate static polymorphism using method overloading.
10. Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
11. Write a program to demonstrate the function templatesand class templates.
12. Write a program to menu driven program for accepting two numbers and perform calculator operations addition, subtraction, multiplication, division and remainder using function template.
13. Write a program to demonstrate exception handling.
14. Write a program to demonstrate various input-output manipulations.
15. Write a program to implement stack abstract data type.
16. Write a program to demonstrate array of objects.

Note: Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

MOOCs (Massive Online Open Courses) FreeResources

E-Learning:

- NPTEL :nptel.ac.in [Core Subjects Certification]
- C++ INSTITUTE :cppinstitute.org [C++ Certification]
- ORACLEEDUCATION :education.oracle.com[Java, DBMS Certification]
- BIG DATA UNIVERSITY :bigdatauniversity.com [Big Data Certification]
- COURSERA :coursera.org [Core Subjects Certification]
- CODEACADEMY :codecademy.com [Coding Certification]
- KHANACADEMY :khanacademy.org [Core Subjects Certification]
- PIXAR IN A BOX :khanacademy.org/partner-content/pixar
- VIDEOLECTURES :videolectures.net
- YOUTUBEEDU :plus.google.com/+YouTubeEDU/posts
- DISNEY RESEARCH :disneyresearch.com
- ALISON :alison.com [Core Subjects Certification]
- INTERNET ARCHIVE :archive.org
- C++PROGRAMMING :cprogramming.com [Learning C and C++]

Freeware:

- SCILAB : scilab.org [MatLab Equivalent]
- GEOGEBRA :geogebra.org [Software for Class Room Teaching]

Search Engine:

- WOLFRAM ALPHA :wolframalpha.com [Computing Engine]
- CITESEER :citeseerx.ist.psu.edu [Searching Research Articles]
- DOAJ :doaj.org [Open Access to Journals]

DSC–3C Data Structures BS306

Theory	4 Hours/Week	4 credits
Practical	2 Hours/Week	1 credit

Unit – I

Fundamental Concepts: Introduction to Data Structures, Types of Data Structures, Introduction to Algorithm, Pseudo-code, Flow Chart, Analysis of Algorithms.

Linear Data Structure Using Arrays: 1-D Arrays, 2-D Arrays, N-D Arrays, Memory Representation and Address Calculation of 1-D, 2-D, N-D Arrays, Concept of Ordered List, String Manipulation, Pros and Cons of Arrays.

Stacks: Concept, Primitive Operations, Abstract Data Type, Representation Stacks Using Arrays, Prefix, Infix, Postfix Notations for Arithmetic Expression, Applications of Stacks– Converting Infix Expression to Postfix Expression, Evaluating the Postfix Expression, Checking Well-formed (Nested) Parenthesis, Processing of Function Calls, Reversing a String.

Unit – II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Execution of Recursive Calls, Recursive Functions, Iteration versus Recursion.

Queues: Concept, Primitive Operations, Abstract Data Type, Representation Queues Using Arrays, Circular Queue, Double-Ended Queue, Applications of Queues.

Linked Lists: Introduction, Concept, Terminology, Primitive Operations-creating, inserting, deleting, traversing, Representation of Linked Lists, Linked List Abstract Data Type, Linked List Variants - Singly Linked List, Doubly Linked List, Linear and Circular Linked List, Representation Stacks and Queues Using Linked Singly Lists, Application of Linked List–Garbage Collection.

Unit – III

Trees: Introduction, Representation of a General Tree, Binary Tree Introduction, Binary Tree Abstract Data Type, Implementation of Binary Trees, Binary Tree Traversals – Preorder, Inorder, Postorder Traversals, Applications of Binary Trees Briefly.

Graphs: Introduction, Graph Abstract Data Type, Representation of Graphs, Graph Traversal – Depth-First Search, Breadth-First Search, Spanning Tree – Prim's Algorithm, Kruskal's Algorithm.

Hashing: Introduction, Hash Functions, Collision Resolution Strategies.

Unit – IV

Searching and Sorting: Sequential (Linear) Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, and Comparison of Sorting Techniques.

Heaps: Concept, Implementation, Abstract Data Type, Heap Sort.

Text

Varsha H. Patil, *Data Structures Using C++*

References

Nell Dale, *C++ Plus Data Structures*
Seymor Lipschutz, *Data Structures (Revised 1e)*
Adam Drozdek, *Data Structures and Algorithms in C++*
Mark Allen Weiss, *Data structures and Algorithm Analysis in C++ (4e)*
D.S. Malik, C*++ Programming: Program Design Including Data Structures (6e)*
Michael Main, Walter Savitch, *Data Structures and Other Objects Using C++ (4e)*
Michael T. Goodrich, R. Tamassia, David M. Mount, *Data Structures and Algorithms in C++*
Yonghui Wu, Jiande Wang, *Data Structure Practice for Collegiate Programming Contests and Education*

Data Structures Lab BS306

Practical 2 Hours/Week 1 credit

1. Write programs to implement the following using an array: a) Stack ADT b) Queue ADT.
2. Write a program to convert the given infix expression to postfix expression using stack.
3. Write a program to evaluate a postfix expression using stack.
4. Write a program to ensure the parentheses are nested correctly in an arithmetic expression.
5. Write a program to find following using Recursion
   a) Factorial of +ve Integer b) n^{th} term of the Fibonacci Sequence c) GCD of two +ve integers
6. Write a program to create a single linked list and write functions to implement the following operations.
   a) Insert an element at a specified position
   b) Delete a specified element in the list
   c) Search for an element and find its position in the list
   d) Sort the elements in the list ascending order
7. Write a program to create a double linked list and write functions to implement the following operations.
   a) Insert an element at a specified position
   b) Delete a specified element in the list
   c) Search for an element and find its position in the list
   d) Sort the elements in the list ascending order
8. Write a program to create singular circular linked lists and function to implement the following operations.
   a) Insert an element at a specified position
   b) Delete a specified element in the list
   c) Search for an element and find its position in the list
9. Write programs to implement the following using a single linked list:
   a) Stack ADT b) Queue ADT.
10. Write a program to implement Binary search technique using Iterative method and Recursive methods.
11. Write a program for sorting the given list numbers in ascending order using the following technique: Bubble sort and Selection sort
12. Write a program for sorting the given list numbers in ascending order using the following technique: Insertion sort and Quick sort
13. Write a program for sorting the given list numbers in ascending order using the following technique: Merge sort and Heap sort
14. Write a program to traverse a binary tree in following way.
    a) Pre-order b) In-order c) Post-order
15. Write a program to the implementation graph traversals – BFS and DFS.
16. Write a program to find the minimum spanning tree for a weighted graph using
    a) Prim's Algorithm b) Kruskal's Algorithm.

Note: Write the Pseudo Code for the above programs.

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

DSC–3D Database Management Systems BS406

Theory	4 Hours/Week	4 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction to Databases: Introduction, Traditional File-Based Systems, Database Approach, Roles in the Database Environment, Advantages and Disadvantages of DBMSs, The Three-Level ANSI-SPARC Architecture, Database Languages, Data Models, Functions of a DBMS, Components of a DBMS.
Relational Model: Introduction, Terminology, Integrity Constraints, Views.
The Relational Algebra: Unary Operations, Set Operations, Join Operations, Division Operation, Aggregation and Grouping Operations.

Unit – II

SQL: Introduction, Data Manipulation–Simple Queries, Sorting Results, Using the SQL Aggregate Functions, Grouping Results, Sub-queries, ANY and ALL, Multi-table Queries, EXISTS and NOT EXIST, Combining Result Tables, Database Updates.
SQL: The ISO SQL Data Types, Integrity Enhancement Feature–Domain Constraints, Entity Integrity, Referential Integrity, General Constraints, Data Definition–Creating a Database, Creating a Table, Changing a Table Definition, Removing a Table, Creating an Index, Removing an Index, Views–Creating a View, Removing a View, View Resolution, Restrictions on Views, View Updatability, WITH CHECK OPTION, Advantages and Disadvantages of Views, View Materialization, Transactions, Discretionary Access Control–Granting Privileges to Other Users, Revoking Privileges from Users.
Advanced SQL: The SQL Programming Language–Declarations, Assignments, Control Statements, Exceptions, Cursors, Subprograms, Stored Procedures, Functions, and Packages, Triggers, Recursion.

Unit – III

Entity–Relationship Modeling: Entity Types, Relationship Types, Attributes, Keys, Strong and Weak Entity Types, Attributes on Relationships, Structural Constraints, Problems with ER Models–Fan Traps, Chasm Traps.
Enhanced Entity–Relationship Modeling: Specialization/Generalization, Aggregation, Composition.
Functional–Dependencies: Anomalies, Partial Functional Dependency, Transitive Functional Dependency, Multi Valued Dependency, Join Dependency.
Normalization: The Purpose of Normalization, How Normalization Supports Database Design, Data Redundancy and Update Anomalies, Functional Dependencies in brief, The Process of Normalization,1NF, 2NF, 3NF, BCNF. The Database Design Methodology for Relational Databases (Appendix–D).

Unit – IV

Transaction Management: Transaction Support–Properties of Transactions, Database Architecture, Concurrency Control–The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods, Multi-version Timestamp Ordering, Optimistic Techniques, Granularity of Data Items, Database Recovery–The Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques, Nested Transaction Model.
Security: Database Security–Threats, Computer-Based Controls–Authorization, Access Controls, Views, Backup and Recovery, Integrity, Encryption, RAID.

Text

Thomas M. Connolly, Carolyn E. Begg, *Database Systems–A Practical Approach to Design, Implementation, and Management (6e)*

References

Sharon Allen, Evan Terry, *Beginning Relational Data Modeling*
Jeffrey A. Hoffer, V. Ramesh, Heikki Topi, *Modern Database Management*
Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*
Ramez Elmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*
Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*
C Coronel, S Morris, Peter Rob, *Database Systems: Design, Implementation, and Management*

Database Management Systems Lab BS406

Practical 2 Hours/Week 1 credit

Consider the relational schema for part of the **DreamHome** case study is:

Branch (branchNo, street, city, postcode)
Staff (staffNo, fName, IName, position, sex, DOB, salary, branchNo)
PropertyForRent (propertyNo, street, city, postcode, type, rooms, rent, ownerNo, staffNo, branchNo)
Client (clientNo, fName, IName, telNo, prefType, maxRent, eMail)
PrivateOwner (ownerNo, fName, IName, address, telNo, eMail, password)
Viewing (clientNo, propertyNo, viewDate, comment)
Registration (clientNo, branchNo, staffNo, dateJoined)

1. Create a database with name "DreamHome" and now create all the tables listed above with constraints.
2. Insert a new row into the table supplying data for all columns.
3. Modify data in the database using UPDATE
4. Delete data from the database using DELETE
5. Changing a table definition using ALTER
6. Removing a table using DROP
7. Removing rows in table using TRUNCATE
8. Create an index and removing an index
9. Practice other standard SQL commands for creating, modifying, displaying data of tables.
10. List full details of all staff.
11. List all staff with a salary greater than £10000.
12. List the property numbers of all properties that have been viewed.
13. Produce a list of salaries for all staff, showing only the staffNo, fName, IName, and salary details.
14. List all cities where there is either a branch office or a property for rent.
15. List all cities where there is a branch office but no properties for rent.
16. List all cities where there is both a branch office and at least one property for rent.
17. List the names and comments of all clients who have viewed a property for rent.
18. Produce a status report on property viewings.
19. List complete details of all staff who work at the branch in Glasgow.
20. List the addresses of all branch offices in London or Glasgow
21. List all staff with a salary between £20,000 and £30,000.
22. Identify all clients who have viewed all properties with three rooms.
23. How many properties cost more than £350 per month to rent?
24. How many different properties were viewed in May 2013?
25. Find the total number of Managers and the sum of their salaries.
26. Find the minimum, maximum, and average staff salary.
27. Find the number of staff working in each branch and the sum of their salaries.
28. List all managers and supervisors.
29. Find all owners with the string 'Glasgow' in their address.
30. List the details of all viewings on property PG4 where a comment has not been supplied.
31. Produce a list of salaries for all staff, arranged in descending order of salary.
32. Produce an abbreviated list of properties arranged in order of property type.
33. Find the number of staff working in each branch and the sum of their salaries.
34. For each branch office with more than one member of staff, find the number of staff working in each branch and the sum of their salaries.
35. List the staff who work in the branch at '163 Main St'.
36. List all staff whose salary is greater than the average salary, and show by how much their salary is greater than the average.
37. List the properties that are handled by staff who work in the branch at '163 Main St'.
38. Find all staff whose salary is larger than the salary of at least one member of staff at branch B003.
39. Find all staff whose salary is larger than the salary of every member of staff at branch B003
40. List the names of all clients who have viewed a property, along with any comments supplied.
41. For each branch office, list the staff numbers and names of staff who manage properties and the properties that they manage.
42. For each branch, list the staff numbers and names of staff who manage properties, including the city in which the branch is located and the properties that the staff manage.
43. Find the number of properties handled by each staff member, along with the branch number of the

member of staff.
44. List all branch offices and any properties that are in the same city.
45. List all properties and any branch offices that are in the same city.
46. List the branch offices and properties that are in the same city along with any unmatched branches or properties.
47. Find all staff who work in a London branch office.
48. Construct a list of all cities where there is either a branch office or a property.
49. Construct a list of all cities where there is both a branch office and a property.
50. Create a view so that the manager at branch B003 can see the details only for staff who work in his or her branch office.
51. Create a view of the staff details at branch B003 that excludes salary information, so that only managers can access the salary details for staff who work at their branch.
52. Create a view of staff who manage properties for rent, which includes the branch number they work at, their staff number, and the number of properties they manage.
53. Removing a view using DROP VIEW
54. Give the user with authorization identifier Manager all privileges on the Staff table.
55. Give users Personnel and Director the privileges SELECT and UPDATE on column salary of the Staff table.
56. Revoke the privilege SELECT on the Branch table from all users.
57. Revoke all privileges you have given to Director on the Staff table.
58. Demonstrate exceptions in PL/SQL
59. Demonstrate cursors in PL/SQL
60. Write PL/SQL queries to create procedures.
61. Write PL/SQL queries to create functions.
62. Write PL/SQL queries to create package.
63. Write PL/SQL queries to create triggers.
64. Write PL/SQL queries using recursion.

Consider the relational schema for part of the **Hotel** case study is:

Hotel (hotelNo, hotelName, city)
Room (roomNo, hotelNo, type, price)
Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)
Guest (guestNo, guestName, guestAddress)

65. Create a database with name "Hotel" and now create all the tables listed above with constraints.
66. Insert a new row into the table supplying data for all columns.
67. Modify data in the database using UPDATE
68. Delete data from the database using DELETE
69. Changing a table definition using ALTER
70. Removing a table using DROP
71. Removing rows in table using TRUNCATE
72. Practice other standard SQL commands for creating, modifying, displaying data of tables.
73. List full details of all hotels.
74. List full details of all hotels in London.
75. List the names and addresses of all guests living in London, alphabetically ordered by name.
76. List all double or family rooms with a price below £40.00 per night, in ascending order of price.
77. List the bookings for which no dateTo has been specified.
78. How many hotels are there?
79. What is the average price of a room?
80. What is the total revenue per night from all double rooms?
81. How many different guests have made bookings for August?
82. List the price and type of all rooms at the Grosvenor Hotel.
83. List all guests currently staying at the Grosvenor Hotel.
84. List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room.
85. What is the total income from bookings for the Grosvenor Hotel today?
86. List the rooms that are currently unoccupied at the Grosvenor Hotel.
87. What is the lost income from unoccupied rooms at the Grosvenor Hotel?
88. List the number of rooms in each hotel.
89. List the number of rooms in each hotel in London.
90. What is the average number of bookings for each hotel in August?
91. What is the most commonly booked room type for each hotel in London?
92. What is the lost income from unoccupied rooms at each hotel today?
93. Insert rows into each of these tables.
94. Update the price of all rooms by 5%.

95. Demonstrate that queries written using the UNION operator and same can be rewritten using the OR.
96. Apply the syntax for inserting data into a table.
97. Create a view containing the cheapest hotels in the world.
98. Create the Hotel table using the integrity enhancement features of SQL.
99. Create a database trigger for the following situations:
    (a) The price of all double rooms must be greater than £100.
    (b) The price of double rooms must be greater than the price of the highest single room.
    (c) A booking cannot be for a hotel room that is already booked for any of the specified dates.
    (d) A guest cannot make two bookings with overlapping dates.
    (e) Maintain an audit table with the names and addresses of all guests who make bookings for hotels in London (do not store duplicate guest details).

Given relation schemas are

Sailors(sid : integer, sname : string, rating : integer, age : real)
Boats(bid : integer, bname : string, color : string)
Reserves(sid : integer , bid : integer, day : date)

100. Find the names and ages of all sailors.
101. Find all sailors with a rating above 7.
102. Find the names of sailors who have reserved boat 103.
103. Find the sids of sailors who have reserved a red boat.
104. Find the names of sailors who have reserved a red boat.
105. Find the colors of boats reserved by Lubber.
106. Find the names of sailors who have reserved at least one boat.
107. Find the names of sailors who have reserved at least two boats.
108. Compute increments for the ratings of persons who have sailed two different boats on the same day.
109. Find the ages of sailors whose name begins and ends with B and has at least three characters.
110. Find the names of sailors who have reserved a red or a green boat.
111. Find the names of sailors who have reserved a red and a green boat.
112. Find the sids of all sailors who have reserved red boats but not green boats.
113. Find all sids of sailors who have a rating of 10 or have reserved boat 104.
114. Find the names of sailors who have not reserved a red boat.
115. Find sailors whose rating is better than some sailor called Horatio.
116. Find sailors whose rating is better than every sailor called Horatio.
117. Find the names of sailors who have reserved all boats.
118. Find the names of sailors who have reserved at least two boats.
119. Find the names of sailors who have reserved all boats called Interlake.
120. Find sailors who have reserved all red boats.
121. Find the sailor name, boat id, and reservation date for each reservation.
122. Find the sids of sailors with age over 20 who have not reserved a red boat.
123. Find the average age of all sailors.
124. Find the average age of sailors with a rating of 10.
125. Find the name and age of the oldest sailor.
126. Count the number of different sailor names.
127. Find the names of sailors who are older than the oldest sailor with a rating of 10.
128. Find the sailors with the highest rating.
129. Find the age of the youngest sailor for each rating level.
130. Find age of the youngest sailor who is eligible to vote for each rating level with at least 2 such sailors.
131. Find the average age of sailors for each rating level that has at least two sailors.
132. For each red boat, find the number of reservations for this boat.
133. Find the average age of sailors who are of voting age (i.e., at least 18 years old) for each rating level that has at least two sailors.
134. Delete the records of sailors who have rating 8 (deleting some rows in a table).
135. Loading data which is present in the text into the table.

Note: Recommended to use open source database software like MySQl, MongoDB, PostgreSQL, etc…
In practical examination, students have to

- Create database
- Create tables with their integrity constraints.
- Insert the data into tables and then execute the queries.
- Answer any **six** queries from **ten** queries given by the examiner.

DSC–3E Programming in Java BS505

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Type Conversion, Casting, Conditional Statements, Loops, Branching Mechanism, Classes, Objects, Class Declaration, Creating Objects, Method Declaration and Invocation, Method Overloading, Constructors–Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects, Class Variables & Methods-static Keyword, this Keyword, One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.
Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keywords, Abstract classes, Interfaces, Abstract Classes Verses Interfaces.

Unit – II

Packages–Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class.
Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.
Multithreading: Introduction, Main Thread, Creation of New Threads – By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority, Synchronization.
Input/Output: Introduction, java.io Package, File Class, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

Unit – III

Applets: Introduction, Example, Life Cycle, Applet Class, Common Methods Used in Displaying the Output. Event Handling: Introduction, Types of Events, Example. AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts. Swing: Introduction, Differences between Swing and AWT, Jframe, Japplet, Jpanel, Components in Swings, Layout Managers, Jtable, Dialog Box.
Database Handling Using JDBC: Introduction, Types of JDBC Drivers, Load the Driver, Establish Connection, Create Statement, Execute Query, Iterate Resultset, Scrollable Resultset, Developing a JDBS Application.

Text

Sachin Malhotra, Saurabh Choudhary, *Programming in Java (2e)*

References

Bruce Eckel, *Thinking in Java (4e)*
Herbert Schildt, *Java: The Complete Reference (9e)*
Y. Daniel Liang, *Introduction to Java Programming (10e)*
Paul Deitel, Harvey Deitel, *Java: How To Program (10e)*
Cay S. Horsttnann, *Core Java Volume I – Fundamentals (10e)*
C. Thomas Wu, *An introduction to object-oriented programming with Java (5e)*
Tony Gaddis, *Starting Out with Java From Control Structures Through Objects (6e)*
Jeanne Boyarsky, Scott Selikoff, *OCA: Oracle Certified Associate Java SE 8 Programmer–I Study Guide*

Java Lab BS505

Practical 2 Hours/Week 1 credit

1	Write java programs to find the following a) largest of given three numbers b) reverses the digits of a number c) given number is prime or not d) GCD of given two integers
2	Write java programs that implement the following a) default constructor b) parameterized constructor c) constructor overloading
3	a) Write a java program to find the smallest of given list integers using array and scanner class. b) Write a java program for multiplication of two matrices.
4	a) Write a java program for demonstrating an inner classes or nested classes. b) Write a java program to implement method overloading, method overriding, dynamic method dispatch
5	Write a java program to implement single, multilevel, hierarchal, multiple, hybrid inheritances.
6	Write java programs that demonstrate the use of abstract, this, super, static, final keywords
7	a) Write a java program for creating a package and using a package. b) Write a java program to demonstrate the use of wrapper classes.
8	a) Write a java program using all five keywords of exception handling mechanism. b) Write a java program for creating customized (user) exception
9	a) Write a java program that checks whether a given string is a palindrome or not. b) Write a java program for sorting a given list of names in ascending order.
10	a) Write a java program to create a file, write the data and display the data. b) Write a java program that reads a file name from user and displays its information.
11	a) Write a java program for controlling main thread. b) Write a java program for creating new thread by extending Thread class.
12	a) Write a java program for creating new thread by implementing Runnable interface. b) Write a java program for thread synchronization.
13	a) Write a java program to create following AWT components: Button, Checkbox, Choice, and List. b) Write java programs to create AWT application using containers and layouts.
14	a) Write java programs to create a simple Applet and create swing based Applet. b) Write a java program to handle different types of events in a swing application.
15	Write java programs to create a swing application using swing components and layouts.
16	Write a java program to store and retrieve data from database using JDBC.

Note: Write the program using simple text editors (not IDE), compile and run from command prompt.

Encourage students to develop small java applications using IDE, like giving as assignment.

Write a small java application using some features of java.

DSE–1E Operating Systems BS506

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction: Computer-System Architecture, Computing Environments.
Operating-System Structures: Operating-System Services, User Interface for Operating-System, System Calls, Types of System Calls, Operating System Structure.
Process Management: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples–Producer-Consumer Problem.
Process Synchronization: Critical-Section Problem, Peterson's Solution, Synchronization, Semaphores, Monitors.

Unit – II

CPU Scheduling: Concepts, Scheduling Criteria, Scheduling Algorithms.
Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit – III

Main Memory: Introduction, Swapping, Contiguous Memory Allocation, Segmentation, Paging.
Virtual Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing.
Mass-Storage Structure: Overview, Disk Scheduling, RAID Structure.
File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection.
File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

Text

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Concepts (9e)*

References

Naresh Chauhan, *Principles of Operating Systems*
Thomas W. Doeppner, *Operating Systems in Depth*
Andrew S. Tanenbaum, *Modern Operating Systems*
William Stallings, *Operating Systems – Internals and Design Principles*
Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

Operating Systems Lab BS506

Practical 2 Hours/Week 1 credit

1	a) Use vi editor to create different files, writing data into files, modifying data in files. b) Use different types of Unix commands on the files created in first program.
2	Write shell programs using 'case', 'then' and 'if' & 'else' statements.
3	Write shell programs using while, do-while and for loop statements.
4	a) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number. b) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
5	a) Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.. b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
6	a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions. b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
7	Write a program that simulate the following Unix commands like ls, mv, cp.
8	Write a program to convert upper case to lower case letters of a given ASCII file.
9	Write a program to program to search the given pattern in a file.
10	Write a program to demonstrate FCFS process schedules on the given data.
11	Write a program to demonstrate SJF process schedules on the given data.
12	Write a program to demonstrate Priority Scheduling on the given burst time and arrival times.
13	Write a program to demonstrate Round Robin Scheduling on the given burst time and arrival times.
14	Write a program to implementing Producer and Consumer problem using Semaphores.
15	Write a program to simulate FIFO, LRU, LFU Page replacement algorithms.
16	Write a program to simulate Sequential, Indexed, and Linked file allocation strategies.

Note: Recommended to use Open Source Software like Fedora, Ubuntu, CentOS, etc...

DSE–2E Software Engineering BS506

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Software Engineering – Introduction, Program Versus Software, Software Engineering, Software Development Process and its Stages, Generic Software Development Process Models, Code of Ethics and Professional Practice, Software Development and Maintenance Cost Breakup.
Requirement Engineering Processes – Requirement Engineering Process, Feasibility Study, Cost and Benefit Analysis, Requirement Specification, Characteristics of a Good Requirement and Validation Techniques, Requirements Management Planning, Process of Requirement Change Management.
Software Requirement Specifications – Introduction, Stakeholder Analysis, Software Requirements Document, IEEE Standard of Software Requirement Specifications, Organizing Functional Requirements, Traceability and Validation of Specifications.

Unit – II

Architectural Styles – Introduction, Architecture Styles, Object Oriented Architecture, Inter-organizational Communication, Cloud Computing Architecture Style, Core, Configurable and Customizable Architecture, Design Models, Architectural Design Principles.
Object Oriented System Analysis – Introduction, Object Oriented Design, Object Oriented Design Models, Object Oriented Analysis, Data Modeling, Comparison Between Top Down Structured and Object Oriented Analysis, Description of Logical and Static Modeling, Identification of Class Relationships.
Object Oriented Design Using UML – Introduction, Sequence Diagram, State Machine Diagram, Timing Diagram, Describing Detailed Object Oriented Design, Decision Tree and Decision Table, Composite Structure Diagram, Generating Test Cases, Moving Towards Physical Design, Structured Methods.

Unit – III

Software Development – Introduction, Good Coding Practices, Code Reuse, Design Pattern, Generator Based Reuse, Application/Software Developed on Product Lines Approach, Component Based Software Engineering, Agile Methods.
Verification, Validation and Software Testing – Introduction, Software Verification and Validation Process, Software Testing, System Testing, Object Oriented Testing Strategy, Test Cases, Equivalence Partitioning (Black Box Testing), Art of Debugging.
Measurement and Metrics for Assessing Software Quality – Introduction, ISO 9126 Quality Standards, Quality Management Models, Ways to Build Quality in Software, Software Quality Control and Metrics, Defect Density Metrics, Chidamber and Kemerer Metric Suites for Object Oriented System, Class Coupling Metric-Coupling Between Objects, Monitoring Dynamic Quality Attributes (Visible Externally) of a Software.

Text

Rajesh Narang, *Software Engineering: Principles and Practices*

References

Ian Sommerville, *Software Engineering*
R. Mall, *Fundamentals of Software Engineering*
Pankaj Jalote, An Integrated *Approach to Software Engineering*
Frank Tsui, Orlando Karam, Barbara Bernal, *Essentials of Software Engineering*
Roger S Pressman, B R Maxim, *Software Engineering – A Practitioner's Approach*
Grady Booch, *The Unified Modeling Language User Guide*

Software Engineering Lab — BS506

Practical 2 Hours/Week 1 credit

Case Studies:

1 Banking System

2 Hotel management system

3 Inventory Control System

4 Library management system

5 Railway Reservation System

Choose any two of above case studies and do the following exercises for that case studies

1 Write the complete problem statement

2 Write the software requirements specification document

3 Draw the entity relationship diagram

4 Draw the data flow diagrams

5 Draw use case diagrams

6 Draw activity diagrams for all use cases

7 Draw sequence diagrams for all use cases

8 Draw collaboration diagram

9 Assign objects in sequence diagrams to classes and make class diagram.

Note: To draw dataflow diagrams using Microsoft Visio Software, SmartDraw, etc…

To draw UML diagrams using Rational Rose Software, StarUML, etc...

The teacher should define the boundaries for the above case study problems and make the practice of problems mentioned.

DSC–3F Computer Networks BS605

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction: Data Communication Components, Line Configuration, Topologies, Transmission Mode, Categories of Networks, ISO Reference Model–Layered Architecture, Functions of Layers, TCP/IP Reference Model.
Transmission Media: Guided Media–Twisted Pair Cable, Coaxial Cable, Optical Fiber, Unguided Media–Satellite Communication, and Cellular Telephony.
Multiplexing: Frequency–Division Multiplexing, Time–Division Multiplexing.

Unit – II

Data Link Layer: Error Detection–VRC, LRC, CRC, Checksum, Error Correction–Hamming Code, Burst Error Correction, Line Discipline–ENQ/ACK, Poll/Select, Flow Control–Stop-and-Wait, Sliding Window, Error Control–Stop-and-Wait ARQ, Sliding Window ARQ Go-Back-n ARQ, Selective-Reject ARQ.
Local Area Networks: Introduction to IEEE 802, Ethernet-CSMA/CD, Implementation, Token Ring,-Token Passing, Implementation.
Switching: Circuit Switching, Packet Switching, Message Switching.

Unit – III

Networking and Internetworking Devices: Repeaters, Bridges, Routers, Gateways, Brouters, Switches, Distance Vector Routing Algorithm, Link State Routing Algorithm.
Transport Layer: Duties of Transport Layer, Connection.
Upper OSI Layers; Session Layer, Presentation Layer, Application Layer.

Text

Behrouz A. Forouzan, *Data Communication and Networking (2e Update)*

References

S.S. Shinde, *Computer Networks*
William Stallings, *Data and Computer Communications*
Andrew S. Tanenbaum, David J Wetherall, *Computer Networks*
Behrouz A Forouzan, Firouz Mosharraf, *Computer Networks A Top-Down Approach*
James F. Kurose, Keith W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*

Networks Lab BS605

Practical 2 Hours/Week 1 credit

1. Write a program to create a socket and implement connect function.
2. Write a program to get MAC address.
3. Write a program to display hello world using signals.
4. Write a program for socket pair system call using IPC.
5. Write a program to implement the sliding window protocol.
6. Write a program to identify the category of IP address for a given IP address.
7. Write a program to print details of DNS host.
8. Write a program to implement listener and talker.
9. Write a program to implement TCP echo using client–server program.
10. Write a program to implement UDP echo using client–server program.
11. Write a UDP client–server program to convert lowercase letters to uppercase letters.
12. Write a TCP client–server program to convert a given string into reverse.
13. Write a UDP client–server program to convert a given string into reverse.
14. Write a program to implement TCP iterative client–server program.
15. Write a program to implement time service using TCP client–server program.
16. Write a program to implement time service using UDP client–server program.

Note: Write above program using C language on Unix/Linux systems.

DSE–1F PHP with MySQL BS606

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introducing PHP – What is PHP? Why use PHP? Evolution of PHP, Installing PHP, Other ways to run PHP, Creating your first script. PHP Language Basics – Using variables, Understanding Data Types, Operators and Expressions, Constants. Decisions and Loops – Making Decisions, Doing Repetitive Tasks with Looping, Mixing Decisions and Looping with HTML.
Strings – Creating and Accessing Strings, Searching Strings, Replacing Text with Strings, Dealing with Upper and Lowercase, Formatting Strings. Arrays – Creating Arrays, Accessing Array Elements, Looping Through Arrays with for-each, Working with Multidimensional Arrays, Manipulating Arrays.

Unit – II

Functions – What is a Function? Why Functions are useful? Calling Functions, Working with Variable Functions, Writing your own Functions, Working with References, Writing Recursive Functions.
Objects – Introduction OOP Concepts, Creating Classes and Objects in PHP, Creating and using Properties, Working with Methods, Object Overloading with _get(), _set() and _call(), Using Inheritance to Extend Power of Objects, Constructors and Destructors, Automatically Loading Class Files, Storing as Strings.
Handling HTML Forms with PHP – How HTML form works, Capturing Form Data with PHP, Dealing with Multi-Value Fields, Generating Web Forms with PHP, Storing PHP Variables in Forms, Creating File Upload Forms, Redirecting After a Form Submission.

Unit – III

Working with Files and Directories - Getting Information on Files, Opening and Closing Files, Reading and Writing to Files, Copying, Renaming, and Deleting Files, Working with Directories.
Introducing Databases and SQL – Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL from PHP.
Retrieving Data from MySQL with PHP – Setting Up the Book Club Database, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records, Building a Member Registration Application.

Text

Matt Doyle, *Beginning PHP 5.3* (Wrox – Wiley Publishing)

References

Ellie Quigley, *PHP and MySQL by Example*
Joel Murach, Ray Harris, *Murach's PHP and MySQL*
Brett McLaughlin, *PHP & MySQL: The Missing Manual*
Luke Welling, Laura Thomson, *PHP and MySQL Web Development*
W. Jason Gilmore, *Beginning PHP and MySQL From Novice to Professional*
Andrew Curioso, Ronald Bradford, Patrick Galbraith, *Expert PHP and MySQL*

PHP with MySQL Lab — BS606

Practical 2 Hours/Week 1 credit

1	a) Write a PHP script to find the factorial of a given number. b) Write a PHP script to find the sum of digits of a given number.
2	a) Write a PHP script to find whether the given number is a prime or not. b) Write a PHP script to demonstrate the use of break, continue statements using nested loops.
3	a) Write a PHP script to display the Fibonacci sequence with HTML page. b) Write a PHP script to create a chess board.
4	a) Write a PHP script using built-in string function like strstr(), strops(), substr_count(), etc... b) Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first character uppercase.
5	a) Write a PHP script that inserts a new item in an array in any position. b) Write a PHP function to check whether all array values are strings or not.
6	a) Write a PHP script to count number of elements in an array and display a range of array elements. b) Write a PHP script to sort a multi-dimensional array set by a specific key.
7	a) Write a PHP script using a function to display the entered string in reverse. b) Write a PHP script using function for sorting words in a block of text by length.
8	a) Write a PHP script for creating the Fibonacci sequence with recursive function. b) Write a PHP script using pass by value and pass by reference mechanisms in passing arguments to functions.
9	a) Write a PHP script to demonstrate the defining and using object properties. b) Write a PHP script to demonstrate the inheritance.
10	a) Write a PHP script to demonstrate the object overloading with _get(), _set(), and _call(). b) Write a PHP script to demonstrate the overloading property accesses with _get() and _set().
11	a) Write a PHP script to demonstrate the method overloading and method overriding mechanisms. b) Write a PHP script to demonstrate the use of final classes and final methods.
12	a) Write a PHP script to demonstrate the use interfaces. b) Write a PHP script using constructors and destructors.
13	Write a PHP application to handling HTML forms with PHP script.
14	a) Write a PHP script to create a file, write data into file and display the file's data. b) Write a PHP script to check and change file permissions, copying, renaming and deleting files.
15	a) Write a PHP application for connecting to MySQL and reading data from database table. b) Write a PHP application for inserting, updating, deleting records in the database table.
16	Write a PHP application for student registration form.

DSE–2F Web Technologies BS606

Theory	3 Hours/Week	3 credits
Practical	2 Hours/Week	1 credit

Unit – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups
Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links.
Images, Audio, and Video: Adding Images Using the <img> Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your web pages.
Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables
Forms: Introducing Forms, Form Controls, Sending Form Data to the Server
Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

Unit – II

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules.
CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the Box Model.
More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout with CSS
Page Layout: Understating the Site's Audience, Page Size, Designing Pages, Coding your Design, Developing for Mobile Devices.
Design Issues: Typography, Navigation, Tables, Forms.

Unit – III

Learning JavaScript: How to Add Script to Your Pages, the Document Object Model, Variables, Operators, Functions, Control Statements, Looping, Events, Built- In Objects,
Working with JavaScript: Practical Tips for Writing Scripts, Form Validation, Form Enhancements, JavaScript Libraries.
Putting Your site on the web: Meta tags, Testing your site, Talking the Leap to Live, Telling the World about your site, Understanding your visitors.

Text

Jon Duckett, *Beginning HTML, XTML, CSS and JavaScript*

References

Chris Bates, *Web Programming*
M. Srinivasan, *Web Technology: Theory and Practice*
Achyut S. Godbole, Atul Kahate, *Web Technologies*
Kogent Learning Solutions Inc, *Web Technologies Black Book*
Ralph Moseley and M. T. Savaliya, *Developing Web Applications*
P.J. Deitel & H.M. Deitel, *Internet and World Wide Web How to program*

Web Technologies Lab BS606

Practical 2 Hours/Week 1 credit

1	a. Write a HTML program using basic text formatting tags, <hn>, <p>,
	, <pre>.
	b. Write a HTML page for Example Cafe using above text formatting tags.

2	a. Write a HTML program using presentational element tags <b>, <i>, <strike>, <sup>, <sub>, <big>, <small>, <hr> b. Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <kbd>, <address>
3	a. Write a HTML program using different list types. b. Write a HTML page that displays ingredients and instructions to prepare a recipe.
4	a. Write a HTML program using grouping elements and . b. Write a HTML Menu page for Example cafe site.
5	a. Write a HTML program using images, audios, videos. b. Write a HTML program to create your time table.
6	Write a HTML program to create a form using text inputs, password inputs, multiple line text input, buttons, check boxes, radio buttons, select boxes, file select boxes.
7	Write a HTML program to create a frames and links between frames.
8	Write a HTML program to create different types of style sheets.
9	Write a HTML program to create CSS on links, lists, tables and generated content.
10	Write a HTML program to create your college web site using multi column layouts.
11	Write a HTML program to create your college web site using for mobile device.
12	Write a HTML program to create login form and verify username and password using DOM
13	a. Write a JavaScript program to calculate area of rectangle using function. b. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
14	a. Write a JavaScript program using switch case?. b. Write a JavaScript program to print multiplication table of given number using loop.
15	a. Write a JavaScript programs using any 5 events. b. Write a JavaScript program using JavaScript built in objects.
16	Write a JavaScript program to create registration form and validate all fields using form validation

MOOCs [Massive Online Open Courses] Free Resources

E-Learning:

- NPTEL :nptel.ac.in [Core Subjects Certification]
- C++ INSTITUTE :cppinstitute.org [C++ Certification]
- ORACLEEDUCATION :education.oracle.com [Java, DBMS Certification]
- BIG DATA UNIVERSITY :bigdatauniversity.com [Big Data Certification]
- COURSERA :coursera.org [Core Subjects Certification]
- CODEACADEMY :codecademy.com [Coding Certification]
- KHANACADEMY :khanacademy.org [Core Subjects Certification]
- PIXAR IN A BOX :khanacademy.org/partner-content/pixar
- VIDEOLECTURES :videolectures.net
- YOUTUBEEDU :plus.google.com/+YouTubeEDU/posts
- DISNEY RESEARCH :disneyresearch.com
- ALISON :alison.com [Core Subjects Certification]
- INTERNET ARCHIVE :archive.org

Freeware:

- SCILAB : scilab.org [MatLab Equivalent]
- GEOGEBRA :geogebra.org [Software for Class Room Teaching]

Search Engine:

- WOLFRAM ALPHA :wolframalpha.com [Computing Engine]
- CITESEER :citeseerx.ist.psu.edu [Searching Research Articles]
- DOAJ :doaj.org [Open Access to Journals]

MAHATMA GANDHI UNIVERSITY

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Telangana State

MATHEMATICS COURSE STRUCTURE

(B.Sc. Common Core Syllabus with effect from 2016-17)

Contents

1. B.Sc. Course Structure Template

2. Syllabus: Theory and Practicals

3. MOOCs(Massive Online Open Courses) Resources for ICT based Learning and Teaching

4. Appendix 1

5. Appendix 2

B.Sc. Course Structure Template

B.Sc. PROGRAMME

FIRST YEAR SEMESTER-I				
Code	Course Title	Course Type	HPW	Credits
BS101	Communication	AECC-1	2	2
BS102	English	CC-1A	5	5
BS103	Second Language	CC –2A	5	5
BS104	Optional - I **Differential Calculus**	DSC-1A	4 T + 2P = 6	4+1=5
BS105	Optional - II	DSC-2A	4 T + 2P = 6	4+1=5
BS106	Optional – III	DSC-3A	4 T + 2P = 6	4+1=5
			30	27
SEMESTER-II				
BS201	Environmental Studies	AECC-2	2	2
BS202	English	CC-1B	5	5
BS203	Second Language	CC –2B	5	5
BS204	Optional - I **Differential Equations**	DSC-1B	4 T + 2P = 6	4+1=5
BS205	Optional - II	DSC-2B	4 T + 2P = 6	4+1=5
BS206	Optional – III	DSC-3B	4 T + 2P = 6	4+1=5
			30	27

B.Sc. PROGRAMME

SECOND YEAR SEMESTER-III				
BS301	SEC	SEC-1	2	2
BS302	English	CC-1C	5	5
BS303	Second Language	CC-2C	5	5
BS304	Optional - I **Real Analysis**	DSC-1C	4 T + 2P = 6	4+1=5
BS305	Optional - II	DSC-2C	4 T + 2P = 6	4+1=5
BS306	Optional – III	DSC-3C	4 T + 2P = 6	4+1=5
			30	27
SEMESTER-IV				
BS401	SEC	SEC-2	2	2
BS402	English	CC -1D	5	5
BS403	Second Language	CC-2D	5	5
BS404	Optional - I **Algebra**	DSC-1D	4 T + 2P = 6	4+1=5
BS405	Optional - II	DSC-2D	4 T + 2P = 6	4+1=5
BS406	Optional – III	DSC-3D	4 T + 2P = 6	4+1=5
			30	27

B.Sc. Course Structure Template

B.Sc. PROGRAMME

THIRD YEAR SEMESTER-V				
Code	Course Title	Course Type	HPW	Credits
BS501	SEC	SEC-3	2	2
BS502	Generic Elective	GE-1	2 T	2
BS503	Optional - I Linear Algebra	DSC-1E	3 T + 2P = 5	3+1=4
BS504	Optional –II	DSC-2E	3 T + 2P = 5	3+1=4
BS505	Optional –III	DSC-3E	3 T + 2P = 5	3+1=4
BS506	Optional –I A/B/C Slid Geometry/ Integral Calculus	DSE- 1E	3 T + 2P = 5	3+1=4
BS507	Optional – II A/B/C	DSE-2E	3 T + 2P = 5	3+1=4
BS508	Optional – III A/B/C	DSE-3E	3 T + 2P = 5	3+1=4
			34	28
SEMESTER-VI				
BS601	SEC	SEC-4	2	2
BS602	Generic Elective	GE-2	2 T	2
BS603	Optional - I Numerical Analysis	DSC-1F	3 T + 2P = 5	3+1=4
BS604	Optional –II	DSC-2F	3 T + 2P = 5	3+1=4
BS605	Optional –III	DSC-3F	3 T + 2P = 5	3+1=4
BS606	Optional –I A/B/C Complex Analysis/ Vector Calculus	DSE- 1F	3 T + 2P = 5	3+1=4
BS607	Optional – II A/B/C	DSE-2F	3 T + 2P = 5	3+1=4
BS608	Optional – III A/B/C	DSE-3F	3 T + 2P = 5	3+1=4
			34	28
	TOTAL Credits			164

B.Sc. PROGRAMME

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC	8	5	40
	Language	12	5	60
	DSC	6	4	24
	DSC			
4	DSE	6	4	24
5	GE	2	2	4
	TOTAL	**40**		**164**
	Optionals Total	24		108

Syllabus

DSC-1A DIFFERENTIAL CALCULUS BS:104

Theory: 4 credits and Practicals: 1 credits
Theory: 4 hours /week and Practicals: 2 hours /week

Objective: The course is aimed at exposing the students to some basic notions in differential calculus .

Outcome: By the time students completes the course they realize wide ranging applications of the subject.

Unit- I

Successive differentiation- Expansions of Functions- Mean value theorems

Unit – II

Indeterminate forms – Curvature and Evolutes

Unit – III

Partial differentiation – Homogeneous functions- Total derivative

Unit – IV

Maxima and Minima of functions of two variables – Lagrange's Method of multipliers –Asymptotes- Envelopes

Text : Shanti Narayan and Mittal, *Differential Calculus*

References: William Anthony Granville, Percey F Smith and William Raymond Longley*; Elements of the differential and integral calculus*

Joseph Edwards , *Differential calculus for beginners*

Smith and Minton, *Calculus*

Elis Pine, *How to Enjoy Calculus*

Hari Kishan ,*Differential Calculus*

Differential Calculus

Practicals Question Bank

UNIT-I

1. If $u=\tan^{-1} x$, prove that

$$(1+x^2)\frac{d^2u}{dx^2}+2x\frac{du}{dx}=0$$

and hence determine the values of the derivatives of u when $x=0$

2. If

$$y=\sin(m\sin^{-1}x),$$ show that

$$(1-x^2)y_{n+2}=(2n+1)xy_{n+1}+(n^2-m^2)y_n$$

and find $y_n(0)$.

3. If U_n denotes the nth derivative of $(Lx+M)/(x^2-2Bx+C)$., prove

$$\frac{x^2-2Bx+C}{(n+1)(n+2)}U_{n+2}+\frac{2(x-B)}{n+1}U_{n+1}+U_n=0.$$

4. If $y=x^2e^x$, then

$$\frac{d^ny}{dx^n}=\frac{1}{2}n(n-1)\frac{d^2y}{dx^2}-n(n-2)\frac{dy}{dx}+\frac{1}{2}(n-1)(n-2)y.$$

5. Determine the intervals in which the function

$$(x^4+6x^3+17x^2+32x+32)e^{-x}$$

is increasing or decreasing.

6. Separate the intervals in which the function

$$(x^2+x+1)/(x^2-x+1)$$

is increasing or decreasing.

7. Show that if $x>0$,

(*i*) $x-\frac{x^2}{2}<\log(1+x)<x-\frac{x^2}{2(1+x)}$.

(*ii*) $x-\frac{x^2}{2}+\frac{x^3}{3(1+x)}<\log(1+x)<x-\frac{x^2}{2}+\frac{x^3}{3}$.

8. Prove that

$$e^{ax}\sin bx=bx+abx^2+\frac{3a^2b-b^3}{3!}x^3+\ldots.$$

$$+\frac{(a^2+b^2)^{\frac{1}{2}n}}{n!}x^n\sin\left(n\tan^{-1}\frac{b}{a}\right)+\ldots$$

9. Show that $\cos^2 x=1-x^2+\frac{1}{3}x^4-\frac{2}{45}x^6\ldots\ldots$

10. Show that

$$e^{m\tan^{-1}x}=1+mx+\frac{m^2}{2!}x^2+\frac{m(m^2-2)}{3!}x^3+\frac{m^2(m^2-8)}{4!}x^4+\ldots.$$

UNIT-II

1. Find the radius of curvature at any point on the curves

(*i*) $y=c\cosh(x/c)$ (*Catenary*).

(*ii*) $x=a(\cos t+t\sin t)$, $y=a(\sin t-t\cos t)$.

(*iii*) $x^{\frac{2}{3}}+y^{\frac{2}{3}}=a^{\frac{2}{3}}$. (Astroid)

(*iv*) $x=(a\cos t)/t$, $y=(a\sin t)/t$.

2. Show that for the curve

$$x=a\cos\theta(1+\sin\theta),\ y=a\sin\theta(1+\cos\theta),$$

the radius of curvature is, a, at the point for which the value of the parameter is $-\pi/4$.

3. Prove that the radius of curvature at the point $(-2a, 2a)$ on the curve $x^2y=a(x^2+y^2)$ is, $-2a$.

4. Show that the radii of curvature of the curve

$$x=ae^{\theta}\ (\sin\theta-\cos\theta),\ y=ae^{\theta}\ (\sin\theta+\cos\theta),$$

and its evolute at corresponding points are equal.

5. Show that the whole length of the evolute of the ellipse

$$x^2/a^2+y^2/b^2=1$$

is $4(a^2/b-b^2/a)$.

6. Show that the whole length of the evolute of the astroid

$$x=a\cos^3\theta,\ y=a\sin^3\theta$$

is $12a$.

7. Evaluate the following :

(*i*) $\lim_{x\to 0}\dfrac{xe^x-\log(1+x)}{x^2}$. (*D.U. 1952*) (*ii*) $\lim_{x\to 0}\dfrac{x\cos x-\log(1+x)}{x^2}$. (*D. U. Hons. 1951, P.U. 1957*)

(*iii*) $\lim_{x\to 0}\dfrac{e^x\sin x-x-x^2}{x^2+x\log(1-x)}$. (*D.U. 1953*) (*iv*) $\lim_{x\to 0}\left\{\dfrac{1}{x}-\dfrac{1}{x^2}\log(1+x)\right\}$. (*D.U. 1955*)

8. If the limit of

$$\frac{\sin 2x+a\sin x}{x^3},$$

as x tends to zero, be finite, find the value of a and the limit.

9. Determine the limits of the following functions :

(*i*) $x\log\tan x$, $(x\to 0)$. (*ii*) $x\tan(\pi/2-x)$, $(x\to 0)$.

(*iii*) $(a-x)\tan(\pi x/2a)$, $(x\to 0)$.

10. Determine the limits of the following functions :

i. $\dfrac{e^x-e^{-x}-x}{x^2\sin x}$, $(x\to 0)$. ii. $\dfrac{\log x}{x^3}$, $(x\to\infty)$.

iii. $\dfrac{1+x\cos x-\cosh x-\log(1+x)}{\tan x-x}$, $(x\to 0)$.

iv. $\dfrac{\log(1+x)\log(1-x)-\log(1-x^2)}{x^4}$, $(x\to 0)$.

UNIT-III

1. If $z=xyf(x/y)$, show that

$$x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}=2z.$$

2. If $z(x+y)=x^2+y^2$, show that

$$\left(\frac{\partial z}{\partial x}-\frac{\partial z}{\partial y}\right)^2=4\left(1-\frac{\partial z}{\partial x}-\frac{\partial z}{\partial y}\right).$$

3. If $z=3xy-y^3+(y^2-2x)^{\frac{3}{2}}$, verify that

$$\frac{\partial^2 z}{\partial x\partial y}=\frac{\partial^2 z}{\partial y\partial x}\text{ and }\frac{\partial^2 z}{\partial x^2}\frac{\partial^2 z}{\partial y^2}=\left(\frac{\partial^2 z}{\partial x\partial y}\right)^2.$$

4. If $z=f(x+ay)+\varphi(x-ay)$, prove that

$$\frac{\partial^2 z}{\partial y^2}=a^2\frac{\partial^2 z}{\partial x^2}.$$

5. If $u=\tan^{-1}\dfrac{x^3+y^3}{x-y}$, find

$$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}.$$

6. If $f(x, y)=0$, $\varphi(y, z)=0$, show that

$$\frac{\partial f}{\partial y}\cdot\frac{\partial\varphi}{\partial z}\cdot\frac{dz}{dx}=\frac{\partial f}{\partial x}\cdot\frac{\partial\varphi}{\partial y}.$$

7. If $x\sqrt{(1-y^2)}+y\sqrt{(1-x^2)}=a$, show that

$$\frac{d^2y}{dx^2}=\frac{a}{(1-x^2)^{\frac{3}{2}}}.$$

8. Given that

$f(x, y)\equiv x^3+y^3-3axy=0$, show that

$$\frac{d^2y}{dx^2}\cdot\frac{d^2x}{dy^2}=\frac{4a^6}{xy(xy-2a^2)^3}.$$

9. If u and v are functions of x and y defined by

$$x=u+e^{-v}\sin u,\ y=v+e^{-v}\cos u,$$

prove that

$$\frac{\partial u}{\partial y}=\frac{\partial v}{\partial x}.$$

10. *If* $H=f(y-z,\ z-x,\ x-y)$; *prove that,*

$$\frac{\partial H}{\partial x}+\frac{\partial H}{\partial y}-\frac{\partial H}{\partial z}=0.$$

UNIT-IV

1. Find the minimum value of $x^2+y^2+z^2$ when
   (*i*) $x+y+z=3a$.
   (*ii*) $xy+yz+zx=3a^2$.
   (*iii*) $xyz=a^3$.
2. Find the extreme value of xy when
   $x^2+xy+y^2=a^2$.
3. In a plane triangle, find the maximum value of
   $\cos A\cos B\cos C$.
4. *Find the envelope of the family of semi-cubical parabolas*
   $y^2-(x+\alpha)^3=0$.
5. *Find the envelope of the family of ellipses*
   $x^2/a^2+y^2/b^2=1$,
   where the two parameter a, b, *are connected by the relation*
   $a+b=c$;
   c, *being a constant.*
6. *Show that the envelope of a circle whose centre lies on the parabola* $y^2=4ax$ *and which passes through its vertex is the cissoid*
   $y^2(2a+x)+x^3=0$.
7. Find the envelope of the family of straight lines $x/a+y/b=1$ where a, b are connected by the relation
   (*i*) $a+b=c$. (*ii*) $a^2+b^2=c^2$. (*iii*) $ab=c^2$,
   c is a constant.
8. *Find the asymptotes of*
   $x^3+4x^2y+4xy^2+5x^2+15xy+10y^2-2y+1=0$.
9. *Find the asymptotes of*
   $x^3+4x^2y+4xy^2+5x^2+15xy+10y^2-2y+1=0$.
10. Find the asymptotes of the following curves
    i. $xy(x+y)=a(x^2-a^2)$.
    ii. $(x-1)(x-2)(x+y)+x^2+x+1=0$.
    iii. $y^3-x^3+y^2+x^2+y-x+1=0$.

DSC- 1B DIFFERENTIAL EQUATIONS BS:204

Theory: 4 Credits and Practicals: 1 credits
Theory: 4 hours /week and Practicals: 2 hours /week

Objective: The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.

Outcomes: After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science.

Unit – I

Differential Equations of first order and first degree:
Exact differential equations – Integrating Factors – Change in variables – Total Differential Equations – Simultaneous Total Differential Equations – Equations of the form $dx/P = dy/Q = dz/R$
Differential Equations first order but not of first degree: Equations Solvable for y – Equations Solvable for x – Equations that do not contain x (or y) – Clairaut's equation

Unit – II

Higher order linear differential equations: Solution of homogeneous linear differential equations with constant coefficients – Solution of non-homogeneous differential equations P(D)y= Q(x) with constant coefficients by means of polynomial operators when Q(x)=bx^k,be^{ax},$e^{ax}V, b\cos(ax), b\sin(ax)$

Unit – III

Method of undetermined coefficients – Method of variation of parameters – Linear differential equations with non constant coefficients – The Cauchy – Euler Equation

Unit – IV

Partial Differential equations- Formation and solution- Equations easily integrable – Linear equations of first order – Non linear equations of first order – Charpit's method – Non homogeneous linear partial differential equations – Separation of variables

Text: Zafar Ahsan, *Differential Equations and Their Applications*

References: Frank Ayres Jr, *Theory and Problems of Differential Equations*

Ford, L.R, *Differential Equations.*

Daniel Murray, *Differential Equations*

S. Balachandra Rao, *Differential Equations with Applications and Programs*

Stuart P Hastings, J Bryce McLead; *Classical Methods in Ordinary Differential Equations*

Differential Equations
Practicals Question Bank

Unit-I

Solve the following differential equations:

1. $y' = \sin(x+y) + \cos(x+y)$

2. $xdy - ydx = a(x^2 + y^2)dy$

3. $x^2 ydx - (x^3 + y^3)dy = 0$

4. $(y+z)dx + (x+z)dy + (x+y)dz = 0$

5. $y\sin 2xdx - (1 + y^2 + \cos^2 x)dy = 0$

6. $y + px = p^2 x^4$

7. $yp^2 + (x-y)p - x = 0$

8. $\dfrac{dx}{y-zx} = \dfrac{dy}{yz+x} = \dfrac{dz}{x^2+y^2}$

9. $\dfrac{dx}{x(y^2-z^2)} = \dfrac{dy}{y(z^2-x^2)} = \dfrac{dz}{z(x^2-y^2)}$

10. Use the transformation $x^2 = u$ and $y^2 = v$ to solve the equation

$axyp^2 + (x^2 - ay^2 - b)p - xy = 0$.

Unit-II

Solve the following differential equations:

1. $D^2 y + (a+b)Dy + aby = 0$

2. $D^3 y - D^2 y - Dy - 2y = 0$

3. $D^3 y + Dy = x^2 + 2x$

4. $y'' + 3y' + 2y = 2(e^{-2x} + x^2)$

5. $y^{(5)} + 2y''' + y' = 2x + \sin x + \cos x$

6. $(D^2 + 1)(D^2 + 4)y = \cos\frac{x}{2}\cos\frac{3x}{2}$

7. $(D^2 + 1)y = \cos x + xe^{2x} + e^x \sin x$

8. $y'' + 3y' + 2y = 12e^x$

9. $y'' - y = \cos x$

10. $4y'' - 5y' = x^2 e^x$

Unit-III

Solve the following differential equations:

1. $y'' + 3y' + 2y = xe^x$

2. $y'' + 3y' + 2y = \sin x$

3. $y'' + y' + y = x^2$

4. $y'' + 2y' + y = x^2 e^{-x}$

5. $x^2 y'' - xy' + y = 2\log x$

6. $x^4 y''' + 2x^3 y'' - x^2 y' + xy = 1$

7. $x^2 y'' - xy' + 2y = x\log x$

8. $x^2 y'' - xy' + 2y = x$

Use the reduction of order method to solve the following homogeneous equation whose one of the solutions is given:

9. $y'' - \frac{2}{x}y' + \frac{2}{x^2}y = 0$, $y_1 = x$

10. $(2x^2 + 1)y'' - 4xy' + 4y = 0$, $y_1 = x$

Unit-IV

1. Form the partial differential equation , by eliminating the arbitrary constants from $z = (x^2 + a)(y^2 + b)$.

2. Find the differential equation of the family of all planes whose members are all at a constant distance r from the origin.

3. Form the differential equation by eliminating arbitrary function F from

$F(x^2 + y^2, z - xy) = 0$.

Solve the following differential equations:

4. $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$

5. $x(z^2 - y^2)p + y(x^2 - z^2)q = z(y^2 - x^2)$

6. $\left(p^2 - q^2\right)z = x - y$

7. $z = px + qy + p^2q^2$

8. $z^2 = pqxy$

9. $z^2(p^2 + q^2) = x^2 + y^2$

10. $r + s - 6t = \cos(2x + y)$

DSC- 1C REAL ANALYSIS BS: 304

Theory: 4 credits and Practicals: 1 credits
Theory: 4 hours /week and Practicals: 2 hours /week

Objective: The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.

Outcome: After the completion of the course students will be in a position to appreciate beauty and applicability of the course.

Unit – I

Sequences: Limits of Sequences- A Discussion about Proofs-Limit Theorems for Sequences-Monotone Sequences and Cauchy Sequences

Unit – II

Subsequences-Lim sup's and Lim inf's-Series-Alternating Series and Integral Tests

Unit – III

Sequences and Series of Functions: Power Series-Uniform Convergence-More on Uniform Convergence-Differentiation and Integration of Power Series (Theorems in this section without Proofs)

Unit – IV

Integration : The Riemann Integral – Properties of Riemann Integral-Fundamental Theorem of Calculus

Text: Kenneth A Ross, *Elementary Analysis-The Theory of Calculus*

References: William F. Trench, *Introduction to Real Analysis*
Lee Larson, *Introduction to Real Analysis I*

Shanti Narayan and Mittal, *Mathematical Analysis*

Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; *Elementary Real analysis*

Sudhir R. Ghorpade Balmohan V. Limaye *„A Course in Calculus and Real Analysis*

Real Analysis

Practicals Question Bank

UNIT-I

1

For each sequence below, determine whether it converges and, if it converges, give its limit. No proofs are required.

(a) $a_n = \frac{n}{n+1}$ **(b)** $b_n = \frac{n^2+3}{n^2-3}$

(c) $c_n = 2^{-n}$ **(d)** $t_n = 1 + \frac{2}{n}$

(e) $x_n = 73 + (-1)^n$ **(f)** $s_n = (2)^{1/n}$

2

Determine the limits of the following sequences, and then prove your claims.

(a) $a_n = \frac{n}{n^2+1}$ **(b)** $b_n = \frac{7n-19}{3n+7}$

(c) $c_n = \frac{4n+3}{7n-5}$ **(d)** $d_n = \frac{2n+4}{5n+2}$

(e) $s_n = \frac{1}{n}\sin n$

3

Suppose $\lim a_n = a$, $\lim b_n = b$, and $s_n = \frac{a_n^2+4a_n}{b_n^2+1}$. Prove $\lim s_n = \frac{a^3+4a}{b^2+1}$ carefully, using the limit theorems.

4

Let $x_1 = 1$ and $x_{n+1} = 3x_n^2$ for $n \geq 1$.

(a) Show if $a = \lim x_n$, then $a = \frac{1}{3}$ or $a = 0$.

(b) Does $\lim x_n$ exist? Explain.

(c) Discuss the apparent contradiction between parts (a) and (b).

5

Which of the following sequences are increasing? decreasing? bounded?

(a) $\frac{1}{n}$ **(b)** $\frac{(-1)^n}{n^2}$

(c) n^5 **(d)** $\sin(\frac{n\pi}{7})$

(e) $(-2)^n$ **(f)** $\frac{n}{3^n}$

6

Let (s_n) be a sequence such that

$$|s_{n+1} - s_n| < 2^{-n} \quad \text{for all} \quad n \in \mathbb{N}.$$

Prove (s_n) is a Cauchy sequence and hence a convergent sequence.

7

Let (s_n) be an increasing sequence of positive numbers and define $\sigma_n = \frac{1}{n}(s_1 + s_2 + \cdots + s_n)$. Prove (σ_n) is an increasing sequence.

8

Let $t_1 = 1$ and $t_{n+1} = [1 - \frac{1}{4n^2}] \cdot t_n$ for $n \geq 1$.

(a) Show $\lim t_n$ exists.

(b) What do you think $\lim t_n$ is?

9

Let $t_1 = 1$ and $t_{n+1} = [1 - \frac{1}{(n+1)^2}] \cdot t_n$ for $n \geq 1$.

(a) Show $\lim t_n$ exists.

(b) What do you think $\lim t_n$ is?

(c) Use induction to show $t_n = \frac{n+1}{2n}$.

(d) Repeat part (b).

10

Let $s_1 = 1$ and $s_{n+1} = \frac{1}{3}(s_n + 1)$ for $n \geq 1$.

(a) Find s_2, s_3 and s_4.

(b) Use induction to show $s_n > \frac{1}{2}$ for all n.

(c) Show (s_n) is a decreasing sequence.

(d) Show $\lim s_n$ exists and find $\lim s_n$.

UNIT-II

11

Let $a_n = 3 + 2(-1)^n$ for $n \in \mathbb{N}$.

(a) List the first eight terms of the sequence (a_n).

(b) Give a subsequence that is constant [takes a single value]. Specify the selection function σ.

12

Consider the sequences defined as follows:

$$a_n = (-1)^n, \qquad b_n = \frac{1}{n}, \qquad c_n = n^2, \qquad d_n = \frac{6n+4}{7n-3}.$$

(a) For each sequence, give an example of a monotone subsequence.

(b) For each sequence, give its set of subsequential limits.

(c) For each sequence, give its lim sup and lim inf.

(d) Which of the sequences converges? diverges to $+\infty$? diverges to $-\infty$?

(e) Which of the sequences is bounded?

13

Prove $\limsup |s_n| = 0$ if and only if $\lim s_n = 0$.

14

Let (s_n) and (t_n) be the following sequences that repeat in cycles of four:

$$(s_n) = (0, 1, 2, 1, 0, 1, 2, 1, 0, 1, 2, 1, 0, 1, 2, 1, 0, \ldots)$$
$$(t_n) = (2, 1, 1, 0, 2, 1, 1, 0, 2, 1, 1, 0, 2, 1, 1, 0, 2, \ldots)$$

Find

(a) $\liminf s_n + \liminf t_n$, **(b)** $\liminf(s_n + t_n)$,
(c) $\liminf s_n + \limsup t_n$, **(d)** $\limsup(s_n + t_n)$,
(e) $\limsup s_n + \limsup t_n$, **(f)** $\liminf(s_n t_n)$,
(g) $\limsup(s_n t_n)$

15

Determine which of the following series converge. Justify your answers.

(a) $\sum \frac{n^4}{2^n}$ **(b)** $\sum \frac{2^n}{n!}$

(c) $\sum \frac{n^2}{3^n}$ **(d)** $\sum \frac{n!}{n^4+3}$

(e) $\sum \frac{\cos^2 n}{n^2}$ **(f)** $\sum_{n=2}^{\infty} \frac{1}{\log n}$

16

Prove that if $\sum a_n$ is a convergent series of nonnegative numbers and $p > 1$, then $\sum a_n^p$ converges.

17

Show that if $\sum a_n$ and $\sum b_n$ are convergent series of nonnegative numbers, then $\sum \sqrt{a_n b_n}$ converges. *Hint*: Show $\sqrt{a_n b_n} \leq a_n + b_n$ for all n.

18

We have seen that it is often a lot harder to find the value of an infinite sum than to show it exists. Here are some sums that can be handled.

(a) Calculate $\sum_{n=1}^{\infty} (\frac{2}{3})^n$ and $\sum_{n=1}^{\infty} (-\frac{2}{3})^n$.

(b) Prove $\sum_{n=1}^{\infty} \frac{1}{n(n+1)} = 1$. *Hint*: Note that $\sum_{k=1}^{n} \frac{1}{k(k+1)} = \sum_{k=1}^{n} [\frac{1}{k} - \frac{1}{k+1}]$.

(c) Prove $\sum_{n=1}^{\infty} \frac{n-1}{2^{n+1}} = \frac{1}{2}$. *Hint*: Note $\frac{k-1}{2^{k+1}} = \frac{k}{2^k} - \frac{k+1}{2^{k+1}}$.

(d) Use (c) to calculate $\sum_{n=1}^{\infty} \frac{n}{2^n}$.

19

Determine which of the following series converge. Justify your answers.

(a) $\sum_{n=2}^{\infty} \frac{1}{\sqrt{n} \log n}$ **(b)** $\sum_{n=2}^{\infty} \frac{\log n}{n}$

(c) $\sum_{n=4}^{\infty} \frac{1}{n(\log n)(\log \log n)}$ **(d)** $\sum_{n=2}^{\infty} \frac{\log n}{n^2}$

20

Show $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^p}$ converges if and only if $p > 1$.

UNIT-III

21

For each of the following power series, find the radius of convergence and determine the exact interval of convergence.

(a) $\sum n^2 x^n$ **(b)** $\sum (\frac{x}{n})^n$

(c) $\sum (\frac{2^n}{n^2}) x^n$ **(d)** $\sum (\frac{n^3}{3^n}) x^n$

(e) $\sum (\frac{2^n}{n!}) x^n$ **(f)** $\sum (\frac{1}{(n+1)^2 2^n}) x^n$

(g) $\sum (\frac{3^n}{n \cdot 4^n}) x^n$ **(h)** $\sum (\frac{(-1)^n}{n^2 \cdot 4^n}) x^n$

22

For $n = 0, 1, 2, 3, \ldots$, let $a_n = [\frac{4+2(-1)^n}{5}]^n$.

(a) Find $\limsup (a_n)^{1/n}$, $\liminf (a_n)^{1/n}$, $\limsup |\frac{a_{n+1}}{a_n}|$ and $\liminf |\frac{a_{n+1}}{a_n}|$.

(b) Do the series $\sum a_n$ and $\sum (-1)^n a_n$ converge? Explain briefly.

23

Let $f_n(x) = \frac{1+2\cos^2 nx}{\sqrt{n}}$. Prove carefully that (f_n) converges uniformly to 0 on $\mathbb{R}$.

24

Prove that if $f_n \to f$ uniformly on a set S, and if $g_n \to g$ uniformly on S, then $f_n + g_n \to f + g$ uniformly on S.

25

Let $f_n(x) = \frac{x^n}{n}$. Show (f_n) is uniformly convergent on $[-1, 1]$ and specify the limit function.

26

Let $f_n(x) = \frac{n+\cos x}{2n+\sin^2 x}$ for all real numbers x.

(a) Show (f_n) converges uniformly on $\mathbb{R}$. *Hint*: First decide what the limit function is; then show (f_n) converges uniformly to it.

(b) Calculate $\lim_{n\to\infty} \int_2^7 f_n(x)\,dx$. *Hint*: Don't integrate f_n.

27

Show $\sum_{n=1}^{\infty} \frac{1}{n^2} \cos nx$ converges uniformly on $\mathbb{R}$ to a continuous function.

28

Show $\sum_{n=1}^{\infty} \frac{x^n}{n^2 2^n}$ has radius of convergence 2 and the series converges uniformly to a continuous function on $[-2, 2]$.

29

(a) Show $\sum \frac{x^n}{1+x^n}$ converges for $x \in [0, 1)$.

(b) Show that the series converges uniformly on $[0, a]$ for each a, $0 < a < 1$.

30

Suppose $\sum_{k=1}^{\infty} g_k$ and $\sum_{k=1}^{\infty} h_k$ converge uniformly on a set S. Show $\sum_{k=1}^{\infty}(g_k + h_k)$ converges uniformly on S.

UNIT-IV

31

Let $f(x) = x$ for rational x and $f(x) = 0$ for irrational x.

(a) Calculate the upper and lower Darboux integrals for f on the interval $[0, b]$.

(b) Is f integrable on $[0, b]$?

32

Let f be a bounded function on $[a, b]$. Suppose there exist sequences (U_n) and (L_n) of upper and lower Darboux sums for f such that $\lim(U_n - L_n) = 0$. Show f is integrable and $\int_a^b f = \lim U_n = \lim L_n$.

33

A function f on $[a, b]$ is called a *step function* if there exists a partition $P = \{a = u_0 < u_1 < \cdots < c_m = b\}$ of $[a, b]$ such that f is constant on each interval (u_{j-1}, u_j), say $f(x) = c_j$ for x in (u_{j-1}, u_j).

(a) Show that a step function f is integrable and evaluate $\int_a^b f$.

(b) Evaluate the integral $\int_0^4 P(x)\,dx$ for the postage-stamp function

34

Show $|\int_{-2\pi}^{2\pi} x^2 \sin^8(e^x)\,dx| \le \frac{16\pi^3}{3}$.

35

Let f be a bounded function on $[a, b]$, so that there exists $B > 0$ such that $|f(x)| \leq B$ for all $x \in [a, b]$.

(a) Show

$$U(f^2, P) - L(f^2, P) \leq 2B[U(f, P) - L(f, P)]$$

for all partitions P of $[a, b]$. *Hint*: $f(x)^2 - f(y)^2 = [f(x) + f(y)] \cdot [f(x) - f(y)]$.

(b) Show that if f is integrable on $[a, b]$, then f^2 also is integrable on $[a, b]$.

36

Calculate

(a) $\lim_{x\to 0} \frac{1}{x} \int_0^x e^{t^2}\, dt$ **(b)** $\lim_{h\to 0} \frac{1}{h} \int_3^{3+h} e^{t^2}\, dt$.

37

Show that if f is a continuous real-valued function on $[a, b]$ satisfying $\int_a^b f(x)g(x)\, dx = 0$ for every continuous function g on $[a, b]$, then $f(x) = 0$ for all x in $[a, b]$.

DSC- 1D ALGEBRA BS: 404

Theory: 4 credits and Practicals: 1 credits
Theory: 4 hours /week and Practicals: 2 hours /week

Objective: The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.

Outcome: On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects.

Unit – I

Groups: Definition and Examples of Groups- Elementary Properties of Groups - Finite Groups; Subgroups -Terminology and Notation -Subgroup Tests - Examples of Subgroups Cyclic Groups: Properties of Cyclic Groups – Classification of Sub groups Cyclic Groups-Permutation Groups: Definition and Notation -Cycle Notation - Properties of Permutations -A Check Digit Scheme Based on D_5

Unit – II

Isomorphisms ; Motivation- Definition and Examples -Cayley's Theorem Properties of Isomorphisms -Automorphisms-Cosets and Lagrange's Theorem Properties of Cosets 138 | Lagrange's Theorem and Consequences-An Application of Cosets to Permutation Groups -The Rotation Group of a Cube and a Soccer Ball -Normal Subgroups and Factor Groups ; Normal Subgroups-Factor Groups -Applications of Factor Groups -Group Homomorphisms - Definition and Examples -Properties of Homomorphisms -The First Isomorphism Theorem

Unit – III

Introduction to Rings: Motivation and Definition -Examples of Rings -Properties of Rings -Subrings -Integral Domains : Definition and Examples –Characteristics of a

Ring -Ideals and Factor Rings; Ideals -Factor Rings -Prime Ideals and Maximal Ideals

Unit – IV

Ring Homomorphisms: Definition and Examples-Properties of Ring-Homomorphisms -The Field of Quotients Polynomial Rings: Notation and Terminology

Text: Joseph A Gallian, *Contemporary Abstract algebra (9th edition)*

References: Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R, *Basic Abstract Algebra*

Fraleigh, J.B. *A First Course in Abstract Algebra*.

Herstein, I.N. *Topics in Algebra*

Robert B. Ash, *Basic Abstract Algebra*

I Martin Isaacs, *Finite Group Theory*

Joseph J Rotman, *Advanced Modern Algebra*

Practicals Question Bank
ALGEBRA
Unit-I

1. Show that $\{1, 2, 3\}$ under multiplication modulo 4 is not a group but that $\{1, 2, 3, 4\}$ under multiplication modulo 5 is a group.

2. Let G be a group with the property that for any x, y, z in the group, $xy = zx$ implies $y = z$. Prove that G is Abelian.

3. Prove that the set of all 3×3 matrices with real entries of the form

$$\begin{pmatrix} 1 & a & b \\ 0 & 1 & c \\ 0 & 0 & 1 \end{pmatrix}$$

   is a group under multiplication.

4. Let G be the group of polynomials under addition with coefficients from Z_{10}. Find the orders of $f(x) = 7x^2 + 5x + 4, g(x) = 4x^2 + 8x + 6$, and $f(x) + g(x)$

5. If a is an element of a group G and $|a| = 7$, show that a is the cube of some element of G.

6. Suppose that $\langle a \rangle, \langle b \rangle$ and $\langle c \rangle$ are cyclic groups of orders 6, 8, and 20, respectively. Find all generators of $\langle a \rangle, \langle b \rangle$, and $\langle c \rangle$.

7. How many subgroups does Z_{20} have? List a generator for each of these subgroups.

8. Consider the set $\{4, 8, 12, 16\}$. Show that this set is a group under multiplication modulo 20 by constructing its Cayley table. What is the identity element? Is the group cyclic? If so, find all of its generators.

9. Prove that a group of order 4 cannot have a subgroup of order 3.

10. Determine whether the following permutations are even or odd.
    a. (135)
    b. (1356)
    c. (13567)
    d. (12)(134)(152)
    e. (1243)(3521).

Unit-II

1. Show that the mapping $a \longrightarrow \log_{10} a$ is an isomorphism from R^+ under multiplication to R under addition.

2. Show that the mapping $f(a + bi) = a - bi$ is an automorphism of the group of complex numbers under addition.

3. Find all of the left cosets of $\{1, 11\}$ in $U(30)$.

4. Let C^* be the group of nonzero complex numbers under multiplication and let $H = \{a + bi \in C^*/a^2 + b^2 = 1\}$. Give a geometric description of the coset $(3+4i)H$. Give a geometric description of the coset $(c + di)H$.

5. Let $H = \left\{ \begin{pmatrix} a & b \\ 0 & d \end{pmatrix} /a, b, d \in R, ad \neq 0 \right\}$. Is H a normal subgroup of $GL(2, R)$?

6. What is the order of the factor group $\frac{Z_{60}}{\langle 5 \rangle}$?

7. Let $G = U(16), H = \{1, 15\}$, and $K = \{1, 9\}$. Are H and K isomorphic? Are G/H and G/K isomorphic?

8. Prove that the mapping from R under addition to $GL(2, R)$ that takes x to

$$\begin{bmatrix} cosx & sinx \\ -sinx & cosx \end{bmatrix}$$

is a group homomorphism. What is the kernel of the homomorphism?

9. Suppose that f is a homomorphism from $Z30$ to $Z30$ and $Kerf = \{0, 10, 20\}$. If $f(23) = 9$, determine all elements that map to 9.

10. How many Abelian groups (up to isomorphism) are there
    a. of order 6?
    b. of order 15?
    c. of order 42?
    d. of order pq, where p and q are distinct primes?
    e. of order pqr, where p, q, and r are distinct primes?

Unit-III

1. Let $M_2(Z)$ be the ring of all 2×2 matrices over the integers and let $R = \left\{ \begin{pmatrix} a & a \\ b & b \end{pmatrix} /a, b \in Z \right\}$ Prove or disprove that R is a subring of $M_2(Z)$.

2. Suppose that a and b belong to a commutative ring R with unity. If a is a unit of R and $b^2 = 0$, show that $a + b$ is a unit of R.

3. Let n be an integer greater than 1. In a ring in which $x^n = x$ for all x, show that $ab = 0$ implies $ba = 0$.

4. List all zero-divisors in Z_{20}. Can you see a relationship between the zero-divisors of Z_{20} and the units of Z_{20}?

5. Let a belong to a ring R with unity and suppose that $a^n = 0$ for some positive integer n. (Such an element is called nilpotent.) Prove that $1 - a$ has a multiplicative inverse in R.

6. Let d be an integer. Prove that $Z[\sqrt{d}] = \{a + b\sqrt{d}/a, b \in Z\}$ is an integral domain.

7. Show that Z_n has a nonzero nilpotent element if and only if n is divisible by the square of some prime.

8. Find all units, zero-divisors, idempotents, and nilpotent elements in $Z_3 \bigoplus Z_6$.

9. Find all maximal ideals in
   a. Z_8.
   b. Z_{10}.
   c. Z_{12}.
   d. Z_n.

10. Show that $R[x]/\langle x^2+1\rangle$ is a field.

Unit-IV

1. Prove that every ring homomorphism f from Z_n to itself has the form $f(x) = ax$, where $a^2 = a$.

2. Prove that a ring homomorphism carries an idempotent to an idempotent.

3. In Z, let $A = \langle 2\rangle$ and $B = \langle 8\rangle$. Show that the group A/B is isomorphic to the group Z_4 but that the ring A/B is not ring-isomorphic to the ring Z_4.

4. Show that the number $9,897,654,527,609,805$ is divisible by 99.

5. Show that no integer of the form $111, 111, 111, ..., 111$ is prime.

6. Let $f(x) = 4x^3+2x^2+x+3$ and $g(x) = 3x^4+3x^3+3x^2+x+4$, where $f(x), g(x) \in Z_5[x]$. Compute $f(x)+g(x)$ and $f(x).g(x)$.

7. Let $f(x) = 5x^4+3x^3+1$ and $g(x) = 3x^2+2x+1$ in $Z_7[x]$.Determine the quotient and remainder upon dividing $f(x)$ by $g(x)$.

8. Let $f(x)$ belong to $Z_p[x]$. Prove that if $f(b) = 0$, then $f(b^p) = 0$.

9. Determine which of the polynomials below is (are) irreducible over Q.
   a. $x^5+9x^4+12x^2+6$
   b. x^4+x+1
   c. x^4+3x^2+3
   d. x^5+5x^2+1
   e. $(5/2)x^5+(9/2)x^4+15x^3+(3/7)x^2+6x+3/14$.

10. Show that x^2+x+4 is irreducible over Z_{11}.

DSC-1E LINEAR ALGEBRA BS: 503

Theory: 3 credits and Practicals: 1 credits
Theory: 3 hours /week and Practicals: 2 hours /week

Objective: The students are exposed to various concepts like vector spaces , bases , dimension, Eigen values etc .

Outcome: After completion this course students appreciate its interdisciplinary nature.

Unit I

Vector Spaces : Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space

Unit II

Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation

Unit III

Diagonalization -Eigenvectors and Linear Transformations -Complex Eigenvalues - Applications to Differential Equations -Orthogonality and Least Squares **:** Inner Product, Length, and Orthogonality -Orthogonal Sets

Text : David C Lay , *Linear Algebra and its Applications 4e*

References: S Lang, *Introduction to Linear Algebra*

Gilbert Strang, Linear *Algebra and its Applications*

Stephen H Friedberg et al*, Linear Algebra*

Kuldeep Singh, *Linear Algebra*

Sheldon Axler, *Linear Algebra Done Right*

Linear Algebra

Practicals Question Bank

UNIT-I

1

Let H be the set of all vectors of the form $\begin{bmatrix} -2t \\ 5t \\ 3t \end{bmatrix}$. Find a vector $\mathbf{v}$ in $\mathbb{R}^3$ such that $H = \text{Span}\{\mathbf{v}\}$. Why does this show that H is a subspace of $\mathbb{R}^3$?

2

Let V be the first quadrant in the xy-plane; that is, let

$$V = \left\{ \begin{bmatrix} x \\ y \end{bmatrix} : x \geq 0, y \geq 0 \right\}$$

a. If $\mathbf{u}$ and $\mathbf{v}$ are in V, is $\mathbf{u} + \mathbf{v}$ in V? Why?

b. Find a specific vector $\mathbf{u}$ in V and a specific scalar c such

3

Let $\mathbf{v}_1 = \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$ and $\mathbf{v}_2 = \begin{bmatrix} -2 \\ 7 \\ -9 \end{bmatrix}$. Determine if $\{\mathbf{v}_1, \mathbf{v}_2\}$ is a basis for $\mathbb{R}^3$. Is $\{\mathbf{v}_1, \mathbf{v}_2\}$ a basis for $\mathbb{R}^2$?

4

The set $\mathcal{B} = \{1 + t^2, t + t^2, 1 + 2t + t^2\}$ is a basis for $\mathbb{P}_2$. Find the coordinate vector of $\mathbf{p}(t) = 1 + 4t + 7t^2$ relative to $\mathcal{B}$.

5

The set $\mathcal{B} = \{1 - t^2, t - t^2, 2 - t + t^2\}$ is a basis for $\mathbb{P}_2$. Find the coordinate vector of $\mathbf{p}(t) = 1 + 3t - 6t^2$ relative to $\mathcal{B}$.

6

The vectors $\mathbf{v}_1 = \begin{bmatrix} 1 \\ -3 \end{bmatrix}, \mathbf{v}_2 = \begin{bmatrix} 2 \\ -8 \end{bmatrix}, \mathbf{v}_3 = \begin{bmatrix} -3 \\ 7 \end{bmatrix}$ span $\mathbb{R}^2$ but do not form a basis. Find two different ways to express $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ as a linear combination of $\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3$.

7

Find the dimension of the subspace of all vectors in $\mathbb{R}^3$ whose first and third entries are equal.

8

Find the dimension of the subspace H of $\mathbb{R}^2$ spanned by $\begin{bmatrix} 1 \\ -5 \end{bmatrix}, \begin{bmatrix} -2 \\ 10 \end{bmatrix}, \begin{bmatrix} -3 \\ 15 \end{bmatrix}$.

9

Let H be an n-dimensional subspace of an n-dimensional vector space V. Show that $H = V$.

10

Let H be an n-dimensional subspace of an n-dimensional vector space V. Show that $H = V$.

UNIT-II

11

If a 4×7 matrix A has rank 3, find $\dim \text{Nul}\, A$, $\dim \text{Row}\, A$, and rank A^T.

12

If a 7×5 matrix A has rank 2, find $\dim \text{Nul}\, A$, $\dim \text{Row}\, A$, and rank A^T.

13

If the null space of an 8×5 matrix A is 3-dimensional, what is the dimension of the row space of A?

14

If A is a 3×7 matrix, what is the smallest possible dimension of Nul A?

15

Let $\mathbf{u} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Find $\mathbf{v}$ in $\mathbb{R}^3$ such that $\begin{bmatrix} 1 & -3 & 4 \\ 2 & -6 & 8 \end{bmatrix} = \mathbf{u}\mathbf{v}^T$.

16

If A is a 7×5 matrix, what is the largest possible rank of A? If A is a 5×7 matrix, what is the largest possible rank of A? Explain your answers.

17

Without calculations, list rank A and $\dim \text{Nul}\, A$

$$A = \begin{bmatrix} 2 & 6 & -6 & 6 & 3 & 6 \\ -2 & -3 & 6 & -3 & 0 & -6 \\ 4 & 9 & -12 & 9 & 3 & 12 \\ -2 & 3 & 6 & 3 & 3 & -6 \end{bmatrix},$$

18

Use a property of determinants to show that A and A^T have the same characteristic polynomial.

19

Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

20

Find the characteristic polynomial and the real eigenvalues of

$$\begin{bmatrix} 4 & 0 & -1 \\ 0 & 4 & -1 \\ 1 & 0 & 2 \end{bmatrix}, \quad \begin{bmatrix} -1 & 0 & 2 \\ 3 & 1 & 0 \\ 0 & 1 & 2 \end{bmatrix}$$

UNIT-III

21

let $A = PDP^{-1}$ and compute A^4.

$$\begin{bmatrix} 5 & 7 \\ 2 & 3 \end{bmatrix}, \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}.$$

22

Let $\mathcal{B} = \{\mathbf{b}_1, \mathbf{b}_2, \mathbf{b}_3\}$ and $\mathcal{D} = \{\mathbf{d}_1, \mathbf{d}_2\}$ be bases for vector spaces V and W, respectively. Let $T : V \to W$ be a linear transformation with the property that

$$T(\mathbf{b}_1) = 3\mathbf{d}_1 - 5\mathbf{d}_2, \quad T(\mathbf{b}_2) = -\mathbf{d}_1 + 6\mathbf{d}_2, \quad T(\mathbf{b}_3) = 4\mathbf{d}_2$$

Find the matrix for T relative to $\mathcal{B}$ and $\mathcal{D}$.

23

Let $\mathcal{D} = \{\mathbf{d}_1, \mathbf{d}_2\}$ and $\mathcal{B} = \{\mathbf{b}_1, \mathbf{b}_2\}$ be bases for vector spaces V and W, respectively. Let $T : V \to W$ be a linear transformation with the property that

$$T(\mathbf{d}_1) = 3\mathbf{b}_1 - 3\mathbf{b}_2, \quad T(\mathbf{d}_2) = -2\mathbf{b}_1 + 5\mathbf{b}_2$$

Find the matrix for T relative to $\mathcal{D}$ and $\mathcal{B}$.

24

Let $\mathcal{B} = \{\mathbf{b}_1, \mathbf{b}_2, \mathbf{b}_3\}$ be a basis for a vector space V and let $T : V \to \mathbb{R}^2$ be a linear transformation with the property that

$$T(x_1\mathbf{b}_1 + x_2\mathbf{b}_2 + x_3\mathbf{b}_3) = \begin{bmatrix} 2x_1 - 3x_2 + x_3 \\ -2x_1 + 5x_3 \end{bmatrix}$$

Find the matrix for T relative to $\mathcal{B}$ and the standard basis for $\mathbb{R}^2$.

25

Let $T : \mathbb{P}_2 \to \mathbb{P}_3$ be the transformation that maps a polynomial $\mathbf{p}(t)$ into the polynomial $(t + 3)\mathbf{p}(t)$.

a. Find the image of $\mathbf{p}(t) = 3 - 2t + t^2$.

b. Show that T is a linear transformation.

c. Find the matrix for T relative to the bases $\{1, t, t^2\}$ and $\{1, t, t^2, t^3\}$.

26

Assume the mapping $T : \mathbb{P}_2 \to \mathbb{P}_2$ defined by

$$T(a_0 + a_1t + a_2t^2) = 3a_0 + (5a_0 - 2a_1)t + (4a_1 + a_2)t^2$$

is linear. Find the matrix representation of T relative to the basis $\mathcal{B} = \{1, t, t^2\}$.

27

Define $T : \mathbb{P}_3 \to \mathbb{R}^4$ by $T(\mathbf{p}) = \begin{bmatrix} \mathbf{p}(-2) \\ \mathbf{p}(3) \\ \mathbf{p}(1) \\ \mathbf{p}(0) \end{bmatrix}$.

a. Show that T is a linear transformation.

b. Find the matrix for T relative to the basis $\{1, t, t^2, t^3\}$ for $\mathbb{P}_3$ and the standard basis for $\mathbb{R}^4$.

28

Let A be a 2×2 matrix with eigenvalues -3 and -1 and corresponding eigenvectors $\mathbf{v}_1 = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$ and $\mathbf{v}_2 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$. Let $\mathbf{x}(t)$ be the position of a particle at time t. Solve the initial value problem $\mathbf{x}' = A\mathbf{x}, \mathbf{x}(0) = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$.

29

construct the general solution of $\mathbf{x}' = A\mathbf{x}$

$A = \begin{bmatrix} -3 & 2 \\ -1 & -1 \end{bmatrix}$, $\begin{bmatrix} -7 & 10 \\ -4 & 5 \end{bmatrix}$

30

Compute the orthogonal projection of $\begin{bmatrix} 1 \\ 7 \end{bmatrix}$ onto the line through $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$ and the origin.

DSE-1E/A ANALYTICAL SOLID GEOMETRY BS: 506

Theory: 3 credits and Practicals: 1 credits
Theory: 3 hours /week and Practicals: 2 hours /week

Objective: Students learn to describe some of the surfaces by using analytical geometry.

Outcome: Students understand the beautiful interplay between algebra and geometry.

Unit I

Sphere: Definition-The Sphere Through Four Given Points-Equations of a Circle-

Intersection of a Sphere and a Line-Equation of a Tangent Plane-Angle of Intersection

of Two Spheres-Radical Plane

Unit II

Cones and Cylinders: Definition-Condition that the General Equation of second degree Represents a Cone-Cone and a Plane through its Vertex –Intersection of a Line with a Cone- The Right Circular Cone-The Cylinder- The Right Circular Cylinder

Unit III

The Conicoid: The General Equation of the Second Degree-Intersection of Line with a Conicoid-Plane of contact-Enveloping Cone and Cylinder

Text : Shanti Narayan and P K Mittal , *Analytical Solid Geometry (17e)*

References: Khaleel Ahmed , *Analytical Solid Geometry*

S L Loney, *Solid Geometry*

Smith and Minton, *Calculus*

Solid Geometry

Practicals Question Bank

UNIT-I

1

Find the equation of the sphere through the four points
$(4, -1, 2), (0, -2, 3), (1, -5, -1), (2, 0, 1)$.

2

Find the equation of the sphere through the four points
$(0, 0, 0), (-a, b, c), (a, -b, c), (a, b, -c)$

3

Find the centre and the radius of the circle
$x+2y+2z=15,\ x^2+y^2+z^2-2y-4z=11.$

4

Show that the following points are concyclic :—
(*i*) $(5, 0, 2), (2, -6, 0), (7, -3, 8), (4, -9, 6)$.
(*ii*) $(-8, 5, 2), (-5, 2, 2), (-7, 6, 6), (-4, 3, 6)$.

5

Find the centres of the two spheres which touch the plane
$$4x+3y=47$$
at the point $(8, 5, 4)$ and which touch the sphere
$$x^2+y^2+z^2=1.$$

6

Show that the spheres
$$x^2+y^2+z^2=25$$
$$x^2+y^2+z^2-24x-40y-18z+225=0$$
touch externally and find the point of the contact.

7

Find the equation of the sphere that passes through the two points
$$(0, 3, 0), (-2, -1, -4)$$
and cuts orthogonally the two spheres
$$x^2+y^2+z^2+x-3z-2=0,\ 2(x^2+y^2+z^2)+x+3y+4=0.$$

8

Find the limiting points of the co-axal system of spheres
$$x^2+y^2+z^2-20x+30y-40z+29+\lambda(2x-3y+4z)=0.$$

9

Find the equations to the two spheres of the co-axal system
$$x^2+y^2+z^2-5+\lambda(2x+y+3z-3)=0,$$
which touch the plane
$$3x+4y=15.$$

10

Show that the radical planes of the sphere of a co-axal system and of any given sphere pass through a line.

UNIT-II

11

Find the equation of the cone whose vertex is the point $(1, 1, 0)$ and whose guiding curve is
$$y=0,\ x^2+z^2=4.$$

12

The section of a cone whose vertex is P and guiding curve the ellipse $x^2/a^2+y^2/b^2=1,\ z=0$ by the plane $x=0$ is a rectangular hyperbola. Show that the locus of P is
$$\frac{x^2}{a^2}+\frac{y^2+z^2}{b^2}=1.$$

13

Find the enveloping cone of the sphere
$$x^2+y^2+z^2-2x+4z=1$$
with its vertex at $(1, 1, 1)$.

14

Find the equation of the quadric cone whose vertex is at the origin and which passes through the curve given by the equations

$$ax^2+by^2+cz^2=1,\ lx+my+nz=p.$$

15

Find the equation of the cone with vertex at the origin and direction cosines of its generators satisfying the relation

$$3l^2-4m^2+5n^2=0.$$

16

Find the equation of the cylinder whose generators are parallel to

$$x=-\tfrac{1}{2}y=\tfrac{1}{3}z$$

and whose guiding curve is the ellipse

$$x^2+2y^2=1,\ z=3.$$

17

Find the equation of the right circular cylinder of radius 2 whose axis is the line

$$(x-1)/2=(y-2)=(z-3)/2.$$

18

The axis of a right circular cylinder of radius 2 is

$$\frac{x-1}{2}=\frac{y}{3}=\frac{z-3}{1};$$

show that its equation is

$$10x^2+5y^2+13z^2-12xy-6yz-4zx-8x+30y-74z+59=0.$$

19

Find the equation of the circular cylinder whose guiding circle is

$$x^2+y^2+z^2-9=0,\ x-y+z=3.$$

20

Obtain the equation of the right circular cylinder described on the circle through the three points (1, 0, 0), (0, 1, 0), (0, 0, 1) as guiding circle.

UNIT-III

21

Find the points of intersection of the line

$$-\tfrac{1}{3}(x+5)=(y-4)=\tfrac{1}{7}(z-11)$$

with the conicoid

$$12x^2-17y^2+7z^2=7.$$

22

Find the equations to the tangent planes to

$$7x^2-3y^2-z^2+21=0,$$

which pass through the line,

$$7x-6y+9=3,\ z=3.$$

23

Obtain the tangent planes to the ellipsoid

$$x^2/a^2+y^2/b^2+z^2/c^2=1,$$

which are parallel to the plane

$$lx+my+nz=0.$$

24

Show that the plane $3x+12y-6z-17=0$ touches the conicoid $3x^2-6y^2+9z^2+17=0$, and find the point of contact.

25

Find the equations to the tangent planes to the surface

$$4x^2-5y^2+7z^2+13=0,$$

26

Find the equations to the tangent planes to the surface

$$4x^2-5y^2+7z^2+13=0,$$

parallel to the plane

$$4x+20y-21z=0.$$

Find their points of contact also.

27

Find the locus of the perpendiculars from the origin to the tangent planes to the surface

$$x^2/a^2+y^2/b^2+z^2/c^2=1$$

which cut off from its axes intercepts the sum of whose reciprocals is equal to a constant $1/k$.

28

If the section of the enveloping cone of the ellipsoid

$$x^2/a^2+y^2/b^2+z^2/c^2=1,$$

whose vertex is P by the plane $z=0$ is a rectangular hyperbola, show that the locus of P is

$$\frac{x^2+y^2}{a^2+b^2}+\frac{z^2}{c^2}=1.$$

29

Find the locus of points from which three mutually perpendicular tangent lines can be drawn to the conicoid $ax^2+by^2+cz^2=1$.

30

$P(1, 3, 2)$ is a point on the conicoid,

$$x^2-2y^2+3z^2+5=0.$$

Find the locus of the mid-points of chords drawn parallel to OP.

DSE-1E/B INTEGRAL CALCULUS BS: 506

Theory: 3 credits and Practicals: 1 credits
Theory: 3 hours /week and Practicals: 2 hours /week

Objective: Techniques of multiple integrals will be taught.

Outcome: Students will come to know about its applications in finding areas and volumes of some solids.

Unit I

Areas and Volumes: Double Integrals-Double Integrals over a Rectangle-Double Integrals over General Regions in the Plane-Changing the order of Integration

Unit II

Triple Integrals: The Integrals over a Box- Elementary Regions in Space-Triple Integrals in General

Unit III

Change of Variables: Coordinate Transformations-Change of Variables in Triple Integrals

Text: Susan Jane Colley, *Vector Calculus(4e)*

References: Smith and Minton , *Calculus*

Shanti Narayan and Mittal*, Integral calculus*

Ulrich L. Rohde , G. C. Jain , Ajay K. Poddar and A. K. Ghosh, *Introduction to Integral Calculus*

Integral Calculus
Practicals Question Bank

Unit-I

1. Let $R = [-3, 3] \times [-2, 2]$. Without explicitly evaluating any iterated integrals, determine the value of $\iint_R (x^5 + 2y)\,dA$.

2. Integrate the function $f(x, y) = 3xy$ over the region bounded by $y = 32x^3$ and $y = \sqrt{x}$.

3. Integrate the function $f(x, y) = x + y$ over the region bounded by $x + y = 2$ and $y^2 - 2y - x = 0$.

4. Evaluate $\iint_D xy\,dA$, where D is the region bounded by $x = y^3$ and $y = x^2$.

5. Evaluate $\iint_D e^{x^2}\,dA$, where D is the triangular region with vertices $(0, 0)$, $(1, 0)$, and $(1, 1)$.

6. Evaluate $\iint_D 3y\,dA$, where D is the region bounded by $xy^2 = 1$, $y = x$, $x = 0$, and $y = 3$.

7. Evaluate $\iint_D (x - 2y)\,dA$, where D is the region bounded by $y = x^2 + 2$ and $y = 2x^2 - 2$.

8. Evaluate $\iint_D (x^2 + y^2)\,dA$, where D is the region in the first quadrant bounded by $y = x$, $y = 3x$, and $xy = 3$.

9. Consider the integral

$$\int_0^2 \int_{x^2}^{2x} (2x + 1)\,dy\,dx.$$

   a) Evaluate this integral.

   b) Sketch the region of integration.

   c) Write an equivalent iterated integral with the order of integration reversed. Evaluate this new integral and check that your answer agrees with part (a).

10. Find the volume of the region under the graph of

$$f(x, y) = 2 - |x| - |y|$$

and above the xy-plane.

Unit-II

Integrate the following over the indicated region W.

11. $f(x, y, z) = 2x - y + z$; W is the region bounded by the cylinder $z = y^2$, the xy-plane, and the planes $x = 0, x = 1, y = -2, y = 2$.

12. $f(x, y, z) = y$; W is the region bounded by the plane $x + y + z = 2$, the cylinder $x^2 + z^2 = 1$, and $y = 0$.

13. $f(x, y, z) = 8xyz$; W is the region bounded by the cylinder $y = x^2$, the plane $y + z = 9$, and the xy-plane.

14. $f(x, y, z) = z$; W is the region in the first octant bounded by the cylinder $y^2 + z^2 = 9$ and the planes $y = x, x = 0$, and $z = 0$.

15. $f(x, y, z) = 1 - z^2$; W is the tetrahedron with vertices $(0, 0, 0), (1, 0, 0), (0, 2, 0)$, and $(0, 0, 3)$.

16. $f(x, y, z) = 3x$; W is the region in the first octant bounded by $z = x^2 + y^2, x = 0, y = 0$, and $z = 4$.

17. $f(x, y, z) = x + y$; W is the region bounded by the cylinder $x^2 + 3z^2 = 9$ and the planes $y = 0$, $x + y = 3$.

18. $f(x, y, z) = z$; W is the region bounded by $z = 0$, $x^2 + 4y^2 = 4$, and $z = x + 2$.

Unit-III

19. $f(x, y, z) = 4x + y$; W is the region bounded by $x = y^2, y = z, x = y$, and $z = 0$.

20. $f(x, y, z) = x$; W is the region in the first octant bounded by $z = x^2 + 2y^2$, $z = 6 - x^2 - y^2$, $x = 0$, and $y = 0$.

Let $\mathbf{T}(u, v) = (3u, -v)$.

21. (a) Write $\mathbf{T}(u, v)$ as $A \begin{bmatrix} u \\ v \end{bmatrix}$ for a suitable matrix A.

22. (b) Describe the image $D = \mathbf{T}(D^*)$, where D^* is the unit square $[0, 1] \times [0, 1]$.

23. Determine the value of

$$\iint_D \sqrt{\frac{x + y}{x - 2y}}\, dA,$$

where D is the region in $\mathbf{R}^2$ enclosed by the lines

24. Evaluate

$$\iint_D \frac{(2x + y - 3)^2}{(2y - x + 6)^2}\, dx\, dy,$$

where D is the square with vertices $(0, 0)$, $(2, 1)$, $(3, -1)$, and $(1, -2)$. (Hint: First sketch D and find the equations of its sides.)

25. Evaluate

$$\iint_D \cos(x^2 + y^2)\, dA,$$

where D is the shaded region in Figure 5.106.

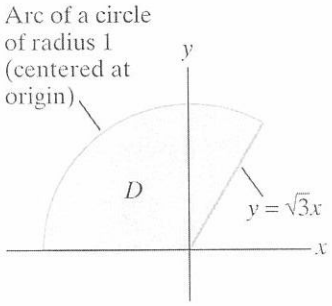

Figure 5.106 The region D of Exercise 25.

26. Evaluate

$$\iint_D \frac{1}{\sqrt{4 - x^2 - y^2}}\, dA,$$

where D is the disk of radius 1 with center at $(0, 1)$. (Be careful when you describe D.)

27. Determine the value of $\iiint_W \frac{z}{\sqrt{x^2 + y^2}}\, dV$, where W is the solid region bounded by the plane $z = 12$ and the paraboloid $z = 2x^2 + 2y^2 - 6$.

DSC-1F NUMERICAL ANALYSIS BS: 603

Theory: 3 credits and Practicals: 1 credits
Theory: 3 hours /week and Practicals: 2 hours /week

Objective: Students will be made to understand some methods of numerical analysis.

Outcome: Students realize the importance of the subject in solving some problems of algebra and calculus.

Unit – I

Solutions of Equations in One Variable : The Bisection Method - Fixed-Point Iteration - Newton's Method and Its Extensions - Error Analysis for Iterative Methods - Accelerating Convergence - Zeros of Polynomials and Müller's Method - Survey of Methods and Software

Unit – II

Interpolation and Polynomial Approximation: Interpolation and the Lagrange Polynomial - Data Approximation and Neville's Method - Divided Differences - Hermite Interpolation - Cubic Spline Interpolation

Unit – III

Numerical Differentiation and Integration: Numerical Differentiation - Richardson's Extrapolation - Elements of Numerical Integration- Composite Numerical Integration - Romberg Integration - Adaptive Quadrature Methods - Gaussian Quadrature

Text : Richard L. Burden and J. Douglas Faires, *Numerical Analysis (9e)*

References: M K Jain, S R K Iyengar and R k Jain, *Numerical Methods for Scientific and Engineering computation*

B.Bradie*, A Friendly introduction to Numerical Analysis*

Numerical Analysis

Practicals Question Bank

UNIT-I

1

Use the Bisection method to find p_3 for $f(x) = \sqrt{x} - \cos x$ on $[0, 1]$.

2

Let $f(x) = 3(x+1)(x-\frac{1}{2})(x-1)$. Use the Bisection method on the following intervals to find p_3.

a. $[-2, 1.5]$ **b.** $[-1.25, 2.5]$

3

Use the Bisection method to find solutions accurate to within 10^{-5} for the following problems.

a. $x - 2^{-x} = 0$ for $0 \le x \le 1$

b. $e^x - x^2 + 3x - 2 = 0$ for $0 \le x \le 1$

c. $2x\cos(2x) - (x+1)^2 = 0$ for $-3 \le x \le -2$ and $-1 \le x \le 0$

4

1. Use algebraic manipulation to show that each of the following functions has a fixed point at p precisely when $f(p) = 0$, where $f(x) = x^4 + 2x^2 - x - 3$.

a. $g_1(x) = \left(3 + x - 2x^2\right)^{1/4}$ **b.** $g_2(x) = \left(\dfrac{x + 3 - x^4}{2}\right)^{1/2}$

5

Use a fixed-point iteration method to determine a solution accurate to within 10^{-2} for $x^4 - 3x^2 - 3 = 0$ on [1, 2]. Use $p_0 = 1$.

6

Use a fixed-point iteration method to determine a solution accurate to within 10^{-2} for $x^3 - x - 1 = 0$ on [1, 2]. Use $p_0 = 1$.

7

Use a fixed-point iteration method to find an approximation to $\sqrt{3}$ that is accurate to within 10^{-4}.

8

The equation $x^2 - 10\cos x = 0$ has two solutions, ± 1.3793646. Use Newton's method to approximate the solutions to within 10^{-5} with the following values of p_0.

a. $p_0 = -100$ **b.** $p_0 = -50$ **c.** $p_0 = -25$

d. $p_0 = 25$ **e.** $p_0 = 50$ **f.** $p_0 = 100$

9

The equation $4x^2 - e^x - e^{-x} = 0$ has two positive solutions x_1 and x_2. Use Newton's method to approximate the solution to within 10^{-5} with the following values of p_0.

10

Use each of the following methods to find a solution in $[0.1, 1]$ accurate to within 10^{-4} for

$$600x^4 - 550x^3 + 200x^2 - 20x - 1 = 0.$$

a. Bisection method **c.** Secant method **e.** Müller's method

b. Newton's method **d.** method of False Position

UNIT-II

11

For the given functions $f(x)$, let $x_0 = 0$, $x_1 = 0.6$, and $x_2 = 0.9$. Construct interpolation polynomials of degree at most one and at most two to approximate $f(0.45)$, and find the absolute error.

a. $f(x) = \cos x$ **c.** $f(x) = \ln(x + 1)$

12

For the given functions $f(x)$, let $x_0 = 1$, $x_1 = 1.25$, and $x_2 = 1.6$. Construct interpolation polynomials of degree at most one and at most two to approximate $f(1.4)$, and find the absolute error.

a. $f(x) = \sin \pi x$ **c.** $f(x) = \log_{10}(3x - 1)$

13

Let $P_3(x)$ be the interpolating polynomial for the data $(0, 0)$, $(0.5, y)$, $(1, 3)$, and $(2, 2)$. The coefficient of x^3 in $P_3(x)$ is 6. Find y.

14

Neville's method is used to approximate $f(0.4)$, giving the following table.

$x_0 = 0$	$P_0 = 1$			
$x_1 = 0.25$	$P_1 = 2$	$P_{01} = 2.6$		
$x_2 = 0.5$	P_2	$P_{1,2}$	$P_{0,1,2}$	
$x_3 = 0.75$	$P_3 = 8$	$P_{2,3} = 2.4$	$P_{1,2,3} = 2.96$	$P_{0,1,2,3} = 3.016$

Determine $P_2 = f(0.5)$.

15

Neville's method is used to approximate $f(0.5)$, giving the following table.

$x_0 = 0$	$P_0 = 0$		
$x_1 = 0.4$	$P_1 = 2.8$	$P_{0,1} = 3.5$	
$x_2 = 0.7$	P_2	$P_{1,2}$	$P_{0,1,2} = \frac{27}{7}$

Determine $P_2 = f(0.7)$.

16

Neville's Algorithm is used to approximate $f(0)$ using $f(-2)$, $f(-1)$, $f(1)$, and $f(2)$. Suppose $f(-1)$ was overstated by 2 and $f(1)$ was understated by 3. Determine the error in the original calculation of the value of the interpolating polynomial to approximate $f(0)$.

17

Use the Newton forward-difference formula to construct interpolating polynomials of degree one, two, and three for the following data. Approximate the specified value using each of the polynomials.

a. $f(0.43)$ if $f(0) = 1$, $f(0.25) = 1.64872$, $f(0.5) = 2.71828$, $f(0.75) = 4.48169$

b. $f(0.18)$ if $f(0.1) = -0.29004986$, $f(0.2) = -0.56079734$, $f(0.3) = -0.81401972$, $f(0.4) = -1.0526302$

18

Use the Newton backward-difference formula to construct interpolating polynomials of degree one, two, and three for the following data. Approximate the specified value using each of the polynomials.

a. $f(0.43)$ if $f(0) = 1$, $f(0.25) = 1.64872$, $f(0.5) = 2.71828$, $f(0.75) = 4.48169$

b. $f(0.25)$ if $f(-1) = 0.86199480$, $f(-0.5) = 0.95802009$, $f(0) = 1.0986123$, $f(0.5) = 1.2943767$

19

Determine the natural cubic spline S that interpolates the data $f(0) = 0$, $f(1) = 1$, and $f(2) = 2$.

20

Determine the clamped cubic spline s that interpolates the data $f(0) = 0$, $f(1) = 1$, $f(2) = 2$ and satisfies $s'(0) = s'(2) = 1$.

UNIT-III

21

Use the forward-difference formulas and backward-difference formulas to determine each missing entry in the following tables.

a.

x	$f(x)$	$f'(x)$
0.5	0.4794	
0.6	0.5646	
0.7	0.6442	

b.

x	$f(x)$	$f'(x)$
0.0	0.00000	
0.2	0.74140	
0.4	1.3718	

22

Derive a method for approximating $f'''(x_0)$ whose error term is of order h^2 by expanding the function f in a fourth Taylor polynomial about x_0 and evaluating at $x_0 \pm h$ and $x_0 \pm 2h$.

23

The forward-difference formula can be expressed as

$$f'(x_0) = \frac{1}{h}[f(x_0 + h) - f(x_0)] - \frac{h}{2}f''(x_0) - \frac{h^2}{6}f'''(x_0) + O(h^3).$$

Use extrapolation to derive an $O(h^3)$ formula for $f'(x_0)$.

24

Show that

$$\lim_{h \to 0} \left(\frac{2+h}{2-h} \right)^{1/h} = e.$$

25

Approximate the following integrals using the Trapezoidal rule.

a. $\int_{0.5}^{1} x^4 \, dx$

b. $\int_{0}^{0.5} \frac{2}{x-4} \, dx$

c. $\int_{1}^{1.5} x^2 \ln x \, dx$

d. $\int_{0}^{1} x^2 e^{-x} \, dx$

26

The Trapezoidal rule applied to $\int_0^2 f(x) \, dx$ gives the value 5, and the Midpoint rule gives the value 4. What value does Simpson's rule give?

27

The quadrature formula $\int_0^2 f(x) \, dx = c_0 f(0) + c_1 f(1) + c_2 f(2)$ is exact for all polynomials of degree less than or equal to 2. Determine c_0, c_1, and c_2.

28

Romberg integration is used to approximate

$$\int_2^3 f(x) \, dx.$$

If $f(2) = 0.51342$, $f(3) = 0.36788$, $R_{31} = 0.43687$, and $R_{33} = 0.43662$, find $f(2.5)$.

29

Use Romberg integration to compute $R_{3,3}$ for the following integrals.

a. $\int_{1}^{1.5} x^2 \ln x \, dx$

b. $\int_{0}^{1} x^2 e^{-x} \, dx$

30

Use Romberg integration to compute $R_{3,3}$ for the following integrals.

a. $\int_{-1}^{1} (\cos x)^2 \, dx$

b. $\int_{-0.75}^{0.75} x \ln(x+1) \, dx$

DSE-1F/A COMPLEX ANALYSIS BS: 606

Theory: 3 credits and Practicals: 1 credits
Theory: 3 hours /week and Practicals: 2 hours /week

Objective: Analytic Functions, contour integration and calculus of residues will be introduced to the students.

Outcome: Students realize calculus of residues is one of the power tools in solvng some problems, like improper and definite integrals, effortlessly.

Unit – I

Regions in the Complex Plane - Analytic Functions - Functions of a Complex Variable - Mappings - Mappings by the Exponential Function - Limits - Theorems on Limits - Limits Involving the Point at Infinity - Continuity - Derivatives - Differentiation Formulas - Cauchy–Riemann Equations - Sufficient Conditions for Differentiability - Polar Coordinates-Harmonic Functions

Elementary Functions: The Exponential Function - The Logarithmic Function - Branches and Derivatives of Logarithms - Some Identities Involving Logarithms Complex Exponents - Trigonometric Functions - Hyperbolic Functions

Unit – II

Integrals: Derivatives of Functions w(t) - Definite Integrals of Functions w(t) - Contours - Contour Integrals - Some Examples - Examples with Branch Cuts - Upper Bounds for Moduli of Contour Integrals -Antiderivatives

Unit – III

Cauchy–Goursat Theorem - Proof of the Theorem - Simply Connected Domains - Multiply Connected Domains - Cauchy Integral Formula - An Extension of the Cauchy Integral Formula - Some Consequences of the Extension - Liouville's Theorem and the Fundamental Theorem of Algebra- Maximum Modulus Principle

Text: James Ward Brown and Ruel V. Churchill, *Complex Variables and Applications (8e)*

References: Joseph Bak and Donald J Newman, Complex *analysis*

Lars V Ahlfors, *Complex Analysis*

S.Lang, Complex *Analysis*

B Choudary, *The Elements Complex Analysis*

Complex Analysis
Practicals Question Bank

UNIT-I

1

Sketch the following sets and determine which are domains:

(a) $|z-2+i| \le 1$; *(b)* $|2z+3| > 4$;
(c) $\operatorname{Im} z > 1$; *(d)* $\operatorname{Im} z = 1$;

2

Sketch the region onto which the sector $r \le 1, 0 \le \theta \le \pi/4$ is mapped by the transformation *(a)* $w = z^2$; *(b)* $w = z^3$; *(c)* $w = z^4$.

3

find all roots of the equation

(a) $\sinh z = i$; *(b)* $\cosh z = \dfrac{1}{2}$.

4

Find all values of z such that

(a) $e^z = -2$; *(b)* $e^z = 1 + \sqrt{3}i$; *(c)* $\exp(2z-1) = 1$.

,

5

Show that

$$\lim_{z \to z_0} f(z)g(z) = 0 \quad \text{if} \quad \lim_{z \to z_0} f(z) = 0$$

and if there exists a positive number M such that $|g(z)| \le M$ for all z in some neighborhood of z_0.

6

show that $f'(z)$ does not exist at any point if *(a)* $f(z) = \overline{z}$; *(b)* $f(z) = z - \overline{z}$; *(c)* $f(z) = 2x + ixy^2$; *(d)* $f(z) = e^x e^{-iy}$.

7

verify that each of these functions is entire:

(a) $f(z) = 3x + y + i(3y - x)$; *(b)* $f(z) = \sin x \cosh y + i \cos x \sinh y$;
(c) $f(z) = e^{-y} \sin x - ie^{-y} \cos x$; *(d)* $f(z) = (z^2 - 2)e^{-x}e^{-iy}$.

8

State why a composition of two entire functions is entire. Also, state why any *linear combination* $c_1 f_1(z) + c_2 f_2(z)$ of two entire functions, where c_1 and c_2 are complex constants, is entire.

9

Show that $u(x, y)$ is harmonic in some domain and find a harmonic conjugate $v(x, y)$ when

(a) $u(x, y) = 2x(1 - y)$; *(b)* $u(x, y) = 2x - x^3 + 3xy^2$;
(c) $u(x, y) = \sinh x \sin y$; *(d)* $u(x, y) = y/(x^2 + y^2)$.

10

Show that if v and V are harmonic conjugates of $u(x, y)$ in a domain D, then $v(x, y)$ and $V(x, y)$ can differ at most by an additive constant.

UNIT-II

11

evaluate

$$\int_C f(z)\, dz.$$

$f(z) = (z+2)/z$ and C is

(a) the semicircle $z = 2e^{i\theta}$ $(0 \le \theta \le \pi)$;
(b) the semicircle $z = 2e^{i\theta}$ $(\pi \le \theta \le 2\pi)$;
(c) the circle $z = 2e^{i\theta}$ $(0 \le \theta \le 2\pi)$.

12

$f(z)$ is defined by means of the equations

$$f(z) = \begin{cases} 1 & \text{when } y < 0, \\ 4y & \text{when } y > 0, \end{cases}$$

and C is the arc from $z = -1 - i$ to $z = 1 + i$ along the curve $y = x^3$.

13

Let C denote the line segment from $z = i$ to $z = 1$. By observing that of all the points on that line segment, the midpoint is the closest to the origin, show that

$$\left| \int_C \frac{dz}{z^4} \right| \le 4\sqrt{2}$$

without evaluating the integral.

14

Let C_R denote the upper half of the circle $|z| = R$ $(R > 2)$, taken in the counterclockwise direction. Show that

$$\left| \int_{C_R} \frac{2z^2 - 1}{z^4 + 5z^2 + 4}\, dz \right| \le \frac{\pi R(2R^2 + 1)}{(R^2 - 1)(R^2 - 4)}.$$

Then, by dividing the numerator and denominator on the right here by R^4, show that the value of the integral tends to zero as R tends to infinity.

15

By finding an antiderivative, evaluate each of these integrals, where the path is any contour between the indicated limits of integration:

(a) $\displaystyle\int_i^{i/2} e^{\pi z}\, dz$; *(b)* $\displaystyle\int_0^{\pi+2i} \cos\left(\frac{z}{2}\right) dz$; *(c)* $\displaystyle\int_1^3 (z-2)^3\, dz$.

16

Use an antiderivative to show that for every contour C extending from a point z_1 to a point z_2,

$$\int_C z^n\, dz = \frac{1}{n+1}(z_2^{n+1} - z_1^{n+1}) \qquad (n = 0, 1, 2, \ldots).$$

17

Let C_0 and C denote the circles

$$z = z_0 + Re^{i\theta} \ (-\pi \le \theta \le \pi) \quad \text{and} \quad z = Re^{i\theta} \ (-\pi \le \theta \le \pi),$$

respectively.

(a) Use these parametric representations to show that

$$\int_{C_0} f(z - z_0)\, dz = \int_C f(z)\, dz$$

18

evaluate the integral

$$\int_C z^m \overline{z}^n dz,$$

where m and n are integers and C is the unit circle $|z| = 1$, taken counterclockwise.

19

$f(z) = 1$ and C is an arbitrary contour from any fixed point z_1 to any fixed point z_2 in the z plane.

evaluate

$$\int_C f(z)\ dz.$$

20

$f(z) = \pi \exp(\pi \overline{z})$ and C is the boundary of the square with vertices at the points 0, 1, $1 + i$, and i, the orientation of C being in the counterclockwise direction.

evaluate

$$\int_C f(z)\ dz.$$

UNIT-III

21

Let C denote the positively oriented boundary of the square whose sides lie along the lines $x = \pm 2$ and $y = \pm 2$. Evaluate each of these integrals:

(a) $\displaystyle\int_C \frac{e^{-z}\, dz}{z - (\pi i/2)}$; *(b)* $\displaystyle\int_C \frac{\cos z}{z(z^2 + 8)}\, dz$; *(c)* $\displaystyle\int_C \frac{z\, dz}{2z + 1}$;

22

Find the value of the integral of $g(z)$ around the circle $|z - i| = 2$ in the positive sense when

(a) $g(z) = \dfrac{1}{z^2 + 4}$; *(b)* $g(z) = \dfrac{1}{(z^2 + 4)^2}$.

23

Let C be the circle $|z| = 3$, described in the positive sense. Show that if

$$g(z) = \int_C \frac{2s^2 - s - 2}{s - z}\, ds \qquad (|z| \ne 3),$$

then $g(2) = 8\pi i$. What is the value of $g(z)$ when $|z| > 3$?

24

Let C be any simple closed contour, described in the positive sense in the z plane, and write

$$g(z) = \int_C \frac{s^3 + 2s}{(s - z)^3}\, ds.$$

Show that $g(z) = 6\pi i z$ when z is inside C and that $g(z) = 0$ when z is outside.

25

Show that if f is analytic within and on a simple closed contour C and z_0 is not on C, then

$$\int_C \frac{f'(z)\,dz}{z - z_0} = \int_C \frac{f(z)\,dz}{(z - z_0)^2}.$$

26

Let C be the unit circle $z = e^{i\theta}(-\pi \le \theta \le \pi)$. First show that for any real constant a,

$$\int_C \frac{e^{az}}{z}\,dz = 2\pi i.$$

Then write this integral in terms of θ to derive the integration formula

$$\int_0^\pi e^{a\cos\theta}\cos(a\sin\theta)\,d\theta = \pi.$$

27

Suppose that $f(z)$ is entire and that the harmonic function $u(x, y) = \mathrm{Re}[f(z)]$ has an upper bound u_0; that is, $u(x, y) \le u_0$ for all points (x, y) in the xy plane. Show that $u(x, y)$ must be constant throughout the plane.

28

Let a function f be continuous on a closed bounded region R, and let it be analytic and not constant throughout the interior of R. Assuming that $f(z) \neq 0$ anywhere in R, prove that $|f(z)|$ has a *minimum value* m in R which occurs on the boundary of R and never in the interior. Do this by applying the corresponding result for maximum

29

Let the function $f(z) = u(x, y) + iv(x, y)$ be continuous on a closed bounded region R, and suppose that it is analytic and not constant in the interior of R. Show that the component function $v(x, y)$ has maximum and minimum values in R which are reached on the boundary of R and never in the interior, where it is harmonic.

30

Let f be the function $f(z) = e^z$ and R the rectangular region $0 \le x \le 1, 0 \le y \le \pi$. Illustrate results in Sec. 54 and Exercise 6 by finding points in R where the component function $u(x, y) = \mathrm{Re}[f(z)]$ reaches its maximum and minimum values.

DSE-1F/B VECTOR CALCULUS BS: 606

Theory: 3 credits and Practicals: 1 credits

Theory: 3 hours /week and Practicals: 2 hours /week

Objective: Concepts like gradient, divergence, curl and their physical relevance will be taught.

Outcome: Students realize the way vector calculus is used to addresses some of the problems of physics.

Unit I

Line Integrals: Introductory Example : Work done against a Force-Evaluation of Line Integrals-Conservative Vector Fields-Surface Integrals: Introductory Example : Flow Through a Pipe-Evaluation of Surface Integrals

Unit II

Volume Integrals: Evaluation of Volume integrals

Gradient, Divergence and Curl: Partial differentiation and Taylor series-Partial differentiation-Taylor series in more than one variable-Gradient of a scalar field-Gradients, conservative fields and potentials-Physical applications of the gradient

Unit III

Divergence of a vector field -Physical interpretation of divergence-Laplacian of a scalar field-Curl of a vector field-Physical interpretation of curl-Relation between curl and rotation-Curl and conservative vector fields.

Text: P.C. Matthews, Vector *Calculus.*

References: G.B. Thomas and R.L. Finney, *Calculus*
H. Anton, I. Bivens and S. Davis, *Calculus*

Vector Calculus

Practicals Question Bank

UNIT-I

1

Evaluate the line integral

$$\int_C \boldsymbol{F} \times \boldsymbol{dr},$$

where $\boldsymbol{F}$ is the vector field $(y, x, 0)$ and C is the curve $y = \sin x$, $z = 0$, between $x = 0$ and $x = \pi$.

2

Evaluate the line integral

$$\int_C x + y^2 \, \boldsymbol{dr},$$

where C is the parabola $y = x^2$ in the plane $z = 0$ connecting the points $(0, 0, 0)$ and $(1, 1, 0)$.

3

Evaluate the line integral

$$\int_C \boldsymbol{F} \cdot \boldsymbol{dr} \qquad \text{where} \qquad \boldsymbol{F} = (5z^2, 2x, x + 2y)$$

and the curve C is given by $x = t$, $y = t^2$, $z = t^2$, $0 \leq t \leq 1$.

4

Find the line integral of the vector field $\boldsymbol{u} = (y^2, x, z)$ along the curve given by $z = y = \mathrm{e}^x$ from $x = 0$ to $x = 1$.

5

Evaluate the surface integral of $\boldsymbol{u} = (y, x^2, z^2)$, over the surface S, where S is the triangular surface on $x = 0$ with $y \geq 0$, $z \geq 0$, $y + z \leq 1$, with the normal $\boldsymbol{n}$ directed in the positive x direction.

6

Find the surface integral of $\boldsymbol{u} = \boldsymbol{r}$ over the part of the paraboloid $z = 1 - x^2 - y^2$ with $z > 0$, with the normal pointing upwards.

7

If S is the entire x, y plane, evaluate the integral

$$I = \iint_S \mathrm{e}^{-x^2 - y^2} \, dS,$$

by transforming the integral into polar coordinates.

8

Find the line integral $\oint_C \boldsymbol{r} \times \boldsymbol{dr}$ where the curve C is the ellipse $x^2/a^2 + y^2/b^2 = 1$ taken in an anticlockwise direction. What do you notice about the magnitude of the answer?

9

By considering the line integral of $\boldsymbol{F} = (y, x^2 - x, 0)$ around the square in the x, y plane connecting the four points $(0, 0)$, $(1, 0)$, $(1, 1)$ and $(0, 1)$, show that $\boldsymbol{F}$ cannot be a conservative vector field.

10

Evaluate the line integral of the vector field $\boldsymbol{u} = (xy, z^2, x)$ along the curve given by $x = 1 + t$, $y = 0$, $z = t^2$, $0 \leq t \leq 3$.

UNIT-II

11

A cube $0 \leq x, y, z, \leq 1$ has a variable density given by $\rho = 1 + x + y + z$. What is the total mass of the cube?

12

Find the volume of the tetrahedron with vertices at $(0,0,0)$, $(a,0,0)$, $(0,b,0)$ and $(0,0,c)$.

13

Evaluate the surface integral of $\boldsymbol{u} = (xy, x, x+y)$ over the surface S defined by $z = 0$ with $0 \leq x \leq 1$, $0 \leq y \leq 2$, with the normal $\boldsymbol{n}$ directed in the positive z direction.

14

Find the surface integral of $\boldsymbol{u} = \boldsymbol{r}$ over the surface of the unit cube $0 \leq x, y, z \leq 1$, with $\boldsymbol{n}$ pointing outward.

15

The surface S is defined to be that part of the plane $z = 0$ lying between the curves $y = x^2$ and $x = y^2$. Find the surface integral of $\boldsymbol{u} \cdot \boldsymbol{n}$ over S where $\boldsymbol{u} = (z, xy, x^2)$ and $\boldsymbol{n} = (0,0,1)$.

16

Find the surface integral of $\boldsymbol{u} \cdot \boldsymbol{n}$ over S where S is the part of the surface $z = x + y^2$ with $z < 0$ and $x > -1$, $\boldsymbol{u}$ is the vector field $\boldsymbol{u} = (2y + x, -1, 0)$ and $\boldsymbol{n}$ has a negative z component.

17

Find the volume integral of the scalar field $\phi = x^2 + y^2 + z^2$ over the region V specified by $0 \leq x \leq 1$, $1 \leq y \leq 2$, $0 \leq z \leq 3$.

18

Find the volume of the section of the cylinder $x^2 + y^2 = 1$ that lies between the planes $z = x + 1$ and $z = -x - 1$.

19 Find the unit normal $\boldsymbol{n}$ to the surface $x^2 + y^2 - z = 0$ at the point $(1,1,2)$.

20 Find the gradient of the scalar field $f = xyz$, and evaluate it at the point (1,2,3). Hence find the directional derivative of f at this point in the direction of the vector $(1,1,0)$.

UNIT-III

21

Find the divergence of the vector field $\boldsymbol{u} = \boldsymbol{r}$.

22

The vector field $\boldsymbol{u}$ is defined by $\boldsymbol{u} = (xy, z + x, y)$. Calculate $\boldsymbol{\nabla} \times \boldsymbol{u}$ and find the points where $\boldsymbol{\nabla} \times \boldsymbol{u} = \boldsymbol{0}$.

23

Find the gradient $\boldsymbol{\nabla}\phi$ and the Laplacian $\nabla^2\phi$ for the scalar field $\phi = x^2 + xy + yz^2$.

24

Find the gradient and Laplacian of

$$\phi = \sin(kx)\sin(ly)\exp(\sqrt{k^2 + l^2}z).$$

25

Find the unit normal to the surface $xy^2 + 2yz = 4$ at the point $(-2,2,3)$.

26
For $\phi(x, y, z) = x^2 + y^2 + z^2 + xy - 3x$, find $\nabla\phi$ and find the minimum value of ϕ.
27
Find the equation of the plane which is tangent to the surface $x^2 + y^2 - 2z^3 = 0$ at the point $(1, 1, 1)$.
28
Find both the divergence and the curl of the vector fields
(a) $\boldsymbol{u} = (y, z, x)$;
(b) $\boldsymbol{v} = (xyz, z^2, x - y)$.
29
For what values, if any, of the constants a and b is the vector field $\boldsymbol{u} = (y\cos x + axz, b\sin x + z, x^2 + y)$ irrotational?
30
(a) Show that $\boldsymbol{u} = (y^2 z, -z^2 \sin y + 2xyz, 2z\cos y + y^2 x)$ is irrotational.
(b) Find the corresponding potential function.
(c) Hence find the value of the line integral of $\boldsymbol{u}$ along the curve $x = \sin \pi t/2$, $y = t^2 - t$, $z = t^4$, $0 \leq t \leq 1$.

MOOCs Resources

A set of MOOCs resources for ICT based learning and teaching

NPTEL: nptel.ac.in

COURSERA: www.coursera.org

MITOCW: ocw.mit.edu

ACADEMIC EARTH: www.academicearth.org

EdX : www.edx.org

KHAN ACADEMY : www.khanacademy.org

ALISON: www.alison.com

STANFORD ONLINE: www.online.stanford.edu

VIDEO LECTURES: videolectures.net

INTERACTIVE REAL ANALYSIS: mathcs.org

VISUAL CALCULUS: archives.math.utk.edu/visual.calculus

MOOCS CALCULUS: mooculus.osu.edu

Few Math Softwares

Useful for Classroom teaching: Geogebra (Freeware)

Type setting software: LaTeX

High end commercial softwares: Mathematica , Maple , Matlab

Answering search engine: www.wolframalpha.com

Group theory software: group explorer 2.2 (Freeware)

Visualization software: Mathematics Visualization Toolkit (freeware)

Appendices

ज्ञान विज्ञान विमुक्तये
प्रो. (डॉ.) जसपाल एस. सन्धू
सचिव
Prof. (Dr.) Jaspal S. Sandhu
MBBS, MS (Ortho), DSM, FAIS, FASM, FAFSM, FFIMS, FAMS
Secretary

विश्वविद्यालय अनुदान आयोग
University Grants Commission
(मानव संसाधन विकास मंत्रालय, भारत सरकार)
(Ministry of Human Resource Development, Govt. of India)
बहादुरशाह ज़फ़र मार्ग, नई दिल्ली-110002
Bahadur Shah Zafar Marg, New Delhi-110002
Ph.: 011-23239337, 23236288,
Fax : 011-23238858, email : jssandhu.ugc@nic.in

BY SPEED POST

D.O.No. F. 1-1/2014(Secy) 12th November, 2014

Dear Sir/Madam,

The UGC has embarked on numerous measures to enhance efficiency and excellence in the higher education system in the country. The reforms undertaken in this regard have led to noticeable improvement in the standards of education. However, because of the diversity in the evaluation system followed by different universities in India, students have suffered acceptance of their credentials, at times, across the university system, as well as the employment agencies.

In order to mitigate this procedure, it has been thought that the Choice-Based Credit System (CBCS) proposed by the UGC should be adopted by all the Universities. This would ensure seamless mobility of students across the higher education institutions in the country as well as abroad. The credits earned by the student can be transferred and would be of great value to the students in the event of their seeking migration from one institution to the other.

Even in the universities which have already adopted the CBCS it has come to our notice that there is tremendous diversity in the adoption of the system that inter-university migration of students amongst such universities has also posed problems. Under the situation mentioned, the UGC has formulated Guidelines for adoption of uniform Choice-Based Credit System across all the universities. The Guidelines have been uploaded on the website of the UGC (www.ugc.ac.in).

You are requested that the Guidelines may kindly be accessed from the UGC website and the system introduced in your esteemed university from the academic year 2015-16. All the actions taken in this regard may kindly be communicated to the Secretary, UGC (email: ugc.action@gmail.com).

With kind regards,

Yours sincerely,

(Jaspal S. Sandhu)

The Vice-Chancellors of all Universities.

Appendix-II

UGC GUIDELINES ON ADOPTION OF CHOICE BASED CREDIT SYSTEM

UNIVERSITY GRANTS COMMISSION
BAHADURSHAH ZAFAR MARG NEW
DELHI — 110 002

UGC Guidelines on Adoption of Choice Based Credit System

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1. Preamble

The University Grants Commission (UGC) has initiated several measures to bring equity, efficiency and excellence in the Higher Education System of country. The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems, besides governance and other matters.

The UGC has formulated various regulations and guidelines from time to time to improve the higher education system and maintain minimum standards and quality across the Higher Educational Institutions (HEIs) in India. The academic reforms recommended by the UGC in the recent past have led to overall improvement in the higher education system. However, due to lot of diversity in the system of higher education, there are multiple approaches followed by universities towards examination, evaluation and grading system. While the HEIs must have the flexibility and freedom in designing the examination and evaluation methods that best fits the the curriculum, syllabi and teaching–learning methods, there is a need to devise a sensible system for awarding the grades based on the performance of students. Presently the performance of the students is reported using the conventional system of marks secured in the examinations or grades or both. The conversion from marks to letter grades and the letter grades used vary widely across the HEIs in the country. This creates difficulty for the acadamia and the employers to understand and infer the performance of the students graduating from different universities and colleges based on grades.

The grading system is considered to be better than the conventional marks system and hence it has been followed in the top instutitions in India and abroad. So it is desirable to introduce uniform grading system. This will facilitate student mobility across institutions within and across countries and also enable potential employers to assess the performance of students. To bring in the desired uniformity, in grading system and method for computing the cumulative grade point average (CGPA) based on the performance of students in the examinations, the UGC has formulated these guidelines.

2. Applicability of the Grading System

These guidel

ines shall apply to all undergraduate and postgraduate level degree, diploma and certificate programmes under the credit system awarded by the Central, State and Deemed to be universities in India.

3. Definitions of Key Words:

1. **Academic Year**: Two consecutive (one odd + one even) semesters constitute one academic year.
2. **Choice Based Credit System (CBCS):** The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).
3. **Course**: Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and

learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.

4. **Credit Based Semester System (CBSS)**: Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.
5. **Credit Point**: It is the product of grade point and number of credits for a course.
6. **Credit**: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
7. **Cumulative Grade Point Average (CGPA)**: It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.
8. **Grade Point**: It is a numerical weight allotted to each letter grade on a 10-point scale.
9. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.
10. **Programme**: An educational programme leading to award of a Degree, diploma or certificate.
11. **Semester Grade Point Average (SGPA)**: It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
12. **Semester**: Each semester will consist of 15-18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.
13. **Transcript or Grade Card or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

4. Semester System and Choice Based Credit System

The Indian Higher Education Institutions have been moving from the conventional annual system to semester system. Currently many of the institutions have already introduced the choice based credit system. The semester system accelerates the teaching-learning process and enables vertical and horizontal mobility in learning. The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning, It is desirable that the HEIs move to CBCS and implement the grading system.

5. Types of Courses:

Courses in a programme may be of three kinds: Core, Elective and Foundation.

1. Core Course:-

There may be a Core Course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

2. Elective Course:-

Elective course is a course which can be chosen from a pool of papers. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline/domain
- Nurturing student's proficiency/skill.

An elective may be "Generic Elective" focusing on those courses which add generic proficiency to the students. An elective may be "Discipline centric"or may be chosen from an unrelated discipline. It may be called an "Open Elective."

3. Foundation Course:-

The Foundation Courses may be of two kinds: Compulsory Foundation and Elective foundation. "Compulsory Foundation" courses are the courses based upon the content that leads to Knowledge enhancement. They are mandatory for all disciplines. Elective Foundation courses are value-based and are aimed at man-making education.

6. Examination and Assessment

The HEIs are currently following various methods for examination and assessment suitable for the courses and programmes as approved by their respective statutory bodies. In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. Some of the HEIs convert these marks to letter grades based on absolute or relative grading system and award the grades. There is a marked variation across the colleges and universities in the number of grades, grade points, letter grades used, which creates difficulties in comparing students across the institutions. The UGC recommends the following system to be implemented in awarding the grades and CGPA under the credit based semester system.

6.1. Letter Grades and Grade Points:

i. Two methods -relative grading or absolute grading– have been in vogue for awarding grades in a course. The relative grading is based on the distribution (usually normal distribution) of marks obtained by all the students of the course and the grades are awarded based on a cut-off marks or percentile. Under the absolute grading, the marks are converted to grades based on pre-determined class intervals. To implement the following grading system, the colleges and universities can use any one of the above methods.

ii. The UGC recommends a 10-point grading system with the following letter grades as given below:

Table 1: Grades and Grade Points

Letter Grade	Grade Point

O (Outstanding)	10
A+(Excellent)	9
A(Very Good)	8
B+(Good)	7
B(Above Average)	6
C(Average)	5
P (Pass)	4
F(Fail)	0
Ab (Absent)	0

iii. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

iv. For non credit courses 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

v. The Universities can decide on the grade or percentage of marks required to pass in a course and also the CGPA required to qualify for a degree taking into consideration the recommendations of the statutory professional councils such as AICTE, MCI, BCI, NCTE etc.,

vi. The statutory requirement for eligibility to enter as assistant professor in colleges and universities in the disciplines of arts, science, commerce etc., is a minimum average mark of 50% and 55% in relevant postgraduate degree respectively for reserved and general category. Hence, it is recommended that the cut-off marks for grade B shall not be less than 50% and for grade B+, it should not be less than 55% under the absolute grading system. Similarly cut-off marks shall be fixed for grade B and B+ based on the recommendation of the statutory bodies (AICTE, NCTE etc.,) of the relevant disciplines.

6.2. Fairness in Assessment:

Assessment is an integral part of system of education as it is instrumental in identifying and certifying the academic standards accomplished by a student and projecting them far and wide as an objective and impartial indicator of a student's performance. Thus, it becomes bounden duty of a University to ensure that it is carried out in fair manner. In this regard, UGC recommends the following system of checks and balances which would enable Universities effectively and fairly carry out the process of assessment and examination.

i. In case of at least 50% of core courses offered in different programmes across the disciplines, the assessment of the theoretical component towards the end of the semester should be undertaken by external examiners from outside the university conducting examination, who may be appointed by the competent authority. In such courses, the question papers will be set as well as assessed by external examiners.
ii. In case of the assessment of practical component of such core courses, the team of examiners should be constituted on 50 – 50 % basis. i.e. half of the examiners in the team should be invited from outside the university conducting examination.
iii. In case of the assessment of project reports / thesis / dissertation etc. the work should be undertaken by internal as well as external examiners.

7. Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

SGPA (Si) = $\sum(C_i \times G_i) / \sum C_i$

where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

CGPA = $\sum(Ci \times Si) / \sum Ci$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

8. Illustration of Computation of SGPA and CGPA and Format for Transcripts

i. Computation of SGPA and CGPA

Illustration for **SGPA**

Course	**Credit**	**Grade letter**	**Grade point**	**Credit Point** (Credit x Grade
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139

Thus, **SGPA =139/20 =6.95**

Illustration for **CGPA**

Semester 1	**Semester 2**	**Semester 3**	**Semester 4**
Credit : 20 SGPA:6.9	Credit : 22 SGPA:7.8	Credit : 25 SGPA: 5.6	Credit : 26 SGPA:6.0

Semester 5	**Semester 6**		
Credit : 26 SGPA:6.3	Credit : 25 SGPA: 8.0		

Thus, **CGPA =** $\frac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} =$ **6.73**

ii. Transcript (Format): Based on the above recommendations on Letter grades, grade points and SGPA and CCPA, the HEIs may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

Telangana State Council of Higher Education, Govt.of Telangana

PRAPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN B.Sc. MICROBIOLOGY (2016-17)

FIRST YEAR - **SEMISTER-1**				
Code	Course Title	Course Type	HPW	Credits
BS101	Communication			
BS102	English			
BS103	Second Language			
BS104	**General Microbiology**	DSC-1A	4+2	5
BS105	Optional-II			
BS106	Optional-III			
SEMISTER-2				
BS201	Environmental studies			
BS202	English			
BS203	Second Language			
BS204	**General Microbiology-II**	DSC-1B	4+2	5
BS205	Optional-II			
BS206	Optional-III			
SECOND YEAR-SEMISTER-3				
BS301	**SEC**	SEC-1	2	2
BS302	English			
BS303	Second Language			
BS304	**Microbial Physiology and Enzymology**	DSC-1C	4+2	5
BS305	Optional-II			
BS306	Optional-III			
SEMISTER-4				
BS401	**SEC**	SEC-2	2	2
BS402	English			
BS403	Second Language			
BS404	**Microbial Genetics and Molecular biology**	DSC-1D	4+2	5
BS405	Optional-II			
BS406	Optional-III			
THERD YEAR-SEMISTER-5				
BS501	**SEC**	SEC-3	2	2
BS502	**Generic Elective**	GE-1	2	2
BS503	***APPLIED MICROBIOLOGY***	DSC-1E	3+2	4
BS504	Optional-II			
BS505	Optional-III			
BS506	**A-IMMUNOLOGY**	DSE-1E	3+2	4

	B- PHARMACEUTICAL MICROBIOLOGY			
BS507	Optional-II-A/B/C			
BS508	Optional-III-A/B/C			
SEMISTER-6				
BS601	**SEC**	SEC-4	2	2
BS602	**Generic Elective**	GE-2	2	2
BS603	**MEDICAL MICROBIOLOGY**	DSC-1F	3+2	4
BS604	Optional-II			
BS605	Optional-III			
BS606	**A-FOOD MICROBIOLOGY B- INDUSTRIAL MICROBIOLOGY**	DSE-1F	3+2	4
	Optional-II-A/B/C			
	Optional-III-A/B/C			
				164

Dept. of Microbiology: MG University, Nalgonda

B.Sc Microbiology program under choice based credit system (CBCS) w. e. f. 2016-17

Syllabus for B.Sc Microbiology **Code: 104, DSC- 1A**

B.Sc I year: 1st semester

Title: General Microbiology -I **4HPW –credits-4**

UNIT-1: HISTROY OF MICROBIOLOGY

Meaning, definition and history of microbiology, Contribution of Anton Von Leuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, lwanoswky, Beijernick, Winogradsky and Alexander Fleming. Importance and application of Microbiology.

UNIT-2: MICROSCOPY

Principles of Microscopy-Bright field, Dark field, Phase-contrast, Fluorescent and Electron microscopy (SEM and TEM). Ocular and stage micrometry. Size determination of microorganisms. Principles and types of stains-simple stain, differential stain, negative stain. Structural stains-spore, capsule, flagella. Hanging drop method.

UNIT-3-MICROBIOLOGICAL TECHNIQUES

Sterilization and disinfection techniques. Principles and methods of sterilization. Physical methods-Autoclave,Hot air oven,pressure cooker,Laminar air flow,Filter sterilization. Radiation methods-U.V rays, Gamma rays, Ultrasonic methods. Chemical methods-use of Alcohols, Aldehydes, Fumigants, Phenol, Halogens and Hypochlorides, Phenol coefficient.

UNIT-4-PURE CULTURE TECHNIQUES

Isolation of Pure cultura techniques- Enrichment culture, Dilution plating, streak plate, spread plate, Micromanipulator technique. Preservation of Microbial cultures – Sub culturing, overlaying cultures with mineral oil, lyophilization, sand cultures, storage at low temperature

References:

1. Michael J. Pelczar, Jr. E.C.S.Chan, Noel R. Krieg Microbiology Tata McGraw- Hill Publisher.
2. Prescott, M.J., Harly, J.P. and Klein Microbiology 5th Edition, WCB Mc GrawHill, New York.
3. Madigan, M.T., Martinkl, J.M and Parker,j. Broch Biology of Microorganism, 9th Edition, MacMillan Press, England.
4. Dube, R.C. and Maheshwari, D.K. General Microbiology S Chand, New Delhi.

Dept.of Microbiology: MG University

B.Sc I year –I-semester Practical Syllabus CHOICE

BASED CREDIT SYSTEM-2016-17(CBCS)

GENERAL MICROBIOLOGY

2HPW-Credits-1

- Light compound microscope and its handling.
- Calibration of microscopic measurements (ocular, stage micrometer)
- Measuring dimensions of microorganisms (Bacterial and fungal spores)
- Simple and differential staining (Gram staining), Spore staining, capsular staining and negative staining.
- Preparation of culture media: Solid/Liquid.
- Sterilization techniques: Autoclave, Hot air oven and filtration.
- Enumeration of bacterial numbers by serial dilution and plating.
- Microscopic observation of bacteria (Gram positive bacilli and cocci: Gram negative bacilli), Cyanobacteria (Nostoc, Spirulina).

References:

1. Experiments in Microbiology by K.R. Aneja.
2. Gopal Reddy.M., Reddy. M.N., Sai Gopal, DVR and Mallaiah K.V. Laboratory Experiments in Microbiology.
3. Dubey, R.C. and Maheshwari, D.K. Practical Microbiology, S. Chand and Co New Delhi.
4. Alcamo, I.E. Laboratory Fundamentals of Microbiology. Jones and Bartlett Publishers, USA.

Dept. of Microbiology: MG University,

Nalgonda

B.Sc Microbiology program under choice based credit system (CBCS)

w.e.f. 2016-17

Syllabus for B.Sc Microbiology **Code: BS 204, DSC-1B**

B. Sc I year: 2nd semester

Title: General Microbiology-II **4HPW-credits-4**

Unit-1; BIOLOGY OF MICROORGANISMS

Classification of living organisms; Haeckel, Whittaker's five kingdom concept and Carlwoese systems. Place of microorganisms in the living world. Differences between prokaryotes and eukaryotes. Prokaryotes-General characteristics of bacteria, Archeae. Rickettsia, Mycoplasma, Cyanobacteria and Actinomycetes. Classification of bacteria as per the second edition of Bergey's manual of Systematic Bacteriology

UNIT-2 STRUCTURE OF MICROORGANISMS

Ultra structure of bacterial cell; Invariant components-cell wall, cell membrane, ribosomes, nucleoid. Variant components-Capsule, flagella, fimbriae, endospores, storage granules. General characteristics and classification of virus. Morphology and structure of TMV and HIV. Structure and multiplication of lambda bacteriophage. Eukaryotes- General characteristics and classification. Eukaryotic microorganisms-protozoa, microalgae, molds and yeast.

UNIT-3 GENERAL CHARECTERISTICS OF BIOMOLECULES

Outline classification and general characteristics of carbohydrates (Monosaccharides, disaccharides and polysaccharides). General characteristics of amino acids and proteins, fatty acids (saturated and unsaturated) and lipids (sphingolipids, sterols and phospholipids)

UNIT-4 BIOMOLECULES AND TECHNIQUES

Structure of nitrogenous bases, nucleotides and nucleic acids. Hydrogen ion concentration in biological fluids. pH measurement. Types of buffers and their uses in biological reactions. Principles and application of colorimetry and chromatography (paper and thin layer)techniques

References:

1. Michael J. Pelczar, Jr. E.C.S.Chan, Noel R. Krieg Microbiology Tata McGraw- Hill Publisher.
2. Prescott, M.J., Harly, J.P. and Klein Microbiology 5th Edition, WCB Mc GrawHill, New York.
3. Madigan, M.T., Martinkl, J.M and Parker,j. Broch Biology of Microorganism, 9th Edition, MacMillan Press, England.
4. Dube, R.C. and Maheshwari, D.K. General Microbiology S Chand, New Delhi.
5. Voet, D Biochemistry WCB. Mc GrawHill, Iowa.
6. N.J. Dimmock, A.J Easton, and K.N. Leppard. Introduction to Modern Virology. Blackwell Publishing.

B.Sc I year –II-semester Practical Syllabus

CHOICE BASED CREDIT SYSTEM (CBCS)-2016-17

GENERAL MICROBIOLOGY-II

2HPW- CREDITS-1

- Paper chromatography-separation of sugars/amino acids
- Determination of pH
- Preparation of Buffers
- Colorimetry- Principles, Beer-Lambert's law, determination of absorption maximum.
- Microscopic observation of algae
- Microscopic observation of fungi (*Saccharomyces, Rhizopus, Aspergillus, Penicillium, Fusarium*)

References:

1. Experiments in Microbiology by K.R. Aneja.
2. Gopal Reddy.M., Reddy. M.N., Sai Gopal, DVR and Mallaiah K.V. Laboratory Experiments in Microbiology.
3. Dubey, R.C. and Maheshwari, D.K. Practical Microbiology, S. Chand and Co New Delhi.
4. Alcamo, I.E. Laboratory Fundamentals of Microbiology. Jones and Bartlett Publishers, USA.
5. Mahy, B.W.J. and Kangro, H.O. Virology – Methods Manual Academic Press, USA.
6. Burleson et al Virology – A Laboratory Manual. Academic Press, USA.

MAHATMA GANDHI UNIVERSITY, NALGONDA

B. Sc MICROBIOLOGY MODEL QUESTION PAPER (THEORY)

Time: $2^{1/2}$ hrs

PART-A Short answer type (8X4=32 Marks)

1
2
3
4
5
6
7
8

PART-B Essay type (4X12=48 Marks)

9 a or b

10 a or b

11 a or b

12 a or b

Dept. Microbiology , Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS)

With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 304, DSC-1C**

B.Sc II year: 3rd Semester

Title: Microbial Physiology and Enzymology **4 HPW-credits-4**

UNIT-1: MICROBIAL NUTRITION AND PHOTOSYNTHESIS -

Microbial Nutrition – Nutritional Requirement, Uptake of nuitrients by cell. Nutritional group of microorganism – Autotrophs , Heterotrophs , Mixotrophs , Methylotrophs. Photosynthetic Apparatus in Prokaryotes. Outline of oxygenic and Anoxygenic photosynthesis in bacteria.

UNIT-2: MICROBIAL GROWTH -

Growth media – Synthetic , Non Synthetic , Selective , Enrichment and Differential media. Microbial growth – Different Phases of Growth in Batch culture. Factors Influencing microbial growth.

Synchronous, Continuous , Biphasic Growth. Methods for measuring microbial growth – Direct Microscopic , Viable count , Turbidometry , Biomass

UNIT-3- MICROBIAL METBOLISM-

Aerobic : Respiration – Glycolysis , HMP Pathway , ED Pathway , TCA Cycle and Anaplerotic reaction, Electron Transport , Oxidative and substrate level phosphorylation.

ß-Oxidation of Fatty acids. Glyoxylate cycle , Anaerobic respiration (Nitrate , Sulphate respiration)

Fermentation – Common Microbial fermentation with special reference alcohol and lactic acid fermentation.

UNIT-4-ENZYMES-

Properties and Classifications of Enzymes , Enzymes unit. Biocatalysis – Induced fit and Lock & Key Model , Coenzymes , Co-Factors. Factors effecting catalytic reaction activity of enzymes. Inhibition of Enzymes activity – Competitive non Competitive , Un competitive and Allosteric

References:

1. Gottschalk, G. (1986). Bacterial Metabolism, Springer-Verlag, New-York.
2. Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.
3. Moat, A.G. and Foster, J.W. (1995). Microbial Physiology, John-Wiley, New York.
4. White, D. (1995). The Physiology and Biochemistry of Prokaryotes, Oxford University Press, New York.
5. Reddy, S.R. and Reddy, S.M. (2004). Microbial Physiology, Scientific Publishers, Jodhpur, India.
6. Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2nd Edition, CBS Publishers and Distributors, New Delhi.
7. Elliot, W.H. and Elliot, D.C. (2001). Biochemistry and Molecular Biology, 2nd Edition, Oxford University Press, U.S.A.

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS)

With effect from 2016-17

II Year B.Sc III SEMESTER MICROBIOLOGY -2016-17

Title: MICROBIAL PHYSIOLOGY & ENZYMOLOGY

Practical syllabus

2HPW- credits-1

- Preparation of media for culturing autotrophic and heterotrophic microorganisms – algal medium, mineral salts medium , nutrient agar medium, McConkey agar and Blood agar.
- Setting and observation of Winogradsky column
- Methods of pure culture isolation
- Enrichment culturing and isolation of phototrophs and chemoautotrophs.
- Determination of viable count of bacteria.
- Turbidometric measurement of bacterial growth.
- Factors affecting bacterial growth – pH, temperature, salts.
- Starch hydrolysis, Catalase test and sugar fermentation test

References:

1. Wilson, K. and Walker, J. (1994). Practical Biochemistry. 4th Edition, Cambridge University Press, England.
2. Sawhney, S.K. and Singh, R. (2000). Introductory Practical Biochemistry, Narosa Publishing House, New Delhi.
3. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology. S. Chand & Co. Ltd., New Delhi.
4. Plummer, D.T. (1988). An Introduction to Practical Biochemistry. 3rd Edition, Tata Mc GrawHill, New Delhi.
5. Reddy, S.M. and Reddy, S.R. (1998). Microbiology – Practical Manual, 3rd Edition, Sri Padmavathi Publications, Hyderabad.
6. Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.
7. Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.
8. Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). Laboratory Experiments in Microbiology, . Himalaya Publishing House, Mumbai.

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 404, DSC-ID**

B.Sc II year: 4th semester

Title: Microbial Genetics and Molecular Biology **4 HPW-credits-4**

UNIT-1 : MICROBIAL GENETICS

Fundamentals of Genetics – Medellin laws , Alleles , Crossing over and Linkage
DNA and RNA as Genetic material
Structure of DNA – Watson and Crick model
Extra Chromosomal genetic elements – Plasmids and Transposons
Replication of DNA- Semi Conservative mechanism

UNIT-2: MUTATIONS

Mutations – Spontaneous and induced , Base pair changes , Frameshift , Deletion , Inversion , Tandem duplication , Insertion
Various physical and chemical mutagens
Outline of DNA Damage and repair mechanism
Brief account on gene transfer among bacteria – Transformation , Transduction and Conjugation

UNIT-3-GENE EXPRESSION

Concept of gene – Muton , Recon and Cistron.
One gene – One enzyme , One gene – One Poly peptide , One gene – One product hypothesis
Types of RNA and their function
Outline of RNA Biosynthesis in Prokaryotes
Genetic Code , Structure of Ribosomes and Brief account on Protein synthesis
Type of Genes – Structural , Constitutive , Regulatory
Operon Concept. Regulation of Genes expression in bacteria – Lac Operon

UNIT-4-RECOMBIANT DNA TECHNOLOGY

Basic principles of genetic engineering –Restriction endonucleases ,
DNA polymerases and Ligases, vectors
Outline of gene cloning methods.
Genomic and c DNA libraries
General account on application of genetic engineering in industry , agriculture and medicine.

References:

1. Freifelder, D. (1997). Essentials of Molecular Biology. Narosa Publishing House, New Delhi.
2. Crueger, W. and Crueger, A. (2000). Biotechnology: A Text Book of Industrial Microbiology, Prentice-Hall of India Pvt. Ltd., New Delhi.
3. Glick, B.P. and Pasternack, J. (1998). Molecular Biotechnology, ASM Press, Washington D.C., USA.
4. Freifelder, D. (1990). Microbial Genetics. Narosa Publishing House, New Delhi.
5. Strickberger, M.W. (1967). Genetics. Oxford & IBH, New Delhi.
6. Sinnot E.W., L.C. Dunn and T. Dobzhansky. (1958). Principles of Genetics. 5th Edition. McGraw Hill, New York.
7. Glazer, A.N. and Nikaido, H. (1995). Microbial Biotechnology – Fundamentals of Applied Microbiology, W.H. Freeman and company, New York.
8. Old, R.W. and Primrose, S.B. (1994) Principles of Gene Manipulation, Blackwell Science Publication, New York.
9. Verma, P.S. and Agarwal, V.K. (2004). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Co. Ltd., New Delhi.

II Year B.Sc IV SEMESTER; MICROBIOLOGY -2016-17
CHOICE BASED CREDIT SYSTEM (CBCS)

Microbial Genetics and Molecular biology

Practical syllabus

2 HPW-Credits-1

- Colorimetric estimation of proteins by Biuret / Lowery method.
- Colorimetric estimation of DNA by Diphenyl amine method.
- Colorimetric estimation of RNA by Orcinol method
- Extraction of genomic DNA
- Agarose gel Electrophoresis
- Problems related to DNA and RNA characteristics, Transcription and Translation

References:

1. Wilson, K. and Walker, J. (1994). Practical Biochemistry. 4th Edition, Cambridge University Press, England.
2. Sawhney, S.K. and Singh, R. (2000). Introductory Practical Biochemistry, Narosa Publishing House, New Delhi.
3. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology. S. Chand & Co. Ltd., New Delhi.
4. Plummer, D.T. (1988). An Introduction to Practical Biochemistry. 3rd Edition, Tata Mc GrawHill, New Delhi.
5. Reddy, S.M. and Reddy, S.R. (1998). Microbiology – Practical Manual, 3rd Edition, Sri Padmavathi Publications, Hyderabad.
6. Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.
7. Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.
8. Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). Laboratory Experiments in Microbiology, . Himalaya Publishing House, Mumbai.

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS)

Syllabus for B.Sc Microbiology Code: BS 503, DSC-1E

CHOICE BASED CREDIT SYSTEM---2015-16

B.Sc III year, SEMESTER-V

THEORY

Title: APPLIED MICROBIOLOGY 3 HPW- Credits-3

UNIT-1 - Microbes in Agriculture

Physical and chemical characteristics of soil
Rhizosphere and phyllosphere
Plant growth promoting microorganisms
(*mycorrhizae,rhizobium,azospirillum,azatobacter,cynobacteria,frankia* and phosphate solubilising microorganisms)
Biofertilizers- *Rhizobium & Cyanobacteria*

UNIT-2 Plant Diseases & Biocontrol

Concept of disease in plant
Symptoms of plant diseases caused by fungi (ground nut rust),bacteria (angular Leaf spot cotton) and viruses (tomato leaf curl) Principles of plant disease control
Biological control of plant diseases, Biopesticides-*Bacillus thuringenisis*, Nuclear polyhedrosis virus (NPV), *Trichoderma*

UNIT-3 Microbial ecology

Outline classification of nitrogen fixation (symbiotic,non symbiotic)
Microorganisms of environment soil,water ,air
Role of microorganisms in nutrient cycles (carbon,nitrogen,sulphur)
Microbial interaction-mutalism, commensalism, antagonism, competition, parasitism, predation

UNIT-4 Role of microbes in environmental Pollution

Microbiology of potable and polluted water. *E.coli* and *Streptococcus faecalis* as indicators of water pollution. Sanitation of potable water. Sewage treatment (primary, secondary and tertiary)
Solid waste disposal-sanitary landfills composting
Outline of biodegradation of environmental pollutants –pesticides

References:

1. Alexander, M. (1985). Introduction to Soil Microbiology, 3rd Edition. Wiley Eastern Ltd., New Delhi.
2. Paul, E.A. and Clark, F.E. (1989). Soil Microbiology and Biochemistry, Academic Press, USA.
3. Subba Rao, N.S. (1993). Biofertilizers in Agriculture and Forestry, 3rd Edition Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

4. Rangaswami, G. and Bhagyaraj, D.J. (2001). Agricultural Microbiology, 2nd Edition, Prentice Hall of India, New Delhi.
5. Atlas, R.M. and Bartha, R. (1998). Microbial Ecology - Fundamentals and Applications, Addison Wesley Longman, Inc., USA
6. Lynch, J.M. and Poole, N.J. (1979). Microbial Ecology – A Conceptual Approach, Blackwell Scientific Publications, USA
7. Subba Rao, N.S. (1999). Soil Microorganisms and Plant Growth. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
8. Reddy, S.R. and Singara Charya, M.A. (2007). A Text Book of Microbiology - Applied Microbiology. Himalaya Publishing House, Mumbai.
9. Singh, R.P. (2007). Applied Microbiology. Kalyani Publishers, New Delhi.

B.Sc III year –V-semester Practical Syllabus-2016-17

APPLIED MICROBIOLOGY

Practical syllabus

2 HPW-CREDITS-1

- Isolation &enumeration of Rhizosphere microorganisms.
- Isolation &identification of Phyllosphere microorganisms.
- Study of root nodules of leguminous plants.
- Isolation of Rhizobium from leguminous root nodules.
- Isolation of *Azospiriullum* and *Azotobacter*.
- Staining & observation of VAM fungi.
- Isolation of microorganisms in air by solid/liquid impingement method.
- Plant diseases-Rust, Smuts, Powdery mildews, Tikka disease of ground nut, citrus canker,bhendi yellow vein mosaic, tomato leaf curl ,little leaf of brinjal.
- Microbial quality testing of water by coliform test
- Determination of Biological oxygen demand (BOD) of water

References:

1. Aneja, K.R. (2001). Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology, 3rd Edition, New Age International (P) Ltd., New Delhi.
2. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology, S. Chand & Co., New Delhi.
3. Burns, R.G. and Slater, J.H. (1982). Experimental Microbiology and Ecology. Blackwell Scientific Publications, USA.
4. Peppler, I.L. and Gerba, C.P. (2004). Environmental Microbiology – A Laboratory Manual. Academic Press. New York.
5. Gupte, S. (1995). Practical Microbiology. Jaypee Brothers Medical Publishers Pvt. Ltd.
6. Kannan, N. (2003). Hand Book of Laboratory Culture Medias, Reagents, Stains and Buffers. Panima Publishing Co., New Delhi.
7. Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). Laboratory Experiments in Microbiology, 2nd edition. Himalaya Publishing House, Mumbai.
8. Reddy, S.M. and Reddy, S.R. (1998). Microbiology – Practical Manual, 3rd Edition, Sri Padmavathi Publications, Hyderabad

DISCIPLINE SPECIFIC ELECTIVE-(DSE-IE) - A

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 506, DSE-1E-A**

B.Sc III year: 5th semester

Title: IMMUNOLOGY **3 HPW-credits-3**

UNIT-1 HISTORY OF IMMUNOLOGY AND IMMUNITY

Development of immunology.
Antigen –types,chemical nature,Antigenic determinants,Haptens
Factors affecting antigenicity.
Antibodies-Basic structure,Types,properties and functions of immunoglobulins.
Complement, components of complement and activation of complement.
Types of immunity-Innate, Acquired; Active and passive, humoral and cell mediated immunity.

UNIT-2 CELLS AND ORGANS OF IMMUNE SYSTEM

Primary and secondary organs of immune system- Thymus, bursa of fabrica, bone marrow, spleen and lymphnodes, mucus associated lymphoid tissue (MALT).
Cells of immune system, Identification and functions of B &T Lymphocytes, Null cells, Monocytes. Macrophages, Neutrophills, Basophills & Eosinophills.

UNIT-3 ANTIGENS AND ANTIBODY REACTION

Components of complement and activation of complement.
Types of antigens-Antibody reactions- Agglutination, blood groups, precipitation, neutralization, complement fixation.
Labeled antibody based techniques-ELISA, RIA and Immunoflurosence

UNIT-4 IMMUNOLOGICAL PROCESSES AND APPLICATIONS

Types of hypersensitivity immediate and delayed.
Autoimmunity and its significance.
Polyclonal and monoclonal antibodies production and application
Vaccines-Natural and recombinants

References:

1. Sudha Gangal. Shubhangi Sontakke. Text book of Basic and Clinical Immunology, Universitie Press.
2. Tizard, I.R. (1995). Immunology : An Introduction, WB Saunders, Philadelphia, USA.
3. Riott, I.M. (1998). Essentials of Immunology, ELBS and Black Well Scientific Publishers, England.
4. Goldsby, Kindt, T.J. and Osborne, B.A. (2004). Kuby Immunology, 6th Edition, W.H.Freeman and Company, New York.
5. Lydyard, P.M., Whelan, A. and Fanger, M.W. (2000). Instant Notes in Immunology, Viva Books Pvt. Ltd., New Delhi.
6. Chakraborty, B. (1998). A Text Book of Microbiology, New Central Book Agency (P) Ltd, Calcutta, India. 12
7. Ananthanarayana, R. and Panicker, C.K.S. (2000). Text Book of Microbiology, 6th Edition, Oriental Longman Publications, USA.
8. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
9. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
10. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.
11. Singh, R.P. (2007). Immunology and Medical Microbiology. Kalyani Publishers, New Delhi.
12. Reddy, S.R. and Reddy, K.R. (2006). A Text Book of Microbiology - Immunology and Medical Microbiology, Himalaya Publishing House, Mumbai.
13. Gupte, S. (1995). Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

DISCIPLINE SPECIFIC ELECTIVE-(DSE-IE) - A

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology Practicals

B.Sc III year: 5th semester

Title: IMMUNOLOGY **2HPW-credits-1**

- Determination of blood grouping and RH typing.
- Total count of RBC and WBC.
- Differential count of blood leucocytes.
- Estimation of blood Haemoglobin.
- WIDAL test for typhoid(slide test)by Ag-Ab reactions
- VDRL test for syphilis (slide test) by Ag-Ab reactions.
- Ouchterlony double diffusion test
- Separation of serum and plasma

References:

1. Talwar, G.P. and Gupta, S.K. (1992). A Hand Book of Practical and Clinical Immunology. CBS Publications, New Delhi.
2. Baren, E.J. (1994). Bailey and Scott's Diagnostic Microbiology, 9th Edition, Mosby Publishers.
3. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology, S. Chand & Co., New Delhi.13
4. Samuel, K.M. (Ed.) (1989). Notes on Clinical Lab Techniques, M.K.G. Iyyer & Son Publishers, Chennai.
5. Wadher, B.J. and Reddy, G.L.B. (1995). Manual of Diagnostic Microbiology, Himalaya Publishing House, Mumbai.
6. Dey, N.C., Dey, T.K., Dey, M. and Sinha, D. (1998). Practical Microbiology, Protozoology, and Parasitology. New Central Book Agency (P) Ltd. Calcutta.
7. Mukherjee, K.L. (1996). Medical Laboratory Technology. Vol II. Tata Mc GrawHill Publishing Co. Ltd., New Delhi.
8. Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). Laboratory Experiments in Microbiology, 2nd edition. Himalaya Publishing House, Mumbai.

DISCIPLINE SPECIFIC ELECTIVE-(DSE-1E) - B

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 506, DSE-1E-B**

B.Sc III year: 5th semester

Title: PHARMACEUTICAL MICROBIOLOGY **3 HPW-credits-3**

UNIT-I:

Principles of chemotherapy – Clinical and lab diagnosis, sensitivity testing, choice of drug, dosage, route of administration, combined/mixed multi drug therapy, control of antibiotic/drug usage.

Unit-II:
History of chemotherapy – plants and arsenicals as therapeutics, Paul Ehrlich and his contributions, selective toxicity and target sites of drug action in microbes.
Over view of development of synthetic drugs.
Antibiotics - The origin, development and definition of antibiotics as drugs, types of antibiotics and their classification.

UNIT-III
Mode of action of important drugs – Cell wall inhibitors (Betalactam – eg. Penicillin), membrane inhibitors (polymyxins), macromolecular synthesis inhibitors (streptomycin), antifungal antibiotics (nystatin)

UNIT-IV:
Anti Microbial Assays: Assay for growth inhibiting substances – Assay for non-medicinal antimicrobials (Phenol coefficient/RWC). Drug sensitivity testing methods and their importance. Assay for antibiotics – Determination of MIC, the liquid tube assay, solid agar tube assay, agar plate assay (disc diffusion, agar well and cylinders cup method).

References:

1. Ananthanarayana, R. and Panicker, C.K.S. (2000). Text Book of Microbiology, 6th Edition, Oriental Longman Publications, USA.
2. Gupte, S. (1995). Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
3. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.

6. Singh, R.P. (2007). Immunology and Medical Microbiology. Kalyani Publishers, New Delhi.
7. Reddy, S.R. and Reddy, K.R. (2006). A Text Book of Microbiology - Immunology and Medical Microbiology, Himalaya Publishing House, Mumbai.
8. Lydyard, P.M., Whelan, A. and Fanger, M.W. (2000). Instant Notes in Immunology, Viva Books Pvt. Ltd., New Delhi.
9. Chakraborty, B. (1998). A Text Book of Microbiology, New Central Book Agency (P) Ltd, Calcutta, India. 12

DISCIPLINE SPECIFIC ELECTIVE-(DSE-2E) - B

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS)

With effect from 2016-17

Syllabus for B.Sc Microbiology
B.Sc III year: 5th semester

PRACTICALS

Title: PHARMACEUTICAL MICROBIOLOGY 2HPW-credits-1

- Tests for disinfectants (Phenol coefficient)
- Determination of antibacterial spectrum of drugs/antibiotics Chemical assays for antimicrobial drugs
- Testing for antibiotic/drug sensitivity/resistance.
- Determination of MIC value for antimicrobial chemicals
- Microbiological assays for antibiotics (Liquid tube assay, agar tube assay, agar well assays)

References:

1. Ananthanarayana, R. and Panicker, C.K.S. (2000). Text Book of Microbiology, 6th Edition, Oriental Longman Publications, USA.
2. Gupte, S. (1995). Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
3. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.
6. Singh, R.P. (2007). Immunology and Medical Microbiology. Kalyani Publishers, New Delhi.
7. Reddy, S.R. and Reddy, K.R. (2006). A Text Book of Microbiology - Immunology and Medical Microbiology, Himalaya Publishing House, Mumbai.
8. Lydyard, P.M., Whelan, A. and Fanger, M.W. (2000). Instant Notes in Immunology, Viva Books Pvt. Ltd., New Delhi.
9. Chakraborty, B. (1998). A Text Book of Microbiology, New Central Book Agency (P) Ltd, Calcutta, India. 12

DISCIPLINE SPECIFIC ELECTIVE-(DSC-1F)

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 603, DSC-1F**

B.Sc III year: 6th semester

Title: MEDICAL MICROBIOLOGY **3HPW-credits-3**

UNIT-I: INTRODUCTION TO MEDICAL MICROBIOLOGY

Histroy of medical Microbiology.
Normal flora of human body. Definition of infection.
Non specific defence mechanism- Mechanical barriers.
Antibacterial substance- Lysozyme, Complement, Properdin, Antiviral substances, Phagocytosis.
Host pathogen interactions. Bacterial toxins, Virulence and Attenuation.

UNIT-II- DIAGNOSTICAND THERAPEUTICAL MICROBIOLOGY

General principles of diagnostic microbiology
Collections, transport & processing of clinical samples.
General methods of lab diagnosis-cultural, biochemical, serological & molecular methods
Test for antimicrobial susceptibility.
Elements of chemotherapy-Therapeutic drugs, Mode of action of Pencillin & sulpha drugs & their clinical use. Drug resistance.
Antiviral agents- Interferon, Base analogues.
Preventive control of diseases- active & passive immunization.

UNIT-III MEDICAL BACTERIOLOGY

General account of following diseases, casual organisms, pathogenesis, epidomology, diagnosis, prevention & control
Air born diseases-Tuberculosis.
Food & waterborn diseases- Cholera, Typhoid.
Contact diseases- Syphilis, Gonorrhoea. General account of Nosocomial infections.
Zoonotic diseases - Anthrax.

UNIT-IV MEDICAL VIROLOGY AND PARASITOLOGY

General account of following diseases, casual organisms, pathogenesis,epidomology,diagnosis,prevention &control
Air born diseases- Influenza.
Food&waterborn diseases- Hepatitis-A, Poliomyelitis, Amoebiosis.

Insect born diseases-Malaria, Filariasis, Dengue fever.
Zoonotic diseases -Rabies. Blood born diseases- Serum hepatitis, AIDS.

References:

1. Ananthanarayana, R. and Panicker, C.K.S. (2000). Text Book of Microbiology, 6th Edition, Oriental Longman Publications, USA.
2. Gupte, S. (1995). Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
3. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.
6. Singh, R.P. (2007). Immunology and Medical Microbiology. Kalyani Publishers, New Delhi.

DISCIPLINE SPECIFIC ELECTIVE-(DSC-IF)

Dept.of Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology

B.Sc III year: 6th semester

PRACTICALS

Title: MEDICAL MICROBIOLOGY **2 HPW-credits-1**

- Biochemical tests for identification members of enterobacteriacea.
- IMVIC test-indole test,methyl red test,voages proskeures test,citrate utilization test.
- Oxidase test.
- Catalase test.
- Study of medically important microorganisms-Ecoli, Klebsiella, Staphylococcus, Psedomonus.
- Test for disinfectant (Phenol coefficient)
- Antibiotic sensitivity testing – Disc diffusion method

Slides

Mycobacterium
Candida albicans
Entamoeba histolytica
plasmodium

References:

1. Ananthanarayana, R. and Panicker, C.K.S. (2000). Text Book of Microbiology, 6th Edition, Oriental Longman Publications, USA.
2. Gupte, S. (1995). Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.
3. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.

DISCIPLINE SPECIFIC ELECTIVE-(DSE-IF) - A

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 606, DSE-1F-A**

B.Sc III year: 6th semester

Title: FOOD MICROBIOLOGY **3 HPW-credits-3**

UNIT-I

Microorganisms of food materials and their sources.
Spoilage of different food materials (Fruits, vegetables, Meat,Fish and Canned foods).
Food born diseases (Salmonellosis & Shigellosis) and their detection.

UNIT-II

Microbiological production of fermented foods- Bread, Cheese ,Yoghurt.
Biochemical activities of microbes in milk. Microorganisms as food – SCP, Edible mushrooms (white button oyster, Paddy straw). Concepts of Probiotics.

Unit-3

Methods of Food preservation, food poisoning (Staphylococci, C. botulinum)
Food intoxication.

UNIT-4

Microbiology of potable and polluted water
E.coli and streptococcus of water pollution Sanitation of potable water
Sewage treatment (primary,secondary And tertiary
Solid waste disposal-sanitary landfills composting
Outline of biodegradtion of environmental pollution –pesticides

References:

1. Stanbury, P.F., Whitaker, A. and Hall, S.J. (1997). Principles of Fermentation Technology, Aditya Books (P) Ltd. New Delhi.
2. Doyle, M.P., Beuchat, L.R. and Montville, T.J. (1997). Food Microbiology: Fundamentals and Frontiers. ASM Press, Washington D.C., USA.
3. Frazier, W.C. and Westhoff, D.C. (1988). Food Microbiology, Mc Graw-Hill, New York.
4. Jay, J.M. (1996). Modern Food Microbiology, Chapman and Hall, New York.
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5. Ray, B. (1996). Fundamentals of Food Microbiology, CRC Press, USA.
6. Rangaswami, G. and Bhagyaraj, D.J. (2001). Agricultural Microbiology, 2nd Edition, Prentice Hall of India, New Delhi.
7. Atlas, R.M. and Bartha, R. (1998). Microbial Ecology - Fundamentals and Applications, Addison Wesley Longman, Inc., USA
8. Paul, E.A. and Clark, F.E. (1989). Soil Microbiology and Biochemistry, Academic Press, USA.

DISCIPLINE SPECIFIC ELECTIVE-(DSE-IF) - A

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS)

With effect from 2016-17

Syllabus for B.Sc Microbiology Practicals

B.Sc III year: 6th semester

PRACTICALS

Title: FOOD MICROBIOLOGY 2HPW-credits-1

- Isolation of microorganisms by crowded plate technique.
- Isolation of Amylase producing organisms.
- Isolation of microorganisms in air by petriplate exposure method.
- Determination of microbiological quality of milk by MBRT method.
- Isolation of fungi & bacteria from spoiled fruits & vegetables.
- Microbiological examination of water by coliform test.
- Determination of biological oxygen demand.
- Spoiled foods-bacterial soft rot,bread& bakery products,milk& milk products, eggs, meat and meat products, canned foods, cheese, yoghurt.
- Bacterial slides- Escherichia coli, Bacillus, Lactobacillus, Azospirillum, Azotobacter, Rhizobium, Yeast, Rhizopus, Penicillium

References:

1. Stanbury, P.F., Whitaker, A. and Hall, S.J. (1997). Principles of Fermentation Technology, Aditya Books (P) Ltd. New Delhi.
2. Doyle, M.P., Beuchat, L.R. and Montville, T.J. (1997). Food Microbiology: Fundamentals and Frontiers. ASM Press, Washington D.C., USA.
3. Frazier, W.C. and Westhoff, D.C. (1988). Food Microbiology, Mc Graw-Hill, New York.
4. Jay, J.M. (1996). Modern Food Microbiology, Chapman and Hall, New York. 15
5. Ray, B. (1996). Fundamentals of Food Microbiology, CRC Press, USA.

DISCIPLINE SPECIFIC ELECTIVE-(DSE-IF) - B

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology **Code: BS 606,DSE-1F-B**

B.Sc III year: 6th semester

Title: INDUSTRIAL MICROBIOLOGY **3 HPW-credits-3**

UNIT-I

Microorganisms of industrial importance-Yeast , Molds, Bacteria, Actinomycetes. Screening and isolation of industrially useful microbes. Methods of Screening and strain improvement.

UNIT-II

Types of fermentation- Aerobic, anaerobic , batch, continuous, submerged, surface, solid state Dual and multiple.

Design of stirred tank reactor fermentor,

UNIT-III

Inoculation media and fermentation media

Raw material used in fermentation industry and their processing

Downstream processing

UNIT-IV

Microbial products

Industrial production of alcohol (ethyl alcohol), Beverages (beer), Amylases, Antibiotics(pencillin) Aminoacids(glutamic acid), Organic acid(citric acid.) VitaminB12, Biofuels (biogas-methane)

References:

1. Patel, A.H. (1984). Industrial Microbiology, Mac Milan India Ltd., Hyderabad.
2. Cassida, L.E. (1968). Industrial Microbilogy, Wiley Eastern Ltd. & New Age International Ltd., New Delhi.
3. Crueger, W. and Crueger, A. (2000). Biotechnology – A Text Book of Industrial Microbiology, Panima Publishing Corporation, New Delhi
4. Reedy, G. (Ed.) (1987). Prescott & Dunn's Industrial Microbiology, 4th Edition, CBS Publishers & Distributors, New Delhi.
5. Reddy, S.R. and Singara Charya, M.A. (2007). A Text Book of Microbiology - Applied Microbiology. Himalaya Publishing House, Mumbai.
6. Singh, R.P. (2007). Applied Microbiology. Kalyani Publishers, New Delhi.
7. Demain, A.L. and Davies, J.E. (1999). Manual of Industrial Microbiology and Biotechnology, ASM Press, Washington, D.C., USA.

DISCIPLINE SPECIFIC ELECTIVE-(DSE-IF) - B

Dept. Microbiology: Mahatma Gandhi University

B.Sc Microbiology under Choice Based Credit System (CBCS) With effect from 2016-17

Syllabus for B.Sc Microbiology

B.Sc III year: 6th semester

Practicals

Title: INDUSTRIAL MICROBIOLOGY 2HPW-credits-1

- Screening for amylase producing microorganisms
- Screening for organic acid producing microorganisms
- Production and Estimation of Ethanol by potassium dichromate method.
- Production and Estimation of Citric acid by titrimetry method.
- Estimation of streptomycin.
- Bacterial slides- Bacillus, Lactobacillus, Yeast, Aspergillus, Pencillium

References:

1. Patel, A.H. (1984). Industrial Microbiology, Mac Milan India Ltd., Hyderabad.
2. Cassida, L.E. (1968). Industrial Microbilogy, Wiley Eastern Ltd. & New Age International Ltd., New Delhi.
3. Crueger, W. and Crueger, A. (2000). Biotechnology – A Text Book of Industrial Microbiology, Panima Publishing Corporation, New Delhi
4. Reedy, G. (Ed.) (1987). Prescott & Dunn's Industrial Microbiology, 4th Edition, CBS Publishers & Distributors, New Delhi.
5. Reddy, S.R. and Singara Charya, M.A. (2007). A Text Book of Microbiology - Applied Microbiology. Himalaya Publishing House, Mumbai.
6. Singh, R.P. (2007). Applied Microbiology. Kalyani Publishers, New Delhi.
7. Demain, A.L. and Davies, J.E. (1999). Manual of Industrial Microbiology and Biotechnology, ASM Press, Washington, D.C., USA.

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA
B.Sc. (PHYSICS) CBCS - SYLLABUS
With effective from 2016 – 2017
Paper Titles (Semester Wise) with Credits

YEAR	SEM	Paper [Theory and Practical]	COURSE TYPE	HRS/PER WEEK	CREDITS
FIRST	I SEM	Paper – I : Mechanics	DSC-1	4	4
		Practical – I : Mechanics	DSC-1A	2	1
	II SEM	Paper – II: Waves and Oscillations	DSC-2	4	4
		Practical – II : Waves and Oscillations	DSC-2A	2	1
SECOND	III SEM	Paper – III : Thermal Physics	DSC-3	4	4
		Practical – III : Thermal Physics	DSC-3A	2	1
	IV SEM	Paper – IV : Optics	DSC-4	4	4
		Practical – IV :Optics	DSC-4A	2	1
THIRD	V SEM	Paper –V : Electromagnetism	DSC-5	3	3
		Practical – V: Electromagnetism	DSC-5A	2	1
		Paper – VI : Elective – I A. Solid state physics B. Quantum Mechanics and Applications	DSE-1	3	3
		Practical – VI : Elective – I Practical A. Solid state physics B. Quantum Mechanics and Applications	DSE-1A	2	1
	VI SEM	Paper – VII : Modern Physics	DSC-6	3	3
		Practical – VII : Modern Physics	DSC-6A	2	1
		Paper – VIII: Elective – II A. Basic Electronics B. Physics of Semiconductor Devices	DSE-2	3	3
		Practical – VIII : Elective – II Practical A. Basic Electronics B. Physics of Semiconductor Devices	DSE-2A	2	1

Total Number of Credits: 36

DSC: Discipline Specific Course (Core)
DSE: Discipline Specific Elective

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics) Semester I-Theory Syllabus

Paper – I: Mechanics

60 hrs
(4 hrs / week)

Unit – I

Vector Analysis (15Hours)

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field and related problems. Vector integration, line, urface and volume integrals. Stokes, Gauss and Greens theorems- simple applications.

Unit – II

Mechanics of Particles (8Hours)

Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section,

Mechanics of rigid bodies (7Hours)

Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor. Euler's equation, precession of a top, Gyroscope,

Unit – III
Central forces (15Hours)

Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws, Coriolis force and its expressions.

UnitIV
Special theory of relativity (15Hours)

Galilean relativity, absolute frames, Michelson-Morley experiment, Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four vector formalism.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008*.
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007*.
3. **First Year Physics** - *Telugu Academy*.
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.

Reference Books

1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
3. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
4. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
5. **Mechanics**. Hans & Puri. *TMH Publications*.
6. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
7. R P Feymman, RB Lighton and M Sands - The Feymman Lectures in Physics, Vol.-1, BI Publications,
8. J.C. Upadhyay - Mechanics.
9. P.K. Srivastava - Mechanics, New Age International.

FIRST SEMISTER PRACTICALS

Practical Paper – I :: Mechanics

45 hrs
2hrs/week

1. Study of a compound pendulum determination of ‘g’ and ‘k’.
2. Y’ by uniform Bending
3. Y by Non-uniform Bending.
4. Moment of Inertia of a fly wheel.
5. Measurement of errors –simple Pendulum.
6. ‘Rigidity moduli by torsion Pendulum.
7. Determination of surface tension of a liquid through capillary rise method.
8. Determination of Surface Tension of a liquid by different methods.
9. Determination of Viscosity of a fluid.
10. Calculation of slope and intercept of a Y= mX +C by theoretical method

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, “A laboratory manual for undergraduate classes” (Vani Publishing House, New Delhi).
2. S.P. Singh, “Advanced Practical Physics” (Pragati Prakashan, Meerut).
3. Workshop and Flint- Advanced Practical physics for students.
4. “Practical Physics” R.K Shukla, Anchal Srivastava
5. Practical Physics” Induprakash and Ramakrishna

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics)Semester II-Theory Syllabus

60 hrs
(4 hrs / week)

Paper – II: Waves and Oscillations

Unit – I

Fundamentals of vibrations (15Hours)

Simple harmonic oscillator, and solution of the differential equation– Physical characteristics of SHM, torsion pendulum, - measurements of rigidity modulus , compound pendulum, measurement of 'g', combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies, Lissajous figures

Unit – II

Damped and forced oscillations (15 Hours)

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with undamped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance, velocity resonance. Coupled Oscillators.

Unit – III

Vibrating Strings (15 Hours)

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport, transverse impedance

Unit – IV

Vibrations of bars (15 Hours)

Longitudinal vibrations in bars- wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the midpoint iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar- wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

NOTE: Problems should be solved at the end of every chapter of all units.

Text books and Reference books

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008*.
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007*.
3. **First Year Physics** - *Telugu Academy*.
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
5. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
6. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
7. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
8. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
9. **Mechanics**. Hans & Puri. *TMH Publications*.
10. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
11. **The Feymman Lectures in Physics, Vol.-1**, R P. Feymman, RB Lighton and M Sands, BI Publications,
12. **Mechanics**-P.K. Srivastava - New Age International.

45hrs

SECOND SEMISTER PRACTICALS

2hrs/week

Practical Paper – II :: Waves and Oscillations

1. Study of damping of an oscillating disc in Air and Water logarithmic decrement.
2. Study of Oscillations under Bifilar suspension.
3. Study of oscillations of a mass under different combination of springs.
4. Verification of Laws of a stretched string (Three Laws).
5. Determination of frequency of a Bar-Melde's experiment.
6. Observation of Lissajous figures from CRO.
7. Volume Resonator –determination of frequency of a tuning fork.
8. Velocity of Transverse wave along a stretched string.
9. Study of damping of a bar pendulum
10. Study of coupled oscillator.

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics)Semester III-Theory Syllabus

60 hrs
(4 hrs / week)

Paper – III: Thermal Physics

Unit – I

Kinetic theory of gases: (6 Hours)

Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

Thermodynamics: (9 Hours)

Basics of thermodynamics-Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature- Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

Unit – II

Thermodynamic potentials and Maxwell's equations: (8 Hours)

Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

Low temperature Physics: (7 Hours)

Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type.

Unit – III

Quantum theory of radiation: (15 Hours)

Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law, Rayleigh-Jeans law, Stefan's law from Planck's law.
Measurement of radiation using pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

Unit – IV

Statistical Mechanics: (15 Hours)

Introduction, postulates of statistical mechanics. Phase space, concept of ensembles and some known ensembles ,classical and quantum statistics and their differences, concept of probability, Maxwell-Boltzmann's distribution law -Molecular energies in an ideal gas- Maxwell-Boltzmann's velocity distribution law, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Application of B-E distribution to Photons-planks radiation formula, Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

Textbooks

1. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
2. **Second Year Physics** – *Telugu Academy.*
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co*.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education*.
2. Berkeley Physics Course. Volume-5. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies*.
3. **An Introduction to Thermal Physics** by Daniel V. Schroeder.*Pearson Education Low Price Edition.*
4. **Thermodynamics** by R.C. Srivastava, Subit K. Saha&Abhay K. *Jain Eastern Economy Edition.*
5. **Feyman's Lectures on Physics** Vol. 1,2,3& 4. *Narosa Publications*.

6 .B.B. Laud **"Introduction to statistics Mechanics"** (Macmillan 1981)

7. F.Reif**:"Statistical Physics "**(Mcgraw-Hill, 1998)

8. K.Haung: "**Statistical Physics "**(Wiley Eastern 1988)

45 hrs

THIRD SEMISTER PRACTICALS **2hrs/week**

Practical Paper – III :: Thermal Physics

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Calibration of thermo couple
6. Cooling Curve of a metallic body
7. Resistance thermometer
8. Thermal expansion of solids
9. Study of conversion of mechanical energy to heat.
10. Determination of the Specific of a solid (graphite rod)

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragathi Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics)Semester IV-Theory Syllabus

60 hrs
(4 hrs / week)

Paper – IV: Optics

Unit I

Interference: (15 Hours)

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light

Interference by division of wave front: Fresnel's biprism – determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes) – Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1,D_2 lines and thickness of a thin transparent plate.

Unit II:

Diffraction: (15 Hours)

Introduction – Distinction between Fresnel and Fraunhoffer diffraction Fraunhoffer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhoffer diffraction due to double slit – Fraunhoffer diffraction pattern with N slits (diffraction grating).Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel's diffraction-Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

Unit I1I:

Polarization (15 Hours)

Polarized light : Methods of Polarization, Polarization by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewster's law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

Unit IV:

Aberrations and Fiber Optics : (15 Hours)

Introduction – Monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration – the achromatic doublet – Removal of chromatic aberration of a separated doublet.

Fiber Optics : Introduction – Optical fibers – Types of optical fibers – Step and graded index fibers – Rays and modes in an optical fiber – Fiber material – Principles of fiber communication and advantages of fiber communication.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1.Optics by Ajoy Ghatak. *The McGraw-Hill companies*.
2.Optics by Subramaniyam and Brijlal. *S. Chand & Co*.
3.Fundamentals of Physics. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
4.Optics and Spectroscopy. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co*.
5.Second Year Physics – *Telugu Academy.*

Reference Books

1. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand& Co. Publications*.
2. **Feyman's Lectures on Physics** Vol. 1,2,3& 4. *Narosa Publications*.
3. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*
4. K. Ghatak, **Physical Optics'**
5. D.P. Khandelwal, Optical and Atomic Physics' (Himalaya Publishing House, Bombay,1988)
7. Smith and Thomson: 'Optics' (John Wiley and sons)

45 hrs

FOURTH SEMISTER PRACTICALS **2hrs/week**

Practical Paper – IV :: Optics

1. Thickness of a wire using wedge method.
2. Determination of wavelength of light using Biprism.
3. Determination of Radius of curvature of a given convex lens by forming Newton's rings.
4. Resolving power of grating.
5. Study of optical rotation-polarimeter.
6. Dispersive power of a prism
7. Determination of wavelength of light using diffraction grating minimum deviation method.
8. Wavelength of light using diffraction grating – normal incidence method.
9. Resolving power of a telescope.
10. Refractive index of a liquid and glass (Boy's Method).
11. Pulfrich refractometer – determination of refractive index of liquid.
12. Wavelength of Laser light using diffraction grating.

Note: Minimum of eight experiments should be performed Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Workshop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics)Semester V-Theory Syllabus

42 hrs
(3 hrs / week)

Paper – V : Electromagnetism

(DSE- Compulsory)

Unit I : Electrostatics (11 hrs)

Electric Field:- Concept of electric field lines and electric flux, Gauss law (Integral and differential forms), application to linear, plane and spherical charge distributions. Conservative nature of electric field E, irrotational field. Electric Potential: - Concept of electric potential, relation between electric potential and electric field, potential energy of a system of charges. Energy density in an electric field. Calculation of potential from electric field for a spherical charge distribution.

Unit II: Magnetostatics (12 hrs)

Concept of magnetic field B and magnetic flux, Biot-Savart's law, B due to a straight current carrying conductor. Force on a point charge in a magnetic field. Properties of B, curl and divergence of B, solenoid field. Integral form of Ampere's law, applications of Ampere's law: field due to straight, circular and solenoid currents. Energy stored in magnetic field. Magnetic energy in terms of current and inductance. Magnetic force between two current carrying conductors. Magnetic field intensity. Ballistic Galvanometer: - Torque on a current loop in a uniform magnetic field, working principle of B.G., current and charge sensitivity, electromagnetic damping, critical damping resistance.

Unit III: Electromagnetic Induction (9 hrs)

Faraday's laws of induction (differential and integral form), Lenz's law, self and mutual Induction. Continuity equation, modification of Ampere's law, displacement current, Maxwell equations

Unit IV: Electromagnetic waves (10 hrs)

Maxwell's equations in vacuum and dielectric medium, boundary conditions, plane wave equation: transverse nature of EM waves, velocity of light in vacuum and in medium, polarization, reflection and transmission. Polarization of EM waves, Brewster's angle, description of linear, circular and elliptical polarization.

Text Books

1. Fundamentals of electricity and magnetism By Arthur F. Kip (McGraw-Hill, 1968)

2. Electricity and magnetism by J.H.Fewkes & John Yarwood. Vol. I (Oxford Univ. Press, 1991).

3. Introduction to Electrodynamics, 3rd edition, by David J. Griffiths, (Benjamin Cummings,1998).

Reference Books

4. Electricity and magnetism By Edward M. Purcell (McGraw-Hill Education, 1986)

5. Electricity and magnetism. By D C Tayal (Himalaya Publishing House,1988)

6. Electromagnetics by Joseph A.Edminister 2nd ed.(New Delhi: Tata Mc Graw Hill, 2006).

36 hrs
2hrs/week

V SEMISTER Practicals Paper – V : Electromagnetism

PHYSICS LABORATORY

1. To verify the Thevenin Theorem
2. To verify Norton Theorem
3. To verify Superposition Theorem
4. To verify maximum power transfer theorem.
5. To determine a small resistance by Carey Foster's bridge.
6. To determine the (a) current sensitivity, (b) charge sensitivity, and (c) CDR of a B.G.
7. To determine high resistance by leakage method.
8. To determine the ratio of two capacitances by De Sauty's bridge.
9. To determine self-inductance of a coil by Anderson's bridge using AC.
10. To determine self-inductance of a coil by Rayleigh's method.
11. To determine coefficient of Mutual inductance by absolute method.

Note: Minimum of eight experiments should be performed.

Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books for Reference

1. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New Delhi.
2. Indu Prakash and Ramakrishna, A Text Book of Practical Physics, Kitab Mahal

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics)Semester V-Theory Syllabus
Paper-VI-A – Solid State Physics

42 hrs
(3hrs / week)

(DSE- Elective-I)

Unit-I (11hrs)

Crystal Structure: Solids Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis – Central and Non-Central Elements. Unit Cell. Miller Indices. Types of Lattices, Reciprocal Lattice. Brillouin Zones. Diffraction of X-rays by Crystals. Bragg's Law. Atomic and Geometrical Factor.

Elementary Lattice Dynamics: Lattice Vibrations and Phonons: Linear Monoatomic and Diatomic Chains. Acoustical and Optical Phonons. Qualitative Description of the Phonon Spectrum in Solids. Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids. T^3 law

Unit-II (11 hrs)

Magnetic Properties of Matter: Dia-, Para-, Ferri- and Ferromagnetic Materials. Classical Langevin Theory of dia–and Paramagnetic Domains. Curie's law, Weiss's Theory of

Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss.

Dielectric Properties of Materials: Polarization. Local Electric Field at an Atom. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mosotti Equation. Classical Theory of Electric Polarizability.

Unit-III (10 hrs)

Elementary band theory: Kronig Penny model. Band Gap. Brillouin zones, effective mass of electron. Conductor, Semiconductor (P and N type) and insulator. Conductivity of Semiconductor, mobility, Hall Effect, Electric Conductivity by four probe method & Hall coefficient.

UNIT IV (10 hrs)

Lasers: Einstein's A and B coefficients. Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion. Three-Level and Four-Level Lasers. Ruby Laser and He-Ne Laser.

Superconductivity: Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect. Idea of BCS theory. D.C and A.C Josephson effects.

Text Books:

1. Solid-state Physics, H. Ibach and H. Luth, 2009, Springer
2. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
3. Solid State Physics, M.A. Wahab, 2011, Narosa Publications
4. Solid State Physics – S. O. Pillai (New Age Publication)
5. Modern Physics by R.Murugesham

Reference Books:

1. Introduction to Solid State Physics, Charles Kittel, 8th Edition, 2004, Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, 2nd Edition, 2006, Prentice-Hall of India
3. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill
4. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning
5. Solid State Physics- R.K.Puri &V.K. Babbar (S.Chand Publication)2013
6. Lasers and Non linear Optics –B.B.Laud-Wiley Eastern.
7. LASERS: Fundamentals and Applications – Thyagarajan and Ghatak (McMillanIndia)

36 hrs
2hrs/week

V SEMISTER Practicals Paper – VI A
Solid State Physics

1. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method)
2. To measure the Magnetic susceptibility of Solids.
3. To determine the Coupling Coefficient of a Piezoelectric crystal.
4. To measure the Dielectric Constant of a dielectric Materials with frequency
5. To study the PE Hysteresis loop of a Ferroelectric Crystal.
6. To draw the BH curve of Fe using Solenoid & determine energy loss from Hysteresis.
7. To measure the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 150^0 C) and to determine its band gap.
8. To determine the Hall coefficient of a semiconductor sample.
9. Calculation of d-values of a given Laue‟s pattern.
10. Calculation of d-values of powder diffraction method.
12. To study the spectral characteristics of a Photo- Voltaic cell.
13. Verification of Bragg‟s equation.

Reference Books

• Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
• Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
• A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
• Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics) Semester V-Theory Syllabus

42 hrs
(3 hrs / week)

Paper-VI-B – QUANTUM MECHANICS AND APPLICATIONS

(DSE- Elective-I)

Unit-I (11 hrs)

Schrodinger equation & the operators: Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function Probability and probability current densities in three dimensions; Conditions for Physical Acceptability of Wave Functions. Normalization. Linearity and Superposition Principles. Hermitian operator, Eigen values and Eigen functions. Position, momentum and Energy operators; commutator of position and momentum operators; Expectation values of position and momentum. Wave Function of a Free Particle.

Unit II (11 hrs)

Time independent Schrodinger equation-Hamiltonian, stationary states and energy eigen values; expansion of an arbitrary wave function as a linear combination of energy eigen functions; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to spread of Gaussian wave-packet for a free particle in one dimension; wave packets, Fourier transforms and momentum space wave function; Position-momentum uncertainty principle.

Unit-III (10 hrs)

General discussion of bound states in an arbitrary potential- continuity of wave function, boundary condition and emergence of discrete energy levels; application to one-dimensional problem-square well potential; Quantum mechanics of simple harmonic oscillator-energy levels and energy eigen functions ground state, zero point energy & uncertainty principle. One dimensional infinitely rigid box- energy eigen values and eigen functions, normalization; Quantum dot as example; Quantum mechanical scattering and tunneling in one dimension across a step potential & rectangular potential barrier.

Unit-IV (10 hrs)

Atoms in Electric & Magnetic Fields: Electron angular momentum. Space quantization. Electron Spin and Spin Angular Momentum. Larmor's Theorem. Spin Magnetic Moment. SternGerlach Experiment. Zeeman Effect: Electron Magnetic Moment and Magnetic Energy, Gyromagnetic Ratio and Bohr Magneton. Atoms in External Magnetic Fields:- Normal and Anomalous Zeeman Effect. Paschen Back and Stark Effect (Qualitative Discussion only).

Text Books:

1. A Text book of Quantum Mechanics, P. M.Mathews and K.Venkatesan, 2nd Ed., 2010, McGraw Hill
2. Quantum Mechanics, Robert Eisberg and Robert Resnick, 2nd Edn., 2002, Wiley.
3. Quantum Mechanics, Leonard I. Schiff, 3rd Edn. 2010, Tata McGraw Hill.

Reference Books:

1. Quantum Mechanics, G. Aruldhas, 2nd Edn. 2002, PHI Learning of India.
2. Cohen-Tannoudji, B Diu and F Laloë, Quantum Mechanics (2 vols) Wiley-VCH 1977 • Basic Quantum Mechanics –A.Ghatak (Mc Millan India) 2012
3. Introduction to Quantum Mechanics, D.J. Griffith, 2nd Ed. 2005, Pearson • Quantum Physics----S. Gasiorowicz (Wiley India) 2013

36 hrs
2hrs/week

V – SEMESTER Practicals Paper – VI B

Quantum Mechanics and Applications

Use C/C++/Scilab for solving the following problems based on Quantum Mechanics like

1. Solve the s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom: Here, m is the reduced mass of the electron. Obtain the energy eigenvalues and plot the corresponding wave functions. Remember that the ground state energy of the hydrogen atom is ≈ -13.6 eV. Take e = 3.795 (eVÅ)1/2, ħc = 1973 (eVÅ) and m = 0.511x106 eV/c2.
2. Solve the s-wave radial Schrodinger equation for an atom: where m is the reduced mass of the system (which can be chosen to be the mass of an electron), for the screened coulomb potential Find the energy (in eV) of the ground state of the atom to an accuracy of three significant digits. Also, plot the corresponding wavefunction. Take e = 3.795 (eVÅ)1/2, m = 0.511x106 eV/c2, and a = 3 Å, 5 Å, 7 Å. In these units ħc = 1973 (eVÅ). The ground state energy is expected to be above -12 eV in all three cases.
3. Solve the s-wave radial Schrodinger equation for a particle of mass m: For the anharmonic oscillator potential for the ground state energy (in MeV) of particle to an accuracy of three significant digits. Also, plot the corresponding wave function. Choose m = 940 MeV/c2, k = 100 MeV fm-2, b = 0, 10, 30 MeV fm-3In these units, cħ = 197.3 MeV fm. The ground state energy I expected to lie between 90 and 110 MeV for all three cases.
4. Solve the s-wave radial Schrodinger equation for the vibrations of hydrogen molecule: Where μ is the reduced mass of the two-atom system for the Morse potential Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function. Take: m = 940x106eV/C2, D = 0.755501 eV, α = 1.44, ro = 0.131349 Å

Laboratory based experiments:

5. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency
6. Study of Zeeman effect: with external magnetic field; Hyperfine splitting
7. To show the tunneling effect in tunnel diode using I-V characteristics.
8. Quantum efficiency of CCDs

Reference Books:

1. Schaum's outline of Programming with C++. J.Hubbard, 2000,McGraw---Hill Publication
2. Numerical Recipes in C: The Art of Scientific Computing, W.H. Pressetal., 3rd Edn., 2007, Cambridge University Press.
3. An introduction to computational Physics, T.Pang, 2nd Edn.,2006, Cambridge Univ. Press • Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific & Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández.2014 Springer.
4. Scilab (A Free Software to Matlab): H. Ramchandran, A.S. Nair. 2011 S. Chand & Co.
5. Scilab Image Processing: L.M.Surhone.2010 Betascript Publishing ISBN:978-613345927

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics) Semester VI-Theory Syllabus

42 hrs
(3 hrs / week)

Paper-VII – MODERN PHYSICS

(DSC- Compulsory)

UNIT-I (11hrs)

Atomic Spectra and Models Inadequacy of classical physics:

Brief Review of Black body Radiation, Photoelectric effect, Compton effect, dual nature of radiation, wave nature of particles. Atomic spectra, Line spectra of hydrogen atom, Ritz Rydberg combination principle. Alpha Particle Scattering, Rutherford Scattering Formula, Rutherford Model of atom and its limitations, Bohr's model of H atom, explanation of atomic spectra, correction for finite mass of the nucleus, Bohr correspondence principle, limitations of Bohr model, discrete energy exchange by atom, Frank Hertz Expt. Somerfield's Modification of Bohr's Theory.

UNIT-II (11hrs)

Wave Particle Duality de Broglie hypothesis, Experimental confirmation of matter wave, Davisson Germer Experiment, velocity of de Broglie wave, wave particle duality, Complementarity. Superposition of two waves, phase velocity and group velocity , wave packets ,Gaussian Wave Packet , spatial distribution of wave packet, Localization of wave packet in time. Time development of a wave Packet; Wave Particle Duality, Complementarity . Heisenberg Uncertainty Principle, Illustration of the Principle through thought Experiments of Gamma ray microscope and electron diffraction through a slit. Time independent and time dependent Schrodinger wave equation. Estimation of ground state energy of harmonic oscillator and hydrogen atom, non-existence of electron in the nucleus. Uncertainty and Complementarities.

UNIT-III (9 hrs)

Nuclear Physics Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle. Nature of nuclear force, NZ graph, Liquid Drop model: semi-empirical mass formula and binding energy, Nuclear Shell Model and magic numbers.

Unit IV (11 hrs)

Radioactivity: stability of the nucleus; Law of radioactive decay; Mean life and half-life; Alpha decay; Beta decay- energy released, spectrum and Pauli's prediction of neutrino; Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus. Fission and fusion- mass deficit, relativity and generation of energy; Fission - nature of fragments and emission of neutrons. Nuclear reactor: slow neutrons interacting with Uranium 235; Fusion and thermonuclear reactions driving stellar energy (brief qualitative discussions), Classification of Elementary Particles

Text Books:

1. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
2. Modern Physics ---Murugesan and Sivaprasad –(S. Chand Higher Academics)
3. Introduction to Modern Physics, Rich Meyer, Kennard, Coop, 2002, Tata McGraw Hill
4. Introduction to Quantum Mechanics, David J. Griffith, 2005, Pearson Education.
5. Physics for scientists and Engineers with Modern Physics, Jewett and Serway, 2010, Cengage Learning. •
6. Quantum Mechanics: Theory & Applications, A.K.Ghatak & S.Lokanathan, 2004, Macmillan

Reference Books

1. Modern Physics – Bernstein, Fishbane and Gasiorowicz (Pearson India) 2010
2. Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles -- R. Eisberg (Wiley India) 2012 Additional Books for Reference
3. Modern Physics, J.R. Taylor, C.D. Zafiratos, M.A. Dubson, 2004, PHI Learning.
4. Theory and Problems of Modern Physics, Schaum`s outline, R. Gautreau and W. Savin, 2nd Edn, Tata McGraw-Hill Publishing Co. Ltd.
5. Quantum Physics, Berkeley Physics, Vol.4. E.H.Wichman, 1971, Tata McGraw-Hill Co.
6. Basic ideas and concepts in Nuclear Physics, K.Heyde, 3rd Edn., Institute of Physics Pub.
7. Six Ideas that Shaped Physics: Particle Behave like Waves, T.A.Moore, 2003, McGraw Hill
8. Modern Physics-Serway (CENGAGE Learnings) 2014
9. Physics of Atoms and Molecules – Bransden (Pearson India) 2003

36 hrs
2hrs/week

VI SEMISTER Practicals Paper – VII :
Modern Physics

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To determine the ionization potential of mercury.
5. To determine the absorption lines in the rotational spectrum of Iodine vapour.
6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
7. To setup the Millikan oil drop apparatus and determine the charge of an electron.
8. To show the tunneling effect in tunnel diode using I-V characteristics.
9. To determine the wavelength of laser source using diffraction of single slit.
10. To determine the wavelength of laser source using diffraction of double slits.
11. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating
12. To determine the value of e/m for electron by long solenoid method.
13. Photo Cell – Determination of Planck's constant.
14. To verify the inverse square law of radiation using a photo-electric cell.
15. To find the value of photo electric work function of a material of the cathode using a photo-electric cell.
16. Measurement of magnetic field – Hall probe method.
17. To determine the dead time of a given G.M. tube using double source.
18. Hydrogen spectrum – Determination of Ridge berg's constant
19. Energy gap of intrinsic semi-conductor
20. G. M. Counter – Absorption coefficients of a material.
21. To draw the plateau curve for a Geiger Muller counter.
22. To find the half-life period of a given radioactive substance using a G.M. Counter.

Reference Books

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Edn, 2011,Kitab Mahal

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics) Semester VI-Theory Syllabus

42 hrs
(3 hrs / week)

Paper-VIII-A : Basic Electronics

(DSE- Elective-II)

Unit-I: (10 hrs)
Network Elements and Network Theorems

Passive elements, Power sources, Active Elements, Network Models: T and π Transformations, Superposition theorem, Thevenin's Theorem, Norton's theorem. Reciprocity Theorem and Maximum power transfer theorem (Simple problems).
Two-port Networks – Introduction- Z-parameters, Y-parameters, h-parameters and ABCD-parameters (Simple problems).

Unit – II: (10 hrs)
Band theory of P-N junction

Energy band in solids (band theory), valence band, conduction band and forbidden energy gap solids, Insulators, semi conductors and, pure or intrinsic semiconductors and impurity or extrinsic semi-conductors. N-type extrinsic semi-conductors, P-type extrinsic semi-conductors, Fermi level, continuity equation.
Diodes: P-N junction diode, Bridge rectifier. Zener diode & its Characteristics. Zener diode as voltage regulator.

Unit-III: (11hrs)
Bipolar Junction Transistor (BJT) – p-n-p and n-p-n transistors, current components in transistors, CB, CE and CC configurations – transistor as an amplifier -RC coupled amplifier. (Qualitative analysis)
Feedback Concept & Oscillators: Feedback, General theory of feedback–Concepts of a Oscillators, Barkhausen's criteria, Phase shift Oscillator.

Unit-IV: (11 hrs)
Digital Electronics

Binary number system, converting Binary to Decimal and vice versa. Binary addition and subtraction (1's and 2's complement methods). Hexadecimal number system. Conversion from Binary to Hexadecimal – vice versa and Decimal to Hexadecimal vice versa.

Logic gates:
OR, AND, NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive – OR gate (EX-OR). De Morgan's Laws – Statement and proof.

NOTE: Problems should be solved from every chapter of all units.

Textbooks

1. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*
2. Principles of Electronics by V.K. Mehta – *S. Chand & Co.*
3. Basic Electronics (Solid state) – B. L. Theraja , S. Chand & Co.
4. A First Course in Electronics- Anwar A. Khan& Kanchan K. Dey, PHI.

Reference Books

1. Basic Electronics – Bernod Grob.
2. Third year Electronics – Telugu Academy
3. Digital Principles & Applications – A.P. Malvino and D.P. Leach
4. Circuit theory- Umesh.

36hours
2hrs/week

VI SEMISTER Practicals Paper – VIII_A :
Basic Electronics

1. AND, OR, NOT, gates – Truth table Verification
2. AND, OR, NOT – gates constructions using universal gates – Verification of truth tables.
3. NAND and NOR gates truth table verification
4. Characteristics of a Transistor in CE configuration
5. R.C. coupled amplifier – frequency response.
6. Verification of De Morgan‟s Theorem.
7. Zener diode V-I characteristics.
8. Verification Thevenin‟s theorem.
9. Maximum Power Transfer theorem
10. P-n junction diode V- I characteristics.
11. Zener diode as a voltage regulator
12. Construction of a model D.C. power supply
13. R C phase shift Oscillator –determination of output frequency

Note: Every student should complete minimum 06 experiments.

Text Books :

1. B.Sc. Practical Physics – C. L. Arora – S. Chand & Co.
2. Viva-voce in Physics – R.C. Gupta, Pragathi Prakashan, Meerut.
3. Laboratory manual for Physics Course by B.P. Khandelwal.
4. Practical Physics by M. Arul Thakpathi by Comptex Publishers.
5. B.Sc. practical physics – Subbi Reddy.

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA

B.Sc. (Physics) Semester VI-Theory Syllabus

42hrs
(3 hrs / week)

Paper-VIII-B : Physics of Semiconductor Devices

(DSE- Elective-II)

Unit-I: (11 hrs)

Semiconductor Physics: Conductors, Semiconductors, forbidden orbits, energy levels, crystals and covalent bonds, free electrons and holes, recombination and life-time, energy bands. Intrinsic Semiconductor- intrinsic carrier concentration, density of electrons in conduction band, fermi-level, mass action law. Carrier transport phenomena- mobility, resistivity, diffusivity, Einstein's relation, current density equation. Extrinsic semiconductor-N-type semiconductor, P-type semiconductor, energy band diagram of extrinsic semiconductor. Hall effect- mobility and Hall angle, experiment arrangement for the study of Hall effect, significance of Hall effect.

Unit – II: (11 hrs)

P-N junction-Depletion layer, Energy level diagram of P-N junction, Band structure of an open circuited p-n junction, Biasing of P-N junction, effect of barrier potential on forward bias, reverse leakage current, reverse breakdown, P-N junction under various conditions-thermal equilibrium, forward and reverse bias, current-voltage characteristics. Derivation of ideal diode equation of P-N junction, diode model and its approximations. Forward and reverse resistance of diode. Dynamic characteristic of diode.

Unit-III: (10 hrs)

Special diodes-Zener diode, Light –emitting diode (LED), Photo-diode, Schottky diode, Backward diodes and Tunnel diode.

Transistors- Bipolar junction transistor (BJT), transistor characteristics, transistor equation in active region, field effect transistor (FET), Phototransistor and MOSFETTs.

Unit-IV: (10 hrs)

Control devices- Shockley Diode, Silicon Controlled Rectifier (SCR), Silicon Controlled Switch (SCS), Unijunction transistor (UJT), Solar Cells, Opto-couplers.

Text books

1. A First Course in Electronics- Anwar A. Khan& Kanchan K. Dey, PHI
2. Physics of Semiconductor Devices- S. M. Sze
3. Physics of Semiconductors- Streetman

36 hrs
2hrs/week

VI SEMISTER Practicals Paper – VIII-B :

Physics of Semiconductor Devices

1. Characteristics of a Transistor in CE configuration
2. Zener diode V-I characteristics.
3. P-n junction diode V- I characteristics.
4. Zener diode as a voltage regulator
5. Determination of carrier concentration using Hall effect
6. Thermistor characteristics
7. Efficiency of a LED
8. Solar cell: fill factor and efficiency
9. FET characteristics
10. SCR characteristics
11. UJT characteristics

Note: Every student should complete minimum 06 experiments.

Text Books:

1. Basic electronics -Grob
2. Practical Electronics- Zbar

Department of Statistics,
Mahatma Gandhi University
B.Sc (Statistics) Three years paper, credits and marks distribution for theory and practical

B.A/B.Sc. I Year I Semester (CBCS)	Paper-I: Descriptive Statistics and Probability (DSC-2A)	4 HPW with 4 Credits and 100 Marks	Practical Paper – I (with 2 HPW, Credits 2 and Marks 50)
B.A/B.Sc. I Year II Semester (CBCS)	Paper-II: Probability Distributions (DSC-2B)	4 HPW with 4 Credits and 100 Marks	Practical Paper – II (with 2 HPW, Credits 2 and Marks 50)
B.A/B.Sc. II Year III Semester (CBCS)	Examination at the end of II Year III Semester (SEC-1)and Paper-III: Statistical Methods (DSC-2C)	2 HPW with 2 Credits and 50 Marks. 4 HPW with 4 Credits and 100 Marks	No Practical Examination at the end of Semester III) Practical Paper – III (with 2 HPW, Credits 2 and Marks 50)
B.A/B.Sc. III Year IV Semester (CBCS)	Examination at the end of III Year IV Semester (SEC-2) Paper-IV: Inference (DSC-2D)	2 HPW with 2 Credits and 50 Marks. 4 HPW with 4 Credits and 100 Marks	No Practical Practical Paper – IV (with 2 HPW, Credits 2 and Marks 50)
B.A/B.Sc. III Year V Semester (CBCS). Generic Elective-GE-1	Examination at the end of III Year V Semester, SEC-3 Examination at the end of III Year, Semester V Paper-V: Applied Statistics-I (DSC-2E). Examination at the end of III Year V Semester.	2 HPW with 2 Credits and 50 Marks. GE – 1 (with 2 HPW, Credits 2 and Marks 50). 3 HPW with 3 Credits	No Practical No Practical Practical Paper – V (with 2 HPW, Credits 1)

B.A/B.Sc. III Year V Semester (CBCS)	Paper-VI: Elective-II-A(SQC and LPP)(DSE-2E). Paper-VI: Elective-II-B (Bio-Statistics-I)(DSE-2E). Paper-VI: Elective-II-C (Actuarial Statistics-I) (DSE-2E)	3 HPW with 3 Credits. 3 HPW with 3 Credits 3 HPW with 3 Credits.	Practical Paper-VI (Practical using MS-Excel and TORA). Elective-II-A (with 2 HPW, Credits 1) Practical Paper VI – Elective IIB(with 2 HPW, Credits 1) Practical Paper –VI – Elective II-C (with 2 HPW, Credit 1)
B.A/B.Sc. III Year VI Semester (CBCS)	Examination at the end of III Year VI Semester. SEC-4	2 HPW with 2 Credits and 50 Marks	No Practical
Generic Elective-GE-2	Examination at the end of III Year, Semester VI	GE – 2 2 HPW, with Credits 2 and Marks 50	No Practical
B.A/B.Sc. III Year VI Semester (CBCS)	Examination at the end of III Year VI Semester. Paper-VII: Applied Statistics – 2 (DSC-2F) Examination at the end of III Year VI Semester ,Paper-VIII: Elective-II- A (Operations Research) (DSE-2F).	3 HPW with 3 Credits. 3 HPW with 3 Credits.	Examination at the end of Semester VI) Practical Paper – VII(with 2 HPW, 1 Credit) Examination at the end of Semester VI). Practical Paper – VII(with 2 HPW, 1 Credit)
B.A/B.Sc. III Year VI Semester (CBCS)	Examination at the end of III Year VI Semester) Paper-VIII: Elective-II-A (Operations Research)(DSE-2F). Examination at the end of III Year VI Semester) Paper-VIII: Elective-II-B (Bio-Statistics-II) (DSE-2F) Examination at the end of III Year VI Semester) Paper-VIII: Elective-II-C (Actuarial Statistics-II)(DSE-2F)	3 HPW with 3 Credits. 3 HPW with 3 Credits. 3 HPW with 3 Credits.	Examination at the end of Semester VI) Practical Paper-VIII– (Using MS-Excel and TORA). Elective – II-A (with 2 HPW, Credits 1) Examination at the end of Semester VI) Practical Paper-VIII –Elective-II-B (with 2 HPW, 1 Credit). Examination at the end of Semester VI) Practical Paper -VIII–Elective-II-C(with 2 HPW, 1 Credit)

Mahatma Gandhi University
B.A/B.Sc. I Year I Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of I Year I Semester)
Paper-I: Descriptive Statistics and Probability (DSC-2A)
(4 HPW with 4 Credits and 100 Marks)
Unit –I

Descriptive Statistics**:** Concept of primary and secondary data. Methods of collection and editing of primary data.Designing a questionnaire and a schedule.Sources and editing of secondary data.Classification and tabulation of data.Measures of central tendency (mean, median, mode, geometric mean and harmonic mean) with simple applications.Absolute and relative measures of dispersion (range, quartile deviation, mean deviation and standard deviation) with simple applications.Importance of moments, central and non-central moments, and their interrelationships, Sheppard's corrections for moments for grouped data. Measures of skewness based on quartilesand moments and kurtosis based on moments with real life examples.

UNIT-II

Probability: Basic concepts in probability—deterministic and random experiments, trail, outcome, sample space, event, and operations of events, mutually exclusive and exhaustive events, and equally likely and favourable outcomes with examples. Mathematical, statistical and axiomatic definitions of probability with merits and demerits. Properties of probability based on axiomatic definition. Conditional probability and independence of events.Addition and multiplication theorems for n events.Boole's inequality and Bayes' theorem.Problems on probability using counting methods and theorems**.**

UNIT-III

Random Variables: Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations. Distribution function and its properties.Transformation of one-dimensional random variable (simple 1-1 functions only).Notion of bivariate random variable, bivariate distribution and statement of its properties.Joint, marginal and conditional distributions.Independence of random variables**.**

UNIT-IV

Mathematical Expectation**:** Mathematical expectation of a function of a random variable. Raw and central moments and covariance using mathematical expectation with examples.
Addition and multiplication theorems of expectation.Definition of moment generating function (m.g.f), cumulant generating function (c.g.f), probability generating function (p.g.f) and characteristic function (c.f) and statements of their properties with applications.Chebyshev's , and Cauchy-Schwartz's inequalities and their applications.

List of reference books:

1.Charles M.Grinstead and Laurie Snell,J:Introduction to Probability,American Mathematical Society

2.Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley

3.V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi

4. GoonAM,GuptaMK,Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd.,Kolakota.

5. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.

6. M.JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.

7. Sanjay Arora and BansiLal:.New Mathematical Statistics : Satya Prakashan , New Delhi

8. Hogg.Tanis.Rao: Probability and Statistical Inference. 7^{th} edition. Pearson

9. SambhavyataAvadhiSiddantalu—TeluguAcademy

10. SahasambandhamVibhajanaSiddantamulu – TeluguAcademy

11. K.V.S. Sarma: Statistics Made Simple: do it yourself on PC. PHI

12. Gerald Keller: Applied Statistics with Microsoft excel. Duxbury, Thomson Learning.

13. Levine, Stephen, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel 4^{th} edition. Pearson Publication.

14. Abraham Kendall and Baker: Discrete Mathematics for Computer Science.

B.A/B.Sc. I Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester I)
Practical Paper – I (with 2 HPW, Credits 2 and Marks 50)

1. Basics of Excel- data entry, editing and saving, establishing and copying formulae, built in Functions in excel, copy and paste and exporting to MS word document. (Not for The Examination).
2. Graphical presentation of data (Histogram, frequency polygon, Ogives).
3. Graphical presentation of data (Histogram, frequency polygon, Ogives) using MS Excel
4. Diagrammatic presentation of data (Bar and Pie).
5. Diagrammatic presentation of data (Bar and Pie) using MS Excel
6. Computation of non-central and central moments – Sheppard's corrections for grouped data.
7. Computation of coefficients of Skewness and Kurtosis – Karl Pearson's and Bowley's β_1 and β_2.
8. Computation of Measures of central tendency, dispersion, Coefficient of Variation and coefficients of Skew -ness, Kurtosis using MS Excel.

Mahatma Gandhi University
B.A/B.Sc. I Year II Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of I Year II Semester)
Paper-II: Probability Distributions (DSC-2B)
(4 HPW with 4 Credits and 100 Marks)

UNIT-I

Discrete distributions**:** Uniform, Bernoulli, Binomial, Poisson, Negative binomial, Geometric and Hyper-geometric(mean and variance only) distributions their applications and uses.

UNIT-II

Properties of these distributions such as m.g.f, c.g.f., p.g.f., c.f., and moments up to fourth order and their real life applications. Reproductive property wherever exists. Binomial approximation to Hyper-geometric, Poisson approximation to Binomial and Negative binomial distributions.

UNIT-III

Continuous distributions: Rectangular and Normal distributions. Normal distribution as a limiting case of Binomial and Poisson distributions. Exponential, Gamma, Beta of two kinds (mean and variance only) and Cauchy (definition and c.f. only) distributions.

UNIT-IV

Properties of these distributions such as m.g.f., c.g.f., c.f., and moments up to fourth order, their real life applications and reproductive property wherever exists.
Statement and applications of weak law of large numbers,Strong law of large numbers and central limit theorem for identically and independently distributed (i.i.d) random variables with finite variance.

List of reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
2. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
3. GoonAM,Gupta MK,Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
4. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
5. M.JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.

6. Sanjay Arora and BansiLal:.New Mathematical Statistics : Satya Prakashan , New Delhi
7. Hogg.Tanis.Rao: Probability and Statistical Inference. 7th edition. Pearson
8. SambhavyataAvadhiSiddantalu—TeluguAcademy
9. SahasambandhamVibhajanaSiddantamulu – TeluguAcademy
10. K.V.S. Sarma: Statistics Made Simple: do it yourself on PC. PHI
11. Gerald Keller: Applied Statistics with Microsoft excel. Duxbury, Thomson Learning.
12. Levine, Stephen, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel 4th edition. Pearson Publication.
13. Abraham Kendall and Baker: Discrete Mathematics for Computer Science.
14. Charles M.Grinstead and Laurie Snell,J:Introduction to Probability,American Mathematical Society

B.A/B.Sc. I Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester II)
Practical Paper – II (with 2 HPW, Credits 2 and Marks 50)

1. Fitting of Binomial distribution – Direct method.
2. **Fitting of Binomial distribution – Direct method using MS Excel.**
3. Fitting of binomial distribution – Recurrence relation Method.
4. Fitting of Poisson distribution – Direct method.
5. **Fitting of Poisson distribution – Direct method using MS Excel.**
6. Fitting of Poisson distribution - Recurrence relation Method.
7. Fitting of Negative Binomial distribution.
8. Fitting of Geometric distribution.
9. Fitting of Normal distribution – Areas method.
10. Fitting of Normal distribution – Ordinates method.
11. Fitting of Exponential distribution.
12. **Fitting of Exponential distribution using MS Excel**.
13. Fitting of a Cauchy distribution.
14. **Fitting of a Cauchy distribution using MS Excel**.

Mahatma Gandhi University
B.A/B.Sc. II Year III Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of II Year III Semester)
Paper-III: Statistical Methods (DSC-2C)
(4 HPW with 4 Credits and 100 Marks)

Unit –I

Population correlation coefficient and its properties. Bivariate data, scattered diagram, sample correlation coefficient, computation of correlation coefficient for grouped data.
Correlation ratio, Spearman's rank correlation coefficient and its properties. Principle of least squares, simple linear regression,correlation verses regression, properties of regression coefficients.Concepts and computation of Partial and Multiple correlation coefficients (for 3 variables only).

Unit –II

Fitting of quadratic and power curves. Concepts of partial and multiple correlation coefficients (only for three variables). Analysis of categorical data, independence and association and partial association of attributes, various measures of association (Yule's) for two way data and coefficient of contingency (Pearson and Tcherprow), coefficient of colligation**.**

Unit – III

Concepts of population, parameter, random sample, statistic, sampling distribution and standard error. Standard error of sample mean(s) and sample proportion(s). Exact sampling distributions-Statement and properties of $\chi 2$, t and F distributions and their interrelationships. Independence of sample mean and variance in random sampling from normal distributions.

Unit – IV

Point estimation of a parameter, concept of bias and meansquare error of an estimate. Criteria of good estimator- consistency, unbiasedness, efficiency and sufficiency with examples. Statement of Neyman's Factorization theorem, derivations of sufficient statistics in case of Binomial, Poisson, Normal and Exponential (one parameter only) distributions. Estimation by method of moments, Maximum likelihood (ML), statements of asymptotic properties of MLE. Concept of interval estimation. Confidence intervals of the parameters of normal population by Pivot method.

List of Reference Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
2. Goon AM, Gupta MK,Das Gupta B : Outlines of Statistics , Vol-II, the World Press Pvt.Ltd.,Kolakota.
3. Hoel P.G: Introduction to matehematical statistics, Asia Publiushing house.
4 .Sanjay Arora and BansiLal:.New Mathematical Statistics Satya Prakashan , New Delhi
5.Hogg and Craig :Introduction to Mathematical statistics. Prentice Hall
6.Siegal,S.,and Sidney: Non-parametric statistics for Behavioral Science. McGraw Hill.
7GibbonsJ.D and SubhabrataChakraborti: Nonparametric Statistical Inference. Marcel Dekker.
8.ParimalMukhopadhyay: Mathematical Statistics. New Central Book agency.
9.Conover : Practical Nonparametric Statistics. Wiley series.
10.V.K.Rohatgi and A.K.Md.Ehsanes Saleh: An introduction to probability and statistics. Wiley series.
11.MoodAM,GraybillF A,Boe's DC. Introduction to theory of statistics. TMH
12. Paramiteyamariyuaparameteyaparikshalu. Telugu Academy.
13.K.V.S. Sarma: Statistics Made simple do it yourself on PC. PHI
14.Gerald Keller: Applied Statistics with Microsoft excel. Duxbury. Thomson Learning
15.Levin, Stephan, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel.4th edition. Pearson Publication.
16.Hogg, Tanis, Rao. Probability and Statistical Inference.7th edition. Pearson Publication.
17.Milton and Arnold(fourth Edition):Introduction to Probability and statistics,Tata Mcgraw hill Publication.

B.A/B.Sc. II Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester III)
Practical Paper – III (with 2 HPW, Credits 2 and Marks 50)

1. Generation of random samples from Uniform (0,1), Uniform (a,b) and exponential distributions.
2. Generation of random samples from Normal and Poisson distributions.
3. **Simulation of random samples from Uniform (0,1), Uniform (a,b),Exponential, Normal and Poisson distributions using MS Excel**.
4. Fitting of straight line and parabola by the method of least squares.
5. **Fitting of straight line and parabola by the method of least squares using MS Excel.**
6. Fitting of power curves of the type $y= a\, x^b$, $y=a\, b^x$ and $y=a\ e^{bx}$ by the method of least squares.
7. **Fitting of power curves of the type $y= a\, x^b$, $y=a\, b^x$ and $y=a\ e^{bx}$ by the method of least squares using MS Excel.**
8. Computation of Yule's coefficient of association.
9. Computation of Pearson's, Tcherprows coefficient of contingency.
10. Computation of correlation coefficient and regression lines for ungrouped data.
11. Computation of correlation coefficient, forming regression lines for ungrouped data.
12. Computation of correlation coefficient, forming regression lines for grouped data.
13. **Computation of correlation coefficient, forming regression lines using MS Excel.**
14. Computation of multiple and partial correlation coefficients.
15. **Computation of multiple and partial correlation coefficients using MS Excel.**
16. Computation of correlation ratio

Mahatma Gandhi University
B.A/B.Sc. II Year IV Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of II Year IV Semester)
Paper-IV: Inference (DSC-2D)
(4 HPW with 4 Credits and 100 Marks)

Unit –I

Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test. One and two tailed tests, test function (non-randomized and randomized). Neyman-Pearson's fundamental lemma for Randomized tests. Examples in case of Binomial, Poisson, Exponential and Normal distributions and their powers. Use of central limit theorem in testing.

Unit II

Large sample tests and confidence intervals for mean(s), proportion(s), standard deviation(s), and correlation coefficient(s**).**

Unit – III

Tests of significance based on $\chi 2$, t and F. $\chi 2$-test for goodness of fit and test for independence of attributes. Definition of order statistics and statement of their distributions.

Unit – IV

Non-parametric tests- their advantages and disadvantages, comparison with parametric tests. Measurement scale- nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon –Mann-Whitney U test, Wald Wolfowitz's runs test**.**

List of Reference Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand&Sons, New Delhi
2. Goon AM, Gupta MK,Das Gupta B : Outlines of Statistics , Vol-II, the World Press Pvt.Ltd.,Kolakota.
3. Hoel P.G: Introduction to matehematical statistics, Asia Publiushing house.
4 .Sanjay Arora and BansiLal:.New Mathematical Statistics Satya Prakashan , New Delhi
5.Hogg and Craig :Introduction to Mathematical statistics. Prentice Hall
6.Siegal,S.,and Sidney: Non-parametric statistics for Behavioral Science. McGraw Hill.
7GibbonsJ.D and SubhabrataChakraborti: Nonparametric Statistical Inference. Marcel Dekker.

8.ParimalMukhopadhyay: Mathematical Statistics. New Central Book agency.
9.Conover : Practical Nonparametric Statistics. Wiley series.
10.V.K.Rohatgi and A.K.Md.Ehsanes Saleh: An introduction to probability and statistics. Wiley series.
11.MoodAM,GraybillFA,Boe's DC. Introduction to theory of statistics. TMH
12. Paramiteyamariyuaparameteyaparikshalu. Telugu Academy.
13.K.V.S. Sarma: Statistics Made simple do it yourself on PC. PHI
14.Gerald Keller: Applied Statistics with Microsoft excel. Duxbury. Thomson Learning
15.Levin, Stephan, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel.4th edition. Pearson Publication.
16.Hogg, Tanis, Rao. Probability and Statistical Inference.7th edition. Pearson Publication.
17.Milton and Arnold(fourth Edition):Introduction to Probability and statistics,Tata Mcgraw hill Publication.

B.A/B.Sc. II Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester IV)
Practical Paper – IV (with 2 HPW, Credits 2 and Marks 50)

1. Large sample tests for mean(s), proportion(s), Standard deviation(s) and correlation coefficient.
2. Small sample tests for single mean and difference of means and correlation coefficient.
3. Paired t-test.
4. **Small sample tests for mean(s), paired t-test and correlation coefficient using MS Excel.**
5. Small sample test for single and difference of variances.
6. **Small sample test for single and difference of variances using MS Excel.**
7. $\chi 2$ – test for goodness of fit and independence of attributes.
8. **$\chi 2$ – test for goodness of fit and independence of attributes using MS Excel.**
9. **Nonparametric tests for single and related samples (sign test and Wilcoxon signed rank test) and one sample runs test.**
10. Nonparametric tests for two independent samples (Median test,Wilcoxon Mann Whitney - U test, Wald - Wolfowitz's runs test)

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MSWord for writing inferences.

Mahatma Gandhi University
B.A/B.Sc. III Year V Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of III Year V Semester)
Paper-V: Applied Statistics-I (DSC-2E)
(3 HPW with 3 Credits)

Unit –I

Design of Sample Surveys:

Concepts of population, sample, sampling unit, parameter, statistic, sample frame and standard error.

Principal steps in sample surveys - need for sampling, census versus sample surveys, sampling and non- sampling errors, sources and treatment of non-sampling errors, advantages and limitations of sampling.

Types of sampling: Subjective, probability and mixed sampling methods.

Methods of drawing random samples with and without replacement.Estimates of population mean, total, and proportion, their variances and the estimates of variances in the following methods.

(i) SRSWR and SRSWOR

(ii) Stratified random sampling with proportional and Neyman allocation, and

(iii) Systematic sampling when N= nk.

Comparison of relative efficiencies.Advantages and disadvantages of above methods of sampling.

Unit –II

Time series: -Time series and its components with illustrations, additive, multiplicative and mixed models. Determination of trend by least squares, moving average methods. Growth curves and their fitting with reference to Modified exponential, Gompertz and Logistic curves.

Determination of seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

Unit –III

Index Numbers: -Concept, construction, uses and limitations of simple and weighted index numbers. Laspeyer's, Paasche's and Fisher's index numbers, criterion of a good index numbers, problems involved in the construction of index numbers.Fisher's index as ideal index number. Fixed and chain base index numbers. Cost of living index numbers and wholesale price index numbers.Base shifting, splicing and deflation of index numbers.

List of reference books:

1. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand
2. ParimalMukhopadhyay : Applied Statistics . New Central Book agency.

3. Daroga Singh and Chowdhary: Theory and Analysis of Sample survey designs.Wiley Eastern.
4. M.R.Saluja : Indian Official Statistics. ISI publications.
5. B.L.Agarwal: Basic Statistics.New Age publications.
6. S.P.Gupta : Statistical Methods. Sultan Chand and Sons.
7. PratirupaSidhanthamulu – Telugu Academy.
8. PrayogaRachana and Visleshana – Telugu Academy.
13. K.V.S. Sarma: Statistics made simple : do it yourself on PC. PHI
14.Gerald Keller; Applied Statistics with Microsoft excel. Duxbury.Thomson Learning.
15Levine, Stephan, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel. Pearson Publication..
16. AnuvartitaSankhyakasastram – Telugu Academy.
17. Arora, SumeetArora,S.Arora: Comprehensive Statistical Methods. S.Chand.
18. A.M.Goon,M.K.Gupta,B.Dasgupta Fundamentals of Statistics Vol II World Press Private Ltd.,Calcutta
19. A.M.Goon,M.K.Gupta,B.Dasgupta An outline of Statistical Theory Vol II World Press Private Ltd.,Calcutta17.

B.A/B.Sc. II Year: Statistics Syllabus

(With Mathematics Combination)
(Examination at the end of Semester V)
Practical Paper – V (with 2 HPW, Credits 1)

Sampling Techniques:

1. Estimation of Population mean, population total and variance of these estimates by
2. Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR
3. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR
4. Systematic sampling with N = nk. Comparison of Systematic sampling with Stratified and SRSWOR

Time Series Analysis

5 Measurement of trend by method of least squares and moving averages.
6. Determination of seasonal indices by the method of Ratio to moving averages.
7. Determination of seasonal indices by the method of Ratio to trend.
8. Determination of seasonal indices by the method of link Relatives.

Index Numbers

9. Computation of all weighted indices.
10. Computation of Cost of living index number.
11. Base shifting, splicing and Deflation.

Statistical Quality Control

1. Construction of $\bar{x}$, **R** and σ- charts.
2. Construction of p and np charts with fixed n.
3. Construction of p and np charts with varying n.
4. Construction of c and u charts.
5. Construction of OC and ASN curves for single and double sampling plan.

Operations Research:

6. Solution of L.P. problem by Graphical method.
7. Solution of L.P. problem by simplex method.
8. Solution of L.P. problem by Big-M and two-phase simplex method.

B.A/B.Sc. III Year V Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of III Year V Semester)
Paper-VI: Elective-II-A(SQC and LPP)(DSE-2E)
(3 HPW with 3 Credits)

Unit – I

Statistical Quality Control

Importance of SQC in industry. Statistical basis of Shewhart control charts. Construction of control charts for variables (mean, range and standard deviation) and attributes (p , np, and c- charts with fixed and varying sample sizes). Interpretation of control charts.

Unit – II

Natural tolerance limits and specification limits, process capability index. Concept of Six sigma and its importance.

Acceptance sampling plans:. Concept of AQL and LTPD.Producers risk and consumer's risk Single and Double sampling plans for attributes and their OC and ASN functions. Design of single and double sampling plans for attributes using Binomial and Poisson distributions

Unit – III

Linear Programming:

Meaning and scope of OR. Convex sets and their properties.Definition of general LPP. Formulation of LPP.Solution of LPP by graphical method.Fundamental theorem of LPP.Simplex algorithm.Concept of artificial variables. Big –M /Penalty method and two-phase simplex methods. Concept of degeneracy and resolving it, Concept of duality, duality as LPP.Dual Primal relationship.

List of reference books

1. KantiSwaroop,P.K.Gupta and ManMohan: Operations Research. Sultan Chand.
2. D.C.Montgomary: Introduction to Statistical Quality Control. Wiley
3. V.K.Kapoor and S.C.Gupta L Fundamentals of Applied Statistics. Sultan Chand
4. Gass: Linear Programming. Mc Graw Hill.
7. Hadley : Linear programming. Addison-Wesley.
8. Wayne L. Winston : Operations Research. Thomson, India edition.4th edition.
9. ParimalMukhopadhyay : Applied Statistics . New Central Book agency
10. AnuvartitaSankhyakasastram – Telugu Academy.
11. R.C.Gupta: Statistical Quality Control.
12. Taha : Operations Research: An Introduction : Mac Millan.
13. ParikriyaParishodhana - Telugu Academy.
14. O.R.Models and Methods by Chandrasekhar Salimath and Bhupender Parashar,Univ.Press

B.A/B.Sc. III Year: Statistics Syllabus

(With Mathematics Combination)
(Examination at the end of Semester V)
Practical Paper-VI (Practical using MS-Excel and TORA)
Elective-II-A (with 2 HPW, Credits 1)

Time Series Analysis

1. Measurement of trend by method of least squares and moving averages.

2. Determination of seasonal indices by the method of Ratio to moving averages.
3. Determination of seasonal indices by the method of Ratio to trend.
4.. Determination of seasonal indices by the method of link Relatives.

Index Numbers

5. Computation of all weighted indices.
6. Computation of Cost of living index number.
7.. Base shifting, splicing and Deflation.

Statistical Quality Control

8 Construction of $\bar{x}$, **R** and σ- charts.
9. Construction of p and np charts with fixed n.
10. Construction of p and np charts with varying n.
11. Construction of c and u charts.
12. Construction of OC and ASN curves for single and double sampling plan.

Operations Research:

13. Solution of L.P. problem by Graphical method.
14. Solution of L.P. problem by simplex method.
15. Solution of L.P. problem by Big-M and two-phase simplex method.

Note 1: The Practical paper VI includes I and II semesters MS-Excel Practical's for examination.

Note 2: The question paper consists of TWO sections. Section A Consists of 3 Questions from Semester I And II. Section B consists of 3 questions from Semester V.

Mahatma Gandhi University
B.A/B.Sc. III Year V Semester (CBCS): Statistics Syllabus

(With Mathematics Combination)
(Examination at the end of III Year V Semester)
Paper-VI: Elective-II-B(Bio-Statistics-I)(DSE-2E)
(3 HPW with 3 Credits).

Unit – I

Bioassay

The purpose and structure of biological assay. Types of biological assays, direct assays, Ratio estimates, asymptotic distributions: Feller's theorem. Regression approach to estimating dose-response, relationships,

Unit – II

Logit and Probit approaches when dose-response curve for standard preparation is unknown, quantal responses, methods of estimation of parameters, estimation of extreme quantiles, dose allocation schemes, polychotomous quantal response, estimation of points on the quantal response function**.**

Unit – III

Statistical Genetics

Basic terminology of genetics.Frequencies of genes and genotypes, Mendal's law, Hardy-Weinberg equilibrium.Mating Frequencies, estimation of allele frequency (dominant /co dominant cases).Multiple alleles.

Approach to equilibrium for X-linked gene, natural selection, mutation, genetic drift, equilibrium when both natural selection and mutation are operative**.**

List of reference books:

1.D.J.Finney (1970): Statistical methods in Biological Assay. Charles Griffin.
2.Z.Govindarajulu (2000): Statistical Techniques in Bioassay. Karger Publishers/Panther Publishers.
3.C.C.Li (1976): First course in population genetics. Boxwood press, California.
4. Falcon and Mackay (1998) : Introduction to quantitative genetics. Longman
5.Cox.D.R. andOakes.D (1984): analysis of survival data. Chapman and Hall.
6.Miller, R.G. (12981): Survival analysis. John wiley.
7. Anil gore and S.A.Paranjpe (2000). A course in mathematical and statistical ecology. KulwerAcademic Publishers.
8. Rielon E.C (1977): An introduction to Mathematical Ecology. Wiley.
9. J.F.Lawless: Statistical models and methods of life data. Wiley.
10. James F Crow and Motoo Kimura: An Introduction to Population Genetics Theory. Alpha edition.

B.A/B.Sc. III Year: Statistics Syllabus
(With Mathematics Combination)

(Examination at the end of Semester V)
Practical PaperVI – Elective-II-B (with 2 HPW, Credits 1)

1. Estimation of relative potency and its standard error.
2.Fitting exponential growth model to data by linearization method.
3. Fitting logistic growth model.
4. Dose response relation and its estimation by least squares method.
5. Dose response relation and estimation by MLE method.
6. Estimation of extreme quantiles.
7. Estimation of points on the quantal response.
8. Hardy –Weinberg equilibrium frequencies.
9. Estimation of allele frequencies.
10. Effects of mutation and selection.

The above practical are to be carried out using MS Excel and Manually.

Note: Training shall be in establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS Word for writing inference.

(With Mathematics Combination)
(Examination at the end of III Year V Semester)
Paper-VI: Elective-II-C (Actuarial Statistics-I) (DSE-2E)
(3 HPW with 3 Credits).

Unit –I.

Utility theory, insurance and utility theory, models for individual claims and their sums, survival function, curate future lifetime, force of mortality.

Unit –II.

Life table and its relation with survival function examples, assumptions of fractional ages, some analytical laws of mortality select and ultimate tables**.**

Unit – III

Multiple life functions, joint life and last survivor status, insurance and annuity benefits through multiple life functions, evaluation for special mortality laws.
Multiple decrement models, deterministic and random survivorship groups, associated single decrement tables, central rates of multiple decrement, net single premiums and their numerical evaluations.

List of Reference books:

1. N.L.Bowers, H.U.Gerber, J.C.Hickman, D.A.Jones and C.J.Nesbitt (1986): Actuarial Mathematics, Society of Actuaries, Ithaca, Illinois,USA .
2. Neill,A.(1977): Life contingencies, Heineman.
3. Spurgeon E.T.(1972): Life contingencies, Cambridge University Press
4. Benjamin,B and Pollard,J.H(1980): Analysis of Mortality and other Actuarial Statistics.
5. Federation of Insurance Institutes study courses: mathematical basis of Life Assurance F.I.21 (Published by Federation if Insurance Institutes, Bombay).

B.A/B.Sc. III Year: Statistics Syllabus
(With Mathematics Combination)

(Examination at the end of Semester V)
Practical Paper –VI – Elective-II-C (with 2 HPW, Credit 1)

1. Computation of values of utility function.
2. Computation of various components of life tables.
3. Construction of multiple decrement table for deterministic survival group.
4. Determination of distribution function, survival function and force of mortality.
5. Construction of multiple decrement table for random survivorship group.

The above practical are to be carried out using MS Excel and Manually.

Note: Training shall be in establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS Word for writing inference.

B.A/B.Sc. III Year VI Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of III Year VI Semester)
Paper-VII: Applied Statistics – 2 (DSC-2F)
(3 HPW with 3 Credits)
Unit –I

Analysis of Variance and Design of Experiments

Statement of Cochran's theorem, ANOVA – one-way, two-way classifications with one observation per cell Expectation of various sums of squares, Statistical analysis, Importance and applications of design of experiments. Principles of experimentation,Concept of Gauss-Markoff linear model with examples, Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) including one missing observation, expectation of various sum of squares. Comparison of the efficiencies of above designs.

Unit –II

Vital statistics: Introduction, definition and uses of vital statistics. Sources of vital statistics, registration method and census method. Rates and ratios, Crude death rates, age specific death rate, standardized death rates, crude birth rate, age specific fertility rate, general fertility rate, total fertility rate. Measurement of population growth, crude rate of natural increase- Pearl's vital index. Gross reproductive rate sand Net reproductive rate, Life tables, construction and uses of life tables and Abridged life tables.

Unit –III

Demand Analysis: Introduction. Demand and supply, price elasticity of supply and demand. Methods of determining demand and supply curves, Leontief's ,Pigous's methods of determining demand curve from time series data, limitations of these methods Pigou's method from time series data. Pareto law of income distribution curves of concentration.

Official Statistics: - Functions and organization of CSO and NSSO. Agricultural Statistics, area and yield statistics. National Income and its computation, utility and difficulties in estimation of national income.

List of reference books:

1. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand
2. ParimalMukhopadhyay : Applied Statistics . New Central Book agency.
3. M.R.Saluja : Indian Official Statistics. ISI publications.
4. B.L.Agarwal: Basic Statistics.New Age publications.
5. S.P.Gupta : Statistical Methods. Sultan Chand and Sons.
6. PratirupaSidhanthamulu – Telugu Academy.
7. PrayogaRachana and Visleshana – Telugu Academy.

B.A/B.Sc. III Year: Statistics Syllabus

(With Mathematics Combination)
(Examination at the end of Semester VI)
Practical Paper – VII(with 2 HPW, 1 Credit)

Designs of Experiments

1. Analysis of CRD
2. Analysis of RBD with and without missing observation. Comparison of RBD with CRD
3. Analysis of LSD with and without missing observation. Comparison of LSD with RBD and CRD

Vital Statistics

4. Computation of Morality rates, Fertility rates and Reproduction rates.
5. Construction of life tables and abridged life tables.

Demand Analysis

6. Construction of Lorenz curve.
7. Fitting of Pareto law to an income data.

Operations Research and Reliability

1. Optimum solution to balanced and unbalanced transportation problem using North-West corner rule, Matrix minimum method and Vogel's approximation method for IBFS.

2. Solution of Assignment problem for both maximization and minimization

3.Solution of travelling salesman problem.

4. Computation of Optimal Sequence and idle time for N jobs on 2 and 3 machines.

5. Computation of System reliability for series, parallel and K out of N systems.

B.A/B.Sc. III Year VI Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of III Year VI Semester)
Paper-VIII: Elective-II-A (Operations Research)(DSE-2F)
(3 HPW with 3 Credits).

Unit-I

Transportation Problem:

Definition of transportation problem, TPP as a special case of LPP, Initial basic feasible solutions by North-West Corner Rule, Matrix minimum methods and VAM. Optimal solution through MODI tableau and stepping stone method for balanced and unbalanced transportation problem.
Degeneracy in TP and resolving it. Concept of Transshipment problem.

Unit-II

Assignment Problem:

Formulation and description of Assignment problem and its variations. Assignment problem as special case of TP and LPP. Unbalanced assignment problem, traveling salesman problem. Optimal solution using Hungarian method.

Unit-III

Sequencing Problems:

Problem of Sequencing. Optimal sequence of N jobs on two and three machines without passing.

Reliability: Introduction. Hazard function, Exponential distribution as life model, its memory-less property.Reliability function and its estimation.System reliability - series, parallel and k out of N systems and their reliabilities.

List of reference books

1. KantiSwaroop,P.K.Gupta and ManMohan: Operations Research. Sultan Chand.
2. S.K.Sinha: Reliability and life testing. Wiley Eastern
3. L.S.Srinath: Reliability Engineering. Affiliated East-West Press.
4. Wayne L. Winston : Operations Research. Thomson, India edition.4th edition.
5. Taha : Operations Research: An Introduction : Mac Millan.
6. O.R.Models and Methods by Chandrasekhar Salimath and BhupenderParashar University Press.

B.A/B.Sc. II Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester VI)
Practical Paper-VIII– (Using MS-Excel and TORA)
Elective – II-A (with 2 HPW, Credits 1)

Designs of Experiments

1. Analysis of CRD
2. Analysis of RBD with and without missing observation. Comparison of RBD with CRD
3. Analysis of LSD with and without missing observation. Comparison of LSD with RBD and CRD

Vital Statistics

4. Computation of Morality rates, Fertility rates and Reproduction rates.
5. Construction of life tables and abridged life tables.

Demand Analysis

6. Construction of Lorenz curve.
7. Fitting of Pareto law to an income data.

Operations research and Reliability:

1. Optimum solution to balanced and unbalanced transportation problem using North-West corner rule, Matrix minimum method and Vogel's approximation method for IBFS.

2. Solution of Assignment problem for both maximization and minimization

3.Solution of travelling salesman problem.

4. Computation of Optimal Sequence and idle time for N jobs on 2 and 3 machines.

4. Computation of System reliability for series, parallel and K out of N systems.

Note 1: The Practical paper VIII includes III and IV semesters MS-Excel Practical's for examination.

Note 2: The question paper consists of TWO sections. Section A Consists of 3 Questions from Semester III And IV. Section B consists of 3 questions from Semester VI.

Mahatma Gandhi University
B.A/B.Sc. III Year VI Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of III Year VI Semester)
Paper-VIII: Elective-II-B (Bio-Statistics-II) (DSE-2F)
(3 HPW with 3 Credits).

Unit – I

Survival Analysis

Survival functions and hazard rates. Types of censoring and likelihood in these cases. Life distributions- Exponential, Gamma, Weibull, Lognormal, Pareto. Linear failure rate. Point estimation, confidence intervals, scores, likelihood ratio, MLE, tests for these distributions.

Unit – II

Life Tables and ageing Process

Life tables, failure rates, mean residual life and their elementary properties, Ageing classes and their properties, Bathtub failure rate. Estimation of survival function.
Acturial estimator, Kaplan-Meier estimator, estimation under the assumption of IFR/ DFR.Tests of exponentiality against nonparametric classes, total time on test.

Unit – III

Quantitative Epidemiology

Introduction to modern epidemiology, principles of epidemiological investigation, surveillance and disease monitoring in populations.
Epidemiologic measures: Organizing and presenting epidemiologic data, measures of disease frequency, measures of effect and association, causation and casual inference. Design and analysis of epidemiologic studies.

List of reference books:

1. Cox.D.R. and Oakes.D (1984): analysis of survival data. Chapman and Hall.
2. Miller, R.G. (12981): Survival analysis. John wiley.
3. Anil gore and S.A.Paranjpe (2000). A course in mathematical and statistical ecology. KulwerAcademic Publishers.
4. Rielon E.C (1977): An introduction to Mathematical Ecology. Wiley.
5. J.F.Lawless: Statistical models and methods of life data. Wiley.
6. James F Crow and Motoo Kimura: An Introduction to Population Genetics Theory.

B.A/B.Sc. III Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of Semester VI)
Practical Paper-VIII –Elective- II-B (with 2 HPW, 1 Credit)

1. Selection and the Hardy -Weinberg test.
2. Genetic drift.
3. Parameter estimation in exponential and Weibull distributions—Type-I, Type-II Censoring.
4. LR tests for exponential and Weibull distribution.
5. Actuarial method of estimation.
6. Kaplan-Meier estimator.

The above practical are to be carried out using MS Excel and Manually.

Note: Training shall be in establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS Word for writing inference.

Mahatma Gandhi University
B.A/B.Sc. III Year VI Semester (CBCS): Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of III Year VI Semester)
Paper-VIII: Elective-II-C (Actuarial Statistics-II)(DSE-2F)
(3 HPW with 3 Credits)

Unit –I

Elements of compound interest (nominal and effective rate of interest)
Life annuities: single payment, continuous life annuities, discrete life annuities, life annuities with monthly payments, communication functions, varying annuities, recursions and complete annuities- immediate and apportionable annuities – due.

Unit – II

Net premiums: Continuous and discrete premiums, true monthly payment premiums, apportionate premiums, commutation functions, and accumulation type benefits.

Unit - III

Net premium reserves: continuous and discrete net premium reserve, reserves on a semi continuous basis, reserves based on true monthly premiums, reserves on an apportionable or accounted continuous basis reserves at fractional durations.

List of Reference books:

1. N.L.Bowers, H.U.Gerber, J.C.Hickman, D.A.Jones and C.J.Nesbitt (1986): Actuarial Mathematics, Society of Actuaries, Ithaca, Illinois,USA .
2. Neill,A.(1977): Life contingencies, Heineman.
3. Spurgeon E.T.(1972): Life contingencies, Cambridge University Press
4. Benjamin,B and Pollard,J.H(1980): Analysis of Mortality and other Actuarial Statistics.
5. Federation of Insurance Institutes study courses: mathematical basis of Life Assurance F.I.21 (Published by Federation if Insurance Institutes, Bombay).

B.A/B.Sc. III Year: Statistics Syllabus

(With Mathematics Combination)
(Examination at the end of Semester VI)
Practical Paper -VIII–Elective- II-C(with 2 HPW, 1 Credit)

1. Computation of compound interest (nominal and effective rate of interests).
2. Annuities and annuity dues.
3. Computation of discrete and continuous net premiums.
4. Annuities payable more frequently than one year.
5. Complete and special annuities.
6. Office premium a.
7. Assurances payable at the moment of death.

The above practical are to be carried out using MS Excel and Manually.

Note: Training shall be in establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS Word for writing inference.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

CURRICULUM FOR ZOOLOGY

IN UNDER GRADUATE DEGREE PROGRAMME CBCS SYLLABUS SCHEDULE 2016 – 2017

MAHATMA GANDHI UNIVERSITY

Year	Semester	Paper	Code	Course Type*	Title of the Paper	No. of Credits	No. of hours per week	Exam Hrs.	Max. Marks		
									I.A	End Exam	Total
I	I	I	BS105	DSC-2A Theory	Animal Diversity-Invertebrates	4	4	2	20	40	60
				DSC-2A Practical	Animal Diversity-Invertebrates	1	2	2	-	40	40
	II	II	BS205	DSC-2B Theory	Ecology, Zoogeography and Animal Behavior	4	4	2	20	40	60
				DSC-2B Practical	Ecology, Zoogeography and Animal Behavior	1	2	2	-	40	40
			BS301	SEC-1	SEC	2	2	2	10	40	50
II	III	III	BS305	DSC-2C Theory	Animal Diversity-Vertebrates and Developmental Biology	4	4	2	20	40	60
				DSC-2C Practical	Animal Diversity-Vertebrates and Developmental Biology	1	2	2	-	40	40
			BS401	SEC-2	SEC	2	2	2	10	40	50
	IV	IV	BS405	DSC-2D Theory	Cell Biology, Genetics and Evolution	4	4	2	20	40	60
				DSC-2D Practical	Cell Biology, Genetics and Evolution	1	2	2	-	40	40
III	V		BS501	SEC-3	SEC	2	2	2	10	40	50
			BS502	GE-1 Theory	Generic Elective	2	2	2	20	40	60
		V	BS504	DSC-2E Theory	Physiology and Biochemistry	3	3	2	20	40	60
				DSC -2E Practical	Physiology and Biochemistry	1	2	2	-	40	40
		VI	BS507	DSE-2E (A, B, C) Theory	Applied Zoology / Entomology/Sericulture	3	3	2	20	40	60
				DSE-2E (A, B, C) Practical	Applied Zoology / Entomology/Sericulture	1	2	2	-	40	40
	VI		BS601	SEC-4	SEC	2	2	2	10	40	50
			BS602	GE-2 Theory	Generic Elective	2	2	2	20	40	60
		VII	BS604	DSC-2F Theory	Immunology and Animal Biotechnology	3	3	2	20	40	60
				DSC-2F Practical	Immunology and Animal Biotechnology	1	2	2	-	40	40
		VIII	BS607	DSE- 2F (A, B, C) Theory	Aquatic Biology/Public Health and Hygiene / Poultry Science	3	3	2	20	40	60
				DSE- 2F (A, B, C) Practical	Aquatic Biology / Public Health and Hygiene / Poultry Science	1	2	2	-	40	40
						48	48				920

*DSC – Discipline Specific Course, DSE – Discipline Specific Elective, GE – Generic Elective, SEC – Skill Enhancement Course

B.Sc. ZOOLOGY MODEL PAPER
ZOOLOGY – CORE / ELECTIVE PAPER

Time: 3 hrs **Max. Marks: 40**

Section- I (Marks: 8x2=16 Marks)
Answer any TWO of the following
Draw labeled diagrams wherever necessary

1. ……..
   or
   ……..

2. ……..
   or
   ……..

Section- II (Marks: 4x4=16)
Answer any FOUR of the following
(Minimum One from each Unit)

3. ……..
4. ……..
5. ……..
6. ……..
7. ……..
8. ……..

Section- III (Marks: 8x1=8)
Answer EIGHT from the following
(TWO from each Unit)

9. ……..
10. ……..
11. ……..
12. ……..
13. ……..
14. ……..
15. ……..
16. ……..
17. ……..
18. ……..
19. ……..
20. ……..

B.Sc. I Year
I - SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
Animal Diversity – Invertebrates

Periods: 60 **Max. Marks: 40**

UNIT – I **(15 Periods)**

1.1 Brief history of Invertebrates

1.1.1 Kingdom Animalia
1.1.2 Brief history of Invertebrates

1.2 Protozoa

1.2.1 General characters
1.2.2 Classification up to classes with examples
1.2.3 Type study - *Elphidium*
1.2.4 Life cycle of *Plasmodium.*
1.2.5 Locomotion, Reproduction and Diseases

1.3 Porifera

1.3.1 General characters
1.3.2 Classification of Porifera up to classes with examples
1.3.3 Type study - *Sycon*
1.3.4 Canal system in sponges and Spicules.

UNIT – II **(15 Periods)**

2.1. Cnidaria

2.1.1 General characters
2.1.2 Classification of Cnidaria up to classes with examples
2.1.3 Type study - *Obelia*
2.1.4 Polymorphism in hydrozoa
2.1.5 Corals and coral reef formation

2.2 Platyhelminthes

2.1.1 General characters
2.1.2 Classification of Platyhelminthes up to classes with examples
2.1.3 Type study- *Schistosoma*

2.3 Nemathelminthes

2.3.1 General characters
2.3.2 Classification of Nemathelminthes up to classes with examples
2.3.3 Type study - *Dracunculus*
2.3.4 Parasitic Adaptations in Helminthes

UNIT – III **(15 Periods)**

3.1 Annelida

3.1.1 General characters
3.1.2 Classification of Annelida up to classes with examples
3.1.3 Type study - *Hirudinaria granulosa.*
3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

3.2.1 General characters
3.2.2 Classification of Arthropoda up to classes with examples
3.2.3 Type study - Prawn
3.2.4 Mouth parts of Insects
3.2.5 Insect metamorphosis
3.2.6 *Peripatus* - Structure and affinities

UNIT – IV **(15 Periods)**

4.1 Mollusca

4.1.1 General characters
4.1.2 Classification of Mollusca up to classes with examples
4.1.3 Type study - *Pila*
4.1.4 Pearl formation
4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

4.2.1 General characters
4.2.2 Classification of Echinodermata up to classes with examples
4.2.3 Water vascular system in star fish
4.2.4 Echinoderm larvae and their significance

4.3 Hemichordata

4.3.1 General characters
4.3.2 Classification of Hemichordata up to classes with examples
4.3.3 *Balanoglossus* - Structure and affinities

Suggested Readings

1. L.H. Hyman '*The Invertebrates' Vol I, II and V*. – M.C. Graw Hill Company Ltd.
2. Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. E.L. Jordan and P.S. Verma '*Invertebrate Zoology*' S. Chand and Company.
4. R.D. Barnes '*Invertebrate Zoology*' by: W.B. Saunders CO., 1986.
5. Barrington. E.J.W., '*Invertebrate structure and Function*' by ELBS.
6 P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
7. Parker, T.J. and Haswell '*A text book of Zoology*' by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).** *Invertebrate Zoology*, V Edition"

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
ANIMAL DIVERSITY - INVERTEBRATES

Periods: 30 **Max. Marks: 40**

1. **Study of museum slides / specimens / models (Classification of animals up to orders)**
   - *i.* **Protozoa:** Amoeba*, Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*
   - *ii.* **Porifera**: *Sycon, Spongilla, Euspongia, Sycon* - T.S & L.S, Spicules, Gemmule
   - *iv.* **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*
   - vi. **Platyhelminthes:** *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
   - *viii.* **Nemathelminthes:** *Ascaris(Male & Female), Drancunculus, Ancylostoma, Wuchereria*
   - x. **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
   - *xii.* **Arthropoda:** Cancer, Palaemon**,** Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male *&* female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.
   - *xiv.* **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
   - *xvi.* **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva
   - xviii. **Hemichordata:** *Balanoglossus,* Tornaria larva
2. **Dissections:**

   Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst
   Insect Mouth Parts
3. **Laboratory Record work shall be submitted at the time of practical examination**
4. An **"Animal album**" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.
5. **Computer aided techniques should be adopted – show virtual dissections**

Suggested manuals:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
ANIMAL DIVERSITY - INVERTEBRATES

Time: 2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of spots: (7 Museum specimens + 2 slides)	18
2. Dissection (one) (Diagram -02 + Dissection & Display-05)	07
3. Field Visit & Note Book	04
4. Project Work	03
5. Certified practical record	03
6. Animal Album	03
7. Viva voce	02

B.Sc. I Year
II - SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Periods: 60 **Max. Marks: 40**

UNIT – I **(15Periods)**

1.1 Ecology - I

1.1.1 Ecosystem structure and functions.
1.1.2 Types of Ecosystems –Aquatic and Terrestrial.
1.1.3 Biogeochemical cycles - Nitrogen, Carbon, Phosphorus and Water.
1.1.4 Energy flow in ecosystem.
1.1.5 Food chain, food web and ecological pyramids.
1.1.6 Animal Associations - Mutualism, commensalism, parasitism, competition, predation.

UNIT – II **(15 Periods)**

2.1 Ecology – II

2.1.1 Concept of Species, Population dynamics and Growth curves.
2.1.2 Community Structure and dynamics and Ecological Succession.
2.1.3 Ecological Adaptations.
2.1.4 Environmental Pollution – Sources, Effect and Control measures of Air, Water, Soil and Noise pollution,
2.1.5 Wildlife conservation - National parks and Sanctuaries of India, Endangered species.
2.1.6. Biodiversity and hotspots of Biodiversity in India.

UNIT – III **(15 Periods)**

3.1 Zoogeography

3.1.1 Zoogeographical regions – Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions - their Climatic and faunal peculiarities
3.1.2 Wallace line, Discontinuous distribution
3.1.3. Continental Drift

UNIT – IV **(15 Periods)**

4.1 Animal Behaviour

4.1.1 Types of Behaviour- Innate and Acquired, Instinctive and Motivated behaviour
4.1.2 Taxes, Reflexes, Tropisms
4.1.3 Physiology and phylogeny of learning, trial and error learning, Imprinting, habituation, Classical conditioning, Instrumental conditioning
4.1.5 Social behavior, Communication, Pheromones

4.1.6 Biological rhythms, Biological clocks, Circadian rhythms

Suggested Readings

M.P.Arora, '*Ecology*' Himalaya Publishing company.
P.D.Sharma, *Environmental Biology'*.
P.R.Trivedi and Gurdeep Raj. '*Environmental Ecology'*
Buddhadev Sarma and Tej Kumar, *Indian Wildlife Threats and Preservation*
Chapman J.L. and Reiss M.J, *Ecology Principles and Applications*, Second Ed., Cambridge University Press, London.
Benny Joseph, *Environmental Studies*, TATA MGraw Hill Com., New Delhi.
Eugene P. Odum, *Fundamentals of Ecology* Third Ed., NataraJ Publishers, Dehradun.
Veer Bala Rastogi, "Ecology and Animal Distribution"
P.K. Gupta, "Text Book of Ecology and Environment"
Bhatnagar and Bansal, "Ecology and Wildlife biology
Dasmann, "Wild life Biology"
Reena Mathur, "Animal Behaviour"
Alocock, "Animal Behaviour- an Evolutionary Approach

B.Sc. I Year
B.Sc. PRACTICAL SYLLABUS FOR II SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Periods: 30 **Max. Marks: 40**

1. Determination of pH of Soil and Water
2. Estimation of salinity (chlorides) of water in given samples.
3. Estimation of Carbonates and bicarbonates in the given water samples.
4. Estimation of dissolved oxygen of pond water, sewage water and effluents.
5. Identification of Zooplankton from a nearby water body.
6. Study of Pond Ecosystem **/** local polluted site - Report submission
7. Study of at least 3 endangered or threatened wild animals of India through photographs / specimens / models
8. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
9. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.
10. Observe the response of invertebrates in different lightening conditions

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

1**. Robert Desharnais,Jeffrey Bell,** 'Ecology Student Lab Manual, Biology Labs'
2. **Darrell S Vodopich,** 'Ecology Lab Manual'

B.Sc. I Year
PRACTICAL MODEL PAPER FOR II SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Time: 2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of Spots: (06 spots)	12
2. Estimation of dissolved oxygen of a pond,	09
3. Identify any **Five** Zooplankton in a given water samples	05
4. Field Visit & Note Book	04
5. Project Report	04
6. Certified practical record	04
7. Viva voce	02

B.Sc. II Year
III - SEMESTER
Discipline Specific Course, Paper – III
[Code: BS305; Course Type DSC 2C]
Animal Diversity- Vertebrates and Developmental Biology

Periods: 60 **Max. Marks: 40**

UNIT – I **(15 Periods)**

1.1. Urochordata, Cephalochordata, Cyclostomata

1.1.1. Salient features of Urochordata
1.1.2. Retrogressive metamorphosis and its significance in Urochordata
1.1.3. Salient features and affinities of Cephalochordata
1.1.4. General characters of Cyclostomata
1.1.5. Comparison of the *Petromyzon* and *Myxine*
1.1.6. General characters and classification of Chordata upto orders with examples.

1.2. Pisces

1.2.1. General characters of Fishes
1.2.2. Classification of fishes up to order level with examples
1.2.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.
1.2.4. Types of Scales and types of Fins

UNIT – II **(15 Periods)**

2.1. Amphibia

2.1.1. General characters of Amphibians
2.1.2. Classification of Amphibians up to orders with examples.
2.1.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.
2.1.4. Parental care in amphibian; neoteny and paedogenesis.

2.2 Reptilia

2.2.1. General characters of Reptilia
2.2.2. Classification of Reptilia up to orders with examples
2.2.3. *Calotes* – Respiratory system, Circulatory and Nervous system.
2.2.4. Temporal fosse in reptiles and its evolutionary importance
2.2.5. Distinguished characters of Poisonous and Non poisonous snakes.
2.2.6. Rhynchocephalia.

UNIT – III **(15 Periods)**

3.1. Aves

3.1.1. General characters of Aves
3.1.2. Classification of Aves up to orders with examples.
3.1.3. *Columba livia* -, Digestive system, Circulatory systems, Respiratory system and

Nervous system.
3.1.4. Migration in Birds
3.1.5. Flight adaptation in Birds

3.2. Mammalia

3.2.1. General characters of Mammalia
3.2.2. Classification of Mammalia up to orders with examples
3.2.3. Rabbit –Digestive, Respiratory, Circulatory and Nervous system.
3.2.4. Dentition in mammals.
3.2.5. Aquatic adaptations in Mammals.

UNIT – IV **(15 Periods)**

4.1 Developmental Biology and Embryology

4.1.1 Gametogenesis (Spermatogenesis and Oogenesis)
4.1.2 Fertilization
4.1.3 Types of eggs
4.1.4 Types of cleavages
4.1.5 Development of Frog up to formation of primary germ layers
4.1.6 Formation of Foetal membrane in chick embryo and their functions
4.1.7 Types and functions of Placenta in mammals
4.1.8 Regeneration in Turbellaria and Lizards

Suggested Readings:

1. E.L.Jordan and P.S. Verma '*Chordate Zoology*' -. S. Chand Publications.
2. Mohan P.Arora. '*Chordata – I*, Himalaya Publishing House Pvt.Ltd.
3. Marshal, Parker and Haswell '*Text book of Vertebrates*'. ELBS and McMillan, England.
4. Alfred Sherwood Romer. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS college Publishing, Saunders College Publishing
5. George C. Kent, Robert K. Carr. *Comparative Anatomy of the Vertebrates*, 9th ed. McGraw Hill.
6. Kenneth Kardong *Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed, 'McGraw Hill.
7. J.W. Young, *The Life of Vertebrates*, 3rd ed, Oxford University press.
8. Harvey Pough F, Christine M. Janis, B. Heiser, *Vertebrate Life,* Pearson, 6th ed, Pearson Education Inc.2002.

B.Sc. II Year

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Discipline Specific Course, Paper – III

[Code: BS305; Course Type DSC 2C]

Animal Diversity- Vertebrates and Developmental Biology

Periods: 30 **Max. Marks: 40**

Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
2. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
3. **Pisces:** Sphyrna *Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Auguilla, Protopterus,* Scales: Placoid, Cycloid, Ctenoid
4. **Amphibia:** *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous,Bufo,Rana,* Axolotal larva
5. **Reptilia :** *Draco, Chemaeleon, Gecko, Uromastix, Vipera russelli, Naja, Bungarus, Enhydrina, Typhlops, Testudo, Trionyx, Crocodilus, Ptyas.*
6. **Aves:** Archaeopteryx**,** *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo;* Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
7. **Mammalia:** *Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,* Hedgehog

Histology: T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lungs Artery, Vein, Bone T.S., Spinal cord.

Osteology :

1. Rabbit – Axial skeleton system (bones of Skull and Vertebral Column)
2. Varanus, Pigeon and Rabbit – Appendicular skeleton system (bones of limbs and girdles)

Dissections of *Labeo/Tilapia*:

1. Digestive system.
2. Brain, Weberian ossicles
3. V, VII, IX, X cranial nerves

Embryology

1. Study of T.S. of Testis and Ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

Laboratory Record work shall be submitted at the time of practical examination

An **"Animal album**" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

Computer aided virtual dissections.

Suggested manuals

1. **S.S.Lal,** Practical Zoology – Vertebrata
2. **P.S.Verma,** A manual of Practical Zoology – Chordata
3. **Freeman & Bracegirdle,** An atlas of embryology

B.Sc. II Year

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Discipline Specific Course, Paper – III

[Code: BS305; Course Type DSC 2C]

Animal Diversity- Vertebrates and Developmental Biology

Time: 2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of spots: (6 Museum specimens + 2 slides)	16
2. Osteology (02 Spots)	04
3. Dissection (one) (Diagram -02 + Dissection & Display-05)	07
4. Embryology (02 Spots)	04
5. Certified practical record	04
6. Animal Album	03
7. Viva voce	02

B.Sc. II Year
IV - SEMESTER
Discipline Specific Course, Paper – IV
[Code: BS405; Course Type DSC 2D]
Cell Biology, Genetics & Evolution

Periods: 60 **Max. Marks: 40**

UNIT – I **(15 Periods)**

1. Cell Biology

1.1. Cell theory, Differences of Prokaryotic and Eukaryotic cells
1.2. Ultrastructure of animal cell
1.3. Structure and functions of plasma membrane proteins.
1.4. Structure and functions of cell organelles –
Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
1.1.5 Chromosomes – Structure, types, giant chromosomes
1.1.6 Cell Division - Mitosis, Meiosis.
1.1.7. Cell cycle and its regulation.

UNIT – II **(15 Periods)**

2. Molecular Biology

2.1 DNA (Deoxyribo Nucleic Acid) - Structure
2.2 RNA (Ribo Nucleic Acid) - Structure, types
2.3 DNA Replication
2.4 Protein Synthesis – Transcription and Translation
2.5 Gene Expression – Genetic Code; operon concept
2.6 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

UNIT – III **(15 Periods)**

3. Genetics

3.1 Mendals laws of Inheritance and Non-Medelian Inheritance
3.2 Linkage and Crossing over
3.3.Sex determination and sex-linked inheritance
3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy.
3.5. Gene mutations- Induced versus Spontaneous mutations.
3.6. Inborn errors of metabolism.
3.7. One gene one enzyme, one gene one polypeptide theory.

UNIT – IV **(15 Periods)**

4. Evolution

4.1. Theories of evolution – Lamarckism and Neo-Lamarckism, Darwinism and Neo-Darwinism, Modern synthetic theory.
4.2. Evidences of Evolution and Hardy Weinberg Law.
4.3. Forces of Evolution – mutation, gene flow, genetic drift, and natural selection.
4.4. Isolation – Pre-mating and post mating isolating mechanisms
4.5. Speciation: Methods of speciation - Allopatric and sympatric
4.6. Causes and Role of Extinction in Evolution.

Suggested readings

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnel**l *'Molecular Cell Biology'* W.H. Free man and company New York.
2. **Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008).** *Principles of Genetics*. VIII Edition. Wiley India.
3. **Snustad, D.P., Simmons, M.J. (2009).** *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
4. **Klug, W.S., Cummings, M.R., Spencer, C.A. (2012).** *Concepts of Genetics*. X Edition. Benjamin Cummings.
5. **Russell, P. J. (2009).** *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
6. **Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B.** *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
7. **Ridley, M. (2004).** *Evolution*. III Edition. Blackwell Publishing
8. **Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007).** *Evolution*. Cold Spring, Harbour Laboratory Press.
9. **Hall, B. K. and Hallgrimsson, B. (2008).** *Evolution*. IV Edition. Jones and Bartlett Publishers
10. **Campbell, N. A. and Reece J. B. (2011).** *Biology*. IX Edition, Pearson, Benjamin, Cummings.
11. **Douglas, J. Futuyma (1997).** *Evolutionary Biology*. Sinauer Associates.
12. **Minkoff, E. (1983).** *Evolutionary Biology*. Addison-Wesley.
13. **James D. Watson, Nancy H. Hopkins** '*Molecular Biology of the Gene'*
14. **Jan M. Savage**. *Evolution*, 2nd ed, Oxford and IBH Publishing Co., New Delhi.
15. **Gupta P.K**., 'Genetics'

B.Sc. II Year

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Discipline Specific Course, Paper – IV

[Code: BS405; Course Type DSC 2D]

Cell Biology, Genetics and Evolution

Periods: 30 **Max. Marks: 40**

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
    i). Different stages of Mitosis and Meiosis
    ii) Lamp brush and Polytene chromosomes

II. Genetics

1. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

III. Evolution

1. Museum Study of Fossil animals: *Peripatus, Coelacanth Fish, Dipnoi fishes, Sphenodon, Archeopteryx*.
2. Study of homology and analogy from suitable specimens and pictures
3. Problems on Hardy-Weinberg Law
4. Macroevolution using Darwin finches (pictures)

Laboratory Record work shall be submitted at the time of practical examination

An **"Album**" containing photographs, cut outs, with appropriate write-up about Genetics and Evolution.

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

Manual of laboratory experiments in cell biology Edward, G.

B.Sc. II Year

B.Sc. PRACTICAL MODEL PAPER FOR IV SEMESTER

Discipline Specific Course, Paper – IV

[Code: BS405; Course Type DSC 2D]

Cell Biology, Genetics and Evolution

Time:2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of spots: (06 spots)	12
2. Prepare and Identify Mitotic divisions with onion root tips:	08
3. One Problem from Genetics	05
4. One Problem from Evolution	05
5. Certified practical record	05
6. Album	03
7. Viva voce	02

B.Sc. III Year
V - SEMESTER
Discipline Specific Course, Paper – V
[Code: BS504; Course Type DSC 2E]
Physiology and Biochemistry

Periods: 45 **Max. Marks: 40**

UNIT – I Physiology (15 Periods)

1.1 Digestion

1.1.1 Digestion definition and extra and intracellular digestion.
1.1.2 Digestion of Carbohydrates, Proteins, Lipids and Cellulose.
1.1.3 Absorption and Assimilation of digested food; role of Gastrointestinal hormones in digestion

1.2 Respiration

1.2.1 Definition of Respiration and Respiratory mechanisms – External, Internal and cellular.
1.2.2 Respiratory Pigments; Transport of oxygen, Oxygen dissociation curves. Bohr's effect.
1.2.3 Transport of CO_2 – Chloride shift; Regulation of respiration – nervous and chemical

1.5.1 Circulation

1.3.1 Types of circulation - Open and Closed circulation
1.3.2 Structure of Mammalian Heart, Types of hearts – Neurogenic and Myogenic; Heart function – Conduction and regulation of heart beat.
1.3.3 Regulation of Heart rate – Tachycardia and Bradycardia; Blood Clotting mechanism

1.4. Excretion
1.4.1 Classification of Animals on the basis of excretory products - Ammonotelic, Uricotelic, Ureotelic
1.4.2 Structure and function of Nephron.
1.4.3 Urine formation, Counter current mechanism.

UNIT – II Physiology (15 periods)

2.1. Muscle Contraction
2.1.1 Types of Muscles
2.1.2 Ultra structure of skeletal muscle fibre
2.1.3 Sliding Filament theory, muscle contraction mechanism and energetics.

2.2. Nerve Impulse

2.2.1 Structure of Neuron

2.2.2 Nerve impulse - Resting potential and Action potential and Conduction of Nerve impulse

2.2.3 Synapse, types of synapses and Synaptic transmission.

2.3. Endocrine System

3.3.1 Endocrine glands - Structure, secretions and functions of Pituitary, Thyroid, Parathyroid, Adrenal glands and Pancreas

3.3.2 Hormone action and concept of Secondary messengers

3.3.3 Male and Female Hormones, Hormonal control of Menstrual cycle in humans.

UNIT – III Physiology and Biochemistry (15 periods)

3.1. Homeostasis and Enzymes

3.1.1 Concept of Homeostasis.

3.1.2 Mechanism of Homeostasis.

3.1.3 Osmoregulation - Water and ionic regulation by freshwater, brackish water and marine animals

3.1.4 Enzymes: Definition, Classification, Inhibition and Regulation

3.2. Biomolecules and Metabolism

3.2.1. Carbohydrates**:** Classification and function of Carbohydrates

3.2.2. Carbohydrate metabolism - Glycolysis, Krebs cycle, , Electron transport and oxidative phosphorylation.

3.2.3 Proteins**:** Classification of proteins based on functions and Chemical nature

3.2.4 Protein Metabolism - Transamination, Deamination and Urea Cycle

3.2.5 Lipids**:** Classification of Lipids

3.2.6. Lipid Metabolism - Fatty acid synthesis and Fatty acid oxidation.

Suggested readings

Gerard J. Tortora and Sandra Reynolds Garbowski *Principles of Anatomy and Physiology*, Tenth Ed., John Wiley & Sons

Arthur C. Guyton MD, *A Text Book of Medical Physiology,* Eleventh ed., John E. Hall, Harcourt Asia Ltd.

William F. Ganong, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005

Sherwood, Klandrof, Yanc, *Animal Physiology*, Thompson Brooks/Coole, 2005.

Sherwood, Klandrof, Yanc, *Human Physiology*, Thompson Brooks/Coole, 2005.

Knut Scmidt-Nielson, *Animal Physiology***,** 5th ed, Cambridge Low Price Edition.

Roger Eckert and Randal, *Animal Physiology***,** 4th ed, Freeman Co, New York**.**

Singh. H.R, Text Book of Animal Physiology and Biochemistry

Nagabhushanam , Comparative Animal Physiology

Veer Bal Rastogi, Text Book of Animal Physiology

B.Sc. III Year PRACTICAL SYLLABUS
V - SEMESTER
Discipline Specific Course, Paper – V
[Code: BS504; Course Type DSC 2E]
Physiology and Biochemistry

Periods: 30 **Max. Marks: 40**

1. Qualitative tests for identification of carbohydrates, proteins and lipids.
2. Qualitative tests for identification of ammonia, urea and uric acid (Nitrogenous excretory products)
3. Effect of pH and Temperature on salivary amylase activity.
4. Study of permanent histological sections of Mammalian Endocrine glands - pituitary, thyroid, pancreas, adrenal gland.
5. Estimation of Haemoglobin by Sahlis method.
6. Estimation of total protein by Lowry's method.
7. Estimation of unit Oxygen consumption of fish with reference to body weight.

- **Laboratory Record work shall be submitted at the time of practical examination**

- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals

Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.

Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill

Guyton, A.C. and Hall, J.E. (2011). T*extbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company

Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H Freeman and Co.

Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.

Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper's Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

B.Sc. III Year PRACTICAL MODEL PAPER
V - SEMESTER
Discipline Specific Course, Paper – V
[Code: BS504; Course Type DSC 2E]
Physiology and Biochemistry

Time:2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of spots: (05 spots)	10
2. Estimation of …….from Biochemistry	06
3. Identification/Study of……from Physiology	06
4. Qualitative Test	06
5. Project Work	05
6. Certified practical record	05
7. Viva voce	02

B.Sc. III Year
VI – SEMESTER
Discipline Specific Elective, Paper – VI
[Code: BS507; Course Type DSE 2E]
Applied Zoology

Periods: 45 **Max. Marks: 40**

UNIT – I **(15 Periods)**

1. Aquaculture and Sericulture

1.1 Types of Fisheries; Fresh Water Fish and Prawn culture
1.2 Fresh water fishing gears and crafts; Induced Breeding.
1.3 Hatchery design and Management of fish and prawn; Transportation of fish and prawn seed.
1.4 Preservation, Processing and By-products of fishes.
1.5 Fish Diseases and control measures
1.6 Life cycle of *Bombyx mori*
1.7 Structure of silk gland and secretion of silk
1.8 Silkworm rearing technology.
1.9 Spinning, harvesting and storage of cocoons.
1.10 Silk worm Pests and Diseases: Uzi fly; Protozoan, Viral, Fungal and Bacterial; Control and prevention.
1.11 Prospects of Sericulture in India

UNIT – II **(15 Periods)**

2. Apiculture and Vermiculture

2.1 Selection of Bee Species for Apiculture.
2.2 Bee Keeping Equipment.
2.3 Methods of Extraction of Honey (Indigenous and Modern).
2.4 Bee Diseases and Enemies.
2.5 Products of Apiculture Industry and its Uses (Honey, Bees Wax).
2.6 Introduction of Vermiculture and Vermicomposting.
2.7 Vermiculture techniques.
2.8 Bedding, Essential parameters for Vermiculture and Management
2.9 Methods of Harvesting (Manual & Mechanical).
2.10 Economic Importance of Vermiculture.

UNIT – III **(15 Periods)**

3. Poultry Farming & Animal Husbandry

3.1 Classification of Fowls based on their use – Broilers and Commercial layers.
3.2 Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs.
3.3 Poultry diseases - Viral, Bacterial, Fungal, Protozoan

3.4 Management of a modern Poultry Farm, progressive plans to promote Poultry as a Self-Employment venture
3.5 Dairy farm and its management
3.6 Animal Husbandry – Introduction, Preservation of semen, artificial insemination of cattle, Induction of early puberty and synchronization of estrus in cattle

Suggested Readings

1. **Prost, P. J. (1962).** *Apiculture*. Oxford and IBH, New Delhi.
2. **Bisht. D.S.,** *Apiculture*, ICAR Publication.
3. **Singh S.,** *Beekeeping in India*, Indian council of Agricultural Research, New Delhi.
4. **Ullal S.R. and Narasimhanna, M.N.** Handbook of Practical Sericulture: CSB,Bangalore
5. **Jolly. M. S.** Appropriate Sericultural Techniques; Ed., Director, CSR & TI, Mysore.
6. Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co.
7. **Narasimhanna**, **M. N.** Manual of Silkworm Egg Production;, CSB, Bangalore 1988.
8. **Wupang—Chun and Chen Da-Chung**, Silkworm Rearing;, Pub. By FAO, Rome 1988.
9. **Sengupta**, **K.** A Guide for Bivoltine Sericulture; Director, CSR & TI, Mysore 1989.
10. **Krishnaswamy**, **S.** Improved Method of Rearing Young age silkworm;CSB,Bangalore,1986.
11. **Jhingran. V.G.** Fish and fisheries in India.,
12. **Khanna. S.S,** An introduction to fishes
13. **Santanam, B. *et al*,** A manual of freshwater aquaculture,
14. **Boyd. C.E. & Tucker.C.S**, Pond aquaculture water quality management,
15. **Biswas.K.P,** Fish and prawn diseases,
16. **Hafez, E. S. E. (1962)**. *Reproduction in Farm Animals*. Lea & Fabiger Publisher
17. **Dunham R.A. (2004).** *Aquaculture and Fisheries Biotechnology Genetic Approache*s. CABI
18. **Pedigo, L.P. (2002)**. *Entomology and Pest Management*, Prentice Hall.
19. **Lee,** Earthworm Ecology
20. **Stevenson,** Biology of Earthworms
21. **Ranganathan L.S,** Vermicomposting technology- soil health to human health

B.Sc. III Year PRACTICAL SYLLABUS
VI – SEMESTER
Discipline Specific Elective, Paper – VI
[Code: BS507; Course Type DSE 2E]
Applied Zoology

Periods: 30 **Max. Marks: 40**

1. Identification and study of important cultivable and edible fishes - Any five
2. Identification and study of important cultivable and edible crustaceans - Any five
3. Identification different larvae of silk worm- Using specimens / pictures
4. Identification of mulberry and non mulberry silkworms
5. Mounting of mouth parts of adult silk worm and silk gland of larva
6. Estimation of quality of milk from different dairy farm units – specific gravity, fat content, pH viscocity.
7. Identification of purity of Honey in different samples
8. Field visits to a Vermiculture / Sericulture / fisheries / apiculture / poultry / dairy farm-submission of any 3 Reports

- **Laboratory Record work shall be submitted at the time of practical examination**

- **Computer aided techniques should be adopted as per UGC guide lines.**

B.Sc. III Year PRACTICAL MODEL PAPER
VI – SEMESTER
Discipline Specific Elective, Paper – VI
[Code: BS507; Course Type DSE 2E]
Applied Zoology

Time: 2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of spots: - (05 spots)	10
2. Identification	06
3. Field trip reports (3)	12
4. Project Work	04
5. Certified practical record	04
6. Viva voce	04

B.Sc. III Year
VI - SEMESTER
Discipline Specific Elective, Paper – VI
[Code: BS507; Course Type DSE 2E]
Entomology

Periods: 45 **Max. Marks: 40**

UNIT – I: Basics of Entomology **(15 Periods)**

1.1. Definition, scope and importance of Entomology.
1.2. Insect classification and their distinctive characters.
1.3. Insect External morphology- Head, Thorax, and Abdomen.
1.4. Insect Internal Morphology – Digestive, Respiratory, Circulatory, Excretory, Nervous, and Reproductive systems.
1.5. Insect growth and development.

UNIT – II: Insect vectors and pests. **(15 Periods)**

2.1. Introduction and history of medical entomology
2.2. Vectors of public health importance – Mosquitoes, Housefly, Sand fly, Lice & Bedbugs
2.3. Vector-borne diseases- (Malaria, Dengue, Filaria) and their control measures.
2.4. Role of pests in Agriculture.
2.5. Crop Pests and their control measures

UNIT – III: Beneficial Insects and Harmful Insects **(15 Periods)**

3.1. Apiculture.
3.2. Lac culture.
3.3. Sericulture.
3.4. Social life of Insects.
3.5. Venomous Insects.

Practicals:

1. Identification and study of house hold Insects - Cockroach, Silver fish, Crickets
2. Identification and study of important Insect vectors – Mosquitoes, House fly, Head lice.
3. Mounting of mouth parts of mosquitoes.
4. Identification different larvae of silk worm- Using specimens / pictures.
5. Field visits to a Sericulture/ apiculture farm and submission of report.

References

1. Text Book of Applied Entomology Vol. I & II by K. P. Srivastava
2. General Applied Entomology by B V David and T N Anathakrishnan
3. Destructive and Useful Insects by C. L. Metcalf
4. A text book of Entomology by Mathur and Upadhay

B.Sc. III Year
V – SEMESTER
Discipline Specific Elective, Paper – VI
[Code: BS507; Course Type DSE 2E]
SERICULTURE

Periods: 45 **Max. Marks: 40**

UNIT – I – Introduction of Sericulture **(15 Periods)**

1.1 History of Sericulture and Present status of sericulture industry in India.
1.2 Sericulture as Agro-industry - Perspectives and prospects of Sericulture in India.
1.3 Geographical distribution of various species and economic races of silkworms - mulberry, tasar, eri and muga silkworm.
1.4 Types of silkworm host plants and their systematic position.
1.5 Morphology and anatomy of Silk glands

UNIT – II – Biology and diseases of Silkworms **(15 Periods)**

2.1 Life cycle, External morphology and biology of mulberry silkworm.
2.2 Internal morphology of Silkworm – Digestive, Respiratory, Nervous, Excretory, and Reproductive systems.
2.3 Influence of biotic and a biotic factor on the incidence of diseases.
2.4 Diseases of *Bombyx mor*i and *Philosamia ricini* —Viral, bacterial protozoan and fungal. Preventive and control measures.
2.5 Insect and vertebrate Pests of silkworm and their management.

UNIT – III – Silkworm Rearing **(15 Periods)**

3.1. Silkworm rearing house and rearing appliances.
3.2. Feeding and Rearing methods of mulberry silk worms.
3.3. Mounting and harvesting of mulberry silk cocoons.
3.4. Properties and composition of silk.
3.5. Commercial characters of cocoons and price fixation.

Practicals:

1. Identification of different types of silkworms.
2. Morphology of egg larva, pupa and adult of different silkworm types.
3. Life history of different silkworm types.
4. Dissection of digestive system and salivary gland of silkworm larva.
6. Dissection of the nervous system of larva silkworm.
7. Rearing appliances
8. Sex differentiation of Larva, Pupa and Adult silkworms
9. Calculation of Shell Ratio.

References:

1. Handbook of Practical Sericulture : Ullal, S.R. and Narasimhanna, M.N. (1987), Central Silk Board Publication, Bangalore.
2. FAO Manuals on Sericulture : Anonymous (1972), Vol. I-IV
3. Sericulture for Rural Development : Hanumappa (1978), Himalaya Publication,
4. The Silkworm, an Important Laboratory Tool : Tazima, Y. (1978), Kodansha Publications, Tokyo.
5. Control of Silkworm Reproduction, Development and Sex : Strunnikov, V.A. (1983), MIR Publications, Moscow.
6. Ericulture in India Sarkar, D.C. (1988), CSB, Bangalore.
7. Silkworm Rearing : Wupang—Chun and Chen Da-Chung (1988), Pub. By FAO.
8. Handbook of Silkworm Rearing : Anonymous (1972), Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan.
9. Improved Method of Rearing Young age silkworm : Krishnaswamy (1986), CSB Publication, Bangalore.

B.Sc. III Year
V- SEMESTER
Discipline Specific Course, Paper – VII
[Code: BS604; Course Type DSC 2F]
Immunology and Animal Biotechnology

Periods: 45 **Max. Marks: 40**

UNIT – I Immunology – Basic concepts; antigens and antibodies (15 Periods)

1.1 Basic concepts of immunology.
1.2 Cells of immune system
1.3 Primary and secondary Organs of immune system
1.4 Types of Immunity – Innate and acquired
1.5 Basic properties of antigens
1.6 Structure, function and types of an antibody.
1.7 B and T cell epitopes, haptens, adjuvants.
1.8 Antigen-antibody reactions,
1.9 T-Cell and B-Cell activation
1.10 Monoclonal antibodies and their production

UNIT – II Working of an Immune system; Immune system in health and disease (15 Periods)

2.1 Structure and functions of major histocompatibility complex.
2.2 Basic properties and functions of Cytokines, Interferons and complement proteins
2.3 Humoral and Cell mediated immunity.
2.4 Types of hyper sensitivity.
2.5 Concepts of autoimmunity and immunodeficiency.
2.6 Introduction to Vaccines and types of Vaccines

UNIT – III Animal Biotechnology and Genetically modified organisms (15 Periods)

3.1 Concept and Scope of Animal Biotechnology.
3.2 Cloning vectors - Plasmids, Cosmids, Lambda bacteriophage, YAC
3.3 Cloning- Cloning methods (Cell, Animal and Gene cloning)
3.4 Animal Cell culture - Equipment and materials for animal cell culture; applications of cell culture techniques
3.5 Recombinant DNA technology and its applications
3.6 Transgenesis – Methods of Transgenesis.
3.7 Production of Transgenic animals and Application of Transgenic animals in Biotechnology.
3.8 Stem cells –types and their applications

Suggested Readings

Arthur C. Guyton MD, *A Text Book of Medical Physiology,* Eleventh ed., John E. Hall, Harcourt Asia Ltd.
William F. Ganong, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
Sherwood, Klandrof, Yanc, *Human Physiology*, Thompson Brooks/Coole, 2005.
Knut Scmidt-Nielson, *Animal Physiology***,** 5th ed, Cambridge Low Price Edition.
Richard A. Glodsby, Thomas J Kind, Barbara A. Osborne, Janis Kuby, *Immunology,* 5th ed, Freeman and Co. New York
Ivan Roitt, *Immunology***,** 4th ed, Johanthan Brostoff, Moshy, London.
Thomas C. Chung, *General Parasitology***,** Hardcourt Brace and Co ltd. Asia. New Delhi.
Gerard D. Schmidt and Larry S Roberts, *Foundations of Parasitology***,** McGraw Hill
Kindt, T. J., Goldsby, R. A., Osborne, B. A., Kuby, J. (2006). VI Edition. Immunology. W.H. Freeman and Company.
Delves, P. J., Martin, S. J., Burton, D. R., Roitt, I.M. (2006). XI Edition. Roitt's Essential Immunology, Blackwell Publishing.

B.Sc. III Year PRACTICAL SYLLABUS
V- SEMESTER
Discipline Specific Course, Paper – VII
[Code: BS604; Course Type DSC 2F]
Immunology and Animal Biotechnology

Periods: 30 **Max. Marks: 40**

I. Immunology

1.Identification of Blood groups
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Enumeration of RBC & WBC from a given blood sample
4. Enumeration of Differential count of WBC from a given blood sample
5. Demonstration of
a. ELISA b. Immunoelectrophoresis
6. Identification of Autoimmune disease through charts.

II. Animal Biotechnology

1. Study the following techniques through photographs / virtual lab
    a. Southern blotting
    b. Western blotting
    c. DNA sequencing (Sanger's method)
    d. DNA finger printing
    e. Identification of Vectors
    f. Identification of Transgenic animals
2. PCR demonstration /virtual lab

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals

Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006). Immunology, VI Edition. W.H. Freeman and Company.
David, M., Jonathan, B., David, R. B. and Ivan R. (2006). Immunology, VII Edition, Mosby, Elsevier Publication.
Abbas, K. Abul and Lechtman H. Andrew (2003.) Cellular and Molecular Immunology. V Edition. Saunders Publication.

B.Sc. III Year PRACTICAL MODEL PAPER
V- SEMESTER
Discipline Specific Course, Paper – VII
[Code: BS604; Course Type DSC 2F]
Immunology and Animal Biotechnology

Time: 2 Hrs. **Max. Marks: 40**

1. Identification, labeled diagram and salient features of spots: (05 spots)	10
2. Identification/Determination from Immunology	06
3. Identification/Study the technique from Anima Biotechnology	06
4. Demonstration of a technique	06
5. Project Work	05
6. Certified practical record	05
7. Viva voce	02

B.Sc. III Year
VI - SEMESTER
Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
AQUATIC BIOLOGY

Periods: 45 **Max. Marks: 40**

UNIT – I Aquatic Biomes **(15 periods)**

1.1 Brief introduction of the aquatic biomes
1.2 Freshwater ecosystem (lakes, wetlands, streams and rivers),
1.3 Estuaries, intertidal zones,
1.4 Oceanic pelagic zone, marine benthic zone.
1.5 Coral reefs

UNIT – II Fresh Water Biology and Marine Biology **(15 periods)**

2.1 Lakes: Origin and classification of lakes
2.2 Lake as an Ecosystem, Lake morphometry
2.3 Physico-chemical Characteristics of fresh water bodies: Light, Temperature, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity: dissolved gases (Oxygen, Carbon dioxide).
2.4 Nutrient Cycles and Lakes- Nitrogen, Sulphur and Phosphorous.
2.5 Streams: Different stages of stream development, Physico-chemical environment, adaptation of hill-stream fishes.
2.6 Salinity and density of sea water; Continental shelf; Adaptation of deep sea organisms; Sea weeds.

UNIT – III Management of Aquatic Resources **(15 periods)**

3.1 Aquatic pollution - Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills,
3.2 Eutrophication
3.3 Management and conservation
3.4 Water pollution acts of India
3.5 Sewage treatment and water quality assessment - BOD and COD.

B.Sc. III Year PRACTICAL SYLLABUS
VI - SEMESTER
Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
AQUATIC BIOLOGY

Periods: 30 **Max. Marks: 40**

PRACTICAL

1. Study of the topography of a lake
2. Physico-Chemical and biological analysis of a lake
   Physico-Chemical analysis of water - O2, CO2, BOD, COD
   Biological– Zooplanktons – Identification and population density of Zooplanktons of a lake
3. Determination of - Turbidity / transparency, Dissolved Oxygen, Free Carbon dioxide, Alkalinity (carbonates & bicarbonates) in water collected from a nearby lake / water body.
4. Instruments used in limnology (secchi disc, van dorn bottle, conductivity meter, Turbidity meter, PONAR grab sampler) and their significance.
5. A Project Report on a visit to a Sewage treatment plant / Marine bio-reserve/Fisheries Institutes.

Suggested Readings

1. Ananthakrishnan : Bioresources Ecology 3rd Edition
2. Goldman – Limnology, 2nd Edition
3. Odum and Barrett – Fundamentals of Ecology, 5th Edition\
4. Pawlowski: Physicochemical Methods for water and Wastewater Treatment, 1st Edition
5. Wetzel: Limnology, 3rd edition
6. Trivedi and Goyal: Chemical and biological methods for water pollution studies

Welch: Limnology Vols.I-II

B.Sc. III Year
VI - SEMESTER
Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Public Health and Hygiene

Periods: 45 **Max. Marks: 40**

UNIT – I Nutrition, Environment and Health (15 Periods)

1.1 Classification of foods - Carbohydrates, proteins, lipids, vitamins and minerals
1.2 Balanced diet and malnutrition.
1.3 Nutritional deficiencies and disorders- Carbohydrates, proteins, lipids, vitamins and minerals.
1.4 Environment and health Impact assessment: concept, steps and applications.
1.5 Occupational, Industrial, agricultural and urban Health-Exposure at work place, urban areas, industrial workers, farmers and agricultural labourers, Health workers and health disorders and diseases.
1.6 Environmental pollution and associated Health hazards
1.7 Water borne diseases; Air borne diseases

UNIT-II Communicable and Non-Communicable diseases (15 Periods)

2.1 Causes, Symptoms, Diagnosis, Treatment and Prevention of Communicable diseases - Malaria, Filaria, Measles, Polio, Chicken pox, Rabies, Plague, Leprosy, Tuberculosis and AIDS.
2.2 Causes, Symptoms, Diagnosis, Treatment and Prevention of Non-Communicable diseases - Hypertension, Coronary Heart diseases, Stroke, Diabetes, Obesity and Mental ill-health.

UNIT-III Health Education in India (15 periods)

3.1 Health care legislation in India – termination of pregnancy act, Maternity benefit act, Transplantation of human organs act, Child Labour act, Biomedical waste act, ESI act.
3.2 WHO Programmes – Government and Voluntary Organizations and their health services
3.3 First Aid and Health awareness, personal health care record maintenance.

Suggested Readings

1. Park and Park, 1995: Text Book of Preventive and Social Medicine – Banarsidas Bhanot Publ. Jodhpur – India.
2. Public Health at the Crossroads Achievements and Prospects. Robert Beaglehole and Ruth
3. Bonita 2nd Edition Cambridge University Press 3. Maxcy Rosenau Last Public Health &
4. Preventive Medicine, Fourteenth Edition Ed RobertWallace, MD, et al. 4.
5. Epidemiology and Management for Health Care: Sathe, P.V. Sathe, A.P., PopularPrakashan,
6. Mumbai, 1991. 5.
7. International Public Health: Diseases, Programs, Systems, and Policies by
8. MichaelMerson, Robert E Black, Anne J Mills Jones and Bartlett Publishers. 6.

B.Sc. III Year PRACTICAL SYLLABUS
VI - SEMESTER
Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Public Health and Hygiene

Periods: 30 **Max. Marks: 40**

1. Medical fitness– Determine the following:
   BMI, Blood Pressure, Cholesterol (LDL, HDL) Heamoglobin
   Complete Blood Picture; Complete urine examination
2. Qualitative identification of carbohydrates, Lipids, vitamins, lipids and minerals,
3. Estimation of fat content and tests milk adulteration**.**
4. Qualitative and quantitative survey methods in public health sciences.
5. Identification of parasitic stages of malaria and filaria through permanent slides
6. Estimation of blood glucose level in a normal and diabetic persons.
7. Project report on Epidemiological survey, different diseases such as
   Malaria; Chicken gunya; AIDS, Diarrhoea
8. Epidemiological survey of a slum area to identify the diseases due to poor sanitation and contaminated drinking water.
9. Visit to a community water purification and treatment plant.
10. Visit to an industry to study occupational health hazard and safety of industrial workers (sugar/milk dairy/textile/cement).
11. Visit to agricultural fields to study occupational health of farmers and agricultural laborers.

- **Laboratory Record work shall be submitted at the time of practical examination**

- **Computer aided techniques should be adopted as per UGC guide lines.**

B.Sc. III Year PRACTICAL MODEL PAPER
VI - SEMESTER
Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Public Health and Hygiene

Time: 2 Hrs. **Max. Marks: 40**

1	Epidemiological survey report of a slum area health status	10
2	Estimation of ----- from food or water or milk	10
3	Project work	10
4	Certified practical record	05
5	Viva voce	05

B.Sc. III Year
VI - SEMESTER
Discipline Specific Elective, Paper – VIII
[Code: BS607; Course Type DSE 2F]
Poultry Science

Periods: 45 **Max. Marks: 40**

Unit -I: Poultry Nutrition and Physiology **15 hours**

1.1 Essential amino acids, proteins, fatty acids, vitamins and minerals their inter-relationships.
1.2 Functional regulation of digestion, absorption and metabolism of nutrients.
1.3 Feed formulation for different species and groups
1.4 Different systems of feeding wet mash, dry mash, crumble and pellet feeding. Feed Passage rate in G.I. tract in relation to digestion and absorption efficiency;
1.5 Characteristics features of endocrine glands. Endocrine control and variable factors influencing growth process

Unit II: Poultry Products technology **15 hours**

2.1 Structure, chemical composition and nutritive value of egg.
2.2 Various measures of egg quality. Shell, albumen and yolk quality assessment.
2.3 Factors influencing egg quality traits. Mechanism of deterioration of egg quality.
2.4 Different methods of preservation of table eggs and their relative merits and demerits.
2.5 Physical, chemicals, microbial and organoleptic evaluation of meat quality

Unit III: Poultry Health Management **15 hours**

3.1 Common diseases of poultry – bacterial, viral, fungal, protozoan, parasitic and other emerging diseases of poultry, their prevention, control and treatment.
3.2 Metabolic and nutrient deficiency diseases and disorders.
3.3 Vaccination programmes and Deworming programmes.
3.4 Control of coccidiosis, worms, ectoparasites and flies. Medication procedures.
3.5 Cleaning and disinfection of poultry houses. Drinking water sanitation

Practical

1. Estimation of amino acids, proteins and fatty acids in feed
2. Virtual demonstration of endocrine glands and their influence on growth of poultry
3. Estimation of albumen and yolk quantity in eggs
4. Estimation of calcium in egg shell.
5. Estimation of carotenes, cholesterol and peroxides in meat of chicken.

B.Com (Computers)

(w.e.f. 2016–2017)

First Year Syllabus (CBCS)

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FACULTY OF COMMERCE,
MAHATMA GANDHI UNIVERSITY
NALGONDA – 508 254 (T.S)

DEPARTMENT OF COMMERCE, M.G.U.

Structure of B.Com (Computers) (CBCS) for Mahatma Gandhi University, Nalgonda. (w.e.f. Academic Year 2016-17)

B.COM (Computers) PROGRAMME

FIRST YEAR:					
SEMESTER-I					
Sl.No.	***Code***	***Course Title***	***Course Type***	***HPW***	***Credits***
(1)	(2)	(3)	(4)	(5)	(6)
1.	BC101	Environmental Studies	AECC-1	2	2
2.	BC102	English	CC-1A	5	5
3.	BC103	Second Language	CC-2A	5	5
4.	BC104	Financial Accounting - I	DSC-1A	5	5
5.	BC105	Business Economics	DSC-2A	5	5
6.	BC106	Business Organization	DSC-3A	4	4
7.	BC107	Information Technology	DSC-4A	3T+2P	4
		Total		**31**	**30**
SEMESTER-II					
8.	BC201	Gender Sensitisation	AECC-2	2	2
9.	BC202	English	CC-1B	5	5
10.	BC203	Second Language	CC-2B	5	5
11.	BC204	Financial Accounting - II	DSC-1B	5	5
12.	BC205	Managerial Economics	DSC-2B	5	5
13.	BC206	Principles of Management	DSC-3B	4	4
14.	BC207	Management Information System	DSC-4B	3T+2P	4
		Total		**31**	**30**
SECOND YEAR:					
SEMESTER-III					
15.	BC301	Principles of Insurance	SEC-1	2	2
16.	BC302	English	CC-1C	5	5
17.	BC303	Second Language	CC-2C	5	5
18.	BC304	Advanced Accounting	DSC-1C	5	5
19.	BC305	Income Tax-I	DSC-2C	5	5
20.	BC306	Business Statistics-I	DSC-3C	4	4
21.	BC307	Programming with C	DSC-4C	3T+2P	4
		Total		**31**	**30**
SEMESTER-IV					
22.	BC401	Practice of Life Insurance	SEC-2	2	2
23.	BC402	English	CC -1D	5	5
24.	BC403	Second Language	CC-2D	5	5
25.	BC404	Corporate Accounting	DSC-1D	5	5
26.	BC405	Income Tax-II	DSC-2D	5	5
27.	BC406	Business Statistics-II	DSC-3D	4	4
28.	BC407	Objective Oriented Programming with C++	**DSE-4D**	**3T+2P**	**4**
		Total		**31**	**30**

THIRD YEAR:					
SEMESTER-V					
29.	BC501	Practice of General Insurance	SEC-3	2	2
30.	BC502		GE-1	2	2
31.	BC503	Cost Accounting	DSC-1E	4	4
32.	BC504	Business Law	DSC-2E	4	4
33.	BC505	Banking Theory & Practice	DSC-3E	4	4
34.	BC506	Auditing	DSC-4E	4	4
35.	**BC507**	Computerised Accounting	**DSE-1A**	**4T+2P**	**5**
36.	**BC508**	E-Commerce	**DSE-2A**	**4T+2P**	**5**
		Total		**32**	**30**
SEMESTER-VI					
37.	BC601	Regulation of Insurance Business	SEC-4	2	2
38.	BC602		GE-2	2	2
39.	BC603	Managerial Accounting	DSC-1F	4	4
40.	BC604	Company Law	DSC-2F	4	4
41.	BC605	Financial Institutions & Markets	DSC-3F	4	4
42.	BC606	Commerce Lab	DSC-4F	2T+4P	4
43.	**BC607**	Web Technologies	**DSE-1B**	**4T+2P**	**5**
44.	**BC608**	Relational Database Management Systems	**DSE-2B**	**4T+2P**	**5**
		Total		**34**	**30**
		GRAND TOTAL		**190**	**180**

AECC: Ability **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; T=Theory; P=Practicals;*

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC Language	8	5	40
	DSC	**8**	**5**	**40**
		16	**4**	**64**
4	**DSE**	**4**	**5**	**20**
5	GE	2	2	4
	TOTAL	**44**		**180**
	Commerce Total	**28**		**124**

SYLLABUS

Paper : (BC 104) : FINANCIAL ACCOUNTING - I

Paper: BC104 Max. Marks: 50
THPW: 5 Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *to acquire conceptual knowledge of basics of accounting and preparation of final accounts of sole trader.*

UNIT-I: ACCOUNTING PROCESS:

Financial Accounting: Introduction – Definition – Evolution – Functions-Advantages and Limitations – Users of Accounting Information- Branches of Accounting – Accounting Principles: Concepts and Conventions- Accounting Standards– Meaning – Importance – List of Accounting Standards issued by ASB -– Accounting System- Types of Accounts – Accounting Cycle- Journal- Ledger and Trial Balance. (Including problems)

UNIT-II: SUBSIDIARY BOOKS:

Meaning –Types - Purchases Book - Purchases Returns Book - Sales Book - - Sales Returns Book - Bills Receivable Book - Bills Payable Book – Cash Book - Single Column, Two Column, Three Column and Petty Cash Book - Journal Proper.(Including problems)

UNIT-III: BANK RECONCILIATION STATEMENT:

Meaning – Need - Reasons for differences between cash book and pass book balances –Favourable and over draft balances – Ascertainment of correct cash book balance (Amended Cash Book) - Preparation of Bank Reconciliation Statement. (Including problems)

UNIT-IV: RECTIFICATION OF ERRORS AND DEPRECIATION:

Capital and Revenue Expenditure – Capital and Revenue Receipts: Meaning and Differences - Differed Revenue Expenditure. Errors and their Rectification: Types of Errors - Suspense Account – Effect of Errors on Profit. (Including problems)

Depreciation (AS-6): Meaning – Causes – Difference between Depreciation, Amortization and Depletion - Objectives of providing for depreciation – Factors affecting depreciation – Accounting Treatment – Methods of depreciation: Straight Line Method - Diminishing Balance Method (Including problems)

UNIT-V: FINAL ACCOUNTS:

Final Accounts of Sole Trader: Meaning -Uses -Preparation of Manufacturing, Trading and Profit & Loss Account and Balance Sheet – Adjustments – Closing Entries.(Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Company.
2. Principles & Practice of Accounting: R.L.Gupta&V.K.Gupta, Sultan Chand.
3. Accountancy-I: S.P. Jain & K.L Narang, Kalyani Publishers.
4. Accountancy–I: Tulasian, Tata McGraw Hill Co.
5. Introduction to Accountancy: T.S.Grewal, S.Chand and Co.
6. Advanced Accountancy-I: S.N.Maheshwari& V.L.Maheswari, Vikas.
7. Fundamentals of Financial Accounting: Deepak Sehgil, Tax Mann Publication.
8. Financial Accounting: Jawahar Lal, Himalaya Publishing House.

Paper : (BC 105) : BUSINESS ECONOMICS

Paper: BC105 Max. Marks: 50
THPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective:*toacquire knowledge for application of economic principles and tools in business practices.*

UNIT-I: INTRODUCTION:
Business Economics: Meaning - Nature – Characteristics - Importance and Role - Micro & Macro Economics - Scope - Objectives - Law of Diminishing marginal utility - Law of Equi-marginal utility.

UNIT- II: DEMAND ANALYSIS:
Meaning – Function - Factors influencing Demand -Types of Demand -Demand Curve - Law of Demand –Exceptions to the law of demand-Elasticity of Demand: Concept - Types of elasticity of demand-price, income and cross Elasticity of Demand –measurement of elasticity—arc and point methods—Importance of various Elasticity of Demand

UNIT-III: SUPPLY ANALYSIS:
Law of Supply - Factors influencing Supply - Market Equilibrium- Consumer Surplus - Theory of Consumer behavior - Utility and indifference curve analysis.

UNIT–IV: PRODUCTION ANALYSIS:
Concept of Production –production function-Total Production - Marginal Production - Average Production –returns to a factor- Law of Variable Proportions - Law of Returns to Scale - Isocost – Isoquants - Economies and Dis-economies of Scale.

UNIT-V: COST AND REVENUEANALYSIS:
Theory of Cost - Concepts of Cost - Short run and Long run cost curves - Traditional and Modern Approaches -Revenue Curves–relationship between total marginal and average revenues- --Break Even Analysis—Meaning – Assumptions – Uses and Limitations.

SUGGESTED READINGS:
1. Business Economics: V. G. Mankar, Himalaya Publishing House
2. Managerial Economics: Vanith Agrawal, Pearson Education
3. Business Economics: H. L. Ahuja, S. Chand & Co. Ltd.
4. Business Economics : R. K. Lekhi, Kalyani Publishers
5. Business Economics: D. M. Mithani, Himalaya Publishing House
6. Business Economics: P. N. Chopra, Kalyani Publishers
7. Essential of Business Economics: D. N. Dwivedi, Vikas Publishers
8. Managerial Economics: Varshney and Maheswari, Sultan Chand
9. Business Economics: P. K. Mehta, Tax Mann Publication.

Paper : (BC 106) : BUSINESS ORGANISATION

Paper: BC106 Max. Marks: 50
THPW: 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: To acquaint the students with the basics of Commerce and Business concepts and functions and forms of Business Organization

UNIT-1: FUNDAMENTAL CONCEPTS:

Concepts of Business, Trade, Industry and Commerce - Classification - Relationship between Trade. Industry and Commerce - Nature of Business - Objectives of Business – Functions of Business- Social Responsibility of a business - Steps to Start an Enterprise

UNIT-II: BUSINESS ORGANIZATION:

Forms of Business Organization - Classification - Factors Influencing the Choice of Suitable Form of Organization - Sole Proprietorship – Meaning, Definition - Characteristics - Advantages and Disadvantages - Suitability of Sole Proprietorship - Partnership -Kinds of Partners - - Partnership Deed –- Meaning – Contents - Registration of Partnership Advantages and Disadvantages of Partnership - Suitability of Partnership - Limited liability partnership – Hindu Undivided Family - Meaning - Characteristics - Advantages and Disadvantages - Co-Operative Organization – Characteristics -Types of Co-Operative Societies - Limitations of Cooperatives.

UNIT-III: FORMATION OF JOINT STOCK COMPANY:

Joint Stock Company - Meaning - Definition - Characteristics - Advantages and Disadvantages - Kinds of Companies -Promotion - Stages of Promotion - Promoter - Characteristics - Kinds - Preparation of Important Documents - Memorandum of Association - Clauses - Articles of Association - Contents – Prospectus - Contents – Red herring Prospectus- Statement in lieu of Prospectus.

UNIT-IV: SOURCES OF FINANCE:

Industrial Finance - Long Term and Short Term Finance - Fixed and Working Capital Finance - Sources of Corporate Finance (A brief introduction to Shares and Debentures, Retained Earnings, Underwriting, Inter Company Investments and Venture Capital, Angel Investors, lease, hire purchase, franchising) .

UNIT V: STOCK EXCHANGE AND MUTUAL FUNDS:

Stock Exchange, Functions — Working of Stock Exchanges, Mutual Funds –Importance, Functions, Types — Role of SEBI in Regulating Stock Exchanges and Mutual Funds in India

SUGGESTED READINGS:

1. Business Organization & Management: Sharma Shashi K. Gupta, Kalyani Publishers
2. Business Organization: Sharma Shashi K. Gupta, Kalyani publishers.
3. Organization & Management: R. D. Agarwal, McGraw Hill.
4. Modern Business Organization: S.A. Sherlekar, V.S. Sherlekar, Himalaya Publishing House
5. Business Organization & Management: C.R. Basu, Tata McGraw Hill
6. Business Organization & Management: R. N. Gupta, S. Chand,
7. Organizational Behaviour Text & Cases: V.S.P. Rao, Himalaya Publishing House
8. Business Organization & Management: Uma Shekaram, Tata McGraw Hill
9. Business Organization & Management: Niranjan Reddy & Surya Prakash, Vaagdevi publishers.
10. Business Organisation and Management, Dr. Neeru Vasihth, Tax Mann Publications.

Paper : (BC 107) : INFORMATION TECHNOLOGY

Paper: BC 107 Max. Marks: 35T + 15P
THPW: 5 (3T & 2P) Time: 3 Hrs.
Credits :4

Objective: *to acquire basic knowledge in Information Technology and its applications in the areas of business.*

UNIT-I: INTRODUCTION:
Introduction to computers - Generations of computers – An overview of computer system - Types of computers - Input & Output Devices.
Hardware: Basic components of a computer system - Control unit – ALU - Input/output functions - Memory – RAM – ROM – EPROM - PROM and Other types of memory.

UNIT-II: OPERATING SYSTEM (OS):
Meaning - Definition & Functions - Types of OS - Booting process - DOS – Commands (internal & external) - Wild card characters – Virus & Hackers – Cryptography & cryptology.
Windows: Using the Start Menu –Control Panel – Using multiple windows – Customizing the Desktop – Windows accessories (Preferably latest version of windows or Linux Ubuntu).

UNIT-III: WORD PROCESSING:
Application of word processing - Menus & Tool Bars - Word processor – Creating – Entering - Saving & printing the document - Editing & Formatting Text - Mail Merge and Macros (Preferably latest version of MS Word or Libre Office Writer).

UNIT-IV: SPREAD SHEET:
Application of work sheet/spread sheet - Menus & Tool bars - Creating a worksheet - Entering and editing of numbers - Cell reference - Worksheet to analyze data with graphs & Charts.
Advanced tools: Functions – Formulae – Formatting numbers - Macros – Sorting - Filtering - Validation & Consolidation of Data (Preferably latest version of MS Excel or Libre Office Calc).

UNIT-V: POWER POINT PRESENTATION:
Application of Power Point Presentation – Menus & Tool bars – Creating presentations – Adding - Editing and deleting slides - Templates and manually – Slide show – Saving - Opening and closing a Presentation – Types of slides - Slide Views - Formatting – Insertion of Objects and Charts in slides - Custom Animation and Transition (Preferably latest version of MS Power Point presentation - Libre Office Impress).
Internet & Browsing: Services available on internet – WWW – ISP – Browsers.
Multimedia: Application of multimedia – Images – Graphics - Audio and Video – IT security.

SUGGESTED READINGS:

1. Introduction to Computers: Peter Norton, McGraw Hill.
2. Fundamentals of Information Technology: Dr. NVN Chary, Kalyani Publishers.
3. Computer Fundamental: Anitha Goel, Pearson.
4. Information Technology Applications for Business: Dr. S. Sudalaimuthu, Himalaya
5. Introduction to Information Technology: ITL ESL, Pearson.
6. Introduction to Information Technology: V. Rajaraman, PHI.
7. Fundamental of Computers: Balaguruswamy, McGraw Hill.
8. PC Software under Windows: Puneet Kumar, Kalyani Publishers.
9. Information Technology and C language: Rajiv Khanna, New Age International.
10. Fundamentals of Information Technology: Alexis Leon, Vikas Publishing House.
11. Informational Technology: P. Mohan, Himalaya Publishing House.
12. Information Technology: R. Renuka, Vaagdevi Publishers.
13. OS-Linux Spoken Tutorials & Libre Office Spoken Tutorials by IIT Bombay.
14. Fundamentals of Information Technology: Rajiv Midha, Tax Mann Publications.

Paper : (BC 204) : FINANCIAL ACCOUNTING-II

Paper: BC204 Max. Marks: 50
THPW: 5Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *to acquire accounting knowledge of bills of exchange and other business accounting methods.*

UNIT-I: BILLS OF EXCHANGE:

Bills of Exchange - Definition- Distinction between Promissory note and Bills of exchange-Accounting treatment of Trade bills: Books of Drawer and Acceptor- Honour and Dishonour of Bills- Renewal of bills- Retiring of bills under rebate- Accommodation bills.(Including problems)

UNIT-II: CONSIGNMENT ACCOUNTS:

Consignment – Meaning – Features– Proforma invoice - Account sales – Del crederecommission-Accounting treatment in the books of the consignor and the consignee - Valuation of consignment stock –Treatment of Normal and abnormal Loss - Invoice of goods at a price higher than the cost price. (Including problems)

UNIT-III: JOINT VENTURE ACCOUNTS:

Joint Venture – Meaning –Features-Difference between Joint Venture and Consignment- Accounting Procedure-Methods of Keeping Records for Joint Venture Accounts-Method of Recording in co-ventures books-Separate Set of Books Method- Joint Bank Account-Memorandum Joint Venture Account (Including problems)

UNIT-IV: ACCOUNTS FROM INCOMPLETE RECORDS:

Single Entry System – Meaning -Features–Difference between Single Entry and Double Entry systems -Defects in Single Entry System - Books and accounts maintained - Ascertainment of Profit - Statement of Affairs and Conversion method (Including problems)

UNIT-V: ACCOUNTING FOR NON-PROFIT ORGANIZATIONS:

Non- Profit Organziation – Meaning – Features – Receipts and Payments Account – Income and Expenditure Account – Balance Sheet(Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Co.
2.Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
3. Accountancy–I: Tulasian, Tata McGraw Hill Co.
4. Accountancy–I: S.P. Jain & K.L Narang, Kalyani.
5. Advanced Accountancy-I: S.N.Maheshwari&V.L.Maheswari, Vikas.
6. Advanced Accountancy: M Shrinivas& K Sreelatha Reddy, Himalaya Publishers.
7. Financial Accounting: M.N Arora, Tax Mann Publications.

Paper : (BC 205) : MANAGERIAL ECONOMICS

Paper: BC205 Max. Marks: 50
THPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective:*to impart conceptual and practical knowledge of managerial economics.*

UNIT-I: NATURE AND SCOPE OF MANAGERIAL ECONOMICS:
Characteristics of managerial economics – Nature and scope of managerial economics -Importance of managerial economics- Basic economic tools in managerial economics- managerial economist role and responsibility

UNIT-II: DEMAND FORECASTING:
Demand estimations for major consumer durables and non-durable products – Demand forecasting techniques: Statistical and Non-Statistical techniques.

UNIT–III: MARKET ANALYSIS:
Definition of market – Market structure (Perfect competition, Imperfect competition) – Price determination -Firms equilibrium in perfect competition, monopoly, monopolistic, oligopoly and duopoly

UNIT-IV: MACRO-ECONOMICS FOR MANAGERS:
National income – Concepts – Methods - Measurement of national income – GDP and GVA—Business cycles- nature –Phases – Causes—Inflation - Causes and control – Deflation and stagflation.

UNIT-V: FISCAL AND MONETARY POLICY
Fiscal Policy- deficits-budgetary deficit-primary deficit-revenue deficit-fiscal deficit-Objectives of FRBM Act - Monetary Policy- Objectives – Repo Rate- Reverse Repo Rate- CRR- SLR- Finance Commission- role and objectives

SUGGESTED READINGS:

1. Managerial Economics: Craig H Peterson and Jain, Pearson education
2. Managerial Economics: Gupta, Tata McGraw Hill
3. Managerial Economics: Maheshwari and Gupta, Sultan Chand & Sons
4. Managerial Economics: Dr. P.C. Thomas, Kalyani Publishers
5. Managerial Economics: H.L. Ahuja, S. Chand and Company
6. Managerial Economics: Mithani, Himalaya Publications
7. Managerial Economics: R.L. Varshney and K.L. M Maheshwari, Sultan Chand
8. Managerial Economics: P. Venkataiah and Surya Prakash, Vaagdevi Publishers
9. Managerial Economics: P.L. Mehta, Tata McGraw Hill
10. Managerial Economics: R.N. Chopra, Kalyani Publishers
11. Managerial Economics: D.N. Dwivedi, Vikas Publishers
12. Managerial Economics: Thomas, Maurice, Sarkar, Tata McGraw Hill
13. Managerial Economics: YogeshMaheshwari, PHI Learning Pvt. Limited
14. Managerial Economics: P.K. Mehta, Tax Mann Pulications.

Paper : (BC 206) : PRINCIPLES OF MANAGEMENT

Paper: BC206 Max. Marks: 50
THPW: 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: To acquaint the students with the Principles, functions and practices of management

UNIT-I: INTRODUCTION

Management - Meaning - Characteristics - Administration Vs Management - Scope of Management - Importance of Management - Functions of Management - Levels of Management - Skills of Management -- Leader Vs. Manager - Scientific Management - Meaning - Definition - Objectives - Criticism – Fayol's 14 Principles of Management .

UNIT-II: PLANNING

Meaning - Definition - Characteristics - Types of Plans - Advantages and Disadvantages – Approaches to Planning - Management by Objectives (MBO) - Steps in MBO - Benefits -Weaknesses

UNIT-III: ORGANIZING:

Organizing-Meaning, Definition – Organization Meaning, Definition - Process of Organizing - Principles of Organization - Types of Organization - Formal and Informal Organizations - Line, Staff Organizations - Line and Staff Conflicts - Functional Organization - - Span of Management - Meaning - Determining Span - Factors influencing the Span of Supervision

UNIT-IV: DELEGATION AND DECENTRALIZATION:

Authority – Meaning - Delegation - Definition - Characteristics: - Elements - Principles, Types of Delegation - Importance of Delegation: - Factors Influencing Degree of Delegation - Barriers - Guidelines for Making Delegation Effective - Centralization - Meaning – Decentralization- Meaning - Difference between Delegation and Decentralization.

UNIT-V: COORDINATION AND CONTROL:

Meaning - Definition - Principles of Coordination – Importance- Process of Coordination-techniques of Effective Coordination - Control - Meaning - Definition – relationship between planning and control-Steps in Control – Types (post, current and pre-control) - Requirements for effective control.

SUGGESTED READINGS:

1. Principles and Practice of Management: R. S. Gupta, B. D. Sharma, W.S. Bhalla, Kaylani
2. Management: Stephen P. Robbins, Person
3. Principles of Management: T Ramasamy, Himalaya Publication
4. Principles of Management Concept: Rajeshviwanathan, Himalaya Publication
5. Management Theory and Practices: P Subba Rao, Himalaya Publishing House
6. Essential of Management: Harold Kontz, McGraw Education
7. Principles of Management, Chandan JS, Vikas Publishers.
8. Fundamentals of Management, Dr. Pradeep Kumar, S. Chand
9. Principles of Management: Neeru Vasishth, Tax Mann Pulications.

Paper : (BC 207) : MANAGEMENT INFORMATION SYSTEM

Paper: BC 207 Max. Marks: 50
THPW: (3T+2P) 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: *to equip the students with finer nuances of MIS.*

UNIT-I: AN OVERVIEW OF MANAGEMENT INFORMATION SYSTEMS (MIS):
Concept & Definition of MIS - MIS Vs. Data Processing - MIS & Decision Support Systems - MIS & Information Resources Management - End User Computing – MIS Structure - Managerial View of IS – Functions of Management - Management Role - Levels of Management.

UNIT-II: FOUNDATION OF INFORMATION SYSTEMS:
Introduction to Information System in Business - Fundamentals of Information Systems - Solving Business Problems with Information Systems - Types of Information Systems, Effectiveness and Efficiency Criteria in Information System - Frame Work For IS - Sequence of Development of IS.

UNIT-III: CONCEPT OF PLANNING & CONTROL:
Concept of Organizational Planning - Planning Process - Computational Support for Planning - Characteristics of Control Process - Nature of Control in an Organization.
IS Planning – Determination of Information Requirements - Business Systems Planning - End Means Analysis - Organizing the Plan.

UNIT-IV: BUSINESS APPLICATIONS OF INFORMATION TECHNOLOGY:
Internet & Electronic Commerce – Intranet - Extranet & Enterprise Solutions - Information System for Business Operations - Information System for Managerial Decision Support - Information System for Strategic Advantage.

UNIT-V: ADVANCED CONCEPTS IN INFORMATION SYSTEMS:
Enterprise Resource Planning - Supply Chain Management - Customer Relationship Management and Procurement Management - Systems Analysis and Design – System Development Life Cycle – Prototyping – Sad - Project Management - Cost Benefit Analysis - Detailed Design - Implementation.

SUGGESTED READINGS:
1. Management Information System: O Brian, TMH.
2. Management Information System: Gordon B.Davis & Margrethe H.Olson, TMH.
3. Information System for Modern Management: Murdick, PHI.
4. Management Information System: Jawadekar, TMH.

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SECOND YEAR SYLLABUS

Paper : (BC 301): PRINCIPLE OF INSURANCE

Paper: BC 301 Max. Marks: 100
PPW: 2 Hrs Exam Duration: 3Hrs
Credits : 2

Objectives: *The objectives of the course are : 1) to provide a basic understanding of the Insurance Mechanism. 2) identify the relationship between Insurers and their Customers and the importance of Insurance Contacts. 3) give an overview of major Life Insurance and General Insurance Products*

UNIT I: RISK MANAGEMENT AND INSURANCE : Understanding of Risk Management – Different Types of Risks – Actual and Consequential Losses – Management of Risks – Loss Minimization Techniques – Basics, Evolution and Nature of Insurance – Concept of Pooling in Insurance – Different Classes of Insurance – Importance of Insurance – Unexpected Eventualities

UNIT II: INSURANCE BUSINESS AND MARKET : Management of Risk by Individuals – Management of Risk by Insurers – Fixing of Premiums – Reinsurance and its Importance for Insurers – Role of Insurance in Economic Development and Social Security – Contribution of Insurance to the Society – Constituents of Insurance Market – Operations of Insurance Companies – Operations of Intermediaries – Specialist Insurance Companies – Insurance Specialists – Role of Regulators – Other Bodies Connected with Insurance

UNIT III: INSURANCE TERMINOLOGY AND INSURANCE CUSTOMERS : Common Terms in Insurance: Life and Non Life – Specific Terms in Insurance: Life and Non Life – Usage of Insurance Terms – Understanding Insurance Customers – Different Customer Needs – Importance of Customers – Customer Mindsets – Customer Satisfaction – Customer Behavior at Purchase Point – Customer Behavior when Claim Occurs – Importance of Ethical Behavior

UNIT IV: INSURANCE CONTRACT : Insurance Contract Terms – Principles of Insurance: Principle of Insurable Interest, Principle of Indemnity, Principle of Subrogation, Principle of Contribution, Relevant Information Disclosure, Principle of utmost Good Faith, Relevance of Proximate Cause

UNIT V: INSURANCE PRODUCTS : a) *Life Insurance Products*: Risk of Dying Early – Risk of Living too Long –Products offered – Term Plans – Pure Endowment Plans – Combinations of Plans – Traditional Products – Linked Policies – Features of Annuities and Group Policies. **b)** General Insurance Products: Risks faced by Owner of Assets – Exposure to Perils – Features of Products Covering Fire and Allied Perils – Products covering Marine and Transit Risks – Products covering Financial Losses due to Accidents – Products covering Financial Losses due to Hospitalization – Products Covering Miscellaneous Risks

SUGGESTED READINGS

1. Risk Management and Insurance : Vaughan and Vaughan
2. Risk Management : A Publication of the Insurance Institute of India
3. Role of Insurance in Financial inclusion : Brinda Publishing House, Hyderabad
3. Guide to Risk Management : Sagar Sanyal
4. Insurance and Risk Management : P.K. Gupta
5. Insurance Theory and Practice : Tripathi PHI
6. Principles of Insurance Management : Neelam C Gulati, Excel Books
7. Life and Health Insurance : Black, JR KENNETH & Harold Skipper, Pearson
8. Principles of Risk Management and Insurance : (13th Edition), George E Rejda
9. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt . South Western College Publishing Cincinnati, Ohio

Suggested Websites : 1) www.irda.gov.in **2)** www.polocyholder.gov.in **3)** www.irdaindia.org.in

Paper: (BC 304) ADVANCED ACCOUNTING

Paper:BC 304 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *To acquire accounting knowledge of partnership firms and joint stock companies*

UNIT-I: PARTNERSHIP ACCOUNTS-I:
Meaning – Partnership Deed - Capital Accounts (Fixed and Fluctuating) – Admission of a Partner – Retirement and Death of a Partner (Excluding Joint Life Policy)(Including problems)

UNIT-II: PARTNERSHIP ACCOUNTS–II:
Dissolution of Partnership – Insolvency of a Partner (excluding Insolvency of all partners) – Sale to a Company(Including problems)

UNIT-III: ISSUE OF SHARES, DEBENTURES, UNDERWRITING AND BONUS SHARES:
Issue of Shares at par, premium and discount - Prorata allotment – Forfeiture and Re-issue of Shares – Issue of Debentures with Conditions of Redemption – Underwriting:Meaning – Conditions- Bonus Shares: Meaning – SEBI Guidelines for Issue of Bonus Shares – Accounting of Bonus Shares(Including problems)

UNIT-IV: COMPANY FINAL ACCOUNTS AND PROFIT PRIOR TO INCORPORATION:
Companies Act 2013: Structure – General Instructions for preparation of Balance Sheet and Statement of Profit and Loss – Part-I: Form of Balance Sheet – Part-II: Statement of Profit and Loss – Preparation of Final Accounts of Companies - Profits Prior to Incorporation- Accounting treatment. (Including problems)

UNIT-V: VALUATION OF GOODWILL AND SHARES:
Valuation of Goodwill: Need – Methods: Average Profits,Super Profits and Capitalization Methods -Valuation of Shares: Need –Net Assets, Yield and Fair Value Methods. (Including problems)

SUGGESTED READINGS:

1. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
2. Advanced Accountancy: Shukla and Grewal, S.Chand & Co.
3. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons.
4. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
5. Accountancy–III: Tulasian, Tata McGraw Hill Co.
6. Advanced Accountancy: Arulanandam; Himalaya.
7. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers.
8. Guidance Note on the Revised Schedule VI to the Companies Act, 1956, The Institute of Chartered Accounts of India.
9. Advanced Accounting (IPCC): D. G. Sharma, Tax Mann Publications.

Paper: (BC 305): INCOME TAX – I

Paper: BC 305 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee.*

UNIT–I: INTRODUCTION:
Direct and Indirect Taxes – Canons of Taxation - Features and History of Income Tax in India – Definitions and Basic Concepts of Income Tax: Assessee – Deemed Assessee – Assessee-in-default – Assessment Year – Previous Year - Income Tax general rule and Exemptions to the Rule– Person – Income – Gross Total Income – Total Income — Incomes Exempt from Tax.
Residential Status and Scope of Total Income: Meaning of Residential Status – Conditions applicable to an Individual Assessee – Incidence of Tax – Types of Incomes – Problems on computation of Total Income of an Individual based on Residential Status.

UNIT-II: AGRICULTURAL INCOME:
Introduction – Definition – Tests to determine Agricultural Income – Partly Agricultural and partly Non-Agricultural Income – Integration: conditions – provisions – computation of Tax on Integration process. Heads of income: Gross Total Income – Taxable Income – Income Tax Rates.

UNIT–III: INCOME FROM SALARIES:
Definition of 'Salary' – Characteristics of Salary – Computation of Salary Income: Salary u/s 17(1) – Annual Accretion – Allowances – Perquisites – Profits in lieu of Salary – Deductions u/s. 16 – Problems on computation of Income from Salary.

UNIT–IV: INCOME FROM HOUSE PROPERTY:
Definition of 'House Property' – Exempted House Property incomes– Annual Value – Determination of Annual Value for Let-out House and Self-occupied House – Deductions u/s.24 – Problems on computation of Income from House Property.

UNIT–V: PROFITS AND GAINS OF BUSINESS OR PROFESSION:
Definition of 'Business and Profession' – Procedure for computation of Income from Business – Rules – Revenue and Capital nature of Incomes and Expenses – Allowable Expenses u/s. 30 to 37 – Expenses expressly disallowed – Deemed Profits – Valuation of Stock – Miscellaneous provisions u/s 44. Depreciation: Meaning – Conditions for charge of depreciation – Assets used for Business – Block of Assets – Rates of Depreciation – Miscellaneous Provisions about depreciation – Computation of Depreciation –problems on computation of Income from Business. Income from Profession: Rules– procedure – problems on computation of Income from Profession.

SUGGESTED READINGS:
1. Income Tax Law and Practice: V.P. Gaur & D.B Narang, Kalyani Publishers.
2. Direct Taxes Law & Practice: Dr. Vinod K. Singhania & Dr. Kapil Singhania, Taxmann
3. Income Tax: B.B. Lal, Pearson Education.
4. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.
5. Income Tax: Johar, McGrawHill Education.
6. Taxation Law and Practice: Balachandran & Thothadri, PHI Learning.

Paper: (BC 306): BUSINESS STATISTICS-I

Paper: BC 306 Max. Marks: 100
PPW: 4Hrs Exam Duration: 3hrs
Credits :4

Objective: *To inculcate analytical and computational ability among the students.*

UNIT-I: INTRODUCTION:
Origin and Development of Statistics – Definition - Importance and Scope - Limitations of Statistics - Distrust of Statistics.
Statistical Investigation: Planning of statistical investigation - Census and Sampling methods - Collection of primary and secondary data - Statistical errors and approximation - classification and Tabulation of data - Frequency distribution.

UNIT – II: DIAGRAMMATIC AND GRAPHIC PRESENTATION:
Diagrammatic presentation: One Dimensional and Two Dimensional Diagrams – Pictograms – Cartograms Graphic presentation: Technique of Construction of Graphs - Graphs of Frequency Distribution - Graphs of Time Series or Histograms.

UNIT-III: MEASURES OF CENTRAL TENDENCY:
Introduction –Significance -Arithmetic Mean- Geometric Mean - Harmonic Mean - Mode – Median - Quartiles and Percentiles - Simple and Weighted Averages - Uses and Limitations of different Averages.

UNIT-IV: MEASURES OF DISPERSION, SKEWNESS AND KURTOSIS:
Measures of Dispersion: Significance - Characteristics - Absolute and Relative Measures - Range - Quartile Deviation - Mean Deviation- Standard Deviation - Coefficient of Variation.
Measures of Skewness - Karl Pearson's Coefficient of Skewness - Bowley's Coefficient of Skewness - Kelly's Measure of Skewness – Kurtosis: Mesokurtosis, Platy kurtosis and Leptokurtosis.

UNIT-V: CORRELATION:
Meaning -Types - Correlation and Causation – Methods: Scatter Diagram - Karl Person's Coefficient of Correlation - Probable Error and Interpretation of Coefficient of Correlation - Rank Correlation - Concurrent Deviation Method.

SUGGESTED READINGS:
1. Statistics for Management: Levin & Rubin, Pearson
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Statistics: E. Narayanan Nadar, PHI Learning
4. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
5. Business Statistics: K. Alagar, Tata McGraw Hill
6. Fundamentals of Statistical: S. P Gupta, Sultan Chand
7. Business Statistics: J. K. Sharma, Vikas Publishers
8. Business Statistics: S. L Aggarwal, S. L. Bhardwaj, Kalyani Publications
9. Statistics-Problems and Solutions: Kapoor V.K, S. Chand
10. Statistics - Theory, Methods and Applications: Sancheti D.C. & Kapoor V.K
11. Business Statistics: S. K. Chakravarty, New Age International Publishers
12. Statistics: Andasn,Sweenly,Williams,Cingage.

Paper: (BC 307): PROGRAMMING WITH C

Paper: BC 307 Max. Marks: 70T + 30P
PPW: 4 (3T+2P) Exam Duration: 3 Hrs.
Credits : 4
Objectives: *To gain the skills of Structured (Procedural/Functional) Programming using C Language.*

UNIT-I: **INTRODUCTION TO C LANGUAGE, DATA TYPES AND I/O OPERATIONS:**
Introduction: Types of Languages – History of C language – Basic Structure – Creating – Compiling - Linking and Executing the C Program - Pre-processors in "C".
Types and I/O operations: Keywords & Identifiers – Constants – Variables - Scope and Life of a Variable - Data types - Storage classes - Reading a character or values - Writing a character or value - Formatted Input and Output operations.

UNIT-II: OPERATORS, EXPRESSIONS AND DECISION MAKING:
Operators: Introduction – Arithmetic – Relational – Logical – Assignment - Conditional - Special operators – Expressions: Arithmetic – Evaluation - Type conversions.
Decision Making & Looping: Introduction - If statements - If-else statements - Switch statements - Conditional statements - While statements - Do statements - For Statements.

UNIT-III: ARRAYS AND STRINGS:
Arrays: Introduction - Defining an array - Initializing an array - One dimensional array – Two dimensional array - Dynamic array.
Strings: Introduction - Declaring and initializing string variables - Reading and Writing strings - String handling functions.

UNIT-IV: BUILT-IN FUNCTIONS AND USER-DEFINED FUNCTIONS:
Built–in functions: Mathematical functions - String functions - Character functions - Date functions. User defined functions: Introduction - Need for user defined functions - Elements of functions - Return values and their types - Function declaration - Function calls - Recursive functions.

UNIT-V: STRUCTURES AND POINTERS:
Structures: Introduction - Declaring structures variables - Accessing structure members - Functions and Structures - Array of structures - Enumerated Data types - Introduction to Unions.
Pointers: Fundamentals - Understanding pointers - Address - Declaration of Pointers.

LAB: PROGRAMS USING C.

SUGGESTED READINGS:
1. Programming in ANSCI C: Balaguruswamy, McGraw Hill.
2. Programming in C: Ashok Kamthane, Pearson.
3. C How to Program: P.J. Deitel & H.M. Deitel, Pearson & PHI.
4. Programming in C: K.S. Kahlon, Kalyani Publishers.
5. Fundamental of C: Dr. N. Guruprasad, Himalaya Publishing House.
6. C: Learning and Building Business and System Applications: Susant Rout, PHI.
7. Mastering C: K.R. Venugopal, McGraw Hill.
8. Programming in C: J.B. Dixit, Firewal Media.
9. The C Programming Language: B.W.Kernighan & D.M.Ritehie, PHI.
10. C: The Complete Reference: H.Schildt, McGraw Hill.
11. Let Us C: Y.Kanetkar, BPB.
12. C++ Spoken Tutorials by IIT Bombay

Paper : (SEC-2) : PRACTICE OF LIFE INSURANCE

Paper: SEC-2 Max. Marks: 50 (40+10)
PPW: 2 Hrs Exam Duration: Hrs
Credits : 2

Objectives:a)To make the student understand Life Insurance Market in India. b) To discuss the issues related to risk management in view of life insurance.

UNIT-I: INTRODUCTION TO LIFE INSURANCE AND TYPES OF LIFE INSURANCE POLICIES AND PREMIUM CALCULATION : Meaning evolution, growth and principles of Life Insurance —Life Insurance Organizations in India-– Competition and Regulation of Life Insurance.Types of Life Insurance Policies – Term, Whole Life, Endowment, Unit Linked and with or without Profit Policies –Customer Evaluation – Policy Evaluation — Group and Pension Insurance Policies – Special features of Group Insurance /Super Annuation Schemes – Group Gratuity Schemes.Computation of Premiums—Meaning of Premium, its calculation--Rebates – Mode of Rebates – Large sum assured Rebates – Premium Loading – Rider Premiums – Computation of Benefits – Surrender value – Paid up value

UNIT-II: SETTLEMENT OF CLAIMS RISK & UNDERWRITTINGS AND FINANCIAL PLANNING & TAX SAVING: Settlement of claims: Intimation Procedure, documents and settlement procedures.Underwriting: The need for underwriting – Guiding principles of Underwriting – Factors affecting Insurability – Methods of Life Classification – Laws affecting Underwriting.Financial Planning and taxation: Savings – Insurance vis-à-vis- Investment in the Units Mutual Funds, Capital Markets – Life Insurance in Individual Financial Planning – Implications in IT treatment.

SUGGESTED READINGS:

1. Insurance Institute of India, Practice of Life Insurance, Mumbai.
2. P.K.Gupta, Insurance and Risk Management, Himalaya Publishing House, Mumbai.
3. Kanika Mishra, Fundamentals of Life Insurance: Theories and Applications, Prentice Hall
4. Kutty, S.K., Managing Life Insurance, Prentice Hall of India: New Delhi
5. Black, Jr. Kenneth and Harold Skipper Jr., Life and Health Insurance, Prentice Hall, Inc., England.
6. K.C. Mishra and C.S. Kumar, Life Insurance: Principles and Practice, Cengage Learning: New Delhi.
7. Sadhak, Life Insurance in India, Respose Books: New Delhi

Paper: (BC 404): CORPORATE ACCOUNTING

Paper: BC 404 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3 Hrs
Credit : 5

Objective: *To acquire knowledge of AS-14 and preparation of accounts of banking and insurance companies.*

UNIT-I: COMPANY LIQUIDATION:
Meaning – Modes - Contributory Preferential Payments – Statements of Affairs - Liquidator's Remuneration - Preparation of Liquidator's Final Statement of Account (Including problems)

UNIT-II: AMALGAMATION (AS-14):
Amalgamation: In the nature of merger and purchase – Calculation of Purchase Consideration – Accounting Treatment in the books of transferor and transferee companies. (Including problems)

UNIT-III: INTERNAL RECONSTRUCTION AND ACQUISITION OF BUSINESS:
Internal Reconstruction: Accounting treatment – Preparation of final statement after reconstruction- Acquisition of business when new set of books are opened- Debtors and Creditors taken over on behalf of vendors- When same set of books are continued(Including problems)

UNIT-IV: ACCOUNTS OF BANKING COMPANIES:
Books and Registers maintained – Slip system of posting – Rebate on Bills Discounted – Non-Performing Assets – Legal Provisions relating to final accounts - Final Accounts. (Including problems)

UNIT-V: ACCOUNTS OF INSURANCECOMPANIES AND INSURANCE CLAIMS:
Introduction – Formats-Revenue Account–Net Revenue Account - Balance Sheet - Valuation Balance Sheet – Net Surplus – General Insurance - Preparation of final accounts with special reference to Fire and Marine Insurance - Insurance claims- Meaning – Loss of Stock and Assets – Average Clause – Treatment of Abnormal Loss - Loss of Profit. (Including problems)

SUGGESTED READINGS:
1. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
2. Accountancy–III: Tulasian, Tata McGraw Hill Co.
3. Advanced Accountancy: Arulanandam; Himalaya
4. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers
5. Advanced Accounting (Vol-II): Chandra Bose, PHI
6. Advanced Accountancy: Shukla and Grewal, S.Chand& Co
7. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons
8. Corporate Accounting: Sakshi Vasudeva, Himalaya.

Paper: (BC 405): INCOME TAX – II

Paper: BC 405 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3Hrs
Credit :5

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee*.

UNIT-I: CAPITAL GAINS:
Introduction - Meaning – Scope of charge – Basis of charge – Short term and Long term Capital Assets – Transfer of Capital Asset – Deemed Transfer – Transfer not regarded as Transfer – Determination of Cost of Acquisition – Procedure for computation of Long-term and Short-term Capital Gains/Losses – Exemptions in respect of certain Capital Gains u/s. 54 – Problems on computation of capital gains.

UNIT–II: INCOME FROM OTHER SOURCES:
General Incomes u/s. 56(1) – Specific Incomes u/s. 56(2) – Dividends u/s. 2(22) – Interest on Securities – Gifts received by an Individual – Casual Income – Family Pension – Rent received on let out of Furniture- Plant and Machinery with/without Building – Deductions u/s. 57 - Problems on computation on Income from Other Sources.

UNIT-III: CLUBBING AND AGGREGATION OF INCOME:
Income of other persons included in the total income of Assessee – Income from Firm and AOP – Clubbing Provisions – Deemed Incomes – Provisions of set-off and Carry forward of losses – computation of Gross Total Income – Deductions from GTI u/s 80C to 80U – Problems on Computation of Taxable Income

UNIT-IV: ASSESSMENT OF INDIVIDUALS:
Computation of Tax Liability – Applicability of Alternate Minimum Tax on Individual u/s 115JC – Problems on Computation of tax liability

UNIT–V: ASSESSMENT PROCEDURE:
Income tax returns – Types of returns – Filing of e-return – Assessment – Types of assessment – Self assessment – Provisional assessment – Regular assessment – Best judgement assessment – Reassessment – Rectification of mistakes – Notice on demand.

SUGGESTED READINGS:
1. Income Tax Law and Practice:V.P. Gaur & D.B- Narang, Kalyani Publishers.
2. Direct Taxes Law & Practice: Dr. Vinod K. Singhania & Dr. Kapil Singhania, Taxmann
3. Income Tax: B. Lal, Pearson Education.
4. Income Tax: M.Jeevarathinam & C. Vijay Vishnu Kumar, SCITECH Publications.
5. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.
6. Income Tax: Johar, McGrawHill Education.
7. Taxation Law and Practice: Balachandran & Thothadri, PHI Learning

Paper: (BC 406): BUSINESS STATISTICS-II

Paper: BC 406 Max. Marks: 100
PPW: 4Hrs Exam Duration: 3hrs
Credit: 4

OBJECTIVE: *To inculcate analytical and computational ability among the students.*

UNIT-I: REGRESSION:
Introduction - Linear and Non Linear Regression – Correlation Vs. Regression - Lines of Regression - Derivation of Line of Regression of Y on X - Line of Regression of X on Y - Using Regression Lines for Prediction.

UNIT-II: INDEX NUMBERS:
Introduction - Uses - Types - Problems in the Construction of Index Numbers - Methods of Constructing Index Numbers - Simple and Weighted Index Number (Laspeyre - Paasche, Marshall – Edgeworth) - Tests of Consistency of Index Number: Unit Test - Time Reversal Test - Factor Reversal Test - Circular Test - Base Shifting - Splicing and Deflating of Index Numbers.

UNIT-III: TIME SERIES:
Introduction - Components – Methods-Semi Averages - Moving Averages – Least Square Method - Deseasonalisation of Data – Uses and Limitations of Time Series.

UNIT-IV: PROBABILITY:
Probability – Meaning - Experiment – Event - Mutually Exclusive Events - Collectively Exhaustive Events - Independent Events - Simple and Compound Events - Basics of Set Theory – Permutation – Combination - Approaches to Probability: Classical – Empirical – Subjective - Axiomatic - Theorems of Probability: Addition – Multiplication - Baye's Theorem.

UNIT-V: THEORITECAL DISTRIBUTIONS:
Binomial Distribution: Importance – Conditions – Constants - Fitting of Binomial Distribution. Poisson Distribution: – Importance – Conditions – Constants - Fitting of Poisson Distribution. Normal Distribution: – Importance - Central Limit Theorem - Characteristics – Fitting a Normal Distribution (Areas Method Only).

SUGGESTED READINGS:
1. Statistics for Management: Levin & Rubin, Pearson,
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Business Statistics: Theory & Application, P. N. Jani, PHI Learning
4. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
5. Business Statistics: K. Alagar, Tata Mc Graw Hill
6. Fundamentals of Statistical: S. P Gupta , Sultan Chand
7. Business Statistics: J. K. Sharma,Vikas Publishers
8. Business Statistics: Vora, Tata Mc Graw Hill
9. Statistics-Problems and Solutions: Kapoor V.K, S. Chand
10. Statistics-Teory, Methods and Applications: SanchetiD.C. & Kapoor V.K
11. Business Statistics: S. K. Chakravarty, New Age International Publishers
12. Business Statistics-G.Laxman,Vasudeva Reddy, K.Goud, TaxmannPublications,Hyderabad.

Paper: (BC 407): OBJECT ORIENTED PROGRAMMING IN C++

Paper: BC 407 Max. Marks: 70T + 30P
PPW: 4 (3T+2P) Exam Duration: 3 Hrs.
Credits : 4

Objective: *To gain skills of Object Oriented Programming using C++ Language.*

UNIT-I: INTRODUCTION:
Object Oriented Programming: Concepts – Benefits – Languages - Structured vs. Object Oriented Programming. C++: Genesis - Structure of a program – Tokens - Data Types – Operators - Control Structures - C vs C++ - Functions.

UNIT-II: CLASSES, OBJECTS, CONSTRUCTORS AND DESTRUCTORS:
Encapsulation - Hiding - Abstract data types - Object & Classes – Attributes - Methods - C++ class declaration - State identity and behaviour of an object. Purpose of Constructors - Default Constructor - Parameterized Constructors - Copy Constructor - Instantiation of objects - Default parameter value - Object types - C++ garbage collection - Dynamic memory allocation – Meta class / Abstract classes.

UNIT-III: OVERLOADING, CONVERSIONS, DERIVED CLASSES AND INHERITANCE:
Function and Operator Overloading - Overloading Unary and Binary Operators - Data and Type Conversions - Derived Classes - Concept of Reusability - Visibility modes - Types of Inheritance - Single and Multiple Inheritance - Multilevel Inheritance.

UNIT-IV: POLYMORPHISM, VIRTUAL FUNCTION, STREAMS AND FILES:
Polymorphism - Virtual - Classes - Pointer to Derived class - Virtual functions - Rules for Virtual function - Pure Virtual functions - Stream Classes - Types of I/O - Formatting Outputs - File Pointers – Buffer - C++ Stream - Unformatted console I/O operations – Functions: get( ) - put( ) – formatted console I /O operations - IOS class format functions - Manipulators.

UNIT–V: EXCEPTION HANDLING AND DATA STRUCTURES IN C++:
Exceptions in C++ Programs - Try and Catch Expressions - Exceptions with arguments. Data Structures: Introduction - Linked list - Stacks - Queues.

SUGGESTED READINGS:
1. Objected Oriented Programming with C++: E. Balagurusamy, McGraw Hill.
2. C++ Programming-A Practical Approach: Madhusudan Mothe, Pearson.
3. Object Oriented Programming Using C++: Chadha & Chadha, Kalyani.
4. Programming in C++: A. N. Kamthane, Pearson.
5. The Complete Reference C++: H. Schildt, McGraw Hill.
6. C++:How to Program: Deitel & Deitel, PHI.
7. Mastering C++: KR.Venugopal & R.Buyya, McGraw Hill.
8. Schaum's Outlines: Programming with C++: by John R Hubbard.
9. Object Oriented Programming using C++: Somashekara, PHI.
10. C++ Spoken Tutorials by IIT Bombay.

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THIRD YEAR:					
SEMESTER-V					
29.	BC501	Practice of General Insurance	SEC-3	2	2
30.	BC502	Introduction to Indian Economy	GE-1	2	2
31.	BC503	Cost Accounting	DSC	4	4
32.	BC504	Business Law	DSC	4	4
33.	BC505	Banking Theory & Practice	DSC	4	4
34.	BCC506	Excel Foundation	DSC	4T+2P	4
35.	**BCC507(a)** **BCC507(b)**	**Computerised Accounting/** **Business Analytics**	**DSE** **DSE**	**4T+2P** **5**	**5** **5**
36.	**BCC508(a)** **BCC508(b)**	**Web Technology/** **Business Simulation**	**DSE** **DSE**	**4T+2P** **5**	**5** **5**
		Total		**30/32**	**30**
SEMESTER-VI					
37.	BC601	Regulation of Insurance Business	SEC-4	2	2
38.	BC602	Sectors of Indian Economy	GE-2	2	2
39.	BC603	Theory and Practice of GST	DSC	3T+2P	4
40.	BC604	Company Law	DSC	4	4
41.	BC605	Managerial Accounting	**DSC**	**4**	**4**
42.	BC606	Commerce Lab	DSC	2T+4P	4
43.	**BCC607(a)** **BCC607(b)**	**E-Commerce/** **Business Forecasting**	**DSE** **DSE**	**4T+2P** **5**	**5** **5**
44.	**BCC608(a)** **BCC608(b)**	**Relational Database Management Systems/** **Business Analytics Programming**	**DSE** **DSE**	**4T+2P** **5**	**5** **5**
		Total		**33/35**	**30**
		GRAND TOTAL		**187**	**180**

AECC: Ability **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; T=Theory; P=Practicals;*

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC Language **DSC**	8 **8** **16**	5 **5** **4**	40 **40** **64**
4	**DSE**	**5**	**4**	**20**
5	GE	2	2	4
	TOTAL	**44**		**180**
	Commerce Total	**28**		**124**

SYLLABUS

Paper : (BC 501) : PRACTICE OF GENERAL INSURANCE

Paper: BC501 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ hrs

Unit I: GENERAL INSURANCE POLICIES:
Introduction to General Insurance-Origin of general insurance—Classification of General Insurance Companies—Indian and International Insurance Market—various roles in Insurance industry—Policy Documents and forms—insurance proposals and forms—General Insurance Products-Fire, Marine, Motor, Liability, Personal Accident and Specialty Insurance, Engineering and other insurance.

Unit II: UNDERWRITING, PREMIUMS, CLAIMS AND INSURANCE RESERVES AND ACCOUNTING:
Concept of Underwriting—Underwriting Process—Risk sharing and its methods—risk management and steps involved in it—Rating and Premiums—concept of soft and hard markets—Concept of Claim-understanding the process of claim management—claims fraud and fraud prevention—Insurance reserves and accounting—different types of reserves of insurance companies—reserving process followed by insurance companies—Insurance accounting.

SUGGESTED READINGS :

1. Practice of General Insurance – Insurance Institute of India.
2. Practice of General Insurance – D.S. Vittal-HPH.
3. Principles & Practice of Insurance- Dr. P. Periasamy – HPH.
4. Risk Management : A Publication of the Insurance Institute of India.,
5. Practice of General Insurance: Dr. V. Padmavathi, Dr. V. Jayalakshmi, PBP.
6. Insurance Theory and Practice: Tripathi PHI
7. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
8. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
9. South Western College Publishing Cincinnati, Ohio.

Paper : (BC 502) : INTRODUCTION TO INDIAN ECONOMY

Paper: BC502 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ Hrs

Objectives: 1) to provide an overview of Indian economy
2) to make the student acquaint with the latest developments in the economy

UNIT I: STRUCTURE OF THE INDIAN ECONOMY:

Indian Economy-Characteristics-Developmental issues-Structural changes in the Indian Economy-Human Development-concept and measures-Occupational distribution and economic development-Natural Resource: Land, Forest, Water & Minerals-Environmental degradation-Infrastructure: Energy, Power, Transport-Social infrastructure

UNIT II: POLICY ASPECTS OF INDIAN ECONOMY:

Liberalization - Privatization-Globalization-Poverty- Unemployment: nature and problems - The parallel economy – Industrial Policy.

SUGGESTED READINGS:

1) Meera Naidu "Introduction to Indian Economy" HPH
2) Ruddar Datt and K.P.M. Sundharam "Indian Economy", S. Chand & Company Ltd., New Delhi, 2013.
3) S.K.Misra & V.K.Puri "Indian Economy-Its Development Experience"Himalaya Himalya Publishing Company, New Delhi, 2013.
4) Introduction to Indian Economy: Dr. P. Venugopal Rao, PBP.
5) Vivek Mittal "Business Environment" Excel Publications, New Delhi, 2013.
6) Aswathappa.K. "Essentials of Business Environment – Text, cases & Exercises" Himalaya Himalya Publishing Company, New Delhi, 2013.
7) Economic Survey—Government of India, Ministry of Finance, Oxford University Press, New Delhi,
8) The Economic Times, News paper
9) Business Line, News paper

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Paper : (BC 503) : COST ACCOUNTING

Paper: BC503 Max. Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3 Hrs

Objective: *to make the students acquire the knowledge of cost accounting methods.*

UNIT-I: INTRODUCTION:
Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Essentials of a good cost accounting system- Difference between Cost Accounting and Financial Accounting – Cost concepts – Cost Classification.

UNIT-II: MATERIAL:
Direct and Indirect Material cost – Inventory Control Techniques – Stock Levels – EOQ – ABC Analysis – JIT - VED - FSND - Issue of Materials to Production – Pricing methods: FIFO - LIFO with Base Stock and Simple and Weighted Average methods.

UNIT-III: LABOUR AND OVERHEADS:
Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages (only Incentive Plans): Halsey, Rowan, Taylor Piece Rate and Merrick Multiple Piece Rate Methods.
Overheads: Classification - Methods of Allocation - Apportionment and Absorption of overheads.

UNIT-IV: UNIT AND JOB COSTING:
Unit Costing: Features - Cost Sheet – Tender and Estimated Cost Sheet.
Job Costing: Features - Objectives – Procedure - Preparation of Job Cost Sheet.

UNIT-V: CONTRACT AND PROCESS COSTING:
Contract Costing: Features – Advantages - Procedure of Contract Costing – Guidelines to Assess profit on incomplete Contracts.
Process Costing: Meaning – Features – Preparation of Process Account – Normal and Abnormal Losses.

SUGGESTED READINGS:

1. Cost Accounting: Jain and Narang, Kalyani
2. Cost Accounting: Srihari Krishna Rao, Himalaya
3. Cost and Management Accounting: Prashanta Athma, Himalaya
4. Cost Accounting: Dr. G. Yogeshweran, PBP.
4. Cost Accounting: Jawaharlal, Tata Mcgraw Hill
5. Cost Accounting: Theory and Practice: Banerjee, PHI
6. Introduction to Cost Accounting: Tulsian, S.Chand
7. Cost Accounting: Horngren, Pearson
8. Cost Accounting: Ravi M. Kishore, Tax Mann Publications.

Paper : (BC 504) : BUSINESS LAW

Paper: BC504 Max Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3Hrs

Objective: *to make the students acquire basic conceptual knowledge of different laws relating to Business.*

UNIT–I: INTRODUCTION:

Development of Business Law - Development of Law in Independent India Contract Act 1872: Agreement and contract - Essentials of a valid contract - Types of contracts - Offer and Acceptance - Essentials of valid offer and acceptance - Communication and revocation of offer and acceptance – Consideration definition - Essentials of valid consideration - Doctrine of "Stranger to a contract"- "No consideration- No contract" - Capacity to a contract - Minors agreements.

UNIT–II: CONTRACT ACT 1872:

Legality of Object and Consideration - Agreements Expressly Declared To Be Void - Wagering Agreements - Contingent Contracts.

Discharge of Contract: Modes of Discharge - Performance of Contracts - Breach of Contract - Remedies for Breach.

UNIT–III: SALE OF GOODS ACT 1930:

Contract of Sale: Essentials of Valid Sale - Sale and Agreement to Sell – Definition and Types of Goods - Conditions and Warranties - Caveat Emptor - Exceptions - Transfer or Passing of Property: Time When Property Passes, Rules of Transfer of Property, Transfer of Ownership - Sale by Non-Owners and its Exceptions - Unpaid Seller - Rights of Unpaid Seller.

Consumer Protection Act 1986: Definitions of Consumer – Person – Goods - Service -Consumer Dispute - Unfair Trade Practice - Restrictive Trade Practice – Defect - Deficiency - Consumer Protection Councils - Consumer Dispute Redressal Agencies - District Forum - State Commission and National Commission - Procedure to Lodge a Complaint for Redressal – Appeals.

UNIT–IV: TRADE MARKS, PATENTS, COPY RIGHTS & INTELLECTUAL PROPERTY RIGHTS:

Trade Marks: Definition - Procedure for Registration of Trade Marks - Patents: Definition - Kinds of Patents - Transfer of the Patent Rights - Rights of the Patentee - Copy Rights: Definition - Essential Conditions for Copy Rights to be Protected - Rights of the Copyright Owner - Terms of Copy Right - Copy Rights Infringement - Other Intellectual Property Rights: Trade Secrets - Geographical Indications.

UNIT–V: INFORMATION TECHNOLOGY ACT & ENVIRONMENTAL PROTECTION ACT:

Information Technology Act-2000: Objectives - Digital Signature - Electronic Governance - Penalties and Adjudication.

Environmental Protection Act 1986: Object - Scope and Scheme of the Act – Definitions - General Powers of the Central Government – Prevention - Control and Abetment of Environmental Pollution – Offences and Penalties.

SUGGESTED READINGS:

1) Company Law: Kapoor, Sultan Chand and Co.
2) Business Law: Sandhya KVN, Himalaya
3) Business Laws: KC Garg & RC Chawla , Kalyani Publishers.
4) Business Law: Prof. G. Krishna Murthy, PBP.
5) Business Law: PC Tulsian & Bharat Tulsian, McGraw Hill Education
6) Business Law: Tejpal Sheth, Pearson.
7) Business Law: MC Kuchal & Vivek Kuchal, Vikas Publishing House.
8) Business Law: Mathur, McGraw Hill Education.
9) Business Law including company Law: SS Gulshan & GK Kapoor, New Age
10)Business Law: Peddina Mohan Rao, PHI.
11) Business Law: P.N. Bansal, Tax Mann Pulications.
12) Business Law: R.S.N. Pillai and Bagavathi, S. Chand.

Paper : (BC 505) : BANKING THEORY AND PRACTICE

Paper: BC505 Max. Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3Hrs

Objective: *to acquire knowledge of working of Indian Banking system.*

UNIT-I: INTRODUCTION:

Origin and Growth of Banking in India - Unit Vs Branch Banking - Functions of Commercial Banks - Nationalization of Commercial Banks in India - Emerging Trends in Commercial Banking in India: E-Banking – Mobile Banking - Core Banking – Bank Assurance – OMBUDSMAN.

UNIT-II: RESERVE BANK OF INDIA:

RBI Constitution - Organizational Structure – Management - Objectives – Functions – Monetary Policy.

UNIT-III: TYPES OF BANKS:

District Co-Operative Central Banks – Contemporary Banks - Regional Rural Banks - National Bank for Agriculture and Rural Development (NABARD) – SIDBI – Development Banks.

UNIT-IV: BANKER AND CUSTOMER RELATIONSHIP:

Definition of Banker and Customer - Relationship Between Banker and Customer - KYC norms - General and Special Features of Relationship - Opening of Accounts - Special Types of Customers Like Minor, Married Women, Partnership Firms, Companies, Clubs and other Non-Trading Institutions.

UNIT-V: NEGOTIABLE INSTRUMENTS:

Descriptions and their Special Features - Duties and Responsibilities of Paying and Collecting Banker - Circumstances under which a Banker can refuse Payment of Cheques - Consequences of Wrongful Dishonors - Precautions to be taken while Advancing Loans Against Securities – Goods - Documents of Title to Goods - Loans against Real Estate -Insurance Policies - Against Collateral Securities – Banking Receipts.

Rule in Clayton's Case - Garnishee Order – Loans against Equitable Mortgage - Legal Mortgage - Distinction between them - Latest Trends in Deposit Mobilization.

SUGGESTED READINGS:

1. Banking Theory & Practices: Dr. P. K. Srivatsava, Himalaya Publishers
2. Banking Theory & Practices: K.E. Shekar, Vikas Publications
3. Banking theory & Practices: Santhi Vedula, HPH.
4. Banking Theory & Practices: Dr. J. Jayanthi, PBP.
5. Banking Theory, Law & Practices: R. R Paul, Kalyani Publishers
6. Money Banking and Financial Markets: Averbach, Rabort. D, MacMillan. Landon
7. Banking: N.T. Somashekar, New Age International Publishers
8. Fundamentals of International Banking: Rup Narayan Bose, Trinity Publishers
9. Modern Commercial Banking: H.R. Machiraju, New Age International Publishers
10. Banking Theory & Practices: R. Rajesh, Tata McGraw Hill
11. Merchant Banking & Financial Services: S. Guruswamy, Tata McGraw Hill
12. Management of Banking & Financial Services; Padmalatha Suresh, Pearson
13. Modern Banking: D. Muralidharan, PHI

Paper : (BCCA 506) :EXCEL FOUNDATION

Paper: BCCA 506 Max. Marks: : 60+20+20
THPW: 4 Hrs Exam Duration: 3 Hrs

Objective: Students will learn how to start working with M S Excel right from basics to Tables, Templates and Printing of their work.

UNIT-I: **INTRODUCTING EXCEL:** Workbooks and Worksheets, Moving Around a Worksheet, Ribbon tabs, Types of commands on the Ribbon, Using Shortcut Menus, Working with Dialogue Boxes, Task Panes, Getting started on your worksheet, Creating a chart, Printing your worksheet, Saving your worksheet, Exploring Data Types, Modifying Cell Contents, Deleting, Replacing, Editing of a cell. Some handy data entry techniques, Number Formatting.

UNIT-II: **WORKSHEET OPERATIONS:** Moving and resizing windows, Switching among windows, Activating a worksheet, Adding, Deleting a worksheet, Changing a sheet tab color, Rearranging your worksheets, Hiding, un-hiding a worksheet, Worksheet View, Comparing sheets side by side, Selecting ranges, complete rows and columns, noncontiguous ranges, multi-sheet ranges, special types of cells. Copying or Moving Ranges. Paste Special dialogue box, Adding comments to cells.

UNIT-III: **TABLES AND FORMATTING:** Creating a Table, Changing the Look of a Table, Navigating in a Table, Selecting parts of a Table, Adding, Deleting new rows or columns, Moving a Table, Working with the Total Row, Removing duplicate rows from a table. Sorting and filtering a table, Converting Table into Range. Formatting tools on the Home tab, Mini Toolbar, Fonts, Text Alignment, Wrapping text to fit a cell, Colors and Shading, Borders and Lines. Naming Styles.

UNIT–IV: EXCEL FILES & TEMPLATES: Creating a New Workbook, Filtering filenames, Saving and Auto Recovery, Password-Protecting a Workbook, Recovering unsaved work, Protect Workbook options, Checking Compatibility. Creating a Excel Templates, Modifying a template, Custom Excel Templates, Default Templates, Editing your Template, Resetting the default workbook, Saving your Custom Templates, Getting ideas for creating Templates.

UNIT–V: **PRINTING YOUR WORK:** Normal, Page Layout, Page Break View, Choosing your printer, Specifying what you want to print, Changing Page Orientation, Specifying paper size, Adjusting page margins, Inserting a page break, Removing manual page breaks, Printing Row and Column Titles, Scaling printed output, Header or Footer Options, Preventing certain cells, Objects from being printed, Creating Custom Views of your Worksheet. Creating PDF files.

Introducing Excel:

SUGGESTED READINGS:

1. Excel 2013 Bible: John Walkenbach, Wiley.
2. Microsoft Excel 2013: Data Analysis and Business Modeling: Winston, PHI
3. Excel Data Analysis - Modeling and Simulation: Hector Guerrero, Springer.
4. Excel Functions and Formulas: Bernd Held,BPB Publications.
5. Financial Analysis and Modeling using Excel and VBA: Chandan Sengupta, Wiley

Paper : (BC 507) (a) : COMPUTERISED ACCOUNTING

Paper: BC507(a) Max. Marks: 60+20+20
PPW: 5 (4T & 2P) Exam Duration: 3 Hrs.
Objective: To make the students to acquire the knowledge of computer software

CHAPTER I: MAINTAINING CHART OF ACCOUNTS IN ERP:
Introduction-Getting Started with ERP - Mouse/Keyboard Conventions-Company Creation-Shut a Company-Select a Company-Alter Company Details-Company Features and Configurations-F11: Company Features-F12: Configuration-Chart of Accounts-Ledger-Group-Ledger Creation-Single Ledger Creation-Multi Ledger Creation-Altering and Displaying Ledgers-Group Creation-Single Group Creation-Multiple Group Creation-Displaying Groups and Ledgers-Displaying Groups-Display of Ledgers-Deletion of Groups and Ledgers – P2P procure to page.

CHAPTER II: MAINTAINING STOCK KEEPING UNITS (SKU):
Introduction-Inventory Masters in ERP - Creating Inventory Masters-Creation of Stock Group-Creation of Units of Measure-Creation of Stock Item-Creation of Godown-Defining of Stock Opening Balance in ERP Stock Category-Reports.

CHAPTER III: RECORDING DAY-TO-DAY TRANSACTIONS IN ERP: Introduction-Business Transactions-Source Document for Voucher-Recording Transactions in ERP - Accounting Vouchers-Receipt Voucher (F6)-Contra Voucher (F4)-Payment Voucher (F5)-Purchase Voucher (F9)-Sales Voucher (F8)-Debit Note Voucher-Credit Note (Ctrl+F8)-Journal Voucher (F7).

CHAPTER IV: ACCOUNTS RECEIVABLE AND PAYABLE MANAGEMENT:
Introduction-Accounts Payables and Receivables-Maintaining Bill-wise Details-Activation of Maintain Bill-wise Details Feature-New Reference-Against Reference-Advance-On Account-Stock Category Report-Changing the Financial Year in ERP.

CHAPTER V: MIS REPORTS:
Introduction-Advantages of Management Information Systems-MIS Reports in ERP - Trial Balance - Balance Sheet-Profit and Loss Account-Cash Flow Statement-Ratio Analysis-Books and Reports - Day Book-Receipts and Payments-Purchase Register-Sales Register-Bills Receivable and Bills Payable.

REFERENCE BOOKS:

1. Computerised Accounting: Garima Agarwal, Himalaya
2. Computerised Accounting: A. Murali Krishna, Vaagdevi publications
3. Computerised Accounting: Dr. G. Yogeshweran, PBP.
4. Aakash Business Tools: Spoken Tutorial Project IIT Bombay
5. Mastering Tally: Dinesh Maidasani, Firewal Media
6. Implementing Tally ERP 9: A.K Nadhani and K.K Nadhani, BPB Publications
7. Computerised Accounting and Business Systems: Kalyani Publications
8. Manuals of Respective Accounting Packages
9. Tally ERP 9: J.S. Arora, Kalyani Publicatio

Paper : (BCC 507) (b): BUSINESS ANALYTICS

Paper: BCC 507 (b) Max. Marks: 80+20
PPW: 5 Hrs Exam Duration: 3 Hrs

Objective: To acquire knowledge for application of Business Analysis techniques and tools in a given business scenario

UNIT-I: INTRODUCTION:
To Decision Science: History of Operations Research/Decision Science, Definition and Features of Decision Science. Approach to Problem Solving, Methodology of Decision Science, Opportunities and Shortcomings of the Decision Science Approach, Applications of Decision Science. Computer Software for Decision Science.

UNIT-II: **INTRODUCTION TO LINEAR PROGRAMMING:**
Structure of Linear Programming Model, Advantages and Limitations of Linear Programming, Application areas of Linear Programming, General Mathematical Model of Linear Programming Problems, Guidelines of Linear Programming Model Formulation

UNIT-III: METHODS OF LINEAR PROGRAMMING - I:
The Graphical Method, Important Definitions, Extreme Point Solution Method, Examples on Maximization LP Problem, Examples on Minimization LP Problem; Examples on Mixed Constraints LP Problem, Iso-Profit (Cost) Function Line Method.

UNIT-IV: **METHODS OF LINEAR PROGRAMMING - II:**
The Simplex Method, Simplex Algorithm (Maximization case), Simplex Algorithm (Minimization case), Two Phase Method, Big M Method, Some Complications and their Resolutions: Unrestricted Variables, Tie for Entering Basic Variable, Tie for Leaving Basic Variable, Degeneracy.

UNIT-V: EXPLORATORY DATA ANALYSIS: Exploring Central Tendency of Data, Exploring Dispersion of Data in terms of Standard Deviation, Skewness and Kurtosis, Standard Error of Mean, Designing Confidence Intervals, Identifying Outliers through Box Plot.

SUGGESTED READINGS:

1. Operations Research: J K Sharma, Macmillan.
2. Operations Research: Anand Sharma, HPH
3. Operations Research: Hamdy A. Taha, Pearson.
4. Operations Research: Mote and Madhaan, Wiley
5. Quantitative Techniques in Management: N. D. Vohra, Tata McGraw Hill.
6. Quantitative Techniques for Managerial Decisions: U. K. Srivastava, G. V. Shenoy and S. C. Sharma. New Age International Ltd.

BCC 508: WEB TECHNOLOGY

Paper: BCC 508 Max.Marks:60+20+20
PPW: 5 (4T + 2P) Exam Duration: 3 Hrs

Objective: *to gain skills of usage of Web Technologies to design Web pages.*

UNIT-I: INTRODUCTION:
Art of creating a web site - Markup language (HTML) – Hypertext - Formatting text - Forms & formulating instructions & formulation elements – Commenting code – Anchors - Back grounds – Images - Hyperlinks – Lists –Tables – Frames - Web design principles.

UNIT-II: AN OVER VIEW OF DYNAMIC WEB PAGES & DYNAMIC WEB PAGE:
An over view of dynamic web pages and dynamic web page technologies: Introduction to Dynamic HTML programing - Cascading style sheets (CSS) - Basic syntax and structure -Events handling - Changing Text and Attributes - Dynamically changing style - Text Graphics and placements - Creating multimedia effects with filters and Transactions.

UNIT-III: JAVA SCRIPT:
Introduction - Client side Java script - Server side Java script - Core features - Data types and variables – Operators - Expressions and statements – Functions – Objects – Array - Date and math related objects - Document object model - Event handling.

UNIT-IV: EVENTS AND EVENT HANDLERS:
General information about Events – Event – OnAbort – OnClick - Ondbl click - Ondrag drop – Onerror - Onfocus - Onkey Press – Onkey Up – Onload - Onmouse Down – Onmouse Move - Onmouse Out – Onmouse Over - Onmove - Onrest – Onresize - Onselect - On submit - Onunload.

UNIT-V: EXTENSIBLE MARKUP LANGUAGE (XML):
Introduction - Creating XML Documents - XML style Sheet - Hyperlinksin XML Document Object Model - XML Query Language.

LAB WORK: CREATING A WEBSITE WITH DYNAMIC FUNCTIONALITY USING CLIENT- SIDE AND SERVER SIDE SCRIPTING.

SUGGESTED READINGS:
1. Web Technology: Pradeep Kumar, HPH
2. Internet & World Wide Web How to Program: Deitel & Deitel, Pearson.
3. Web programming: Chris Bates.
4. HTML & XML An Introduction NIIT, PHI.
5. HTML for the WWW with XHTML & CSS: Wlizabeth Castro, Pearson
6. Internet and Web Technologies: Raj Kamal, McGraw Hill.
7. Web Technology: A Developer's Perspective: Gopalan & Sivaselvan, PHI.
8. The Complete Reference PHP: S. Holzner, McGraw Hill.
9. Internet Technology and Web Page Design: R.Singh&M.Sonia, Kalyani.
10. Web Programming using PHP and MySQL: A.Babu, K.Meena & Sivakumar, HPH.
11. Web Technology and Design by Xavier, New Age International Pub.

Paper : (BCC 508) : BUSINESS SIMULATION

Paper: BCC 508 Max. Marks: 80+20
PPW: 5 Hrs Exam Duration: 3 Hrs

Objective: Students will learn how to build simulation models using M S Excel.

UNIT-I: FUNCTIONS AND FORMULAS: Understanding Screen Layout - Creating Auto List & Custom List - Entering, Selecting and Editing Data - Understanding References (Relative, Absolute & Mixed) - Working on Various Functions & Formulas - Common Basic Functions - Logical Functions - Text Functions - Date & Time Functions - Lookup & Reference Functions - Mathematical Functions - Conditional Functions - Referring Data from Different Worksheet & Workbook Formula–Auditing -Various Calculation Techniques - Working on Ranges.

UNIT-II: **PRESENTATION OF DATA:** Sorting Techniques - Various Data Filtering Techniques - Formatting Techniques - Conditional Formatting - Number Formatting - Table Formatting - Protecting Sheets & Files - Understanding Various Excel Window Techniques - Viewing Excel Spreadsheet in various Layouts - Advanced Printing Techniques - Templates - Themes.

UNIT-III: **DATA ANALYSIS TOOLS:** Data Consolidation - Text to Columns - Flash Fill - Remove Duplicates - Advanced Data Validation Techniques - What-if Analysis - Goal Seek - Data Table - Solver – Scenarios; Working with Tables - Creating Charts - Understanding Sparklines (Line, Column, Win/Loss) - Pivot Tables & Pivot Charts.

UNIT – IV: **SIMULATION – 1:** Simulations, Decision Trees and Forecasting, when should we use simulation, simulation modeling cycle. Introduction to Monte Carlo Simulation, generating random values, discrete and continuous functions,Excel for simple simulation.

UNIT – V: **SIMULATION – II:** Managerial applications of risk analysis, performing a simulation using @Risk, analyzing the simulation output, generating various plots. Simulation in forecasting, Advanced simulation techniques, simulations for: stocks, financial statements, games, taxes (Any two).

SUGGESTED READINGS:

1. Excel 2013 Bible: John Walkenbach, Wiley.
2. Excel Data Analysis - Modeling and Simulation: Hector Guerrero, Springer.
3. Excel Functions and Formulas: Bernd Held,BPB Publications.
4. Microsoft Excel 2013: Data Analysis and Business Modeling: Winston, PHI
5. Financial Analysis and Modeling using Excel and VBA: Chandan Sengupta, Wiley

BC 601: REGULATIONS OF INSURANCE BUSINESS

Paper: BC601 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ Hrs
Objective: To equip the students with the knowledge regarding Insurance Business Regulations

UNIT I: INSURANCE LEGISLATION IN INDIA:

History of life and non-life insurance legislation—nationalization—insurance reforms—insurance business Act, 1972—IRDA and its functions including licensing functions—Web aggregators—regulation for intermediaries—CCS-SPV-PoS-insurance repositories-TPAs—Role and duties of surveyors—Origin and development of micro-insurance—regulation of ULIPs—pension schemes—money laundering—KYC—methods of receipt of premium—Exchange control regulations relating to General and Life Insurance—IRDA Health Insurance Regulations, 2016—Health plus life combi products.

UNIT II: POLICY HOLDERS RIGHTS OF ASSAINGMENT, NOMINATION AND TRANSFER:

Assignment and transfer of insurance policies—provisions related to nomination—repudiation—Fraud—protection of policyholder interest—stages in insurance policy-presale stage-post sale stage-free look period—grievance redressal—claim settlement—key feature document—dispute resolution mechanism—insurance ombudsman—solvency margin and investments—international trends in insurance regulation.

SUGGESTED READINGS :

1. Regulation of Insurance Business – Insurance Institute of India
2. Regulation of Insurance Business – D.S. Vittal, HPH
3. Regulation of Insurance Business: Dr. V. Padmavathi, PBP
4. Risk Management : A Publication of the Insurance Institute of India
5. Insurance Theory and Practice: Tripathi PHI
6. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
7. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
8. South Western College Publishing Cincinnati, Ohio.
9. Insurance Management – S.C. Sahoo & S.C. Das-HPH.

BC 602: SECTORS OF INDIAN ECONOMY

Paper: BC602 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ Hrs

Objective: To equipment the students with the knowledge regarding Basics of Indian Economy

UNIT I: AGRICULTURE IN INDIA:

Place of agriculture: Progress-Green revolution-Present state-New thrust areas-Food security: Legislation-Schemes-Public distribution system-Agricultural Marketing: Types-warehousing-Agricultural Labour-Minimum wages-Rural credit-RRBs-NABARD.

UNIT II: INDUSTRIES AND TERTIARY SECTOR IN INDIA:

Role and pattern of industrialization-Large-scale industry- Small-scale industry-Information Technology Industry-Labour problems-Labour Policy-Social Security-Trade Union Movement-Industrial Disputes-Unorganized Sector-Foreign Trade - Balance of Payments - SEZs- Foreign Exchange- Convertibility-Banking Sector-Money Market- Public Finance-Financial relations between Centre and States;.

SUGGESTED READINGS:

1) Ruddar Datt and K.P.M. Sundharam "Indian Economy", S. Chand & Company Ltd., New Delhi, 2010.
2) S.K.Misra & V.K.Puri "Indian Economy-Its Development Experience"Himalaya Himalya Publishing Company, New Delhi, 2010.
3) Vivek Mittal "Business Environment" Excel Publications, New Delhi, 2007.
4) Sectors of India Economy: Dr. P. Venugopal Rao, PBP
5) Anjaneyulu, "Introduction to Indian Economy" Himalaya Himalya Publishing Company, New Delhi, 2011.
6) Economic Survey—Government of India, Ministry of Finance, Oxford University Press, New Delhi,
7) Sectors of Indian Economy: Satya Sudha, Himalaya
8) The Economic Times, News paper
9) Business Line, News paper

BC 603: THEORY AND PRACTICE OF GST

Paper: BC603 Max. Marks: 60+20+20
PPW: 3T+2P Exam Duration: 3Hrs

Objective: To equipment the students with the knowledge regarding Theory and Practice of GST

CHAPTER I: INTRODUCTION TO GST:

Introduction – GST - Taxes Subsumed under GST -Determination of Tax - Registration -Process of Registration - Cancellation and renovation of registration - Supply of Goods and Services - Transition to GST - Registered Business -Availed Input Tax Credit -Unavailed CENVAT credit and Input VAT on capital goods-Availing the input credit held in closing stock -Invoicing -Tax Invoice -Bill of Supply - Credit Note, Debit Note and Supplementary Invoice-Transportation of goods without issue of Invoice - Input Credit Mechanism - Input Tax - GST Returns - Payment of Tax.

CHAPTER II: GETTING STARTED WITH GST:

Introduction - Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods-Intrastate Inward Supply -Intrastate Outward Supply -Interstate -Interstate Outward Supply - Return of Goods -Purchase Returns -Sales Returns -Supplies Inclusive of Tax -Defining Tax Rates at Master and Transaction Levels - Defining GST Rates at Stock Group Level-Defining GST Rate at Transaction Level -Hierarchy of Applying Tax Rate Details –Reports.

CHAPTER III: RECORDING ADVANCED ENTRIES, GST ADJUSTMENT AND RETURN FILING:

Introduction -Accounting of GST Transactions -Purchases from Composition Dealer -Purchases from Unregistered Dealers-Exports -Imports -Exempted Goods -SEZ Sales -Advance Receipts and payments - Mixed Supply and Composite Supply under GST -Mixed Supply of Goods -Composite Supply of Goods - GST Reports - Generating GSTR- Report in ERP -Input Tax Credit Set Off -GST Tax Payment -Time line for payment of GST tax -Modes of Payment -Challan Reconciliation -Exporting GSTR- return and uploading in GST portal.

CHAPTER IV: GETTING STARTED WITH GST (SERVICES):

Introduction -Determination of supply of services -Determining the Place of Supply of Services -Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods - Intrastate Inward Supply-Intrastate Outward Supply -Interstate Supply -Interstate Outward Supply - Interstate Inward Supply -Interstate Outward Supply of Services -Cancellation of Services -Cancellation of Inward Supplies -Cancellation of Outward Supply of Services -Defining Tax Rates at Master and Transaction Levels.

CHAPTER V: RECORDING ADVANCED ENTRIES AND MIGRATION TO ERP:

Introduction - Accounting Multiple Services in a Single Supply - Recording Partial Payment to Suppliers -Outward Supplies - Recording Outward Supply with Additional Expenses - Supply of services -Business to consumers - Time of Supply of Services - Place of Supply of Services - Determining place of supply of services - Exempt Supply of Services under GST -Export Supply of Services - Reverse Charge on Services under GST - Advance Receipts from Customers under GST - Advance Receipt and issuing Invoice on same month -Advance Receipt and issuing Invoice on different month - Reversal of GST on account of cancellation of advance receipt - Generating GSTR- Report in ERP - Input Tax Credit Set Off - Migration to ERP - Activate Goods and Services Tax (GST) in ERP - Set up GST rates - Update Masters - Update party GSTIN/UIN - Creation of GST Duty ledgers.

SUGGESTED READINGS:

1. Taxmann's Basics of GST
2. Taxmann's GST: A practical Approach
3. Theory & Practice of GST, Srivathsala, HPH
4. Theory & Practice of GST: Dr. Ravi M.N, PBP.

BC 604: COMPANY LAW (2013Act)

Paper: BC604 Max. Marks:80 + 20
PPW: 4 Exam Duration: 3Hrs

Objective: *to understand legal provisions applicable for establishment, management and winding up of companies in India as per Companies Act 2013.*

UNIT-I: INCORPORATION OF COMPANIES:
Company: Meaning and Definition – Characteristics - Classification – Legislation on Companies – Incorporation - Promotion – Registration - Memorandum of Association – Articles of Association – Certificate of Incorporation - Prospectus – Statement in lieu of Prospectus – Commencement of business.

UNIT–II: MANAGEMENT OF COMPANIES:
Director: Qualification - Disqualification - Position - Appointment - Removal – Duties and Liabilities – Loans – Remuneration – Managing Director – Corporate Social Responsibility – Corporate Governance.

UNIT–III: COMPANY SECRETARY:
Company Secretary: Definition – Appointment – Duties – Liabilities – Company Secretary in Practice – Secretarial Audit.

UNIT–IV: COMPANY MEETINGS:
Meeting: Meaning – Requisites - Notice – Proxy - Agenda – Quorum – Resolutions – Minutes – Kinds – Shareholder Meetings - Statutory Meeting - Annual General Body Meeting – Extraordinary General Body Meeting – Board Meetings.

UNIT–V: WINDING UP:
Meaning – Modes of Winding Up –Winding Up by tribunal – Voluntary Winding Up – Compulsory Winding Up – Consequences of Winding Up – Removal of name of the company from Registrar of Companies – Insolvency and Bankruptcy code - 2016.

SUGGESTED READINGS:

1) Company Law: ND Kapoor, Sultan Chand and Co.
2) Company Law: Rajasri. – HPH
3) Company Law: Prof. G. Krishna Murthy, G. Kavitha, PBP
4) Company Law and Practice: GK Kapoor & Sanjay Dhamija, Taxmann Publication.
5) Company Law: Revised as per Companies Act- 2013: KC Garg et al, Kalyani Publication.
6) Corporate Law: PPS Gogna, S Chand.
7) Company Law: Bagrial AK: Vikas Publishing House.

BC 605: MANAGERIAL ACCOUNTING

Paper: BC605 Max. Marks: 80 + 20
PPW: 5 Hrs Exam Duration: 3 Hrs

Objective: *to acquire Managerial Accounting decision-making techniques and reporting methods.*

UNIT-I: INTRODUCTION:
Managerial Accounting: Features – Objectives – Scope – Functions – Advantages and Limitations – Relationship between Cost, Management and Financial Accounting.

UNIT-II: MARGINAL COSTING:
Meaning – Importance – Marginal Cost Equation – Difference between Marginal Costing and Absorption Costing – Application of Marginal Costing – CVP Analysis – Break Even Analysis: Meaning – Assumptions – Importance - Limitations.

UNIT-III: DECISION MAKING:
Make or Buy – Add or Drop Products – Sell or Process Further – Operate or Shut-down – Special Order Pricing – Replace or Retain.

UNIT-IV: BUDGETS AND BUDGETARY CONTROL:
Budget: Meaning – Objectives – Advantages and Limitations – Essentials of Budgets - Budgetary Control - Classification of Budgets - Preparation of Budgets.

UNIT-V: STANDARD COSTING AND VARIANCE ANALYSIS:
Standard Costing: Meaning – Importance – Standard Costing and Historical Costing - Steps involved in Standard Costing.
Variance Analysis: Material variance - Labour variance - Overhead variance - Sales variance.

SUGGESTED READINGS:

1. Management Accounting- Principles & Practice: Sharma RK & Shashi K. Gupta, Kalyani
2. Advanced Managerial Accounting: Srihari Krishna Rao, Himalaya
3. Advanced Managerial Accounting: Dr. Sundaram, PBP
3. Advanced Management Accounting: Robert S. Kaplan & Anthony A. Atkinson, Prentice-Hall
4. Management Accounting: Rustagi R.P, Galgotia
5. Managerial Accounting: Ronald W. Hilton, TMH

BC 606: COMMERCE LAB

Paper: BC606 Max. Marks: 70PF* + 30VV
PPW: 4 (2T+4P) Exam Duration:

Objective: *to become familiar with various business documents and acquire practical knowledge, which improve over all skill and talent.*

UNIT-I: BASIC BUSINESS DOCUMENTS:

Trade license under Shops and Establishments Act - Labor license from Department of labor - Partnership Deed - Pollution, Health licenses – Quotation - Invoice form and preparation - Computation of simple interest, compound interest and EMI - Way bill used during transport - Debit Note and Credit Note - Audit Report.

UNIT-II: FINANCE, BANKING AND INSURANCE DOCUMENTS:

Promissory Note - Bill of exchange – Cheque - Pay in slip - Withdrawal form - Account opening and Nomination form KYC - Deposit form and Deposit Receipts - Loan application form - Insurance Proposal form and Insurance Policy - ATM Card Application form - Credit appraisal report - Insurance agency application procedure - ESI / PF membership form.

UNIT-III: DOCUMENTS FOR INCORPORATION A COMPANY:

Memorandum of Association - Articles of Association - Certificate of Incorporation – Prospectus - Certificate of Commencement of Business - Annual Report – Chairman's Speech - Model bye-laws of some society - Society/ Trust registration form - Complaint in a Consumer forum - Complaint under Right to Information Act.

UNIT-IV: DOCUMENTS OF TAXATION:

PAN application under Income Tax Act - TAN application under Income Tax Act - Form:16 to be issued by Employer - TDS and its certificate u/s15 - Income Tax payment challans and Refund Order - Income Tax Returns including TDS Return - Notices under Income Tax Act - Assessment Order - GST Dealer-Application and License - Registration under GST.

UNIT-V: BUSINESS CHARTS:

Elements of business - Forms of business organizations - Procedure of incorporation of companies - Classification of partners with salient features of each of them - International, National, State level and Regional entrepreneurs - Hierarchy of Banking business in India - Tax administration in India - Various taxes imposed in India - Export and import procedure - Purpose and powers of authorities like RBI, SEBI, IRDA, ROC.

COMMERCE LAB FACILITIES:

i) Colleges are required to provide a commerce lab containing all the documents related to commerce and facilities as, computer, printer, OHP, LCD Projector with sufficient furniture.

ii) Teachers should practically explain the documents and help in filling the same in the simulated environment.

iii) Students are required to do the above personally and gain the knowledge of filling the above documents and the same are to be kept in a portfolio.

iv) At the end of semester, the portfolios would be evaluated by the external examiner designated by the Controller of Examinations, Osmania University, from the panel submitted by the Board of Studies in Commerce. The Examiner would evaluate the portfolio for a maximum of 35 marks and conduct viva-voce examination for 15 marks. The award lists duly signed are to be sent the Controller of Examinations.

***the student has to collect the various documents prepare activity charts and submit the same in the form of a record.**

Paper : (BC 607) (a) : E-COMMERCE

Paper: BC607 (a) **Max Marks:** 60+20+20
PPW: 5 (4T + 2P) **Exam Duration: 3 Hrs**
Objective: *to acquire conceptual and application knowledge of ecommerce.*

UNIT-I: INTRODUCTION:
E-Commerce: Meaning - Advantages & Limitations - E-Business: Traditional & Contemporary Model, Impact of E-Commerce on Business Models - Classification of E-Commerce: B2B - B2C - C2B - C2C - B2E - Applications of Ecommerce: E-Commerce Organization Applications - E-Marketing - E-Advertising - E-Banking - Mobile Commerce - E-Trading - E-Learning - E-Shopping.

UNIT-II: FRAMEWORK OF E-COMMERCE:
Framework of E-Commerce: Application Services - Interface Layers - Secure Messaging - Middleware Services and Network Infrastructure - Site Security - Firewalls & Network Security - TCP/IP – HTTP - Secured HTTP – SMTP - SSL.
Data Encryption: Cryptography – Encryption – Decryption - Public Key - Private Key - Digital Signatures - Digital Certificates.

UNIT-III: CONSUMER ORIENTED E-COMMERCE APPLICATIONS:
Introduction - Mercantile Process Model: Consumers Perspective and Merchant's Perspective - Electronic Payment Systems: Legal Issues & Digital Currency - E-Cash & E-Cheque - Electronic Fund Transfer (EFT) - Advantages and Risks - Digital Token-Based E-Payment System - Smart Cards.

UNIT-IV: ELECTRONIC DATA INTERCHANGE:
Introduction - EDI Standards - Types of EDI - EDI Applications in Business – Legal - Security and Privacy issues if EDI - EDI and E-Commerce - EDI Software Implementation.

UNIT-V: E-MARKETING TECHNIQUES:
Introduction - New Age of Information - Based Marketing - Influence on Marketing - Search Engines & Directory Services - Charting the On-Line Marketing Process - Chain Letters - Applications of 5P's (Product, Price, Place, Promotion, People) E-Advertisement - Virtual Reality & Consumer Experience - Role of Digital Marketing.

Lab work: *Using Microsoft Front Page Editor and HTML in Designing a Static Webpage/Website.*
SUGGESTED READINGS:

1. Frontiers of Electronic Commerce: Ravi Kalakota, Andrew B Whinston, Pearson
2. E-Commerce: Tulasi Ram Kandula, Himalaya Publishing House.
3. E-Commerce: An Indian Perspective: P.T. Joseph, S.J, PHI
4. Electronic Commerce, Framework Technologies & Applications: Bharat Bhasker, McGraw Hill
5. Introduction To E-Commerce: Jeffrey F Rayport, Bernard J. Jaworski: Tata McGraw Hill
6. Electronic Commerce, A Managers' Guide: Ravi Kalakota, Andrew B Whinston
7. E-Commerce & Computerized Accounting: Rajinder Singh, Er. Kaisar Rasheed, Kalyani
8. E-Commerce & Mobile Commerce Technologies: Pandey, Saurabh Shukla, S. Chand
9. E-Business 2.0, Roadmap For Success: Ravi Kalakota, Marcia Robinson, Pearson
10. Electronic Commerce: Pete Loshin / John Vacca, Firewall Media
11. E-Commerce, Strategy, Technologies And Applications : David Whiteley, Tata Mcgraw Hill
12. Digital Commerce and Its Applications (Student's Handbook): K Goyal, Kalyani Publication

Paper : (BCC 607) (b) : BUSINESS FORECASTING

Paper:BCC 607 (b) Max. Marks: 80+20
PPW: 5Hrs Exam Duration: 3 Hrs

Objective: To acquire knowledge for application of Business Forecasting techniques and tools in a given business scenario

UNIT-I:**INTRODUCTION TO FORECASTING:** Types of Forecasting Methods, Time Series Analysis, Components of Time Series- Secular Trend, Seasonal Variations, Cyclical Variations, Random Variations, The Additive Model and Multiplicative Model, Measurements of Error in Forecasting (MAD, MAPE, RMSE), Freehand Method

UNIT-II:TIME SERIES ANALYSIS: Smoothing Techniques, Moving Averages Method, Weighted Moving Averages Method, Semi-Averages Method, Exponential Smoothing Method, Double Exponential Smoothing Method, Regression Trend Analysis, Autocorrelation and Auto regression.

UNIT-III:LINEAR REGRESSION: Introduction to Simple Linear Regression, Determination of Intercept and coefficient of Regression, Coefficient of Determination, Standard Error of Estimate, Measuring Autocorrelation- Durbin Watson Statistics, Testing of slope, Estimate of population of coefficient of regression, Testing the overall Model.

UNIT-IV: **MULTIPLE LINEAR REGRESSION:** Multiple Regression model with more than one Independent Variable, Determination of Coefficient of Multiple Determination (R^2), Adjusted R^2, Standard Error of Estimate, Testing Assumptions of Linear Regression.

UNIT-V:LOGISTIC REGRESSION: The Odds and Probabilities, Logit Function, Logistic Regression Coefficients, Nagelkerke R Square, Classification Matrix, Sensitivity and Specificity, ROC Curve.

SUGGESTED READINGS:

1. Business Statistics: Naval Bajpai, Pearson.
2. Multivariate Data Analysis: Hair, Black, Babin, Anderson, Pearson.
3. Statistics for Management:Anand Sharma, HPH
4. Applied Multivariate Statistical Analysis: Richard A. Johnson, Pearson.
5. Statistics for Business and Economics: Anderson, Cengage Learning.
6. Statistics for Management:R. I. Levin, D. S.Rubin,S.Rastogi&M. H. Siddiqui,Pearson.
7. Statistical Tools for Managers: D P Apte,Excel Books.

BCCA 608 (a): RELATIONAL DATABASE MANAGEMENT

Paper: BCCA 608 (a) Max. Marks: 60+20+20
PPW: 5 (4T + 2P) Exam Duration: 3 Hrs

Objective: *to acquire basic conceptual background necessary to design and develop simple database system, Relational database mode, ER model and distributed databases, and to write good queries using a standard query language called SQL.*

UNIT-I: BASIC CONCEPTS:

Database Management System - File based system - Advantages of DBMS over file based system - Database Approach - Logical DBMS Architecture - Three level architecture of DBMS or logical DBMS architecture - Need for three level architecture - Physical DBMS Architecture - Database Administrator (DBA) Functions & Role - Data files indices and Data Dictionary - Types of Database.

Relational and ER Models**:** Data Models - Relational Model – Domains - Tuple and Relation - Super keys - Candidate keys - Primary keys and foreign key for the Relations - Relational Constraints - Domain Constraint - Key Constraint - Integrity Constraint - Update Operations and Dealing with Constraint Violations - Relational Operations - Entity Relationship (ER) Model – Entities – Attributes – Relationships - More about Entities and Relationships - Defining Relationship for College Database - E-R Diagram - Conversion of E-R Diagram to Relational Database.

UNIT-II: DATABASE INTEGRITY AND NORMALISATION:

Relational Database Integrity - The Keys - Referential Integrity - Entity Integrity - Redundancy and Associated Problems – Single Valued Dependencies – Normalisation - Rules of Data Normalisation - The First Normal Form - The Second Normal Form - The Third Normal Form - Boyce Codd Normal Form - Attribute Preservation - Lossless-join Decomposition - Dependency Preservation.

File Organisation : Physical Database Design Issues - Storage of Database on Hard Disks - File Organisation and Its Types - Heap files (Unordered files) - Sequential File Organisation - Indexed (Indexed Sequential) File Organisation - Hashed File Organisation - Types of Indexes - Index and Tree Structure - Multi-key File Organisation
- Need for Multiple Access Paths - Multi-list File Organisation - Inverted File Organisation.

UNIT-III: STRUCTURES QUERY LANGUAGE (SQL**):**

Meaning – SQL commands - Data Definition Language - Data Manipulation Language - Data Control Language - Transaction Control Language - Queries using Order by – Where - Group by - Nested Queries.

Joins – Views – Sequences - Indexes and Synonyms - Table Handling.

UNIT-IV : TRANSACTIONS AND CONCURRENCY MANAGEMENT:

Transactions - Concurrent Transactions - Locking Protocol - Serialisable Schedules - Locks Two Phase Locking (2PL) - Deadlock and its Prevention - Optimistic Concurrency Control.

Database Recovery and Security: Database Recovery meaning - Kinds of failures - Failure controlling methods - Database errors - Backup & Recovery Techniques - Security & Integrity - Database Security - Authorization.

UNIT-V: DISTRIBUTED AND CLIENT SERVER DATABASES:

Need for Distributed Database Systems - Structure of Distributed Database - Advantages and Disadvantages of DDBMS - Advantages of Data Distribution - Disadvantages of Data Distribution - Data Replication - Data Fragmentation.

Client Server Databases: Emergence of Client Server Architecture - Need for Client Server Computing - Structure of Client Server Systems & its advantages.

LAB: SQL QUERIES BASED ON VARIOUS COMMANDS.

SUGGESTED READINGS:

1. Database Systems: R.Elmasri & S.B. Navathe, Pearson.
2. Relational Database Management Systems: Tulasi Ram Kandula, HPH
3. Introduction to Database Management System: ISRD Group, McGraw Hill.
4. Database Management System: R.Ramakrishnan & J.Gehrke, McGraw Hill.
5. Modern Database Management: J.A.Hoffer,V.Rames &H.Topi, Pearson.
6. Database System Concepts: Silberschatz, Korth & Sudarshan, McGraw Hill.
7. Simplified Approach to DBMS: Parteek Bhaia, Kalyani Publishers.
8. Database Management System: Nirupma Pathak, Himalaya.
9. Database Management Systems: Pannerselvam, PHI.
10. Relational Database Management System: Srivastava & Srivastava, New Age
11. PHPMySQL Spoken Tutorials by IIT Bombay.
12. Oracle Database: A Beginner's Guide: I.Abramson, McGraw Hill.

Paper : (BCC 608) (b):BUSINESS ANALYTICS PROGRAMMING

Paper: BCC 608(b) Max. Marks: 80+20
PPW: 5 Hrs Exam Duration: 3Hrs

Objective: Students will learn how to master basics of most used Analytical Softwares like Base-SAS, R and Python.

UNIT-I: **INTRODUCTION:** Database Management Systems – Definition, What is MySql? MySql Installer, Download sample Database, Loading Sample Database, Structured Query Language, Data types.

UNIT-II: DATA DEFINITION AND MANIPULATION: Creating Table, Data Integrity, Creating constraints, Querying Database, Retrieving result sets, Functions and Joins, Sub Queries.

UNIT-III: BASICS OF SAS: Introduction to SAS, Installation of SAS university Edition, prerequisites for data analysis using SAS, SAS architecture, Data Types, formats and informats, SAS coding- Data step and proc step, libraries, Importing external data, Reading and manipulating Data, functions, Data Transformations, Conditional Statements.

UNIT-IV: **PYTHON:** Basics of Python – various tools, Installation of Anaconda Navigator, Data types – string, tuples, set, lists, dictionary, Arrays. Spyder and Documentation with Jupyter.

UNIT-V: **R PROGRAMMING:** Basics of R, Installation of R studio, Vectors, Matrices, Data types, Importing files, Writing files, Merging Files, Data Manipulation and Data Cleaning, Functions,

SUGGESTED READINGS:

1. R : Hands-on Programming; Garrett Grolemund, O' Reilly Media Publishers
2. R : R Cookbook; Teetor Paul, O' Reilly Media Publishers
3. Python : Mastering Python for Data Science; Samir Madhavan, Packt Publishing
4. Python : Python for Data Analysis; W McKinney, O' Reilly Media Publishers
5. SAS : The little SAS book; Lora D Delwiche, SAS Institute
6. SAS : SAS for dummies; Chris Hemedinger and Stephen McDaniel, Wiley
7. MySql : MYSQL in a nutshell; Russell Dyer, O' Reilly Media Publishers
8. MySql : MySQL cookbook by Paul DuBois, O' Reilly Media Publishe

B.Com (General)

(w.e.f. 2016–2017)

First Year Syllabus (CBCS)

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DEPARTMENT OF COMMERCE,
MAHATMA GANDHI UNIVERSITY
NALGONDA – 508 254 (T.S)

DEPARTMENT OF COMMERCE, M.G.U

Structure of B.Com (General) (CBCS) for
Mahatma Gandhi University, Nalgonda. (w.e.f. Academic Year 2016-17)

B.COM (General) PROGRAMME

FIRST YEAR:					
SEMESTER-I:					
Sl.No.	***Code***	***Course Title***	***Course Type***	***HPW***	***Credits***
(1)	(2)	(3)	(4)	(5)	(6)
1.	BC101	Environmental Studies	AECC-1	2	2
2.	BC102	English	CC-1A	5	5
3.	BC103	Second Language	CC-2A	5	5
4.	BC104	Financial Accounting – I	DSC-1A	5	5
5.	BC105	Business Economics	DSC-2A	5	5
6.	BC106	Business Organization	DSC-3A	4	4
7.	BC107	Information Technology	DSC-4A	3T+2P	4
		Total		**31**	**30**
SEMESTER-II:					
8.	BC201	Gender Sensitisation	AECC-2	2	2
9.	BC202	English	CC-1B	5	5
10.	BC203	Second Language	CC-2B	5	5
11.	BC204	Financial Accounting - II	DSC-1B	5	5
12.	BC205	Managerial Economics	DSC-2B	5	5
13.	BC206	Principles of Management	DSC-3B	4	4
14.	BC207	Foreign Trade	DSC-4B	4	4
		Total		**30**	**30**
SECOND YEAR:					
SEMESTER-III:					
15.	BC301	Principles of Insurance	SEC-1	2	2
16.	BC302	English	CC-1C	5	5
17.	BC303	Second Language	CC-2C	5	5
18.	BC304	Advanced Accounting	DSC-1C	5	5
19.	BC305	Income Tax-I	DSC-2C	5	5
20.	BC306	Business Statistics-I	DSC-3C	4	4
21.	BC307	Entrepreneurial Development & Business Ethics	DSC-4C	4	4
		Total		**30**	**30**
SEMESTER-IV:					
22.	BC401	Practice of Life Insurance	SEC-2	2	2
23.	BC402	English	CC -1D	5	5
24.	BC403	Second Language	CC-2D	5	5
25.	BC404	Corporate Accounting	DSC-1D	5	5
26.	BC405	Income Tax-II	DSC-2D	5	5
27.	BC406	Business Statistics-II	DSC-3D	4	4
28.	BC407	Financial Statement Analysis	DSC-4D	4	4
		Total		**30**	**30**

THIRD YEAR:					
SEMESTER-V					
29.	BC501	Practice of General Insurance	SEC-3	2	2
30.	BC502		GE-1	2	2
31.	BC503	Cost Accounting	DSC-1E	4	4
32.	BC504	Business Law	DSC-2E	4	4
33.	BC505	Banking Theory & Practice	DSC-3E	4	4
34.	BC506	Auditing	DSC-4E	4	4
35.	**BC507**	Computerised Accounting	**DSE-1A**	**4T+2P**	**5**
36.	**BC508**	Accounting Standards	**DSE-2A**	**5**	**5**
		Total		**31**	**30**
SEMESTER-VI					
37.	BC601	Regulation of Insurance Business	SEC-4	2	2
38.	BC602		GE-2	2	2
39.	BC603	Managerial Accounting	DSC-1F	4	4
40.	BC604	Company Law	DSC-2F	4	4
41.	BC605	Financial Institutions & Markets	DSC-3F	4	4
42.	BC606	Commerce Lab	DSC-4F	2T+4P	4
43.	**BC607**	Advanced Managerial Accounting	**DSE-1B**	**5**	**5**
44.	**BC608**	Advanced Corporate Accounting	**DSE-2B**	**5**	**5**
		Total		**32**	**30**
		GRAND TOTAL		**184**	**180**

AECC: Ability **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; T=Theory; P=Practicals;*

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC Language	8	5	40
	DSC	**8**	**5**	**40**
		16	**4**	**64**
4	**DSE**	**4**	**5**	**20**
5	GE	2	2	4
	TOTAL	**44**		**180**
	Commerce Total	**28**		**124**

SYLLABUS

Paper : (BC 104) : FINANCIAL ACCOUNTING - I

Paper: BC104 Max. Marks: 50
THPW: 5 Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *to acquire conceptual knowledge of basics of accounting and preparation of final accounts of sole trader.*

UNIT-I: ACCOUNTING PROCESS:
Financial Accounting: Introduction – Definition – Evolution – Functions-Advantages and Limitations – Users of Accounting Information- Branches of Accounting – Accounting Principles: Concepts and Conventions- Accounting Standards– Meaning – Importance – List of Accounting Standards issued by ASB -– Accounting System- Types of Accounts – Accounting Cycle- Journal- Ledger and Trial Balance. (Including problems)

UNIT-II: SUBSIDIARY BOOKS:
Meaning –Types - Purchases Book - Purchases Returns Book - Sales Book - - Sales Returns Book - Bills Receivable Book - Bills Payable Book – Cash Book - Single Column, Two Column, Three Column and Petty Cash Book - Journal Proper.(Including problems)

UNIT-III: BANK RECONCILIATION STATEMENT:
Meaning – Need - Reasons for differences between cash book and pass book balances –Favourable and over draft balances – Ascertainment of correct cash book balance (Amended Cash Book) - Preparation of Bank Reconciliation Statement. (Including problems)

UNIT-IV: RECTIFICATION OF ERRORS AND DEPRECIATION:
Capital and Revenue Expenditure – Capital and Revenue Receipts: Meaning and Differences - Differed Revenue Expenditure. Errors and their Rectification: Types of Errors - Suspense Account – Effect of Errors on Profit. (Including problems)
Depreciation (AS-6): Meaning – Causes – Difference between Depreciation, Amortization and Depletion - Objectives of providing for depreciation – Factors affecting depreciation – Accounting Treatment – Methods of depreciation: Straight Line Method - Diminishing Balance Method (Including problems)

UNIT-V: FINAL ACCOUNTS:
Final Accounts of Sole Trader: Meaning -Uses -Preparation of Manufacturing, Trading and Profit & Loss Account and Balance Sheet – Adjustments – Closing Entries.(Including problems)

SUGGESTED READINGS:
1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Company.
2. Principles & Practice of Accounting: R.L.Gupta&V.K.Gupta, Sultan Chand.
3. Accountancy-I: S.P. Jain & K.L Narang, Kalyani Publishers.
4. Accountancy–I: Tulasian, Tata McGraw Hill Co.
5. Introduction to Accountancy: T.S.Grewal, S.Chand and Co.
6. Advanced Accountancy-I: S.N.Maheshwari& V.L.Maheswari, Vikas.
7. Fundamentals of Financial Accounting: Deepak Sehgil, Tax Mann Publication.
8. Financial Accounting: Jawahar Lal, Himalaya Publishing House.

Paper : (BC 105) : BUSINESS ECONOMICS

Paper: BC105 Max. Marks: 50
THPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective:*toacquire knowledge for application of economic principles and tools in business practices.*

UNIT-I: INTRODUCTION:

Business Economics: Meaning - Nature – Characteristics - Importance and Role - Micro & Macro Economics - Scope - Objectives - Law of Diminishing marginal utility - Law of Equi-marginal utility.

UNIT- II: DEMAND ANALYSIS:

Meaning – Function - Factors influencing Demand -Types of Demand -Demand Curve - Law of Demand –Exceptions to the law of demand-Elasticity of Demand: Concept - Types of elasticity of demand-price, income and cross Elasticity of Demand –measurement of elasticity—arc and point methods—Importance of various Elasticity of Demand

UNIT-III: SUPPLY ANALYSIS:

Law of Supply - Factors influencing Supply - Market Equilibrium- Consumer Surplus - Theory of Consumer behavior - Utility and indifference curve analysis.

UNIT–IV: PRODUCTION ANALYSIS:

Concept of Production –production function-Total Production - Marginal Production - Average Production –returns to a factor- Law of Variable Proportions - Law of Returns to Scale - Isocost – Isoquants - Economies and Dis-economies of Scale.

UNIT-V: COST AND REVENUEANALYSIS:

Theory of Cost - Concepts of Cost - Short run and Long run cost curves - Traditional and Modern Approaches -Revenue Curves–relationship between total marginal and average revenues- --Break Even Analysis—Meaning – Assumptions – Uses and Limitations.

SUGGESTED READINGS:

1. Business Economics: V. G. Mankar, Himalaya Publishing House
2. Managerial Economics: Vanith Agrawal, Pearson Education
3. Business Economics: H. L. Ahuja, S. Chand & Co. Ltd.
4. Business Economics : R. K. Lekhi, Kalyani Publishers
5. Business Economics: D. M. Mithani, Himalaya Publishing House
6. Business Economics: P. N. Chopra, Kalyani Publishers
7. Essential of Business Economics: D. N. Dwivedi, Vikas Publishers
8. Managerial Economics: Varshney and Maheswari, Sultan Chand
9. Business Economics: P. K. Mehta, Tax Mann Publication.

Paper : (BC 106) : BUSINESS ORGANISATION

Paper: BC106 Max. Marks: 50
THPW: 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: To acquaint the students with the basics of Commerce and Business concepts and functions and forms of Business Organization

UNIT-1: FUNDAMENTAL CONCEPTS:

Concepts of Business, Trade, Industry and Commerce - Classification - Relationship between Trade. Industry and Commerce - Nature of Business - Objectives of Business – Functions of Business- Social Responsibility of a business - Steps to Start an Enterprise

UNIT-II: BUSINESS ORGANIZATION:

Forms of Business Organization - Classification - Factors Influencing the Choice of Suitable Form of Organization - Sole Proprietorship – Meaning, Definition - Characteristics - Advantages and Disadvantages - Suitability of Sole Proprietorship - Partnership -Kinds of Partners - - Partnership Deed –- Meaning – Contents - Registration of Partnership Advantages and Disadvantages of Partnership - Suitability of Partnership - Limited liability partnership – Hindu Undivided Family - Meaning - Characteristics - Advantages and Disadvantages - Co-Operative Organization – Characteristics -Types of Co-Operative Societies - Limitations of Cooperatives.

UNIT-III: FORMATION OF JOINT STOCK COMPANY:

Joint Stock Company - Meaning - Definition - Characteristics - Advantages and Disadvantages - Kinds of Companies -Promotion - Stages of Promotion - Promoter - Characteristics - Kinds - Preparation of Important Documents - Memorandum of Association - Clauses - Articles of Association - Contents – Prospectus - Contents – Red herring Prospectus- Statement in lieu of Prospectus.

UNIT-IV: SOURCES OF FINANCE:

Industrial Finance - Long Term and Short Term Finance - Fixed and Working Capital Finance - Sources of Corporate Finance (A brief introduction to Shares and Debentures, Retained Earnings, Underwriting, Inter Company Investments and Venture Capital, Angel Investors, lease, hire purchase, franchising) .

UNIT V: STOCK EXCHANGE AND MUTUAL FUNDS:

Stock Exchange, Functions — Working of Stock Exchanges, Mutual Funds –Importance, Functions, Types — Role of SEBI in Regulating Stock Exchanges and Mutual Funds in India

SUGGESTED READINGS:

1. Business Organization & Management: Sharma Shashi K. Gupta, Kalyani Publishers
2. Business Organization: Sharma Shashi K. Gupta, Kalyani publishers.
3. Organization & Management: R. D. Agarwal, McGraw Hill.
4. Modern Business Organization: S.A. Sherlekar, V.S. Sherlekar, Himalaya Publishing House
5. Business Organization & Management: C.R. Basu, Tata McGraw Hill
6. Business Organization & Management: R. N. Gupta, S. Chand,
7. Organizational Behaviour Text & Cases: V.S.P. Rao, Himalaya Publishing House
8. Business Organization & Management: Uma Shekaram, Tata McGraw Hill
9. Business Organization & Management: Niranjan Reddy & Surya Prakash, Vaagdevi publishers.
10. Business Organisation and Management, Dr. Neeru Vasihth, Tax Mann Publications.

Paper : (BC 107) : INFORMATION TECHNOLOGY

Paper: BC107 Max. Marks: 35T + 15P
THPW: 5 (3T & 2P) Time: 3 Hrs.
Credits : 4

Objective: *to acquire basic knowledge in Information Technology and its applications in the areas of business.*

UNIT-I: INTRODUCTION:
Introduction to computers - Generations of computers – An overview of computer system - Types of computers - Input & Output Devices.
Hardware:Basic components of a computer system - Control unit – ALU - Input/output functions - Memory – RAM – ROM – EPROM - PROM and Other types of memory.

UNIT-II: OPERATING SYSTEM (OS):
Meaning - Definition & Functions - Types of OS - Booting process - DOS – Commands (internal & external) - Wild card characters – Virus & Hackers – Cryptography & cryptology
Windows: Using the Start Menu –Control Panel – Using multiple windows – Customizing the Desktop – Windows accessories (Preferably latest version of windows or Linux Ubuntu).

UNIT-III: WORD PROCESSING:
Application of word processing - Menus & Tool Bars - Word processor – Creating – Entering - Saving & printing the document - Editing & Formatting Text - Mail Merge and Macros (Preferably latest version of MS Word or Libre Office Writer).

UNIT-IV: SPREAD SHEET:
Application of work sheet/spread sheet - Menus & Tool bars - Creating a worksheet - Entering and editing of numbers - Cell referencing - Worksheet to analyze data with graphs & Charts.
Advanced tools: Functions – Formulae – Formatting numbers - Macros – Sorting- Filtering - Validation &Consolidation of Data (Preferably latest version of MS Excel or Libre Office Calc)

UNIT-V: POWER POINT PRESENTATION:
Application of Power Point Presentation – Menus & Tool bars – Creating presentations – Adding - Editing and deleting slides - Templates and manually creating presentation– Slide show – Saving - Opening and closing a Presentation –Types of slides - Slide Views - Formatting – Insertion of Objects and Charts in slides - Custom Animation and Transition (Preferably latest version of MS Power Point presentation - Libre Office Impress). Internet & Browsing:Services available on internet – WWW – ISP – Browsers. Multimedia: Application of multimedia – Images – Graphics-Audio and Video – IT security.

SUGGESTED READINGS:

1. Introduction to Computers: Peter Norton, McGraw Hill.
2. Fundamentals of Information Technology: Dr. NVN Chary, Kalyani Publishers.
3. Computer Fundamental: AnithaGoel, Pearson.
4. Information Technology Applications for Business: Dr. S. Sudalaimuthu, Himalaya
5. Introduction to Information Technology: ITL ESL, Pearson.
6. Introduction to Information Technology: V. Rajaraman, PHI.
7. Fundamental of Computers: Balaguruswamy, McGraw Hill.
8. PC Software under Windows: Puneet Kumar, Kalyani Publishers.
9. Information Technology and C language: Rajiv Khanna, New Age International.
10. Fundamentals of Information Technology: Alexis Leon, Vikas Publishing House.
11. Informational Technology: P. Mohan, Himalaya Publishing House.
12. Information Technology: R. Renuka, Vaagdevi Publishers.
13. OS-Linux Spoken Tutorials &Libre Office Spoken Tutorials by IIT Bombay.
14. Fundamentals of Information Technology: Rajiv Midha, Tax Mann Publications.

Paper : (BC 204) : FINANCIAL ACCOUNTING-II

Paper: BC204 Max. Marks: 50
THPW: 5Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *to acquire accounting knowledge of bills of exchange and other business accounting methods.*

UNIT-I: BILLS OF EXCHANGE:

Bills of Exchange - Definition- Distinction between Promissory note and Bills of exchange-Accounting treatment of Trade bills: Books of Drawer and Acceptor- Honour and Dishonour of Bills- Renewal of bills- Retiring of bills under rebate- Accommodation bills.(Including problems)

UNIT-II: CONSIGNMENT ACCOUNTS:

Consignment – Meaning – Features– Proforma invoice - Account sales – Del crederecommission-Accounting treatment in the books of the consignor and the consignee - Valuation of consignment stock –Treatment of Normal and abnormal Loss - Invoice of goods at a price higher than the cost price. (Including problems)

UNIT-III: JOINT VENTURE ACCOUNTS:

Joint Venture – Meaning –Features-Difference between Joint Venture and Consignment- Accounting Procedure-Methods of Keeping Records for Joint Venture Accounts-Method of Recording in co-ventures books-Separate Set of Books Method- Joint Bank Account-Memorandum Joint Venture Account (Including problems)

UNIT-IV: ACCOUNTS FROM INCOMPLETE RECORDS:

Single Entry System – Meaning -Features–Difference between Single Entry and Double Entry systems - Defects in Single Entry System - Books and accounts maintained - Ascertainment of Profit - Statement of Affairs and Conversion method (Including problems)

UNIT-V: ACCOUNTING FOR NON-PROFIT ORGANIZATIONS:

Non- Profit Organziation – Meaning – Features – Receipts and Payments Account – Income and Expenditure Account – Balance Sheet(Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Co.
2.Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
3. Accountancy–I: Tulasian, Tata McGraw Hill Co.
4. Accountancy–I: S.P. Jain & K.L Narang, Kalyani.
5. Advanced Accountancy-I: S.N.Maheshwari&V.L.Maheswari, Vikas.
6. Advanced Accountancy: M Shrinivas& K Sreelatha Reddy, Himalaya Publishers.
7. Financial Accounting: M.N Arora, Tax Mann Publications.

Paper : (BC 205) : MANAGERIAL ECONOMICS

Paper: BC205 Max. Marks: 50
THPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective:*to impart conceptual and practical knowledge of managerial economics.*

UNIT-I: NATURE AND SCOPE OF MANAGERIAL ECONOMICS:
Characteristics of managerial economics – Nature and scope of managerial economics -Importance of managerial economics- Basic economic tools in managerial economics- managerial economist role and responsibility

UNIT-II: DEMAND FORECASTING:
Demand estimations for major consumer durables and non-durable products – Demand forecasting techniques: Statistical and Non-Statistical techniques.

UNIT–III: MARKET ANALYSIS:
Definition of market – Market structure (Perfect competition, Imperfect competition) – Price determination -Firms equilibrium in perfect competition, monopoly, monopolistic, oligopoly and duopoly

UNIT-IV: MACRO-ECONOMICS FOR MANAGERS:
National income – Concepts – Methods - Measurement of national income – GDP and GVA—Business cycles- nature –Phases – Causes—Inflation - Causes and control – Deflation and stagflation.

UNIT-V: FISCAL AND MONETARY POLICY
Fiscal Policy- deficits-budgetary deficit-primary deficit-revenue deficit-fiscal deficit-Objectives of FRBM Act - Monetary Policy- Objectives – Repo Rate- Reverse Repo Rate- CRR- SLR- Finance Commission- role and objectives

SUGGESTED READINGS:

1. Managerial Economics: Craig H Peterson and Jain, Pearson education
2. Managerial Economics: Gupta, Tata McGraw Hill
3. Managerial Economics: Maheshwari and Gupta, Sultan Chand & Sons
4. Managerial Economics: Dr. P.C. Thomas, Kalyani Publishers
5. Managerial Economics: H.L. Ahuja, S. Chand and Company
6. Managerial Economics: Mithani, Himalaya Publications
7. Managerial Economics: R.L. Varshney and K.L. M Maheshwari, Sultan Chand
8. Managerial Economics: P. Venkataiah and Surya Prakash, Vaagdevi Publishers
9. Managerial Economics: P.L. Mehta, Tata McGraw Hill
10. Managerial Economics: R.N. Chopra, Kalyani Publishers
11. Managerial Economics: D.N. Dwivedi, Vikas Publishers
12. Managerial Economics: Thomas, Maurice, Sarkar, Tata McGraw Hill
13. Managerial Economics: YogeshMaheshwari, PHI Learning Pvt. Limited
14. Managerial Economics: P.K. Mehta, Tax Mann Pulications.

Paper : (BC 206) : PRINCIPLES OF MANAGEMENT

Paper: BC206 Max. Marks: 50
THPW: 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: To acquaint the students with the Principles, functions and practices of management

UNIT-I: INTRODUCTION

Management - Meaning - Characteristics - Administration Vs Management - Scope of Management - Importance of Management - Functions of Management - Levels of Management - Skills of Management -- Leader Vs. Manager - Scientific Management - Meaning - Definition - Objectives - Criticism – Fayol's 14 Principles of Management .

UNIT-II: PLANNING

Meaning - Definition - Characteristics - Types of Plans - Advantages and Disadvantages – Approaches to Planning - Management by Objectives (MBO) - Steps in MBO - Benefits -Weaknesses

UNIT-III: ORGANIZING:

Organizing-Meaning, Definition – Organization Meaning, Definition - Process of Organizing - Principles of Organization - Types of Organization - Formal and Informal Organizations - Line, Staff Organizations - Line and Staff Conflicts - Functional Organization - - Span of Management - Meaning - Determining Span - Factors influencing the Span of Supervision

UNIT-IV: DELEGATION AND DECENTRALIZATION:

Authority – Meaning - Delegation - Definition - Characteristics: - Elements - Principles, Types of Delegation - Importance of Delegation: - Factors Influencing Degree of Delegation - Barriers - Guidelines for Making Delegation Effective - Centralization - Meaning – Decentralization- Meaning - Difference between Delegation and Decentralization.

UNIT-V: COORDINATION AND CONTROL:

Meaning - Definition - Principles of Coordination – Importance- Process of Coordination-techniques of Effective Coordination - Control - Meaning - Definition – relationship between planning and control-Steps in Control – Types (post, current and pre-control) - Requirements for effective control.

SUGGESTED READINGS:

1. Principles and Practice of Management: R. S. Gupta, B. D. Sharma, W.S. Bhalla, Kaylani
2. Management: Stephen P. Robbins, Person
3. Principles of Management: T Ramasamy, Himalaya Publication
4. Principles of Management Concept: Rajeshviwanathan, Himalaya Publication
5. Management Theory and Practices: P Subba Rao, Himalaya Publishing House
6. Essential of Management: Harold Kontz, McGraw Education
7. Principles of Management, Chandan JS, Vikas Publishers.
8. Fundamentals of Management, Dr. Pradeep Kumar, S. Chand
9. Principles of Management: Neeru Vasishth, Tax Mann Publications.

Paper : (BC 207) : FOREIGN TRADE

Paper: BC207 Max. Marks: 50
THPW: 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: *to gain knowledge of India's foreign trade procedures policies, and international institutions.*

UNIT-I: INTRODUCTION:
Foreign Trade: Meaning and Definition - Types – Documents used-Commercial Invoice – Bills of Lading / Airway Bill – Marine Insurance Policy and Certificate – Bills of Exchange – Consumer Invoice – Customs Invoice – Certificate of Origin – Inspection Certificate – Packing List.

UNIT-II: BALANCE OF TRADE AND BALANCE OF PAYMENTS:
Introduction – Meaning - Components of BOT & BOP - Concept of Disequilibrium – Causes -Remedies for Correcting Balance of Payments in International Trade.

UNIT-III: INDIAN TRADE POLICY:
Importance and its Implementation – Current Export Policy and Import Policy.

UNIT-IV: FOREIGN TRADE AND TRADE BLOCS:
Growth - Significance of Foreign Trade – Merits - Demerits – Trade Blocs : Types – Preferential Trade Area, Free Trade Area, Customs Unions, Common Markets, Economic Unions, Monetary Unions, Customs and Monetary Unions, and Economic and Monetary Unions.

UNIT-V: INTERNATIONAL ECONOMIC INSTITUTIONS:
IMF: Objectives - Functions - World Bank: Objectives – Functions - Subsidiaries of World Bank – IMF Vs. IBRD; New Development Bank (NDB) – Objective Functions – Features – Membership – Shareholding, Criticism, Asian Infrastructure Investment Bank (AIIB) – Objective Functions – Features – Membership – Shareholding, Criticism; Trans-Pacific Partnership (TPP) - Objective Functions – Features – Membership – Shareholding, Criticism; UNCTAD: Aims – Features; WTO - Aims - Features – Agreements.

SUGGESTED READINGS:

1. International Marketing: Rathore & Jain, Himalaya Publishers.
2. International Marketing: Kushpat S. Jain & Rimi Mitra, Himalaya Publishers
3. International Economics: SSM Desai & Nirmal Bhalerao, Himalaya Publishers.
4. International Business Environment & Foreign Exchange Economies: Singh & S. Srivastava,
5. Foreign Trade and Foreign Exchange: O.P Agarwal & B.K. Chaudri, Himalaya Publishers
6. International Financial Markets & Foreign Exchange: Shashi.K.Gupta & Praneet Rangi, Kalyani
7. International Economics: Theory & Practice: Paul R. Krugman, Pearson Publishers.

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DEPARTMENT OF COMMERCE, O.U.

Structure of B.Com (General) (CBCS) for Mahatma Gandhi University, Nalgonda. (w.e.f. Academic Year 2016-17)

B.COM (General) PROGRAMME

FIRST YEAR:					
SEMESTER-I:					
Sl.No.	***Code***	***Course Title***	***Course Type***	***HPW***	***Credits***
(1)	(2)	(3)	(4)	(5)	(6)
1.	BC101	A/B/C/D	AECC-1	2	2
2.	BC102	English	CC-1A	5	5
3.	BC103	Second Language	CC-2A	5	5
4.	BC104	Financial Accounting - I	DSC-1A	5	5
5.	BC105	Business Economics	DSC-2A	5	5
6.	BC106	Business Organization	DSC-3A	4	4
7.	BC107	Information Technology	DSC-4A	3T+2P	4
		Total		**31**	**30**
SEMESTER-II:					
8.	BC201	A/B/C/D	AECC-2	2	2
9.	BC202	English	CC-1B	5	5
10.	BC203	Second Language	CC-2B	5	5
11.	BC204	Financial Accounting - II	DSC-1B	5	5
12.	BC205	Managerial Economics	DSC-2B	5	5
13.	BC206	Principles of Management	DSC-3B	4	4
14.	BC207	Foreign Trade	DSC-4B	4	4
		Total		**30**	**30**
SECOND YEAR:					
SEMESTER-III:					
15.	BC301	Principles of Insurance	SEC-1	2	2
16.	BC302	English	CC-1C	5	5
17.	BC303	Second Language	CC-2C	5	5
18.	BC304	Advanced Accounting	DSC-1C	5	5
19.	BC305	Income Tax-I	DSC-2C	5	5
20.	BC306	Business Statistics-I	DSC-3C	4	4
21.	BC307	Entrepreneurial Development & Business Ethics	DSC-4C	4	4
		Total		**30**	**30**
SEMESTER-IV:					
22.	BC401	Practice of Life Insurance	SEC-2	2	2
23.	BC402	English	CC -1D	5	5
24.	BC403	Second Language	CC-2D	5	5
25.	BC404	Corporate Accounting	DSC-1D	5	5
26.	BC405	Income Tax-II	DSC-2D	5	5
27.	BC406	Business Statistics-II	DSC-3D	4	4
28.	BC407	Financial Statement Analysis	DSC-4D	4	4
		Total		**30**	**30**

THIRD YEAR:					
SEMESTER-V					
29.	BC501	Practice of General Insurance	SEC-3	2	2
30.	BC502		GE-1	2	2
31.	BC503	Cost Accounting	DSC-1E	4	4
32.	BC504	Business Law	DSC-2E	4	4
33.	BC505	Banking Theory & Practice	DSC-3E	4	4
34.	BC506	Auditing	DSC-4E	4	4
35.	**BC507**	Computerised Accounting	**DSE-1A**	**4T+2P**	**5**
36.	**BC508**	Accounting Standards	**DSE-2A**	**5**	**5**
		Total		**31**	**30**
SEMESTER-VI					
37.	BC601	Regulation of Insurance Business	SEC-4	2	2
38.	BC602		GE-2	2	2
39.	BC603	Managerial Accounting	DSC-1F	4	4
40.	BC604	Company Law	DSC-2F	4	4
41.	BC605	Financial Institutions & Markets	DSC-3F	4	4
42.	BC606	Commerce Lab	DSC-4F	2T+4P	4
43.	**BC607**	Advanced Managerial Accounting	**DSE-1B**	**5**	**5**
44.	**BC608**	Advanced Corporate Accounting	**DSE-2B**	**5**	**5**
		Total		**32**	**30**
		GRAND TOTAL		**184**	**180**

AECC: Ability **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; T=Theory; P=Practicals;*

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC Language	8	5	40
	DSC	**8**	**5**	**40**
		16	**4**	**64**
4	**DSE**	**4**	**5**	**20**
5	GE	2	2	4
	TOTAL	**44**		**180**
	Commerce Total	**28**		**124**

SECOND YEAR SYLLABUS

Paper : (BC 301): PRINCIPLE OF INSURANCE

Paper: BC 301 Max. Marks: 100
PPW: 2 Hrs, ***Credits : 2*** Exam Duration: 3Hrs

Objectives: *The objectives of the course are : 1) to provide a basic understanding of the Insurance Mechanism. 2) identify the relationship between Insurers and their Customers and the importance of Insurance Contacts. 3) give an overview of major Life Insurance and General Insurance Products*

UNIT I: RISK MANAGEMENT AND INSURANCE : Understanding of Risk Management – Different Types of Risks – Actual and Consequential Losses – Management of Risks – Loss Minimization Techniques – Basics, Evolution and Nature of Insurance – Concept of Pooling in Insurance – Different Classes of Insurance – Importance of Insurance – Unexpected Eventualities

UNIT II: INSURANCE BUSINESS AND MARKET : Management of Risk by Individuals – Management of Risk by Insurers – Fixing of Premiums – Reinsurance and its Importance for Insurers – Role of Insurance in Economic Development and Social Security – Contribution of Insurance to the Society – Constituents of Insurance Market – Operations of Insurance Companies – Operations of Intermediaries – Specialist Insurance Companies – Insurance Specialists – Role of Regulators – Other Bodies Connected with Insurance

UNIT III: INSURANCE TERMINOLOGY AND INSURANCE CUSTOMERS : Common Terms in Insurance: Life and Non Life – Specific Terms in Insurance: Life and Non Life – Usage of Insurance Terms – Understanding Insurance Customers – Different Customer Needs – Importance of Customers – Customer Mindsets – Customer Satisfaction – Customer Behavior at Purchase Point – Customer Behavior when Claim Occurs – Importance of Ethical Behavior

UNIT IV: INSURANCE CONTRACT : Insurance Contract Terms – Principles of Insurance: Principle of Insurable Interest, Principle of Indemnity, Principle of Subrogation, Principle of Contribution, Relevant Information Disclosure, Principle of utmost Good Faith, Relevance of Proximate Cause

UNIT V: INSURANCE PRODUCTS : a) *Life Insurance Products*: Risk of Dying Early – Risk of Living too Long –Products offered – Term Plans – Pure Endowment Plans – Combinations of Plans – Traditional Products – Linked Policies – Features of Annuities and Group Policies. **b)** General Insurance Products: Risks faced by Owner of Assets – Exposure to Perils – Features of Products Covering Fire and Allied Perils – Products covering Marine and Transit Risks – Products covering Financial Losses due to Accidents – Products covering Financial Losses due to Hospitalization – Products Covering Miscellaneous Risks

SUGGESTED READINGS

1. Risk Management and Insurance : Vaughan and Vaughan
2. Risk Management : A Publication of the Insurance Institute of India :
3. Role of Insurance in Financial inclusion Brinda Publishing House, Hyderabad
3. Guide to Risk Management : Sagar Sanyal
4. Insurance and Risk Management : P.K. Gupta
5. Insurance Theory and Practice : Tripathi PHI
6. Principles of Insurance Management : Neelam C Gulati, Excel Books
7. Life and Health Insurance : Black, JR KENNETH & Harold Skipper, Pearson
8. Principles of Risk Management and Insurance : (13th Edition), George E Rejda
9. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt . South Western College Publishing Cincinnati, Ohio

Suggested Websites : 1) www.irda.gov.in **2)** www.polocyholder.gov.in **3)** www.irdaindia.org.in

Paper : (BC 304) : ADVANCED ACCOUNTING

Paper: BC 304 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *To acquire accounting knowledge of partnership firms and joint stock companies*

UNIT-I: PARTNERSHIP ACCOUNTS-I:
Meaning – Partnership Deed - Capital Accounts (Fixed and Fluctuating) – Admission of a Partner – Retirement and Death of a Partner (Excluding Joint Life Policy)(Including problems)

UNIT-II: PARTNERSHIP ACCOUNTS–II:
Dissolution of Partnership – Insolvency of a Partner (excluding Insolvency of all partners) – Sale to a Company (Including problems)

UNIT-III: ISSUE OF SHARES, DEBENTURES, UNDERWRITING AND BONUS SHARES:
Issue of Shares at par, premium and discount - Prorata allotment – Forfeiture and Re-issue of Shares – Issue of Debentures with Conditions of Redemption – Underwriting: Meaning – Conditions- Bonus Shares: Meaning – SEBI Guidelines for Issue of Bonus Shares – Accounting of Bonus Shares(Including problems)

UNIT-IV: COMPANY FINAL ACCOUNTS AND PROFIT PRIOR TO INCORPORATION:
Companies Act 2013: Structure – General Instructions for preparation of Balance Sheet and Statement of Profit and Loss – Part-I: Form of Balance Sheet – Part-II: Statement of Profit and Loss – Preparation of Final Accounts of Companies - Profits Prior to Incorporation- Accounting treatment. (Including problems)

UNIT-V: VALUATION OF GOODWILL AND SHARES:
Valuation of Goodwill: Need – Methods: Average Profits, Super Profits and Capitalization Methods -Valuation of Shares: Need –Net Assets, Yield and Fair Value Methods. (Including problems)

SUGGESTED READINGS:
1. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
2. Advanced Accountancy: Shukla and Grewal, S.Chand & Co.
3. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons.
4. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
5. Accountancy–III: Tulasian, Tata McGraw Hill Co.
6. Advanced Accountancy: Arulanandam; Himalaya.
7. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers.
8. Guidance Note on the Revised Schedule VI to the Companies Act, 1956, The Institute of Chartered Accounts of India.
9. Advanced Accounting (IPCC): D. G. Sharma, Tax Mann Publications.

Paper : (BC 305) INCOME TAX – I

Paper: BC 305 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee.*

UNIT–I: INTRODUCTION:
Direct and Indirect Taxes – Canons of Taxation - Features and History of Income Tax in India – Definitions and Basic Concepts of Income Tax: Assessee – Deemed Assessee – Assessee-in-default – Assessment Year – Previous Year - Income Tax general rule and Exemptions to the Rule– Person – Income – Gross Total Income – Total Income — Incomes Exempt from Tax.
Residential Status and Scope of Total Income: Meaning of Residential Status – Conditions applicable to an Individual Assessee – Incidence of Tax – Types of Incomes – Problems on computation of Total Income of an Individual based on Residential Status.

UNIT-II: AGRICULTURAL INCOME:
Introduction – Definition – Tests to determine Agricultural Income – Partly Agricultural and partly Non-Agricultural Income – Integration: conditions – provisions – computation of Tax on Integration process. Heads of income: Gross Total Income – Taxable Income – Income Tax Rates.

UNIT–III: INCOME FROM SALARIES:
Definition of 'Salary' – Characteristics of Salary – Computation of Salary Income: Salary u/s 17(1) – Annual Accretion – Allowances – Perquisites – Profits in lieu of Salary – Deductions u/s. 16 – Problems on computation of Income from Salary.

UNIT–IV: INCOME FROM HOUSE PROPERTY:
Definition of 'House Property' – Exempted House Property incomes– Annual Value – Determination of Annual Value for Let-out House and Self-occupied House – Deductions u/s.24 – Problems on computation of Income from House Property.

UNIT–V: PROFITS AND GAINS OF BUSINESS OR PROFESSION:
Definition of 'Business and Profession' – Procedure for computation of Income from Business – Rules – Revenue and Capital nature of Incomes and Expenses – Allowable Expenses u/s. 30 to 37 – Expenses expressly disallowed – Deemed Profits – Valuation of Stock – Miscellaneous provisions u/s 44. Depreciation: Meaning – Conditions for charge of depreciation – Assets used for Business – Block of Assets – Rates of Depreciation – Miscellaneous Provisions about depreciation – Computation of Depreciation –problems on computation of Income from Business. Income from Profession: Rules– procedure – problems on computation of Income from Profession.

SUGGESTED READINGS:
1. Income Tax Law and Practice: V.P. Gaur & D.B Narang, Kalyani Publishers.
2. Direct Taxes Law & Practice: Dr. Vinod K. Singhania & Dr. Kapil Singhania, Taxmann
3. Income Tax: B.B. Lal, Pearson Education.
4. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.
5. Income Tax: Johar, McGrawHill Education.
6. Taxation Law and Practice: Balachandran & Thothadri, PHI Learning.

Paper: (BC 306): BUSINESS STATISTICS-I

Paper: BC 306 Max. Marks: 100
PPW: 4Hrs Exam Duration: 3hrs
Credits : 4

Objective: *To inculcate analytical and computational ability among the students.*

UNIT-I: INTRODUCTION:
Origin and Development of Statistics – Definition - Importance and Scope - Limitations of Statistics - Distrust of Statistics.
Statistical Investigation: Planning of statistical investigation - Census and Sampling methods - Collection of primary and secondary data - Statistical errors and approximation - classification and Tabulation of data - Frequency distribution.

UNIT – II: DIAGRAMMATIC AND GRAPHIC PRESENTATION:
Diagrammatic presentation: One Dimensional and Two Dimensional Diagrams – Pictograms – Cartograms Graphic presentation: Technique of Construction of Graphs - Graphs of Frequency Distribution - Graphs of Time Series or Histograms.

UNIT-III: MEASURES OF CENTRAL TENDENCY:
Introduction –Significance -Arithmetic Mean- Geometric Mean - Harmonic Mean - Mode – Median - Quartiles and Percentiles - Simple and Weighted Averages - Uses and Limitations of different Averages.

UNIT-IV: MEASURES OF DISPERSION, SKEWNESS AND KURTOSIS:
Measures of Dispersion: Significance - Characteristics - Absolute and Relative Measures - Range - Quartile Deviation - Mean Deviation- Standard Deviation - Coefficient of Variation.
Measures of Skewness - Karl Pearson's Coefficient of Skewness - Bowley's Coefficient of Skewness - Kelly's Measure of Skewness – Kurtosis: Mesokurtosis, Platy kurtosis and Leptokurtosis.

UNIT-V: CORRELATION:
Meaning -Types - Correlation and Causation – Methods: Scatter Diagram - Karl Person's Coefficient of Correlation - Probable Error and Interpretation of Coefficient of Correlation - Rank Correlation - Concurrent Deviation Method.

SUGGESTED READINGS:
1. Statistics for Management: Levin & Rubin, Pearson
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Statistics: E. Narayanan Nadar, PHI Learning
4. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
5. Business Statistics: K. Alagar, Tata McGraw Hill
6. Fundamentals of Statistical: S. P Gupta, Sultan Chand
7. Business Statistics: J. K. Sharma, Vikas Publishers
8. Business Statistics: S. L Aggarwal, S. L. Bhardwaj, Kalyani Publications
9. Statistics-Problems and Solutions: Kapoor V.K, S. Chand
10. Statistics - Theory, Methods and Applications: Sancheti D.C. & Kapoor V.K
11. Business Statistics: S. K. Chakravarty, New Age International Publishers
12. Statistics: Andasn,Sweenly,Williams,Cingage.

Paper : (BC 307) : ENTREPRENEURAL DEVELOPMENT & BUSINESS ETHICS

Paper: BC 307 Max. Marks: 100
PPW: 4 Hrs Exam Duration: 3Hrs
Credits : 4

Objective: *To have exposure to the e*ntrepreneurial *culture, development and business ethics to set up and manage small units.*

UNIT–I: INTRODUCTION:
Entrepreneur: Evolution-Concept - Functions - Characteristics – Importance of Entrepreneur– Types of Entrepreneurs - Entrepreneurship-Entrepreneurial Competencies-Women Entrepreneurs in India – Opportunities & Challenges-Entrepreneurship today.

UNIT–II: ENTREPRENEURIAL DEVELOPMENT:
Entrepreneurial opportunities in India-Environment Scanning– Idea Generation – Transformation of Ideas into Opportunities - Idea & opportunity assessment – Market assessment – Trend spotting – Creativity &Innovation – Innovative process – Selection of the right opportunity.

UNIT–III: PROJECT AND MSMEs:
Project: Concept -Classification - Identification - Formulation – Design - Planning and Appraisal - Social Cost-Benefit Analysis – Budget and Planning Financial Analysis &Project Financing - MSME – Government Policy and Support.

UNIT–IV: ENTTREPRENEURALDEVELOPMENT POLICIES AND PROGRAMMES:
Entrepreneurship Development Programmes – Policies of the Government – Institutions for Entrepreneurship Development Training (EDIs) in India: CED, MDI, EDII, IED, NIESBUD, EMC, STEPs, XISS, SIDO, SISIs - Role of Consultancy Organizations: IDCs, TCOs – Role of Financial Institutions and Banks.

UNIT–V: BUSINESS ETHICS:
Concept of Business Ethics-Moral Values-Utilitarianism and Universalism -Business Standards and Values - Concept of Corporate Social Responsibility

SUGGESTED READINGS:

1. Entrepreneurship Development: A.Shankaraiah et al, KalyaniPublishers.
2. Fundamentals of Entrepreneurship: K.K. Patra, Himalaya Publishing House.
3. Entrepreneurship Development:Dr.S.S.Khanka, S.Chand.
4. Entrepreneurship Development: V.Gangadhar et al, Kalyani Publishers.
5. Entrepreneurship Development & Small Business Enterprises: Poornima Charantimath, Pearson.
6. Entrepreneurship: Robert D. Hisrich, McGraw Hill
7. Entrepreneurship: Arya Kumar, Pearson
8. The Dynamics of Entrepreneurial Development & Management: Vasanth Desai, Himalaya
9. Business Ethics: Chandra Kumar Roy, Prabhat Kumar Roy, Vikas Publishing House Ltd.
10. Business Ethics: Sanjeev K. Bansal, Kalyani Publishers.
11. Entrepreneurial Development and Business Ethics : Prof.Sarma V.S.Veluri, Prof.M.Yadagiri, Dr.Surender Gade,Sarita Madipelli

Paper : (SEC-2) : PRACTICE OF LIFE INSURANCE

Paper: SEC-2 Max. Marks: 50 (40+10)
PPW: 2 Hrs Exam Duration: Hrs
Credits : 2

Objectives:a)To make the student understand Life Insurance Market in India. b) To discuss the issues related to risk management in view of life insurance.

UNIT-I: INTRODUCTION TO LIFE INSURANCE AND TYPES OF LIFE INSURANCE POLICIES AND PREMIUM CALCULATION : Meaning evolution, growth and principles of Life Insurance —Life Insurance Organizations in India-– Competition and Regulation of Life Insurance.Types of Life Insurance Policies – Term, Whole Life, Endowment, Unit Linked and with or without Profit Policies –Customer Evaluation – Policy Evaluation — Group and Pension Insurance Policies – Special features of Group Insurance /Super Annuation Schemes – Group Gratuity Schemes.Computation of Premiums—Meaning of Premium, its calculation--Rebates – Mode of Rebates – Large sum assured Rebates – Premium Loading – Rider Premiums – Computation of Benefits – Surrender value – Paid up value

UNIT-II: SETTLEMENT OF CLAIMS RISK & UNDERWRITTINGS AND FINANCIAL PLANNING & TAX SAVING: Settlement of claims: Intimation Procedure, documents and settlement procedures.Underwriting: The need for underwriting – Guiding principles of Underwriting – Factors affecting Insurability – Methods of Life Classification – Laws affecting Underwriting.Financial Planning and taxation: Savings – Insurance vis-à-vis- Investment in the Units Mutual Funds, Capital Markets – Life Insurance in Individual Financial Planning – Implications in IT treatment.

SUGGESTED READINGS:

1. Insurance Institute of India, Practice of Life Insurance, Mumbai.
2. P.K.Gupta, Insurance and Risk Management, Himalaya Publishing House, Mumbai.
3. Kanika Mishra, Fundamentals of Life Insurance: Theories and Applications, Prentice Hall
4. Kutty, S.K., Managing Life Insurance, Prentice Hall of India: New Delhi
5. Black, Jr. Kenneth and Harold Skipper Jr., Life and Health Insurance, Prentice Hall, Inc., England.
6. K.C. Mishra and C.S. Kumar, Life Insurance: Principles and Practice, Cengage Learning: New Delhi.
7. Sadhak, Life Insurance in India, Respose Books: New Delhi

Paper : (BC 404) : CORPORATE ACCOUNTING

Paper: BC 404 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3 Hrs
Credits : 5

Objective: *To acquire knowledge of AS-14 and preparation of accounts of banking and insurance companies.*

UNIT-I: COMPANY LIQUIDATION:
Meaning – Modes - Contributory Preferential Payments – Statements of Affairs - Liquidator's Remuneration - Preparation of Liquidator's Final Statement of Account (Including problems)

UNIT-II: AMALGAMATION (AS-14):
Amalgamation: In the nature of merger and purchase – Calculation of Purchase Consideration – Accounting Treatment in the books of transferor and transferee companies. (Including problems)

UNIT-III: INTERNAL RECONSTRUCTION AND ACQUISITION OF BUSINESS:
Internal Reconstruction: Accounting treatment – Preparation of final statement after reconstruction- Acquisition of business when new set of books are opened- Debtors and Creditors taken over on behalf of vendors- When same set of books are continued(Including problems)

UNIT-IV: ACCOUNTS OF BANKING COMPANIES:
Books and Registers maintained – Slip system of posting – Rebate on Bills Discounted – Non-Performing Assets – Legal Provisions relating to final accounts - Final Accounts. (Including problems)

UNIT-V: ACCOUNTS OF INSURANCECOMPANIES AND INSURANCE CLAIMS:
Introduction – Formats-Revenue Account–Net Revenue Account - Balance Sheet - Valuation Balance Sheet – Net Surplus – General Insurance - Preparation of final accounts with special reference to Fire and Marine Insurance - Insurance claims- Meaning – Loss of Stock and Assets – Average Clause – Treatment of Abnormal Loss - Loss of Profit. (Including problems)

SUGGESTED READINGS:
1. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
2. Accountancy–III: Tulasian, Tata McGraw Hill Co.
3. Advanced Accountancy: Arulanandam; Himalaya
4. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers
5. Advanced Accounting (Vol-II): Chandra Bose, PHI
6. Advanced Accountancy: Shukla and Grewal, S.Chand& Co
7. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons
8. Corporate Accounting: Sakshi Vasudeva, Himalaya.

Paper : (BC 405) : INCOME TAX – II

Paper: BC 405 Max. Marks: 100
PPW: 5 Hrs Exam Duration: 3Hrs
Credits : 5

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee*.

UNIT-I: CAPITAL GAINS:
Introduction - Meaning – Scope of charge – Basis of charge – Short term and Long term Capital Assets – Transfer of Capital Asset – Deemed Transfer – Transfer not regarded as Transfer – Determination of Cost of Acquisition – Procedure for computation of Long-term and Short-term Capital Gains/Losses – Exemptions in respect of certain Capital Gains u/s. 54 – Problems on computation of capital gains.

UNIT–II: INCOME FROM OTHER SOURCES:
General Incomes u/s. 56(1) – Specific Incomes u/s. 56(2) – Dividends u/s. 2(22) – Interest on Securities – Gifts received by an Individual – Casual Income – Family Pension – Rent received on let out of Furniture- Plant and Machinery with/without Building – Deductions u/s. 57 - Problems on computation on Income from Other Sources.

UNIT-III: CLUBBING AND AGGREGATION OF INCOME:
Income of other persons included in the total income of Assessee – Income from Firm and AOP – Clubbing Provisions – Deemed Incomes – Provisions of set-off and Carry forward of losses – computation of Gross Total Income – Deductions from GTI u/s 80C to 80U – Problems on Computation of Taxable Income

UNIT-IV: ASSESSMENT OF INDIVIDUALS:
Computation of Tax Liability – Applicability of Alternate Minimum Tax on Individual u/s 115JC – Problems on Computation of tax liability

UNIT–V: ASSESSMENT PROCEDURE:
Income tax returns – Types of returns – Filing of e-return – Assessment – Types of assessment – Self assessment – Provisional assessment – Regular assessment – Best judgement assessment – Reassessment – Rectification of mistakes – Notice on demand.

SUGGESTED READINGS:
1. Income Tax Law and Practice:V.P. Gaur & D.B- Narang, Kalyani Publishers.
2. Direct Taxes Law & Practice: Dr. Vinod K. Singhania & Dr. Kapil Singhania, Taxmann
3. Income Tax: B. Lal, Pearson Education.
4. Income Tax: M.Jeevarathinam & C. Vijay Vishnu Kumar, SCITECH Publications.
5. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.
6. Income Tax: Johar, McGrawHill Education.
7. Taxation Law and Practice: Balachandran & Thothadri, PHI Learning

Paper: (BC 406) : BUSINESS STATISTICS-II

Paper: BC 406 Max. Marks: 100
PPW: 4 Hrs Exam Duration: 3hrs
Credits : 4
OBJECTIVE: *To inculcate analytical and computational ability among the students.*

UNIT-I: REGRESSION:
Introduction - Linear and Non Linear Regression – Correlation Vs. Regression - Lines of Regression - Derivation of Line of Regression of Y on X - Line of Regression of X on Y - Using Regression Lines for Prediction.

UNIT-II: INDEX NUMBERS:
Introduction - Uses - Types - Problems in the Construction of Index Numbers - Methods of Constructing Index Numbers - Simple and Weighted Index Number (Laspeyre - Paasche, Marshall – Edgeworth) - Tests of Consistency of Index Number: Unit Test - Time Reversal Test - Factor Reversal Test - Circular Test - Base Shifting - Splicing and Deflating of Index Numbers.

UNIT-III: TIME SERIES:
Introduction - Components – Methods-Semi Averages - Moving Averages – Least Square Method - Deseasonalisation of Data – Uses and Limitations of Time Series.

UNIT-IV: PROBABILITY:
Probability – Meaning - Experiment – Event - Mutually Exclusive Events - Collectively Exhaustive Events - Independent Events - Simple and Compound Events - Basics of Set Theory – Permutation – Combination - Approaches to Probability: Classical – Empirical – Subjective - Axiomatic - Theorems of Probability: Addition – Multiplication - Baye's Theorem.

UNIT-V: THEORITECAL DISTRIBUTIONS:
Binomial Distribution: Importance – Conditions – Constants - Fitting of Binomial Distribution. Poisson Distribution: – Importance – Conditions – Constants - Fitting of Poisson Distribution. Normal Distribution: – Importance - Central Limit Theorem - Characteristics – Fitting a Normal Distribution (Areas Method Only).

SUGGESTED READINGS:
1. Statistics for Management: Levin & Rubin, Pearson,
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Business Statistics: Theory & Application, P. N. Jani, PHI Learning
4. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
5. Business Statistics: K. Alagar, Tata Mc Graw Hill
6. Fundamentals of Statistical: S. P Gupta , Sultan Chand
7. Business Statistics: J. K. Sharma,Vikas Publishers
8. Business Statistics: Vora, Tata Mc Graw Hill
9. Statistics-Problems and Solutions: Kapoor V.K, S. Chand
10. Statistics-Teory, Methods and Applications: SanchetiD.C. & Kapoor V.K
11. Business Statistics: S. K. Chakravarty, New Age International Publishers
12. Business Statistics-G.Laxman,Vasudeva Reddy, K.Goud, TaxmannPublications,Hyderabad.

Paper : (BC 407) : FINANCIAL STATEMENT ANALYSIS

Paper: BC 407 Max. Marks: 100
PPW: 4Hrs Exam Duration: 3 Hrs
Credits : 4

Objective: *To acquire knowledge and techniques of Financial Statements' Analysis.*

UNIT-I: INTRODUCTION:
Financial Statements: Meaning – Components: Assets – Liabilities – Equity - Income and Expenditure and their features – Constituents: Income Statement and Balance Sheet their features - Information incorporated and their Qualitative requirements - Limitations. (Theory only)

UNIT-II: TECHNIQUES OF FINANICAL STATEMENT ANALYSIS:
Meaning – Objectives - Techniques: Comparative Statement, Common Size Statement, Trend Analysis.(Including problems)

UNIT-III: RATIO ANALYSIS:
Meaning – Objectives – Classification – Advantages and Limitations – Computation of various ratios: Activity Ratios - Liquidity Ratios - Solvency Ratios - Profitability Ratios.(including problems)

UNIT-IV: FUNDS FLOW ANANLYSIS:
Concept of Fund – Meaning and Importance – Statement of Changes in Working Capital – Statement of Sources and Application of Funds – Limitations (Including problems)

UNIT-V: CASH FLOW ANALYSIS (AS-3):

Meaning – Importance – Differences between Funds Flow and Cash Flow Statements – Procedure for preparation of Cash Flow Statement (including problems)

SUGGESTED READINGS:
1. Financial Statement Analysis: George Foster, Pearson
2. Financial Statement Analysis: K R Subramanyam, TMH
3. Financial Statement Analysis: George Foster, Pearson ----Repeated ---Pl. delete
4. Advanced Management Accounting: Ravi M Kishore, Taxmann
5. Management Accounting: S.P.Gupta
6. Accounting for Managerial Decisions: Shashi K Gupta, Kalyani Publishers

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THIRD YEAR:					
SEMESTER-V					
29.	BC501	Practice of General Insurance	SEC-3	2	2
30.	BC502	Introduction to Indian Economy	GE-1	2	2
31.	BC503	Cost Accounting	DSC	4	4
32.	BC504	Business Law	DSC	4	4
33.	BC505	Banking Theory & Practice	DSC	4	4
34.	BC506	Auditing	DSC	4	4
35.	**BC507**	Computerised Accounting	**DSE**	**4T+2P**	**5**
36.	**BC508**	Accounting Standards	**DSE**	**5**	**5**
		Total		**31**	**30**
SEMESTER-VI					
37.	BC601	Regulation of Insurance Business	SEC-4	2	2
38.	BC602	Sectors of Indian Economy	GE-2	2	2
39.	BC603	Theory and Practice of GST	DSC	**3T+2P**	4
40.	BC604	Company Law	DSC	4	4
41.	BC605	Managerial Accounting	**DSC**	**4**	**4**
42.	BC606	Commerce Lab	DSC	**2T+4P**	4
43.	**BC607**	Financial Institutions & Markets	DSE	5	5
44.	**BC608**	Advanced Corporate Accounting	**DSE**	**5**	**5**
		Total		**33**	**30**
		GRAND TOTAL		**185**	**180**

AECC: Ability **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; T=Theory; P=Practicals;*

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	AECC	2	2	4
2	SEC	4	2	8
3	CC Language	8	5	40
	DSC	**8**	**5**	**40**
		16	**4**	**64**
4	**DSE**	**4**	**5**	**20**
5	GE	2	2	4
	TOTAL	**44**		**180**
	Commerce Total	**28**		**124**

SYLLABUS

Paper : (BC 501) : PRACTICE OF GENERAL INSURANCE

Paper: BC501 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ hrs

Unit I: GENERAL INSURANCE POLICIES:
Introduction to General Insurance-Origin of general insurance—Classification of General Insurance Companies—Indian and International Insurance Market—various roles in Insurance industry—Policy Documents and forms—insurance proposals and forms—General Insurance Products-Fire, Marine, Motor, Liability, Personal Accident and Specialty Insurance, Engineering and other insurance.

Unit II: UNDERWRITING, PREMIUMS, CLAIMS AND INSURANCE RESERVES AND ACCOUNTING:
Concept of Underwriting—Underwriting Process—Risk sharing and its methods—risk management and steps involved in it—Rating and Premiums—concept of soft and hard markets—Concept of Claim-understanding the process of claim management—claims fraud and fraud prevention—Insurance reserves and accounting—different types of reserves of insurance companies—reserving process followed by insurance companies—Insurance accounting.

SUGGESTED READINGS :

1. Practice of General Insurance – Insurance Institute of India.
2. Practice of General Insurance – D.S. Vittal-HPH.
3. Principles & Practice of Insurance- Dr. P. Periasamy – HPH.
4. Risk Management : A Publication of the Insurance Institute of India.,
5. Practice of General Insurance: Dr. V. Padmavathi, Dr. V. Jayalakshmi, PBP.
6. Insurance Theory and Practice: Tripathi PHI
7. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
8. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
9. South Western College Publishing Cincinnati, Ohio.

Paper : (BC 502) : INTRODUCTION TO INDIAN ECONOMY

Paper: BC502 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ Hrs

Objectives: 1) to provide an overview of Indian economy
2) to make the student acquaint with the latest developments in the economy

UNIT I: STRUCTURE OF THE INDIAN ECONOMY:

Indian Economy-Characteristics-Developmental issues-Structural changes in the Indian Economy-Human Development-concept and measures-Occupational distribution and economic development-Natural Resource: Land, Forest, Water & Minerals-Environmental degradation-Infrastructure: Energy, Power, Transport-Social infrastructure

UNIT II: POLICY ASPECTS OF INDIAN ECONOMY:

Liberalization - Privatization-Globalization-Poverty- Unemployment: nature and problems - The parallel economy – Industrial Policy.

SUGGESTED READINGS:

1) Meera Naidu "Introduction to Indian Economy" HPH
2) Ruddar Datt and K.P.M. Sundharam "Indian Economy", S. Chand & Company Ltd., New Delhi, 2013.
3) S.K.Misra & V.K.Puri "Indian Economy-Its Development Experience"Himalaya Himalya Publishing Company, New Delhi, 2013.
4) Introduction to Indian Economy: Dr. P. Venugopal Rao, PBP.
5) Vivek Mittal "Business Environment" Excel Publications, New Delhi, 2013.
6) Aswathappa.K. "Essentials of Business Environment – Text, cases & Exercises" Himalaya Himalya Publishing Company, New Delhi, 2013.
7) Economic Survey—Government of India, Ministry of Finance, Oxford University Press, New Delhi,
8) The Economic Times, News paper
9) Business Line, News paper

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Paper : (BC 503) : COST ACCOUNTING

Paper: BC503 Max. Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3 Hrs

Objective: *to make the students acquire the knowledge of cost accounting methods.*

UNIT-I: INTRODUCTION:
Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Essentials of a good cost accounting system- Difference between Cost Accounting and Financial Accounting – Cost concepts – Cost Classification.

UNIT-II: MATERIAL:
Direct and Indirect Material cost – Inventory Control Techniques – Stock Levels – EOQ – ABC Analysis – JIT - VED - FSND - Issue of Materials to Production – Pricing methods: FIFO - LIFO with Base Stock and Simple and Weighted Average methods.

UNIT-III: LABOUR AND OVERHEADS:
Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages (only Incentive Plans): Halsey, Rowan, Taylor Piece Rate and Merrick Multiple Piece Rate Methods.
Overheads: Classification - Methods of Allocation - Apportionment and Absorption of overheads.

UNIT-IV: UNIT AND JOB COSTING:
Unit Costing: Features - Cost Sheet – Tender and Estimated Cost Sheet.
Job Costing: Features - Objectives – Procedure - Preparation of Job Cost Sheet.

UNIT-V: CONTRACT AND PROCESS COSTING:
Contract Costing: Features – Advantages - Procedure of Contract Costing – Guidelines to Assess profit on incomplete Contracts.
Process Costing: Meaning – Features – Preparation of Process Account – Normal and Abnormal Losses.

SUGGESTED READINGS:

1. Cost Accounting: Jain and Narang, Kalyani
2. Cost Accounting: Srihari Krishna Rao, Himalaya
3. Cost and Management Accounting: Prashanta Athma, Himalaya
4. Cost Accounting: Dr. G. Yogeshweran, PBP.
4. Cost Accounting: Jawaharlal, Tata Mcgraw Hill
5. Cost Accounting: Theory and Practice: Banerjee, PHI
6. Introduction to Cost Accounting: Tulsian, S.Chand
7. Cost Accounting: Horngren, Pearson
8. Cost Accounting: Ravi M. Kishore, Tax Mann Publications.

Paper : (BC 504) : BUSINESS LAW

Paper: BC504 Max Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3Hrs

Objective: *to make the students acquire basic conceptual knowledge of different laws relating to Business.*

UNIT–I: INTRODUCTION:

Development of Business Law - Development of Law in Independent India Contract Act 1872: Agreement and contract - Essentials of a valid contract - Types of contracts - Offer and Acceptance - Essentials of valid offer and acceptance - Communication and revocation of offer and acceptance – Consideration definition - Essentials of valid consideration - Doctrine of "Stranger to a contract"- "No consideration- No contract" - Capacity to a contract - Minors agreements.

UNIT–II: CONTRACT ACT 1872:

Legality of Object and Consideration - Agreements Expressly Declared To Be Void - Wagering Agreements - Contingent Contracts.

Discharge of Contract: Modes of Discharge - Performance of Contracts - Breach of Contract - Remedies for Breach.

UNIT–III: SALE OF GOODS ACT 1930:

Contract of Sale: Essentials of Valid Sale - Sale and Agreement to Sell – Definition and Types of Goods - Conditions and Warranties - Caveat Emptor - Exceptions - Transfer or Passing of Property: Time When Property Passes, Rules of Transfer of Property, Transfer of Ownership - Sale by Non-Owners and its Exceptions - Unpaid Seller - Rights of Unpaid Seller.

Consumer Protection Act 1986: Definitions of Consumer – Person – Goods - Service -Consumer Dispute - Unfair Trade Practice - Restrictive Trade Practice – Defect - Deficiency - Consumer Protection Councils - Consumer Dispute Redressal Agencies - District Forum - State Commission and National Commission - Procedure to Lodge a Complaint for Redressal – Appeals.

UNIT–IV: TRADE MARKS, PATENTS, COPY RIGHTS & INTELLECTUAL PROPERTY RIGHTS:

Trade Marks: Definition - Procedure for Registration of Trade Marks - Patents: Definition - Kinds of Patents - Transfer of the Patent Rights - Rights of the Patentee - Copy Rights: Definition - Essential Conditions for Copy Rights to be Protected - Rights of the Copyright Owner - Terms of Copy Right - Copy Rights Infringement - Other Intellectual Property Rights: Trade Secrets - Geographical Indications.

UNIT–V: INFORMATION TECHNOLOGY ACT & ENVIRONMENTAL PROTECTION ACT:

Information Technology Act-2000: Objectives - Digital Signature - Electronic Governance - Penalties and Adjudication.

Environmental Protection Act 1986: Object - Scope and Scheme of the Act – Definitions - General Powers of the Central Government – Prevention - Control and Abetment of Environmental Pollution – Offences and Penalties.

SUGGESTED READINGS:

1) Company Law: Kapoor, Sultan Chand and Co.
2) Business Law: Sandhya KVN, Himalaya
3) Business Laws: KC Garg & RC Chawla , Kalyani Publishers.
4) Business Law: Prof. G. Krishna Murthy, PBP.
5) Business Law: PC Tulsian & Bharat Tulsian, McGraw Hill Education
6) Business Law: Tejpal Sheth, Pearson.
7) Business Law: MC Kuchal & Vivek Kuchal, Vikas Publishing House.
8) Business Law: Mathur, McGraw Hill Education.
9) Business Law including company Law: SS Gulshan & GK Kapoor, New Age
10)Business Law: Peddina Mohan Rao, PHI.
11) Business Law: P.N. Bansal, Tax Mann Pulications.
12) Business Law: R.S.N. Pillai and Bagavathi, S. Chand.

Paper : (BC 505) : BANKING THEORY AND PRACTICE

Paper: BC505 Max. Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3Hrs

Objective: *to acquire knowledge of working of Indian Banking system.*

UNIT-I: INTRODUCTION:

Origin and Growth of Banking in India - Unit Vs Branch Banking - Functions of Commercial Banks - Nationalization of Commercial Banks in India - Emerging Trends in Commercial Banking in India: E-Banking – Mobile Banking - Core Banking – Bank Assurance – OMBUDSMAN.

UNIT-II: RESERVE BANK OF INDIA:

RBI Constitution - Organizational Structure – Management - Objectives – Functions – Monetary Policy.

UNIT-III: TYPES OF BANKS:

District Co-Operative Central Banks – Contemporary Banks - Regional Rural Banks - National Bank for Agriculture and Rural Development (NABARD) – SIDBI – Development Banks.

UNIT-IV: BANKER AND CUSTOMER RELATIONSHIP:

Definition of Banker and Customer - Relationship Between Banker and Customer - KYC norms - General and Special Features of Relationship - Opening of Accounts - Special Types of Customers Like Minor, Married Women, Partnership Firms, Companies, Clubs and other Non-Trading Institutions.

UNIT-V: NEGOTIABLE INSTRUMENTS:

Descriptions and their Special Features - Duties and Responsibilities of Paying and Collecting Banker - Circumstances under which a Banker can refuse Payment of Cheques - Consequences of Wrongful Dishonors - Precautions to be taken while Advancing Loans Against Securities – Goods - Documents of Title to Goods - Loans against Real Estate -Insurance Policies - Against Collateral Securities – Banking Receipts.

Rule in Clayton's Case - Garnishee Order – Loans against Equitable Mortgage - Legal Mortgage - Distinction between them - Latest Trends in Deposit Mobilization.

SUGGESTED READINGS:

1. Banking Theory & Practices: Dr. P. K. Srivatsava, Himalaya Publishers
2. Banking Theory & Practices: K.E. Shekar, Vikas Publications
3. Banking theory & Practices: Santhi Vedula, HPH.
4. Banking Theory & Practices: Dr. J. Jayanthi, PBP.
5. Banking Theory, Law & Practices: R. R Paul, Kalyani Publishers
6. Money Banking and Financial Markets: Averbach, Rabort. D, MacMillan. Landon
7. Banking: N.T. Somashekar, New Age International Publishers
8. Fundamentals of International Banking: Rup Narayan Bose, Trinity Publishers
9. Modern Commercial Banking: H.R. Machiraju, New Age International Publishers
10. Banking Theory & Practices: R. Rajesh, Tata McGraw Hill
11. Merchant Banking & Financial Services: S. Guruswamy, Tata McGraw Hill
12. Management of Banking & Financial Services; Padmalatha Suresh, Pearson
13. Modern Banking: D. Muralidharan, PHI

Paper : (BC 506) : AUDITING

Paper: BC506 Max. Marks: 80 + 20
PPW: 4 Hrs Exam Duration: 3Hrs

Objective: *to understand meaning and elements of auditing and gain knowledge for execution of audit.*

UNIT-I: INTRODUCTION:
Auditing: Meaning – Definition – Evolution – Objectives – Importance - Types of Audit – Standards of Auditing – Procedure for issue of standards by AASB.

UNIT–II: AUDITOR AND EXECUTION OF AUDIT:
Appointment – Qualification and Disqualification – Qualities – Remuneration – Removal – Rights – Duties – Civil and Criminal Liabilities of Auditors – Commencement of Audit – Engagement Letter – Audit Program – Audit Note Book – Audit Workbook – Audit Markings.

UNIT–III: INTERNAL CONTROL, INTERNAL CHECK AND INTERNAL AUDIT:
Meaning and Objectives of Internal Control – Internal Check and Internal Audit – Internal Check Vs. Internal Audit – Internal Control vs. Internal Audit.

UNIT–IV: VOUCHING:
Meaning – Objectives – Types of Vouchers – Vouching of Trading Transactions – Vouching Cash Transaction – Auditing in an EDP Environment.

UNIT–V: VERIFICATION AND VALUATION OF ASSETS:
Meaning and Definition – Distinction – Verification and Valuation of various Assets and Liabilities – Audit Committee – Role of Audit Committee – Audit Reports.

SUGGESTED READINGS:

1. Principles and Practice of Auditing: RG Saxena, Himalaya Publishing House.
2. Auditing and Assurance for CA Integrated Professional Competence: SK Basu, Pearson.
3. Auditing : Mahitha HPH
4. Auditing: Dr. Nazia Sultana, PBP.
5. Auditing: Aruna Jha, Taxmann Publications**.**
6. Auditing Principles, Practices & Problems: Jagdish Prakash, Kalyani Publishers.
7. Auditing and Assurance: Ainapure & Ainapure, PHI Learning.
8. Principles and Practice of Auditing: Dinkar Pagare, Sultan Chand & Sons.
9. Fundamentals of Auditing: Kamal Gupta and Ashok Arora, Tata McGraw-Hill
10. A Hand Book of Practical Auditing: B.N. Tandon etal., S. Chand.

Paper : (BC 507) : COMPUTERISED ACCOUNTING

Paper: BC507 Max. Marks: 60+20+20
PPW: 5 (4T & 2P) Exam Duration: 3Hrs.
Objective: To make the students to acquire the knowledge of computer software

UNIT I: MAINTAINING CHART OF ACCOUNTS IN ERP:
Introduction-Getting Started with ERP - Mouse/Keyboard Conventions-Company Creation-Shut a Company-Select a Company-Alter Company Details-Company Features and Configurations-F11: Company Features-F12: Configuration-Chart of Accounts-Ledger-Group-Ledger Creation-Single Ledger Creation-Multi Ledger Creation-Altering and Displaying Ledgers-Group Creation-Single Group Creation-Multiple Group Creation-Displaying Groups and Ledgers-Displaying Groups-Display of Ledgers-Deletion of Groups and Ledgers – P2P procure to page.

UNIT II: MAINTAINING STOCK KEEPING UNITS (SKU):
Introduction-Inventory Masters in ERP - Creating Inventory Masters-Creation of Stock Group-Creation of Units of Measure-Creation of Stock Item-Creation of Godown-Defining of Stock Opening Balance in ERP Stock Category-Reports.

UNIT III: RECORDING DAY-TO-DAY TRANSACTIONS IN ERP:
Introduction-Business Transactions-Source Document for Voucher-Recording Transactions in ERP - Accounting Vouchers-Receipt Voucher (F6)-Contra Voucher (F4)-Payment Voucher (F5)-Purchase Voucher (F9)-Sales Voucher (F8)-Debit Note Voucher-Credit Note (Ctrl+F8)-Journal Voucher (F7).

UNIT IV: ACCOUNTS RECEIVABLE AND PAYABLE MANAGEMENT: Introduction-Accounts Payables and Receivables-Maintaining Bill-wise Details-Activation of Maintain Bill-wise Details Feature-New Reference-Against Reference-Advance-On Account-Stock Category Report-Changing the Financial Year in ERP.

UNIT V: MIS REPORTS:
Introduction-Advantages of Management Information Systems-MIS Reports in ERP - Trial Balance - Balance Sheet-Profit and Loss Account-Cash Flow Statement-Ratio Analysis-Books and Reports - Day Book-Receipts and Payments-Purchase Register-Sales Register-Bills Receivable and Bills Payable.

REFERENCE BOOKS:

1. Computerised Accounting: Garima Agarwal, Himalaya
2. Computerised Accounting: A. Murali Krishna, Vaagdevi publications
3. Computerised Accounting: Dr. G. Yogeshweran, PBP.
4. Aakash Business Tools: Spoken Tutorial Project IIT Bombay
5. Mastering Tally: Dinesh Maidasani, Firewal Media
6. Implementing Tally ERP 9: A.K Nadhani and K.K Nadhani, BPB Publications
7. Computerised Accounting and Business Systems: Kalyani Publications
8. Manuals of Respective Accounting Packages
9. Tally ERP 9: J.S. Arora, Kalyani Publications.

Paper: (BC 508) : ACCOUNTING STANDARDS

Paper: BC508 **Max Marks: 80+20**
PPW: 5 Hrs **Exam Duration: 3 Hrs**

Objectives: *To make the students acquire the knowledge of provisions and application of Indian Accounting Standards.*

UNIT-I: INTRODUCITON:
Introduction to Accounting Standards – Objectives of Accounting Standards – Benefits and Limitations of Accounting Standards – Process of Formulation of Accounting Standards in India – List of Accounting Standards in India (AS) – Need for Convergence Towards Global Standards – International Financial Reporting Standards as Global Standards – Benefits of Convergence with IFRS – Applicability of Accounting Standards in India.

UNIT-II: AS 1, 2, 3, 4, 5, 7 and 9: AS-1: Disclosure of Accounting Policies – AS-2: Valuation of Inventories – AS-3: Cash Flow Statement – AS-4: Contingencies and Events Occurring after Balance Sheet Date – AS-5: Net Profit / Loss for the Period, Prior Period, Extraordinary Items and Changes in Accounting Policies – AS-7: Accounting for Construction Contracts – AS-9: Revenue Recognition (including simple problems).

UNIT-III: AS-10, 11, 12, 13, 14, 16 and 17: AS-10: Property Plant and Equipment – AS-11: Accounting for the Effects of Changes in Foreign Exchange Rates – AS-12: Accounting for Government Grants – AS-13: Accounting for Investments – AS-14: Accounting for Amalgamations – AS-16: Accounting for Borrowing Costs - AS-17: Segment Reporting (including simple problems).

UNIT-IV: AS-18, 19, 20, 22, 24, 26 and 29: AS-18: Related Party Disclosures – AS-19: Accounting for Leases – AS-20: Earnings Per Share – AS-22: Accounting for Taxes on Income – AS-24: Discontinuing Operations – AS-26: Accounting for Intangibles – AS-29: Provisions, Contingent Liabilities and Contingent Assets (including simple problems).

UNIT-V: Introduction of Ind AS:
Introduction - Development in Ind AS – List of Ind AS – Significance of Ind AS – Carve outs/ins in Ind AS – AS Vs. Ind AS - Road map for implementation of Ind AS.

Suggested Readings:

1. Accounting Standards: Saini, HPH
2. Accounting Theory and Practice: Jawaharlal, Himalaya Publishing Company
3. Accounting Standards: Rawat D.S, Taxmann Allied Services Private Limited
4. IFRS Concepts and Applications: Kamal Garg, Bharat Law House Pvt. Limited
5. Accounting Theory: Porwal L.S, TataMcGraw-Hill Publishing Company
6. Accounting Theory & Management Accounting: Jain S.P. &Narang K.L, Kalyani
7. Accounting Standards and Corporate Accounting Practices: Ghosh T.P, Taxman

BC 601: REGULATIONS OF INSURANCE BUSINESS

Paper: BC601 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ Hrs

Objective: To equip the students with the knowledge regarding Insurance Business Regulations

UNIT I: INSURANCE LEGISLATION IN INDIA:

History of life and non-life insurance legislation—nationalization—insurance reforms—insurance business Act, 1972—IRDA and its functions including licensing functions—Web aggregators—regulation for intermediaries—CCS-SPV-PoS-insurance repositories-TPAs—Role and duties of surveyors—Origin and development of micro-insurance—regulation of ULIPs—pension schemes—money laundering—KYC—methods of receipt of premium—Exchange control regulations relating to General and Life Insurance—IRDA Health Insurance Regulations, 2016—Health plus life combi products.

UNIT II: POLICY HOLDERS RIGHTS OF ASSAINGMENT, NOMINATION AND TRANSFER:

Assignment and transfer of insurance policies—provisions related to nomination—repudiation—Fraud—protection of policyholder interest—stages in insurance policy-presale stage-post sale stage-free look period—grievance redressal—claim settlement—key feature document—dispute resolution mechanism—insurance ombudsman—solvency margin and investments—international trends in insurance regulation.

SUGGESTED READINGS :

1. Regulation of Insurance Business – Insurance Institute of India
2. Regulation of Insurance Business – D.S. Vittal, HPH
3. Regulation of Insurance Business: Dr. V. Padmavathi, PBP
4. Risk Management : A Publication of the Insurance Institute of India
5. Insurance Theory and Practice: Tripathi PHI
6. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
7. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
8. South Western College Publishing Cincinnati, Ohio.
9. Insurance Management – S.C. Sahoo & S.C. Das-HPH.

BC 602: SECTORS OF INDIAN ECONOMY

Paper: BC602 Max. Marks: 40+10
PPW: 2 Hrs Exam Duration: 1½ Hrs

Objective: To equipment the students with the knowledge regarding Basics of Indian Economy

UNIT I: AGRICULTURE IN INDIA:

Place of agriculture: Progress-Green revolution-Present state-New thrust areas-Food security: Legislation-Schemes-Public distribution system-Agricultural Marketing: Types-warehousing-Agricultural Labour-Minimum wages-Rural credit-RRBs-NABARD.

UNIT II: INDUSTRIES AND TERTIARY SECTOR IN INDIA:

Role and pattern of industrialization-Large-scale industry- Small-scale industry-Information Technology Industry-Labour problems-Labour Policy-Social Security-Trade Union Movement-Industrial Disputes-Unorganized Sector-Foreign Trade - Balance of Payments - SEZs- Foreign Exchange- Convertibility-Banking Sector-Money Market- Public Finance-Financial relations between Centre and States;.

SUGGESTED READINGS:

1) Meera Naidu " Sectors of Indian Economy" HPH
2) Ruddar Datt and K.P.M. Sundharam "Indian Economy", S. Chand & Company Ltd., New Delhi, 2010.
3) S.K.Misra & V.K.Puri "Indian Economy-Its Development Experience"Himalaya Himalya Publishing Company, New Delhi, 2010.
4) Vivek Mittal "Business Environment" Excel Publications, New Delhi, 2007.
5) Sectors of India Economy: Dr. P. Venugopal Rao, PBP
6) Anjaneyulu, "Introduction to Indian Economy" Himalaya Himalya Publishing Company, New Delhi, 2011.
7) Economic Survey—Government of India, Ministry of Finance, Oxford University Press, New Delhi,
8) Sectors of Indian Economy: Satya Sudha, Himalaya
9) The Economic Times, News paper
10) Business Line, News paper

BC 603: THEORY AND PRACTICE OF GST

Paper: BC603 Max. Marks: 60+20+20
PPW: 3T+2P Exam Duration: 3Hrs

Objective: To equipment the students with the knowledge regarding Theory and Practice of GST

UNIT I: INTRODUCTION TO GST:

Introduction – GST - Taxes Subsumed under GST -Determination of Tax - Registration -Process of Registration - Cancellation and renovation of registration - Supply of Goods and Services - Transition to GST - Registered Business -Availed Input Tax Credit -Unavailed CENVAT credit and Input VAT on capital goods-Availing the input credit held in closing stock -Invoicing -Tax Invoice -Bill of Supply - Credit Note, Debit Note and Supplementary Invoice-Transportation of goods without issue of Invoice - Input Credit Mechanism - Input Tax - GST Returns - Payment of Tax.

UNIT II: GETTING STARTED WITH GST:

Introduction - Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods-Intrastate Inward Supply -Intrastate Outward Supply -Interstate -Interstate Outward Supply - Return of Goods -Purchase Returns -Sales Returns -Supplies Inclusive of Tax -Defining Tax Rates at Master and Transaction Levels - Defining GST Rates at Stock Group Level-Defining GST Rate at Transaction Level -Hierarchy of Applying Tax Rate Details –Reports.

UNIT III: RECORDING ADVANCED ENTRIES, GST ADJUSTMENT AND RETURN FILING:

Introduction -Accounting of GST Transactions -Purchases from Composition Dealer -Purchases from Unregistered Dealers-Exports -Imports -Exempted Goods -SEZ Sales -Advance Receipts and payments - Mixed Supply and Composite Supply under GST -Mixed Supply of Goods -Composite Supply of Goods - GST Reports - Generating GSTR- Report in ERP -Input Tax Credit Set Off -GST Tax Payment -Time line for payment of GST tax -Modes of Payment -Challan Reconciliation -Exporting GSTR- return and uploading in GST portal.

UNIT IV: GETTING STARTED WITH GST (SERVICES):

Introduction -Determination of supply of services -Determining the Place of Supply of Services -Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods - Intrastate Inward Supply-Intrastate Outward Supply -Interstate Supply -Interstate Outward Supply - Interstate Inward Supply -Interstate Outward Supply of Services -Cancellation of Services -Cancellation of Inward Supplies -Cancellation of Outward Supply of Services -Defining Tax Rates at Master and Transaction Levels.

UNIT V: RECORDING ADVANCED ENTRIES AND MIGRATION TO ERP:

Introduction - Accounting Multiple Services in a Single Supply - Recording Partial Payment to Suppliers -Outward Supplies - Recording Outward Supply with Additional Expenses - Supply of services -Business to consumers - Time of Supply of Services - Place of Supply of Services - Determining place of supply of services - Exempt Supply of Services under GST -Export Supply of Services - Reverse Charge on Services under GST - Advance Receipts from Customers under GST - Advance Receipt and issuing Invoice on same month -Advance Receipt and issuing Invoice on different month - Reversal of GST on account of cancellation of advance receipt - Generating GSTR- Report in ERP - Input Tax Credit Set Off - Migration to ERP - Activate Goods and Services Tax (GST) in ERP - Set up GST rates - Update Masters - Update party GSTIN/UIN - Creation of GST Duty ledgers.

SUGGESTED READINGS:

1. Taxmann's Basics of GST
2. Taxmann's GST: A practical Approach
3. Theory & Practice of GST, Srivathsala, HPH
4. Theory & Practice of GST: Dr. Ravi M.N, PBP.

BC 604: COMPANY LAW (2013Act)

Paper: BC604 Max. Marks:80 + 20
PPW: 4 Exam Duration: 3Hrs

Objective: *to understand legal provisions applicable for establishment, management and winding up of companies in India as per Companies Act 2013.*

UNIT-I: INCORPORATION OF COMPANIES:
Company: Meaning and Definition – Characteristics - Classification – Legislation on Companies – Incorporation - Promotion – Registration - Memorandum of Association – Articles of Association – Certificate of Incorporation - Prospectus – Statement in lieu of Prospectus – Commencement of business.

UNIT–II: MANAGEMENT OF COMPANIES:
Director: Qualification - Disqualification - Position - Appointment - Removal – Duties and Liabilities – Loans – Remuneration – Managing Director – Corporate Social Responsibility – Corporate Governance.

UNIT–III: COMPANY SECRETARY:
Company Secretary: Definition – Appointment – Duties – Liabilities – Company Secretary in Practice – Secretarial Audit.

UNIT–IV: COMPANY MEETINGS:
Meeting: Meaning – Requisites - Notice – Proxy - Agenda – Quorum – Resolutions – Minutes – Kinds – Shareholder Meetings - Statutory Meeting - Annual General Body Meeting – Extraordinary General Body Meeting – Board Meetings.

UNIT–V: WINDING UP:
Meaning – Modes of Winding Up –Winding Up by tribunal – Voluntary Winding Up – Compulsory Winding Up – Consequences of Winding Up – Removal of name of the company from Registrar of Companies – Insolvency and Bankruptcy code - 2016.

SUGGESTED READINGS:

1) Company Law: ND Kapoor, Sultan Chand and Co.
2) Company Law: Rajashree. – HPH
3) Company Law: Prof. G. Krishna Murthy, G. Kavitha, PBP
4) Company Law and Practice: GK Kapoor & Sanjay Dhamija, Taxmann Publication.
5) Company Law: Revised as per Companies Act- 2013: KC Garg et al, Kalyani Publication.
6) Corporate Law: PPS Gogna, S Chand.
7) Company Law: Bagrial AK: Vikas Publishing House.

BC 605: MANAGERIAL ACCOUNTING

Paper: BC605 Max. Marks: 80 + 20
PPW: 5 Hrs Exam Duration: 3 Hrs

Objective: *to acquire Managerial Accounting decision-making techniques and reporting methods.*

UNIT-I: INTRODUCTION:
Managerial Accounting: Features – Objectives – Scope – Functions – Advantages and Limitations – Relationship between Cost, Management and Financial Accounting.

UNIT-II: MARGINAL COSTING:
Meaning – Importance – Marginal Cost Equation – Difference between Marginal Costing and Absorption Costing – Application of Marginal Costing – CVP Analysis – Break Even Analysis: Meaning – Assumptions – Importance - Limitations.

UNIT-III: DECISION MAKING:
Make or Buy – Add or Drop Products – Sell or Process Further – Operate or Shut-down – Special Order Pricing – Replace or Retain.

UNIT-IV: BUDGETS AND BUDGETARY CONTROL:
Budget: Meaning – Objectives – Advantages and Limitations – Essentials of Budgets - Budgetary Control - Classification of Budgets - Preparation of Budgets.

UNIT-V: STANDARD COSTING AND VARIANCE ANALYSIS:
Standard Costing: Meaning – Importance – Standard Costing and Historical Costing - Steps involved in Standard Costing.
Variance Analysis: Material variance - Labour variance - Overhead variance - Sales variance.

SUGGESTED READINGS:

1. Management Accounting- Principles & Practice: Sharma RK & Shashi K. Gupta, Kalyani
2. Advanced Managerial Accounting: Srihari Krishna Rao, Himalaya
3. Advanced Managerial Accounting: Dr. Sundaram, PBP
3. Advanced Management Accounting: Robert S. Kaplan & Anthony A. Atkinson, Prentice-Hall
4. Management Accounting: Rustagi R.P, Galgotia
5. Managerial Accounting: Ronald W. Hilton, TMH

BC 606: COMMERCE LAB

Paper: BC606 Max. Marks: 70PF* + 30VV
PPW: 4 (2T+4P) Exam Duration:

Objective: *to become familiar with various business documents and acquire practical knowledge, which improve over all skill and talent.*

UNIT-I: BASIC BUSINESS DOCUMENTS:

Trade license under Shops and Establishments Act - Labor license from Department of labor - Partnership Deed - Pollution, Health licenses – Quotation - Invoice form and preparation - Computation of simple interest, compound interest and EMI - Way bill used during transport - Debit Note and Credit Note - Audit Report.

UNIT-II: FINANCE, BANKING AND INSURANCE DOCUMENTS:

Promissory Note - Bill of exchange – Cheque - Pay in slip - Withdrawal form - Account opening and Nomination form KYC - Deposit form and Deposit Receipts - Loan application form - Insurance Proposal form and Insurance Policy - ATM Card Application form - Credit appraisal report - Insurance agency application procedure - ESI / PF membership form.

UNIT-III: DOCUMENTS FOR INCORPORATION A COMPANY:

Memorandum of Association - Articles of Association - Certificate of Incorporation – Prospectus - Certificate of Commencement of Business - Annual Report – Chairman's Speech - Model bye-laws of some society - Society/ Trust registration form - Complaint in a Consumer forum - Complaint under Right to Information Act.

UNIT-IV: DOCUMENTS OF TAXATION:

PAN application under Income Tax Act - TAN application under Income Tax Act - Form:16 to be issued by Employer - TDS and its certificate u/s15 - Income Tax payment challans and Refund Order - Income Tax Returns including TDS Return - Notices under Income Tax Act - Assessment Order - GST Dealer-Application and License - Registration under GST.

UNIT-V: BUSINESS CHARTS:

Elements of business - Forms of business organizations - Procedure of incorporation of companies - Classification of partners with salient features of each of them - International, National, State level and Regional entrepreneurs - Hierarchy of Banking business in India - Tax administration in India - Various taxes imposed in India - Export and import procedure - Purpose and powers of authorities like RBI, SEBI, IRDA, ROC.

COMMERCE LAB FACILITIES:

i) Colleges are required to provide a commerce lab containing all the documents related to commerce and facilities as, computer, printer, OHP, LCD Projector with sufficient furniture.

ii) Teachers should practically explain the documents and help in filling the same in the simulated environment.

iii) Students are required to do the above personally and gain the knowledge of filling the above documents and the same are to be kept in a portfolio.

iv) At the end of semester, the portfolios would be evaluated by the external examiner designated by the Controller of Examinations, Osmania University, from the panel submitted by the Board of Studies in Commerce. The Examiner would evaluate the portfolio for a maximum of 35 marks and conduct viva-voce examination for 15 marks. The award lists duly signed are to be sent the Controller of Examinations.

***the student has to collect the various documents prepare activity charts and submit the same in the form of a record.**

BC 607: FINANCIAL INSTITUTIONS AND MARKETS

Paper: BC607 Max. Marks: 80 + 20
PPW: 4 Hours Exam Duration: 3 Hours

Objective: To familiarize with various Financial Institutions and Markets.

UNIT-I: INDIAN FINANCIAL SYSTEM:

Components – Functions – Flow of Funds Matrix – Financial System and Economic Development – Recent Developments in Indian Financial System – Weaknesses of Indian Financial System.

UNIT-II: FINANCIAL INSTITUTIONS:

Commercial Banking: Types – Functions – Lending by Commercial Banks – Recent Developments – Merchant Banking-functions—Venture Capital—objectives--Private Equity–role in start-ups—Hire purchase and leasing—Non-banking Finance Companies: Types – Functions.

UNIT-III: MONEY MARKET:

Functions of Money Market – Organization of Money Market – Dealers – Money Market Instruments – RBI – Functions - Role of RBI in Money Market - LAF (Liquidity Adjustment Facility), MSF (Marginal Standing Facility), Repo, and Reverse Repo – MPC (Monetary Policy Committee) – Structure and Functions.

UNIT-IV: DEBT MARKET:

Evolution of Debt Markets in India - Money Market & Debt Market in India – Instruments and Players in Debt Market: Government Securities - PSU Bonds - Corporate Bonds - Securities Trading Corporation of India - Primary Dealers in Government Securities – Bonds: Features of Bonds - Types of Bonds - Bond Ratings.

UNIT-V: EQUITY MARKET:

Meaning - Development of Equity Culture in India – Primary Market: IPO and FPO – Methods of IPO - Role of Merchant Bankers in Fixing the Price - Red Herring Prospectus – Sweat Equity - ESOP – Rights Issue – Secondary Market: Meaning and Functions of Stock Exchanges - Evolution and Growth of Stock Exchanges - Stock Exchanges in India - Recent Developments in Indian Stock Exchanges - Stock Market Indices – SEBI: Objectives and Functions.

SUGGESTED READINGS:

1) Bhole, L.M., Financial Markets and Institutions. Tata McGraw Hill Publishing Company, New Delhi, India.
2) Prof. Prashanta Athma, Financial Institutions and Markets: PBP
3) Bihar S.C., Indian Financial System. International Book House Pvt. Ltd., New Delhi, India.
4) Gordon & Natarajan, Financial Markets and Services. Himalaya Publishing House, New Delhi, India.
5) Khan and Jain, Financial Services, Tata McGraw Hill, New Delhi, India.
6) Khan, M.Y., Indian Financial System -Theory and Practice. Vikas Publishing House, New Delhi, India.
7) Shashi K. Gupta & Nisha Aggarwal, Financial Services. Kalyani Publishers, New Delhi, India.
8) Vinod Kumar, Atul Gupta & Manmeet Kaur, Financial Markets, Institutions & Financial Services, Taxmann's Publications, New Delhi, India.

BC 608: ADVANCED CORPORATE ACCOUNTING

Paper: BC 608 Max. Marks: 80 + 20
PPW: 5 Hrs Exam Duration: 3 Hrs

Objective: *to gain knowledge of AS-19 & 21 and format accounts.*

UNIT-I: HOLDING COMPANIES (AS-21):
Nature – Legal requirements – Capital and Revenue Profit/Reserves/Losses – Minority Interest – Cost of Control or Goodwill – Capital Reserve – Inter Company Transactions – Un-realized Profit on Unsold stock - Revaluation of Assets – Interim Dividend by Subsidiary Companies - Debentures in Subsidiary Companies – Consolidated Balance Sheet.

UNIT-II: ELECTRICITY COMPANIES (DOUBLE ACCOUNTING SYSTEM):
Meaning of Double Account System – Final Accounts - Calculation of Reasonable Return and Disposal of Surplus – Replacement of an Asset.

UNIT-III: ACCOUNTING FOR PRICE LEVEL CHANGES:
Introduction – History – Limitations – Profit measurement under different systems of accounting – Methods of Accounting for Price Level Changes: Current Purchasing Power (CPP) – Current Cost Accounting (CCA).

UNIT-IV: LEASE ACCOUNTS (AS-19):
Meaning – Terminology – Advantages and Disadvantages – Types: Financial and Operating Lease – Accounting Treatment in the books of both the parties.

UNIT-V: HUMAN RESOURCE ACCOUNTING & SOCIAL RESPONSIBILITY ACCOUNTING:
Human Resource Accounting: Definition – Objectives – Assumptions – Advantages and Limitations – Approaches - Human resource accounting in India (Theory only).
Social Responsibility Accounting: Meaning – Nature – Need – Objectives – Accounting Concepts – Indicators of Social Performance (Theory only).

SUGGESTED READINGS:

1. Corporate Accounting: R.L.Gupta, M.Radha Swamy, Sultan Chand
2. Advanced Carporate Accounting: Srilatha Reddy, Himalaya
3. Advanced Carporate Accounting: Dr. Thangapandi, PBP
3. Advanced Accounting: Tulsania, TataMcGraw-hill Publishing Company
4. Corporate Accounting: Jain & Narang, Kalyani Publications
5. Advanced Accounting: S.M.Shukla, Sahitya Bhavan
6. Corporate Accounting: Prashanta Athma, Himalaya Publishers.
7. Advanced Accounting (Vol. II): Chandra Bose, PHI

MAHATMA GANDHI UNIVERSITY
NALGONDA
CHOICE BASED CREDIT SYSTEM (CBCS)
(With Effect from Academic Year 2016 -17)

Computer skills

U – 1: Computer Concepts:
Evolution, Basic structure and Characteristics of computers; Types of memory chips; Study of various input – out put devices like magnetic tapes, magnetic discs, MICR, OCR, CDROMS etc., Types of printers; Principles of flow charting; Importance of operating systems, detailed study of the operating systems MSDOS , UNIX and WINDOWS; Computer Viruses;

U – 2: Programming in 'C' language:
Operators, Expressions, Data input, Output, Control statements like – (IF-ELSE, WHILE DO, FOR, BREAK AND CONTINUE and GOTO) Functions, Library functions, Arrays.

UNIT – III: Introduction to MS-Office (WORD ,ACCESS & EXCEL):
MS-Word: Basics, working with files, working with text, formatting paragraphs, styles, lists, tables, Graphics, spellings and grammar and page formatting macros, table of contents.
MS-Excel: Basics, Spreadsheets, data types, formulas, Formatting, charts, graphs.
MS –Access: – data base concepts, Screen layouts, Creating tables, Data sheet records, table relation ships, Sorting and filtering, Queries, forms, form controls, Sub forms, reports, importing, exporting, linking.

UNIT – IV: Introduction to MS-Office (power point & World Wide WEB)
MS Power point: Power point basics, Views, Slide control, Apply design, Page setup, Templates, Background, Control, Color Screens, Transitions and animations, working with texts and working with graphics.
Hypertext and World Wide Web (WWW): Structure and Organization of the WWW, WWW browsers, Information search in WWW, search engines, Pharmaceutical resources in WWW Types of indexing tools and search strategies; Internet and E-Mail.

Text Books:

1. Fundamentals of Computers by P.K. Sinha
2. Let Us C by Yashvanth Kanetkar
3. Working in Microsoft Office By Ron Mansfield

Reference Books:

1. Programming with 'C' by Byron Goltfield- Schum series
2. Computer programming in 'C' by V Rajaraman.
3. Computer programming in 'C' by Balaguruswamy

MAHATMA GANDHI UNIVERSITY
NALGONDA
CHOICE BASED CREDIT SYSTEM (CBCS)
(With Effect from Academic Year 2016 -17)

U.G. I year Semester-II - (B.Sc/B.A./B.Com)

Gender Sensitization

AECC-2 – Total 2 Credits

UNIT – I (Theory) – 1 Credit– 1 Hour of Instruction per Week

1. Gender : Definition, Nature and Evolution, Culture, Tradition, Historicity.
2. Gender Spectrum: Biological, Sociological, Psychological Conditioning.
3. Gender based division of labour-domestic work and use value.
4. Gender, Human Rights and Parity (parallel progress of both genders).

UNIT – II (Practical Activity) 1 Credit – 2 Hours of Activity per Week

Group discussion, Presentation, Role play, Survey, Case studies, Group project based on following issues:

- Respect and Co-existence
- Social, Biological, Psychological, Political, Economic, Cultural, Health Issues.
- Domestic Violence, Eve-Teasing, Sexual Harassment.
- Real Life Experience of Gender Interaction.
- Print and Electronic Media and Gender Inequalities.
- Contemporary Challenges.

Book: "Towards a World of Equals: A Bilingual Textbook on Gender" published by Telugu Akademi

III Semester Skill Enhancement Courses

Mathematics Stream:

Computation using Excel / Basic Analytical Chemistry

Bio-Sciences Stream:

Medical Diagnostics / Basic Analytical Chemistry

Arts Stream:

Historical & Cultural Tourism in India / Rural Development

Commerce Stream:

Principles of Insurance

Computation using Excel

2 Credits

UNIT-I: UNDERSTANDING EXCEL: Excel's Files, Ribbon and shortcut, Create a workbook, Enter data in a worksheet, Format a worksheet, Format numbers in a worksheet, Create an Excel table, Filter data by using an Auto filter, Sort data by using an AutoFilter. Essential worksheet Operations: Using Short cut keys, Key board shortcuts. Working with Cells and Ranges: Formatting Cells, Name Manager. Visualizing Data Using Conditional Formatting: Apply conditional formatting. Printing Your Work: Print a worksheet, Using Print Preview and other utilities

UNIT-II: DATES AND TIMES & TEXT: Working with Dates & Time, Creating Formulas that Manipulate text – Upper, Proper, Lower, Concatenate, Text to Column. Creating Formulas that Count, Sum, Subtotal. Create a formula, Use a function in a formula. Creating Formulas that Look up Values: VLookup, Hlookup, Match & index. Creating charts and Graphics. Chart the data, Creating Sparkline Graphics, Using Insert Tab utilities.

Suggested Books:

1. Charts and Graphs Microsoft Excel 2013 – **Bill Felen – Pearson Publication.**
2. Statistics made simple do it yourself on PC – **KVS Sarma – 2nd Edition – PHI.**
3. Microsoft Office 2007- Essential Concepts and Techniques – **Shelly Cashman Vermaat – Cengage Learning.**
4. PC software Under Windows – **Puneet Kumar – Kalyani Publishers.**

Basic Analytical Chemistry

2 Credits

Unit I : Titrimetric Methods in Analysis

Introduction to Analytical Chemistry and its interdisciplinary nature, Definitions: Standard solutions, Equivalence Point, Indicators, End point, Titration General Aspects of: Primary standards, Desirable properties of standard solution. Volumetric calculations: Molarity, Normality, percentage concentration, parts per million, Neutralization Titration, Standard solution and acid-base indicators. Titration curve for strong acid-strong base Systematic equilibrium concentrations for SA-SB titration. Acid-Base indicators, colour change range of an indicator, Indicator error. Data Analysis: Analytical data evaluations: Errors, Accuracy and precision, Normal distribution curve, Mean and standard deviation.

UNIT II: Water & Soil pollutant

Water pollution: Introduction. Classification of water pollutants, Sources of water pollution. Origin of waste water, Effect of water pollutants, Water analysis: colour, turbidity, total dissolved solids, conductivity, acidity, alkalinity, hardness (total, permanent, temporary, calcium and magnesium hardness), chlorides, sulfates, fluorides and Dissolved Oxygen. Drinking water standards, Composition of soil, Concept of pH and pH measurement, Determination of pH of soil & water samples.

Reference Books:

1. Fundamentals of Analytical Chemistry, 7th Edition by skoog, west, Holler.
2. Quantitative Analysis 6th Edition - R.A. Day, Jr., A.L. Underwood.
3. Analytical Chemistry –Dr. Alka Gupta, Pragati Prakashan.
4. Analytical Chemistry : Principles, 2Ed –John H. Kennedy.
5. Analytical Chemistry –VIth Ed. Gary D. Christian.
6. Environmental Chemistry- *Anil Kumar* ***De*** ,Arnab Kumar ***De*** *7th Edition*
7. Vogel's Textbook of Quantitative Chemical Analysis- by G.H.Jeffory, J.Mendham, R.C.Denney, 5th edition,1998.

Suggested Applications:

a..Determination of Acetic acid in vinegar.

b..Determination of Alkalinity of soda ash

Suggested Instrumental demonstrations:

a. Estimation of Mn, Cr, Fluoride and Phosphates in water samples by Spectrophotometer

Medical Diagnostics

2 Credits

Unit I: **Introduction to medical diagnostics, Diagnostic methods for analysis of blood and urine**

1.1 Introduction to medical diagnostics and its importance

1.2 Blood composition, Leishman's staining, Platelet count using haemocytometer, Erythrocyte sedimentary Rate (ESR) ,packed cell volume(P.C.V)

1.3 Urine analysis Physical characteristics, abnormal constituents.

Unit II: **Non-infection , Infection diseases & Tumours**

1.1 Non-infection diseases –causes, types, symptoms, complications, diagnosis and prevention of diabetes (type-I&II), Hypertension (Primary &secondary), testing of blood glucose using glucometer/ kit.

1.2 Infectious diseases- causes, types, symptoms complication, diagnosis and prevention of tuberculosis and hepatitis.

1.3 Tumours – Types (Benign) Malignant) , detection & metastasis.

Suggested Readings:

1. Prakash, G.(2012). Lab Manual on Blood analysis and Medical Diagnostics. S. Chand and Co. Ltd., New Delhi.

Historical & Cultural Tourism in India

2 Credits

Unit-I: Tourism – Concept and Meaning – Nature – Scope - Tourism as an Industry - Socio-Economic Impact of Tourism - History of Tourism Development in India - Promotional Strategies of Tourism - Tools of Publicity, Role of Films, Television, Press, Poster-display, Brochures, Role of Guides - Historical Tourism - Monuments, Religious and Secular - Historical Sites - Historical Events - Impact of Tourism Development on Protection and Conservation of Historical Monuments and Sites and Vice-Versa - Socio-Cultural Tourism: Fairs and Festivals of India - Performing Arts (Dance, Drama and Music) - Museums, Art - Galleries, Yoga and Health Centers - Indian Cuisine.

Unit-II: Eco-Tourism - Beaches, Hill-Resorts, Surf-Riding, Ballooning, Rafting, Gliding - Wild-life Sanctuaries - National Parks, Safaris, Mountaineering –Trekking – Skiing - Sports Tourism - Tourism in Telangana – Tourist Places - Tourism Handicrafts: Textiles – Metal Work, Stone and Wood Carvings, Furniture, Jewellery, Toys, Musical Instruments – Terracotta - Display and Sale of Handicrafts - Shops at Heritage Centers – Organizing Exhibitions – Duty Free Shops.

Recommended Books:

1. Dallen, J. Timothy, Cultural Heritage and Tourism: An Introduction (Aspects of Tourism Texts), Channel View Publications, 2011.
2. INTACH, Heritage and Development: Recent Perspectives, Aryan Books International, 2012. K.R. Gupta, Concise Encyclopedia of India: (Places of Historical and Tourist Interest), 2010.
3. Melanie, K. Smith, Issues in Cultural Tourism Studies, Psychology Press, 2003.
4. P.N. Girija Prasad, Eco-Tourism and Its Development, Adhyayan Publishers, 2012.
5. S.P. Gupta & Lal Krishna (eds.), Cultural Tourism in India: Museums, Monuments and Arts, 2003.
6. V.K. Singh, Historical and Cultural Tourism in India, Aadi Publications, 2008.
7. Vaibhav Chauhan, Heritage Tourism: Territory Unexplored. Vanaja Uday, Cultural Tourism and Performing Arts of Andhra Pradesh: Prospects and Perspectives, Research India Press, 2012.
8. A.K. Bhatia, Tourism Development – Principles & Practices, Sterling Publishers, 2016.
9. Sampad Kumar, Swain & Jitendra Mohan Mishra, Principles and Practices in Tourism, OUP, 2011.
10. Indira, Tourism in Andhra Pradesh: Growth and Developments, 1956-2007, Research India Press, New Delhi, 2014.
11. D. Satyanarayana, Kotha Paryataka Sthalalu (Telugu).

Rural Development

2 Credits

Unit – I: Introduction of Rural Development:

Rural Development: - Meaning – Importance and objectives of Rural Development- Rural Economy of India: size and structure of Rural Economy - The characteristics of the Rural Sector - Role of Agricultural and Allied Sector- Role of the Non-Agricultural sub-sector-Education, Health, Sanitation, Rural Artisan– Nature of changes since Independence - Challenges and opportunities.

Unit – II: Determinants & Approaches to Rural Development:

Determinants of Rural Development: Change in Output - Changes in the Utilization of Natural Resources – Employment, Capital, Technology and Industrial framework Approaches to Rural Development: C.D. Program - Intensive Agricultural Districts Program - S.F.D.A. and M F.A.L.A.- D.P.A.P. - D.D.P. - I.R.D.P., D.W.C.R.A. - S.G.S.Y., Self help groups in Rural Development, other programmes for Rural Development.

Suggested Readings:

1. Katar Singh (1999), "Rural Development - principles policies and Management" Sage Publications, New Delhi.

2. I. Satyasundaram (1999) “Rural Development" Himalaya Publishing House, New Delhi.

3. Bhalla. G. S. (1994) "Economic Liberalization and Indian Agriculture" (Ed)

4. John Mellor and Gunvant Desai (1986) “Agricultural Change and Rural Poverty”, Oxford University Press, Bombay.

5. NABARD (1999) “Review of working of Regional Rural Banks”, Mumbai.

6. Ministry of Rural area and Employment “Programs for Change” GoI, New Delhi.

7. Plan Documents, GoI, New Delhi.

I: PRINCIPLES OF INSURANCE

Objectives: The objectives of the course are to

- ✓ provide a basic understanding of the Insurance Mechanism
- ✓ identify the relationship between Insurers and their Customers and the importance of Insurance Contacts
- ✓ give an overview of major Life Insurance and General Insurance Products

UNIT I:Risk Management, Concept of Insurance, Business of Insurance, Insurance Market and Insurance Terminology

Understanding of Risk—Types of Risks–-- Actual and Consequential Losses –Unexpected Eventualities—LossMinimization Techniques – Basics, Evolution and Nature of Insurance – Concept of Pooling in Insurance – Different Classes of Insurance – Importance of Insurance – Management of Risk by Individuals – Management of Risk by Insurers – Fixing of Premiums – Reinsurance and its Importance for Insurers – Role of Insurance in Economic Development and Social Security –Constituents of Insurance Market – Operations of Insurance Companies – Operations of Intermediaries – Specialist Insurance Companies – Insurance Specialists – Role of Regulators and Other Bodies Connected with Insurance—CommonTerms and specific terms in Insurance: Life and Non Life – Usage of Insurance Terms – Understanding Insurance Customers and their needs and behavior in purchase and claims– Importance of Customers – Customer Mindsets – Customer Satisfaction — Importance of Ethical Behavior

UNIT II: Insurance Customer, Insurance Products and Insurance Contracts

Life Insurance and General Insurance Products: Risk of Dying Early – Risk of Living too Long – Products offered – Term Plans – Pure Endowment Plans – Combinations of Plans – Traditional Products – Linked Policies – Features of Annuities and Group Policies. General Insurance Products: Risks faced by Owner of Assets – Exposure to Perils – Features of Products Covering Fire and Allied Perils – Products covering Marine and Transit Risks – Products covering Financial Losses due to Accidents – Products covering Financial Losses due to Hospitalization – Products Covering Miscellaneous Risks. Insurance Contract Terms – Principles of Insurance: Principle of Insurable Interest, Principle of Indemnity, Principle of Subrogation, Principle of Contribution, Relevant Information Disclosure, Principle of utmost Good Faith, Relevance of Proximate Cause

Suggested Readings

1. Principles of Insurance : Insurance Institute of India
2. Risk Management : Insurance Institute of India
3. Role of Insurance in Financial inclusion : Brinda Publishing House, Hyderabad

5. Insurance Theory and Practice : Tripathi PHI

IV Semester Skill Enhancement Courses

Mathematics Stream:

Theory of Equations / Electrical Circuits & Network Skills

Bio-Sciences Stream:

Apiculture / Food Adulteration

Arts Stream:

Legal Literacy / Office Management

Commerce Stream:

Practice of Life Insurance / Banking Technology

Theory of Equations

2 Credits

Unit I

Graphic representation of a polynomial-Maxima and minima values of polynomials-Theorems relating to the real roots of equations-Existence of a root in the general equation –Imaginary roots-Theorem determining the number of roots of an equation-Equal roots-Imaginary roots enter equations in pairs-Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots-

Unit II

Relations between the roots and coefficients-Theorem-Applications of the theorem-Depression of an equation when a relation exists between two of its roots-The cube roots of unity- Symmetric functions of the roots-examples.

Text:

1. W.S. Burnside and A.W. Panton, *The Theory of Equations*

References:

1. C. C. Mac Duffee, Theory *of Equations*
2. Hall and Knight, *Higher Algebra*

ELECTRICAL CIRCUITS AND NETWORK SKILLS

2 Credits

UNIT-I

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

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

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

UNIT-II

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

Components with DC or AC sources: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Relay protection device

Reference Books:

1. A text book in Electrical Technology - B L Theraja - S Chand & Co.
2. A text book of Electrical Technology - A K Theraja
3. Performance and design of AC machines - M G Say ELBS Edn.
4. Electrical Circuits, K.A. Smith and R.E. Alley, 2014, Cambridge University Press

Apiculture

2 Credits

Unit- I **Biology of Bees & Rearing of bees**

1.1 History ,classificatios and Biology of honey bees

1.2 Social organisation of Bee colony

1.3 Artificial Bee rearing (Apiary), Bee keeping equipments

1.4 Methods of extraction of honey (indigenous & modern)

Unit-II Bee economy & Diseases and enemies of bees :

2.1 Products of Apiculture industry and its uses, pollen etc.

2.2 Bee keeping industry recent efforts , modern methods.

2.3 Bee diseases and enemies.

2.4 Control and preventive measures.

Suggested Readings:

1. Prost,P.J.Apiculture. Oxford and IBH, New Delhi.
2. Bisht D.S., Apiculture, ICAR Publication.
3. Singh S., Beekeeping in India, Indian Council of Agricultural Research, New Delhi.

Food Adulteration

2 Credits

Unit-I

Definition and introduction to food adulteration

Types of food adulteration

Common food adulterants

Causes of food adulteration

Analysis of food

Unit-II

Effects of food adulteration

Prevention of food adulteration

Detection of common food adulterants

Food Adulteration Act-1954

Suggested Readings:

1. Jesse Park Battershall. Food adulteration and its detection. Published by book on demand, Miami, 2015
2. R.B.Sethi's Prevention of food adulteration Act.
3. Dr. Sheela.S. prevention of Food adulteration.

Legal Literacy

2 Credits

Unit - I

1. Introduction: Judiciary – Significance and functions.
2. Sources of Law , Concept of Rule of Law and Judicial Review.
3. Judicial System in India – Supreme Court, High Court and District Courts.
4. Constitutional Protections of Rights: Writs- Habeas Corpus, Mandamus, Certiorari, Prohibition and Quo-warranto.
5. Arbitration, Tribunal Adjudication and Alternate Dispute Resolution – Administrative Tribunals, Ombudsman, Mediation, Conciliation, Lok Adalats, Lokpal and Lokayukta.
6. Right to information Act – 2005

Unit – II

1. Legal Terminology: Appeals, Alimony, Backlog, Bail, Bench, Contempt of Court, Immunity, Indian Penal Code, Civil Procedure Code, Criminal Procedure Code, Juvenile Court, Power of Attorney, Petition, Plaint, Suit, Status Quo, Summons.
2. First Information Report (FIR) – Procedure and Importance.
3. Public Interest Litigation (PIL)
4. Rights of Senior Citizens, Disabled, Tribal's and Depressed Classes.

References:

1. Jeroma Hall, Principles of Criminal Law
2. Ratan Lal & Dhiraj Law, Indian Penal Code
3. R.W.M. Dias-Jurisprudence (1994) Indian Reprint-Adithya Books, Delhi
4. D.D.Basu, Shorter Constitution of India, 2001 Wadhwa, Nagpur
5. V.R.Krishna Iyer, The Dialectics and Dynamics of Human Right in India
6. S.K.Kapoor, Human Right under Int.Law & Indian Law
7. Dr. Hemath Kumar, Lok Adalat In India - Genesis Law Practice And Prospects
8. Dr. Mamta Rao, Public Interest Litigation (PIL) - Legal Aid and Lok Adalats

Office Management

2 Credits

Unit I: Introduction

1. Office Management: Nature, Scope and Importance
2. Basic Principles of Office Organization
3. Office Accommodation
4. Office Automation and paperless Office

Unit II: Office Organization and Management

1. Office Planning and Lay-out Office Environment
2. Forms: Management and Control
3. Office Filing System and Classification
4. Office Communication, Correspondence

Paper : (SEC-2) : PRACTICE OF LIFE INSURANCE

Paper: SEC-2 Max. Marks: 50 (40+10)
PPW: 2 Hrs Exam Duration: Hrs
Credits : 2

Objectives:a)To make the student understand Life Insurance Market in India. b) To discuss the issues related to risk management in view of life insurance.

UNIT-I: INTRODUCTION TO LIFE INSURANCE AND TYPES OF LIFE INSURANCE POLICIES AND PREMIUM CALCULATION : Meaning evolution, growth and principles of Life Insurance —Life Insurance Organizations in India-– Competition and Regulation of Life Insurance.Types of Life Insurance Policies – Term, Whole Life, Endowment, Unit Linked and with or without Profit Policies –Customer Evaluation – Policy Evaluation — Group and Pension Insurance Policies – Special features of Group Insurance /Super Annuation Schemes – Group Gratuity Schemes.Computation of Premiums—Meaning of Premium, its calculation--Rebates – Mode of Rebates – Large sum assured Rebates – Premium Loading – Rider Premiums – Computation of Benefits – Surrender value – Paid up value

UNIT-II: SETTLEMENT OF CLAIMS RISK & UNDERWRITTINGS AND FINANCIAL PLANNING & TAX SAVING: Settlement of claims: Intimation Procedure, documents and settlement procedures.Underwriting: The need for underwriting – Guiding principles of Underwriting – Factors affecting Insurability – Methods of Life Classification – Laws affecting Underwriting.Financial Planning and taxation: Savings – Insurance vis-à-vis- Investment in the Units Mutual Funds, Capital Markets – Life Insurance in Individual Financial Planning – Implications in IT treatment.

SUGGESTED READINGS:

1. Insurance Institute of India, Practice of Life Insurance, Mumbai.
2. P.K.Gupta, Insurance and Risk Management, Himalaya Publishing House, Mumbai.
3. Kanika Mishra, Fundamentals of Life Insurance: Theories and Applications, Prentice Hall
4. Kutty, S.K., Managing Life Insurance, Prentice Hall of India: New Delhi
5. Black, Jr. Kenneth and Harold Skipper Jr., Life and Health Insurance, Prentice Hall, Inc., England.
6. K.C. Mishra and C.S. Kumar, Life Insurance: Principles and Practice, Cengage Learning: New Delhi.
7. Sadhak, Life Insurance in India, Respose Books: New Delhi

V Semester Skill Enhancement Courses

Mathematics Stream:

Laplace Transforms / Chemistry of Cosmetics & Perfumes

Bio-Sciences Stream:

Mushroom Cultivation Technology / Chemistry of Cosmetics & Perfumes

Arts Stream:

Archives and Museums / Interview Skills and Ethics

Commerce Stream:

Practice of General Insurance / International Banking

Laplace Transforms

2 Credits

Unit I : Laplace transforms

Definition of Integral Transform - Definition of Laplace transform - linearity property- Piecewise continuous functions - Existence of Laplace transform - Functions of exponential order and of class A - First and second shifting theorems of Laplace transform - Change of scale property- Laplace transform of derivatives - Initial value theorem – Final value theorem - Laplace transform of integrals - Multiplication by powers of t - Division by t –Evaluation of Integrals - Laplace transform of periodic functions and some special functions.

Unit-II : Inverse Laplace transforms

Definition of Inverse Laplace transform – Definition of Null function - Linearity property - First and second shifting theorems of inverse Laplace transform, Change of scale property – Inverse Laplace transform of derivatives - Inverse Laplace transform of Integrals – Multiplication by powers of p - Division by powers of p – Definition of Convolution – convolution theorem - Heaviside's expansion theorem or formula and applications – The Beta function.

Prescribed text Book: Scope as in ***Integral transforms*** by A.R. Vasishtha & Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut. Chapter I, Chapter II: All sections except 2.3 and 2.18

Reference Book: ***Operational Mathematics*** by R.V.Churchil, McGraw Hill Company

Chemistry of Cosmetics & Perfumes

2 Credits

Unit I: Basic Information about Cosmetics & Perfumes

Historical background of Cosmetics, Definition and Classification of Cosmetics & Perfumes and their interdisciplinary nature. Introduction to skin and skin creams, Astringents and Skin Tonics, Antiperspirants, Deodorants, Sun screen and Suntan, Face packs and Masks, Face powder and make-ups. Introduction to Nail and Nail products; Hair and Hair products. The use of water in cosmetic industry. Cleanliness, Hygiene and Microbiological control in Manufacture, A brief history of Perfume.

Unit-II: Formulation and Evaluation of Cosmetics & Perfumes

Ingredients of Cosmetics, Herbals use of Cosmetics, Formulation of Cosmetics for skin- Skin cream, Lotion, Face powder & Compacts, Skin colorants, Body powder, Face pack & Masks, Bath Preparations (bath salt, oil, powder, foam), Astringents & Skin tonics (antiperspirants, astringent lotion, pre-shave & after shave lotion, colognes), Formulation of Cosmetics for Nails,

Nail polishes, Nail lacquers & removers, Nail bleaches & Stain removers, Cuticle remover & softener, Fingernail elongations, Formulation of Cosmetics for eye- Eye shadow, Mascara, Eyebrow pencil, Eye cream, Eye liners, Kajal, Quality Control of Cosmetics, A brief details of different vegetable and animal substances used in Perfumary.

Reference Books:

- Harry's *Cosmeticology*, Seventh Edition, Chemiccal Publishing, New York, USA.
- G.W.Akinson, *Perfumes and their Preparation*, N.W.Hinley & Co., New York, USA.
- P.P. Sharma, Cosmetics formulation manufacturing & Quality control, Vandana Pub, Delhi.

Suggested Applications:

a. Preparation of Shampoo.
b. Preparation of Nail polish.

Mushroom Cultivation Technology

2 Credits

Unit-I

1. Introduction, importance and history of mushroom cultivation in India.
2. Types of edible mushrooms available in India- Pleurotus citrinopileatus, Agaricus bisporus.
3. Nutritional and medicinal value of edible mushrooms

Unit-II

1. Steps in mushroom cultivation, selection of site and types of mushroom, farm structure, design layout principle and techniques of compost and composting.
2. Preparation of spawn casing and crop production, harvesting and marketing.
3. Types of food prepared from mushrooms.Research centres- National level and Regional level.

Suggested Readings:

Tewari, Pankal Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi

Archives and Museums

2 Credits

Unit-I: Definition of Archives – Scope – Types of Archives – Development of Archives – National and State Archives in India - Archives – Understanding the Traditions of Preservation – Collection - Purchase –Documentation: Accessioning – Indexing – Cataloguing – Digital Documentation and De-accessioning - Chemical Preservation and Restoration.

Unit-II: Definition of Museum - Introduction – Scope - Types of Museums - Significance of Museums - Museums in India - Museums – Collection – Field Exploration – Excavation – Purchase – Gift and Exchanges – Treasure Trove – Documentation - Indexing – Museum Presentation and Exhibition – Outreach Activities of Museums and Archives.

Recommended Books:

1. Saloni Mathur, *India by Design: Colonial History and Cultural Display*, University of California, 2007.
2. Sengupta, S., *Experiencing History through Archives*, Munshiram Manoharlal, Delhi, 2004.
3. Guha Thakurta, Tapati, *Monuments, Objects, Histories: Institution of Art in Colonial and Post-Colonial India*, New York, 2004.
4. Kathpalia, Y.P., *Conservation and Restoration of Archive Materials*, UNESCO, 1973.
5. Choudhary, R.D., *Museums of India and Their Maladies*, Agam Kala, Calcutta, 1988.
6. Nair, S.M., *Bio-Deterioration of Museum Materials*, Agam Kala Prakashan, 2011.
7. Agrawal, O.P., *Essentials of Conservation and Museology*, Sundeep Prakashan, New Delhi, 2007.

Interview Skills and Ethics

2 Credits

Unit I: Introduction:What is an interview, Types of interviews (Traditional,Screening, Behavioural and Group) and Basic norms of interview**,** Rules of Interview: Writing an effective Resume, Giving correct and accepted way of self introduction, Knowing the Organization,Self, and Job), Preparation and the Interview Ettiqutte: Physical and Pshycological preparation, Grooming your self, staying healthy, Dressing, Body language, Do's and Dont's ect. Practice Questions, Mock interviews, Tips and Tricks for the interview.

Unit II: Definition of Ethics, How to live/lead a good life, Our rights and responsibilities, The language of right and wrong, Moral decisions – What is good and bad, Civic sense, Ethics in communication, Code of ethics.

Reference:

Adams, Sally. *Interviewing for Journalists.* New York: Routledge, 2001.

8. Anderson, Rob and Killenberg, George M.*Interviewing:Speaking, Listening and Learning for Professional Life.* Mountain View, CA: Mayfield Publishing, 1999.
9. Biagi, Shirley. *Interviews that Work:A Practical Guide for Journalists.* Belmont, CA:Wadsworth, 1992.
10. Brady, John Joseph. *The Interviewer's Handbook:A Guerrilla Guide: Techniques & Tactics for Reporters & Writers.* Waukesha, WI: Writer Books, 2004.
11. Brauer, C. (2013). Just Sustainability? Sustainability and Social Justice in Professional Codes of Ethics for Engineers. Science & Engineering Ethics, 19(3), 875-891. doi: 10.1007/s11948-012-9421-4
12. Clements, Curtis, John D. Neill, and Scott O. Stovall. "The Impact of Cultural Differences on the Convergence of International Accounting Codes of Ethics." *Journal of Business Ethics* 90: Supplement 3 (2009) 383-391.
13. Davis, Michael. "Do Cops Really Need Code of Ethics?", *Criminal Justice Ethics.* 10 (1991): 14-28.
14. ---. *Profession, Code, and Ethics*. Burlington, VT: Ashgate, 2002.
15. ---. "Thinking like an engineer: The Place of a Code of Ethics in the Practice of a Profession", Philosophy and Public Affairs 20.2 (1991): 150-167.
16. ---Thinking Like an Engineer: Studies in the Ethics of a Profession. New York: Oxford University Press, 1998. CSEP.TA157.D321998
17. ---"Three Myths about Codes of Engineering Ethics." *IEEE Technology and Society Magazine*, Vol. 20, Issue 3. (Fall 2001) pp. 8-16.
18. ---"What Can We Learn by Looking for the First Code of Professional Ethics?" Theoretical Medicine 24.5 (2003): 433-454.
19. Davis, Michael and Andrew Stark. *Conflict of Interest in the Professions*. Vol. VI The Oxford Series. Oxford University Press, 2001.

VI Semester Skill Enhancement Courses

Mathematics Stream:

Sci Lab / Renewable Energy & Energy Harvesting

Bio-Sciences Stream:

Bio-fertilizers / Nursery and Gardening

Arts Stream:

Women & Child Rights / Good Governance

Commerce Stream:

Regulation of Insurance Business / Central Banking

Sci Lab

2 Credits

Unit – I

Introduction to Scilab – what is scilab, downloading & installing scilab, a quick taste of scilab.

The Scilab Environment – manipulating the command line, working directory, comments, variables in memory, recording sessions, the scilab menu bar, demos.

Scalars & Vectors – introduction, initializing vectors in scilab, mathematical operations on vectors, relational operations on vectors, logical operations on vectors, built-in logical functions.

Unit – II

Scalars & Vectors – elementary mathematical functions, mathematical functions on scalars, complex numbers, trigonometric functions, inverse trigonometric functions, hyperbolic functions.

Matrices – introduction, arithmetic operators for matrices, basic matrix processing.

Polynomials – introduction, creating polynomials, basic polynomial commands, finding roots of polynomial, polynomial arithmetic, miscellaneous polynomial handling.

Text

Er. Hema Ramachandran, Dr. Achuthsankar S. Nair, *Computer SCILAB–A Free Software to MATLAB*

References

Digite, *Introduction to Scilab*

Digite, *Optimization in Scilab*

Scilab Enterprises, *Scilab for Very Beginners*

Digite, *Introduction to Discrete Probabilities with Scilab*

Note: Student friendly video lecturers pertaining to this course are available at http://spoken-tutorial.org/

Teachers are advised to teach this courses in the computer lab itself, so that the interested students may derive some time to perform few programs their own.

Renewable Energy & Energy Harvesting

2 Credits

Unit-I

Fossil fuels and Alternate Sources of energy: Fossil fuels and nuclear energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.

Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV modules and equivalent circuits, and sun tracking systems.

Unit-II

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

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

Geothermal Energy: Geothermal Resources, Geothermal Technologies.

Hydro Energy: Hydropower resources, hydropower technologies, environmental impact of Hydro power sources.

Reference Books:

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi

2. Solar energy - M P Agarwal - S Chand and Co. Ltd.

3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.

4. Godfrey Boyle, “Renewable Energy, Power for a sustainable future”, 2004, Oxford University

Press, in association with The Open University.

5. Dr. P Jayakumar, Solar Energy: Resource Assesment Handbook, 2009

6. J.Balfour, M.Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).

7. http://en.wikipedia.org/wiki/Renewable_energy

Bio-fertilizers

2 Credits

Unit-I

1. General account about the microbes used as biofertilizers, Rhizobium, Azotabacter importance in cultivation.
2. Cyanobacteria as biofertilizer, Nitrogen fixation BGA and Azolla in rice cultivation

Unit-II

1. Mycorrhizal association and types of mycorrhizal association; Isolation and inoculums production of VAM and its influence on crop plants.
2. Organic farming- Green manuring and organic fertilizers, recycling of biodegradable municipal , agricultural and industrial wastes.

Suggested Readings:

1. Vayas, S.C, Vayas , S. and Modi, H.A 1998 Bio-fertilizers and organic farming, Akta Prakasham, Nadiad
2. Subha Rao, N.S.2000, Soil microbiology, Oxford & IBH publishers, New Delhi
3. Sathe, T.V. 2004 vermiculture and organic farming. Daya publishers
4. Dubey, R.C., 2005 A text book of biotechnology S.Chand & Co., New Delhi

Nursery and Gardening

2 Credits

Unit-I

1. Nursery: Definition, objectives, scope and building up of infrastructure for nursery.
2. Seed: structure and types- seed dormancy; causes and methods of breaking dormancy- seed storage, seed banks.
3. Vegetative propagation: air layering, cutting, selection of cutting, collecting season, rooting medium and planting of cuttings- Hardening of plants- green house- mist chamber.

Unit-II

1. Gardening definition, objectives and scope- different types of gardening
2. Computer application in landscaping - Gardening operations
3. Study of cultivation of different vegetables: Cabbage, Brinjal, Lady's fringer, Tomatoes and Carrots.

Suggested Readings:

1. Bose T. K & Mukherjee , D.,1972, Gardening in India , Oxford & IBH Publishing Co., New Delhi
2. Sandhu,M.K., 1989, Plant Propagation. Wile Eastern Ltd.,Bangalore, Madras.
3. kumar,N.,1997, Introduction to Horticulture,Rajalakshmi Publications,Nagercoil.
4. Edmond Musser & Andres , Foundamentals of Horticulture ,McGraw Hill Book Co.,New Delhi
5. Agrawal,P.K.1993,Hand Book of Seed Technology , Dept . of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi.
6. Janick ules .1979 . Horticultural science. (3rd Ed), W.H Freeman and co., San Francisco, USA.

Women & Child Rights

2 Credits

Unit - I

1. Introduction: Definition, perspectives and foundations of Human Rights.
2. Universal Declaration of Human Rights (1948).
3. National Human Rights Commission of India.
4. Women's Rights as Human Rights; UN Convention on Elimination of all forms of Discriminations against Women (CEDAW). Crime Against Women – Domestic Violence – Dowry Related Harassment and Dowry Deaths – Molestation – Sexual Abuse and Rape – Loopholes in Practice – Law Enforcement.
5. Women Rights in Indian Constitution – Fundamental Rights and Directive Principles.
6. Protective legislation for women in India - SITA (1956), Dowry Prohibition Act (1961), PNDT (1994), Domestic violence (Prevention) Act (2005) and Prevention Sexual Harassment of women at Workplace Act (2013).
7. Women's Right to Property.

Unit – II

1. Children's Rights: Definitions, meaning and importance.
2. The United Nations **Convention on the Rights of the Child** (**UNCRC) -1990.**
3. Safeguards of Indian Constitution for Rights of Children.
4. Barriers to realization of Child Rights.
5. National Commission for Protection of Child Rights (NCPCR)

References:

1. Agarwal, H.O., Implementation of Human Rights Covenants with Special Reference to India(Allahabad: Kitab Mahal, 1983).
2. Bajwa, G.S. and D.K. Bajwa, Human Rights in India: Implementation and Violations (New Delhi: D.K. Publishers, 1996).
3. Nitya Rao "Good Women do not Inherit Land" Social Science Press and Orient Blackswan 2008
4. International Solidarity Network "Knowing Our Rights" An imprint of Kali for Women 2006
5. P.D.Kaushik "Women Rights" Bookwell Publication 2007
6. Aruna Goal "Violence Protective Measures for Women Development and Empowerment" Deep and Deep Publications Pvt 2004
7. Monica Chawla "Gender Justice" Deep and Deep Publications Pvt Ltd.2006
8. Preeti Mishra "Domestic Violence Against Women" Deep and Deep Publications Pvt 2007
9. ClairM.Renzetti, Jeffrey L.Edleson, Raquel Kennedy Bergen, Source Book on "Violence Against Women" Sage Publications 2001.
10. Diwan, Paras and Peeyushi Diwan, Children and Legal Protection (New Delhi: Deep and Deep, 1994).
11. Pachauri, S.K., Children and Human Rights (Delhi: APH Publications, 1999).

Good Governance

2 Credits

Unit - I: Introduction

1. Meaning Definitions and importance of Governance
2. Concepts of Good Governance
3. Government and Governance
4. Public and Private Governance

Unit- II: State and Governance

1. The State, Market and Civil Society
2. Techniques of Good Governance
3. Good Governance and Civil Society
4. IT Act 2000 , ICT and Good Governance