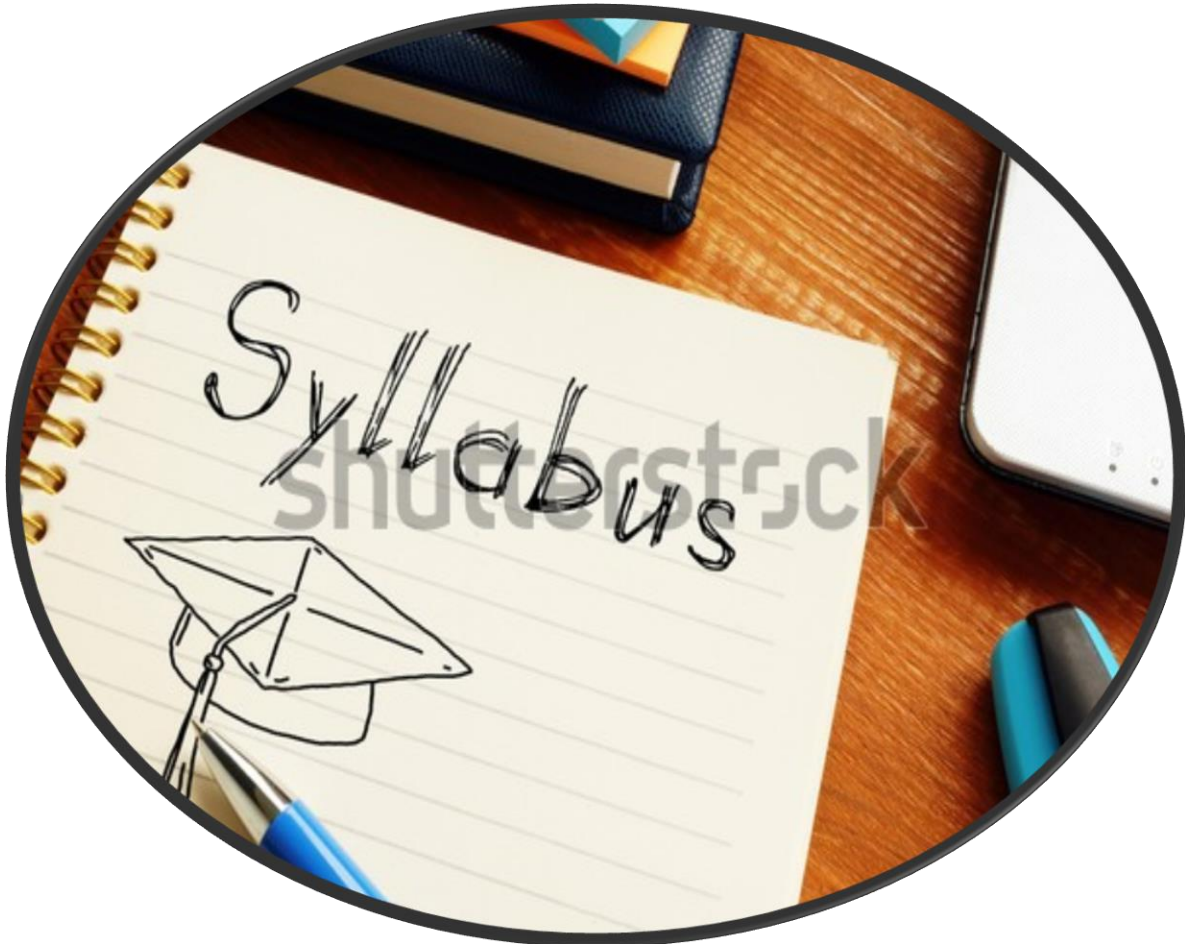


# YOGI VEMANA UNIVERSITY

## SYLLABUS 2016-17



YOGI VEMANA UNIVERSITY  
GENERAL ENGLISH SYLLABUS  
 FOR B.A/B.Com/B.Sc COURSES under CBCS

SEMESTER – I

1. Every unit shall state the objectives and expected deliverables.
2. Every lesson shall have
  - i) Questions on subject comprehension, paragraph, short note, single sentence answer types
  - ii) Exercises on vocabulary, syntax, and pronunciation
  - iii) Language exercises shall include exercises in paraphrasing, note-making and report writing wherever possible
  - iv) Pre -reading and post- reading activities.

Unit – I

PROSE

1. A.P. J. Abdul Kalam: The Knowledge Society (from Ignited Minds)
2. NgugiWaThiong'o: The Language of African Literature (from Decolonizing the Mind)

Unit – II

POETRY

1. Robert Frost: The Road Not Taken
2. Nissim Ezekiel: Night of the Scorpion

Unit – III

SHORT STORY

1. Mulk Raj Anand: The Lost Child
2. Henry Lawson: The Loaded Dog

Unit – IV

ONE - ACT PLAY

William Shakespeare: The Merchant of Venice (Court Scene – Act IV Scene -1)

Unit – V

LANGUAGE ACTIVITY

1. Classroom and Laboratory Activities
  - i. Single Sentence Answer Questions on Vocabulary (spelling), sound(pronunciation), sense (meaning), and syntax (usage)
2. Classroom Activity
  - i. Exercises in Articles and Prepositions
  - ii. Exercises in Tenses, Interrogatives and Question tags

Note: In classroom instruction it may be ensured that the theoretical and practical components of CSS-I complement the language activity in this semester.

YOGI VEMANA UNIVERSITY  
GENERAL ENGLISH SYLLABUS  
 FOR B.A/B.Com/B.Sc COURSES under CBCS

SEMESTER – II

Unit – I  
 PROSE

1. J. B.S Haldane: The Scientific Point of View
2. A.G. Gardiner: On Shaking Hands

Unit - II  
 POETRY

1. John Keats: Ode to Autumn
2. KishwarNaheed: I am not that Woman (from An Anthology of Commonwealth Poetry edited by C.D. Narasimhaiah)

Unit –III  
 SHORT STORY]

1. Ruskin Bond: The Boy Who Broke the Bank
2. R. K. Narayan: Half a Rupee Worth

Unit – IV  
 ONE ACT PLAY

Anton Chekhov: The Proposal

Unit – V  
 LANGUAGE ACTIVITY

1. Classroom and Laboratory Activities
  - i. Transformation of Sentences (Voice, Speech and Degrees)
  - ii. Dialogue Practice (Oral)
  - iii. Listening Comprehension
2. Classroom Activity
  - i. Guided Composition
  - ii. Dialogue Writing
  - iii. Reading Comprehension

YOGI VEMANA UNIVERSITY  
GENERAL ENGLISH SYLLABUS  
 FOR B.A/B.Com/B.Sc COURSES under CBCS

SEMESTER –III

Unit – I

PROSE

1. M.K. Gandhi: Shyness My Shield (from The Story of My Experiments with Truth)
2. Alexis C. Madrigal: Why People Really Love Technology: An Interview with Genevieve Bell

Unit – II

POETRY

1. Gabriel Okara: Once upon a Time
2. Seamus Heaney: Digging

Unit – III

SHORT STORY

1. Jhumpa Lahiri: The Interpreter of Maladies
2. Shashi Deshpande: The Beloved Charioteer

Unit – IV

ONE ACT PLAY

- Gurajada Appa Rao: Kanyasulkam, translated by C. Vijayasree & T. VijayaKumar (Acts I & II)

Unit – V

LANGUAGE ACTIVITY

1. Classroom and Laboratory Activities
  - i. JAM Sessions
  - ii. Note Taking
  - iii. Reporting for the Media
  - iv. Expansion of an idea
2. Classroom Activity
  - i. Transformation of sentences (Simple-Complex-Compound Sentences)
  - ii. Note Making
  - iii. Report Writing
  - iv. Writing for the Media

Note: In classroom instruction it may be ensured that the theoretical and practical components of CSS-II complement the language activity in this semester.

YOGI VEMANA UNIVERSITY:KADAPA  
PART- 1 (B) TELUGU  
SEMESTER - I  
(Common to B.A/B.Com/B.Sc)

**SEMESTER - I**

**I. ప్రాచీన కవిత్వం:**

- (అ) నన్నయ - గంగాశంకరుల కథ  
ఆంధ్రమహాభారతం-అదివర్ణం-నాల్గవ అశ్వాసం (120-165)  
"నరపరుడగు శంతనునకు" నుండి "దివ్య భూషణాలంకృత" వరకు
- (ఆ) తిక్కన - ద్రౌపది పరివేషనం - ఆంధ్రమహాభారతం - ఉద్యోగపర్వం -  
తృతీయ అశ్వాసం - (100-125)  
"ధర్మనందను పలుకులు" నుండి "అని యూఱడిలగ బలికిన" వరకు

**II అధునిక కవిత్వం**

- (అ) గురజాడ - కన్యక  
(ఆ) శ్రీశ్రీ - దేశచరిత్రలు

**III కథానికలు**

- (అ) పాపినేని శివశంకర్ - చింతల లోపు  
(ఆ) బండి నారాయణస్వామి - సావుకూడు

**IV వ్యాకరణం**

- (అ) సంధులు - నవద్దీర్ఘ గుణ, వృద్ధి, యణాదేశ, త్రిక, గ.న.ద.ద.వాదేశ,  
రుగాగమ, టుగాగమ, ఆమేడిత, అత్వ ఇత్వ ఉత్వ సంధులు.
- (ఆ) సమాసాలు - తత్పరుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి.
- (ఇ) అక్షర దోషాలు - దోషాలు సరిదిద్ది సాధు రూపాలు రాయాలి.

**విద్యార్థి కృత్యాలు:**

1. శ్రీశ్రీ కవిత దేశ చరిత్రలకు సంబంధించిన పేరడీలు సేకరించండి.
2. ముత్యాల సరాలు భండస్సులో రచనలు చేసే ప్రయత్నం చేయండి.
3. అనాది ద్రౌపది పరిస్థితిని ప్రస్తుత సమాజ పరిస్థితికి అన్వయించండి.  
(పైన సూచించిన విద్యార్థి కృత్యాలు కొన్ని ఉదాహరణలు మాత్రమే. ఇటువంటివి మరిన్ని ప్రయత్నించగలరు.)

**General Telugu Syllabus for B.A/ B.Com/B.Sc., Courses Under CBCS  
W.e.f. 2015-16 (Revised in April - 2016)**

**SEMESTER - II**

**I. ప్రాచీన కవిత్వం:**

- (అ) ధూర్జటి - సాయుజ్యము  
(శ్రీకాళహస్తి మహాత్మ్యము - ద్వితీయాశ్వాసం (109-139)  
శ్రీతాంబుననౌత్వ.... నుండి వస్తుగంబు .... వరకు
- (ఆ) చేమకూర వేంకటకవి- సుభద్రా పరిణయం  
విజయ విలాసం - 3వ ఆశ్వాసం - (93-139)  
“కనయని పెండ్లికేగ వలె ధాత్రికి”నుండి  
“శేరెక్కి దంపతులరుగి” వరకు.

**II ఆధునిక కవిత్వం**

- (అ) జాషువా - పిరదొసి లేఖ  
("అ సుల్తాను" ... నుండి "అనుచు లిఖించె" వరకు)
- (ఆ) గొడ్డాపు నర్సయ్య - 'చెట్టు' ఖండిక 1 నుండి 25 వద్యాలు  
("శ్రీనిధానం" నుండి "మహిమ నీది" వద్యం వరకు)  
(కవితా వైజయంతి వద్య సంకలనం నుండి)

**III కథానికలు**

- (అ) కేతు విశ్వనాథ రెడ్డి - నమ్మకున్న నేల  
(ఆ) ముప్పాళ్ళ రంగనాయకమ్మ- అమ్మకు ఆదివారం లేదా?

**IV నవల**

- డా॥ వి.ఆర్. రాసాని - బతుకాట

**విద్యార్థి కృత్యాలు:**

1. సుభద్ర వివాహ ఆచారాలు - ఈనాటి వివాహ ఆచారాలు తులనాత్మకంగా పరిశీలించండి.
2. మీకు నచ్చిన ఒక చెట్టుకు సంబంధించిన పూర్తి నమాచారాన్ని సేకరించండి.
3. మీ ఇంటి నేపథ్యంలో అమ్మలకు ఆదివారం ఉందో లేదో ఒక సంఘటన ఆధారంగా కథ రాయండి.
4. నమ్మకున్న నేల కథలోని రైతుల గాఢలసు చిత్రాలతో దినపత్రికల ఆధారంగా సేకరించండి.

**General Telugu Syllabus for B.A/ B.Com/B.Sc., Courses Under CBCS  
W.e.f. 2015-16 (Revised in April - 2016)  
SEMESTER - III**

**I. ప్రాచీన కవిత్వం:**

- (అ) పోతన - వామనావతారం  
ఆంధ్రమహాభాగవతం - ఎనిమిదవ స్కంధం (582-621)  
("కులమున్ రాజ్యము" నుండి "రవిబింబంబుపమింప" వరకు)
- (ఆ) కొఱవిగోపరాజు - శాలివాహన విజయం  
సింహాసన ద్వాత్వింశతిక - ఒకటవ అశ్వాసం (115-165)  
("సజ్జిత దానధర్మ" నుండి "ఇట్లు విక్రమార్కుడీల్లిన" వరకు)

**II ఆధునిక కవిత్వం**

- (అ) కుసుమ ధర్మన్న - హరిజన శతకము (1-20)  
"శ్రీహరిసుత నీడు" నుండి "నీకులంబువారు" వరకు
- (ఆ) రాయప్రోలు సుబ్బారావు - సంక్రాంతి సంబరము - మిశ్రమంజరిలోంచి - "అయిదు  
లక్షల ఆరవదేదులు" నుండి "మంగళము సంక్రాంతి సామికి" వరకు

**III గద్యభాగం (వ్యాస సంపుటి)**

- (అ) ఆచార్య గుణ్డమూడి కృపాచారి - తెలుగు భాష
- (ఆ) ఆచార్య రాచమోళిం చంద్రశేఖర రెడ్డి - వ్యక్తిత్వ వికాసం

**IV ఛందస్సు - అలంకారాలు**

- (అ) ఛందస్సు - ఉత్పలమాల, చంపకమాల, శార్దూలం, మత్తేభం, కందం, తేటగీతి,  
ఆటవెలది
- (ఆ) అలంకారాలు - ఉపమ, రూపక, ఉత్పేక్ష, స్పృహావోక్తి, అతిశయోక్తి, ఆర్ధాంతరన్యాస,  
దృష్టాంతం, శబ్దాలంకారాలు.

**విద్యార్థి కృత్యాలు:**

1. తెలుగు వారాలు, తిథులు, నక్షత్రాలు, సంవత్సరాల పేర్లు నేర్చుకోండి.
2. మీ వ్యక్తిత్వాన్ని మీరు ఏ విధంగా మెరుగుపరుచుకుంటున్నారో వ్యాసం రాయండి.
3. అంత్యానుప్రసాసాలంకారంలో ఒక కవిత సొంతంగా రాయండి.

YOGI VEMANA UNIVERSITY:KADAPA  
PART- 1 (B) URDU  
SEMESTER - I  
(Common to B.A/B.Com/B.Sc/BBA)

Paper I: POETRY

- UNIT –I
1. GHAZAL  
MEER –U~~lti~~ ho ~~gaveen~~ sab ~~tadbeeren~~
  2. NAZM  
IQBAL –Nava ~~Shiyalah~~
- UNIT –II
1. GHAZAL  
GHALIB –Ye na thi hamari ~~khismat~~
  2. NAZM  
Akbar ~~Ilahabadi~~ –~~Nasih~~at-e-~~Aqla~~aqi
- UNIT –III
1. GHAZAL  
HALI –Uske ~~jate~~ hi ye ~~kya~~ ho ~~gavee~~ ~~ghar~~ ki ~~surat~~
  2. NAZM  
FAIZ –~~Mujhse~~ ~~pehli~~ si ~~muhabbat~~ meri ~~mehboob~~
- UNIT –IV
1. GHAZAL  
YASEER KURNULI–~~Rafeeq~~-o-~~hamnafas~~
  2. NAZM  
AKHTARUL IMAAN –~~Khabr~~
- UNIT –V
1. GHAZAL  
RAHI FIDAYI–~~Apni~~ ~~tareeq~~ ke ~~raqim~~ ke ~~live~~
  2. NAZM  
IQBAL QUSRO –~~Izn~~-e-~~Aam~~

Prescribed book: MUNTAKHAB ADAB –I

YOGI VEMANA UNIVERSITY: KADAPA  
PART- 1 (B) URDU  
SEMESTER - II  
Common to B.A/B.Com/B.Sc/BBA

**Prose**  
Unit-I

Mazmoon 'Behas-o-Takrar' – Sir Syed

Unit-II

Afsana 'Toba Tek Singh' – Manto

Unit-III

Drama 'Gud ki Makhiyan' – Kareen Rumi

Unit-IV

Muraqqa 'Ustad-e-Muhatarram Zore Sahib' – Sulaiman Athar  
Jaweed

Unit-V

Inshaiya 'Padiye gar beemar' – Mushtaq Ahmed Yusufi

YOGI VEMANA UNIVERSITY: KADAPA  
PART- 1 (B) URDU  
SEMESTER - III  
Common to B.A/B.Com/B.Sc/BBA  
Prose and Poetry

UNIT – I Dastan – Mir Amman– Bagh-o-Bahar-Aghaz Khisse ka

UNIT – II Khutoote Ghalib –Banaam Mir Mehdi Majrooh  
Aur Hatim Ali Mehar

UNIT – III Masnavi – Ibne Nishati – Phoolbun – Aaghaze Dastan -  
21 Sher

UNIT – IV Marsiya – Meer Anees – Jab Qata ki masafate shab  
aaftab ne ( Ibtidavi 6 band musaddas ke )

UNIT – V Rubaiyaat

1. Amjad Hyderabad – ‘ Har cheez ka khona bhi ‘
2. Saghar Jayvedi –‘ Tareef ki meezaan pe tul jate hain

Prescribed Book: MUNTAKHAB ADAB – II

B.A/ B.Com/B.Sc.  
Semester - I  
Foundation Course-1: Human Values and Professional Ethics  
(Common for All UG Programs)

**Unit-I : Introduction to Value Education**

1. Value Education, Definition, Concept and Need for Value Education
2. The Content and Process of Value Education
3. Self-Exploration as a means of Value Education
4. Happiness and Prosperity as parts of Value Education

**Unit-II : Harmony in the Human Being**

1. Human Being is more than just the Body
2. Harmony of the Self ('I') with the Body
3. Understanding Myself as Co-existence of the Self and the Body
4. Understanding Needs of the Self and the Needs of the Body

**Unit-III : Harmony in the Family and Society and Harmony in the Nature**

1. Family as a basic unit of Human Interaction and Values in Relationships
2. The Basics for respect and today's Crisis : Affection, Care, Guidance, Reverence, Glory, Gratitude and Love
3. Comprehensive Human Goal : The Five dimensions of Human Endeavour

**Unit-IV : Social Ethics**

1. The Basics for Ethical Human conduct
2. Defects in Ethical Human Conduct
3. Holistic Alternative and Universal order
4. Universal Human Order and Ethical Conduct

**Unit-V : Professional Ethics**

1. Value Based Life and Profession
2. Professional Ethics and Right Understanding
3. Competence in Professional Ethics
4. Issues in Professional Ethics – The Current scenario
5. Vision for Holistic Technologies, Production System and Management Models

**References:**

1. A.N.Tripathy, Human Values, New Age International Publishers, 2003
2. Bajpai.B.L., Indian Ethos and Modern Management, New Royal Book Co., Lucknow, 2004
3. Bertrand Russell, Human Society in Ethics and Politics
4. Corliss Lamont, Philosophy of Humanism
5. Gaur.R.R., Sangal.R, Bagaria.G.P., A Foundation Course in Value Education, Excel Books.
6. Gaur.R.R., Sangal.R, Bagaria.G.P., Teacher's Manual, Excel Books, 2009
7. I.C.Sharma, Ethical Philosophy of India, Nagin & Co., Julundhar
8. Mortimer.J.Adler, What Man has Made of Man
9. R.Subramanian, Professional Ethics, Oxford University Press
10. Text Book for Intermediate - Ethics and Human Values, Telugu Academy, Hyderabad.
11. William Lilly, Introduction to Ethics, Allied Publishers

Foundation Course-2: Environmental Studies  
(Common for All UG Programs)

**Unit-I: Natural Resources:**

6 Hrs

Definition, Scope and importance. Need for public awareness.

Brief description of;

- Forest resources: Use and over-exploitation. Deforestation; timber extraction, mining, dams. Effect of deforestation environment and tribal people
- Water resources: Use and over-utilization. Effects of over utilization of surface and ground water. Floods, drought.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- Food resources: World food problems, Effects of modern agriculture; fertilizer- pesticide, salinity problems.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- Land resources: Land as resources, land degradation, man induced landslides, soil erosion and desertification

**Unit-II : Ecosystems, Biodiversity and its conservation**

6 Hrs

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Food chains, food webs and ecological pyramids
- Characteristic features of the following ecosystems:-Forest ecosystem, Desert ecosystem, Aquatic ecosystem.
- Value of biodiversity: Consumptive use, productive use. Biodiversity in India.
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity

**Unit-III : Environmental Pollution**

6 Hrs

- Definition, Causes, effects and control measures of:- Air pollution, Water pollution, Soil pollution, Noise pollution
- Solid waste management; Measures for safe urban and industrial waste disposal
- Role of individual in prevention of pollution
- Disaster management: Drought, floods and cyclones

**Unit-IV: Social Issues and the Environment**

6 Hrs

- From Unsustainable to Sustainable development
- Water conservation, rain water harvesting, watershed management.
- Climate change, global warming, ozone layer depletion,
- Environment protection Act
- Wildlife Protection Act, Forest Conservation Act

**Unit-V: Human Population and the Environment**

6 Hrs

- Population explosion, impact on environment.
- Family welfare Programme
- Environment and human health
- Women and Child Welfare
- Value Education
- Role of Information Technology in Environment and human health.

**References:**

1. M.Satyanarayana, M.V.R.K.Narasimhacharyulu, G. Rambabu and V.VivekaVardhani, Environmental Studies, Telugu Academy, Hyderabad.
2. R.C.Sharma and Gurbir Sangha, Environmental Studies, Kalyani Publishers.
3. Purnima Smarath, Environmental Studies, Kalyani Publish

Semester - II  
 Foundation Course –3  
 Information & Communication Technology-I  
 (Computer Fundamentals and Office Tools) (30 hrs. of Teaching Learning including Lab)  
 (Common for all UG Programs)

Unit-I: Basics of Computers :Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working – Central Processing Unit – I/O Devices.

Unit-II: Primary, Auxiliary and Cache Memory – Memory Devices. Software, Hardware, Firmware and People ware – Definition and Types of Operating System – Functions of an Operating System – MS-DOS – MS Windows – Desktop, Computer, Documents, Pictures, Music, Videos, Recycle Bin, Task Bar – Control Pane.

Unit-III: MS-Word

Features of MS-Word – MS-Word Window Components – Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Equations – Spelling and Grammar – Thesaurus – Mail Merge

Unit-IV: MS-PowerPoint

Features of PowerPoint – Creating a Blank Presentation - Creating a Presentation using a Template - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and Scaling of an Object – Slide Transition – Custom Animation

Unit-V: MS-Excel

Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Formulae, Referencing cells – Inserting Rows/Columns –Changing column widths and row heights, auto format, changing font sizes, colors, shading.

References:

1. ReemaThareja, Fundamentals of Computers, Oxford University Press, India
2. V.Raja Raman, Fundamentals of Computers, Prentice Hall of India.
3. John Walkenbach, Herb Tyson, Michael R.Groh and Faithe Wempen, Microsoft Office 2010 Bible Wiley Publishers

**Foundation Course-4**  
**Communication and Soft Skills-1 (Course Content (30 Hours))**

(Common for All UG Programs)

Vocabulary is considered the key to communication and it plays a great role for learners in acquiring a language. The first unit, therefore, is on the different aspects of vocabulary. Since English is a predicate-oriented language, there are two units on grammar focusing on the verb phrase. Listening and speaking are the two receptive skills. Listening is the basic skill of communication, and reading helps a person refine their writing skills. Unit IV and Unit V are on listening and reading respectively.

**Unit I: Vocabulary Building**

1. (a) Prefixes and Suffixes  
(b) Conversion  
(c) Compounding  
(d) Analogy
2. One-Word Substitutes
3. Words Often Confused
4. Synonyms and Antonyms
5. Phrasal Verbs

**Unit II: Grammar - 1**

1. Types of Verbs
2. Subject-Verb Agreement

**Unit III: Grammar - 2**

1. Meanings of Modals
2. Tense (Present and Past) and Aspect
3. The Several Possibilities for Denoting Future Time
4. Articles and Prepositions

**Unit IV: Listening Skills**

1. The Importance of Listening
2. Types of Listening
3. Barriers/Obstacles to Effective Listening
4. Strategies for Effective Listening

**Unit V: Reading Skills**

1. Skimming
2. Scanning
3. Intensive Reading and Extensive Reading
4. Comprehension

Semester - III  
Foundation Course -5  
Information & Communication Technology–2  
(Internet Fundamentals and Web Tools) (30 hrs. of Teaching Learning including Lab)  
(Common for All UG Programs)

Unit-I: Fundamentals of Internet : Networking Concepts, Data Communication – Types of Networking, Internet and its Services, Internet Addressing – Internet Applications – Computer Viruses and its types – Browser – Types of Browsers.

Unit-II: Internet Applications: Using Internet Explorer, Standard Internet Explorer Buttons, Entering a Web Site Address, Searching the Internet – Introduction to Social Networking: Twitter, Tumblr, LinkedIn, Facebook, Flickr, Skype, Yelp, Vimeo, Yahoo!, Google+, Youtube, WhatsApp, etc.

Unit-III: E-Mail : Definition of E-mail - Advantages and Disadvantages – User IDs, Passwords, Email Addresses, Domain Names, Mailers, Message Components, Message Composition, Mail Management, Email Inner Workings.

Unit IV: WWW- Web Applications, Web Terminologies, Web Browsers, URL – Components of URL, Searching WWW – Search Engines and Examples.

Unit-V: Basic HTML: Basic HTML – Web Terminology – Structure of a HTML Document – HTML, Head and Body tags – Semantic and Syntactic Tags – HR, Heading, Font, Image and Anchor Tags – Different types of Lists using tags – Table Tags, Image formats – Creation of simple HTML Documents.

References:

1. Raymond Green Law and Ellen Hepp, Fundamentals of the Internet and the World Wide Web, TMH Publishers.

Foundation Course - 6  
Communication and Soft Skills-2 (Course Content (30 hours))

(Common for All UG Programs)

CSS-2 aims at improving the speaking skills of the learner. For many learners of English, the sound-spelling relationship of the language appears anarchic. Another problem many Indian learners face is English word accent. Unit I and Unit II help learners overcome these problems to a great extent. The remaining units are on the two productive skills, speaking and writing. The techniques of day-to-day conversations and the important characteristics of interviews and GDs presented in this course strengthen the learner's speaking skills. The last unit presents various aspects of presentation in writing.

Unit I: Pronunciation-1  
The Sounds of English

Unit II: Pronunciation-2  
1. Word Accent  
2. Intonation

Unit III: Speaking Skills-1  
1. Conversation Skills  
2. Interview Skills  
3. Presentation Skills  
4. Public Speaking

Unit IV: Speaking Skills-2  
1. Role Play  
2. Debate  
3. Group Discussion

Unit V: Writing Skills  
1. Spelling  
2. Punctuation  
3. Information Transfer

- o Tables
- o Bar Diagrams
- o Line Graphs
- o Pie Diagrams
- o Flow Charts
- o Tree Diagrams
- o Pictures

Semester - IV  
Foundation Course -7  
Communication and Soft Skills-3 (Course Content (30 hours))  
(Common for All UG Programs)

A current axiom is that hard skills will get a person an interview, but soft skills will get that person the job. Unit I of the course is on soft skills, which are absolutely necessary in the global job market. Writing is considered the most difficult of all the skills. Units II to V help the learner improve their writing skills, especially academic/formal writing.

**Unit I: Soft Skills**

1. Positive Attitude
2. Body Language
3. SWOT/SWOC Analysis
4. Emotional Intelligence
5. Netiquette

**Unit II: Paragraph Writing**

1. Paragraph Structure
2. Development of Ideas

**Unit III: Paraphrasing and Summarizing**

1. Elements of Effective Paraphrasing
2. Techniques for Paraphrasing
3. What Makes a Good Summary?
4. Stages of Summarizing

**Unit IV: Letter Writing**

1. Letter Writing (Formal and Informal)
2. E-correspondence

**Unit V:**

1. Resume and CV
2. Cover Letter

## Foundation Course - 8 Analytical Skills

(Common for All UG Programs) (Total 30 Hrs)

Unit-I : Data Analysis: The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

Unit-II: Sequence and Series: Analogies of numbers and alphabets completion of blank spaces following the pattern in A:b::C: d relationship odd thing out; Missing number in a sequence or a series.

Unit-III: Arithmetic ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM & GCD (HCF). Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

Unit-IV: Quantitative aptitude: Averages, Ration and proportion, Problems on ages, Time-distance – speed.

Unit-V: Business computations: Percentages, Profit & loss, Partnership, simple compound interest.

### References:

1. R S Agrawal, Quantitative Aptitude for Competitive Examination, S.Chand publications.
2. R V Praveen, Quantitative Aptitude and Reasoning, PHI publishers.
3. Pratogitaprakasan, Kic X, Quantitative Aptitude: Numerical Ability (Fully Solved) Objective Questions, Kiran Prakasan publishers
4. Abhijit Guha, Quantitative Aptitude for Competitive Examination, TMG Hill publications.
5. Old question Paper of the Exams conducted by (Wipro, TCS, Infosys, etc.) at their recruitment process, source-Internet.

Note: The teachers/students are expected to teach /learn the contents by not converting them to the problems of algebra at the maximum possible extent, but to use analytical thinking to solve the exercises related to those topics. This is the main aim of the course

**Foundation Course-9**  
**Entrepreneurship Education**  
 (Common for All UG Programs)

(Total 30 Hrs)

Unit-I: Entrepreneurship: Entrepreneur characteristics – Classification of Entrepreneurships – Incorporation of Business – Forms of Business organizations –Role of Entrepreneurship in economic development –Start-ups.

Unit-II: Idea Generation and Opportunity Assessment: Ideas in Entrepreneurships – Sources of New Ideas – Techniques for generating ideas – Opportunity Recognition – Steps in tapping opportunities.

Unit-III: Project Formulation and Appraisal : Preparation of Project Report –Content; Guidelines for Report preparation – Project Appraisal techniques –economic – Steps Analysis; Financial Analysis; Market Analysis; Technical Feasibility.

Unit-iv: Institutions Supporting Small Business Enterprises: Central level Institutions: NABARD; SIDBI, NIC, KVIC; SIDIO; NSIC Ltd; etc. – state level Institutions –DICs- SFC- SSIDC- Other financial assistance.

Unit-V: Government Policy and Taxation Benefits: Government Policy for SSIs- tax Incentives and Concessions –Non-tax Concessions –Rehabilitation and Investment Allowances.

**References:**

1. Arya Kumar, Entrepreneurship, Pearson, Delhi, 2012.
2. Poornima M.CH., Entrepreneurship Development–Small Business Enterprises, Pearson, 2009
3. Michael H. Morris, et. al., Entrepreneurship and Innovation, Cengage Learning, New Delhi, 2011
4. KanishkaBedi, Management and Entrepreneurship, Oxford University Press, Delhi, 2009
5. Anil Kumar, S., et.al., Entrepreneurship Development, New Age Publishers, New Delhi, 2011
6. Khanka, SS, Entrepreneurship Development, S. Chand, New Delhi.
7. Peter F. Drucker, Innovation and Entrepreneurship.
8. A.Sahay, M. S. Chikara, New Vistas of Entrepreneurship: Challenges and Opportunities.

Foundation Course-10  
Leadership Education  
(Common for All UG Programs) (Total 30 Hrs)

1. Organisation – Management – Leadership – Meaning and Significance – Different theories – Trait Theory, Blake & Mountan Theory – Other functions of Management.
2. Behavioral Concepts – Individual Behaviour – Perception – Learning – Attitude Formation and Change – Motivation – Theories of Motivation – Personality Development.
3. Interpersonal Behaviour – Communication – Leadership – Influencing Relations – Transactional Analysis.
4. Group Dynamics – Roles – Morale – Conflict – Groups – Inter-Group Behaviour – Inter- Group Collaboration and Conflict Management.
5. Team Building and Management – Developing team resources – Designing team – Participation and Repercussion – Team building activities.

References:

1. Fred Luthans, “Organizational Behaviour”, Tata McGraw Hill Publishing Co., New Delhi.
2. Robins, Stephen P, “Organizational Behaviour”, Prentice Hall of India, New Delhi.
3. Koontz and O “Donnell”, Essentials of Management, TMH Publishing Co., New Delhi.
4. Keith Davis, “Human Behaviour at Work”, Tata McGraw Hill Publishing Co., New Delhi.
5. Aswathappa,”Orgnizational Behaviour”, Himalaya Publishing House, Mumbai
6. Stoner Freeman, “Management”, Prentice Hall of India, New Delhi.

**BA Economics Syllabus under CBCS**  
**I Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – I**  
**Paper – I (Core Paper)**  
**Micro Economics – Consumer Behavior**

**Module -1**

Nature, definition and scope of Economics - Wealth, Welfare, Scarcity and modern definitions.

**Module -2**

Methodology in Economics - Micro & Macro; Static and Dynamic analysis; Normative and positive science, Inductive & Deductive methods; Partial and general Equilibrium.

**Module - 3**

Utility analysis: - cardinal approach-The Law of diminishing Marginal utility- The Law of Equi-Marginal Utility- concept of consumer's surplus

**Module - 4**

Demand analysis - Law of Demand - Elasticity of Demand - Measurement of Elasticity of Demand - Price, Income & Cross Elasticities of Demand.

**Module - 5**

Ordinal Approach: Indifference Curve analysis - Properties of Indifference curves - Price or budget line - Equilibrium of the Consumer with the help of Indifference curves – Samuelson's Revealed preference theory.

**REFERENCES:**

1. R.G. Lipsey and K.A. Chrystal - "Economics", Oxford University Press, 10/e, 2004.
2. P.A. Samuelson & W.D. Nordhaus-"Economics", Tata Mc Graw Hill, 18/e, 2005.
3. N.Gregory Mankiw-"Principles of Economics", Thompson 2015 .
4. H.L.Ahuja-"Advanced Economic Theory" S.Chand.
5. M.L.Seth-"Micro Economics", Laxmi Narayana Agarwal, 2015.
6. Bilas, A.-"Micro Economic Theory", International Student Edition, Mc Graw Hill, 1971.
7. Telugu Academy Publications
8. D.M. Mithani & G.K. Murty - Business Economics, Himalaya Publishing, 2015.

**B. A. ECONOMICS**  
**I Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – II**  
**Paper – II (Core Paper)**  
**Micro Economics - Production and Price Theory**

**Module - 1**

Production function-Concept of homogeneous production function-Cobb- Douglas Production function- Law of variable proportions-Law of Returns to Scale - Different Concepts of Costs – Explicit & Implicit, Opportunity, Total – fixed and Variable Costs, Marginal & Average Costs & its Relationship. Concept of Revenue – Total, Marginal & Average Revenue and Break – Even Point

**Module - 2**

Analyse different types of Market structures - Perfect Competition - Price determination and equilibrium of firm and industry under perfect competition - Monopoly - Price determination - Price discrimination.

**Module - 3**

Monopolistic competition - price determination - Oligopoly - Kinked demand curve approach.

**Module - 4**

Marginal Productivity theory of distribution - Theories of wage determination Subsistence theory of wages, Standard of living theory of wages, Modern theory of wages Wages and collective bargaining - concept of minimum wage.

**Module - 5**

Theory of Rent: Ricardian theory of rent - Quasi rent concept of Alfred Marshall. Theories of Interest - Classical, Neo-classical and Keynes Liquidity Preference theory - Profit - dynamic, innovations, Risk and Uncertainty theories.

**REFERENCES:**

1. R.G. Lipsey and K.A.Chrystal - "Economics", Oxford University Press, 10/e, 2004.
2. P.A.Samuelson & W.D. Nordhaus-"Economics", Tata Mc.Graw Hill, 18/e, 2005.
3. N.Gregory Mankiw-"Principles of Economics", Thompson 2015.
4. H.L.Ahuja-"Advanced Economic Theory" S.Chand, 2004.
5. M.L.Seth-"Micro Economics", Laxmi Narayana Agarwal, 2015.
6. Bilas, A.-"Micro Economic Theory", International Student Edition, Mc.Graw Hill, 1971.
7. Telugu Academy Publications
8. D.M. Mithani & G.K. Murty - Business Economics, Himalaya Publishing, 2015.

**B. A. ECONOMICS**  
**II Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – III**  
**Paper – III (Core Paper)**  
**Macro Economics - National Income, Employment and Money**

**Module - 1**

Meaning, definition of Macro Economics - Importance of Macro Economics- Difference between Micro and Macro Economics - Paradox of Macro Economics - Limitations

**Module - 2**

National Income - Definitions, Concepts of National Income - Measurement of National Income- Circular flow of Income in Two, Three and Four Sector Economy.

**Module - 3**

Classical theory of Employment - Say's Law of Markets.

**Module - 4**

Keynesian Theory of Employment - Consumption function – Investment Function - Marginal Efficiency of Capital (MEC)- Concepts of multiplier and accelerator

**Module - 5**

Meaning and Functions of Money - Classification of money - Gresham's Law - RBI classification of Money. Theories of Money - Fisher's Quantity theory of Money Cambridge approach (Marshall, Pigou, Robertson & Keynes).

**REFERENCES:**

1. G Ackley - "Macro Economics Theory and Policy", Collier Macmillan, 1978.
2. E Shapiro - "Macro Economic Analysis", Galgotia Publications, 1999.
3. Central Statistical Organisations - "National Accounts Statistics".
4. R Dornbush s Fisher and R Startz - "Macro Economics", Tata Mc Gray Hill, 9/e, 2004.
5. M.L. Seth- "Macro Economics", Lakshmi Narayana Agarwal, 2015.
6. K.P.M. Sundaram - "Money, banking & International Trade", Sultan Chand, 2010.
7. Dillard, D - "The Economics of John Maynard Keynes", Crossby Lockwood & Sons.
8. M.N.Mish ra & S.B.Mishra - "Insurance Principles & Practice" S.Chand 2012.
9. Bharati V.Pathak "The Indian Financial System Markets. Institutions & Services". Pearson 2008.
10. Telugu Academy Publication

**B. A. ECONOMICS**  
**II Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – IV**  
**Paper – IV (Core Paper)**  
**Banking and International Trade**

**Module - 1**

Trade Cycles - meaning and definition - Phases of a Trade Cycle -Inflation - definition - types of inflation - causes and effects of inflation measures to control inflation.

**Module - 2**

Banking: Meaning and definition -Functions of Commercial Banks - Concept of Credit creation-Functions of RBI - Recent developments in banking sectors.

**Module – 3**

Non-Bank Financial Institutions – Types of NBFIs - Factors contributing to the Growth of NBFIs –Money market – Defects of Indian money market

**Module – 4**

Concepts of Shares-Debentures - Stock Market - Functions - Primary and Secondary Markets - SEBI - - Insurance - Life Insurance and General Insurance.

**Module - 5**

Macro Economic Policy - Fiscal, Monetary and Exchange rate policies  
 Objectives and Significance - Importance of International Trade - Regional and International Trade – Defining Balance of Trade and Balance of Payment.

**REFERENCES:**

1. G.Ackley - "Macro Economics Theory and Policy", Collier Macmillan, 1978.
2. E.Shapiro - "Macro Economic Analysis", Galgotia Publications, 1999.
3. Central Statistical Organisations - "National Accounts Statistics".
4. R.Dornbush, s.Fisher and R.Startz - "Macro Economics", Tata Mc.Graw Hill, 9/e,2004.
5. M.L.Seth- "Macro Economics", Lakshmi Narayana Agarwal, 2015.
6. K.P.M. Sundaram - "Money, banking & International Trade", Sultan Chand, 2010.
7. Dillard, D - "The Economics of John Maynard Keynes", Crossby Lockwood & Sons.
8. M.N.Mishra & S.B.Mishra - "Insurance Principles & Practice" S.Chand 2012.
9. Bharati V.Pathak "The Indian Financial System Markets. Institutions & Services".
10. Pearson.
11. D.M.Mithani & G.K.Murty - "Business Economics", Himalaya Publishing House, 2015.
12. M.L.Jhingan - Economic Development - Vikas, 2012.
13. G.Omkarnath - Economics - A Primer for India - Orient Blackswan, 2012.
14. Agarwal, V. (2010) Macroeconomics: theory and Policy, Dorling Kindersley (India)
15. Pvt. Ltd., New Delhi

**B. A. ECONOMICS**  
**III Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – V**

**Paper – V (Core Paper)**

**Paper V : CONTEMPORARY INDIAN ECONOMY**

**Module-I :**

Characteristics of India as a developing Economy- Demographic Features of India- Population Dividend- Occupational Structure in India- Trends in the growth of India's National Income.

**Module-II :**

Tax Reforms and GST- tax Revenue and its devolution to states – Public Debt Redemption Methods- Brief outline of Globalization and its impact on Indian Economy.

**Module-III :**

Magnitude of poverty in India- Unemployment and its dimensions- Major schemes of rural and urban development- Objectives and achievements of Planning in India- Balanced Regional Development- NITI Ayog.

**Module- IV:**

Indian Agriculture- Importance of agriculture in India –Factors determining agriculture productivity- Land use and Cropping Pattern in India- Agriculture Infrastructure- Rural Credit- Micro Finance- Self Help Groups- Agriculture price policy- Agriculture Insurance- Food Security.

**Module-V:**

Industrial polices, 1956, 1991 – Growth and problems of small scale industries in India -Make In India -Foreign direct Investment. Foreign Exchange Management Act (FEMA)- SEZs- Disinvestment Policy in India- Growing importance of Service Sector in India – Banking, Insurance, IT, Education and health.

**References:**

1. Dhingra I.C., Indian Economy, Sultan Chand, 2014
2. Ruddar Dutt and K.P.M. Sundaram- Indian Economy, Sultan Chand,2015
3. S.K. Misra & V.K. Puri-Indian Economy, Himalaya Publishing House, 2015
4. G.Omkarnath-Economics- A Premier of India, Orient Blacksmn, 2012
5. Telugu Academy Publications
6. Dr. S.G.K. Murthy, Indian Economy – Gitam University

**B. A. ECONOMICS**  
**III Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – V**

**Paper – VI (Core Paper)**

**PAPER VI : QUANTITATIVE TECHNIQUES**

(Mathematical derivations and proofs are not required. Only applications)

**Quantitative Methods**

**Unit-I:** Introduction: Meaning- Definition- Function- Importance and Limitations of Statistics. Collection of Data- Primary and Secondary Data- Schedule and Questionnaire- Diagram and Graphic Presentation of Data (One dimensional and frequency curves).

**Unit:II:** Measures of Central Tendency: Definition, Objectives and Characteristics of Measures of Central Tendency- Types of Averages- Arithmetic Mean, Geometric Mean, Harmonic Mean- Mean- Mode- Properties of Averages.

**Unit-III:** Measures of Dispersion: Definition, Objectives of Dispersion- Range- Quartile Deviation- Mean Deviation- Standard Deviation- Coefficient of variation.

**Unit-IV:** Measures of correlation and Regression : Meaning, Definition and Uses of correlation- Types of Correlation- Karl Pearson's Correlation Coefficient- Spearman's Rank Correlation- Probable Error- Meaning. Utility of Regression Analysis- comparison between Correlation and Regression.

**Unit V:** Matrix: Definition- Examples- types of Matrices- matrix Addition- Multiplication- Determinant of Matrices- Minors- Co-Factors- Inverse of a Matrix.

**REFERENCES:**

1. Sivayya K.V. and Satya rao, Business Mathematics, Sarathi Publication, Guntur.
2. Sancheti and Kapoor V.K., Business Mathematics, Sulthan Chand & Sons, New Delhi.
3. D N Elhance, Fundamentals of Statistics, Kithab Mahal, Allahabad.
4. Gupta SC, Fundamentals of Business Statistics, Sulthan Chand & Sons, New Delhi.
5. Aggarwal, Business Statistics, Kalyani Publishers Hyderabad.
6. Reddy CR, Business Statistics, Deep & Deep Publications.
7. S.P. Gupta & V.K. Kapoor, Fundamentals of mathematical Statistics, S. Chand and Co, 2014

**B. A. ECONOMICS**  
**III Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – VI**

**Paper VII -- AGRICULTURAL ECONOMICS**

**Module-1**

Nature and Scope of Agricultural Economics. Factors affecting agricultural development: technological, institutional and general. Interdependence between agriculture and industry.

**Module-2**

Concept of production function : input-output and product relationship in farm production.

**Module-3**

Growth and productivity trends in Indian agriculture with special reference to Andhra Pradesh. Agrarian reforms and their role in economic development.

**Module-4**

Systems of farming, farm size and productivity relationship in Indian agriculture with special reference to Andhra Pradesh- New agriculture strategy and Green revolution : and its Impact

**Module-5**

Emerging trends in production, processing, marketing and exports; policy controls and regulations relating to industrial sector with specific reference to agro-industries in agri-business enterprises.

**RECOMMENDED / REFERENCE BOOKS**

1. Sadhu An, Singh Amarjit and Singh Jasbir (2014), Fundamentals of Agricultural Economics, Himalaya Publishing House, Delhi
2. Lekhi RK and Singh Joginder, Agricultural Economics, Kalyani Publishers
3. Bhaduri, A. (1984), The Economic Structure of Backward Agriculture, Macmillan, Delhi.
4. Bilgrami, S.A.R. (1996), Agricultural Economics, Himalayas publishing house, Delhi.
5. Dantwala, M.L. et.al (1991), Indian Agricultural Development Since Independence, Oxford & IBH, New Delhi.

6. Government of India (1976), Report of the National Commission on Agriculture, New Delhi.
5. Government of India, Economic Survey (Annual), New Delhi.
7. Gualti, A. and T. Kelly (1999), Trade Liberalisation and Indian Agriculture Oxford University Press, New Delhi

**B. A. ECONOMICS**  
**III Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – VI**

**Paper – VIII-A1 - Agribusiness Environment in Andhra Pradesh**

**Module-1**

Role of agriculture in development process in Andhra Pradesh vis-à-vis other developed states. Economy wide effects of agriculture in Andhra Pradesh through trickle down effects. Backward and forward linkages of agriculture with rest of economy.

**Module-2**

Agricultural finance-importance in modern agriculture- performance of agricultural finance in Andhra Pradesh -problems of agricultural finance – Inter linkages of agricultural credit and other input markets and product markets.

**Module-3**

Dynamics of agriculture-crop (horticulture, field crops), sector-livestock (poultry dairy and fisheries) sector and inter linkages among the sectors. Agribusiness sector in Andhra Pradesh-salient features, constraints, sub sectors of agribusiness-input sector, production sector, processing sector.

**Module-4**

Growth performance of major agricultural commodities in Andhra Pradesh-production and processing trends in exports and imports of major agricultural commodities.

**Module-5**

Marketing policy- structure of agri markets – regulated markets – need – activities – structure – APMC act – market legislations – Role of Farmer Groups in the marketing of Agricultural Produce.

**References:**

1. Adhikary M. 1986. Economic Environment of Business. S. Chand & Sons.
2. Aswathappa K. 1997. Essentials of Business Environment. Himalaya Publ.
3. Francis Cherunilam 2003. Business Environment. Himalaya Publ.

**B. A. ECONOMICS**  
**III Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – VI**

**Paper – VIII-A2 - Agricultural output Marketing**

**Module-1**

Structure and Model of Agri-Marketing Organizations with functions: Functions of intermediaries, Marketing Practices in Primary and secondary and terminal market, Regulated markets, co-operative marketing.

**Module-2**

Marketing costs and margins, Marketing Finance. Marketing Structure of Major agricultural commodities, food grains: Rice, and Maize. Cash Crops; Cotton, Oil Seeds, Vegetables and Fruits, Milk, Meat and Poultry products.

**Module-3:**

Problems and Challenges in Agriculture Marketing - Market Yards - Support prices - Rural Warehousing.

**Module-4:**

State Intervention in Agricultural Marketing, Role of Various agencies (Andhra Pradesh Agro, MARKEED, State Department, and FCI, Tobacco Board, Cotton Corporation) and its impact on market efficiency. Agriculture Price Commission.

**Module-5:**

Inter-regional and international trade in agriculture; emerging scenario of international trade in agricultural commodities; concept of terms of trade and balance of payments,. WTO and Indian agriculture with special reference to Andhra Pradesh .

**References:**

1. C.S.G.Krishnamacharyulu & Lalitha Ramakrishnan, “Rural Marketing: Text and Cases”, Pearson Education, New Delhi.
2. Awadhesh Kumar Singh & Satyaprakash Pandey, Rural Marketing: Indian Perspective, New Age International Publishers, New Delhi.
3. Matoria, C.B. & Badri Vishal: Agriculture Problems in India
4. Arora, R.C., “Integrated Rural Development”, S. Chand Limited, New Delhi.
5. Gopaldaswamy, T.P., “Rural Marketing: Environment, Problems and Strategies, Vikas Publishing House Pvt. Ltd., New Delhi.
6. Bedi & Bedi, “Rural Marketing”, Himalaya Publishing House, New Delhi.

**B. A. ECONOMICS**  
**III Year B. A. Programme (UG) Courses – Under CBCS**  
**Semester – VI**

**Paper – VIII-A3 - Agricultural Input Marketing**

**Module-1**

Agri input marketing – Meaning and importance – distinctive features of Agri. Input marketing – Distribution channels of agri. Inputs – Private, Government, Co-operative and Joint sector. Agri inputs promotional programme – concepts and techniques.

**Module-2**

Issues in seed marketing – determinants of seed demand – private sector contribution – public sector support to private sector - Distinctive features of Seed Marketing vis – a – vis other Input Marketing – strengths and weaknesses on Indian seed industry.

**Module-3**

Fertilizer industry scenario – public, private, co-operative and joint sector role – fertilizer production consumption, and imports – fertilizer marketing characteristics. Biofertilizers – its role and scope – major constraints involved – production level – market level – field level. Marketing network/ channels.

**Module-4**

Pesticide industry – an overview – nature of industry growth – consumption crop wise, area wise – demand and supply – market segmentation.-IPM concept development – biopesticides – its role and scope.

**Module-5**

Agricultural mechanization – benefits and importance and future priorities – scenario of farm implements and machinery sector – economic advantage of mechanization – contribution of agricultural mechanization – Need for the development of agricultural machinery and implements to suit the local resource endowments.

**References:**

1. Acharya SS & Agarwal NL 2004, Agricultural Marketing in India – Oxford & IBH.

## B. A. HISTORY

I Year B. A. Programme (UG) Courses – Under CBCS

Semester – I

Paper – I (Core Paper)

**ANCIENT****INDIAN HISTORY & CULTURE (from earliest times to 600 A.D) (Indian*****History and Culture from Earliest Times to 647 A.D)***

Unit – I	Survey of Sources: Literary & Archaeological Sources; Influence of Geography on History; Unity in Diversity; Traces of Stone Age Cultures (Circa 3,50,000 B. C to 3,000 B. C); Indus Valley Civilization (Circa 3000 B. C to 1,500 B. C): Origin, Extent, Salient Features.
Unit – II	Vedic Age & Religious Reform Movements (Circa 1500 B. C to 600 B. C): Society, Polity, Economy, Culture during early and later Vedic period; Jainism and Buddhism: Causes, Doctrines, Spread, Importance and Impact.
Unit - III	Transition from Territorial States to Emergence of Empires (Circa 600to Century to 300 B. C): Rise of Mahajanapadas – Causes for Magadha’s Success; Persian and Macedonian Invasions; Mauryan Empire: State, Imperial Administration, Economy, Ashoka’s Dhamma, Art & Architecture, Significance & Downfall.
Unit - IV	Conditions during 200 B. C to 300 A. D.: Central Asian Contacts – Kushanas – Aspects of polity, society, Economy, Religion, Art& Architecture; The Age of Satavahanas: Pattern of Administration – Social, Economic, Religious & Cultural Developments; Sangam Age: The Three Early Kingdoms (Chola, Chera& Pandya) – Society, Language & Literature.
Unit – V	India between 300 A. D & 600 A. D.: The Rise and Growth of Guptas: Administration, Society, Economy, Religion, Art, Literature and Science & Technology – Decline.

## References:

1	A.L. Basham, The Wonder That Was India
2	D.N.Jha, Ancient India
3	D.D.Kosambi, An Introduction to the Study of Indian History
4	D.P.Chattopadhyay, Science and Society in Ancient India
5	B.N.Mukherjee, The Rise and Fall of the Kushana Empire
6	K.A. NilakanthaShastri, A History of South India
7	R.C.Majumdar, K.K.Dutta&H.C.RoyChowdhuri (ed.), Advanced History of India
8	Kumkum Roy, The Emergence of Monarchy in North India: eighth to fourth centuries BC
9	RomilaThapar (et. al). India: Historical Beginnings and the Concept of the Aryan
10	M.L.K. Murthy, <i>Pre-and Protohistoric Andhra Pradesh upto 500 B.C.</i> , New Delhi, 2003

**Study Tour:** Study tour to local museum or at least to nearby historical sites is to be conducted.

Students should be asked to prepare an inventory of items preserved in the museum and

## B. A. HISTORY

I Year B. A. Programme (UG) Courses – Under CBCS

Semester – II

Paper – II (Core Paper)

**EARLY MEDIEVAL INDIAN HISTORY & CULTURE (600 A.D to 1526 A. D.)***(Indian History and Culture from 647 to 1526 A.D)*

Unit – I	Harsha & His Times: Administration, Religion – Hiuen Tsang -Polity, Society, Economy and Culture from 7 <sup>th</sup> to 11 <sup>th</sup> Century A. D. under Chalukyas of Badami& Eastern Chalukyas of Vengi.
Unit – II	Age of later Pallavas during 7 <sup>th</sup> & 8 <sup>th</sup> Centuries A. D.: Contribution to Cultural Development & Art & Architecture; The Chola Empire from 9 <sup>th</sup> to 12 Century A. D.: Rise of the Empire, Administration and Cultural Life.
Unit - III	Conditions in India on the eve of Turkish Invasions; Early Invasions: Traces of Arab Invasion, Ghazni&Ghori; Delhi Sultanate (1206 to 1290 A.D.) under Slave Dyanasty.
Unit - IV	Delhi Sultanate (1290 to 1526 A.D.): Khaljis: Expansion & Consolidation, Administrative & Economic Reforms - The Tughlaqs - Decline & Disintegration of the Delhi Sultanate; Administration, Society, Economy, Technology, Religion, Art & Architecture under the Sultanate.
Unit – V	Cultural Development in India between 13 <sup>th</sup> & 15 <sup>th</sup> Centuries A. D.: Impact of Islam on Indian Society and Culture – Bhakti and Sufi Movements – Emergence of Composite Culture.

## References:

1	Basham, A.L (ed) A Cultural History of India
2	Champakalakshmi, R Trade, Ideology and Urbanization : South India 300 BC – AD 1300
3	Chandra, S History of Medieval India (800 – 1700)
4	Chattopadyay, B.D The Making of Early Medieval India. (Delhi, 1994)
5	Habib, Irfan, Medieval India: The Study of a Civilization
6	Habibullah, A.B.M, The Foundation of Muslim Rule in India
7	Kumar Sunil, The Emergence of the Sultanate of Delhi
8	Nizami, K.A. Some Aspects of Religion and Politics in India in the 13th c
9	K.A. NilakantaSastri, A History of South India from Prehistoric Times to the Fall of Vijayanagara
10	K.A.NilkantaSastri, The Cholas
11	Shireen Moosvi, The Economy of the Mughal Empire

## B. A. HISTORY

II Year B. A. Programme (UG) Courses – Under CBCS

Semester – III

Paper – III (Core Paper)

**LATE MEDIEVAL & COLONIAL HISTORY OF INDIA (1526 to 1857 A. D.)***(History and Culture of India (1526 – 1857))*

Unit – 1	India from 1526 to 1707 A. D.: Emergence of Mughal Empire - Sources, Conditions in India on the eve of Babur's invasion, Brief Summary of Mughal Polity – Sher Shah & Sur Interregnum – Expansion & Consolidation of Mughal Empire – Rise of Marathas & Peshwas.
Unit – II	Administration, Economy, Society and Cultural Developments under the Mughals – Disintegration of Mughal Empire.
Unit - III	India under Colonial Hegemony : Beginning of European Settlements – Anglo-French Struggle – Policies of Expansion - Subsidiary Alliance & Doctrine of Lapse - Consolidation of British Empire in India up to 1857 A. D.
Unit - IV	Economic Policies of the British (1757-1857): Land Revenue Settlements – Commercialization of Agriculture – Impact of Industrial Revolution on Indian Industry ; Administration of the Company – Regulating Charter Acts; Cultural & Social Policies: Humanitarian Measures & Spread of Modern Education
Unit – V	Anti-Colonial Upsurge – Peasant & Tribal Revolts - 1857 Revolt – Causes, Nature & Consequences.

## References:

1	Bipan Chandra, Modern India
2	Bipan Chandra, Rise and Growth of Economic Nationalism in India
3	C.A. Bayly, Indian Society and the Making of the British Empire
4	Harbans Mukhia, The Mughals of India
5	Irfan Habib, Medieval India: The study of a Civilization
6	L.P. Sharma, The Mughal Empire
7	R.P. Dutt, India Today
8	Sathis Chandra, Essays on Medieval Indian History

## B. A. HISTORY

II Year B. A. Programme (UG) Courses – Under CBCS

Semester – IV

Paper – IV (Core Paper)

**SOCIAL REFORM MOVEMENT & FREEDOM STRUGGLE (1820 to 1947 A.D.)***(History and Culture of India (1857 – 1947))*

Unit – 1	Social, Religious & Self-Respect Movements: Social & Cultural Awakening – Brahma Samaj, Arya Samaj, Theosophical Society, Ramakrishna Mission, Aligarh Movement – Emancipation of Women – Struggle Against Caste: Jyotiba Phule, Narayana Guru, Periyar, Dr. B. R. Ambedkar.
Unit – II	Growth of Nationalism in the 2 <sup>nd</sup> Half of 19 <sup>th</sup> Century – Impact of British Colonial Policies under Viceroy's Rule and the Genesis of Freedom Movement – Birth of Indian National Congress.
Unit - III	Freedom Struggle from 1885 to 1920: Moderate Phase — Partition of Bengal - Emergence of Militant Nationalism – Swadeshi & Boycott Movement – Home Rule Movement.
Unit - IV	Freedom Struggle from 1920 to 1947: Gandhiji's Role in the National Movement – Revolutionary Movement – Subhas Chandra Bose.
Unit – V	Muslim League & the Growth of Communalism – Partition of India – Advent of Freedom - Integration of Princely States into Indian Union – Sardar Vallabhai Patel.

## References:

1	Anil Seal, Emergence of Indian Nationalism
2	Banerjee, Sekhar, From Plassey to Partition
3	Bayly, C A., Indian Society and Making of the British Empire
4	Brown, Judith: Gandhi's Rise to Power
5	Chandra, Bipan, et. al., India's Struggle for Independence
6	Chatterjee, Jaya, Bengal Divided: Hindu Communalism and Partition 1932-1947

## B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – V

Paper – V (Core Paper) \_\_\_\_\_ **AGE OF**  
**RATIONALISM AND HUMANISM THE WORLD BETWEEN**  
**15<sup>TH</sup>& 18<sup>TH</sup> CENTURIES**

*(History of Modern World (1453 – 1821 A.D))*

Unit – I	Feudalism -Geographical Discoveries: Causes – Compass & Maps – Portugal Leads and Western World Follows – Consequences;
Unit – II	The Renaissance Movement: Factors for the Growth of Renaissance – Characteristic Features - Transformation from Medieval to Modern World; Reformation & Counter Reformation Movements: The Background – Protestantism – Spread of the Movement– Counter Reformation– Effects of Reformation
Unit - III	Emergence of Nation States: Contributory Factors - England and other Nation States – Impact due to the Emergence of Nation States.;Age of Revolutions: The Glorious Revolution (1688) – Origin of Parliament – Constitutional Settlement – Bill of Rights – Results.
Unit - IV	Age of Revolutions: The American Revolution (1776) – Opening of New World – Causes – Course – Declaration of Independence, 1776 – Bill of Rights, 1791 – Significance.
Unit – V	Age of Revolutions: The French Revolution (1789) – Causes - Teachings of Philosophers - Course of the Revolution – Results.

**Project Work:** Individual or group projects may be presented by the students regarding preparation of bibliography on various topics.

Students should also be asked to construct glossaries to help them study and review lessons while helping them to understand a large array of vocabulary words.

## B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – V

Paper – VI (Core Paper)

**HISTORY &****CULTURE OF ANDHRA DESA (from 12<sup>th</sup> to 19<sup>th</sup> Century A.D.) (History and Culture of Andhra from Satavahanas to 1857 A.D)**

Unit – I	Andhra during 12 <sup>th</sup> & 13 <sup>th</sup> Centuries A.D.: Kakatiyas – Origin & its Antecedents – Administration – Social & Economic Life – Industries & Trade - Promotion of Literature and Culture – Architecture & Sculpture – Decline; The Age of Reddy Kingdoms: Patronage to Literature – Trade & Commerce.
Unit – II	Andhra between 14 <sup>th</sup> & 16 <sup>th</sup> Centuries A.D.: Vijayanagara Empire: Polity, Administration, Society & Economy – Sri Krishna Devaraya and his contribution to Andhra Culture – Development of Literature & Architecture – Decline and Downfall.
Unit - III	Andhra through 16 <sup>th</sup> & 17 <sup>th</sup> Centuries A.D.: Evolution of Composite Culture - The QutbShahis of Golkonda – Origin & Decline – Administration, Society & Economy – Literature & Architecture.
Unit - IV	The 18 <sup>th</sup> & 19 <sup>th</sup> Centuries in Andhra: East India Company's Authority over Andhra – Three Carnatic Wars – Occupation of Northern Circars and Ceded Districts –Early Uprisings – Peasants and Tribal Revolts.
Unit – V	The 18 <sup>th</sup> & 19 <sup>th</sup> Centuries in Andhra: Impact of Company Rule on Andhra – Administration – Land Revenue Settlements – Society – Education - Religion – Impact of Industrial Revolution on Economy – Peasantry & Famines – Contribution of Sir Thomas Munroe, C. P. Brown & Sir Arthur Cotton – Impact of 1857 Revolt in Andhra

**Project Work:** Students may be asked to identify families/ areas/ institutions/ personalities/ monuments related to freedom struggle and prepare dissertation under the guidance of a teacher so as to equip them with better understanding of society and historical processes. This exercise should also aim at exposing the spirit of research, analysis, criticism, innovation and invention among the students.

B. A. HISTORY  
 III Year B. A. Programme (UG) Courses – Under CBCS  
 Semester – VI  
**Paper – VII**

**HISTORY OF MODERN EUROPE (from 19<sup>th</sup> Century to 1945 A. D.)**

*(History of Modern World (1821 – 1945))*

Unit – I	Industrial Revolution: Origin, Nature and Impact.
Unit – II	Unification Movements in Italy & Germany and their Impact.
Unit - III	Communist Revolution in Russia – Causes, Course and Results – Impact on World Order.
Unit - IV	World War I: Age of Rivalry in Europe Between 1870 and 1914 – Results of the War – Paris Peace Conference - League of Nations.
Unit – V	World War II: Causes, Fascism & Nazism – Results; The United Nations Organization: Structure, Functions and Challenges.

References:

1	J.A.Hobson, Imperialism: A Study
2	C.D. Hazen, Modern Europe up to 1945
3	H.A.L.Fisher, History of Europe

## HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

**Paper – VIII-A-1 (Cluster Elective Paper –1)****CULTURAL TOURISM IN ANDHRA PRADESH**

Unit – I	Concepts of Tourism: Nature – Scope – Definition – Tourists & Excursionists – Domestic & International Tourists.																						
Unit – II	Types of Tourism: Heritage Tourism – Pilgrimage Tourism - Recreation Tourism – Sports & Adventure Tourism - Advance Tourism – Health Tourism – Environment Tourism.																						
Unit - III	History and Tourism – Heritage Sites – Definition – Ancient Monuments Preservation Act of 1904, Act of 1958 and Act of 1972 - Archaeological Survey of India – Stage Museums.																						
Unit - IV	Planning and Development of A.P. Tourism: APTDC – Aims & Objectives – Fairs & Festivals – Andhra Cuisine –Restaurants - Eco Tourism – Beaches & Hill Resorts – Mountaineering – Tourist Places in A.P.																						
Unit – V	Modalities of Conducting Tourism: Field Work - Visit to a Site – Conduct of <table border="1" style="width: 100%;"> <tr> <td style="width: 10%;"></td> <td>Research – Preparation of Project Report</td> </tr> </table> <p>References:</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td>APTDC Publications</td> </tr> <tr> <td>2</td> <td>Ashorth G.J, Marketing in Tourism Industry</td> </tr> <tr> <td>3</td> <td>Bhatia A.K., Tourism Development</td> </tr> <tr> <td>4</td> <td>Clare, Gunn, Tourism Planning</td> </tr> <tr> <td>5</td> <td>Khan, Nafees A, Development Tourism in India</td> </tr> <tr> <td>6</td> <td>Krishna K Karama, Basics of Tourism</td> </tr> <tr> <td>7</td> <td>Marrison A.M, Hospitality and Travel Marketing</td> </tr> <tr> <td>8</td> <td>RangaMukesh, Tourism Potential in India</td> </tr> <tr> <td>9</td> <td>Sarkar H, Museums and Protection of Monuments and Antiquities in India</td> </tr> <tr> <td>10</td> <td>Vijayalaxmi K.S., History of Tourism</td> </tr> </table> <p><b>Field Trip:</b> Compulsory field trip to destinations of architectural, archaeological, historical and cultural importance is to be conducted. Students should be made to prepare detailed reports on the hand-on experience they gained in such trips.</p> <p>Students should be encouraged to create <b>blogs</b> for local site seeing places and to write and organize articles on those spots</p>		Research – Preparation of Project Report	1	APTDC Publications	2	Ashorth G.J, Marketing in Tourism Industry	3	Bhatia A.K., Tourism Development	4	Clare, Gunn, Tourism Planning	5	Khan, Nafees A, Development Tourism in India	6	Krishna K Karama, Basics of Tourism	7	Marrison A.M, Hospitality and Travel Marketing	8	RangaMukesh, Tourism Potential in India	9	Sarkar H, Museums and Protection of Monuments and Antiquities in India	10	Vijayalaxmi K.S., History of Tourism
	Research – Preparation of Project Report																						
1	APTDC Publications																						
2	Ashorth G.J, Marketing in Tourism Industry																						
3	Bhatia A.K., Tourism Development																						
4	Clare, Gunn, Tourism Planning																						
5	Khan, Nafees A, Development Tourism in India																						
6	Krishna K Karama, Basics of Tourism																						
7	Marrison A.M, Hospitality and Travel Marketing																						
8	RangaMukesh, Tourism Potential in India																						
9	Sarkar H, Museums and Protection of Monuments and Antiquities in India																						
10	Vijayalaxmi K.S., History of Tourism																						

Year B. A. Programme (UG) Courses – Under CBCS  
Semester – VI

**Paper – VIII-A-2 (Cluster Elective Paper 2) POPULAR  
MOVEMENTS IN ANDHRA DESA (1848 TO 1956 A.D.)**

*(History and Culture of Andhra from 1857 to 2014)*

Unit – I	Social & Self Respect Movements: Social Conditions –KandukuriVeerasingam, Raghupathi Venkata Rathnam Naidu, GuruzadaApparao, Komarraju Venkata Laxmana Rao; New Literary Movements: Causes – RayaproluSubbarao, ViswanathaSathyanarayana, GurrarnJashua, BoyiBheemanna, SriSri – Impact.
Unit – II	Freedom Movement in Andhra (1885-1920): Contributory Factors – Vandemataram Movement – Swadeshi & Boycott programs – Glorious Events at Rajahmundry, Kakinada, Kotappakonda& Tenali – Home Rule Movement in Andhra.
Unit - III	Freedom Movement in Andhra (1920-1947): Non-Cooperation Movement –
	ChiralaPerala, Palanadu&Pedanandipadu Activities – Alluri Seetarama Raju &Rampa Revolt (1922-24) – Anti-Simon Commission Movement – Civil Disobedience Movement – Quit India Movement.
Unit - IV	Movement for Separate Andhra State (1953): Causes – Andhra Maha Sabha – Andhra Provincial Congress Committee – Andhra University – Conflict between Coastal Andhra &Rayalaseema – Sri Bagh Pact – Constitution of Committees & their Contribution – Martyrdom of PottiSriramulu – Formation of separate Andhra State.
Unit – V	Movement for formation of Andhra Pradesh (1956): VisalandhraMahasabha – Role of Communists – States Reorganization Committee – Gentlemen’s Agreement – Formation of Andhra Pradesh.
	References:
	1   B. Kesava Narayana, Political and Social Factors in Modern Andhra
	2   K.V.Narayana Rao, The Emergence of Andhra Pradesh
	3   M. Venkata Rangaiah, The Freedom Struggle in Andhra Pradesh
	4   P.R.Rao, History of Modern Andhra
	5   SarojiniRegani, Highlights of Freedom Movement
	6   SarojiniRegani, □□□□□□□□□□□□□□□□ □□□□
	7   V. Ramakrishna, Social Reform Movement in Andhra
	8   B. Kesava Narayana, Modern Andhra & Hyderabad – 1858 – 1956 A.D., 2016
	<b>Project Work:</b> With the aim of understanding of techniques and methods of research and presentation, students should be encouraged to draft a report on local writers, struggles, human rights movements, different types of social discrimination etc.

## B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

**Paper – VIII-A-3 (Cluster Elective Paper – 3) COMTEMPORARY  
HISTORY OF ANDHRA PRADESH (1956-2014)**

Unit – I	Socio-Economic Changes in Andhra Pradesh – River Projects & Infrastructural Development – Education & Scientific Progress – Regional Politics – Emergence of Telugu Desam Party.
Unit – II	Growth of Leftist Ideology – Marxist & Radical Literature – Naxalbari Movement - Communist Activities - Electoral Politics – Present Status of Communist Movement.
Unit - III	Dalit Movement – Understanding Untouchability - Education – Literature - Struggle for Identity – Demand for Political Space.
Unit - IV	Early trends towards Bifurcation: Jai Telangana Movement (1969) – Mulki Rules – Legal Battle - Jai Andhra Movement (1972) – Six Point Formula (1973).
Unit – V	Bifurcation of Andhra Pradesh: Power Politics – Economic Discontentment Riparian Disputes - Unemployment –Foundation of Telangana RastraSami Movements for separate Telangana & unified Andhra Pradesh – Formation Telangana State (2014)
References:	
1	Barry Pavier, The Telangana Movement - 1944-51
2	Chinnayya Suri, Agrarian Movement in Andhra, 1921-71
3	K. Ramachandra Murthy, Unveiling Telangana State
4	P.R.Rao, History of Modern Andhra
5	S. Ratnakar, A Brief History of Telangana & Andhra Pradesh
6	Sri Krishna Committee Report
7	TarimelaNagireddy, India Mortgaged
8	Y.V.Krishna Rao, Growth of Capitalism in Indian Agriculture: A Case Study
9	KattiPadmarao, □□□□□ □
10	Y. Chinnarao, □□□□□□ □□□□
11	News Paper Clippings (2001-2014)
<b>Project Work:</b> Students may be asked to prepare assignments on local caste struggles; regional disparities; aspirations; recent developments etc., through interviews and verifying press reports.	

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**FIRST YEAR; SEMESTER – I**  
**B.A. POLITICAL SCIENCE**  
**PAPER-I: BASIC CONCEPTS OF POLITICAL SCIENCE**

Unit-1: Explanatory Frameworks of Politics

1. What is Politics: Nature and Scope of Political Science
2. Approaches to the Study of Politics: Normative, Historical, Empirical Traditions

Unit-2: What is the State

1. Origin and Evolution of the Modern State
2. Different Conceptions on the role of the Modern State: Social Democratic and Neo

Liberal conceptions

Unit-3: Nations and Nationalism

1. Conceptual Distinction between Nationality and Nation
2. Varieties of Nationalism: Culture and Civic Nationalism

Unit-4: Rights and Citizenship

1. Evolution of Rights: Civil and Social rights
2. Citizenship: Universal and Differential Citizenship

Unit-5: Freedom, Equality and Justice

1. Freedom: Negative and Positive Freedom
2. Equality: Formal Equality, Equality of Opportunity, Equality of Outcome
3. Justice: Justice based on Needs, Deserts and Rights

**Reference books:**

1. Bhargava Rajeev and Acharya Ashok (eds) (2008) Political Theory: An Introduction, Pearson, New Delhi.
2. Andrew Heywood (2007) Politics 3<sup>rd</sup> edition, Palgrave Macmillan, New York.
3. Bellamy R (1993) (Ed) Theories and Concepts of Politics, Manchester university press, New York.

**FIRST YEAR; SEMESTER – II**  
**B.A. POLITICAL SCIENCE**  
**PAPER-II: POLITICAL INSTITUTIONS**  
**(CONCEPTS, THEORIES AND INSTITUTIONS)**

Unit-1: Constitutionalism

1. The Purpose of Constitutional law, Theory of Separation of Powers
2. Structural Forms of the Modern State: Basic features of Parliamentary and Presidential forms of Government

Unit-2: Territorial Division of Authority of the Modern State

1. Basic features of Federal form of Government
2. Basic features of Unitary form of Government

Unit-3: Institutional forms of the Modern State

1. Democracy: Basic features of Classical and Modern Representative Democracy
2. Models of Democracy: Procedural Democracy and Substantive Democracy

Unit-4: Judiciary and Democratic State

1. The nature, role and functions of the Judiciary
2. Judicial Review: Debates on the Supremacy of legislature or Judiciary in the protection of Constitutional law

**Reference books:**

1. Andrew Heywood (2007) Politics 3<sup>rd</sup> edition, Palgrave Macmillan, New York
2. Held, David (2006) Models of Democracy 3<sup>rd</sup> edition Oxford Polity Press
3. Birch A.H (2000) The Concepts and Theories of Democracy, London Routledge
4. Bogdanor, V (Ed) (1988) Constitutions in Democratic Politics Gower, Aldershot

**SECOND YEAR; SEMESTER – III**  
**B.A. POLITICAL SCIENCE**  
**PAPER-III: INDIAN CONSTITUTION**

Unit-1: The Making of the Constitution

1. The ideological legacy of the Indian National Movement on the Constituent Assembly
2. The Nature and Composition of the Constituent Assembly

Unit-2: Philosophical Premises of the Indian Constitution

1. Preamble: The underlying values of the Indian Constitution
2. Salient features of the Constitution of India

Unit-3: Fundamental rights and Directive principles of State Policy

1. Individual and Collective Rights: Limitations on the fundamental Rights
2. Judicial Interpretation of Fundamental Rights
3. The doctrine of 'Basic Structure' of the Constitution: KesavanandaBharathi Case

Unit-4: Indian Federalism

1. Unitary and Federal features in the Indian Constitution
2. Tension Areas between the Union and State Governments  
Legislative, Administrative and Financial Spheres

Unit-5: Working of the Indian Constitution

1. The Values of the Indian Constitution and Ushering of Social Revolution in India
2. The causes for the Ascendency of the Executive over legislature and Judiciary; Major Controversies regarding the Amendments to the Constitution
3. Nature and Role of Higher Judiciary in India; Recent Debates on the mode of appointment of Judges

**Reference books:**

1. Granville Austin (1972) the Indian Constitution, Cornerstone of a Nation Oxford university Press, New Delhi.
2. Madhavkhosla (2012) the Indian Constitution, oxford university press, New Delhi
3. Granville Austin (1999) Working a Democratic Constitution; A History of the Indian |

**SECOND YEAR; SEMESTER – IV**  
**B.A. POLITICAL SCIENCE**  
**PAPER-IV: INDIAN POLITICAL PROCESS**

Unit-1: Approaches to Study the Political Processes in India

1. Theory of Modernization: Transition from Tradition to Modernity
2. Marxian Approach: Transition from pre-capitalism to capitalism

Unit-2: Social Structure and Democratic Process

1. Transition of Caste System: From Hierarchy to Identity: Role of Agency
2. Politicisation of Intermediate and Dalit Caste Communities
3. Evolution of Modernity in India

Unit-3: Religion and Politics

1. Competing Communalisms: Majoritarian and Minoritarian
2. Debates on Secularism; Role of the State towards religion

Unit-4: Party and Electoral Processes in India

1. Electoral Trends of the Lok Sabha from 1952 to 2014: From the One Party Congress System to Multi Party Coalitions
2. Determinants of Voting Behavior in India: Caste, Class, Patronage, Money etc.
3. Evolution of Party System in India: the Ideology and Social bases of major Political Parties: INC, BJP, CPM, DMK, BSP, TDP

**Reference books:**

1. Chandhoke N and Priyadarshini P (Eds) (2009) Contemporary India Economy, society, politics, Pearson, New Delhi.
2. Vanaik A and Bhargava R (Eds) (2010) Understanding Contemporary India Critical perspectives orient black swan New Delhi.
3. Jajal N G and Mehta PB (Eds) (2010) Oxford Companion to Indian Politics Oxford University Press, New Delhi.
4. Kohliatul and Prema Singh (Ed) (2013) Routledge Hand book of Indian Politics Routledge, New York.
5. Jaffrelot C (2003) India's Silent Revolution: The Rise of the Lower Caste in North India, C Hrust, London.
6. Stanely A. Kochanek, Robert I. Hardgrave. India Government and Politics in a Developing Nation, Boston, Wards Worth Publishing, 2006.
7. Rajeev Bhargava (Ed) Secularism and its Critics (1998), Delhi

## THIRD YEAR; SEMESTER – V

### B.A. POLITICAL SCIENCE

#### PAPER-V : INDIAN POLITICAL THOUGHT

##### Unit-1: Traditions of Ancient Indian Political Thought

1. Sources and features of Ancient Indian Political Thought
2. Manu: Social laws
3. Kautilya: Theory of the State

##### Unit-2: Renaissance Thought

1. Rammohun Roy: Religious and Social Reform
2. Pandita Ramabai: Gender

##### Unit-3: Early Nationalism

1. Dadabai Naoroji: Drain Theory and Poverty
2. Ranade M G : The Role of the State and Religious Reform

##### Unit-4: Religious Nationalism

1. Savarkar V D : Hindutva or Hindu Cultural Nationalism
2. Mohammed Iqbal: Islamic Communitarian Nationalism

##### Unit-5: Democratic Egalitarianism

1. Gandhi-Swaraj and Satyagraha
2. Jawaharlal Nehru- Democratic Socialism
3. Dr. Ambedkar B R – Annihilation of Caste System
4. M.N. Roy: Radical Humanism

#### Reference books:

1. Pantham Thomas and Kenneth Deutsch (Ed) (1986)  
Political thought in modern India, Sage, New Delhi
2. Bidyut Chakrabarty and Rajendra Kumar Pandey (2009) modern Indian political thought, Sage, New Delhi
3. Gurpreet Mahajan (2013), India : Political ideas and making of a democratic discourse, Zed book, London
4. Partha Chatterjee (1986) nationalist thought and the colonial world: A derivative disclosure, Zed books, London

## THIRD YEAR; SEMESTER – V

### B.A. POLITICAL SCIENCE

#### PAPER-VI : WESTERN POLITICAL THOUGHT

##### Unit-1: Classical Western Political Thought

1. Plato: Theory of Forms, Critique of Democracy, Justice
2. Aristotle: Citizenship, State, Justice, Virtue

##### Unit-2: Early Medieval to the Beginning of Modern Thought

1. St. Augustine: Earthly City and Heavenly City, Evil, Freewill, Moral Action
2. Machiavelli, Statecraft, Virtue, Fortuna

##### Unit-3: Liberal Thought

1. Thomas Hobbes: Human nature, Social Contract, liberty, State
2. John Locke: Natural Rights, Consent, Social Contract, State
3. Rousseau: Social institutions and Moral Man, Equality, liberty and General Will

##### Unit-4: Liberal Democratic Thought

1. Jeremy Bentham: Utilitarianism
2. John Stuart Mill: Individual liberty, Representative Government

##### Unit-5: Philosophical Idealism and its critique

1. Hegel: Individual Freedom, Civil Society, State
2. Karl Marx: Alienation, Surplus Value, Materialist Conception of History, State

#### Reference books

1. Shefali Jha (2010) Western Political Thought from Plato to Karl Marx, Pearson, New Delhi
2. Boucher D and Kelly P (Eds) (2009) Political Thinkers from Socrates to the Present, Oxford University press, oxford
3. Coleman J (2000) A History of Modern Political Thought: From Ancient Greece to early Christianity, Blackwell publishers, oxford
4. Macpherson C B (1962) The Political Theory of Possessiveness Individualism, Oxford University press, oxford
5. Hampsher-monk I (2001) A History of Modern Political Thought: Major Political Thinkers from Hobbes to Marx, Blackwell publishers, oxford

## THIRD YEAR; SEMESTER –VI

### B.A. POLITICAL SCIENCE

#### PAPER-VII : PRINCIPLES OF PUBLIC ADMINISTRATION

##### Unit-1: Nature of Public Administration

1. Meaning, Nature and Scope of Public Administration
2. Significance of Public Administration
3. Public and Private Administration

##### Unit-2: Administrative Theories

1. Classical Theory-Henry Fayol
2. Human Relations theory-Elton Mayo
3. Rational Decision making theory-Herbert Simon

##### Unit-3: Principles of Organization

1. Hierarchy- Span of control-Unity of command
2. Decision Making-Communication
3. Co-ordination-leadership

##### Unit-4: Structure of organization

1. Chief Executive-Types and Functions
2. Department-Bases of Departmentalization
3. Line and Staff Agencies

##### Unit-5: Theories of Motivation

1. Meaning and importance of Motivation
2. Hierarchy of needs theory; Abraham Maslow
3. Theories of X and Y ; Douglas Mc Gregor

#### Reference books:

1. Pardhasaradhi (Eds) (2011) Public Administration; Concepts, Theories and Principles, Telugu Academy, Hyderabad
2. R.kSapru (2014) 3<sup>rd</sup> Edition, Administrative Theories and Management Thought, PHI learning Pvt.Ltd, New Delhi.
3. Prasad D R, Prasad V S,(Eds) (2010),Administrative Thinkers, Sterling Publishers, NewDel

## THIRD YEAR; SEMESTER – VI

### B.A. POLITICAL SCIENCE

(Cluster Elective)

#### PAPER: VIII-A1: INTERNATIONAL RELATIONS

##### Unit- I: Basic Concepts of International Relations

1. Meaning, Nature and Scope of International Relations
2. (a). Balance of power                      (b). National interests (c). Collective Security  
(d). Diplomacy

##### Unit-II: Approaches to the study of International Relations

1. Idealism – Woodrow Wilson
2. Classical Realism – Hans Morgenthau
3. Neo – realism – Kenneth Waltz

##### Unit-III: Phases of International Relations (1914-1945)

1. Causes for the First World War
2. Causes for the Second World War

##### Unit-IV: Phases of International Relations (1945 onwards)

1. Origins of First Cold War
2. Rise and Fall of Détente
3. Origins and the End of Second Cold War

##### Unit-V: International Organisation

1. The role of UNO in the protection of International Peace
2. Problems of the Third World : Struggle for New International Economic Order

#### Reference Books:

1. Jackson, R and Sorensan Y, Introduction to International Relations; Theories and approaches, New York, OUP, 2008.
2. Baylis, J and Smith, S (Eds), The Globalization of World Politics; An Introduction to International Relations, Oxford, OUP,2011
3. Aneek Chatterjee, International Relations Today; Concepts and Applications, New Delhi, Pearson Education, 2008.
4. E.H. Carr, International relations between the two world Wars, London, Palgrave Macmillan, 2004

THIRD YEAR; SEMESTER –VI  
**B.A. POLITICAL SCIENCE PAPER:VIII-A2: INDIAN FOREIGN  
 POLICY**

Unit- I: Evolution of Indian Foreign of Policy

1. Determinants of Indian Foreign of Policy
2. Continuity and change in Indian Foreign Policy

Unit-II: Non-Alignment and UNO

1. The role of India in the Non-Alignment Movement
2. Relevance of Non-Aligned Movement in the Contemporary World
3. Role of India in the UNO in protection of International Peace

Unit-III: India's Relation with USA and China

1. Indo- US Relations: Pre- Cold War Era, Post- Cold War Era
2. India – China Relations: Pre- Cold War Era, Post- Cold War Era

Unit-IV: India and her Neighbours

1. Indo- Pakistan Relations
2. India's role in South Asian Association of Regions Cooperation (SAARC)

Reference Books:

1. David Scott (Ed), Handbook of India's International Relations, London, Routledge,2011
2. Ganguly, S (Ed), India as an Emerging Power,Portland, Franck class, 2003
3. Pant, H, Contemporary Debates in Indian Foreign and Security Policy, London, Palgrave Macmillian,2008
4. Tellis, A and Mirski, S (Eds), Crux of Asia; China, India, and the Emerging global Order, Washington, Carnegie endowment for international peace,2013
5. Muni, S.D, India's Foreign Policy Delhi CUP, 2009
6. Alyssa Ayres and Raja Mohan, C (Eds), Power Realignment in Asia: China, India and the United States, New Delhi, Sage, 2002.
7. Appadorai, A, Domestic roots of Indian Foreign Policy, New Delhi, OUP,1971 Dutt, V.P, India's Foreign Policy in a Changing World, New Delhi,NBT,2011

## THIRD YEAR; SEMESTER – VI

### B.A. POLITICAL SCIENCE

#### PAPER: VIII-A3 : CONTEMPORARY GLOBAL ISSUES

##### Unit- I: Conceptions of Globalization

1. Economic Conception of Globalization
2. Political Conception of Globalization

##### Unit-II: Anchors of Global Political Economy

1. International Monetary Fund – Nature, Role and Functions
2. World Bank-Nature, Role and Functions
3. World Trade Organization: Origin, Nature and role in the context of Globalization

##### Unit-III: Nation State and Globalization

1. The role of Nation State in the context of Globalization
2. Consequences of Globalization – Rise of Inequalities within and across Nations

##### Unit-IV: Contemporary Global issues

1. Ecological Issues: International Agreements On Climate Change
2. International Terrorism: Non- State Actors and State Terrorism

#### Reference Books:

1. Ritzer, G., Globalization: A Basic Text, Sussex: Wiley- Black well,2009
2. Streger, M., Globalization: A Very Short Introduction, Oxford, OUP,2013
3. Heywood, A., Global Politics, New York, Palgrave Macmillian,2011
4. Held, D et.al, Global Transformations; Politics, Economics and culture California, Stanford University Press,1999
5. J. Volger, ‘Environmental Issues’ in J. Baylis, S. Smith and Owens, P(Eds) Globalization of world politics, New York, Palgrave,2011

**Yogi Vemana University – Kadapa**  
**Syllabus for I B.A. Part – II Urdu**

**First year Optional Urdu**

**SEMESTER - I**

**First year Optional Urdu Paper - I**

**URDU PROSE**

**Afsanavi Adab aur Drama**

- UNIT – I**            **Novel**            -            **Taaruf aur Irteqa**
- UNIT – II**            **Novel ‘Nirmala’**        by **Premchand**
- UNIT – III**            **Afsana**            -            **Taaruf aur Irteqa**
- UNIT – IV**            **Urdu Afsane edited by Raziya Sajjad Zaheer.**  
**The following short stories only:**
1. **‘Woh’ by Balraj Menra**
  2. **‘Computer Isq’ by Joginder Pal**
  3. **‘Lal aur Peela’ by K.A.Abbas**
  4. **‘Mom ki Mariyam’ by Jeelani Banu**
  5. **‘Allah de Banda le’ by Raziya Sajjad Zaheer**
- UNIT – V**            **Drama ‘Darwaze Khol Do’ by Krishan Chander**

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**Yogi Vemana University – Kadapa**  
**Syllabus for I B.A. Part – II Urdu**

**SEMESTER - II**  
**First year Optional Urdu Paper - II**

**URDU PROSE**  
**Ghair Afsanavi Adab**

- UNIT – I**            **SAFARNAMA - ‘Bullet Train mein kabhi na baitho’**  
by Mujtaba Hussain
- UNIT – II**            **KHAKA - Taaruf aur Irteqa**
- UNIT – III**           **Khaka - ‘Dr.Abdul Haq marhoom’ by Rasheed Ahmed  
Siddiqui.**
- UNIT – IV**           **INSHAIYA - Taaruf aur Irteqa**
- UNIT – V**            **Inshaiva – ‘Jheengar ka Janaza’ by  
Khwaja Hasan Nizami**

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**Yogi Vemana University – Kadapa**  
**Syllabus for II B.A. Part – II Urdu**

**SEMESTER - III**  
**Second year Optional Urdu Paper - III**

**URDU POETRY**

Prescribed book : Gowhare Adab by A.P.Urdu Academy

- UNIT – I**            **MASNAVI – A portion of Gulzar-e-Naseem**  
**‘Aana tajul mulook ka sehrae tilism se’**
- UNIT – II**            **GHAZAL – The following Ghazals only:**  
**1. ‘Bas ke dushwar hai har kaam’**    by **Ghalib**  
**2. ‘Woh adae dilbari ho ke nawae’**    by **Jigar**  
**3. ‘Jala ke mashale jan hum’**            by **Majrooh**
- UNIT – III**            **NAZM**  
**1. ‘Rooh arzi aadam ka isteqbal karti hai’**  
**By Allama Iqbal**  
**2. ‘Sagar ke kinare’**                    by **Maqdoom**
- UNIT – IV**            **Ghazalgo shora ki sawaneh**  
**1.Ghalib      2.Jigar      3.Majrooh**
- UNIT – V**            **Nazmgo shora ki sawaneh**  
**1.Allama Iqbal      2. Maqdoom**

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**Yogi Vemana University – Kadapa**  
**Syllabus for II B.A. Part – II Urdu**

**SEMESTER - IV**  
**Second year Optional Urdu Paper - IV**

**URDU POETRY**

Prescribed book : Gowhare Adab by A.P.Urdu Academy

- UNIT – I**            **QASEEDA – Ta’aruf**
- UNIT – II**            **QASEEDA – Mohsin Kakori (Selected portion)**  
**‘Simte kashi se chala janibe mathura badal’**
- UNIT – III**            **MARSIYA – Ta’aruf**
- UNIT – IV**            **MARSIYA – Meer Anees (Selected portion)**  
**‘Namake khwane takallum hai fasahat meri’**
- UNIT – V**            **Biography of following poets:**  
**1.Mohsin Kakori 2. Meer Anees**

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Yogi Vemana University – Kadapa Syllabus  
for III B.A. Part – II Urdu

SEMESTER – V

Third year Optional Urdu Paper -V  
TAREEKH-E-ADAB

Prescribed book : Tariqe Adabe Urdu by Noorul Hasn Naqvi

- UNIT – I Urdu Zaban ka Aghaz o Irteqa
- UNIT – II Deccani Daur – 1. Mohd.Quli Qutub Shah  
**1. Mulla Wajhi**  
**3.Nusrati**
- UNIT – III Dabistan-e-Dehli  
**1. Meer**  
**2. Sauda**  
**3. Dard**  
**4. Ghalib**  
**5. Momin**
- UNIT – IV Dabistan-e-Lukhnow  
**1. Insha**  
**2. Jur'at**  
**3. Mushafi**  
**4. Nasiq**  
**5. Aatish**
- UNIT – V Nazeer Akbarabadi

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Yogi Vemana University – Kadapa Syllabus  
for B.A. Part – II Urdu

SEMESTER – V  
Third year Optional Urdu Paper - VI

TAREEKH-E-ADAB

Prescribed book : Tariqe Adabe Urdu by Noorul Hasn Naqvi

- UNIT – I                      FORT WILLIAM COLLEGE aur uske Musannafeen  
**1. Meer Aman**  
**2. Haidar Bakhs Haidari**  
**3. Sher Ali Afsos**
- UNIT – II                      SIR SYED AHMED KHAN
- UNIT – III                     HALI      AUR      SHIBLI
- UNIT – IV                     TARAQQI PASAND TEHREEK
- UNIT – V                      TANZ-O-MIZAH  
**1. Patras Bukhari**  
**2. Shaukat Thanvi**  
**3. Mushtaq Ahmad Yusufi**

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Yogi Vemana University – Kadapa Syllabus  
for B.A. Part – II Urdu

SEMESTER - VI  
Third year Optional Urdu Paper - VII ADABI

TANQEED

Prescribed book: Fanne Tanqeed aur Urdu Tanqeed Nigari by Noorul Hasan Naqvi

- UNIT – I                      TANQEED – Mafhoom aur Ahmiyat
- UNIT – II                      TANQEED- Agaz –O-Irteqa
- UNIT – III                      TANQEED –O-THAQEEQ KA BAHAMI RISHTA
- UNIT-IV                      1. TASSURATI TANQEED  
2. TASSURATI NAQID - Majnu Gorakhpuri
- UNIT-V                      1.MARKSI TANQEED  
2.MARKSI NAQID – Syed Ehtisham Hussain

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Yogi Vemana University – Kadapa Syllabus  
for B.A. Part – II Urdu SEMESTER – VI  
Third year Optional Urdu Paper (Cluster Elective) PAPER- VIII-  
A1

DABISTANE TANQEED AUR CHAND AHAM TANQEED NIGAR

Prescribed book: Fanne Tanqeed aur Urdu Tanqeed Nigari by Noorul Hasan Naqvi

UNIT-I	TANQEED-Maani-o-Mafhoom- Ahmiyat
UNIT-II	NAQQAD KE FARAEZ-TANQEED NIGAR KI QUSUSIYAT
UNIT-III	MASHRIQI –O-MAGRIBI TANQEED TAZKIRATI TANQEED
UNIT-IV	TANQEED KE DABISTAN:-  <ol style="list-style-type: none"> <li>1) TA’ASSURATI TANQEED</li> <li>2) JAMALIYATI TANQEED</li> <li>3) TARIQEEPASAND TANQEED</li> <li>4) SCIENTIFIC TANQEED</li> </ol>
UNIT-V	CHAND AHAM TANQEED NIGAR:-  <ol style="list-style-type: none"> <li>1) EHTISHAM HUSSAIN</li> <li>2) SHIBLI</li> <li>3) ALE AHMED SUROOR</li> <li>4) KALEEMUDDIN AHMED</li> </ol>

Yogi Vemana University – Kadapa Syllabus  
for B.A. Part – II Urdu

Third year Optional Urdu Paper (Cluster Elective) PAPER-VIII-  
A2

HALI AUR MUQADDAMA SHAIR-O-SHAIRI

Prescribed book: Muquddama Shair-o-Shairi by Altaf Hussain Hali

UNIT-I URDU TANQEED MEIN HALI KA MUQAM-O-  
MARTAB

UNIT-II HALI KE TANQEEDI AFKAR-O-NAZRIYAT

UNIT-III MUQADDAMA SHAIR-O-SHAIRI KA TAROOF-IJMALI JAYAZA

UNIT-IV GAZAL, QASEEDA, MASNAVI AUR MARSIIYE KE MUTALIQ  
HALI KE AFKAR

UNIT-V HALI KI SAWANEH NIGARI:-

1. HAYATH JAVEED
2. HAYATH SADI
3. YA'AD GARE GALIB

Yogi Vemana University – Kadapa  
Syllabus for B.A. Part – II Urdu

Third year Optional Urdu Paper (Cluster Elective)  
PAPER-VIII-A3

SPECIAL STUDY OF MOULANA ABUL KALAM AZAD

Prescribed book: Moulana Azad ki Kahani  
by **Zaffar Ahamed Nizami**

**UNIT-I BACH'PAN**

**UNIT-II SAHAFAT**

**UNIT-III CONGRESS KI SADARAT**

**UNIT-IV VIZARAT**

**UNIT-V TASANIF**

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**B.A./ B.Sc., COMPUTER APPLICATIONS  
SYLLABUS**

**I YEAR I SEMESTER**

**Paper I: Fundamentals of Computers**

**Unit-I: Introduction to computer**

What is Computer, Characteristics of Computers, Generations of Computers, Classification of Computers, Basic Computer Organization, and Applications of Computers.

**Unit-II: Memory, Processor and I/O devices**

Introduction, Memory Hierarchy, Processor Registers, Cache memory, Primary Memory, Secondary Storage Devices,  
Input and Output Devices: Magnetic tapes, Floppy Disks, Hard Disks, Optical Disks, USB Flash Devices, Memory Cards, Mass Storage Devices.

**UNIT-III: Computer Software**

Introduction to Computer Software, Classification of Computer Software, System Software, Application Software, Firmware, Middleware, Acquiring Computer Software, Design and Implementations of Correct, Efficient and Maintainable Programs

**UNIT-IV: Introduction to Operating System**

Operating Systems: Introduction, Evolution of Operating Systems, Process Management, Memory Management, File Management, Device Management, Security Management, Command Interpreter, Popular Operating Systems

**UNIT-V: Introduction to Algorithms and Programming Languages**

Algorithm, Control Structures used in Algorithms, Some more Algorithms, Flowcharts, Pseudo code, Programming Languages, Categorization of High-Level Languages, Some Popular High-Level Languages, Factors affecting selection of Programming Language.

**TEXT BOOKS:**

1. Fundamentals of Computers By Reema Thareja from Oxford University Press

**Reference Books:**

1. Peter Norton, Introduction to Computers, 6<sup>th</sup> Edition Tata McGraw Hill, 2008
2. Jacob Beckerman, How to build a Computer 2014-15 Learn, Select parts, Assemble, and Install: A step by step Guide to Your First Home Built.
3. Leon A and Leon M, Computers for Everyone, Leon Vikas, 2001.
4. Turban E, Rainer R K, and Potter RE, Introduction to Information Technology, Jhon Wiley & Sons, 2000.

## I YEAR II SEMESTER

### PAPER- II :OFFICE AUTOMATION TOOL

#### UNIT I

**Office Automation:** Introduction to automation, Need of automation, Word Processing, Basics of MS-Word, Text editing, Text formatting, working with header and footer, working with tables. **Graphics:** Importing graphics, Clipart, Insert picture, Clip Art Gallery, using word's drawing features, drawing objects, text in drawing. **Templates:** Template types, using templates, exploring templates, modifying templates. **Macros:** Macro, Recording macros, editing macros, running a macro. **Mail Merge:** Mail Merge concept, Main document, data sources, merging data source and main document. Overview of word menu options word basic tool bar.

#### UNIT II

**MS Power Point:** Introduction, Building a presentation, Outlining the presentation, Creating the text and chart slides, Formatting charts, customizing a presentation, drawing on slides, Creating slide shows

**Creating Presentations :** Using auto content wizard, Using blank presentation option, Using design template option, Adding slides, Deleting a slide, Importing Images from the outside world, Drawing in power point, Transition and build effects, Deleting a slide, Numbering a slide, Saving presentation, Closing presentation, Printing presentation elements.

#### UNIT III

**Excel Basics:** Overview of Excel features, Getting started, Creating a new worksheet, Selecting cells, Entering and editing text, Entering and editing Numbers, entering and editing Formulas, Referencing cells, moving cells, copying cells, sorting cell data, inserting rows, inserting columns, Inserting cells, Deleting parts of a worksheet, clearing parts of a worksheet.

**Formatting:** Page setup, changing column widths and Row heights, auto format, changing font sizes and Attributes, centering text across columns, using border buttons and Commands, changing colors and shading, hiding rows and columns.

#### UNIT IV

**Introduction to functions:** Parts of a functions, Functions Requiring Add-ins, The Function Wizard. Examples functions by category: Data and time functions, Engineering functions, Math and Trig functions, Statistical functions, Text functions.

**Excel Charts:** Chart parts and terminology, Instant charts with the chard wizard, creation of different types of charts, printing charts, deleting charts – Linking in Excel

**Excel Graphics:** Creating and placing graphic objects, Resizing Graphics, Drawing Lines and Shapes

**UNIT V****MS Access**

**Creating a Simple Database and Tables:** Creating a contact Databases with the wiz, The Access Table Wizard, Creating Database Tables without the wizard, Field Names, Data Types and Properties, Adding, deleting fields, renaming the fields in a table. **Forms:** The Form Wizard, Saving Forms, Modifying Forms

**Entering and Editing Data:** Adding Records, Duplicating previous entries without Retyping, Undo, Correcting Entries, Global Replacements, Moving from Record to Record in a table.

**Finding, Sorting and Displaying Data:** Queries and Dynasets, Creating and using select queries, Returning to the Query Design, Multilevel Sorts, Finding incomplete matches, Showing All Records after a Query, Saving Queries, Crosstab Queries, Report Generation.

**TEXT BOOKS**

1. Baja K K , Office Automation , MacMillan India Ltd, 1996.
2. Steve Sagman, Microsoft Office XP for Windows, Pearson Education Asia, 2002.
3. Jennifer Fulton, Microsoft Office 2000 Cheat Sheet, Prentice-Hall of India, 1999.

**REFERENCE BOOKS**

1. Windows XP Home Edition Complete , BPB Publications, 2001.
2. Raghav Bahl , Exploring Microsoft Office XP , Cyber Tech, 2001 .
3. Sanjay Saxena , MS Office 2000 for Everyone, Vikas Publishing , 2001

## **II YEAR III SEMESTER**

### **PAPER- III : NETWORKS AND INTERNET FOUNDATION**

#### **UNIT I**

Introduction to Network, advantages and disadvantages of network , Types of Networks – Network topologies, Types of topologies- Connecting Devices – Hubs, Repeaters, Bridges, Routers, Network Interface Cards (NIC) and Switches -- Network Operating system - analog and digital signal, analog and digital signal transmission.

#### **UNIT II**

Introduction to Network Communication Model- Network Architecture –Application Layer, Presentation Layer, Session Layer, transport Layer, Network Layer, Data-link Layer, Physical Layer.

#### **UNIT III**

Introduction to Protocols, TCP/IP Protocol- Protocols and their classification –Address Resolution Protocol(ARP) , Reverse Address Resolution Protocols (RARP) , SMTP, MIME, IMAP, POP, ICMP, HTTP.

#### **UNIT IV**

Overview of Internet, revolution of Internet , Internet service providers (ISP) –setting windows environment for dial up networking, search engine, searching web using search engines – audio on internet – newsgroup – subscribing to news groups.

#### **UNIT V**

Intranet concepts and architecture, building corporate world wide web protocol, Internet infrastructure, Internet Security design - intranet as business tools, future of intranet.

Bluetooth and other wireless networks.- configuring wireless networks- Security – virus and antivirus, configuring firewalls.

#### **TEXT BOOKS**

1. Introduction to Computer Networks by P.K.Singh, VK Global Publications Pvt. Ltd.
2. Wireless Home Networking For Dummies, By Danny Briere, Hurley, Edward Ferris, Wiley publications

#### **REFERENCE BOOKS**

1. Computer Networks, Andrew S. Tanenbaum, Pearson edition , Third Edition
2. Home Networking For Dummies, By Kathy Ivens , Wiley publications

**II YEAR IV SEMESTER**  
**Paper – IV: Programming IN C**

**Unit- I: Introduction to Algorithms and Programming Languages:** Algorithm – Key features of Algorithms – Some more Algorithms – Flow Charts. **Introduction to C:** Structure of C Program –Writing the first C Program – File used in C Program – Compiling and Executing C Programs –Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting.

**Unit-II: Decision Control and Looping Statements:** Introduction to Decision Control Statements –Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Go to Statement.

**Unit- III: Arrays:** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations on Array – one dimensional array for inter-function communication – Two dimensional Arrays –Operations on Two Dimensional Arrays, **Strings:** Introduction String and Character functions.

**Unit- IV: Functions:** Introduction – using functions – Function declaration / prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive function.

**Unit-V: Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function. **Structure, Union, and Enumerated Data Types:** Introduction – Nested Structures – Arrays of Structures – Structures and Functions - Unions – Enumerated Data Types.

**Reference Books:**

1. Reema Thareja, Introduction to C programming, Oxford University Press.
2. E Balagurusamy, Programming in ANSI C Tata McGraw-Hill, Sixth Edition.
3. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Publisher, 2002.
4. Henry Mulish & Hubert L.Coo Reema Thareja: The Spirit of C: An Introduction to Modern Programming, Jaico Publishing House,1996.

**BA III YEAR V SEMESTER****PAPER – V: DATABASE MANAGEMENT SYSTEMS**

Database system applications, Database system vs File system, **Views of data:** Data abstraction, Instances and schemas. **Database languages:** DDI, DML. Database users and administrators, Transaction management, **Database system structure:** Storage manager, Query processor.

**UNIT – II:**

**Database design and ER diagrams:** Beyond ER design entities, attributes and entity sets, Relationships and relationship sets, additional features of ER model, Concept design with ER model, Conceptual design for large enterprises.

**Relational model:** Introduction to the relational model, integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design.

**UNIT – III**

Schema Refinement: decomposition, problems related to decomposition, FDS: Normalization, Basic normal forms and advanced normal forms.

**UNIT – IV**

**Form of basic SQL query:** Examples of basic SQL queries, introduction to nested queries, correlated nested queries set, comparison operators, aggregative operators, null values, comparison using null values, joins. **Views:** Destroying or altering tables and views.

**UNIT – V**

**PL/SQL:** Introduction to PL/SQL, structure of PL/SQL program, variables, constants, operators, conditional statements, constraints, procedures, functions.

## PAPER – VI-A : ELECTRONIC COMMERCE (ELECTIVE)

### Unit I

**Electronic Commerce Environment and Opportunities:** Background, The Electronic Commerce Environment, Electronic Market place Technologies. **Mode of Electronic Commerce:** Electronic Data Interchange, Migration to Open EDI, Electronic Commerce with WWW/Internet, Commerce Net Advocacy, Web Commerce going forward.

### Unit II

**Approaches to Safe Electronic Commerce:** Secure Transport Protocols, Secure Transactions, Secure Electronic Payment Protocol (SEPP), Secure Electronic transaction (SET), Certificates for authentication Security on Web Servers and Enterprise Networks

### Unit III

**Electronic Cash and Electronic Payment Schemes:** Internet Monetary Payment & Security Requirements, Payment and Purchase Order Process, On-line Electronic cash. **Internet / Intranet Security Issues and Solution:** The need for Computer Security, Specific Intruder Approaches, Security Strategies, Security Tools, Encryption, Enterprise Networking and Access to the Internet, Antivirus Programs, Security Teams.

### Unit IV

**Master Card / Visa secure Electronic Transaction:** Introduction, Business Requirements, Concepts, Payments Processing. **E-Mail and Secure E-Mail technologies for Electronic Commerce:** Introduction The Means of Distribution, A Model for Message Handling, E-Mail Handling, Multipurpose Internet Mail Extensions, Message Object Security Services, Comparisons of Security Methods, MIME and Related Facilities for EDI over the Internet.

### Unit V

**Internet Resources for Commerce Introduction:** Introduction, Technologies for Web Servers, Internet Tools Relevant to Commerce, Internet Applications for Commerce, Internet Charges, Internet Access and Architecture.

### TEXT BOOK

Web Commerce Technology Handbook, by Daniel Minoli, Emma Minoli, McGraw-Hill

## APER VI-B : CLOUD COMPUTING (ELECTIVE)

### UNIT I

**Introduction & Concepts:** Introduction to cloud computing: introduction, characteristics of cloud computing, cloud models, cloud services examples, cloud-based services & applications.

**Cloud Concepts & Technologies:** Virtualization, Load Balancing, Scalability & Elasticity, Deployment, Replication, Monitoring, Software Defined Networking, Networking Function Virtualization, Map Reduce, Identity And Access Management, Service Level Agreements, Billing.

### UNIT II

**Cloud Services & Platforms:** Compute Services, Storage Services, Database Services, Applications Services, Content Delivery Services, Analytics Services, Deployment & Management Services, Identity & Access Management Services, Open Source Private Cloud Software.

### UNIT III

**Cloud Application Design:** Introduction, Design Considerations for Cloud Applications, Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches.

### UNIT IV

**Python Basics:** Introduction, Installing Python, Python Data Types & Data Structures, Control flow, Functions, Modules, Packages, File Handling, Date/Time Operations, Classes 163.

### UNIT V

**Python for Cloud:** Python for Amazon Web Services, Python for Google Cloud Platform, Python for Windows Azure.

### TEXT BOOK:

1. Cloud Computing A Hands On Approach By Arshdeep Bahga And Vijay Madisetti From University Press.

III YEAR VI SEMESTER  
PAPER – VII  
WEBTECHNOLOGIES

#### UNIT I

HTML: Basic HTML, Document body, Text, Hyper links, adding more formatting, Lists, Tables using images. More HTML: Multimedia objects, Frames, Forms towards interactive, HTML document heading detail.

#### UNIT II

Cascading Style Sheets: Introduction, using Styles, simple examples, your own styles, properties and values in styles, style sheet, formatting blocks of information, layers.

#### UNIT III

Introduction to JavaScript: What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript: Data and objects in JavaScript, regular expressions, exception handling

#### UNIT IV

DHTML with JavaScript: Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images,

#### UNIT V

XML: defining data for web applications, basic XML, document type definition, presenting XML, document object model. Web Services

#### TEXT BOOKS

1. Web Technologies by A.A.Puntambekar from Technical Publications, Pune

#### REFERENCE BOOKS

1. INTERNET AND WEB TECHNOLOGIES - Rajkamal, TMH.
2. TCP/IP PROTOCOL SUITE - Behrouz A. Forouzan, 3rd edition, TMH.

## WEB TECHNOLOGIES LAB

1. Create a simple HTML page which demonstrates all types of lists.
2. Create a letter head of your college using following styles
  - i. image as background
  - ii. use header tags to format college name and address
3. Create a web page, which contains hyper links like fruits, flowers, animals. When you click on hyper links, it must take you to related web page; these web pages must contain with related images.
4. Create a hyperlink to move around within a single page rather than to load another page.
5. Create a leave letter using different text formatting tags.
6. Create a table format given bellow using row span and colspan.

RNO	NAME	MARKS				
		M1	M2	M3	M4	M5

Insert 5 records.

7. Create a table with different formats as given bellow.
  - i. Give different background and font colors to table header, footer and body.
  - ii. Use table caption tag.
8. Divide a web page vertically and horizontally with scroll bars, name them as shown bellow decorate it with some items.

F1

F2

F3

9. Create a student Bio-Data, using forms.
10. Create a web page using following style sheets
  - i. Inline style sheets.
  - ii. Embedded style sheets.
  - iii. External style sheets
11. Write a JavaScript program to accept two values from form and apply any 5 mathematical functions

## CLUSTER ELECTIVE

### PAPER- VIII-A1 - DESKTOP PUBLISHING TECHNOLOGIES

#### UNIT I

**Basics of Desktop Publishing:** what is DTP? – Letterpress Printing – Wooden Types and Metal Types, Hot Metal Types, Printing Photographs - Offset Printing- Gravure – Hardware requirements – Software Requirements – DTP Operator’s Arsenal – Text Editors, word Processors, Vector Illustration Applications or drawing Applications, Bitmap Image Editing Application, Page Layout applications - Scanning –Printing –Monitor – briefly Input and Output Devices – Vector graphics and Raster graphics .

#### UNIT II

**Fonts** – Font Styles, Serif and Sans Serif, Dimensions of font , Fixed pitch fonts nad proportional spaced fonts, scaling tracking, kerning, leading and ligatures, fonts in your computer, vector fonts and bitmapped fonts - character level and Paragraph level formatting – Drop Caps – Hyphenations – Alignments –Indentation – Single side and Double Side Documents –Headers and Footers – Selecting the text and graphics – Graphic file formats – screen colors (RGB) and Printer colors (CMYK) –Spot colors and Process Colors – Color Separations – Colur Half-tone images - Generic Process of Desktop Publishing.

#### UNIT – III

**PhotoShop7:** Introduction – Parts of Page shop window - Open, Save, Close and Create a Image – Using Toolbox – Tool Options bar – Using layers – Layers palette, adding new layer, Hiding layer, Renaming layer, Remove layer, Merge layer, copy and paste with image  
– Fascinating colors – Color models, Color Picker, Color palette, Swatches Palette, ICC – Inserting text in images – printing images – filters to improve images .

#### UNIT – IV

**Page Maker7:** Introduction of Page Maker- starting of Page Maker – Creating a new publication in Page Maker – Dialog Boxes Document and setup and Save Publication – Close the publication – Text Blocks- drawing a text block by dragging the Mouse cursor, Empty Text block by a Mouse Click.

## UNIT V

Fitting text Blocks on a page, Inserting pages while placing Text – Handling Pages – Inserting, Deleting and go to the desired pages – using the Toolbox – Using the Tool Bars – Importing text & Pictures – wrapping text around the pictures – Character level formatting – Opening Multiple Publication windows – Using story editor-Using Styles – Pre-defined styles, new style – Using the Document Master Pages – Sample Publication.

## TEXT BOOK

1. Rapidex DTP Course by Shirish Chavan, Unicorn Books Pvt. Ltd., Edition 2005

## REFERENCE BOOK

2. DeskTop Publishing English Edition By Ashish Joshi, Jigisha Raval, Pragmesh Patel, Computer world Publications,

## CLUSTER ELECTIVE

### PAPER –VIII -A2 - MULTIMEDIA SYSTEMS

#### UNIT II

**What is Multimedia?:** Definition – Where to use Multimedia – Delivering Multimedia **Text-** The Power of Meaning – About Fonts and Faces – Using Text in Multimedia-Computers and Text – Font Editing and Design Tools – Hyper Media and Hyper Text

#### UNIT II

**Images:** Before you Start to Create – Making Still Images – Color – Image File Formats **Sound** – The Power of Sound – Digital Audio – MIDI Audio – MIDI vs Digital Audio – Multimedia System Sounds – Audio File Formats.

#### UNIT III

**Video:** Using Video - How Video Works and is Displayed - Digital Video Containers - Obtaining Video Clips - Shooting and Editing Video  
**Making Multimedia:** The Stages of a Multimedia Project - What You Need: The Intangibles- What You Need: Hardware - What You Need: Software - What You Need: Authoring Systems

#### UNIT IV

**Planning and Costing:** The Process of Making Multimedia – Scheduling -Estimating - RFPs and Bid Proposals

**Designing and Producing:** Designing - Producing

#### UNIT V

**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 We

#### TEXT BOOK

1. Multimedia: Making It Work, Tay Vaughan, 8<sup>th</sup> Edition, Tara Mc-Graw Hill.

#### REFERENCE BOOKS

1. Multimedia Systems, John F.Koegel Buford, Pearson edition, 2003
2. Ranjan Parekh, Principles of Multimedia, TMH, 2006.Engineering Evaluation Software
3. Multimedia: Computing, Communication and applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Edition, 2001

CLUSTER ELECTIVE  
PAPER –VIII –A3 - PHP and  
My SQL

**Unit-I: Building blocks of PHP:** Variables, Data Types, Operators and Expressions, Constants.

**Flow Control Functions in PHP:** Switching Flow, Loops, Code Blocks and BrowserOutput.  
**Working with Functions:** Defining Functions, Calling functions, returning the values from User- Defined Functions, Variable Scope, Saving State between Function calls with the Static statement, more about arguments.

**Unit-II: Working with Arrays:** Arrays, Creating Arrays, Some Array-Related Functions.  
**Working with Objects:** Creating Objects, Object Instance. **Working with Strings, Dates and Time:** Formatting Strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

**Unit-III: Working with Forms:** Creating Forms, Accessing Form - Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads.

**Unit-IV: Working with Files and Directories:** Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen (), Running Commands with exec(), Running Commands with system () or passthru ().

**Working with Images:** Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

**Unit-V: Interacting with MySQL using PHP:** MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data.

## References:

1. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach Yourself, Pearson Education (2007).
2. Xue Bai Michael Ekedahl, The Web Warrior Guide to Web Programming, Thomson (2006)

**B.Sc - BIOCHEMISTRY (CBCS) SYLLABUS**  
**SEMESTER- I**  
**Paper I : Biomolecules**

**Unit – I : Biophysical Concepts 12 hours**

Water as a biological solvent and its role in biological processes. Biological relevance of pH, measurement of pH, pKa of functional groups in biopolymers such as proteins and nucleic acids. Importance of buffers in biological systems, ion selective electrodes, and oxygen electrode. Donnan membrane equilibrium. Significance of osmotic pressure in biological systems.

**Unit – II : Carbohydrates 12 hours**

Carbohydrates: Classification, monosaccharides, D and L designation, open chain and cyclic structures, epimers and anomers, mutarotation, reactions of carbohydrates (due to functional groups - hydroxyl, aldehyde and ketone). Amino sugars, Glycosides. Structure and biological importance of disaccharides (sucrose, lactose, maltose, isomaltose, trehalose), trisaccharides (raffinose, melezitose), structural polysaccharides (cellulose, chitin, pectin) and storage polysaccharides (starch, inulin, glycogen). Glycosaminoglycans, Bacterial cell wall polysaccharides. Outlines of glycoproteins, glycolipids and blood group substances.

**Unit – III Lipids 12 hours**

Lipids: Classification, saturated and unsaturated fatty acids, structure and properties of fats and oils (acid, saponification and iodine values, rancidity). General properties and structures of phospholipids, sphingolipids and cholesterol. Prostaglandins- structure and biological role of PGD<sub>2</sub>, PGE<sub>2</sub> and PGF<sub>2</sub> α. Lipoproteins: Types and functions Biomembranes: Behavior of amphipathic lipids in water- formation of micelles, bilayers, vesicles, liposomes. Membrane composition and organization – Fluid mosaic model.

**Unit-IV : Amino Acids and Peptides 12 hours**

Amino Acids: Classification, structure, stereochemistry, chemical reactions of amino acids due to carbonyl and amino groups. Titration curve of glycine and pK values. Essential and non- essential amino acids, non-protein amino acids. Peptide bond - nature and conformation. Naturally occurring peptides – glutathione, enkephalin.

**Unit-V : Proteins 12 hours**

Proteins: Classification based on solubility, shape and function. Determination of amino acid composition of proteins. General properties of proteins, denaturation and renaturation of proteins. Structural organization of proteins- primary, secondary, tertiary and quaternary structures (Eg. Hemoglobin and Myoglobin), forces stabilizing the structure of protein. Outlines of protein sequencing.

## Semester-II

### Paper-II Nucleic acids and Biochemical Techniques

#### Unit-I : Nucleic Acids 12 hours

Nature of nucleic acids. Structure of purines and pyrimidines, nucleosides, nucleotides. Stability and formation of phosphodiester linkages. Effect of acids, alkali and nucleases on DNA and RNA. Structure of Nucleic acids- Watson-Crick DNA double helix structure, introduction to circular DNA, super coiling, helix to random coil transition, denaturation of nucleic acids hyper chromic effect,  $T_m$ -values and their significance. Reassociation kinetics, cot curves and their significance. Types of RNA and DNA.

#### Unit-II: Porphyrins 9 hours

Structure of porphyrins; Protoporphyrin, porphobilinogen properties Identification of Porphyrins. Structure of metalloporphyrins – Heme, cytochromes and chlorophylls.

#### Unit-III: Biochemical Techniques I 15 hours

Methods of tissue homogenization: (Potter-Elvehjem, mechanical blender, sonicator and enzymatic). Principle and applications of centrifugation techniques- differential, density gradient. Ultracentrifugation-preparative and analytical. Principle and applications of chromatographic techniques- paper, thin layer, gel filtration, ionexchange and affinity chromatography. Elementary treatment of an enzyme purification. Electrophoresis- principles and applications of paper, polyacrylamide (native and SDS) and agarose gel electrophoresis.

#### Unit-IV: Biochemical Techniques II 12 hours

Colorimetry and Spectrophotometry- Laws of light absorption- Beer-Lambert law. UV and visible absorption spectra, molar extinction coefficient, biochemical applications of spectrophotometer. Principle of fluorimetry. Tracer techniques: Radio isotopes, units of radio activity, half life,  $\beta$  and  $\gamma$ - emitters, use of radioactive isotopes in biology.

#### Unit- V : Techniques employed in metabolic studies 12 hours

Broad outlines of Intermediary metabolism, methods of investigation, Intermediary metabolism in vivo studies such as analysis of excretion, Respiratory exchange, Removal of organs and perfusion studies, in vitro studies such as tissue slice techniques; Homogenates and purified enzyme systems; isotope tracer studies, use of inhibitors and antimetabolites.

#### Practical - 2 : Nucleic acids and Biochemical Techniques 45 hrs

List of Experiments: (3 periods/week)

**Semester III**  
**Paper-III : Enzymology and Bioenergetics**

**Unit-I: Classification of Enzymes and Structure 12 hours**

Introduction to biocatalysis, differences between chemical and biological catalysis. Nomenclature and classification of enzymes. Enzyme specificity. Active site. Principles of energy of activation, transition state. Interaction between enzyme and substrate- lock and key, induced fit models. Definition of holo-enzyme, apo-enzyme, coenzyme, cofactor. Fundamentals of enzyme assay, enzyme units.

**Unit II: Influence of Physical factors and Inhibitors on Enzyme activity. 12 hours**

Factors affecting the catalysis- substrate concentration,  $pH$ , temperature. Michaelis – Menten equation for uni-substrate reaction (derivation not necessary), significance of  $KM$  and  $V_{max}$ . Enzyme inhibition- irreversible and reversible, types of reversible inhibitions- competitive and non-competitive.

**Unit-III: Mechanism of enzyme action 12 hours**

Outline of mechanism of enzyme action- acid-base catalysis, covalent catalysis, electrostatic catalysis, and metal ion catalysis. Regulation of enzyme activity- allosterism and cooperativity, ATCase as an allosteric enzyme, covalent modulation- covalent phosphorylation of phosphorylase, zymogen activation- activation of trypsinogen and chymotrypsinogen. Isoenzymes (LDH). Multienzyme complexes (PDH). Ribozyme.

**Unit- IV: Bioenergetics 12 hours**

Bioenergetics: Thermodynamic principles – Chemical equilibria; free energy, enthalpy (H), entropy (S). Free energy change in biological transformations in living systems; High energy compounds. Energy, change, oxidation-reduction reactions.

**Unit V : Biological Oxidations in Mitochondria 12 hours**

Organization of electron carriers and enzymes in mitochondria. Classes of electron-transferring enzymes, inhibitors of electron transport. Oxidative phosphorylation. Uncouplers and inhibitors of oxidative phosphorylation. Mechanism of oxidative phosphorylation.

**Practical – 3: Enzymology**

**List of Experiments: 45 hrs**

1. Assay of amylase
2. Assay of urease
3. Assay of catalase.

## **Semester - IV**

### **Paper-IV : Intermediary Metabolism**

#### **Unit- I : Carbohydrate Metabolism 12 hours**

Concept of anabolism and catabolism. Glycolytic pathway, energy yield. Fate of pyruvate formation of lactate and ethanol, Pasteur effect. Citric acid cycle, regulation, energy yield, amphipathic role. Anaplerotic reactions. Glycogenolysis and glycogenesis. Pentose phosphate pathway. Gluconeogenesis. Photosynthesis- Light and Dark reactions, Calvin cycle, C4 Pathway. Disorders of carbohydrate metabolism- Diabetes Mellitus.

#### **Unit- II : Lipid Metabolism 12 hours**

Catabolism of fatty acids ( $\beta$ - oxidation) with even and odd number of carbon atoms, Ketogenesis, *de novo* synthesis of fatty acids, elongation of fatty acids in mitochondria and microsomes, Biosynthesis and degradation of triacylglycerol and lecithin. Biosynthesis of cholesterol. Disorders of lipid metabolism.

#### **Unit- III: Metabolism of Amino acids 12 hours**

General reactions of amino acid metabolism- transamination, decarboxylation and deamination, Urea cycle and regulation, Catabolism of carbon skeleton of amino acids- glycolytic and ketogenic amino acids. Metabolism of glycine, serine, aspartic acid, methionine, phenylalanine and leucine. Biosynthesis of creatine. Inborn errors of aromatic and branched chain amino acid metabolism.

#### **Unit- IV: Nitrogen Fixation 12 hours**

Nitrogen cycle, Non-biological and biological nitrogen fixation, Nitrogenase system. Utilization of nitrate ion, Ammonia incorporation into organic compounds. Synthesis of glutamine and regulatory mechanism of glutamine synthase.

#### **Unit- V: Metabolism of Nucleic acid and heme: 12 hours**

Biosynthesis and regulation of purine and pyrimidine nucleotides, *de novo* and salvage pathways. Catabolism of purines and pyrimidines. Biosynthesis of deoxyribo nucleotides ribonucleotide reductase and thymidylate synthase and their significance. Disorders of nucleotide metabolism- Gout, Lesch- Nyhan syndrome. Biosynthesis and degradation of heme.

#### **Practical – 4: Quantitative Analysis**

##### **List of Experiments: 45 hrs**

1. Estimation of amino acid by Ninhydrin method.

## Biochemistry

### Semester-V

#### Paper – V : Physiology, Clinical Biochemistry and Immunology

##### Unit- I : Physiology 12 hours

Digestion and absorption of carbohydrates, lipids and proteins. Composition of blood and coagulation of blood. Hemoglobin and transport of gases in blood (oxygen and CO<sub>2</sub>). Muscle- kinds of muscles and mechanism of muscle contraction.

##### Unit II: Endocrinology 12 hours

Endocrinology- organization of endocrine system. Classification of hormones. Outlines of chemistry, physiological role and disorders of hormones of thyroid, parathyroid, pituitary and hypothalamus. Introduction of gastro intestinal hormones. Mechanism of hormonal action signal transduction pathways for gluco corticoids and insulin. Adrenalin, estrogen and progesterone.

##### Unit- III : Nutritional Biochemistry 12 hours

Balanced diet. Calorific values of foods and their determination by bomb calorimeter. BMR and factors affecting it. Specific dynamic action of foods. Energy requirements and recommended dietary allowance (RDA) for children, adults, pregnant and lactating women. Sources of complete and incomplete proteins. Biological value of proteins. Malnutrition- Kwashiorkar, Marasmus and PEM. Vitamins- sources, structure, biochemical roles, deficiency disorders of water and fat soluble vitamins. Introduction to nutraceutical and functional foods. Bulk and trace elements-Ca, Mg, Fe, I, Cu, Mo, Zn, Se and F. Obesity and starvation.

##### Unit- IV : Clinical Biochemistry 12 hours

Plasma proteins in health and disease. Disorders of blood coagulation (haemophilia). Types of anemias, haemoglobinopathies-sickle cell anemia. Liver diseases-jaundice. Liver function tests- conjugated and total bilirubin in serum, albumin: globulin ratio, Serum enzymes in liver diseases- SGPT, GGT and alkaline phosphatase. Kidneys-structure of nephron, urine formation, normal and abnormal constituents of urine. Biological buffers. Role of kidneys in maintaining acid-base and electrolyte balance in the body. Renal function test- creatinine.

##### Unit- V : Immunology 12 hours

Organization of immune system. Organs and cells of immune system. Innate and acquired immunity. Cell mediated and humoral immunity (T- and B- cells). Classification of

immunoglobulins, structure of IgG. Epitopes / antigenic determinants. Concept of haptens. Adjuvants. Monoclonal antibodies. Antigen-antibody reactions- agglutination, immunoprecipitation, immunodiffusion. Blood group antigens. Immunodiagnostics- ELISA. Vaccines and their classification. Traditional vaccines-live and attenuated. Modern vaccines-recombinant and peptide vaccines. Outlines of hypersensitivity reactions.

## SEMESTER V

### Paper – VI(A): Basic Microbiology (Elective-1)

#### **Unit –I : History of Development of Microbiology 12hrs**

Development of microbiology as a discipline, Spontaneous generation vs. biogenesis. Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming. Role of microorganisms in fermentation, Germ theory of disease, Development of various microbiological techniques. Establishment of fields of medical microbiology and immunology through the work of Paul Ehrlich, Elie Metchnikoff, Edward Jenner

#### **Unit-II: Diversity of Microbial world 12hrs**

Binomial Nomenclature, Whittaker's five kingdom and Carl Woese's three kingdom classification systems and their utility. Difference between prokaryotic and eukaryotic microorganisms. General characteristics of different groups: acellular microorganisms (Viruses, Viroids, Prions) and Cellular microorganisms (Bacteria, Algae, Fungi and Protozoa) with emphasis on distribution and occurrence and mode of reproduction.

#### **Unit-III : Viruses, Bacteria and Protozoa 12hrs**

An introduction to viruses with special reference to the structure and replication of the following: Poxvirus and Poliovirus. Bacterial Diseases- Cholera and Typhoid. TMV and T4 . Protozoan Diseases- Amebiasis and Malaria.

#### **Unit- IV: Algae 12hrs**

History of phycology; General characteristics of algae: occurrence, thallus organization, algae cell ultra structure, pigments, flagella, eyespot food reserves and vegetative, asexual and sexual reproduction. Applications of Algae in agriculture, industry, environment and food.

#### **Unit- V: Fungi 12hrs**

General characteristics of fungi - habitat, distribution, nutritional requirements, fungal cell ultra-structure, thallus organization and aggregation, fungal wall structure and synthesis, asexual reproduction, sexual reproduction, heterokaryosis, heterothallism and parasexual mechanism. Economic Importance of Fungi in Agriculture, environment, Industry, medicine, food, biodeterioration, m

**ELECTIVE PRACTICAL- 6A: BASIC MICROBIOLOGY****List of Experiments:**

1. Microbiology Laboratory Practices and Bio safety.
2. To study the principle and applications of important instruments (biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter)
3. Preparation and sterilization of culture media for bacterial cultivation
4. Study of different shapes of bacteria, fungi, algae, protozoa using permanent slides/ pictographs
5. Staining of bacteria using Gram stain
6. Isolation of pure cultures of bacteria by streaking method.
7. Estimation of CFU count.

**SUGGESTED READINGS**

1. Atlas RM. (1997). Principles of Microbiology. 2nd edition. W M.T.Brown Publishers.
2. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill B

## SEMESTER V

### **Paper – VI(B) : Molecular Basis of Infectious Diseases (Elective-2)**

#### **Unit-I : Classification of infectious agents 12 hrs**

Bacteria, Viruses, protozoa and fungi. Past and present emerging and re-emerging infectious diseases and pathogens. Source, reservoir and transmission of pathogens, Antigenic shift and antigenic drift. Host parasite relationship, types of infections associated with parasitic organisms. Overview of viral and bacterial pathogenesis. Infection and evasion.

#### **Unit-II: Overview of diseases caused by bacteria 12 hrs**

Detailed study of tuberculosis: History, causative agent, molecular basis of host specificity, infection and pathogenicity, Diagnostics, Therapeutics, inhibitors and vaccines. Drug resistance and implications on public health. Other bacterial diseases including Typhoid, Diphtheria, Pertussis, Tetanus and Pneumonia.

#### **Unit –III: Overview of diseases caused by Viruses 12 hrs**

Detailed study of AIDS, history, causative agent, pathogenesis, Diagnostics, Drugs and inhibitors. Other viral diseases including hepatitis, influenza, rabies, chikungunya and polio.

#### **Unit-IV: Overview of diseases caused by Parasites 12 hrs**

Detailed study of Malaria, history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Drugs and Inhibitors, Resistance, Vaccine development. Other diseases including leishmaniasis, amoebiasis.

#### **Unit-V: Overview of diseases caused by other organisms 12 hrs**

Fungal diseases, General characteristics. Medical importance of major groups, pathogenesis, treatment.

#### **Elective Practical -6B: MOLECULAR BASIS OF INFECTIOUS DISEASES 45 hrs 3 periods/ Week**

##### **List of Experiments:**

1. Permanent slides of pathogens. Mycobacterium tuberculosis, Leishmania, Plasmodium falciparum
2. WIDAL test
3. Gram staining
4. Acid fast staining
4. PCR based diagnosis
5. Dot Blot ELISA
6. Immunization Programme- Field visit

### **SUGGESTED READINGS**

1. Prescott, Harley, Klein's Microbiology (2008) 7 th Ed., Willey, J.M., Sherwood, L.M., Woolverton, C.J. Mc Graw Hill International Edition (New York) ISBN: 978-007126727.
2. Mandell, Douglas and Bennett.S, Principles and practices of Infectious diseases, 7edition, Volume, 2. Churchill Livingstone Elsevier.
3. Sherris Medical Microbiology: An Introduction to Infectious Diseases by Kenneth J.Ryan, C.George Ray, Publisher: McGraw-Hill
4. Medical Microbiology by Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller, Elsevier Health S

## Semester – VI

### Paper – VII : Microbiology and Molecular Biology

#### Unit- I : Microbiology 12hours

Introduction to brief history of microbiology. Classification of microorganisms- prokaryotic and eukaryotic microorganisms. Isolation and cultivation of bacteria. Selective media and enriched media. Bacterial growth curve and kinetics of growth. Gram's staining- Gram positive and Gram negative bacteria, motility and sporulation. Structure and composition of viruses. Isolation and cultivation of bacterial plaques. Lytic and lysogenic life cycle of  $\lambda$  phage. Retro viruses- HIV.

#### Unit II-Applied Biochemistry 12 hours

Fermentation Technology: Batch, continuous culture techniques, principle types of fermentors. Industrial production of chemicals- alcohol, acids (citric acid), solvents (acetone), antibiotics (penicillin), Enzyme Technology: Immobilization of enzymes and cells, different methods. Industrial applications. Production of transgenic plants and their applications. Introduction to Bioinformatics- definitions of proteomics and genomics. Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignments- BLAST and FASTA.

#### Unit- III : DNA Replication and Transcription 12 hours

Nature and structure of the gene. DNA replication- models of replication, Meselson-Stahl's experimental proof for semi-conservative model. DNA polymerases I, II and III of *E.coli*, helicase, topoisomerases, primase, ligase. Bidirectional replication model. Okazaki fragments, leading and lagging strands of DNA synthesis. Inhibitors of DNA replication. Transcription - RNA synthesis, RNA polymerases of prokaryotes. Promoters, Initiation- sigma factors and their recognition sites. Elongation- role of core enzyme. Termination- rho dependent and rho independent.

#### Unit- IV: Protein Synthesis and Regulation of Gene Expression 12 hours

Introduction to protein synthesis- Genetic code, deciphering of genetic code, Nirenberg's and Khorana's experiments, wobble hypothesis, degeneracy of genetic code.

Protein synthesis- activation of amino acids (aminoacyl t-RNA synthetases). Ribosome structure. Initiation, elongation and termination of protein synthesis. Post- translational modifications signal hypothesis. Inhibitors of protein synthesis. Regulation of prokaryotic gene expression- induction and repression. Lac operon.

#### **Unit- V: Recombinant DNA technology 12 hours**

Outlines of cloning strategies. DNA sequencing- Maxam Gilbert and Sanger's methods. Tools of r-DNA technology: Enzymes- Restriction endonucleases, ligase, phosphatases, reverse transcriptase, polynucleotide kinases, terminal transferase nucleases-S1 and RNAase H.

Restriction mapping. Cloning vectors- Plasmid, Expression vector - Host- *E.coli*.

Construction of c-DNA and genomic libraries. Isolation and sequencing of cloned genes- colony hybridization, nucleic acid hybridization. Polymerase chain reaction- principle and applications. Outlines of blotting techniques-Southern, Northern and Western.

Applications of gene cloning- production of insulin and human growth hormone, production of Bt cotton and edible vaccines.

#### **Practical- 7: Microbiology and Molecular Biology 45 hrs**

##### **List of Experiments:**

1. Preparation of culture media and sterilization methods.
2. Isolation of pure cultures: (i) Streak plate method. (ii) Serial dilution method.
3. Gram staining.
4. Motility of bacteria by hanging drop method.
5. Antibiotic sensitivity by paper disc method.
6. Isolation of DNA from onion/liver/coconut endosperm.
7. Estimation of DNA by diphenylamine method.
8. Estimation of RNA by orcinol method..
9. Sequence alignments of insulin/BSA with other proteins using BLAST and FASTA.
10. Examination of milk quality

## Semester – VI

## Cluster Elective : VIII-A

## PAPER-VIII-A1 : NUTRITIONAL BIOCHEMISTRY

**Unit-I: Nutrition & Diet**

- 1.1 Introduction & definition-Foods and Nutrition
- 1.2 Principle food components, balanced diet
- 1.3 Nutritional requirement & recommended dietary allowance (RDA)
- 1.4 (BMR) Basal Metabolic Rate
- 1.5 Body Composition & Energy requirements

**Unit-II: Proteins in Nutrition**

- 2.1 Biological value of proteins
- 2.2 Protein calorie deficiencies
- 2.3 Kwashiorkor
- 2.4 Marasmus
- 2.5 Malnutrition

**Unit-III: Mineral Nutrients**

- 3.1 Micro Nutrients
- 3.2 Macro Nutrients
- 3.3 Dietary sources deficiency and recommended dietary allowances of calcium, phosphorus  
& Iron
- 3.4 Dietary sources, deficiency and recommended dietary allowance of trace elements

**Unit-IV: Vitamins**

- 4.1 Fat soluble vitamins
- 4.2 Vitamin A, D, E & K
- 4.3 Water soluble vitamins
- 4.4 Vitamin B6 complex, Vitamin B5, Folic acid

**Unit-V: Fatty Acids**

- 5.1 Essential Fatty Acids
- 5.2 Energy value of fats
- 5.3 Phospholipids in Nutrition
- 5.4 Nutrition in pregnancy
- 5.5 Nutrition for Infants

**PAPER-VIII-A2 : CLINICAL BIOCHEMISTRY**

<b>UNIT – I: Basic Medical Laboratory Principles and Procedures:</b>	10 Hours
1.1 Introduction to clinical biochemistry.	
1.2 Uses of Biochemical tests	
1.3 Specimen Collection and sample analysis, Reference values.	
1.4 Quality Control, Automation.	
<b>UNIT – II: Clinical Biochemistry of carbohydrates, proteins &amp; Lipids:</b>	20 Hours
2.1 Regulation of Blood Sugar, Tests for Diabetes, Fasting Blood Glucose, PP.	
2.2 Glucose Tolerance Test, Glycosylated Hemoglobin.	
2.3 Determination of plasma proteins and its importance.	
2.4 General lipid Metabolism, functions and disorders of plasma lipoproteins.	
<b>UNIT – III: Clinical Enzymology:</b>	10 Hours
3.1 Plasma Enzymes in Diagnosis.	
3.2 Chemical significance, SGOT, SGPT, LDH, CK, ALP & Amylase.	
3.3 Enzymes in Diagnosis of Liver, Heart muscle disorders.	
<b>UNIT – IV: Water &amp; Mineral Metabolism and Acid-Base Balance:</b>	10 Hours
4.1 Body fluid distribution (Electrolyte and water)	
4.2 Factors which influence the distribution of body water.	
4.3 Acid-Base balance in body, Acidosis and Alkalosis.	
4.4 Buffer systems in body to regulate acid-base balance.	
<b>UNIT – V: Organ Function Tests:</b>	10 Hours
5.1 Kidney function tests.	
5.2 Serum creatinine, Creatinine clearance.	
5.3 Liver function tests.	
5.4 Ischemic heart disease, Jaundice	
5.5 Gastric and pancreatic function tests.	
<b>Practicals:</b>	
1. Glucose Tolerance test.	

## **Paper: VIII-A3 : MEDICAL MICROBIOLOGY**

### **Unit –I Microbial and Human Interactions:**

Normal microbial population of healthy human body - Skin, mouth, upper respiratory tract, intestinal tract, urino-genital tract, eye.

### **Unit –II Harmful Microbial and Human Interactions :**

Entry of pathogens into the host, types of bacterial pathogens, Mechanism of bacterial pathogenicity, colonization and growth, Virulence, Virulence factors – exotoxins, enterotoxins, endotoxins, neurotoxins

### **Unit –III General Account of Epidemiology:**

Principles of epidemiology, Current epidemics (AIDS, Nosocomial, Acute respiratory Syndrome,) Measures for prevention of epidemics –Global health consideration, Emerging and reemerging infectious diseases Biological warfare and biological weapons.

### **Unit –IV Person to person Microbial disease:**

Names of pathogen, disease symptoms, and preventive measures airborne transmission of diseases by airborne pathogens: Streptococcal diseases, Corynebacterium Diphtheria, and Whooping cough, Mycobacterium Tuberculosis Direct contact transmission of diseases: Staphylococcus, Hepatitis viruses. Sexually transmitted diseases: Gonorrhoea and syphilis

### **Unit –V Animal transmitted, Artropod transmitted, Soil borne and Water borne microbial diseases:**

Animal transmitted disease: Rabies Artropod transmitted disease: Malaria Soil borne diseases: Tetanus Water borne microbial diseases: Cholera, Giardiasis,.

List of Experiments: Project work

**YOGI VEMANA UNIVERSITY**

**B.Sc., Biotechnology: Choice Based Credit System**

**B.Sc., SEMESTER I**

**PAPER-I: MICROBIOLOGY AND CELL BIOLOGY**

**UNIT I**

**History, Development and Microscopy**

History and development of microbiology: contributions of Louis Pasteur, Robert Koch and Edward Jenner. Microscopy: Compound microscopy: Numerical aperture and its importance, resolving power, oil immersion objectives and their significance, principles and applications of dark field, phase contrast, fluorescent microscopy. Electron microscopy: Principle, ray diagram and applications, TEM and SEM, comparison between optical and electron microscope, limitations of electron microscopy. Stains and staining procedures: Acidic, basic and neutral stains, Gram staining, Acid fast staining, Flagella staining, Endospore staining.

**UNIT II**

**Bacteria:** Bacterial morphology and subcellular structures, general morphology of bacteria, shapes and sizes, generalized diagram of typical bacterial cell. Slime layer and capsule, difference between the structure, function and the position of the two structures. Cell wall of gram +ve and Gram -ve cells. General account of flagella and fimbriae. Chromatin material, plasmids; definition and kind of plasmids (conjugative and non-conjugative) F, R, and Col plasmids. Endospores: Detailed study of endospore structure and its formation, germination, basis of resistance.

**Viruses:** General characteristics of viruses, difference between virus and typical microbial cell, structure, different shapes and symmetries with one example of each type, classification of viruses on the basis of nucleic acids, phage and animal cell viruses, example of each and their importance. Brief idea of lytic cycle and lysogeny.

**UNIT III**

**Microbial Nutrition:** Basic nutritional requirements: Basic idea of such nutrients as water, carbon, nitrogen, sulfur and vitamins etc., natural and synthetic media, nutritional classification of bacteria. Selective and Differential media, Enriched media, Enrichment media.

**Microbial growth and control: Growth:** Growth rate and generation time, details of growth curve and its various phases. **Concept** of synchronous cultures, continuous and batch cultures (chemostat and turbidostat). Measurement of growth. Physical conditions required for growth: Temperature (classification of microorganisms on the basis of temperature requirements), pH etc. Pure cultures and cultural characteristics. Maintenance of pure culture. **Microbial Control:** Terminologies - Sterilization, disinfection, antiseptic, sanitization, germicide, microbistasis, preservative and antimicrobial agents. **Mechanism** of cell injury: Damage to cell wall, cell membrane, denaturation of proteins, inhibition of protein synthesis, transcription, replication, other metabolic reactions and change in supercoiling of DNA. Physical methods of control: Temperature (moist heat, autoclave, dry heat, hot air oven and incinerators), desiccation, surface tension, osmotic pressure, radiation, UV light, electricity, ultrasonic sound waves, filtration. Chemical methods of control: Antiseptics and disinfectants (halogens, alcohol, gaseous sterilization. Concept of biological control.

## UNIT V

**Cell Biology:** Eukaryotic Cell - Structure and function of the following: nucleus, nuclear membrane, nucleoplasm, nucleolus, golgi complex, Mitochondria, Chloroplast, endoplasmic reticulum, lysosomes, peroxisomes, glyoxisomes and vacuoles.

### Reference books:

1. Microbiology-Concept and applications, Pelczar M.J.J, E.C.S. Chang & N.R. Krieg, 1993. McGraw Hill company New York
2. Microbiology. Prescott L.M, J.D. Harley & D. A. Klein, 1999. McGraw Hill
3. General Microbiology, Stanier, 1986. McMillan Publishing Co
4. Microbiology - An Introduction, 4th Edition, Gerard J. Tortora, Berdell R. Funke, Christine L. Care, 1992. The Benjamin/Cummings Publishing Company, Inc

**B. Sc. SEMESTER II****PAPER-II: MACROMOLECULES, ENZYMOLOGY AND BIOENERGETICS****UNIT I**

**Nucleic Acids and Chromosomes:** Chemical structure and base composition of nucleic acids, Chargaff's rules, Watson Crick Model (B-DNA), deviations from Watson-Crick model, other forms of DNA (A- and Z-DNA), forces stabilizing nucleic acid structures, (hydrogen bonds and hydrophobic associations, base stacking).

**UNIT II**

**Amino acids and Proteins:** Structure of amino acids occurring in proteins, classification of amino acids (pH based, polarity based and nutrition based physico-chemical properties of amino acids. Primary, Secondary, Tertiary & Quaternary structure of proteins.

**UNIT III**

Carbohydrates: Definition, classification, nomenclature of carbohydrates, structures of monosaccharides, disaccharides and polysaccharides. Concept and examples of heteropolysaccharides.

Lipid: Types of lipids, structures of saturated and unsaturated fatty acids, triglycerides, phospholipids, Concept of acid value, saponification value and iodine value. Chemistry of Porphyrines. Heme, Cytochromes, and Chlorophylls.

**UNIT IV**

**Enzymes:** Terminology: Active site, allosteric site, Holoenzyme, apoenzyme, coenzyme, substrate, inhibitor, activator, modulator etc. Classification and nomenclature of enzymes. Substrate Specificity (bond specificity, group specificity, absolute specificity,

stereospecificity), lock and key and induced fit models. Enzyme kinetics: Michaelis-Menten equation, effect of substrate concentration, effect of enzyme concentration, effect of p H and temperature, temperature. Enzyme inhibition kinetics (reversible inhibition types – competitive, uncompetitive and non-competitive), brief idea of irreversible inhibition.

#### UNIT V

**Bioenergetics:** Concept of free energy, Entropy, Enthalpy & Redox Potential. Concept of high energy bonds as related to the structure of ATP, Phosphoenolpyruvate, Creatine phosphate etc. Glycolysis (pathway, entry of other monosachharides and disaccharides, regulation, inhibitors) Gluconeogenesis: Bypass reactions.

#### References:

1. Lehninger. 2000. Principles of Biochemistry, CBS Publishers
2. Stryer, L., 2002. Biochemistry. W.H. Freeman
3. Harper, 2003. Biochemistry. McGraw-Hill
4. Voet, D. and Voet, J.G. 1995. Biochemistry

#### PRACTICAL-II: MACROMOLECULES & ENZYMOLOGY

1. Qualitative estimation of Carbohydrates
2. Qualitative estimation of Amino acids
3. Quantitative Estimation of proteins by Biuret method
4. Estimation of DNA by Diphenylamine method
5. Estimation of RNA by Orcinol method
6. Quantitative estimation of sugars (Dinitrosalicylic acid method).
7. Estimation of glucose by Benedict's quantitative method

## B.Sc., SEMESTER III

### PAPER- III: BIOPHYSICAL TECHNIQUES

#### UNIT – I

**Spectrophotometry:** Spectrum of light, absorption of electromagnetic radiations, Beer's law - derivation and deviations, extinction coefficient. Instrumentation of Colorimeter; UV and visible spectrophotometry, Double beam spectrometer; dual-wavelength spectrometer, Applications of UV and visible spectrophotometry.

#### UNIT II:

**Chromatography:** Partition principle, partition coefficient, nature of partition forces, brief account of paper chromatography. Thin layer chromatography and column chromatography. Gel filtration: Principle, instrumentation and applications. Ionexchange chromatography: Principle, instrumentation and applications. Affinity chromatography: Principle, instrumentation and applications. HPLC

#### UNIT III

**Electrophoresis:** Migration of ions in electric field, Factors affecting electrophoretic mobility. Gel electrophoresis: - Types of gels, SDS-PAGE Electrophoresis and applications. Agarose gel electrophoresis, applications. Isoelectric focusing Pulsed-field gel electrophoresis.

#### UNIT – IV:

**Isotopic tracer technique:** Radioactive & stable isotopes, rate of radioactive decay. Units of radioactivity. Concept of measurement of radioactivity, Cerenkov radiation. Measurement of

Stable isotopes: Falling drop method for deuterium measurement, Principles of tracer technique, advantages and limitations, applications of isotopes in biotechnology

#### UNIT V:

**Centrifugation:** Basic principles, concept of RCF, types of centrifuges (clinical, high speed and ultracentrifuges). Preparative centrifugation: Differential and density gradient centrifugation, applications (Isolation of cell components). Analytical centrifugation: Sedimentation coefficient, determination of molecular weight by sedimentation velocity and sedimentation equilibrium methods.

**Biostatistics** Basic concepts of mean, median, mode, Standard deviation and Standard error. Introduction to ANOVA

#### Reference books:

1. Wilson, K. & Walker, J., 2000. Practical Biochemistry.
2. Biophysical chemistry – **Upadhyay**, Himalaya Publication edition 3, 2005.
3. Fundamentals Of Biostatistics by Khan (Author), Khanum Ukaaz Publications, Hyderabad.

#### **PRACTICAL-III: BIOPHYSICAL TECHNIQUES LAB**

1. Spectrophotometric analysis of DNA denaturation.
2. Determination of absorption spectrum of oxy- and deoxyhemoglobin and methemoglobin.
3. Protein estimation by E280/E260 method.
4. Paper chromatography of amino acids/sugars.
5. TLC of sugars/amino acids.
6. Cellular fractionation and separation of cell organelles using centrifuge.
7. Isolation of mitochondria and assay of marker enzyme.
8. Estimation of Urea by diacetyl monoxime method.
9. Estimation of Sugars by Folin Wu method

**B. Sc. SEMESTER IV**  
**PAPER-IV: IMMUNOLOGY**

**UNIT I**

**Immune system:** History and introduction to immunology; Organs and cells of immune system; Immunity- types; innate immune mechanism, Acquired immune mechanism.

**UNIT II**

**Antibody and Antigen:** Antibody structure and classes, Antibody diversity, Types of Antigens, Antigenicity (factors affecting antigenicity), haptens. Complement system.

**UNIT III**

**Immunity:** Cell mediated immunity: TC mediated immunity, NK cell mediated immunity, ADCC, brief description of cytokines and MHC (MHC types and diversity), Primary and secondary immune response; Humoral immunity

**UNIT IV**

**Hypersensitivity and vaccination:** General features of hypersensitivity, various types of hypersensitivity, Autoimmunity – any two diseases as examples; Vaccination: Discovery, principles, significance, Types of Vaccines.

**UNIT V**

**Immunological Techniques:** Antigen-antibody reactions: Precipitation, agglutination, complement fixation, immunodiffusion, ELISA. Hybridoma technology: Monoclonal antibodies and their applications in immunodiagnosis.

**References:**

1. Immunology by J.Kubey (1993) Freeman and company
2. Essential immunology, Ivan Riott, 2000. Blackwell Science, 9th Edition
3. The Elements of Immunology by Fahim Halim Khan (2009) Pearson Education Limited

**PRACTICAL-IV: IMMUNOLOGY LAB**

1. Antigen – antibody reaction – determination of Blood group, Cross reactivity
2. Pregnancy test
3. Widal test
4. Ouchterloney immunodiffusion
5. Radial immunodiffusion
6. ELISA
7. Isolation of casein by isoelectric precipitation
8. Production of antibodies and their titration

**Note:** - Mandatory to perform atleast 6 practicals

## B. Sc. III –Semester V

### PAPER- V: MOLECULAR BIOLOGY

#### Unit I:

**Genome Structure:** Watson and Crick model of DNA; Genome organization with specific reference to prokaryotic and eukaryotic genomes; Genome size. Concepts of Genetic Material, Gene, Chromosome and Genome. Experiments to prove DNA and RNA as genetic material (Griffith experiment, Hershey- Chase experiment, Fraenkel-Conrat experiment).

#### Unit II

**DNA Replication:** Enzymology of replication (DNA polymerase I, pol II and III, helicases, topoisomerases, single strand binding proteins, primase. Proof of semiconservative replication, Replication origin, initiation, elongation, and termination in prokaryotes. Rolling circle replication of DNA.

#### Unit III

**Transcription :** Enzymatic synthesis of RNA: Basic features of transcription, structure of prokaryotic RNA polymerase (core enzyme and holo enzyme, sigma factor ), concept of promoter (Pribnow box, -10 and -35 sequences), Four steps of transcription (promoter binding and activation, RNA chain initiation, chain elongation, termination and release). Reverse transcription,

#### Unit IV

##### **Genetic Code and Protein Synthesis**

Genetic code: Features of genetic code, Structure of mRNA, brief structure of tRNA, the wobble hypothesis. Initiation, elongation, termination of protein synthesis in prokaryotes; Poly and Monocistronic m-RNA.

#### Unit V:

##### **Gene Expression and regulation**

Regulation of gene expression; Clustered genes and the operon concepts - Negative and positive control of the Lac Operon, trp operon, Control of gene expression.

#### References:

1. Molecular cell Biology (III rd Edition), Harvey Lodish, David Baltimore et al., W.H. Freeman, 2000.
2. The Molecular Biology of the Gene, J.D.Watson et al., 1987. Benjamin Cummings
3. Molecular Biology by David Freifelde

## B. Sc. III – Semester V

### PAPER-VI(A) : rDNA TECHNOLOGY (Elective Theory)

#### Unit I:

**Restriction and Modification.** Classification of restriction endonucleases. Enzymes used in molecular cloning: Polymerases, ligases, phosphatases, kinases and nucleases, reverse transcriptase and terminal transferase.

#### Unit II

**Cutting and joining DNA** (cohesive end ligation, methods of blunt end ligation). Transfection and transformation. Selection of transformed cells. Screening methods (Genetic marker and blue white screening)

Unit III: **Cloning vehicles** - Plasmid, Bacteriophage, Construction of genomic and cDNA libraries. Advantages of cDNA libraries.

#### Unit IV:

**Methods of gene sequencing** – Maxam - Gilberts and Sanger's dideoxy chain termination methods; Polymerase chain reaction technique (Components in PCR and PCR conditions)

**Methods of gene transfer** in fungi, yeast and higher plants using microinjection, microprojectile bombardment (gene gun method, Electroporation and Agrobacterium mediated transformation)

#### Unit V:

**Applications** of recombinant DNA technology in Agriculture (Transgenic Plants) Medicine (production of Insulin, Growth hormone, Tissue plasminogen activator and HBsAg vaccine)

#### References:

1. Principles of Gene Manipulation and Genomics - Primrose, S.B. and Twyman R.M. 2006. 7th Edition. Blackwell Publishing Company
2. A Text Book of Biotechnology. R.C. Dubey. S.Chand & Co Ltd, New Delhi.
3. Gene Cloning: An introduction by T. A. Brown (1986) 3<sup>rd</sup> Edition Gharman & Hall

## PAPER-VI(B) : GENETICS (Elective Theory)

### UNIT I

**Mendel's Laws and Inheritance:** Mendel experiments, Mendel Laws and deviations: incomplete dominance and Co dominance Penetration and pleiotropism, Recessive and Dominant epistatic gene interactions. Concept of multiple alleles.

### UNIT II

**Genes and their variations:** Structure of gene, gene and environment, gene copies of prokaryotic and Eukaryotic chromosomes. Eukaryotic chromosome organization, histone proteins.

### Unit III:

**Gene mutations:** Mutagenesis - Spontaneous and induced (Chemical and physical) mutations; Natural and induction of mutations, point mutations, frameshift mutations, auxotrophic conditional and suppressor mutations.

### UNIT IV:

**DNA Damage and DNA Repair:** Factors affecting DNA damage; Light induced repair, Excision repair and mismatch repair, Post replication repair, Rec gene and its role in DNA repair, SOS repair and SOS response

### Unit V:

**Transposable elements:** Structure and Molecular basis of AC-DS transposition in maize, "P" element of Drosophila and hybrid dysgenesis, Yeast "T7" elements, Retroposan

### References:

1. Principles of Genetics – **E.J.Gardener, M.J.Simmons and D.P.Snustad**, John Wiley & Sons Publications.
2. Molecular Biology of the Cell – **Alberts**. Garland publication, edition 4, 2002.
3. Genetics by P. K. Gupta (2014) Rastogi Publications

**B. Sc. III – Semester VI****PAPER-VII : PLANT AND ANIMAL BIOTECHNOLOGY****UNIT I:****Cell and tissue culture:**

Introduction to Plant Biotechnology: Principles of plant cell and tissue culture – totipotency, dedifferentiation, redifferentiation; Introduction to cell and Tissue culture Laboratory facilities; Types of media (Eg. MS Media & its composition), Preparation and sterilization. **UNIT II:**

**Tissue and micropropagation:** Somatic embryogenesis and organogenesis; Clonal Propagation of economically important plants (Banana), Production of secondary metabolites through plant tissue culture, Methods in the production of transgenic plants, Bt Cotton, Golden rice.

**UNIT III:**

**Various techniques of animal cell and tissue culture:** Basic laboratory facilities of animal cell culture laboratory, Culture media, growth factors. Characteristics of cells in culture: Contact inhibition, anchorage dependence, cell-cell communication etc.; Cell senescence; cell and tissue response to trophic factors. Primary culture, immortal cells, cell lines. d) Maintenance of cell lines in the laboratory.

**UNIT IV:**

**Gene transfer methods in animals:** Transgenesis, transgenic methods – microinjection, electroporation, lipofection, embryonic stem cell mediated-, retroviral mediated- Artificial insemination, In Vitro Fertilization, Embryo transfer in farm animals Production of Dolly..

**UNIT V:**

IPR: Intellectual property rights- patent, copyright, trademark etc Social, ethical and legal issues in Biotechnology.

**References:**

1. Introduction to Plant Biotechnology Chawla,(2003) (2nd edn) Oxford and IBH Publishers
2. A Text Book of Biotechnology. R.C. Dubey. S.Chand& Co Ltd, New Delhi.
3. Biotechnology, Satyanarayana. U, 2008, Books and Allied (p) Ltd.
4. Basic Biotechnology, S. Ignachimuthu. 1995. Tata McGraw Hill Publishers, New Delhi
5. Elements of Biotechnology by P. K. Gupta (2005) Rastogi Publications
6. Animal Biotechnology Recent Concepts And Developments (2013) MJP Publ

## PAPER-VIII-A1 : ENVIRONMENTAL BIOTECHNOLOGY

### Unit I:

**Principles of Ecology**, Water and terrestrial ecosystems, Bio-geo chemical cycles - Carbon, Nitrogen cycles. Role of microbes in bio-geochemical cycles.

### Unit II:

**Inorganic and Organic pollutants** of air, land and water; maintenance of standards, Environmental monitoring. Detection, treatment and prevention of pollution. Biological indicators

### Unit III:

**Biocides**, Four stage alternatives, Refuse disposal - Treatment methods, effluent from pharmaceuticals, fertilizers, pulp and paper industry.

### Unit IV:

**Waste water management** - Aerobic and anaerobic treatment, primary, secondary and tertiary treatment of municipal wastes, Solid waste management.

### Unit V:

**Bioremediation**, Biodegradation of recalcitrant compounds and the role of genetically engineered microbes and genetically modified organisms in the environmental management.

#### References:

1. Waste water engineering - treatment, disposal and reuse, Metcalf and Eddy Inc., Tata McGraw Hill, New Delhi.
2. Bioremediation. Baaker. KH and Herson D.S., 1994. Mc.GrawHill Inc. NewYork
3. Environmental biotechnology - **Alan Scragg**, Pearson Education Limited.

## PAPER-VIII-A2 : INDUSTRIAL BIOTECHNOLOGY

### Unit I:

**Isolation, Screening**, Preservation and Improvement of Industrially Important Microorganisms. Synthetic and Natural Medium, Precursors, Antifoams, Sterilization Methods and Inoculum Preparation.

### Unit II:

**Definition of bioreactor**, basic principles of bioreactor. Classification of bioreactors. Analysis of batch, continuous, fed batch and semi-continuous bioreactors.

### Unit III:

**Ethanol Production** by Fermentation using Molasses, Starchy Substances. Production of Alcoholic Beverages like Beer and Wine. Production of Citric Acid by Submerged and Solid State Fermentations.

### Unit IV:

**Sources of Industrial Enzymes**, Production of Microbial Enzymes like Amylase and protease. Baker's Yeast and SCP Production. Production of Antibiotics: Penicillin.

### Unit V:

**Biotechnology Products**- Production of recombinant proteins having therapeutic and diagnostic applications (Insulin, Growth Hormone, Recombinant vaccines, Monoclonal Antibody).

### References:

1. Industrial Microbiology by L.E Casida, John Wiley and sons INC
2. Industrial microbiology by A.H.Patel, Macillan India Ltd.

## PAPER-VIII-A3 : MEDICAL BIOTECHNOLOGY

### UNIT- I

Human Genetics and Human Genome: History and development of human Genome Project; organization of the human genome. – chromosome and gene organization -Inherited human diseases-single gene diseases,complex traits.

### UNIT- II

Gene Therapy: Identification and isolation of defective genes ,Cancer causes and genetics – Genetic Counselling.

Infectious Diseases: Classification: fungal, protozoal, helminthic, bacterial and viral; Hospital-acquired infections (nosocomial), Sexually transmitted Diseases.

### Unit -III

Immunology, Vaccines and Transplantation Technology

Antigens and Antibodies –Acquired and Innate Immunity, Immune system, Immune diseases,Allergy. Immunity to infections by viruses, bacteria, fungi and parasites. Blood groups. Monoclonal antibodies.

### Unit -IV

Embryonic Stem cells: Culture & Therapy. Artificial Blood. Aminocentosis. Biochemical and Molecular Diagnostics (PCR, ELISA, FISH, Microarray etc).Drug delivery methods

### UNIT- V

Social, Ethical and Legal Issues in Medical Biotechnology

IPR : patents and copyrights. Human cloning. Pre-natal sex determination and foeticide. Clinical Trials introduction.

## I B.Sc - SEMESTER- I: BOTANY SYLLABUS

### Paper- I : Microbial Diversity, Algae and Fungi

Total hours of teaching 60hrs @ 4 hrs per week

#### **UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12hrs)**

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
3. Brief account of special groups of bacteria- Archaeobacteria, Mycoplasma, Actinomycetes and Cyanobacteria.

#### **UNIT- II: VIRUSES**

**(12hrs)**

1. Viruses- Discovery, general account, structure & replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids, Prions.
2. Plant diseases caused by viruses– Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bhendi Vein clearing and Papaya leaf curl diseases.

#### **UNIT III: BACTERIA**

**(12hrs)**

1. Bacteria: Discovery, General characteristics, cell structure and nutrition.
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

#### **UNIT –IV Algae**

**(12hrs)**

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of Oedogonium, Ectocarpus and Polysiphonia.

#### **UNIT V: FUNGI**

**(12hrs)**

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota), Penicillium (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.

## I B. Sc - SEMESTER- II: BOTANY THEORY SYLLABUS

### Paper –II: Diversity of Archaeoniaties & Plant Anatomy

Total hours of teaching 60hrs @ 4 hrs per week

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#### UNIT – I: BRYOPHYTES

(12hrs)

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of Marchantia and Funaria.
3. Evolution of Sporophyte in Bryophytes.

#### UNIT - II: PTERIDOPHYTES

(12hrs)

1. Pteridophytes: General characters, classification (up to Classes)
2. Structure, reproduction and life history of Lycopodium, and Marsilea.
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

#### UNIT – III: GYMNOSPERMS

(12hrs)

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy, reproduction and life history of Pinus and Gnetum
3. Economic importance with reference to wood, essential oils and drugs

#### UNIT –IV: Tissues and Tissue systems

(12hrs)

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems–Epidermal, ground and vascular.

#### UNIT – V. Secondary growth

(12hrs)

1. Anomalous secondary growth in Achyranthes, Boerhaavia and Dracaena
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

**Suggested activity:** Collection of Marsilea sporocarp, Pinus needles, male and female cones, study pollen grains, collection of locally available economically useful timbers.

## II B. Sc - SEMESTER –III: BOTANY THEORY PAPER –III

### Paper-III : Plant Taxonomy and Embryology)

Total hours of teaching 60hrs @ 4 hrs per week

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#### UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12hrs)

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions & important herbaria, Botanical gardens, Flora.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

#### UNIT – II: CLASSIFICATION

(12 hrs)

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.
3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

#### UNIT –III: SYSTEMATIC TAXONOMY-I

(12hrs)

1. Systematic study and economic importance of the following families:  
Annonaceae, Brassicaceae, Rutaceae, Curcubitaceae, and Apiaceae.

#### UNIT –IV: SYSTEMATIC TAXONOMY-II

(12hrs)

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Arecaceae and Poaceae.

#### UNIT – V: EMBRYOLOGY

(12hrs)

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (Peperomia, Drusa, Adoxa) of embryo sacs.
3. Pollination and Fertilization (out lines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.

**Suggested activity:** Collection of locally available plants of medicinal importance, observing

**IIB.Sc. BOTANY, SEMESTER- IV, Paper-IV: THEORY SYLLABUS****PAPER –IV: Plant Physiology and Metabolism**Total hours of teaching 60hrs @ 4 hrs per week

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**UNIT – I: Plant – Water relations (12 hrs)**

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

**UNIT –II: Mineral nutrition & Enzymes (12hrs)**

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

**UNIT –III: PHOTOSYNTHESIS (12 hrs)**

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, carbon assimilation pathways: C<sub>3</sub>, C<sub>4</sub>, and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

**UNIT – IV: PLANT METABOLISM (12 hrs)**

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

**UNIT –V: GROWTH AND DEVELOPMENT (12hrs)**

1. Growth and development: definition, phases and kinetics of growth.

### III B. Sc - SEMESTER- V: BOTANY SYLLABUS THEORY PAPER – V

#### Paper-V: Cell Biology, Genetics and Plant Breeding

**Total hours of teaching 60 hrs @ 3 hrs per week**

##### UNIT – I Cell Biology:

**(12hrs)**

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

##### UNIT – II Genetic Material:

**(12hrs)**

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.

##### UNIT – III Mendelian Inheritance:

**(12 hrs)**

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
4. Crossing Over: concept & significance.

##### UNIT – IV Plant Breeding:

**(12 hrs)**

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

##### UNIT – V Breeding, Crop Improvement and Biotechnology:

**(12 hrs)**

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

### III B. Sc - SEMESTER- V: BOTANY THEORY SYLLABUS

#### PAPER-VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 3 hrs per week

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UNIT – I. Elements of Ecology (12 hrs)

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology (12 hrs)

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT – II Population & Community Ecology (12 hrs)

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.
3. Interaction between plants growing in a community.

UNIT – IV Phytogeography (12 hrs)

1. Principles of Phytogeography, Distribution (~~wides~~, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

UNIT- V: Plant Biodiversity and its importance (12 hrs)

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (*In-situ* and *ex-situ* methods).
4. Seed banks - conservation of genetic resources and their importance

**Suggested activity :** Collection of different soils, studying their texture, observing polluted water

### III B. Sc - BOTANY SYLLABUS SEMESTER- VI

#### Paper VII: Plant tissue culture and its biotechnological applications

Total hours of teaching 60hrs @ 3hrs per week

#### Unit I: PLANT TISSUE CULTURE – 1

(12hrs)

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells, differentiation and dedifferentiation.
2. Methodology - sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micro-propagation/clonal propagation of ornamental and horticulturally important plants.
3. Callus subculture maintenance, growth measurements, morphogenesis in callus culture – organogenesis, somatic embryogenesis.

#### UNIT-II: Plant Tissue culture -2

(12hrs)

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Production of secondary metabolites.
3. Cryopreservation; Germ plasm conservation.

#### Unit III: Recombinant DNA technology

(12hrs)

1. Restriction Endonucleases (history, types I-IV, biological role and application); concepts of restriction mapping.
2. Cloning Vectors: Prokaryotic(pUC 18, pBR322, Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC)
3. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR mediated gene cloning)
4. Construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by complementation technique, colony hybridization.

#### Unit IV: Methods of gene transfer

(12hrs)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Micro projectile bombardment.
2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

#### Unit V: Applications of Biotechnology

(12 hrs)

1. Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance.
2. Genetic modification – transgenic plants for pest resistant (Bt-cotton); herbicide resistance (Round Up Ready soybean); improved agronomic traits - flavr Savr tomato, Golden rice); Improved horticultural varieties(Moon dust carnations)

## III B.Sc.: BOTANY SYLLABUS SEMESTER- VI

**Cluster Electives, CLUSTER–A CLUSTER ELECTIVE, PAPER–VIII-A1****Paper VIII-A1: Biological instrumentation and Methodology**

Total hours of teaching 60hrs @ 3hrs per week

Unit -I: Imaging and related techniques: (12hrs)

Principles of microscopy; Light microscopy; Fluorescence microscopy; Electron Microscopy (a)  
Flow cytometry (b) Applications of fluorescence microscopy:

Unit- II: pH and Centrifugation: (12 hrs)

pH meter: Principles and instrumentation, Centrifugation: Principles, types of centrifuges, types of rotors, differential and density gradient centrifugation, application.

Unit- III: Spectrophotometry: (12hrs)

Principle involved in Spectrophotometer; Spectrophotometric techniques, Instrumentation: ultraviolet and visible spectrophotometry (single and double beam, double wavelength spectrophotometers), Infrared spectrometers.

Unit- IV: Chromatography: (12hrs)

Chromatographic techniques: Principle and applications – Column - thin layer –paper, affinity and gas chromatography - Gel filtration - Ion exchange and High performance liquid chromatography techniques– Examples of application for each chromatographic system - Basic principles of electrophoresis.

Unit-V:Preparation of molar, molal and normal solutions, buffers, the art of scientific writing  
**(12hrs)**

Understanding the details on the label of reagent bottles.Molarity and normality of common acids and bases.Preparation of solutions.Dilutions.Percentage solutions.Molar, molal and normal solutions. Technique of handling micropipettes; Knowledge about common toxic chemicals and safety measures in their handling. The art of scientific writing and presentation of scientific matter.Scientific writing and ethics.Writing references.Powerpoint presentation.Poster presentation. Introduction to copyright-academic misconduct/plagiarism in scientific writing.

## Paper VIII-A1: PRACTICAL SYLLABUS

1. Microscopy – Light microscopy: principles, parts & function
2. Micrometry- principle and measurement of microscopic objects: Low power and high power.
3. Camera Lucida drawing with magnification and scale.
4. Principle and working of phase contrast microscope
5. Principle & operation of Centrifuge
6. Preparation of standard acid and alkali and their standardization.  
b) Preparation of various solutions (normal, molar, and percent) and ppm/ppb by serial dilutions
7. Study of principle and working of pH meter and Measurement of pH of Milk, Pepsi, Lemon juice etc. using pH paper and pH meter
8. Study of principle of Chromatography and separation of amino acids mixture By ascending Paper Chromatography
7. Principle & operation of Colorimeter
8. Principle & operation of Spectrophotometer
9. Chromosome banding, FISH, chromosome painting

## III B.Sc.: BOTANY SYLLABUS SEMESTER- VI PAPER – VIII-A2

**Paper VIII-A2: Mushroom Culture and Technology**

Total hours of teaching 60hrs @ 3hrs per week

**Unit I: Introduction, history:** (12hrs)

Introduction - history - scope of edible mushroom cultivation, Types of edible mushrooms available in India – *Volvariellavolvacea*, *Pleurotuscitrinopileatus*, *Agaricusbisporus*. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms.

## UNIT II: Pure culture-spawn preparation: (12hrs)

Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization - preparation of test tube slants to store mother culture – culturing of *Pleurotus* mycelium on Petriplates, preparation of mother spawn in saline bottle and polypropylene bag and their multiplication.

## Unit III: Cultivation Technology: (12hrs)

Infrastructure: Substrates (locally available) Polythene bags, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology, composting technology in mushroom production.

## Unit IV: Storage and nutrition : (12hrs)

Short-term storage (Refrigeration - up to 24 hours) Long term Storage (canning, pickles, papads), drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content – Vitamins.

## Unit V: Food Preparation: (12hrs)

Types of foods prepared from mushrooms; soup, cutlet, omelette, samosa, pickles and curry. Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

**Suggested activities:** Growing spawn on laboratory prepared medium in petriplates and maintaining, preparing compost and compost beds, packing of beds, spawning, maintaining moisture, picking, blanching and packing. Collecting naturally growing mushrooms and identifying them properly, visits to mushroom houses.

## Suggested Readings:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3. Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.
4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.

**B.Sc. PHYSICS SYLLUBUS UNDER CBCS**  
w.e.f. 2015-16 (Revised in April 2016)  
**For Mathematics Combinations**  
**B.Sc. 1<sup>st</sup> Semester Physics**  
**Paper I: Mechanics & Properties of Matter**

Work load: 60 hrs per semester

4 hrs/week

**UNIT-I (10 hrs)**

**1. Vector Analysis**

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

**UNIT-II (10 hrs)**

**2. Mechanics of particles**

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

**UNIT-III (16 hrs)**

**3. Mechanics of Rigid bodies**

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum, Euler equations and its applications, precession of a top, Gyroscope, precession of the equinoxes.

**4. Mechanics of continuous media**

Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio in terms of  $\gamma$ ,  $n$  and  $k$ . Classification of beams, types of bending, point load, distributed load.

**UNIT-IV (12hrs)**

**5. Central forces**

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, Derivation of Kepler's laws. Motion of satellites.

**UNIT-V (12 hrs)**

**6. Special theory of relativity**

Galilean relativity, absolute frames Michelson-Morley experiment, negative result Postulates of special theory of relativity Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

**Paper II: Waves & Oscillations**  
**(For Maths Combinations)**  
**II SEMESTER**

**Work load: 60 hrs per semester**

**4 hrs/week**

**UNIT-I (12 hrs)**

**1. Simple Harmonic oscillations**

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 (12 hrs)**

**2. Damped and forced oscillations**

Damped harmonic oscillator, solution of the differential equation of motion of damped oscillator, logarithmic decrement, relaxation time and quality factor, differential equation of motion of forced oscillator and its solution, amplitude resonance and velocity resonance.

**UNIT-III (10 hrs)**

**3. Complex vibrations**

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients.

**UNIT-IV (17hrs)**

**4. Vibrating strings: 8 hrs**

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 and harmonics.

**5. Vibrations of bars: 9 hrs**

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 fixed at one end. Tuning fork.

**UNIT-V (9 hrs)**

**6. Ultrasonics:**

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods, detection of ultrasonics, determination of wavelength of ultrasonic waves Applications of ultrasonic waves.

**REFERENCE BOOKS:**

1. BSc Physics Vol.1, Telugu Academy, Hyderabad.
  2. Waves and Oscillations. N. Subramanyam and Brijlal. Vikas Pulications.
  3. Unified Physics Vol., Mechanics, Waves and Oscillations, Jai Prakash Nath&Co.Ltd.
  4. Fundamentals of Physics. Halliday/Resnick/Walker. Wiley India Edition 2007
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**Paper III: Wave Optics**  
**(For Maths Combinations)**  
**III SEMESTER**

**Work load:60 hrs per semester**

**4 hrs/week**

**UNIT-I (8 hrs)**

**1. Aberrations:**

Introduction – monochromatic aberrations - spherical aberration, coma, astigmatism, curvature of field and distortion- explanation and methods of elimination, Chromatic aberration - the achromatic doublet. Achromatism for two lenses (i) in contact and (ii) separated by a distance.

**UNIT-II (14hrs )**

**2. Interference**

Principle of superposition, coherence, conditions for interference of light. Fresnel's biprism-determination of wavelength of light, change of phase on reflection. Oblique incidence of a plane wave on a thin film due to reflected light (cosine law), colors of thin films, Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) - Determination of diameter of wire, Newton's rings in reflected light. Michelson interferometer - Determination of wavelength of monochromatic light using Newton's rings and Michelson Interferometer.

**UNIT-III (14hrs )**

**3. Diffraction**

Introduction distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction –Diffraction due to (i) single slit, (ii) double slit and (iii) N slits (diffraction grating), Resolving power of grating, Determination of wavelength of light in normal incidence and minimum deviation methods using diffraction grating, Fresnel's half period zones - area of the half period zones, zone plate – construction and theory, comparison of zone plate with convex lens - difference between interference and diffraction.

**UNIT-IV(10 hrs )**

**4.Polarisation:**

Polarized light: methods of polarization polarization by reflection, refraction, double refraction, scattering of light, Brewster's law, Malus law, Nicol prism - polarizer and analyzer, Quarter wave plate, Half wave plate, optical activity- determination of specific rotation by Laurent's half shade polarimeter, Babinet's compensator.

**UNIT-V (14hrs )**

**5. Lasers :**

Lasers: introduction, spontaneous emission, stimulated emission. Population inversion, Laser principle, Einstein coefficients, Types of lasers - He-Ne laser and Ruby laser, Applications of lasers.

**6. Fiber Optics**

Introduction- different types of fibers, rays and modes in an optical fiber, fiber material, principles of fiber communication (qualitative treatment only), advantages of

**Paper IV: Thermodynamics & Radiation Physics**  
**(For Maths Combinations)**  
**IV SEMESTER**

**Work load: 60 hrs per semester**

**4 hrs/week**

**UNIT-I (10 hrs)**

**1. Kinetic theory of gases**

Introduction, Deduction of Maxwell's law of distribution of molecular speeds, experimental verification. Transport phenomena - Viscosity of gases - thermal conductivity and diffusion of gases.

**UNIT-II(12 hrs)**

**2. Thermodynamics**

Introduction, Isothermal and adiabatic processes, Reversible and irreversible processes, Carnot's engine and its efficiency, Carnot's theorem, Second law of thermodynamics - Kelvin's and Clausius statements, Entropy - physical significance - Change in entropy in reversible and irreversible processes, Entropy of Universe, Temperature-Entropy (T-S) diagram and its uses - Change of entropy of a perfect gas.

**UNIT-III(12 hrs)**

**3. Thermodynamic potentials and Maxwell's equations**

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 Vander waal's gas.

**UNIT-IV(12 hrs)**

**4. Low temperature Physics**

Introduction, Joule Kelvin effect - 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, applications of substances at low temperature.

**UNIT-V(14 hrs)**

**5. Quantum theory of radiation**

Blackbody-Ferry's black body, distribution of energy in the spectrum of black body, Wein's law, Rayleigh-Jean's law, Quantum theory of radiation- Planck's law, Types of pyrometers- Disappearing filament optical pyrometer - experimental determination, Angstrom pyroheliometer - determination of solar constant, Temperature of Sun.

**REFERENCE BOOKS:**

1. BSc Physics, Vol.2, Telugu Akademy, Hyderabad
2. Thermodynamics, R.C.Srivastava, S.K.Saha & Abhay K.Jain, Eastern Economy Edition.
3. Unified Physics Vol.2, Optics & Thermodynamics, Jai Prakash Nath & Co.Ltd.,

**Paper V: Electricity, Magnetism & Electronics**  
**(For Maths Combinations)**  
**V Semester**

**Work load: 60 hrs per semester**

**4 hrs/week**

**UNIT-I (12 hrs)**

**1. Electric field intensity and potential:**

Gauss's law statement and its proof- Electric field intensity due to (1) Uniformly charged sphere and (2) an infinite conducting sheet of charge. Electrical potential – potential due to i) a point charge, ii) charged spherical shell, Equipotential surfaces.

**2. Dielectrics:**

Electric dipole moment and molecular polarizability- Electric displacement D, electric polarization P – relation between D, E and P- Dielectric constant and susceptibility.

**UNIT-II (12 hrs)**

**3. Electric and magnetic fields**

Biot-Savart's law, explanation and calculation of B due to long straight wire and solenoid, Hall effect – determination of Hall coefficient and applications.

**4. Electromagnetic induction**

Faraday's laws, Lenz's law, Self and mutual inductances, coefficient of coupling, calculation of self inductance of a long solenoid, Energy Stored in magnetic field, Transformer - energy losses - efficiency.

**UNIT-III (12 hrs)**

**5. Alternating currents and electromagnetic waves**

Alternating current - Relation between current and voltage in LR and CR circuits - vector diagrams, LCR series and parallel resonant circuits, Q -factor.

**6. Maxwell's equations**

Idea of displacement current - Maxwell's equations (integral and differential forms) (no derivation), Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, production of electromagnetic waves (Hertz experiment).

**UNIT-IV (12 hrs)**

**7. Basic electronics:**

PN junction diode and Zener diode - I-V characteristics, PNP and NPN transistors, CB, CE and CC configurations, transistor (CE) characteristics, Determination of hybrid parameters, Transistor as an amplifier.

**UNIT-V: (12 hrs)**

**8. Digital electronics :**

Number systems - Conversion of binary to decimal system and vice versa, Laws of Boolean algebra, De Morgan's laws - statement and proof, Basic logic gates, NAND and NOR as universal gates, exclusive-OR gate, Half and full adders.

**Paper VI: Modern Physics**  
**(For Maths Combinations)**  
**V Semester**

Work load: 60 hrs per semester

4 hrs/week

**UNIT-I (12 hrs)**

**1. Atomic and molecular physics**

Introduction, Drawbacks of Bohr's atomic model, Sommerfeld's elliptical orbits - relativistic correction (no derivation). Vector atom model- quantum numbers associated with it, Stern-Gerlach experiment, Zeeman effect and its experimental arrangement. Raman effect - hypothesis, Stokes and Anti Stokes lines, Quantum theory of Raman effect, Experimental arrangement, Applications of Raman effect.

**UNIT-II (12 hrs)**

**2. Matter waves & Uncertainty Principle**

Matter waves, de Broglie's hypothesis - wavelength of matter waves, Properties of matter waves, Davisson and Germer experiment. Heisenberg's uncertainty principle for position and momentum (x and p), energy and time (E and t). Experimental verification.

**UNIT-III (12 hrs)**

**3. Quantum (wave) mechanics**

Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations - derivations. Physical interpretation of wave function, Application of Schrodinger wave equation to particle in one dimensional potential infinite box.

**UNIT-IV(12 hrs)**

**4. General Properties of Nuclei**

Basic ideas of nucleus - size, mass, charge, density, angular momentum, magnetic moment, electric quadrupole moments, binding energy of nucleus, Liquid drop model and Shell model (qualitative aspects only).

**5. Radioactivity decay:**

**Alpha decay:**  $\alpha$ -decay - Gamow's theory, Geiger Nuttal law,  $\beta$ -decay- electron emission, positron emission, electron capture and neutrino hypothesis of  $\beta$ -decay.

**UNIT-V (12 hrs)**

**6. Crystal Structure**

Amorphous and crystalline materials, unit cell, Miller indices, Bragg's law, diffraction of X-rays by crystals- experimental techniques of Laue's method and powder diffraction method.

**7. Superconductivity:**

Introduction, experimental facts, critical temperature, critical field, Meissner effect, Isotope effect, Type I and type II superconductors, applications of superconductors.

**Unit-I (14 Hours)**

1. **FET**-Advantages of FET over BJT ,FET-Construction, Working, characteristics and uses; MOSFET-enhancement MOSFET, depletion MOSFET, construction and working , drain and transfer characteristics of MOSFET, applications of MOSFET.

**Unit-II (12Hours)**

2. **Operational Amplifiers**: Characteristics of ideal and practical Op-Amp (IC 741), Basic differential amplifiers, Op-Amp supply voltage, IC identification, Internal blocks of Op-Amp, its parameter -off set voltages and currents, CMRR, slew rate.

**Unit-III (12 Hours)**

3. **Applications of Op-Amp**: Op-Amp as voltage amplifier, Inverting amplifier, Non-inverting amplifier, voltage follower, summing amplifier, difference amplifier, comparator, integrator, differentiator.

**Unit-IV(10 Hours)**

4. **IC 555 Timer** -Its pin diagram internal architecture, Application as astable-multivibrator and mono stable multivibrator. Applications of mono stable multivibrator-a) frequency divider b) pulse stretcher, Applications of astable multivibrator-a) square wave oscillator b)Free-running ramp generator .

**Unit-V (12 Hours)**

5. **Sequential digital circuits**: Flip-flops, RS, Clocked SR, JK, D, T, Master-Slave Flip-flops, Conversion of Flip flops.

**Reference Books**

1. Digital Electronics by G.K.Kharate Oxford University Press
2. Unified Electronics by Agarwal and Agarwal. Vol I,II&III
3. Op- Amp and Linear ICs by Ramakanth A Gavekwad. 4<sup>th</sup> edition PHI
4. Digital Principles and Applications by Malvino and Leach, TMH, 1996, 4<sup>th</sup> edition.
5. Digital Circuit design by Morris Mano.PHI
6. Switching Theory and Logic design by A AnandKumar .PHI
7. operations amplifier by SV Subramanyam.

**Elective Paper-VII Practical: Analog and Digital Electronics**

**2hrs/Week**

Minimum of 6 experiments to be done and recorded

- 1) Characteristics of FET
- 2) Characteristics of MOSFET
- 3) Characteristics of Op-amp.(IC741)
- 4) Op-Amp as amplifier/inverting amplifier
- 5) Op-Amp as integrator/differentiator

**Semester –VI**  
**Cluster Electives VIII-A**  
**Paper – VIII-A-1: Electronic devices and circuits**

**No. of Hours per week: 04**

**Total Lectures : 60**

**UNIT-I : (10hrs)**

**1.Networks Theorems:**

Statement and proofs of Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power transfer theorem, Milliman's theorem and Reciprocity theorem.

**UNIT-II : (12 hrs)**

**2.UJT & SCR:**

UJT construction-working, V-I characteristics, Experimental determination of UJT parameters, UJT as a Relaxation oscillator.

Silicon Controlled Rectifier (SCR), Structure and working of SCR. Two transistor representation, Characteristics of SCR. Experimental set up to study the SCR characteristics, Application of SCR for power control.

**UNIT-III : (12 hrs)**

**3.Rectifiers and Power Supplies :**

Half wave, full wave and bridge rectifiers-Efficiency-ripple factor- Regulation, Types of filter-choke input(inductor) filter, L-section &  $\pi$ -section filters. Three terminal fixed voltage I.C(78 XX). regulators - Principle and working of SMPS(switch mode power supplies).

**UNIT-IV : (12hrs)**

**4.Photo electric devices:** Structure and operation, characteristics, spectral response and application of photo diode, multiple junction photo diode, LDR and LED, Photovoltaic cell.

**Unit- V (14 Hours)**

**5. CRO :** Block diagram of basic CRO, construction of CRT, electron gun, electrostatic focusing and acceleration(only explanation) , time base operation, synchronization, front panel controls.

**6. Applications CRO:** Measurements of dc and ac voltages, ac frequency, time period, special features of dual trace.

**REFERENCE BOOKS:**

1. Electric Circuit Analysis- S.R. Paranjothi- New Age International.
2. Networks and Systems – D.Roy Chowdary.
3. Unified Electronics (Circuit Analysis and Electronic Devices) by Agarwal-Arora. Vol- I
4. A text book in electrical technology by B.L.Thereja (S.Chand&Co).Vol- IV

## Semester –VI

## Cluster Elective Paper VIII-A-2: Computational Methods and Programming

No. of Hours per week: 04

Total Lectures:60

**UNIT-I (12hrs)**

- Fundamentals of C language:** C character set-Identifiers and Keywords-Constants - Variables-Data types-Declarations of variables-Declaration of storage class-Defining symbolic constants- Assignment statement.
- Operators:** Arithmetic operators-Relational operators-Logic operators-Assignment operators- Increment and decrement operators-Conditional operators.

**UNIT-II (12hrs)**

- Expressions and I/O Statements:** Arithmetic expressions-Precedence of arithmetic operators-Type converters in expressions-Mathematical (Library) functions - Data input and output-The getchar and putchar functions-scanf-printf simple programs.

**UNIT-III (12hrs)**

- Arrays:** One dimensional and two dimensional arrays - Initialization - Type declaration - Inputting and outputting of data for arrays - Programs of matrices addition, subtraction and multiplication

**UNIT-IV (12hrs)**

- Linear and Non - Linear equations:** Solution of Algebra and transcendental equations- Bisection, Falsi position and Newton-Rhapson methods-Basic principles-Formulae-algorithms

**UNIT-V (12hrs)**

- Numerical differentiation and integration:** Numerical differentiation-algorithm for evaluation of first order derivatives using formulae based on Taylor's series-Numerical integration-Trapezoidal and Simpson's 1/3 rule- Formulae-Algorithms.

## Semester –VI

## Cluster Elective Paper –VIII-A-3: Electronic Instrumentation

No. of Hours per week: 04

Total Lectures:60

**Unit – I (12Hours)**

1. **Basics of measurements:** Instrument, accuracy, precision, sensitivity, resolution, range, errors in measurement, Multi meter - principle- measurement of dc voltage and dc current, ac voltage and resistance, Operating instructions of multi meter.

**Unit -II (10 Hours)**

2. **Electronic Voltmeter:** Advantages over conventional multi meter, considerations in selecting voltmeter, Basic volt meter (TVM), Differential voltmeter, Solid state voltmeter AC voltmeter using rectifiers and their significances.

**Unit– III (14 Hours)**

3. **Digital Multi meter:** Block diagram, working and specifications of digital multi meter, Universal counter and Frequency counter- Block diagram, frequency and time period measurement & accuracy and resolution.

**Unit – IV (12 Hours)**

4. **Digital instruments:** Comparison of analog and digital instruments, Principle and working of digital instruments - Tacho meter,  $P^H$  meter, Capacitance meter and phase meter. Digital voltmeter- advantages, Performance parameters, Block diagram and working.

**Unit – V (12 Hours)**

5. **Signal generators:** Block diagram explanation, specifications of low frequency signal generators(AF Sine and square wave generator, RF Signal Generator), pulse generator, function generator-working, Brief idea for testing, specifications. Distortion factor meter, wave analysis.

**Reference Books**

1. A text book in electrical technology by B.L. Thereja (S Chand&Co)-Vol IV
2. Digital circuits and systems by Venugopal 2011 (Tata Mcgraw Hill)
3. Digital Electronics by SubrathaGhoshal 2012 (Cengage Learning)
4. Electronic measurements and instrumentation by U.A Bakshi. A.V Bakshi K.A Bakshi
5. Electronic instrumentation by H. S. Kalsi.

## Structure of Chemistry Syllabus Under CBCS

### SEMESTER – I

#### **Paper I - Inorganic & Organic Chemistry 60hrs (4h/w)**

#### **INORGANIC CHEMISTRY 30 hrs (2h / w)**

##### **UNIT –I**

##### **p-block elements –I 15h**

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)

Group - 14: Preparation and applications of silanes and silicones.

Group - 15: Preparation and reactions of hydrazine, hydroxylamine.

##### **UNIT-II**

##### **1. p-block elements -II 8h**

Group - 16: Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content.

Group-17: Inter halogen compounds and pseudo halogens.

##### **2. Organometallic Chemistry 7h**

Definition - classification of Organometallic compounds - nomenclature, preparation, properties and applications of alkyls of Li and Mg.

#### **ORGANIC CHEMISTRY 30hrs (2h /w)**

##### **UNIT-III**

##### **Structural theory in Organic Chemistry 10 h**

Types of bond fission type of organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like  $H_2O$ ,  $NH_3$  &  $AlCl_3$ ).

Inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes,

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical reactions. Elimination-Examples.

##### **UNIT-IV**

##### **1. Acyclic Hydrocarbons 6 h**

Alkenes - Addition of halogen. Addition of HX, Markonikov's rule (with mechanism), addition of H<sub>2</sub>O, HOX, H<sub>2</sub>SO<sub>4</sub> and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

Alkynes – Terminal and non terminal Alynes, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Electrophilic addition of X<sub>2</sub>, HX, H<sub>2</sub>O (Tautomerism), Oxidation with KMnO<sub>4</sub>, OsO<sub>4</sub>, Metal Ammonia reduction and Polymerisation reaction of acetylene.

## 2. Alicyclic hydrocarbons (Cycloalkanes)

4 h

Nomenclature, Preparation by Freund's method, Wislicenus method. Properties - Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory.

## UNIT-V

### Benzene and its reactivity

10h

Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation), Molecular structure of Benzene based on modern concepts (VBT and MOT).

Reactions - Mechanism of nitration, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens

### List of Reference Books

1. Inorganic Chemistry by J.E.Huheey
2. Basic Inorganic Chemistry by Cotton and Wilkinson
3. A textbook of qualitative inorganic analysis by A.I. Vogel
4. Organic Chemistry by Morrison and Boyd
5. A Text Book of Organic chemistry by I L Finar Vol I
6. Concise Inorganic Chemistry by J.D.Lee

<b>SEMESTER - II</b>	
<b>Paper II (Physical &amp; General Chemistry)</b>	<b>60 hrs. (4h/w)</b>
<b>PHYSICAL CHEMISTRY</b>	<b>30 hrs (2h / w)</b>

**UNIT-I****Solidstate****10h**

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Defects in crystals.

**UNIT-II****1. Gaseous state****6 h**

Deviation of real gases from ideal behavior. Vander Waal's equation of state. P-V Isotherms of real gases, Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. The vander Waal's equation and the critical state. Law of corresponding states. Relationship between critical constants and vander Waal's constants. Joule Thomson effect.

**2. Liquid state****4 h**

Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid/liquid. Application of liquid crystals as LCD devices.

**UNIT-III****Solutions****10h**

Liquid-liquid - ideal solutions, Raoult's law. Ideally dilute solutions, Henry's law. Non-ideal solutions. Vapour pressure - composition and vapour pressure- temperature curves. Azeotropes-HCl-H<sub>2</sub>O, ethanol-water systems and fractional distillation. Partially miscible liquids-phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

**UNIT-IV****1.Surface chemistry****8 h**

Definition of colloids. SOLS- properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid.

Liquids in liquids (emulsions)-properties and uses. Liquids in solids (gels) uses.

Adsorption: Physical adsorption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption

**2.Chemical Bonding****7h**

Valence bond theory, hybridization, VB theory as applied to  $\text{ClF}_3$ ,  $\text{Ni}(\text{CO})_4$ , Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules ( $\text{N}_2$ ,  $\text{O}_2$ , CO and NO).

**UNIT-V****Stereochemistry of carbon compounds****15 h**

Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation.

Chiral molecules- definition and criteria(Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane.

D,L and R,S configuration methods and E,Z- configuration with examples.

**List of Reference Books**

1. Principles of physical chemistry by Prutton and Marron
2. Solid State Chemistry and its applications by Anthony R. West
3. Text book of physical chemistry by K L Kapoor
4. Text book of physical chemistry by S Glasstone
5. Stereochemistry of Organic compounds by E L Eliel
6. Advanced Organic Chemistry by F A Carey and R J Sundberg
7. Stereochemistry by P.S.Kalsi
8. Stereochemistry of Organic compounds by D. Nasipuri
9. Advanced physical chemistry by Bahl and Tuli
10. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

**SEMESTER - III****Paper III (INORGANIC & ORGANIC CHEMISTRY) 60 hrs (4 h / w)****INORGANIC CHEMISTRY****30 hrs (2h / w)****UNIT –I****1. Chemistry of d-block elements: 9h**

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states

**2. Theories of bonding in metals:****6h**

Metallic properties and its limitations, Valence bond theory, Free electron theory, Explanation of thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

**UNIT – II****3. Metal carbonyls : 7h**

EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.

**4. Chemistry of f-block elements: 8h**

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, comparison of lanthanides and actinides.

**ORGANIC CHEMISTRY****30 h (2h/w)**

## UNIT – III

### 1. Halogen compounds

5 h

Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aryl alkyl, allyl, vinyl, benzyl halides.

$S_N1$  and  $S_N2$  – reaction mechanism with optically active alkyl halide 2-bromobutane.

### 2. Hydroxy compounds

5 h

Nomenclature and classification of Alcohols: Preparation with hydroboration reaction and Grignard synthesis. Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water.

Chemical properties:

a) Dehydration of alcohols.

b) Oxidation of alcohols by  $CrO_3$ ,  $KMnO_4$ .

Identification of alcohols by oxidation with  $KMnO_4$ , Ceric ammonium nitrate, Luca's reagent .

Phenols: Preparation i) from diazonium salt, ii) from cumene.

Chemical Properties: a) Bromination, b) Kolbe-Schmidt reaction( with mechanism)

c) Reimer-Tiemann reaction, ( with mechanism), d) azocoupling,

Identification of Phenol with neutral  $FeCl_3$

## UNIT-IV

### Carbonyl compounds

10 h

Nomenclature of aliphatic and aromatic carbonyl compounds, Synthesis of aldehydes from acid chlorides, synthesis of ketones from nitriles. Physical properties: Reactivity of carbonyl group in aldehydes and ketones.

Nucleophilic addition reaction with a)  $NaHSO_3$ , b)  $HCN$ , c)  $RMgX$ , d)  $NH_2OH$ , e)  $PhNHNH_2$ , f) 2,4 DNPH, With mechanism a) Aldol, b) Cannizzaro's reaction, c)

Perkin reaction, d) Benzoin condensation, Reduction: Clemmensen reduction, Wolf-Kishner reduction, MPV reduction, reduction with  $LiAlH_4$  and  $NaBH_4$ . Analysis of aldehydes and ketones with a) 2,4-DNPH test, b) Tollen's test, c) Fehling test, d) Schiff's test e) Haloform test (with equation)

## UNIT-V

### 1. Carboxylic acids and derivatives

6 h

Nomenclature, classification of carboxylic acids. Methods of preparation by Hydrolysis of nitriles, amides and esters (by acids and bases), c) Carbonation of Grignard reagents.

Special methods of preparation of aromatic acids by a) Oxidation of side chain. b) Hydrolysis by benzotrichlorides. c) Kolbe reaction. **Physical properties:**

Hydrogen bonding, dimeric association, **Chemical properties:** Reactions involving H, OH and COOH groups- salt formation. anhydride formation. acid chloride formation.

**SEMESTER IV**  
**Paper IV ( SPECTROSCOPY & PHYSICAL CHEMISTRY)**  
**60 hrs (4 h / w)**

**SPECTROSCOPY** **30 hrs**  
**(2h / w)**

**UNIT-I** **6h**  
 Beer-Lambert's law and its limitations, transmittance, absorbance and molar absorptivity.  
 Application of Beer-Lambert law for quantitative analysis of 1. Chromium in  $K_2Cr_2O_7$   
 2. Manganese in Manganous sulphate

**Electronic spectroscopy:** **8h**  
 Interaction of electromagnetic radiation with molecules and types of molecular spectra.  
 Energy levels of molecular orbitals ( $\sigma$ ,  $\pi$ ,  $n$ ). Selection rules for electronic spectra. Types  
 of electronic transitions in molecules effect of conjugation. Concept of chromophore and  
 auxochrome.

**UNIT-II**

**Infra red spectroscopy** **8h**  
 Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic  
 molecules. Characteristic absorption bands of various functional groups. Interpretation of  
 spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

**Proton magnetic resonance spectroscopy ( $^1H$ -NMR)** **8h**  
 Principles of nuclear magnetic resonance, equivalent and non-equivalent protons,  
 position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling,  
 coupling constants. Applications of NMR with suitable examples - ethyl bromide,  
 ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

**PHYSICAL CHEMISTRY** **30 hrs (2h / w)**

**UNIT-III**

**Dilute solutions** **10h**  
 Colligative properties. Raoult's law, relative lowering of vapour pressure, its relation to  
 molecular weight of non-volatile solute. 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 of determination. Osmosis,  
 osmotic pressure, experimental determination. Theory of dilute solutions. Determination  
 of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative  
 properties- Van't Hoff factor.

## **UNIT-IV**

### **Electrochemistry-I**

**10h**

Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorfs method. Application of conductivity measurements- conductometric titrations.

## **UNIT-V**

### **1. Electrochemistry-II**

**4h**

Single electrode potential, sign convention, Reversible and irreversible cells Nernst Equation- Reference electrode, Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode, Determination of EMF of cell, Applications of EMF measurements - Potentiometric titrations.

### **2.Phase rule**

**6h**

Concept of phase, components, degrees of freedom. Thermodynamic Derivation of Gibbs phase rule. Phase equilibrium of one component system - water system. Phase equilibrium of two- component system, solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, simple eutectic diagram, desilverisation of lead., NaCl-Water system.

### **List of Reference Books**

1. Spectroscopy by William Kemp
2. Spectroscopy by Pavia
3. Organic Spectroscopy by J. R. Dyer
4. Modern Electrochemistry by J.O. M. Bockris and A.K.N.Reddy
5. Advanced Physical Chemistry by Atkins
6. Introduction to Electrochemistry by S. Glasstone
7. Elementary organic spectroscopy by Y.R. Sharma
8. Spectroscopy by P.S.Kalsi

## SEMESTER-V

### Paper - V (INORGANIC, PHYSICAL & ORGANIC CHEMISTRY) 45 hrs (3 h / w)

#### INORGANIC CHEMISTRY

##### UNIT – I

###### Coordination Chemistry:

8h

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal field theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - merits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

##### UNIT-II

###### 1. Magnetic properties of metal complexes:

4h

Types of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility-Gouymethod.

###### 2. Stability of metal complexes:

3h

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

#### ORGANIC CHEMISTRY

##### UNIT- III

###### Nitro hydrocarbons:

3h

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity -halogenation, reaction with HONO (Nitrous acid),Nef reaction and Mannich reaction leading to Micheal addition and reduction.

##### UNIT – IV

###### Nitrogen compounds:

12h

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1°, 2°, 3° 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. Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg

separation e) Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines). Electrophilic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

## PHYSICAL CHEMISTRY

### UNIT- V

#### Thermodynamics

15h

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect- coefficient. Calculation of  $w$ , for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation-Kirchoff's equation. Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

#### List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by
5. Text book of physical chemistry by S Glasstone
6. Concise Inorganic Chemistry by J.D.Lee
7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
8. A Text Book of Organic Chemistry by Bahl and Arun bahl
9. A Text Book of Organic chemistry by I L Finar Vol I
10. Advanced physical chemistry by Gurudeep Raj

## SEMESTER-V

### Paper - VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY)

45 hrs (3 h / w)

#### INORGANIC CHEMISTRY

##### UNIT-I

###### 1. Reactivity of metal complexes: 4h

Labile and inert complexes, ligand substitution reactions -  $SN^1$  and  $SN^2$ , substitution reactions of square planar complexes - Trans effect and applications of trans effect.

###### 2. Bioinorganic chemistry: 4h

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Zn .

Metalloporphyrins – Structure and functions of hemoglobin, and Chlorophyll.

#### PHYSICAL CHEMISTRY

##### UNIT-II

###### 1. Chemical kinetics 8h

Rate of reaction - Definition of order and molecularity. Derivation of rate constants for first, second, third and zero order reactions and examples. Derivation for time half change. Methods to determine the order of reactions. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

###### 2. Photochemistry 5h

Difference between thermal and photochemical processes. Laws of photochemistry- Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield-Photochemical reaction mechanism- hydrogen- chlorine, hydrogen- bromine reaction. Qualitative description of fluorescence, phosphorescence, Photosensitized reactions- energy transfer processes (simple example)

#### ORGANIC CHEMISTRY

##### UNIT- III

###### Heterocyclic Compounds 7h

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1,4,-dicarbonyl compounds, Paul-Knorr synthesis.

Properties : Acidic character of pyrrole - electrophilic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan.

Pyridine – Structure - Basicity - Aromaticity - Comparison with pyrrole - one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

## UNIT-IV

### Carbohydrates

8h

Monosaccharides: (+) Glucose (aldo hexose) - Evidence for cyclic structure of glucose (some negative aldehydes tests and mutarotation) - Proof for the ring size (methylation, hydrolysis and oxidation reactions) - Pyranose structure (Haworth formula and chair conformational formula).

(-) Fructose (keto hexose) - Evidence of 2 - keto hexose structure (formation of pentaacetate, formation of cyanohydrin its hydrolysis and reduction by HI). Cyclic structure for fructose (Furanose structure and Haworth formula) - osazone formation from glucose and fructose – Definition of anomers with examples.

Interconversion of Monosaccharides: Aldopentose to Aldohexose (Arabinose to D- Glucose, D-Mannose) (Kiliani - Fischer method). Epimers, Epimerisation - Lobry de bruyn van Ekenstein rearrangement. Aldohexose to Aldopentose (D-Glucose to D- Arabinose) by Ruff degradation. Aldohexose to Keto hexose [(+) Glucose to (-) Fructose] and Keto hexose to Aldohexose (Fructose to Glucose)

## UNIT- V

### Amino acids and proteins

7h

Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma 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 leucine) by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis.

Physical properties: 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.

### List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by Atkins
5. Text book of physical chemistry by S Glasstone

**SEMESTER-VI**  
**ELECTIVE PAPER – VII : ENVIRONMENTAL CHEMISTRY**  
**45 hrs (3 h / w)**

**UNIT-I**

**Introduction**

**9h**

Concept of Environmental chemistry-Scope and importance of environment in now adays – Nomenclature of environmental chemistry – Segments of environment - Natural resources – Renewable Resources – Solar and biomass energy and Nonrenewable resources – Thermal power and atomic energy – Reactions of atmospheric oxygen and Hydological cycle.

**UNIT-II**

**Air Pollution**

**9h**

Definition – Sources of air pollution – Classification of air pollution – Acid rain – Photochemical smog – Green house effect – Formation and depletion of ozone – Bhopal gas disaster – Controlling methods of air pollution.

**UNIT-III**

**Water pollution**

**9h**

Unique physical and chemical properties of water – water quality and criteria for finding of water quality – Dissolved oxygen – BOD, COD, Suspended solids, total dissolved solids, alkalinity – Hardness of water – Methods to convert temporary hard water into soft water – Methods to convert permanent hard water into soft water – eutrophication and its effects – principal wastage treatment – Industrial waste water treatment.

**UNIT-IV**

**Chemical Toxicology**

**9h**

Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effects – toxicity of lead, mercury, arsenic and cadmium.

**UNIT-V**

**Ecosystem and biodiversity**

**9h**

**Ecosystem**

Concepts – structure – Functions and types of ecosystem – Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels – Biogeochemical cycles (carbon, nitrogen and phosphorus)

**Biodiversity**

Definition – level and types of biodiversity – concept - significance – magnitude and distribution of biodiversity – trends - biogeographical classification of india – biodiversity at national, global and regional level.

**List of Reference books**

1. Fundamentals of ecology by M.C.Dash
2. A Text book of Environmental chemistry by W. Moore and F.A. Moore
3. Environmental Chemistry by Samir k. Banerji

**LABORATORY COURSE – VII**

1. Determination of carbonate and bicarbonate in water samples (acidity and alkalinity)
2. Determination of hardness of water using EDTA
  - a) Permanent hardness
  - b) Temporary hardness
3. Determination of Acidity
4. Determination of Alkalinity
5. Determination of chlorides in water samples

**Cluster Elective –VIII A**  
**Fuels and Industrial Inorganic materials**  
**PAPER – VIII-A-1 : FUEL CHEMISTRY AND BATTERIES**

**45 hrs (3 h / w)**

**UNIT –I**

**12h**

Review of energy sources ( renewable and non-renewable) – classification of fuels and their calorific value. Coal: Uses of Coal (fuel and non fuel) 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 based chemicals , requisites of a good metallurgical coke , coal gasification (Hydro gasification and catalytic gasification ) coal liquefaction and solvent refining.

**UNIT-II**

**6h**

Petroleum and petrol chemical industry:

Composition of crude petroleum , refining and different types of petroleum products and their applications.

**UNIT-III**

**10h**

Fractional distillation (principle and process) , cracking ( Thermal and catalytic cracking). Reforming petroleum and non petroleum fuels (LPG , CNG , LNG , biogas ) ,fuels derived from biomass , fuel from waste , synthetic fuels (gaseous and liquids) , clear fuels , petro chemicals : vinyl acetate , propylene oxide , isoprene , butadiene , toluene and its derivative xylene.

**UNIT-IV**

**10h**

Lubricants:

Classification of lubricants , lubricating oils (conducting and non conducting) , solid and semi solid lubricants , synthetic lubricants. Properties of lubricants (viscosity index , cloud point , pour point) and their determination.

**UNIT-V**

**7h**

**Batteries:**

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

**Reference books:**

1. E.Stochi : Industrial chemistry , Vol-1, Ellis Horwood Ltd.UK
2. P.C.Jain , M.Jain: Engineering chemistry, Dhanpat Rai &sons , Delhi.
3. B.K.Sharma: Industrial Chemistry , Goel Publishing house , Meerut.

## SEMESTER-VI

### PAPER – VIII-A-2: INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

45 hrs (3 h / w)

#### UNIT - I

##### Recapitulation of *s*- and *p*-Block Elements

8h

Periodicity in *s*- and *p*-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electronegativity (Pauling, Mulliken, and Alfred - Rochow scales). Allotropy in C, S, and P. Oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides), inert pair effect, diagonal relationship and anomalous behaviour of first member of each group.

#### UNIT – II

15h

##### Silicate Industries

**Glass:** Glassy state and its properties, classification (silicate and non-silicate glasses).

Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

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

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

#### UNIT – III

8h

##### Fertilizers:

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

#### UNIT – IV

8h

##### Surface Coatings:

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

#### UNIT – V

6h

##### Alloys:

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

**Chemical explosives:**

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

**Reference Books:**

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

## SEMESTER-VI

## PAPER – VIII-A-3 : ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

45 hrs (3 h / w)

**UNIT-I**

Analysis of soaps: moisture and volatile matter, combined alkali, total fatty matter, free alkali, total fatty acid, sodium silicate and chlorides.

Analysis of paints : Vehicle and pigments , Barium Sulphate , total lead, lead chromate, iron pigments, zinc chromate

**UNIT- II**

Analysis of oils: saponification value, iodine value, acid value, ester value, bromine value, acetyl value.

Analysis of industrial solvents like benzene, acetone, methanol and acetic acid.,  
Determination of methoxyl and N-methyl groups.,

**UNIT-III**

Analysis of fertilizers: urea, NPK fertilizer, super phosphate,

Analysis of DDT, BHC, endrin, endosulfone, malathion, parathion.,

Analysis of starch, sugars, cellulose and paper,

**UNIT -IV**

Gas analysis: carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydrocarbon, unsaturated hydrocarbons, nitrogen, octane number, cetane number

Analysis of Fuel gases like: water gas, producer gas, kerosene (oil) gas.

Ultimate analysis : carbon, hydrogen, nitrogen, oxygen, phosphorus and sulfur.,

**UNIT - V**

Analysis of Complex materials:

**Analysis of cement**- loss on ignition, insoluble residue, total silica, sesqui oxides, lime, magnesia, ferric oxide, sulphuric anhydride.

**Analysis of glasses** - Determination of silica, sulphur, barium, arsenic, antimony, total  $R_2O_3$ , calcium, magnesium, total alkalies, aluminium, chloride, fluoride

**SUGGESTED BOOKS:**

- 1.F.J.W elcher-Standard methods of analysis,
- 1.F.J.X ogel-A text book of quantitative Inorganic analysis-ELBS,
- 3.H.H.Willard and H.Deal- Advanced quantitative analysis- Van Nostrand Co,
- 4.F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
- 5.J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on analytical chemistry and its applications -- Inter Science- Vol I to VII.,
- 6.G.Z.Weig - Analytical methods for pesticides, plant growth regulators and food additives - Vols I to VII,
- 7.Analytical Agricultural Chemistry by S.L.Chopra & J.S.Kanwar -- Kalyani Publishers

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS****FIRST YEAR – SEMESTER- I****PAPER-I : INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY****TOTAL HOURS: 48****CREDITS: 4****UNIT-I No. of hours: 12**

History and mile stones in microbiology. Contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky. Importance and applications of microbiology. Classification of microorganisms – Haeckel’s three Kingdom concept, Whittaker’s five kingdom concept, three domain concepts of Carl Woese. Outline classification of bacteria as per the second edition of Bergey’s Manual of Systematic Bacteriology.

**UNIT – II No. of hours: 10**

General characteristics of Bacteria, Archaea, Mycoplasmas and Cyanobacteria. Ultra structure of Prokaryotic cell- Variant components and invariant components. General characteristics of viruses. Morphology, Structure and replication of TMV and HIV.

**UNIT-III No. of hours: 10**

General characteristics and outline classification of Fungi, Algae and Protozoa. Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

**UNIT-IV No. of hours: 8**

Staining Techniques –Simple and Differential (Gram Staining and Spore Staining). Sterilization and disinfection techniques - Physical methods – autoclave, hot- air oven, pressure cooker, laminar air flow, filter sterilization, Radiation methods – UV rays, Gamma rays. Chemical methods – alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites.

**UNIT –V No. of hours: 8**

Isolation of Microorganisms from natural habitats. Pure culture techniques – dilution-plating, Streak-plate, Spread-plate, Pour-Plate and micromanipulator. Enrichment culturing. Preservation of microbial cultures – subculturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature.

**PRACTICAL-I: INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY****TOTAL HOURS: 48****CREDITS: 2**

1. Microbiology Good Laboratory Practices and Biosafety.
  2. Preparation of culture media for cultivation of bacteria
  3. Preparation of culture media for cultivation of fungi
  4. Sterilization of medium using Autoclave
-

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS  
FIRST YEAR – SEMESTER- II  
PAPER-II : MICROBIAL BIOCHEMISTRY & METABOLISM**

**TOTAL HOURS: 48**

**UNIT-I No. of hours: 10**

Outline classification and general characteristics of carbohydrates (monosaccharides, disaccharides and polysaccharides). General characteristics of amino acids. Structure of nitrogenous bases, nucleotides, nucleic acids. Fatty acids (saturated and unsaturated lipids) (sphingolipids, sterols and phospholipids).

**UNIT-II No. of hours: 8**

Principle and applications of – Colorimetry Chromatography (paper, thin-layer), Spectrophotometry (UV & visible), Centrifugation and Gel Electrophoresis

**UNIT-III No. of hours: 10**

Properties and classification of Enzymes. Biocatalysis- induced fit and Coenzymes and Cofactors. Factors affecting catalytic activity. Inhibitors (competitive, noncompetitive, uncompetitive and allosteric).

**UNIT-IV No. of hours: 10**

Microbial Nutrition –Nutritional requirements and uptake of nutrients by different groups of microorganisms- autotrophs, heterotrophs, mixotrophs. Growth requirements, complex, selective, enrichment and differential media. Microbial Growth curves, growth in batch cultures, Synchronous, continuous, biphasic growth. Methods for measuring microbial growth – Direct microscopic counts, turbidometry and biomass.

**UNIT-V No. of hours: 10**

Aerobic respiration -Glycolysis, HMP path way, ED path way, TCA cycle, oxidative and substrate level phosphorylation. Anaerobic respiration (Nitrate reduction) Alcohol and lactic acid fermentations. Outlines of oxygenic and anoxygenic photosynthesis in bacteria.

**PRACTICAL-II : MICROBIAL BIOCHEMISTRY & METABOLISM**

**TOTAL HOURS: 48**

1. Qualitative Analysis of Carbohydrates
2. Qualitative Analysis of Aminoacids
3. Colorimetric estimation DNA by diphenylamine method

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS**  
**SECOND YEAR – SEMESTER- III**  
**PAPER-III : MICROBIAL GENETICS AND MOLECULAR BIOLOGY**

**TOTAL HOURS:48**

**CREDITS: 4**

**UNIT-I No. of hours: 10**

DNA and RNA as genetic material. Structure and organization of prokaryotic DNA. Extrachromosomal genetic elements – Plasmids and transposons. Replication of DNA – Semi conservative mechanism, Enzymes involved in replication.

**UNIT-II No. of hours: 10**

Mutations – spontaneous and induced, base pair changes, frame shifts, deletions, inversions, tandem duplications, insertions. Mutagens - Physical and Chemical mutagens. Outlines of DNA damage and repair mechanisms. Genetic recombination in bacteria – Conjugation, Transformation and Transduction.

**UNIT-III No. of hours: 10**

Concept of gene – Muton, Recon and Cistron. One gene one enzyme and one gene one polypeptide hypotheses. Types of RNA and their functions. Genetic code. Structure of ribosomes.

**UNIT-IV No. of hours: 8**

Types of genes – structural, constitutive, regulatory Protein synthesis – Transcription and translation. Regulation of gene expression in bacteria – *lac* operon.

**UNIT-V No. of hours: 10**

Basic principles of genetic engineering. Restriction endonucleases, DNA polymerases and ligases. Vectors. Outlines of gene cloning methods. Polymerase chain reaction. Genomic and cDNA libraries. General account on application of genetic engineering in industry, agriculture and medicine.

**PRACTICAL-III : MICROBIAL GENETICS AND MOLECULAR BIOLOGY**

**TOTAL HOURS: 48**

**CREDITS: 2**

1. Study of different types of DNA and RNA using micrographs and model / schematic representations
2. Study of semi-conservative replication of DNA through micrographs / schematic representations
3. Isolation of genomic DNA from *E. coli*

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS  
SECOND YEAR – SEMESTER- IV**

**PAPER- IV: IMMUNOLOGY AND MEDICAL MICROBIOLOGY**

**TOTAL HOURS: 48**

**CREDITS: 4**

**UNIT-I No. of hours: 10**

Types of immunity – innate and acquired; active and passive; humoral and cell-mediated immunity. Primary and secondary organs of immune system – thymus, bursa fabricus, bone marrow, spleen and lymph nodes. Cells of immune system. Identification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and eosinophils.

**UNIT-II No. of hours: 10**

Antigens – types, chemical nature, antigenic determinants, haptens. Factors affecting antigenicity. Antibodies – basic structure, types, properties and functions of immunoglobulins. Types of antigen-antibody reactions - Agglutinations, Precipitation, Neutralization, complement fixation, blood groups. Labeled antibody based techniques – ELISA, RIA and Immunofluorescence. Polyclonal and monoclonal antibodies – production and applications. Concept of hypersensitivity and Autoimmunity.

**UNIT-III No. of hours: 10**

Normal flora of human body. Host pathogen interactions: infection, invasion, pathogen, pathogenicity, virulence and opportunistic infection. General account on nosocomial infection. General principles of diagnostic microbiology- collection, transport and processing of clinical samples. General methods of laboratory diagnosis - cultural, biochemical, serological and molecular methods.

**UNIT-IV No. of hours: 8**

Antibacterial Agents- Penicillin, Streptomycin and Tetracycline. Antifungal agents – Amphotericin B, Griseofulvin Antiviral substances - Amantadine and Acyclovir Tests for antimicrobial susceptibility. Brief account on antibiotic resistance in bacteria - Methicillin-resistant Staphylococcus aureus (MRSA). Vaccines – Natural and recombinant.

**UNIT-V No. of hours: 10**

General account on microbial diseases – causal organism, pathogenesis, epidemiology, diagnosis, prevention and control Bacterial diseases – Tuberculosis and Typhoid Fungal diseases – Candidiasis. Protozoal diseases – Malaria. Viral Diseases - Hepatitis- A and AIDS

**PRACTICAL-IV : IMMUNOLOGY AND MEDICAL MICROBIOLOGY**

**TOTAL HOURS: 48**

**CREDITS: 2**

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS**

**THIRD YEAR – SEMESTER- V**

**PAPER-V : ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT - I No. of hours: 8**

Terrestrial Environment: Soil profile and soil microflora Aquatic Environment: Microflora of fresh water and marine habitats Atmosphere: Aeromicroflora and dispersal of microbes Extreme Habitats: Extremophiles: Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity, & low nutrient levels.

**UNIT – II No. of hours: 8**

Role of microorganisms in nutrient cycling (Carbon, nitrogen, phosphorus). Treatment and safety of drinking (potable) water, methods to detect potability of water samples: (a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for faecal coliforms (b) Membrane filter technique. Microbial interactions – mutualism, commensalism, antagonism, competition, parasitism, predation.

**UNIT – III No. of hours: 6**

Outlines of Solid Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill). Liquid waste management: Composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment.

**UNIT – IV No. of hours: 7**

Plant Growth Promoting Microorganisms - Mycorrhizae, Rhizobia, *Azospirillum*, *Azotobacter*, *Frankia*, phosphate-solubilizers and Cyanobacteria. Outlines of biological nitrogen fixation (symbiotic, non-symbiotic). Biofertilizers - *Rhizobium*.

**UNIT – V No. of hours: 7**

Concept of disease in plants. Symptoms of plant diseases caused by fungi, bacteria, and viruses. Plant diseases - groundnut rust, Citrus canker and tomato leaf curl. Principles of plant disease control.

**PRACTICAL-V : ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Analysis of soil – pH, Moisture content and water holding capacity.

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS  
THIRD YEAR – SEMESTER -V**

**PAPER-VI A: MICROBIAL DIAGNOSIS IN HEALTH CLINICS (ELECTIVE)**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT- I No. of hours: 8**

Bacterial, Viral, Fungal and Protozoan Diseases of various human body systems, Disease associated clinical samples for diagnosis.

**UNIT- II No. of hours: 8**

Collection of clinical samples (oral cavity, throat, skin, blood, CSF, urine and faeces) and precautions required. Method of transport of clinical samples to laboratory and storage.

**UNIT- III No. of hours: 8**

Examination of sample by staining - Gram stain, Ziehl-Neelson staining for tuberculosis, Giemsa-stained thin blood film for malaria Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, MacConkey agar, Distinct colony properties of various bacterial pathogens.

**UNIT- IV No. of hours: 6**

Serological Methods - Agglutination, ELISA, immunofluorescence, Nucleic acid based methods - PCR, Nucleic acid probes. Typhoid, Dengue and HIV, Swine flu.

**UNIT- V No. of hours: 6**

Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method, Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method

**PRACTICAL-VI A: MICROBIAL DIAGNOSIS IN HEALTH CLINICS**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Collection transport and processing of clinical specimens (Blood, Urine, Stool and Sputum).  
Receipts, Labeling, recording and dispatching clinical specimens.
2. Isolation of bacteria in pure culture and Antibiotic sensitivity.

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS**

**THIRD YEAR – SEMESTER- V**

**PAPER-VI B : MICROBIAL BIOTECHNOLOGY (ELECTIVE)**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT- I No. of Hours: 8**

Microbial biotechnology: Scope and its applications in human therapeutics, agriculture (Biofertilizers, PGPR, Mycorrhizae), environmental, and food technology. Genetically engineered microbes for industrial application: Bacteria and yeast

**UNIT- II No. of Hours: 7**

Recombinant microbial production processes in pharmaceutical industries - Streptokinase, recombinant vaccines (Hepatitis B vaccine). Microbial polysaccharides, polyesters and bioplastics. Microbial production of bio-pesticides Microbial biosensors

**UNIT- III No. of Hours: 10**

Microbial based transformation of steroids and sterols. Bio-catalytic processes and their industrial applications: Production of high fructose syrup and production of cocoa butter substitute. Immobilization methods and their application: Whole cell immobilization

**UNIT- IV No. of Hours: 7**

Bio-ethanol and bio-diesel production: commercial production from lignocellulosic waste and algal biomass. Biogas production: Methane and hydrogen production using microbial culture. Microorganisms in bioremediation: Degradation of xenobiotics. Mineral recovery, removal of heavy metals from aqueous effluents.

**UNIT- V No. of Hours: 4**

Outlines of Intellectual Property Rights: Patents, Copyrights, Trademarks

**PRACTICAL-VI B: MICROBIAL BIOTECHNOLOGY**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Yeast cell immobilization in calcium alginate gels

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS**  
**THIRD YEAR – SEMESTER- VI**  
**PAPER-VII : FOOD AND INDUSTRIAL MICROBIOLOGY**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT- I No. of hours: 8**

Intrinsic and extrinsic parameters that affect microbial growth in food Microbial spoilage of food - fruits, vegetables, milk, meat, egg, bread and canned foods Food intoxication (botulism). Food-borne diseases (salmonellosis) and their detection.

**UNIT – II No. of hours: 7**

Principles of food preservation - Physical and chemical methods. Fermented Dairy foods – cheese and yogurt. Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw). Probiotics and their benefits.

**UNIT – III No. of hours: 6**

Microorganisms of industrial importance – yeasts, moulds, bacteria, actinomycetes. Isolation and Screening of industrially-important microorganisms. Outlines of strain improvement.

**UNIT – IV No. of hours: 8**

Types of fermentation processes – solid state, liquid state, batch, fed-batch, continuous. Design of fermenter. Ingredients of Fermentation media Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

**UNIT – V No. of hours: 7**

Microbial production of Industrial products - Citric acid, Ethanol, amylases, penicillin, glutamic acid and vitamin B12.

**PRACTICAL-VII: FOOD AND INDUSTRIAL MICROBIOLOGY**

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS**  
**THIRD YEAR – SEMISTER-VI**  
**CLUSTER ELECTIVE**  
**PAPER-VIII-A1 : COMPUTATIONAL METHODS AND BIOINFORMATICS**

**UNIT-I**

A) Definition of statics, population and universe, the sample and population, statistical inference. Parameters and statistics. Internal data: Construction of histograms & interpretation. The normal distribution of mean, mode, median and standard deviation representing the normal curve, comparisons of means and variance.

B) Proportion data: examples of proportion data (MPN, sterility testing of medicines, animal toxicity, therapeutic, infection and immunization studies), Chi - square test, goodness of fit.

C) Count data: Examples of count data (bacteria cell count, radioactivity count, colony and plaque count) statistical treatment to count data:- Poisson distribution, standard error confidence limits of counts. (20hrs)

**UNIT-II**

A). Analysis of variance: Analysis of co-variance: introduction, procedure, t-Test and F-Test for multiple comparisons.

B) Correlation and regression and line fitting through graph points, standard curves, correlation, linear regression, MLR, multi-collinearity, standard curves and interpolation of unknown Y - values (15hrs)

**UNIT-III**

A) Computer fundamentals - organization and working of computers Basic definitions - hard ware and soft ware film ware, Program flowchart computer architecture fundamentals-internals, externals net work peripherals.

B) Introduction to windows 2000: Desktop files and folders: simple operations like creation deletion, moving, copying files or folders using window explorer. Searching files and folders and other simple operations.

**UNIT-IV**

A) Word processing: opening, creating and saving documents, Typing, navigating, selecting, editing and sorting, checking spelling and grammar formatting - changing appearance of page - importing graphics, working with tables, documents printing. Basis of power point

B) Use of internet and working systems.

C) Microbiology applications of special software.

**UNIT-V**

A) Bioinformatics: Definition concept scope and relevance of bioinformatics Applications nbr genomics, proteomics, os databases.molecular modeling, drug designing, gene therapy, structure and functional relationship of biomolecules and other application of bioinformatics .

B) Sequence analysis: Concepts, importance and alignment methods, comparative, multiple sequence alignments and scoring methods.

C) Phylogenetic Analysis - concept evolution of p. trees gene predictions -methods , tools(GRAIL ,Genlang, gene tindu, procrutes, Gene panges, Prot.pred:- methods for knowing & unknowing folds modelling and drug designing.

**PRACTICAL- VIII-A1 : COMPUTATIONAL METHODS AND BIOINFORMATICS**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Introduction to Bioinformatics data bases: NCBI
2. Sequence retrieval using BLAST
3. Sequence alignment and Phylogenetic analysis using CLUSTAL W and Phylip
4. Pick out a given gene from genomes using Gene Scan or other softwares (Promotor region identification, repeat in genome ORF prediction). Gene finding tools (Glimmer, GENE SCAN), Primer designing, GENE SCAN/GENE TOOL
5. Protein structure: Primary structure analysis, Secondary structure prediction using PSI-PRED, Homology modeling using Swiss model

**B.Sc MICROBIOLOGY (CBCS) SYLLABUS  
THIRD YEAR – SEMISTER-VI  
PAPER-VIII-A2 : BIOFERTILIZERS AND BIOPESTICIDES**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT – I No of Hours: 10**

General account of the microbes used as biofertilizers for various crop plants and their advantages over chemical fertilizers. Symbiotic N<sub>2</sub> fixers: *Rhizobium* - Isolation, characteristics, types, inoculum production and field application, legume/pulses plants *Frankia* from non-legumes and characterization. Cyanobacteria from *Azolla*, characterization, mass multiplication, Role in rice cultivation, Crop response, field application.

**UNIT – II No of Hours: 6**

Free living *Azospirillum*, *Azotobacter* - isolation, characteristics, mass inoculum production and field application.

**UNIT – III No of Hours: 6**

Phosphate solubilizing microbes - Isolation, characterization, mass inoculum production, field application

**UNIT – IV No of Hours: 7**

Importance of mycorrhizal inoculum, types of mycorrhizae and associated plants, Mass inoculum production of VAM, field applications of Ectomycorrhizae and VAM.

**UNIT – V No of Hours: 7**

General account of microbes used as bioinsecticides and their advantages over synthetic pesticides. *Bacillus thuringiensis* - production, Field applications. Viruses – NPV cultivation and field applications.

**PRACTICAL-VIII-A2: BIOFERTILIZERS AND BIOPESTICIDES**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Isolation of *Rhizobium* from root nodules.
3. Isolation of phosphate solubilizers from soil
4. Staining and observation of VAM
3. A visit to biofertilizer production unit.

**SUGGESTED READINGS**

- Agarwal SK (2005) **Advanced Environmental Biotechnology**, APH publication.
- Kannaiyan, S. (2003). **Bioethnology of Biofertilizers**, CHIPS, Texas.
- Mahendra K. Rai (2005). **Hand book of Microbial biofertilizers**, The Haworth Press, Inc. New York.
- Reddy, S.M. et. al. (2002). **Bioinoculants for sustainable agriculture and forestry**, Scientific Publishers.
- Saleem F and Shakoori AR (2012) **Development of Bioinsecticide**, Lap Lambert Academic Publishing GmbH KG
- Subba Rao N.S (1995) **Soil microorganisms and plant growth** Oxford and IBH publishing co. Pvt. Ltd. NewDelhi.

**PAPER-VIII-A3: MICROBIAL QUALITY CONTROL IN FOOD AND PHARMACEUTICAL INDUSTRIES**

**TOTAL HOURS: 36**

**CREDITS: 3**

**UNIT – I No. of Hours: 8**

Good laboratory practices - Good microbiological practices. Biosafety cabinets – Working of biosafety cabinets, using protective clothing, specification for BSL-1, BSL-2, BSL-3. Discarding biohazardous waste – Methodology of Disinfection, Autoclaving & Incineration

**UNIT – II No. of Hours: 8**

Culture and microscopic methods - Standard plate count, Most probable numbers, Direct microscopic counts, Biochemical and immunological methods: Limulus lysate test for endotoxin, gel diffusion, sterility testing for pharmaceutical products

**UNIT – III No. of Hours: 8**

Molecular methods - Nucleic acid probes, PCR based detection, biosensors.

**UNIT – IV No. of Hours: 8**

Enrichment culture technique, Detection of specific microorganisms - on XLD agar, *Salmonella Shigella* Agar, Manitol salt agar, EMB agar, McConkey Agar, Saboraud Agar Ascertaining microbial quality of milk by MBRT, Rapid detection methods of microbiological quality of milk at milk collection centres (COB, 10 min Resazurin assay).

**UNIT – V No. of Hours: 4**

Hazard analysis of critical control point (HACCP) - Principles, flow diagrams, limitations Microbial Standards for Different Foods and Water – BIS standards for common foods and drinking water.

**PRACTICAL-VIII-A3: MICROBIAL QUALITY CONTROL IN FOOD AND PHARMACEUTICAL INDUSTRIES**

**TOTAL HOURS: 36**

**CREDITS: 2**

1. Microbiological laboratory safety- General rules & Regulations.
2. Sterility tests for Instruments – Autoclave & Hot Air Oven
3. Disinfection of selected instruments & Equipments
4. Sterility of Air and its relationship to Laboratory & Hospital sepsis.
5. Sterility testing of Microbiological media
6. Sterility testing of Pharmaceutical products –Antibiotics, Vaccines & fluids
7. Standard qualitative analysis of water.
8. Quantitative analysis of water – Membrane filter method
9. Analysis of food samples for Mycotoxins

**YOGI VEMANA UNIVERSITY: KADAPA**  
**STATISTICS CBCS SYLLABUS**

Semester – I (CBCS With Maths Combination Common to BA/BSc)

**Paper - I: Descriptive Statistics and Probability**

No. of Hours/week : 04

credits 3

**UNIT-I**

Introduction to Statistics: Concepts of Primary and Secondary data. Methods of collection and editing of primary data, Secondary data. Designing a questionnaire and a schedule. Diagrammatic and graphical representation of data. Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean.

**UNIT-II**

Measures of dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation. Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

**UNIT-III**

Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events,

**UNIT-IV**

Probability theorems: Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorem and problems.

**UNIT-V**

Random variable: Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables.

**Text Books:**

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
  - 2 BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr M Jagannohan Rao, Dr N.Srinivasa Rao, Dr P. Tirunathi Rao, Smt D.Viivalakshmi
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**YOGI VEMANA UNIVERSITY: KADAPA**  
**STATISTICS SYLLABUS**  
Semester – II (CBCS With Maths Combination Common to BA/BSc)  
**Paper - II :Mathematical Expectation and Probability Distributions**  
**(Scientific calculators are allowed)**

No. of Hours/week : 04

credits 3

UNIT-I

Mathematical expectation : Mathematical expectation of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties. Chebyshev and Cauchy - Schwartz inequalities.

UNIT-II

Discrete Distributions : Binomial and Poisson distributions, their definitions, first four central moments,  $\beta_1$  and  $\beta_2$ . M.G.F, C.F, C.G.F, P.G.F, mean, variance, additive property if exists. Poisson approximation to Binomial distribution.

UNIT-III

Negative Binomial, Geometric, Hyper-geometric distributions - Definitions, means, variances, M.G.F, C.F, C.G.F, P.G.F, reproductive property if exists. Binomial approximation to Hyper Geometric Distribution, Poisson approximation to Negative binomial distribution.

UNIT-IV

Continuous Distributions : Rectangular, Exponential, Gamma, Beta Distributions of first and second kind. Other properties such as mean, variance, M.G.F, C.G.F, C.F, and reproductive property if exist.

UNIT - V

Normal Distribution: Definition, Importance, Properties, M.G.F, CF, additive property, Normal distribution as a limiting case of Binomial and Poisson distribution. Cauchy Distribution definition, CF and reproductive property.

**Text Books:**

1. V.K Kapoor and S.C Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr M Jaganmohan Rao, Dr N Srinivasa Rao, Dr P Tirupathi Rao, Smt D Vijayalakshmi
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

**Reference books:**

4. Willam Feller : Introduction to Probability theory and its applications. Volume -I, Wiley
5. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt Ltd., Kolakota.
6. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
7. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
8. Sanjay Arora and Bansil Lal: New Mathematical Statistics: Satya Prakashan, New Delhi
9. Hogg Tanis Rao: Probability and Statistical Inference. 7<sup>th</sup> edition Pearson.

# YOGI VEMANA UNIVERSITY: KADAPA

## STATISTICS SYLLABUS

Semester – III (CBCS With Maths Combination Common to BA/BSc)

**Paper - III : Statistical Methods and Sampling Distributions**

No. of Hours/week : 04

credits 3

### UNIT – I

**Curve fitting:** Bi- variate data, Principle of least squares, fitting of degree polynomial. Fitting of straight line (), Fitting of Second degree polynomial or parabola (), Fitting of power curve () and exponential curves of type i) and ii) with problems.

### UNIT – II

**Correlation :** Meaning, Types of Correlation, Measures of Correlation : Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties), Bi-variate frequency distribution, correlation coefficient for bi-variate data and simple problems. Correlation ratio, concept of multiple and partial correlation coefficients (three variables only) and properties

### UNIT – III

**Regression :** Concept of Regression, Linear Regression: Regression lines, Regression coefficients and its properties, Regressions lines for bi-variate data and simple problems. Correlation vs regression. concept of multiple linear regression and partial regression.

### UNIT – IV

**Attributes :** Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency of data. Conditions for consistency of data for 2 and 3 attributes only , Independence of attributes , Association of attributes and its measures, Relationship between association and colligation of attributes, Contingency table: Square contingency(), Mean square contingency(2 ), Coefficient of mean square contingency (C), Tschuprow's coefficient of contingency (

### UNIT – V

**Exact Sampling distributions:** Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Definition and properties of Student's t- distribution, F – Distribution, - Distribution and their applications, the relationship between t and F – distribution and the relationship between F and distribution.

#### Text books

1. BA/BSc-III-statistics, statistical methods and inference, T. L. Vasudeva Murthy, A

# YOGI VEMANA UNIVERSITY: KADAPA

## STATISTICS SYLLABUS

Semester – IV (CBCS With Maths Combination Common to BA/BSc)

### Paper - IV: Statistical Inference

(Scientific calculators are allowed)

No. of Hours/week : 04

credits 3

#### UNIT-I

**Theory of estimation:** Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, & sufficiency and. Statement of Neyman's factorization theorem. Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson & Normal Population parameters estimate by MLE method. Confidence intervals of the parameters of normal population.

#### UNIT-II

**Testing of Hypothesis:** 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. Neyman-Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

#### UNIT – III

**Large sample Tests:** large sample test for single mean and difference of two means, confidence intervals for mean(s). Large sample test for single proportion, difference of proportions. standard deviation(s) and correlation coefficient(s).

#### UNIT – IV

**Small Sample tests:** t-test for single mean, difference of means and paired t-test.  $\chi^2$ -test for goodness of fit and independence of attributes. F-test for equality of variances.

#### UNIT – V

**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.

#### TEXT BOOKS

1. BA/BSc II year statistics - statistical methods and inference - Telugu Academy by A.Mohanrao, N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C. Ravichandra Kumar.
  2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.
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# YOGI VEMANA UNIVERSITY: KADAPA

## STATISTICS SYLLABUS

Semester – V (CBCS With Maths Combination Common to BA/BSc)

### **Paper - V: SAMPLING THEORY and DESIGN OF EXPERIMENTS**

No. of Hours/week : 04

credits 3

#### UNIT – I

**Sampling Theory:** Principal steps in sample surveys - census versus sample survey, sampling and non- sampling errors, advantages of sampling over census and limitations of sampling. Types of sampling: Subjective, probability and mixed sampling methods.

#### UNIT – II

**Simple Random Sampling:** Simple random sampling, selection procedure of simple random sampling, Advantages and Disadvantages of simple random sampling. Estimation of population mean, population total and variance of these estimates by Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR.

#### UNIT – III

**Stratified random sampling:** Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

**Systematic sampling:** Systematic sampling definition when  $N = nk$  and merits and demerits of systematic sampling - estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.

#### UNIT – IV

**Analysis of variance:** Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

**Design of Experiments:** Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design (C.R.D).

#### UNIT – V

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD. Factorial experiments – Main effects and interaction effects of  $2^2$  and  $2^3$  factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

#### **Text Books:**

1. Telugu Academy BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by Prof K. Srinivasa Rao, Dr D.Giri, Dr A. Anand, Dr V.Papaiah Sastry.
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

# YOGI VEMANA UNIVERSITY: KADAPA

## STATISTICS SYLLABUS

Semester – V (CBCS With Maths Combination Common to BA/BSc)

### **Paper – VI : Statistical Quality Control and Reliability**

No. of Hours/week :04

credits 3

#### UNIT – I

**Statistical Quality Control** : Definition, Importance of SQC in industry. Causes of variation-chance and assignable causes, Process and Product control, Importance of Normal distribution and  $3\sigma$  control limits, specification limits and Natural tolerance limits.

#### UNIT– II

**Shewart control charts** – Variable Control Charts- and R-chart, and S- chart. Attribute type of charts - np- chart(No of defectives), p- chart(Proportion of defectives) with fixed and variable sample size and C-Chart(No. of defects per unit), its applications.

#### UNIT – III

**Acceptance sampling plans**: Definition, Types of Accepting sampling plans, Merits and demerits of Acceptance sampling plans, applications, Concept of, AQL and LTPD, Producers risk and Consumer's risk. AOQ and AOQL curves, OC, ASN, and ATI curves.

#### UNIT – IV

Single and Double sampling plans for attributes and derivation of their OC and ASN functions. Design of single and double sampling plans for attributes.

#### UNIT – V

**Reliability**: Meaning and concept of reliability, Reliability measures –Failure Density, Failure Rate or Hazard function, Probability of Failure, Mean Time to Failure(MITF), Mean Time Between Failures(MTBF), Exponential distribution as life model, its memory- less property.

#### **List of reference books :**

1. Fundamentals of Applied Statistics. By V.K Kapoor and S.C Gupta , Sultan Chand.
2. Reliability and life testing by S.K.Sinha. Wiley Eastern
3. Statistical Quality Control by R.C.Gupta:
4. B.A/B.Sc III Year Paper-IV Statistics- applied Statistics- Telugu Academic by Prof.K.Srinivasa Rao, Dr.D. Giri, Dr.A.Anand, Dr. V.Papaiah Sastry
5. B.A/B.Sc Statistics Paper-IV Statistics, Quality, Reliability and OR by DVLN Jogiraju, C.Srikala, Palnati Sudarsan.

# YOGI VEMANA University: KADAPA

## STATISTICS MODEL QUESTION PAPER

Semester – VI (CBCS With Maths Combination Common to BA/BSc)

Paper – VII: ECONOMIC STATISTICS

No. of Hours/week : 04

credits 3

### UNIT-I

**Time Series:** Time Series and its components with illustrations, additive, multiplicative models. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method. Determination of seasonal indices by simple averages method, ratio to moving average, Ratio to trend and Link relative methods.

### UNIT-II

**Growth curves:** Modified exponential curve, Logistic curve and Gompertz curve, fitting of growth curves by the method of three selected points and partial sums.

### UNIT-III

**Index numbers:** Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspeyres's, Paasche's and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Fixed and chain base index

numbers. Cost of living index number and wholesale price index number. Base shifting, splicing and deflation of index numbers.

### UNIT-IV

**Official Statistics:** Functions and organization of CSO and NSSO. Agricultural Statistics, area and yield statistics. National income and computation, utility and difficulties in estimation of national income.

### UNIT-V

**Vital Statistics:** Introduction, definition and uses of vital statistics, sources of vital statistics. Mortality rates: Crude death rate(CDR), Specific death rate(SDR), standardized death rate(STDR). Fertility rates: crude birth rate(CBR), age specific fertility rate(ASFR), general fertility rate(GFR), total fertility rate(TFR). Measurement of population growth: crude rate of natural increase and pearl's vital index, Gross reproduction rate(GRR) and net reproduction rate(NRR). Life tables: construction and uses of life tables and abridged life tables.

#### Text Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof K. Srinivasa Rao, Dr D.Giri, Dr A.Anand, Dr V.Papaiah Sastry.

#### Reference Books:

3. Indian Official statistics - MR Saluja.
4. Anuvarthita Sankyaka Sastram - Telugu Academy.

**YOGI VEMANA UNIVERSITY: KADAPA**  
**STATISTICS SYLLABUS**

**Semester – VI (CBCS With Maths Combination Common to BA/BSc)**  
**Paper – VIII(A1): OR and Applications of Linear Programming Problem**

No. of Hours/week : 04

Credits: 3

**UNIT-I**

**Basics of OR and Linear Programming Problem:** Introduction of OR, Definition, characteristics, scope, applications and limitations of OR. Formulation of linear programming of problems (LPP), Convex sets, Basic feasible solutions, Graphical solution of linear programming problems. Alternative solutions, Unbounded solutions, Non existing feasible solutions by Graphical method.

**UNIT-II**

**Simplex Method:** General formulation of LP Problems and Matrix form of LP problems, Slack variable, Surplus variable, unrestricted Variable, Standard form of LPP, Canonical form of LPP. Introduction to simplex method, Definitions and notations, Computational procedure of simplex algorithm. Artificial variable technique, Big-M method and Two-phase simplex method, Degeneracy in LPP and method to resolve degeneracy. Alternative solutions, Unbounded solutions, Non existing feasible solutions and Solution of simultaneous equations by Simplex method.

**UNIT-III**

**Duality in Linear Programming and Dual Simplex Method:** Introduction, Definition of Dual Problems, General rules for converting any primal into its Dual, Economic interpretation of duality, Relation between the solution of Primal and Dual problem, Using duality to solve primal problem. Dual Simplex Method.

**UNIT-IV**

**Transportation problem:** Introduction, Mathematical formulation of Transportation problem, Tabular representation, Definitions, Initial Basic feasible solution of Transportation problem- North-west corner rule, Lowest cost entry method, Vogel's approximation method. Method of finding optimal solution-Modi method(U-V method). Degeneracy in transportation problems, Resolution of degeneracy, Unbalanced transportation problem.

**Assignment problem:** Introduction, Mathematical formulation of Assignment problem, Reduction theorem(statement only), Hungarian Method for solving Assignment problem, Unbalanced Assignment problem. The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.

**UNIT-V**

**Sequencing problem:** Introduction, assumptions of sequencing problem, Johnson's algorithm for n jobs on two machines problem- problems with n-jobs on two machines, algorithm for n jobs on three machines problem- problems with n- jobs on three machines, algorithm for n jobs on k machines problem, problems with n-jobs on k-machines. Graphical method for two jobs on k- machines.

**Reference Books:**

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. Kanti Swarup, P.K.Gupta, Manmohn, Operations Research, Sultan Chand and sons, New Delhi.
3. J.K. Sharma, Operations Research and Application, Mc Millan and Company, New Delhi.
4. Gass: Linear Programming. Mc Graw Hill.
5. Hadly: Linrar programming. Addison-Wesley.

**YOGI VEMANA UNIVERSITY: KADAPA**  
**STATISTICS SYLLABUS**  
**Semester – VI (CBCS With Maths Combination Common to BA/BSc)**  
**Paper – VIII(A2): Numerical Methods**

No. of Hours/week : 04

Credits 3

**UNIT-I**

Definitions of Forward difference operator( $\Delta$ ), Backward difference operator( $\nabla$ ), Shift or Extension(displacement) operator (E), Central Differences operator( $\mu$ ), Differentiation operator(D), Mean value operator ( Symbolic relations between operators, properties of difference and shift operators, fundamental theorem on finite differences and simple problems.

**UNIT-II**

**Interpolation with equal intervals:** Concept of interpolation and extrapolation, assumptions and uses of interpolation, difference tables, methods of interpolation with equal intervals - Newton's formula for forward and backward interpolation, Central differences, Gauss forward and backward, Sterling, Bessel's and Lalace-Everett's Formulae,

**UNIT-III**

**Interpolation with unequal intervals:** Divided differences and their properties. Methods of interpolation with unequal intervals – Newton's Divided difference formula and Lagrange's formula. Inverse interpolation- Lagrange's formula.

**UNIT-IV**

**Numerical Differentiation:** Introduction to Numerical differentiation. Determination of First and Second order derivatives for the given data using Newton's forward and backward, Gauss forward and backward, Sterling, Bessel's and Newton's Divided difference formula.

**UNIT-V**

**Numerical Integration:** Introduction to numerical integration, General Quadrature formula for equidistant ordinates, Trapezoidal rule, Simpson's 1/3 rd. Simpson's 3/8 th rule and Weddle's rule.

Books Recommended:

1. H.C. Saxena, Finite Differences and Numerical Analysis, S. Chand and Company, NewDelhi.
2. P.P.Gupta, G.S.Malik and Sanjay Gupta, Calculus of Finite Differences and Numerical Analysis, Krishna Prakashan Media(P) Ltd., Meerut(UP), India.
3. S.Ranganatham, M.V.S.S.N Prasad, V.Ramesh Babu, S.Chand& Company Ltd.
4. S. S. Sastry, Introductory Methods Numerical Analysis, Prentice- Hall of India.
5. C.F. Gerald and P. O. Wheatley, Applied Numerical Analysis, Addison- Wesley, 1998.

**YOGI VEMANA UNIVERSITY: KADAPA**  
**STATISTICS SYLLABUS**  
**Semester – VI (CBCS With Maths Combination Common to BA/BSc)**  
**Paper – VIII(A3): Econometric Methods**

No. of Hours/week : 04

Credits :3

**UNIT-I**

**Basic Econometrics:** Nature of econometrics and economic data, concept of econometrics, steps in empirical economic analysis, econometric model, importance of measurement in economics, the structure of econometric data, cross section, pooled cross section, time series and paired data, simple regression models, two variable linear regression model, assumptions estimations of parameters.

**UNIT-II**

**Models and Estimations:** Gauss marcoff theorem, OLS estimations, partial and multiple correlations coefficients. The general linear model assumptions, estimation and properties of estimators, BLUEs, and tests of significance of estimators, R square and ANOVA.

**UNIT-III**

**Problems in OLS Estimators:** Nature, test, consequences and remedial steps of problems of heteroscedasticity; Multicollinearity and Auto-correlation; Problems of specification error; Errors of measurement.

**UNIT-IV**

**Regressions with Qualitative Independent Variables:** Dummy variable technique — Testing structural stability of regression models comparing two regressions, interaction effects, seasonal analysis.

**UNIT-V**

**Regressions with Qualitative Independent Variables:** Piecewise linear regression, use of dummy variables, regression with dummy dependent variables; The LPM, Logit, Probit and Tobit models — Applications.

**BASIC READING LIST**

1. Amemiya, T. (1985), *Advanced Econometrics*, Harvard University Press, Cambridge, Mass.
2. Baltagi, B.H. (1998), *Econometrics*, Springer, New York.
3. Dongherty, C. (1992), *Introduction to Econometrics*, Oxford University Press, New York.
4. Goldberger, A.S. (1998), *Introductory Econometrics*, Harvard University Press, Cambridge, Mass.
5. Gujarati, D.N. (1995), *Basic Econometrics (6th Edition)*, McGraw Hill, New Delhi.
6. Hill R. C., E.G. William and G.G. Judge (1997), *Undergraduate Econometrics*, Wiley, New York.
7. Kennedy. P. (1998), *A Guide to Econometrics (4th Edition)*, MIT Press, New York.
8. Kmenta, J. (1997), *Elements of Econometrics (Reprint Edition)*, University of Michigan Press, New York.
9. Koutsoyiannis. A. (1977), *Theory of Econometrics (2nd ed.)*, The Macmillan Press Ltd., London.
10. Krishna, K.L. (Ed.) (1997), *Econometric Applications in India*, Oxford University Press, NewDelhi.



Structure of Computer Science/Information Technology (IT) Syllabus

**I YEAR I SEMESTER**

**Computer Fundamentals & Photoshop**

**Course Outcome**

To explore basic knowledge on computers and Photoshop's beauty from the practical to the painterly artistic and to understand how Photoshop will help you create your own successful images.

**UNIT-I:**

Introduction to computers, characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations. Number systems :binary, hexa and octal numbering system.

**UNIT-II:**

Input and output devices: Keyboard and mouse, inputting data in other ways, Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory. Windows basics: desktop, start menu, icons.

**Unit –III**

Introduction to Adobe Photoshop, Getting started with Photoshop, creating and saving a document in Photoshop, page layout and back ground, Photoshop program window-title bar, menu bar, option bar, image window, image title bar, status bar, ruler, palettes, tool box, screen modes, saving files, reverting files, closing files.

**Unit –IV**

**Images:** working with images, image size and resolution, image editing, colour modes and adjustments, Zooming & Panning an Image,, , Rulers, Guides & Grids- Cropping & Straightening an Image, image backgrounds ,making selections.

**Working with tool box:** working with pen tool, save and load selection-working with erasers-working with text and brushes-Colour manipulations: colour modes- Levels – Curves - Seeing Colour accurately - Patch tool – Cropping-Reading your palettes - Dust and scratches- Advanced Retouching- smoothing skin

**Unit-V**

**Filters:** The filter menu, Working with filters- Editing your photo shoot, presentation –how to create adds, artistic filter, blur filter, brush store filter, distort filters, noise filters, pixel ate filters, light effects, difference clouds, sharpen filters, printing.

## I YEAR II SEMESTER

### Paper-II : PROGRAMMING IN C

#### Course Objectives

1. Learn how to solve common types of computing problems.
2. Learn data types and control structures of C
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

#### Course Outcomes

Upon successful completion of the course, a student will be able to:

1. Appreciate and understand the working of a digital computer
2. Analyze a given problem and develop an algorithm to solve the problem
3. Improve upon a solution to a problem
4. Use the 'C' language constructs in the right way
5. Design, develop and test programs written in 'C'

#### UNIT I

**Introduction to Algorithms and Programming Languages:** Algorithm – Key features of Algorithms, Flow Charts.

**Introduction to C:** Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting

#### UNIT II

**Decision Control and Looping Statements:** Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

#### UNIT III

**Arrays:** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array, Operations on Array: One dimensional array, Two dimensional Arrays, Multidimensional Arrays.

**Strings:** Introduction, Characters, String handling functions.

**Functions:** Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

#### UNIT IV

**Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables - - Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function.

**Structure, Union, and Enumerated Data Types:** Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Unions – Enumerated Data Types

**II YEAR III SEMESTER****Paper-III : OBJECT ORIENTED PROGRAMMING USING JAVA****Course Objectives**

As the business environment becomes more sophisticated, the software development (software engineering is about managing complexity) is becoming increasingly complex. As of the best programming paradigm which helps to eliminate complexity of large projects, Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

**Course Outcomes**

At the end of this course student will:

1. Understand the concept and underlying principles of Object-Oriented Programming
2. Understand how object-oriented concepts are incorporated into the Java programming language
3. Develop problem-solving and programming skills using OOP concept
4. Understand the benefits of a well structured program
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java
6. Develop efficient Java applets and applications using OOP concept
7. Become familiar with the fundamentals and acquire programming skills in the Java language.

**UNIT – I**

**FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING:** Object Oriented paradigm –Basic concepts of Object Oriented Programming – Benefits of OOP –Applications of OOP.

**Overview of Java Language:** Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments.

**Constants, Variables and Data types:** Constants – Variables – Data types – Declaration of Variables-Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

## UNIT – II

**Operators and Expressions:** Arithmetic Operators – Relational Operators- Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence and Associativity.

**Decision Making and Branching:** Decision Making with If statement – Simple If Statement-If else Statement-Nesting If Else Statement- the Else If Ladder-The switch Statement – The ?: operator.

**Decision Making and Looping:** The while statement – The do statement – The for statement – Jumps in Loops, labelled loops.

## UNIT – III

**Class, Objects and Methods:** Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods, Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Abstract Methods and Classes – Visibility Control.

**Arrays, Strings and Vectors:** One-dimensional Arrays-creating an Array – Two dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types.

## UNIT – IV

**Interfaces:** Multiple Inheritance - Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

**Packages:** Java API packages – Using system Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

**Multithreaded Programming:** Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread –Using Thread Methods –Thread Exceptions – Thread Priority – Synchronization.

## UNIT - V

**Managing Errors and Exceptions:** Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging.

**Applet Programming:** How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a WebPage – Applet Tag – Adding Applet to HTML file – Running the Applet – More about Applet Tag – Passing parameters to Applets – Aligning the display – More about HTML tags – Displaying Numerical Values – Getting Input from the user.

## II YEAR IV SEMESTER

### Paper-IV: DATA STRUCTURES

#### Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms..

#### Course Outcomes

After completing this course satisfactorily, a student will be able to:

1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
4. Demonstrate different methods for traversing trees
5. Compare alternative implementations of data structures with respect to performance
6. Compare and contrast the benefits of dynamic and static data structures implementations
7. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack .
8. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

#### UNIT I

**Concept of Abstract Data Types (ADTs)-** Data Types, Data Structures, Storage Structures, Primitive and Non-primitive Data Structures, Linear and Non-linear Data Structures.

**Linear Lists –** ADT, Array and Linked representations, Pointers.

**Linked Lists:** Single Linked List, Double Linked List, Circular Linked List , applications

#### UNIT II

**Stacks:** Definition, ADT, Array and Linked representations, Implementations and Applications

**Queues:** Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Priority Queues, Implementations and Applications.

### **UNIT III**

**Trees:** Binary Tree, Definition, Properties, ADT, Array and Linked representations, Implementations and Applications. Binary Search Trees (BST) – Definition, ADT, Operations and Implementations, BST Applications. Introduction to Threaded Binary Trees, Heap trees.

### **UNIT IV**

**Graphs** – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees

### **UNIT- V**

**Sorting and Searching:** Selection, Insertion, Bubble, Merge, Quick, Heap sort, Sequential and Binary Searching.

### **REFERENCE BOOKS**

1. D S Malik, Data Structures Using C++, Thomson, India Edition 2006.
2. Sahni S, Data Structures, Algorithms and Applications in C++, McGraw-Hill, 2002.
3. SamantaD, Classic Data Structures, Prentice-Hall of India, 2001.
4. Heilman G I,. Data Structures and Algorithms with Object-Oriented Programming, Tata McGraw-Hill. 2002. (Chapters I and 14).
5. Tremblay P, and Sorenson P G, Introduction to Data Structures with Applications, Tata McGraw-Hill,

### **Student activity:**

1. **Create a visible stack using C-graphics**
2. **Create a visible Queue using C-graphics**

### III YEAR V SEMESTER

#### Paper-V: Data Base Management System

##### Course Objective:

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

##### Course Outcomes

On completing the subject, students will be able to:

1. Design and model of data in database.
2. Store, Retrieve data in database.

##### UNIT I

**Overview of Database Management System:** Introduction, Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management System, file-based system, Drawbacks of file-Based System, advantages of DBMS, Data models, Database Architecture.

##### UNIT II

**Relational Model:** Introduction, CODD's Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra.

##### UNIT III

**Entity-Relationship Model:** Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS A relationship and attribute inheritance, multiple inheritance, advantages of ER modelling.

##### UNIT IV

**Structured Query Language:** Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operations, View, Sub Query, Embedded SQL,

##### UNIT V

**PL/SQL:** Introduction, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Exceptions Handling.

## III YEAR V SEMESTER

### Paper VI : Software Engineering

#### Course Objectives

The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

#### Course outcomes

1. Ability to gather and specify requirements of the software projects.
2. Ability to analyze software requirements with existing tools
3. Able to differentiate different testing methodologies
4. Able to understand and apply the basic project management practices in real life projects
5. Ability to work in a team as well as independently on software projects

#### UNIT I

**INTRODUCTION:** Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models - Planning - Risk analysis.

#### UNIT II

**REQUIREMENTS ANALYSIS:** Requirement Engineering Processes – Feasibility Study – Software Requirement Analysis – Analysis Concepts and Principles – Analysis Process – Analysis Model.

#### UNIT III

**SOFTWARE DESIGN:** Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

#### UNIT IV

**USER INTERFACE DESIGN AND REAL TIME SYSTEMS:** User interface design - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards.

#### UNIT V

**SOFTWARE QUALITY AND TESTING:** Software Quality Assurance - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing.

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## III YEAR VI SEMESTER

### Paper-VII : Web Technologies

#### Course Objective

- To provide knowledge on web architecture, web services, client side and server side scripting technologies to focus on the development of web-based information systems and web services.
- To provide skills to design interactive and dynamic web sites.

#### Course Outcome

1. To understand the web architecture and web services.
2. To practice latest web technologies and tools by conducting experiments.
3. To design interactive web pages using HTML and Style sheets.
4. To study the framework and building blocks of .NET Integrated Development Environment.
5. To provide solutions by identifying and formulating IT related problems.

#### Unit I

**HTML:** Basic HTML, Document body, Text, Hyper links, adding more formatting, Lists, Tables using images. **More HTML:** Multimedia objects, Frames, Forms towards interactive, HTML document heading detail.

#### Unit II

**Cascading Style Sheets:** Introduction, using Styles, simple examples, your own styles, properties and values in styles, style sheet, formatting blocks of information, layers.

#### Unit III

**Introduction to JavaScript:** What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. **Objects in JavaScript:** Data and objects in JavaScript, regular expressions, exception handling.

#### Unit IV

**DHTML with JavaScript:** Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.

#### Unit V

**XML:** defining data for web applications, basic XML, document type definition, presenting XML, document object model. Web Services.

**III YEAR VI SEMESTER**  
**Cluster Elective VIIIA**  
**Paper-VIII–A1 : Foundations of Data Science**

**Course Objectives**

Modern scientific, engineering, and business applications are increasingly dependent on data, existing traditional data analysis technologies were not designed for the complexity of the modern world. Data Science has emerged as a new, exciting, and fast-paced discipline that explores novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

**Course Outcomes**

1. Able to apply fundamental algorithmic ideas to process data.
2. Learn to apply hypotheses and data into actionable predictions.
3. Document and transfer the results and effectively communicate the findings using visualization techniques.

**UNIT I**

**INTRODUCTION TO DATA SCIENCE** :Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modeling and validation – introduction to NoSQL.

**UNIT II**

**MODELING METHODS** :Choosing and evaluating models – mapping problems to machine learning, evaluating clustering models, validating models – cluster analysis – K-means algorithm.

**UNIT III**

**INTRODUCTION TO R Language**: Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames.

## UNIT IV

**MAP REDUCE:** Introduction – distributed file system – algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce – Hadoop - Understanding the Map Reduce architecture.

## UNIT V

**DELIVERING RESULTS** :Documentation and deployment – producing effective presentations– Introduction to graphical analysis – plot() function – displaying multivariate data.

### Reference Books

- 1.Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
- 2.Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2014.
- 3.Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley & Sons, Inc., 2012.
- 4.W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”, 2013.
- 5.Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, “Practical Data Science Cookbook”, Packt Publishing Ltd., 2014.
- 6.Nathan Yau, “Visualize This: The FlowingData Guide to Design, Visualization, and Statistics”, Wiley, 2011.
- 7.Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.

### Student Activity:

1. **Collect data from any real time system and create clusters using any clustering algorithm**
2. **Read the student exam data in R perform statistical analysis on data and print results.**

## Paper-VIII- A1 Foundations of Data Science Lab

### Objectives :

- R is a well-developed, simple and effective programming language which includes conditionals, loops, user defined recursive functions and input and output facilities.
- R has an effective data handling and storage facility,
- R provides a suite of operators for calculations on arrays, lists, vectors and matrices.
- R provides a large, coherent and integrated collection of tools for data analysis.

### Outcomes:

- 1) At end student will learn to handle the data through R.
- 2) Student will familiar with loading and unloading of packages.

#### I. Installing R and R studio

#### II. Basic Operations in r

1. Arithmetic Operations
2. Comments and spacing
3. Logical Operators - <, <=, >, >=, =, !=, &&, 1

#### III.

1. Getting data into R, Basic data manipulation
2. Vectors, Matrices, operation on vectors and matrices.

#### IV.

1. Basic Plotting
2. Quantitative data
3. Frequency plots
4. Box plots
5. Scatter plot
6. 6. Categorical data
7. Bar charts
8. Pie charts

#### V. Loops and functions

1. if, if else, while, for break, next, repeat.

Basic functions- Print(), exp( ), Log( ), sqrt( ), abs( ), sin( ), Cos( ), tan( ), factorial( ), rand ().

**Course Objective**

The Objective of this course is to provide practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem.

**Course Outcome**

1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.

**UNIT I**

**INTRODUCTION TO BIG DATA:** Introduction – distributed file system – Big Data and its importance, Four V's in big data, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

**UNIT II**

**INTRODUCTION HADOOP :** Big Data – Apache Hadoop & Hadoop Eco-System – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

**UNIT- III**

**HADOOP ARCHITECTURE:** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode.

**UNIT-IV**

Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

**UNIT-V**

**HIVE AND HIVEQL, HBASE**:-Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries.

**Reference Books**

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.
3. Tom White, “HADOOP: The definitive Guide” , O Reilly 2012.
4. Vignesh Prajapati, “Big Data Analytics with R and Haoop”, Packet Publishing 2013.
5. Tom Plunkett, Brian Macdonald et al, “Oracle Big Data Handbook”, Oracle Press, 2014.
6. Jy Liebowitz, “Big Data and Business analytics”,CRC press, 2013.

**Student Activity:**

1. Collect real time data and justify how it has become Big Data
2. Reduce the dimensionality of a big data using your own map reducer

## Paper-VIII-A2 : BIG DATA TECHNOLOGY LAB

### Objectives:

- Understand what Hadoop is
- Understand what Big Data is
- Learn about other open source software related to Hadoop

### Outcomes:

- i) Get help on the various Hadoop commands
- ii) Observe a Map-Reduce job in action

### 1. Implement the following Data Structures in Java

- a) Linked Lists
- b) Stacks
- c) Queues
- d) Set
- e) Map

- (i) Perform setting up and Installing Hadoop in its three operating modes: Standalone  
Pseudo distributed  
Fully distributed
- (ii) Use the web based tools to monitor your Hadoop setup.

### 3. Implement the following file management tasks in Hadoop.

- Adding files and directories
- Retrieving files
- Deleting files

## Paper-VIII-A3 : COMPUTING FOR DATA ANALYTICS

### Course Objectives

The objective of this course is to teach fundamental concepts and tools needed to understand the emerging role of business analytics in Organizations.

### Course Outcomes

1. Learn the Big Data in Technology Perspective.
2. Understanding of the statistical procedures most often used by practicing engineers
3. Understand Forecasting methods and apply for business applications.

### UNIT – I

**DATA ANALYTICS LIFE CYCLE: Introduction** to Big data Business Analytics - State of the practice in analytics role of data scientists - Key roles for successful analytic project - Main phases of life cycle - Developing core deliverables for stakeholders.

### UNIT – II

**STATISTICS Sampling Techniques** : Data classification, Tabulation, Frequency and Graphic representation - Measures of central value - Arithmetic mean, Geometric mean, Harmonic mean, Mode, Median, Quartiles, Deciles, Percentile.

### UNIT – III

**PROBABILITY AND HYPOTHESIS TESTING: Random** variable, distributions, two dimensional R.V, joint probability function, marginal density function. Random vectors - Some special probability distribution - Binomial, Poisson, Geometric, uniform, exponential, normal, gamma and Erlang. Multivariate normal distribution.

### UNIT – IV

**PREDICTIVE ANALYTICS: Predictive modeling and Analysis** - Regression Analysis, Multicollinearity , Correlation analysis, Rank correlation coefficient, Multiple correlation, Least square, Curve fitting and good ness of fit.

### UNIT – V

**TIME SERIES FORECASTING AND DESIGN OF EXPERIMENTS** :Forecasting Models for Time series : MA, SES, TS with trend, season - Design of Experiments, one way classification, two way classification, ANOVA, Latin square, Factorial Design.

### Reference Books

1. Chris Eaton, Dirk Deroos, Tom Deutsch et al., "Understanding Big Data", McGrawHill, 2012.
2. Alberto Cordoba , "Understanding the Predictive Analytics Lifecycle", Wiley, 2014.
3. Eric Siegel, Thomas H. Davenport , "Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die", Wiley, 2013.
4. James R Evans, "Business Analytics – Methods, Models and Decisions", Pearson 2013.
5. R. N. Prasad, Seema Acharya, "Fundamentals of Business Analytics", Wiley, 2015.
6. S M Ross, "Introduction to Probability and Statistics for Engineers and Scientists", Academic Foundation, 2011.
7. David Hand, Heiki Mannila, Padhria Smyth, "Principles of Data Mining", PHI 2013.
8. Spyros Makridakis, Steven C Wheelwright, Rob J Hyndman, "Forecasting methods and applications", Wiley 2013( Reprint).

### Student Activity:

1. **Collect temperatures of previous months and prepare a logic to estimate the temperature of next one week**
2. **Collect real time data and apply statistical techniques to classify it.**

**Objectives :**

Understanding and application of statistics through applied data analysis. The statistical software R is a widely used and stable software that is free.

**Outcomes:** At end student will familiar with the following.

**1. Measures of Centrality:-**

- a) Mean
- b) Median
- c) Quantiles

**Measures of relation (between two variables):-**

- a) Covariance,  $S_{xy}$
- b) Correlation,  $r$

**2. Discrete distributions:**

- a) Mean and Variance
- b) Binomial distribution
- c) Hyper geometric distribution
- d) poison distribution

**Continuous distribution**

- a) Uniform distribution
- b) Normal distribution
- c) Exponential distribution

**3. Covariance and correlation**

**4. Simple Linear regression**

- a) Linear regression and least square
- b) Parameter estimates and estimators
- c) Variance of estimators.

**III YEAR VI SEMESTER**  
**(Cluster 2) Paper-VIII : Elective –B-1**

**Distributed Systems**

**Course Objectives**

- To expose the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.
- To discuss multiple levels of distributed algorithms, distributed file systems, distributed databases, security and protection.

**Course Outcomes**

- Create models for distributed systems.
- Apply different techniques learned in the distributed system.

**UNIT I**

Introduction to Distributed Computing Systems, System Models, and Issues in Designing a Distributed Operating System, Examples of distributed systems.

**UNIT II**

Features of Message Passing System, Synchronization and Buffering, Introduction to RPC and its models, Transparency of RPC, Implementation Mechanism, Stub Generation and RPC Messages, Server Management.

**UNIT III**

Introduction, Design and implementation of DSM system, Granularity and Consistency Model, Advantages of DSM, Clock Synchronization, Event Ordering, Mutual exclusion, Deadlock.

**UNIT IV**

Task Assignment Approach, Load Balancing Approach, Load Sharing Approach, Process Migration and Threads.

**UNIT V**

File Models, File Accessing Models, File Sharing Semantics, File Caching Schemes, File Replication, Atomic Transactions, Access control.

**Reference Books**

1. Pradeep. K. Sinha: “ Distributed Operating Systems: Concepts and Design ”, PHI, 2007.
- 2 .George Coulouris, Jean Dollimore, Tim Kindberg: “ Distributed Systems” , Concept and Design, 3<sup>rd</sup> Edition, Pearson Education, 2005.

**III YEAR VI SEMESTER**  
**(Cluster 2 ) Paper-VIII : Elective –B-2**

**Cloud Computing**

**Course Objectives:**

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

**Course Outcomes**

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player , Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability
6. Design Cloud Services and Set a private cloud

**UNIT I**

**Introduction & Concepts:** Introduction to cloud computing: introduction, characteristics of cloud computing, cloud models, cloud services examples, cloud-based services & applications.

**Cloud Concepts & Technologies:** Virtualization, Load Balancing, Scalability & Elasticity, Deployment, Replication, Monitoring, Software Defined Networking, Networking Function Virtualization, Map Reduce, Identity And Access Management, Service Level Agreements, Billing.

**UNIT II**

**Cloud Services & Platforms:** Compute Services, Storage Services, Database Services, Applications Services, Content Delivery Services, Analytics Services, Deployment & Management Services, Identity & Access Management Services, Open Source Private Cloud Software.

**UNIT III**

**Cloud Application Design:** Introduction, Design Considerations for Cloud Applications, Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches.

**Python Basics:** Introduction, Installing Python, Python Data Types & Data Structures, Control flow, Functions, Modules, Packages, File Handling, Date/Time Operations, Classes  
163.

#### **UNIT V**

**Python for Cloud:** Python for Amazon Web Services, Python for Google Cloud Platform, Python for Windows Azure.

#### **TEXT BOOK:**

1. Cloud Computing A Hands On Approach By Arshdeep Bahga And Vijay Madiseti  
From University Press.

#### **Reference Books**

1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi - 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
4. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madiseti, University Press
5. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammarai selvi, TMH

**III YEAR VI SEMESTER**  
**(Cluster 2) Paper-VIII : Elective –B-3**

**Cryptography and Network Security**

**Course Objectives:**

The student will learn about the different security issues in different environments. This will also help us to learn different sciences in providing security like cryptography and steganography.

**Course Outcomes**

1. Compare the strengths and limitations of different security mechanisms
2. Address the core issues of security and transmission of information.
3. Develop simple and new algorithms.

**UNIT 1:**

Introduction: Attacks, services and mechanisms, security attacks, security services, a model for internet work security.

Classical techniques: Conventional encryption model, steganography, classical encryption techniques

Modern techniques: Simplified DES, block cipher principles, data encryption standard, strength of DES, differential and linear crypt analysis, block cipher design principles and modes of operations.

**UNIT 2:**

Conventional encryption: Placement of encryption function, traffic confidentiality, key distribution, random number generation.

Public key cryptography: Principles, RSA algorithm, key management, Diffie-Hellman key exchange, elliptic curve cryptography.

**UNIT 3:**

Message authentication and hash functions: Authentication requirements and functions, Message Authentication, Hash functions, security of hash functions and MACs.

**UNIT 4:**

Hash and MAC algorithms: MD file, message digest algorithm, secure hash algorithm

Digital signatures and authentication protocols: Digital signatures, authentication protocols, digital signature standards

**UNIT 5:**

Authentication applications: Kerberos, X.509 directory authentication service.

Electronic mail security: Pretty good privacy, S/MIME.

**Text Books:**

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER –I  
PAPER – I: DIFFERENTIAL EQUATIONS

60 Hrs

**UNIT – I (12 Hours), Differential Equations of first order and first degree :**

Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

**UNIT – II (12 Hours), Orthogonal Trajectories.**

**Differential Equations of first order but not of the first degree :**

Equations solvable for  $p$ ; Equations solvable for  $y$ ; Equations solvable for  $x$ ; Equations that do not contain  $x$  (or  $y$ ); Equations of the first degree in  $x$  and  $y$  – Clairaut's Equation.

**UNIT – III (12 Hours), Higher order linear differential equations-I:**

Solution of homogeneous linear differential equations of order  $n$  with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General Solution of  $f(D)y=0$

General Solution of  $f(D)y=Q$  when  $Q$  is a function of  $x$ .

$\frac{1}{f(D)}$  is Expressed as partial fractions.

P.I. of  $f(D)y = Q$  when  $Q = be^{ax}$

P.I. of  $f(D)y = Q$  when  $Q$  is  $b \sin ax$  or  $b \cos ax$ .

**UNIT – IV (12 Hours), Higher order linear differential equations-II:**

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of  $f(D)y = Q$  when  $Q = bx^k$

P.I. of  $f(D)y = Q$  when  $Q = e^{ax}V$

P.I. of  $f(D)y = Q$  when  $Q = xV$

P.I. of  $f(D)y = Q$  when  $Q = x^mV$

**UNIT – V (12 Hours), Higher order linear differential equations-III:**

Method of variation of parameters; Linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation.

**Reference Books :**

1. Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition.
2. A text book of mathematics for BA/BSc Vol 1 by N. Krishna Murthy & others, published by S. Chand & Company, New Delhi.
3. Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company.

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – II  
PAPER – II : SOLID GEOMETRY

**60 Hrs**

**UNIT – I (12 hrs) : The Plane :**

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

**UNIT – II (12 hrs) : The Line :**

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line;

**UNIT – III (12 hrs) : Sphere :**

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;

**UNIT – IV (12 hrs) : Sphere & Cones :**

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified form of the equation of two spheres.

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators;

**UNIT – V (12 hrs) Cones & Cylinders :**

Intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex; Right circular cone; Equation of the right circular cone with a given vertex; axis and semi-vertical angle.

Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.

**Reference Books :**

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.
2. A text book of Mathematics for BA/B.Sc Vol 1, by V Krishna Murthy & Others, Published by S. Chand & Company, New Delhi.

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – III  
PAPER – III : ABSTRACT ALGEBRA

60 Hrs

**UNIT – 1 : (10 Hrs) GROUPS :-**

Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group. Composition tables with examples.

**UNIT – 2 : (14 Hrs) SUBGROUPS :-**

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition – examples-criterion for a complex to be a subgroups.

Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

**Co-sets and Lagrange's Theorem :-**

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

**UNIT – 3 : (12 Hrs) NORMAL SUBGROUPS :-**

Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group.

**UNIT – 4 : (10 Hrs) HOMOMORPHISM :-**

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

**UNIT – 5 : (14 Hrs) PERMUTATIONS AND CYCLIC GROUPS :-**

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley's theorem.

**Cyclic Groups :-**

Definition of cyclic group – elementary properties – classification of cyclic groups.

**Reference Books :**

1. Abstract Algebra, by J.B. Fraleigh. Published by Narosa Publishing house.
2. A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, Published by S.Chand

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – IV  
PAPER- IV : REAL ANALYSIS

**UNIT – I (12 hrs) : REAL NUMBERS & INFINITE SERIES :**

The algebraic and order properties of  $\mathbb{R}$ , Absolute value and Real line, Completeness property of  $\mathbb{R}$ , Applications of supremum property; intervals. Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. **(No. Question is to be set from this portion.)**

Introduction to series, convergence of series. Cauchy's general principle of convergence for series, tests for convergence of series, Series of Non-Negative Terms.

1. Comparison test
2. Cauchy's  $n^{\text{th}}$  root test or Root Test.
3. D'Alembert's Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

**UNIT –II (12 hrs) : CONTINUITY**

**Limits :** Limits of functions. Limits at infinity.

**Continuous functions :** Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

**UNIT – III (12 hrs) : DIFFERENTIATION AND MEAN VALUE THEOREMS :**

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

**UNIT – IV (12 hrs) : RIEMANN INTEGRATION-I:**

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for  $\mathbb{R}$  – integrability. Another definition of Riemann integral. Some classes of bounded integrable functions.

**UNIT – V (12 hrs) : RIEMANN INTEGRATION-II:**

Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

**Reference Books :**

1. Real Analysis by Rubert & Bartely and D.R. Sherbart. Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania Published by S. Chand & Company Pvt. Ltd., New Delhi.

**Suggested Activities:**

Seminar/ Quiz/ Assignments/ Project on Real Analysis and its applications

**Reference Books :**

1. Real Analysis by Rubert & Bartely and D.R. Sherbart. Published by John Wiley.

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – V  
PAPER – V: RING THEORY & VECTOR CALCULUS

60 Hrs

**UNIT – 1 (12 hrs) RINGS-I**

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field.

**UNIT – 2 (12 hrs) RINGS-II**

Sub Rings, Ideals, Quotient Rings.

Definition of Homomorphism – Homomorphic Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorphism.

**UNIT –3 (12 hrs) VECTOR DIFFERENTIATION**

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

**UNIT – 4 (12 hrs) VECTOR INTEGRATION**

Line Integral, Surface Integral, Volume integral with examples.

**UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS**

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

**Reference Books :-**

1. Abstract Algebra by J. Fraleigh, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
4. Vector Calculus by R. Gupta, Published by Laxmi Publications.
5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications.
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

**Suggested Activities:**

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – V  
PAPER – VI : LAPLACE TRANSFORMS

60 Hrs

**UNIT – 1 (12 hrs) Laplace Transform - I**

Definition of - Integral Transform – Laplace Transform Linearity, Property, Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order, and of Class A.

**UNIT – 2 (12 hrs) Laplace Transform - II**

First Shifting Theorem, Second Shifting Theorem, Change of Scale Property, Laplace Transform of the derivative of  $f(t)$ , Initial Value theorem and Final Value theorem.

**UNIT – 3 (12 hrs) Laplace Transform - III**

Laplace Transform of Integrals – Multiplication by  $t$ , Multiplication by  $t^n$  – Division by  $t$ . Laplace transform of Bessel Function, Laplace Transform of Error Function, Laplace Transform of Sine and cosine integrals.

**UNIT – 4 (12 hrs) Inverse Laplace Transform - I**

Definition of Inverse Laplace Transform. Linearity, Property, First Shifting Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions, Examples.

**UNIT – 5 (12 hrs) Inverse Laplace Transform - II**

Inverse Laplace transforms of Derivatives–Inverse Laplace Transforms of Integrals – Multiplication by Powers of ‘P’– Division by powers of ‘P’– Convolution Definition – Convolution Theorem – proof and Applications – Heaviside’s Expansion theorem and its Applications.

**Reference Books :-**

1. Laplace Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi.
3. Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
4. Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S. Chand and Co., Pvt.Ltd., New Delhi.

**Suggested Activities:**

Seminar/ Quiz/ Assignments

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – VI  
PAPER – VII : LINEAR ALGEBRA - I

60 Hrs

**UNIT – I (12 hrs) : Vector Spaces - I**

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

**UNIT –II (12 hrs) : Vector Spaces - II**

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

**UNIT –III (12 hrs) : Linear Transformations**

Linear transformations, linear operators, Properties of L.T., Determination of L.T, sum and product of L.T's Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank -Nullity Theorem.

**UNIT –IV (12 hrs) : Vector Space Isomorphism**

Fundamental theorem of homomorphism, Singular and non –singular transformations, inverse function, Uniqueness of inverse.

**UNIT –V (12 hrs) : Matrix of a Linear Transformation**

Definition of Matrix of a Linear Transformation, Problems on finding the matrix of a Linear Transformation, Transition matrix and problems on transition matrix.

**Reference Books :**

1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut-250002.
2. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.
3. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4<sup>th</sup> Edition 2007.

**Suggested Activities:**

Seminar/ Quiz/ Assignments/ Project on “Applications of Linear algebra Through Computer Sciences”

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – VI  
Cluster Elective – Paper VIII - A1: INTEGRAL TRANSFORMS

**UNIT – I (12 hrs) Application of Laplace Transform to solutions of Differential Equations :-**

Solutions of ordinary Differential Equations.  
Solutions of Differential Equations with constants co-efficient  
Solutions of Differential Equations with Variable co-efficient

**UNIT – II (12 hrs) Application of Laplace Transform :-**

Solution of simultaneous ordinary Differential Equations.  
Solutions of partial Differential Equations.

**UNIT – III (12 hrs) Application of Laplace Transforms to Integral Equations :-**

Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro Differential Equations. Application of L.T. to Integral Equations.

**UNIT – IV (12 hrs) Fourier Transforms:-**

Definition of Fourier Transform – Fourier sine Transform – Fourier cosine Transform – Relationship between Fourier and Laplace transforms – Linear Property – Change of Scale Property – Modulation theorem – Derivative theorem – Shifting property – Convolution Theorem for Fourier transform – Problems related to Integral Equations – Parseval's Identity.

**UNIT – V (12 hrs) Fourier Series:-**

Fourier series, Fourier series in the interval  $[-\pi, \pi]$ , Fourier series in the interval  $[0, 2\pi]$ . Half range series, Fourier sine series in  $[0, \pi]$ , Fourier cosine series in  $[0, \pi]$ , Fourier series in the interval  $[-l, l]$ , Fourier series in the interval  $[0, 2l]$ , Fourier half range series in  $[0, l]$ .

**Reference Books :-**

1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by Shanthi Narayana and P.K. Mittal, Published by S. Chand and Company pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
5. Integral Transforms by M.D. Raising hania - H.C. Saxsena and H.K. Dass Published by S.Chand and Company pvt. Ltd., New Delhi.
6. Fourier series and Integral Transforms by Dr.S Sreenadh, S Ranganatham, MVSSN Prasad.

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – VI

**Cluster Elective – Paper VIII – A2 : NUMERICAL ANALYSIS**

**60 Hrs**

**UNIT- I: (12 hours)**

**Errors in Numerical computations and Solution of Algebraic and Transcendental Equations:** Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation. The bisection method, The iteration method, The method of false position, Newton Raphson method, Generalized Newton Raphson method.

**UNIT – II: (12 hours)**

**Interpolation–I:** Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial, Newton's formulae for interpolation.

**UNIT – III: (12 hours)**

**Interpolation – II :** Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula.

**UNIT – IV: (12 hours)**

**Interpolation – III:** Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton's general interpolation Formula.

**UNIT – V: (12 hours)**

**Numerical Differentiation and Integration:** Numerical differentiation, The Cubic Spline method, Numerical integration, Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule.

**Reference Books :**

1. Numerical Analysis by S S Sastry published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

**Suggested Activities:**

B.A./B.Sc. MATHEMATICS SYLLABUS  
SEMESTER – VI

Cluster Elective – Paper VIII -A3 : LINEAR ALGEBRA - II

**UNIT- I: (12 hours)**

**Rank of a Matrix :** Sub-matrix and Minors of a Matrix, Rank of a Matrix, Elementary transformations, Reduction to Normal Form, Inverse of a Matrix using elementary transformations, Echelon form.

**UNIT – II: (12 hours)**

**Linear Equations:** Consistency, System of Homogeneous Linear equations, System of Non-homogeneous Linear equations.

**UNIT – III: (12 hours)**

**Characteristic roots and Vectors of a Square Matrix:** Characteristic roots, characteristic vectors, Properties of characteristic vectors, Cayley - Hamilton Theorem, Inverse of a matrix by using Cayley - Hamilton Theorem.

**UNIT –IV (12 hrs) : Inner product space - I**

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law.

**UNIT –V (12 hrs) : Inner product space - II**

Orthogonality, Ortho normal set, complete ortho-normal set, Gram – Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

**Reference Books :**

1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut-250002.
2. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low price edition), New Delhi.
3. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4<sup>th</sup> Edition 2007.
4. A Text Book on Matrices by P.K.Mittal, S.Chand Co.
5. A Text Book on Matrices by A.R. Vasistha, A.K.Vasistha, Krishna Prashan Media.
6. A Text Book on Matrices by Santhi Narayan, S.Chand Co.

ZOOLOGY SYLLABUS FOR I SEMESTER

ZOOLOGY - PAPER - I

ANIMAL DIVERSITY - NONCHORDATES

Periods:60

Max. Marks:100

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Brief history, Significance of Diversity of Non Chordates

Protozoa

General characters

Classification of Protozoa up to classes with examples

Elphidium (type study)

Porifera

General characters

Classification of Porifera up to classes with examples

Sycon – External Characters, Types of cells,

Skelton in Sponges

Canal system in sponges

Unit - II

Coelenterata

General characters

Classification of Coelenterata up to classes with examples

Obelia - External Characters, Structure of Polyp and Medusa

Polymorphism in coelenterates

Corals and coral reef formation

Platyhelminthes

General characters

Classification of Platyhelminthes upto classes with examples

Fasciola hepatica, Reproductive System, Life History and pathogenicity

Unit - III

Nemathelminthes

General characters

Classification of Nemathelminthes up to classes with examples

Annelida

General characters

Classification of Annelida up to classes with examples

Hirudinaria granulosa, Digestive System, Reproductive System

Coelomoducts

Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost

## Arthropoda

General characters

Classification of Arthropoda up to classes with examples

Prawn, Appendages, Respiratory system

Peripatus - Structure and affinities

## Mollusca

General characters

Classification of Mollusca up to classes with examples

Pearl formation in Pelecypoda

Torsion in gastropods

## Unit - V

## Echinodermata

General characters

Classification of Echinodermata up to classes with examples

Water vascular system in star fish

## Hemichordata

General characters

Classification of Hemichordata up to classes with examples

Balanoglossus - Structure and affinities

## Non-Chordata larval forms

Amphiblastula

Nauplius

Bipinnaria

Tornaria

ZOOLOGY SYLLABUS FOR II SEMESTER

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Periods:60

Max. Marks: 100

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Unit - I

General characters of Chordata

Prochordata

Salient features of Cephalochordata

Affinities of Cephalochordata

Salient features of Urochordata

Structure and life history of Herdmania

Significance of Retrogressive metamorphosis

Unit - II

Cyclostomata

General characters of Cyclostomata

Comparison of the Petromyzon and Myxine

Pisces

General characters of Fishes

Classification of fishes up to sub - class level with examples

Scoliodon, Digestive system, Heart, Brain

Migration in Fishes

Types of Scales

Dipnoi

Unit - III

3.1 Amphibia

General characters of Amphibian

Classification of Amphibia upto orders with examples.

Rana hexadactyla, Digestive system, Respiratory system, Heart

Reptilia

General characters of Reptilia

Classification of Reptilia upto orders with examples

Identification of Poisonous snakes and Skull in reptiles

Unit - IV

Aves

General characters of Aves

Classification of Aves upto subclasses with examples.

## Mammalia

General characters of Mammalia

Classification of Mammalia upto sub - classes with examples

Comparison of Prototherians, Metatherians and Eutherians

Dentition in mammals

ZOOLOGY SYLLABUS FOR III SEMESTERZOOLOGY - PAPER - III

## CYTOLOGY, GENETICS AND EVOLUTION

Periods:60

Max. Marks:100

## Unit - I

## 1. Cytology - I

Definition, history, prokaryotic and eukaryotic cells, virus

Electron microscopic structure of eukaryotic cell.

Plasma membrane –Different models of plasma membrane.

## Unit – II

## 2. Cell organelles

Structure and functions of Endoplasmic Reticulum

Structure and functions of Golgi apparatus

Structure and functions of Lysosomes

Structure and functions of Ribosomes

Structure and functions of Mitochondria

## 2.7. Chromatin, Chromosomes - Structure, types, functions

## Unit - III

## Genetics - I

Mendel's work on transmission on traits

Principles of inheritance

Incomplete dominance and codominance

Lethal alleles, Epistasis, Pleiotropy

## Unit - IV

## Genetics - II

Sex determination

Sex linked inheritance

Linkage and crossing over

Extra chromosomal inheritance

Human karyotyping

## Unit - V

## Evolution

Lamarckism, Darwinism, Hardy-Weinberg Equilibrium.

Variations, isolating mechanisms, natural selection

Speciation (Allopatric and Sympatric)

Macro evolutionary principles (Example: Darwin's finches)

ZOOLOGY SYLLABUS FOR IV SEMESTERZOOLOGY - PAPER - IV

## EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods:60

Max. Marks: 100

## Unit - I

## Developmental Biology and Embryology

Gametogenesis

Types of eggs

Formation and functions of Foetal membrane in chick embryo

Development, types and functions of Placenta in mammals

## Unit - II

## Physiology - I

Elementary study of process of digestion

Absorption of digested food

Respiration - Pulmonary ventilation, transport of oxygen and carbondioxide

Circulation - Structure and functioning of heart, Cardiac cycle

Excretion - Structure of nephron, urine formation, counter current mechanism

## Unit - III

## Physiology - II

Nerve impulse transmission, origin and propagation of action potentials

Muscle contraction - Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction

Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas

Hormonal control of reproduction in a mammal

## Unit - IV

## Ecology - I

Meaning and scope of Ecology

Nutrient cycles - Nitrogen, carbon and phosphorus

Components of Ecosystem (Example:lake), food chains and food web, energy flow in ecosystem

## Unit - V

## Ecology - II

Habitat and ecological niche

Community interactions - Mutualism, commensalism, parasitism, competition, predation

## Ecological succession

## Zoogeography

Zoogeographical regions

Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions

ZOOLOGY SYLLABUS FOR V SEMESTER  
ZOOLOGY - PAPER - V  
 ANIMAL BIOTECHNOLOGY

Periods:60

Max. Marks:100

Unit 1: Tools of Recombinant DNA technology - Enzymes and Vectors

Restriction modification systems: Types I, II and III. Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering

Cloning Vectors: Plasmid vectors:pBR and pUC series, Bacteriophage, Cosmids.

Unit 2 Techniques of Recombinant DNA technology

Cloning: Use of linkers and adaptors

PCR: Basics of PCR.

Hybridization techniques: Southern, Northern and Western blotting,

Genomic and cDNA libraries: Preparation and uses

UNIT 3 Animal Cell Technology

Cell cultures: primary culture, secondary culture, Organ culture; Cryopreservation of cultures.

Hybridoma Technology: Production of Monoclonal antibodies (mAb), Applications of mAb

Stem cells: Types of stem cells, applications of stem cell technology in cell based therapy.

Unit 4 Reproductive Technologies & Transgenic Animals

Manipulation of reproduction in animals: Artificial Insemination, In vitro fertilization , super ovulation, Embryo transfer

Transgenic Animals: Transgenic - sheep, - fish; applications

Unit 5 Applied Biotechnology

Industry: Fermentation: Different types of Fermentation: Short notes on - Submerged & Solid state; batch, Fed batch & Continuous;

Agriculture: fisheries – monoculture in fishes, polyploidy in fishes; DNA fingerprinting

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ZOOLOGY SYLLABUS FOR V SEMESTER

ZOOLOGY - PAPER - VI

ANIMAL HUSBANDRY

Periods:60	Max. Marks: 100
UNIT – I	10 Hours
General introduction to poultry farming. Principles of poultry housing. Poultry houses. Systems of poultry farming. Management of chicks, growers and layers. Management of Broilers.	
UNIT – II:	10 Hours
Poultry feed management – Principles of feeding. Methods of feeding. Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management.	
UNIT – III:	10 Hours
Selection, care and handling of hatching eggs. Egg testing. Methods of hatching. Brooding and rearing. Sexing of chicks.	
UNIT- IV:	20 Hours
Breeds of Dairy Cattle and Buffaloes – Definition of breed; Classification of Indian Cattle breeds, exotic breeds and Indian buffalo breeds. (Three each category). Housing of dairy animals – Selection of site for dairy farm; systems of housing – loose, housing system. Conventional dairy barn. Cleaning and sanitation of dairy farm. Weaning of calf. Castration and dehorning. Deworming.	
UNIT - V:	10 Hours
Care and management of dairy animals - Care and management of calf, heifer, milk animal, dry and pregnant animal, bulls and bullocks.	

VI SEMESTER  
ZOOLOGY SYLLABUS FOR CLUSTER ELECTIVE –VIII-A:  
AQUACULTURE

Cluster Elective Paper: VIII-A-1

PRINCIPLES OF AQUACULTURE

Periods:60

Max.Marks:100

Unit – I

Introduction / Basics of Aquaculture

Definition, Significance and History of Aquaculture

Major cultivable species for aquaculture: freshwater, brackish water and marine.

Criteria for the selection of species for culture

Unit – II

Types of Aquaculture

Freshwater, Brackishwater and Marine

Concept of Monoculture, Polyculture, Composite culture, Monosex culture and Integrated fish farming

Culture practices

Traditional, extensive, modified extensive, semi-intensive and intensive cultures of fish.

Unit – III

Design and construction of aquafarms

Criteria for the selection of site for freshwater and brackish water pond farms

Design and construction of fish and shrimp farms

Nutrition and feeds

Natural food and Artificial feeds and their importance in fish and shrimp culture

Unit – IV

Management of carp culture ponds

4.1.1 Culture of Indian major carps: Pre-stocking management – Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization; Stocking management – Stocking density and stocking; Post-stocking management – Feeding, water quality, growth and health care; and Harvesting of ponds

## Unit – V

Culture of shrimp (*Penaeus monodon* or *Litopenaeus vannamei*)  
 Culture of pearl oysters  
 Culture of ornamental fishes – Setting up and maintenance of aquarium.

### REFERENCES BOOKS

1. Bardach, JE et al. 1972. Aquaculture – The farming and husbandry of freshwater and marine organisms, John Wiley & Sons, New York.
2. Bose AN et al. 1991. Coastal aquaculture Engineering. Oxford & IBH Publ.Co.Pvt.Ltd.
3. Chakraborty C & Sadhu AK. 2000. Biology Hatchery and Culture Technology of Tiger Prawn and Giant Freshwater Prawn. Daya Publ. House.
4. FAO. 2007. Manual on Freshwater Prawn Farming.
5. Huet J. 1986. A text Book of Fish Culture. Fishing News Books Ltd.
6. ICAR. 2006. Hand Book of Fisheries and Aquaculture. ICAR.
7. Ivar LO. 2007. Aquaculture Engineering. Daya Publ. House.
8. Jhingran V.G. 2007. Fish and Fisheries of India. Hindustan Publ. Corporation, India.
9. Landau M. 1992. Introduction to Aquaculture. John Wiley & Sons.
10. Lovell RT. 1998. Nutrition and Feeding of fishes. Chapman & Hall.
11. Mcvey JP. 1983. Handbook of Mariculture. CRC Press.
12. MPEDA: Handbooks on culture of carp, shrimp, etc.
13. New MB. 2000. Freshwater Prawn Farming. CRC Publ.
14. Pillay TVR. 1990. Aquaculture- Principles and Practices, Fishing News Books Ltd., London.
15. Pillay TVR & Kutty MN. 2005. Aquaculture- Principles and Practices. 2<sup>nd</sup> Ed. Blackwell
16. Rath RK. 2000. Freshwater Aquaculture. Scientific Publ.
14. Stickney RR. 1979. Principles of Warmwater Fish Culture, John Wiley & Sons
15. Wheaton FW. 1977. Aquacultural Engineering. John Wiley & Sons.

Cluster Elective Paper: VIII-A-2

AQUACULTURE MANAGEMENT

Periods : 60

Max.Marks : 100

Unit – I

Breeding and Hatchery Management

Bundh Breeding and Induced breeding of carp by Hypophysation;  
and use of synthetic hormones

Types of fish hatcheries; Hatchery management of Indian major carps

Breeding and Hatchery management of *Penaeus monodon*

Unit – II

Water quality Management

Water quality and soil characteristics suitable for fish and shrimp culture

Identification of oxygen depletion problems and control mechanisms in culture ponds

Liming materials, Organic manures and Inorganic fertilizers commonly used and their implications in fish ponds

Unit – III

Feed Management

Live Foods and their role in shrimp larval nutrition.

Supplementary feeds: Principal foods in artificial diets; Types of feeds; Feed additives and Preservatives; role of probiotics.

Feed formulation and manufacturing; Feed storage

Unit – IV

Disease Management

Principles of disease diagnosis and health management;

Prophylaxis, Hygiene and Therapy of fish diseases

Etiology, Symptoms, prophylaxis and therapy of common fish diseases in fish ponds

Unit – V

Economics and Marketing

5.1.1 Principles of aquaculture economics – Capital costs, variable costs, cost-benefit analysis

5.1.2 Fish marketing methods in India; Basic concepts in demand and price analysis

Fish Genetics

Genetic improvement of fish stocks – Hybridization of fish.

Cryopreservation of gametes, Production of monosex and sterile fishes and their significance in aquaculture.

REFERENCE BOOKS

1. Boyd CE. 1979. *Water Quality in Warm Water Fish Ponds*. Auburn University
2. Boyd, CE. 1982. *Water Quality Management for Pond Fish Culture*. Elsevier Sci. Publ. Co.
3. Chakraborty C & Sadhu AK. 2000. *Biology Hatchery and Culture Technology of Tiger Prawn and Giant Freshwater Prawn*. Daya Publ. House
4. Conroy CA and Herman RL. 1968. *Text book of Fish Diseases*. TFH (Great Britain) Ltd, England.

Cluster Elective Paper: VIII-A-3

## POST HARVEST TECHNOLOGY

Periods : 60

Max.Marks : 100

## Unit – I

## Handling and Principles of fish Preservation

Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage).

Principles of preservation– cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives, exposure to low radiation of gamma rays.

## Unit – II

## Methods of fish Preservation

Traditional methods - sun drying, salt curing, pickling and smoking.

Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, Irradiation and Accelerated Freeze drying (AFD).

## Unit – III

## Processing and preservation of fish and fish by-products

Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet

food from trash fish, fish manure.

Fish by-products – fish glue, ising glass, chitosan, pearl essence, shark fins, fish leather and fish maws.

## Unit – IV

## Sanitation and Quality control

Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.

Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

## Unit – V

## Quality Assurance, Management and Certification

Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.

**YOGI VEMANA UNIVERSITY**  
**Revised Common Framework of CBCS for students admitted in B.Com (Gen) in 2016-17 onwards**  
**B.Com - Semester -I**

**Semester - I**

**DSC 1A 1.1- Fundamentals of Accounting-I**

**Unit-I – Introduction to Accounting**

Need for Accounting – Definition – Objectives, Advantages – Book keeping and Accounting– Accounting concepts and conventions - Accounting Cycle - Classification of Accounts and its rules - Double Entry Book-keeping - Journalization - Posting to Ledgers, Balancing of ledger Accounts (problems).

**Unit –II: Subsidiary Books:**

Types of Subsidiary Books - Cash Book, Three-column Cash Book- Petty cash Book (Problems).

**Unit-III: Trail Balance and Rectification of Errors:**

Preparation of Trail balance - Errors – Meaning – Types of Errors – Rectification of Errors (Problems)

**Unit-IV- Bank Reconciliation Statement:**

Need for bank reconciliation - Reasons for difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement- Problems on both favorable and unfavourable balances.

**Unit -V: Final Accounts:**

Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – Final Accounts with adjustments (Problems).

**Reference Books**

1. T.S.Reddy & A. Murthy, Financial Accounting , Margham Publications
2. R.L Gupta & V. K Gupta, Principles and Practice of Accounting, Sultan Chand & Sons
3. S.P. Jain & K.L Narang, Accountancy-I, Kalyani Publishers
4. Tulasian, Accountancy -I, Tata McGraw Hill Co.
5. V.K.Goyal, Financial Accounting, Excel Books
6. K. Arunjothi, Fundamentals of Accounting; Maruthi Publications

## **DSC 2 A 1.2- Business Organization**

### **Unit-I – Introduction**

Concepts of Business, Trade, Industry and Commerce – Features of Business -Trade Classification - Aids to Trade – Industry – Classification – Relationship of Trade, Industry and Commerce.

### **Unit II- Business Functions and Entrepreneurship**

Functions of Business and their relationship - Factors influencing the choice of suitable form of organization – Meaning of Entrepreneurship – Characteristics of a good entrepreneur - Types – Functions of Entrepreneurship.

### **Unit –III – Forms of Business Organizations**

Sole Proprietorship – Meaning – Characteristics – Advantages and Disadvantages – Partnership - Meaning – Characteristics- Kinds of partners – Advantages and Disadvantages – Partnership Deed – Hindu-undivided Family – Cooperative Societies.

### **Unit-IV- Joint Stock Company**

Joint Stock Company – Meaning – Characteristics –Advantages – Kinds of Companies - Differences between Private Ltd and Public Ltd Companies.

### **Unit-V- Company Incorporation**

Preparation of important Documents for incorporation of Company – Memorandum of Association – Articles of Association – Differences Between Memorandum of Association and Articles of Association - Prospectus and its contents.

### **Reference Books**

1. C.D.Balaji and G. Prasad, Business Organization - Margham Publications, Chennai.
2. R.K.Sharma and Shashi K Gupta, Business Organization - Kalyani Publications.
3. C.B.Guptha, Industrial Organization and Management, Sultan Chand.
4. Y.K.Bushan, Business organization and Management, Sultan Chand.
5. Sherlekar, Business Organization and Management, Himalaya Publications.

### DSC 3A 1.3 - Business Economics-I

#### **Unit-I- Introduction**

Meaning and Definitions of Business Economics - Nature and scope of Business Economics- Micro and Macro Economics and their differences.

#### **Unit-II- Demand Analysis**

Meaning and Definition of Demand - Determinants of Demand -- Demand function – Law of demand- Demand Curve - Exceptions to Law of Demand.

#### **Unit –III- Elasticity of Demand**

Meaning and Definition of Elasticity of Demand – Types of Elasticity of Demand – Measurements of Price elasticity of demand – Total outlay Method – Point Method – Arc Method.

#### **Unit – IV- Cost and Revenue Analysis**

Classification of Costs – Total - Average – Marginal and Cost function – Long-run – Short-run – Total Revenue - Average revenue – Marginal Revenue.

#### **Unit-V- Break-Even Analysis**

Type of Costs – Fixed Cost – Semi-variable Cost – Variable Cost– Cost behaviour - Breakeven Analysis - Its Uses and limitations.

#### **Reference Books**

1. S.Sankaran, Business Economics, Margham Publications, Chennai.
2. Business Economics - Kalyani Publications.
3. Business Economics – Himalaya Publishing House.
4. Aryasri and Murthy Business Economics, Tata McGraw Hill.
5. Business Economics, Maruthi Publications.

## Semester - II

### DSC IB 2.1– Fundamentals of Accounting-II

#### Unit-I: Depreciation

Meaning of Depreciation - Methods of Depreciation: Straight line – Written down Value – Sum of the Years' Digits - Annuity and Depletion (Problems).

#### Unit-II: Provisions and Reserves

Meaning – Provision vs. Reserve – Preparation of Bad debts Account – Provision for Bad and doubtful debts – Provision for Discount on Debtors – Provision for discount on creditors - Repairs and Renewals Reserve A/c (Problems).

#### Unit-III: Bills of Exchange

Meaning of Bill –Features of bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the books of Drawer and Drawee (Problems).

#### Unit-IV: Consignment Accounts

Consignment - Features - Proforma invoice - Account sales – Del-credre Commission - Accounting treatment in the books of consigner and consignee - Valuation of closing stock - Normal and Abnormal losses (Problems).

#### Unit-V: Joint Venture Accounts

Joint venture - Features - Differences between Joint-venture and consignment – Accounting procedure - Methods of keeping records (Problems).

#### Reference Books:

1. R.L. Gupta & V.K. Gupta, Principles and Practice of Accounting, Sultan Chand
2. T. S. Reddy and A. Murthy - Financial Accounting, Margham Publications.
3. S.P. Jain & K.L Narang, Accountancy-I, Kalyani Publishers.
4. Tulsan, Accountancy-I, Tata McGraw Hill Co.
5. V.K. Goyal, Financial Accounting, Excel Books
6. T.S. Grewal, Introduction to Accountancy, Sultan Chand & Co.
7. Haneef and Mukherjee, Accountancy-I, Tata McGraw Hill
8. Arulanandam, Advanced Accountancy, Himalaya Publishers
9. S.N Maheshwari & V.L Maheswari. Advanced Accountancy-I, Vikas Publishers.

## DSC 2 B 2.2: Business Environment

### Unit – I: Overview of Business Environment

Business Environment – Meaning – Macro and Micro Dimensions of Business Environment – Economic – Political – Social – Technological – Legal – Ecological – Cultural – Demographic – Changing Scenario and implications – Indian Perspective – Global perspective.

### Unit – II: Economic Growth

Meaning of Economic growth – Factors Influencing Development – Balanced Regional Development.

### Unit – III - Development and Planning

Rostow's stages of economic development - Meaning – Types of plans – Main objects of planning in India – NITI Avog and National Development Council – Five year plans.

### Unit – IV : Economic Policies

Economic Reforms and New Economic Policy – New Industrial Policy – Competition Law – Fiscal Policy – Objectives and Limitations – Union budget – Structure and importance of Union budget – Monetary policy and RBI.

### Unit – V -Social, Political and Legal Environment

Concept of Social Justice - Schemes - Political Stability - Leal Changes.

### Suggested Readings:

1. Rosy Joshi and Sangam Kapoor : Business Environment.
2. Francis Cherunilam : Business Environment.
3. S.K. Mishra and V.K. Puri : Economic Environment of Business.
4. K. Aswathappa : Essentials of Business Environment.

### DSC 3 B 2.3 - Business Economics-II

**Unit-I: Production and Costs:** Techniques of Maximization of output, Minimization of costs and Maximization of profit - Scale of production - Economies and Dis-economies of Scale - Costs of Production – Cobb-Douglas Production Function.

**Unit-II: Market Structure-I:** Concept of Market - Market structure - Characteristics - Perfect competition - characteristics equilibrium price - profit maximizing output in the short and long run Monopoly- characteristics - Profit maximizing out-put in the short and long run - Defects of Monopoly – Distinction between Perfect competition and Monopoly.

**Unit-III Market Structure-II:** Monopolistic Competition - Characteristics - Product differentiation - Profit maximization - Price and output in the short and long - run – Oligopoly - characteristics - Price rigidity - Kinked Demand Curve - Distribution - Concepts - Marginal Productivity - Theory of Distribution.

**Unit-IV National Income And Economic Systems:** National Income - Definition Measurement - GDP - Meaning Fiscal deficit - Economic systems - Socialism - Mixed Economic System - Free Market economy.

**Unit-V Structural Reforms:** Concepts of Economic liberalization, Privatization, Globalization - WTO Objectives Agreements - Functions - Trade cycles - Meaning - Phases - Benefits of International Trade - Balance of Trade and Balance of payments.

#### Reference Books:

1. Arvasri and Murthy, Business Economics, Tata McGraw Hill
2. H.L Ahuja, Business Economics, Sultan Chand & Sons
3. KPM Sundaram, Micro Economics
4. Mankiw, Principles of Economics, Cengage Publications
5. Mithani, Fundamentals of Business Economics, Himalaya Publishing House
6. DAR Subrahmanyam & V Hari Leela, A Text Book on Business Economics, Maruthi Publishers.
7. A.V. R. Chary, Business Economics, Kalyani Publishers, Hyderabad.

### Semester - III

#### DSC 1 C 3.1- Corporate Accounting

##### Unit - I:

**Accounting for Share Capital** - Issue, forfeiture and reissue of forfeited shares- concept & process of book building - **(Problems only)**

##### Unit - II:

**Issue and Redemption of Debentures** - Employee Stock Options – Accounting Treatment for Convertible and Non-Convertible debentures (preparation of Journal and Ledger). **(Problems only)**

##### Unit –III:

**Valuation of Good will and Shares** : Need and methods - Normal Profit Method, Super Profits Method – Capitalization Method - Valuation of shares - Need for Valuation - Methods of Valuation - Net assets method, Yield basis method, Fair value method (including problems).

##### UNIT – IV:

**Company Final Accounts**: Preparation of Final Accounts – Adjustments relating to preparation of final accounts – Profit and loss account and balance sheet – Preparation of final accounts using computers (including problems).

##### Unit –V

**Provisions of the Companies Act, 2013** relating to issues of shares and debentures - Preparation of Balance Sheet and Profit and Loss Account – Schedule-III. Issue of rights and bonus shares - Buyback of shares.**(Problems only)**

##### Reference Books:

1. Corporate Accounting – Haneef & Mukherji,
2. Corporate Accounting – RL Gupta & Radha swami
3. Corporate Accounting – P.C. Tulsian
4. Advanced Accountancy: Jain and Narang
5. Advanced Accountancy : R.L. Gupta and M Radhaswamy. S Chand.
6. Advanced Accountancy : Chakraborty
7. Modern Accounting: A. Mukherjee, M. Hanife Volume-II McGraw Hill
8. Accounting standards and Corporate Accounting Practices: T.P. Ghosh Taxman
9. Corporate Accounting: S.N. Maheswari, S.R. Maheswari, Vikas Publishing House.
10. Advanced Accountancy: Arutanandam, Raman, Himalaya Publishing House.

## DSC 2C 3.2- Business Statistics

### Unit 1: Introduction to Statistics:

Definition, importance and limitations of statistics - Collection of data - Schedule and questionnaire – Frequency distribution – Tabulation -Diagrammatic and graphic presentation of data using Computers (Excel).

### Unit 2: Measures of Central Tendency:

Characteristics of measures of Central Tendency-Types of Averages – Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Deciles, Percentiles, Properties of averages and their applications.

### Unit 3: Measures of dispersion and Skewness:

Properties of dispersion-Range-Quartile Deviation –Mean Deviation-Standard Deviation-Coefficient of Variation-Skewness definition-Karl Pearson's and Bowley's Measures of skewness-Normal Distribution.

### Unit 4: Measures of Relation:

Meaning and use of correlation – Types of correlation-Karl Pearson's correlation coefficient – Spearman's Rank correlation-probable error-Calculation of Correlation by Using Computers.

### Unit 5: Analysis of Time Series & Index Numbers:

Components of Time series- Measurement of trend – Index Numbers-Methods of Construction of Index Numbers – Price Index Numbers – Tests of Adequacy of Index Numbers – Cost of Index Numbers.

### Suggested Readings:

- |  |                                      |
|--|--------------------------------------|
| 1. Business Statistics                         | Reddy, C.R Deep Publications.        |
| 2. Statistics-Problems and Solutions           | Kapoor V.K.                          |
| 3. <u>Fundamentals of Statistics</u>           | <u>Elhance.D.N</u>                   |
| 4. Statistical Methods                         | Gupta S.P                            |
| 5. Statistics                                  | Gupta B.N.                           |
| 6. Fundamentals of Statistics                  | Gupta S.C                            |
| 7. Statistics-Theory, Methods and Applications | <u>Sancheti.D.C. &amp;Kapoor V.K</u> |
| 8. <u>Business Statistics</u>                  | <u>J.K. Sharma</u>                   |
| 9. Business Statistics                         | <u>Bharat Jhunjhunwala</u>           |
| 10. <u>Business Statistics</u>                 | <u>R.S.Bharadwaj</u>                 |

### DSC 3C 3.3 - Banking Theory & Practice

#### Unit-I: Introduction

Meaning & Definition of Bank – Functions of Commercial Banks – Kinds of Banks - Central Banking Vs. Commercial Banking.

#### Unit-II: Banking Systems

Unit Banking, Branch Banking, Investment Banking- Innovations in banking – E banking - Online and Offshore Banking , Internet Banking - Anywhere Banking - ATMs - RTGS.

#### Unit-III: Banking Development

Indigenous Banking - Cooperative Banks, Regional Rural banks, SIDBI, NABARD - EXIM Bank.

#### Unit-IV: Banker and Customer

Meaning and Definition of Banker and customer – Types of Customers - General Relationship and Special Relationship between Banker and Customer - KYC Norms.

#### Unit-V: Collecting Banker and Paying Banker

Concepts - Duties & Responsibilities of Collecting Banker – Holder for Value – Holder in Due Course – Statutory Protection to Collecting Banker - Responsibilities of Paying Banker - Payment Gateways.

#### Books for Reference

1. Banking Theory: Law & Practice   : K P M Sundram and V L Varshney
2. Banking Theory, Law and Practice   : B. Santhanam; Margam Publications
3. Banking and Financial Systems : Arvasri
4. Introduction to Banking : Vijaya Raghavan
5. Indian Financial System : M.Y.Khan
6. Indian Financial System : Murthy & Venugopal

## Semester - IV

### DSC 1D 4.1- Accounting for Service Organizations

#### **Unit-I: Non-Trading/ Service Organizations**

Non profit entities-Features of nonprofit entities-Accounting process-Preparation of summaries – Receipt and payment account – Meaning and special features – Procedure of preparation – Uses and Limitations.

Income and expenditure account – Features – Procedure for preparation – Preparation of Balance Sheet **(Problems only)**

#### **Unit – II Single Entry or Accounts from Incomplete Records:**

Single Entry - Features-Books and accounts maintained-Recording of transactions-Ascertainment of Profit.(Statement of Affairs method only). **(Problems only)**

#### **Unit – III - Bank Accounts**

Bank Accounts – Books and Registers to be maintained by Banks – Slip System of Posting – Rebate on bills discounted – Schedule of advances – Non forming assets –Banking Regulation Act, 1969 - Legal Provisions Relating to preparation of Final Accounts. **(Problems only)**

#### **Unit-IV: Insurance Companies**

Life Insurance Companies –Preparation of Revenue Account, Balance Sheet (including problems) – LIC Act, 1956.

#### **Unit – V - Insurance Claims for Loss of Stocks only**

Fire loss claims - Claims for loss of goods - Average clause - Steps calculation. **(Problems only)**

#### **Suggested Readings**

1. Corporate Accounting – RL Gupta & M. Radha Swami
2. Corporate Accounting – P.C. Tulsian
3. Company Accounts : Monga, Girish Ahuja and Shok Sehagal
4. Advanced Accountancy: Jain and Narang
5. Advanced Accountancy : R.K. Gupta and M. Radhaswamy
6. Advanced Accountancy : Chakraborty
7. Advanced Accountancy: S.P. Iyengar
8. Modern Accounting: A. Mukherjee, M. Hanife McGraw Hill Company Ltd., New Delhi.
9. Accounting standards and Corporate Accounting Practices: T.P. Ghosh Taxman
10. Corporate Accounting: S.N. Maheswari, S.R. Maheswari, Vikas Publishing.
11. Advanced Accountancy: Arutanandam, Raman, Himalaya Publishing House.
12. Advanced Accounts: M.C. Shukla, T.S. Grewal, S.C. Gupta, S. Chand.

## **DSC 2D 4.2- Business Laws**

### **Unit-1 Contract**

Meaning and Definition of Contract-Essential elements of valid Contract -Valid, Void and Voidable Contracts - Indian Contract Act, 1872.

### **Unit-2 Offer and Acceptance**

Definition of Valid Offer, Acceptance and Consideration -Essential elements of a Valid Offer, Acceptance and Consideration.

### **Unit-3 Capacity of the Parties and Contingent Contract**

Rules regarding to Minors contracts - Rules relating to contingent contracts - Different modes of discharge of contracts-Rules relating to remedies to breach of contract.

### **Unit-4 Sale of Goods Act 1930**

Contract of sale – Sale and agreement to sell – Implied conditions and warranties – Rights of unpaid vendor.

### **Unit-5:**

Cyber Law and Contract Procedures - Digital Signature - Safety Mechanisms.

### **Suggested Readings:**

1. J. Jayasankar, Business Laws, Margham Publication. Chennai -17
2. Kapoor ND, Mercentile Law, Sultan Chand
3. Balachandram V, Business law Tata
4. Tulsian, Business Law Tata
5. Pillai Bhagayathi, Business Law, S.Chand.
6. Business Laws, Maruthi Publishers

### DSC 3D 4.3- Income Tax

#### Unit-I

**Introduction:** Income Tax Law – Basic concepts: Income, Person, ~~Assesse~~, Assessment year, Agricultural Income, Capital and revenue, Residential status, Income exempt from tax (theory only).

#### Unit-II

**Income from salary:** Allowances, perquisites, profits in lieu of salary, deductions from salary income, computation of salary income and qualified savings eligible for deduction u/s 80C (including problems).

#### Unit-III

**Income from House Property:** Annual value, let-out/self occupied/deemed to be let-out house, deductions from annual value - computation of income from house property (including problems).

#### Unit-IV

**Income from Capital Gains – Income from other sources –** (from Individual point of view) - chargeability – and assessment (including problems).

#### Unit-V:

**Computation of total income of an individual –** Deductions under section - 80 (including problems).

#### Reference Books:

1. Dr. Vinod; K. Singhania; Direct Taxes – Law and Practice, Taxman Publications
2. B.B. Lal; Direct Taxes; Konark Publications
3. Dr. Mehrotra and Dr. Goyal; Direct Taxes – Law and Practice; Sahitya Bhavan Publication.
4. Gaur and Narang; Income Tax, Kalyani Publishers, New Delhi.

## Semester - V

### DSC - IE 5.1 Cost Accounting

**Unit-I:Introduction:** Distinguish between Financial Accounting, Cost Accounting and management accounting - Cost Concepts and Classification – Cost Centre and Cost Unit – Preparation of Cost Sheet.

**Unit-II: Elements of Cost:** Materials: Material control – Selective control, ABC technique – Methods of pricing issues – FIFO, LIFO, Weighted average, (problems only).

**Unit-III: Labour:** Labour: Control of labor costs – Methods of remuneration – labour incentives schemes – Time rate halsey plan, Rowan plan, piece rate- F.W Taylor and Merrick multiple piece rate method (problems only )

**Unit-IV: Methods of Costing:** Job costing And contract costing – (problems only).

**Unit -V: Marginal costing :** Marginal Costing – BEP,P/V ratio, Margin of safety (problems only)

#### References:

1. S.P. Jain and K.L. Narang – Advanced Cost Accounting, Kalyani Publishers, Ludhiana.
2. M.N. Aurora – A test book of Cost Accounting, Vikas Publishing House Pvt. Ltd.
3. S.P. Iyengar – Cost Accounting, Sultan Chand & Sons.
4. Nigam & Sharma – Cost Accounting Principles and Applications, S.Chand & Sons.
5. S.N Maheswari – Principles of Management Accounting.
6. I.M.Pandey – Management Accounting, Vikas Publishing House Pvt. Ltd.
7. Sharma & Shashi Gupta – Management Accounting, Kalyani Publishers. Ludhiana.

## DSC 2E 5.2 ADVANCED ACCOUNTING –I

### **UNIT-I:- Self –balancing System:**

Meaning, Advantages of self balancing system- preparation of sales ledger adjustment account, purchase ledger adjustment account and General ledger adjustment account. (Problems only)

### **Unit –II:- Royalty**

Royalties- preparation of minimum rent account, Royalties account, short working accounts and Land lord account (Problems only)

### **UNIT – III:- Insolvency Accounting**

Insolvency of an Individual- Preparation of statement of affairs, and deficiency account. (problems only)

### **UNIT – IV:- Partnership Accounts-I**

Nature- deed- Types of Capital accounts (Fixed and fluctuating), Calculation of goodwill, Revaluation of assets and liabilities of firm- Admission of a partner (problems only)

### **UNIT-V:- Partnership Accounts-II**

Retirement of a partner- Death of a partner- Dissolution of a partnership firm- Garner Vs Murray Case (problems only)

### **Reference Books:**

1. Advanced Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons
2. Corporate Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons
3. Accountancy-I- S.P.Jain and K.L.Narang. Kalyani Publications
4. Advanced Accountancy- M.C.Shukla and T.S. Grewal, Sultan Chand & Sons

### DSC 3E 5.3 Commercial Geography

**Unit –I: The Earth:** Internal structure of the Earth – Latitude – Longitude – Realms of the Earth – Evolution of the Earth – Environmental pollution - Global Warming - Measures to be taken to protect the Earth.

**Unit -II: India – Agriculture:** Land Use - Soils - Major crops – Food and Non-food Crops – Importance of Agriculture – Problems in Agriculture – Agriculture Development.

**Unit -III: India – Forestry:** Forests – Status of Forests in Andhra Pradesh – Forest (Conservation) Act, 1980 – Compensatory Afforestation Fund (CAF) Bill, 2015 - Forest Rights Act, 2006 and its Relevance – Need for protection of Forestry.

**Unit -IV: India – Minerals and Mining:** Minerals – Renewable and non Renewable – Use of Minerals – Mines – Coal, Barites, etc. – Singareni Coal mines and Mangampeta Barites - District-wise Profile.

**Unit-V: India – Water Resources – Rivers:** Water resources - Rationality and equitable use of water – Protection measures - Rivers - Perennial and peninsular Rivers - Interlinking of Rivers - Experience of India and Andhra Pradesh.

#### References:

1. Shabiar Ahmad; Quazi, Natural Resource Consumption and Environment Management, APH Publishing Corporation.
2. Tarachand, Economic and Commercial Geography of India, Vikas Publishing House.
3. Dr. S. Sankaran, Commercial Geography, Margam Publications, Chennai.
4. C. B. Memoria, Commercial Geography, Lal Agarwal & Co.
5. C. B. Memoria, Economic and Commercial Geography, Lal Agarwal & Co.

## **DSC 4F 5.4 GOODS & SERVICE TAX FUNDAMENTALS-I**

**Unit I: Introduction:** Overview of GST - Concepts – Limitations of VAT – Need for Tax Reforms - Justification for introduction of GST - Shortcomings and advantages at the Central Level and State Level on introduction of GST- Process of Introduction of GST - Constitutional Amendments.

**Unit II: GST:Principles** – Models of GST: Austrlian, Candian, Kelkar-Shah – Bagchi-Poddar -Comprehensive structure of GST model in India: Single, Dual GST–Transactions covered under GST.

**Unit-III: Taxes and Duties:** Subsumed under GST - Taxes and Duties outside the purview of GST: Tax on items containing Alcohol – Tax on Petroleum products -Tax on Tobacco products - Taxation of Services

**Unit-IV: Inter-State Goods and Services Tax:** Major advantages of IGST Model –Interstate Goods and Service Tax: Transactions within a State under GST – Interstate Transactions under GST - Illustrations.

**Unit-V: Time of Supply of Goods & Services:** Value of Supply - Input Tax Credit –Distribution of Credit -Matching of Input Tax Credit - Availability of credit in special circumstances- Cross utilization of ITC between the Central GST and the State GST.

### **References:**

1. Goods and Services Tax in India – Notifications on different dates.
2. GST Bill 2012.
3. Background Material on Model GST Law, Sahitya Bhawan Publications, Hospital Road, Agra - 282 003.
4. The Central Goods and Services Tax Act, 2017, NO. 12 OF 2017 Published by Authority,

## Cluster Elective -I: E-Commerce

### DSC 5E 5.5 e-Commerce

**Unit-I: e-Commerce:** Features of Electronic Commerce - Distinction between e-Commerce and e-Business - Types of Business Models: B2B, B2C, C2C - Benefits and Limitations of e-Commerce - Apps.

**Unit-II: e-Business Applications:** Integration and e-Business suits - ERP, e-SCM, e-CRM - Methods and benefits of e-Payment Systems –e-Marketing – Applications and issues

**Unit-III: e-Business on different Fields:** e-Tourism – e-Recruitment – e- Real Estate – e-Stock Market – e-Music/Movies - e-Publishing and e-Books.

**Unit-IV: Concept of Online Education:** Process - Methods - e-Content development and Deliveries - Major technologies used in e-Education - Online Testing - Methods - Future Trends.

**Unit-V: Mobile Commerce:** Ticketing - Me-Seva: Government and Consumer Services – e-Retailing - e-Groceries – Security challenges - Case Studies.

#### References:

1. Turban E. Lee J., King D. and Chung H.M: Electronic commerce-a Managerial Perspective, Prentice-Hall International, Inc.
2. Bhatia V., E-commerce, Khanna Book Pub. Co. (P) Ltd., Delhi.
3. Daniel Amor, E Business R (Evolution), Pearson Education.
4. Krishnamurthy, E-Commerce Management, Vikas Publishing House.
5. David Whiteley, E-Commerce: Strategy, Technologies and Applications, Tata McGraw Hill.
6. P. T. Joseph, E-Commerce: A Managerial Perspectives, Tata McGraw Hill.

## **DSC 6E 5.6 Business Networks**

**Unit-I: Business Forms:** Interrelation among Stakeholders – Business and Government – Business and Society: Social Network and Facebook.

**Unit-II: Business Networking through ICT:** Basic concepts – Uses and Application of Business Networks – Different Layers of Business Networks – Internet and Business Networks – Network Security.

**Unit-III: Business Networking Systems and Devices:** Communication Satellites – Servers – Cloud Computing – Sharing – Spectrum – Commercial issues.

**Unit-IV: Customer Relationship Management:** Establishing Network connection with customers– Forward and Backward Integration – Customer Data Base – Creation and Maintenance – Legal and Ethical Issues.

**Unit-V: Business Analytics:** Master Data Management – Data Warehousing and Mining – Data Integration – OLTP and OLAP.

### **References:**

1. Jerry, FitzGerald and Alan Dennis, Business Data Communications and Networking, John Wiley & Sons.
2. Tanenbaum, A. S., Computer Networks, Pearson Education.
3. David A Stamper, Business Data Communications. Addison Wesley.
4. Business Analytics – Methods, Models and Decisions, James R. Evans, Prentice Hall.
5. Business Analytics - An Application Focus, Purba Halady Rao, PHI learning
6. R.N Prasad and Seema Acharya, Fundamentals of Business Analytics, Wiley India.

## Cluster Elective – 2: Banking and Financial Services

### DSC 5E 5.5: Central Banking

**Unit-I: Introduction** : Evolution and Functions of Central Bank –Development of Central Banks in Developed and Developing countries – Trends in Central Bank Functions.

**Unit-II: Central banking in India** : Reserve Bank of India – Constitution and Governance, Recent Developments, RBI Act. – Interface between RBI and Banks.

**Unit-III: Monetary and Credit Policies** : Monetary policy statements of RBI – CRR – SLR –Repo Rates – Reverse Repo Rates – Currency in circulation – Credit control measures.

**Unit-IV: Inflation and price control by RBI** : Intervention mechanisms – Exchange rate stability – Rupee value – Controlling measures.

**Unit-V: Supervision and Regulation** : Supervision of Banks – Basle Norms, Prudential Norms, Effect of liberalization and Globalization – Checking of money laundering and frauds.

#### **References :**

1. Reserve Bank of India Publication, Functions and Working of the RBI
2. Vasant Desai, Central Banking and Economic Development, Himalaya Publishing.
3. S.Panandikar, Banking in India, Orient Longman.
4. Reserve Bank of India Publication, Report on Trends and Progress of Banking in India.
5. Annual Reports of Reserve Bank of India.
6. Rita Swami, Indian Banking System, International Publishing House Pt Ltd.
7. S.V.Joshi, C.P.Rodrigues and Azhar Khan, Indian Banking System, MacMillan Publishing.

### **DSC 6E 5.6: Rural and Farm Credit**

**Unit-I : Rural Credit :** Objectives and Significance of Rural credit – Classification of rural credit – General Credit Card (GCC) – Financial Inclusion – Rupay card.

**Unit-II : Rural Credit Agencies :** Institutional and Non-institutional Agencies for financing agriculture and Rural Development – Self Help Groups (SHG) – Financial for Rural Industries.

**Unit-III : Farm Credit :** Scope – Importance of farm credit – Principles of Farm Credit – Cost of Credit – Types – Problems and remedial measures – Kisan Credit Card (KCC) Scheme.

**Unit-IV : Sources of Farm Credit :** Cooperative Credit : PACS – APCOB – NABARD –Lead Bank Scheme – Role of Commercial and Regional Rural Banks – Problems of recovery and over dues.

**Unit-V : Farm Credit Analysis :** Eligibility Conditions – Analysis of 3 R's (Return, Repayment Capacity and Risk –bearing Capacity) – Analysis of 3 C's of Credit (Character, Capacity and Capital) – Crop index reflecting use and farm credit – Rural Credit Survey Reports.

#### **References :**

1. National Bank of Agricultural and Rural Development (NABARD) Annual report.
2. Economy Survey, Government of India.
3. Rural Development, Sundaram I.S., Himalaya Publishing House, Mumbai.
4. Rural Credit in India. C.S.Rayudu, Mittal Publications.
5. Farm Credit and Co-operative in India, Tiruloati V., Naidu. V T Naidu, Vora & Co Pub Ltd

## SEMESTER –VI

### DSC IF 6.1 GOODS AND SERVICE ACT & CUSTOMER ACT-II

**Unit-I: Registration and Filing**–Registration of Assesses Under GST - Persons liable for registration - Compulsory registration in certain cases - Procedure for registration - Deemed registration - GST Rate Structure.

**Unit-II: Administration:** Officers under GST Act: Appointment and Powers of officers- Administration of officers of State tax or Union-territory tax – Accounts and Records – Retention of Records – Audit by Tax Authorities.

**Unit-III: Assessment:** Self-assessment - Provisional assessment –Security of Returns - Assessment of Non-filers of returns - Assessment of Unregistered persons –Audit and Assessment – Other features of Dual GST model.

**Unit-IV: Levy and Exemption of Tax:**Chargeability – Collection at Source –E-Commerce - Composition Levy - Tax under Central GST and State GST - Zero-rating of Exports – GST on Imports –Returns under GST –Taxation of Services–Remission of Tax - Adjustment and Refund of GST.

**Unit- V: Customs Act:** Types of Custom Duties- Valuation for Customs Duty- Tariff Value- Customs Value- Methods of Valuation for Customs - Problems on Custom Duty Assessment.

**References:**

1. Goods and Services Tax in India – Notifications on different dates
2. Customs Law Manual and Customs Tariff of India- R K Jain.
3. Background Material on Model GST Law, Sahitya Bhawan Publications, Hospital Road, Agra - 282 003.
4. The Central Goods and Services Tax Act, 2017, NO. 12 OF 2017 Published by Authority, Ministry of Law and Justice, New Delhi, the 12<sup>th</sup> April, 2017.

## DSC 2F 6.2 AUDITING

**Unit-I: Auditing:** Meaning – Objectives – Importance of Auditing – Auditing as a Vigil Mechanism – Role of Auditor in checking corporate frauds.

**Unit-II: Types of Audit:** Based on Ownership and time - Independent, Financial, Internal, Cost, Tax, Government, Secretarial audits.

**Unit-III: Planning of Audit:** Steps to be taken at the commencement of a new audit - Audit programme - Audit note book - Internal check, internal audit and internal control.

**Unit-IV: Vouching and Investigation:** Vouching of cash and trading transactions - Investigation, Auditing vs. Investigation

**Unit-V: Company Audit and Auditors Report:** Auditor's Qualifications – Appointment and Reappointment – Rights, duties, liabilities and disqualifications - Audit report: Contents – Preparation - Relevant Provisions of Companies Act, 2013.

### References:

1. S.Vengadamani, “Practical Auditing”, Margham Publications, Chennai.
2. Ghatalia, “Principles of Auditing”, Allied Publishers Pvt. Ltd., New Delhi.
3. Pradeesh Kumar, Baldev Sachdeva & Jagwant Singh, “Auditing Theory and Practice, Kalyani Publications, Ludhiana.
4. N.D. Kapoor, “Auditing”, S. Chand, New Delhi.
5. R.G. Saxena, “Principles and Practice of Auditing”, Himalaya Publishing House, New Delhi.
6. Jagadesh Prakesh, “Principles and Practices of Auditing” Kalyani Publications, Ludhiana.
7. Kamal Gupta and Ashok Gupta, “Fundamentals of Auditing”, Tata McGraw Hill

### DSC 3F 6.3 MANAGEMENT ACCOUNTING

**Unit–I: Management Accounting:** Interface with Financial Accounting and Cost Accounting - Financial Statement analysis and interpretation: Comparative analysis – Common size analysis and trend analysis (including problems).

**Unit–II: Ratio Analysis:** Classification, Importance and limitations - Analysis and interpretation of Accounting ratios - Liquidity, profitability, activity and solvency ratios (including problems).

**Unit–III: Fund Flow Statement:** Concept of fund: Preparation of funds flow statement. Uses and limitations of funds flow analysis (including problems).

**Unit–IV: Cash Flow Statement:** Concept of cash flow – Preparation of cash flow statement - Uses and limitations of cash flow analysis (including problems).

**Unit–V: Standard Cost:** Material variance only (including Problems).

**References:**

1. S.N. Maheswari, A Textbook of Accounting for Management, S. Chand Publishing, New Delhi.
2. I.M Pandey, “Management Accounting”, Vikas Publishing House, New Delhi,
3. Shashi K. Gupta & R.K. Sharma, “Management Accounting: Principles and Practice”, Kalyani Publishers, Ludhiana.
4. Jawahar Lal, Accounting for Management, Himalaya Publishing House, New Delhi.
5. Charles T. Horngren, [et.al](#), “Introduction to Management Accounting” Person EducationIndia. New Delhi, 2002.
6. Murthy & Guruswamy – Management Accounting, Tata McGraw Hill, New Delhi.

## DSC 4F 6.4 ADVANCED ACCOUNTING-II

### **UNIT-I:- Hire purchase – instalment purchase accounting**

Hire Purchase system- Calculation of interest- Accounting procedure for preparation of Hire Purchase Accounts –Instalment purchase system (problems only)

### **UNIT-II:- Branch Accounts:**

Branch Accounting- Debtors system- stock and debtors system- invoice price method (excluding independent and foreign branch). (problems only)

### **UNIT-III:- Internal Reconstruction:**

Meaning- Reasons and factors for reconstruction procedure for capital reduction- preparation of post reconstruction balance sheet and capital reduction account (excluding surrender of shares) (problems only)

### **UNIT-IV:- Liquidation:**

Meaning – liquidation expenses- Liquidator’s remuneration – preparation of Liquidator’s final statement of account (problems only)

### **UNIT-V:- Profits Prior to Incorporation of Company:**

Profits prior to incorporation of Company- Accounting treatment (problems only)

### **Reference Books:**

1. Advanced Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons

## CLUSTER ELECTIVE -1

### DSC 5F 6.5: e-PAYMENTS SYSTEM

**Unit-I: e-Cash and Virtual Money:** Electronic Data Interchange (EDI) - EFT/RTGS/Electronic Payment modes - Foundations of e-Cash and Issues; Security, Anonymity, Untraceability, Virtualcurrencies, Bitcoin.

**Unit-II: Automated Clearing and Settlement:** Process of Real Time Gross Settlement System Net Settlement -ATM Networks - Fedwire, CHIPS and SWIFT.

**Unit-III: e-Payment Security and Digital Signature:** Cryptographic Methods - Hash functions Public/Private Key methods: RSA - Digital Signatures - Certification Process - Digital identity Documents and Remote Authentication.

**Unit-IV: Mobile Payments:** Wireless payments, Digital Wallets, Google Wallet – Obopay - Security Challenges.

**Unit-V: Electronic Invoice and Payment System:** Electronic Statement Delivery - EIPP providers- Biller service providers - Customer service providers - Reconciliation through Bank -Invoice Papereelimination - Scan-based trading (SBT).

**References:**

1. Domonique Rambure and Alec Nacamuli, "Payment Systems: From the Salt Mines to the Board Room", Palgrave MacMillan.
2. Weidong Kou, "Payment Technologies for E-Commerce". Springer, Germany.
3. Donal O'Mahony, Michael Peirce and Hitesh Tewari, "Electronic Payment Systems", Artech House, Inc.
4. M. H. Sherif, Protocols for Secure Electronic Commerce, Boca Raton, Fla, CRC Press.

### **DSC 6F 6.6 SOCIAL MEDIA AND e-MARKETING**

**Unit-I: Social Media:** Career in Social Media Marketing - Strategic Marketing - Social media Planning process - Campaigns (tactics and results).

**Unit-II: Social Consumers:** Social media marketing segments - Digital consumers - Digital communities - Online communities - Strong & Weak Ties - Social Community - Social Publishing.

**Unit-III: Social Media Sites:** Face book - Twitter - LinkedIn - YouTube and their Operations - Data mining and Social Media - Role of Social Media in Marketing Research - Social Media and Privacy/Ethics.

**Unit-IV: e-Marketing:** Objectives, Online Advertising - Distribution in e-Marketing, Lead Generation Platform - Customer Service mechanism - Relationship Building medium.

**Unit-V: Methods of e-Marketing:** Advertising Techniques, Selling Methods, Sales Promotion - Public Relations - Sponsorship, Merchandising, Teleconferencing - Chatting.

## References:

1. Chaffey, D., e-Marketing Excellence: Planning and Optimizing Your Digital Marketing, Burlington: Elsevier.
2. Hanson, W. A. & Kalvanam, K., Internet Marketing & e-Commerce, Thomson Southwestern, Mason, Ohio.
3. Harris, L., Marketing the e-Business, Hoboken: Taylor & Francis.
4. Krishnamurthy, S., Contemporary research in e-Marketing, Hershey, PA: Idea Group Publication.
5. Stephen Dann & Susan Dann, E-Marketing: Theory and Application, Macmillan, New York.
6. Seth Godin, E-Marketing, Berkley Publishing Group.
7. Irvine Clarke & Theresa B. Flaherty Advances in Electronic Marketing, Idea Group Publishing, Hershey.

## Cluster Elective – 2: Banking and Financial Services

### DSC 5F 6.5: Financial Services

**Unit-I: Financial Services** : Role of Financial Services – Banking and Non Banking Companies – Activities of Non Banking Finance Companies – Fund Based Activities – Fee Based Activities.

**Unit-II: Merchant Banking Services** : Scope and importance of merchant banking services – Venture Capital – Securitization – Demat Services – Commercial Paper.

**Unit-III: Leasing and Hire – Purchase** : Types of Lease, Documentation and Legal aspects – Fixation of Rentals and Evaluation – Hire Purchasing – Securitization of debts – House Finance.

**Unit-IV: Credit Rating** : Purpose – Types – Credit Rating Symbols – Agencies : CRISIL and CARE – Equity Assessment vs. Grading – Mutual funds.

**Unit-V : Other Financial Services** : Factoring and Forfeiting – Procedural and financial aspects – Installment System – Credit Cards –Central Depository Systems : NSDL, CSDL.

**References :**

1. B.Santhanam, Financial Services, Margham Publication, Chennai.
2. M.Y.Khan, Financial Services, Tata McGraw – Hill, New Delhi.
3. Machendra Raja, Financial Services, S.Chand Publishers, New Delhi.
4. V.A.Avdhani, Marketing of Financial Services
5. Machiraji, “Indian Financial System”, Vikas Publishers.
6. Sandeep Goel, Financial Services, PHI Learning.
7. L.M.Bhole, Financial Institutions and Markets, Tata McGraw Hill.
8. SEBI Guidelines, Bharat Publications, New Delhi.
9. E.Gordon & H.Natarajan, Capital Market in India, Himalaya publishing House.

**DSC 6F 6.6 : Marketing of Financial Services**

**Unit-I : Difference between Goods and Services** : Managing Service Counters – Integrated Service Management – Service Elements.

**Unit-II : Constructing Service Environment** : Managing People for service Advantage – Service Quality and Productivity – Customer Loyalty.

**Unit-III : Pricing and Promotion Strategies** : Pricing strategies – Promotion strategies – B2B Marketing – Marketing Planning and Control for services.

**Unit-IV : Distributing Services** : Cost and Revenue Management – Approaches for providing services – Channels for Service provision – Designing and managing Service Process.

**Unit-V : Retail Financial Services** : Investment services – Insurance services – Credit Services – Institutional Financial Services – Marketing practices in select Financial Service Firms.

**B.Com. (Computer Applications)**

Revised Common Framework of CBCS for students admitted in B.Com(Computers) from 2016-17 onwards

Semester –I

**Semester - I**  
**DSC 1A 1.1- Accounting-I**

**Unit-I – Introduction to Accounting**

Need for Accounting – Definition – Objectives, Advantages – Book keeping and Accounting– Accounting concepts and conventions - Accounting Cycle - Classification of Accounts and its rules - Double Entry Book-keeping - Journalization - Posting to Ledgers, Balancing of ledger Accounts (problems).

**Unit –II: Subsidiary Books:**

Types of Subsidiary Books - Cash Book, Three-column Cash Book- Petty cash Book (Problems).

**Unit-III: Trail Balance and Rectification of Errors:**

Preparation of Trail balance - Errors – Meaning – Types of Errors – Rectification of Errors (Problems)

**Unit-IV- Bank Reconciliation Statement:**

Need for bank reconciliation - Reasons for difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement- Problems on both favorable and unfavourable balances.

**Unit -V: Final Accounts:**

Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – Final Accounts with adjustments (Problems).

**References:**

1. T.S.Reddy & A. Murthy, Financial Accounting , Margham Publications
2. R L Gupta & V. K Gupta, Principles and Practice of Accounting, Sultan Chand & Sons
3. S.P. Jain & K.L Narang, Accountancy-I, Kalyani Publishers
4. Tulasian, Accountancy -I, Tata McGraw Hill Co.
5. V.K.Goyal, Financial Accounting, Excel Books
6. K. Arunjothi, Fundamentals of Accounting; Maruthi Publications

## **DSC 2 A 1.2 - Business Organization and Management**

**Unit-I: Introduction:** Concepts of Business, Trade , Industry and Commerce – Features of Business -Trade Classification - Aids to Trade – Industry – Classification – Relationship among Trade, Industry and Commerce.

**Unit-II: Forms of Business Organizations:** Forms of Business Organization: Sole Proprietorship, Joint Hindu Family Firm, Partnership firm, Joint Stock Company, Cooperative Society; Choice of Form of Organization. Government - Business Interface; Public Sector Enterprises (PSEs) - Multinational Corporations (MNCs).

**Unit-III: Joint Stock Company:** Company Incorporation: Preparation of important Documents for incorporation of Company – Memorandum of Association – Articles of Association – Differences Between Memorandum of Association and Articles of Association - Prospectus and its contents - Companies Act, 2013.

**Unit-IV: Management and Organization:** Process of Management: Planning; Decision-making; Organizing: Line and Staff - Staffing - Directing and Controlling; Delegation and Decentralization of Authority.

**Unit-V: Functional Areas of Management:** Production - Manufacturing - Make in India - Marketing Management: Marketing Concept; Marketing Mix; Product Life Cycle; Pricing Policies and Practices. Financial Management: Objectives; Sources and Forms of Funds – Human Resource Management: Functions.

### **Suggested Readings:**

1. Kaul, V.K., *Business Organization and Management*, Pearson Education, New Delhi.
2. Chhabra, T.N., *Business Organization and Management*, Sun India Publications, New Delhi.
3. Koontz and Weihrich, *Essentials of Management*, McGraw Hill Education.
4. Basu, C. R., *Business Organization and Management*, McGraw Hill Education.
5. Jim, Barry, John Chandler, Heather Clark; *Organization and Management*, Cengage Learning.
6. Allen, L.A., *Management and Organization*; McGraw Hill, New York.
7. R.K.Sharma and Shashi K Gupta, *Business Organization* - Kalyani Publications.
8. C.B.Guptha, *Industrial Organization and Management*, Sultan Chand.
9. Y.K.Bushan, *Business organization and Management*, Sultan Chand.
10. Sherlekar, *Business Organization and Management*, Himalaya Publications.

## **DSC3 A- Computer Fundamentals & Photoshop**

### **Unit-I**

**Introduction to Computers:** Characteristics and limitations of Computer, Block diagram of computer, types of computers, uses of computers, computer generations. Number systems: binary, hexa and octal numbering system- Windows basics: desktop, start menu, icons – Recent Developments – Cloud Server.

### **Unit-II**

**Input and Output Devices:** Keyboard and mouse, input data in other ways, Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory.

### **Unit –III**

**Introduction to Adobe Photoshop:** Getting started with Photoshop, creating and saving a document in Photoshop, page layout and back ground, Photoshop program window-title bar, menu bar, option bar, image window, image title bar, status bar, ruler, pallets, tool box, screen modes, saving files, reverting files, closing files.

### **Unit –IV**

**Images:** working with images, image size and resolution, image editing, color modes and adjustments, Zooming & Panning an Image, Rulers, Guides & Grids- Working with Tool box: Practice Sessions.

### **Unit-V**

**Layers:** Working with layers- layer styles- opacity-adjustment layers. **Filters:** The filter menu, Working with filters- Editing your photo shoot, presentation –how to create ads, artistic filter, blur filter, brush store filter, distort filters, noise filters, pixel ate filters, light effects, difference clouds, sharpen filters, printing.

### **Reference Books:**

- 1.ReemaThareja, Fundamentals of Computers, Oxford University Press
2. Adobe Creative Team, Adobe Photoshop Class Room in a Book.
- 3.David Maxwell, Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, Color Grading & Graphic...19 February 2016.

## Semester - II

### DSC 1B 2.1 – Accounting-II

#### **Unit-I: Depreciation**

Meaning of Depreciation - Methods of Depreciation: Straight line – Written down Value – Sum of the Years' Digits - Annuity and Depletion (Problems).

#### **Unit-II: Provisions and Reserves**

Meaning – Provision vs. Reserve – Preparation of Bad debts Account – Provision for Bad and doubtful debts – Provision for Discount on Debtors – Provision for discount on creditors - Repairs and Renewals Reserve A/c (Problems).

#### **Unit-III: Bills of Exchange**

Meaning of Bill –Features of bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the books of Drawer and Drawee (Problems).

#### **Unit-IV: Consignment Accounts**

Consignment - Features - Proforma invoice - Account sales – Del-credre Commission - Accounting treatment in the books of consigner and consignee - Valuation of closing stock - Normal and Abnormal losses (Problems).

#### **Unit-V: Joint Venture Accounts**

Joint venture - Features - Differences between Joint-venture and consignment – Accounting procedure - Methods of keeping records (Problems).

#### **Reference Books:**

1. R.L. Gupta & V.K. Gupta, Principles and Practice of Accounting, S.Chand & Co.
2. T. S. Reddy and A. Murthy, Financial Accounting, Margham Publications.
3. S.P. Jain & K.L Narang, Accountancy-I, Kalyani Publishers.
4. Tulsan, Accountancy-I, Tata McGraw Hill Co.
5. V.K. Goyal, Financial Accounting, Excel Books
6. T.S. Grewal, Introduction to Accountancy, Sultan Chand & Co.
7. Haneef and Mukherjee, Accountancy-I, Tata McGraw Hill
8. Arulanandam, Advanced Accountancy, Himalaya Publishers
9. S.N.Maheshwari & V.L.Maheswari, Advanced Accountancy-I, Vikas Publishers.

### DSC 2 B 2.2 - Business Economics

**Unit-I- Introduction:** Meaning and Definitions of Business Economics - Nature and scope of Business Economics- Micro and Macro Economics and their Interface.

**Unit-II- Demand Analysis:** Definition - Determinants of Demand -- Demand function – Law of demand- Demand Curve - Exceptions to Law of Demand - Elasticity of Demand – Types of Elasticity of Demand – Measurements of Price elasticity of Demand – Total outlay Method – Point Method – Arc Method.

**Unit – III: Cost and Revenue Analysis**

Classification of Costs – Total - Average – Marginal; Cost function – Long-run – Short-run – Total Revenue - Average revenue – Marginal Revenue - Production and Costs: Techniques of Maximization of output, Minimization of costs and Maximization of profit - Scale of production - Economies and Dis-economies of Scale - Cobb-Douglas Production Function.

**Unit-IV: Market Structure:** Concept of Market - Market structure - Perfect competition - characteristics - equilibrium price - Monopoly- characteristics - Defects of Monopoly – Distinction between Perfect competition and Monopoly - Monopolistic Competition - Characteristics - Product differentiation - Oligopoly - characteristics - Price rigidity - Kinked Demand Curve.

**Unit-V: National Income And Economic Systems:** National Income - Measurement - GDP - Growth Rates - Problems in Assessment - Economic Systems - Socialism - Mixed Economic System - Free Market Economy - Economic liberalization, Privatization, Globalization - Free Trade - Agreements - Trade cycles - Phases - International Trade - Balance of payments.

**References:**

1. S.Sankaran, Business Economics, Margham Publications, Chennai.
2. Business Economics - Kalyani Publications.
3. Business Economics – Himalaya Publishing House.
4. Aryasri and Murthy Business Economics , Tata McGraw Hill.
5. Aryasri and Murthy, Business Economics, Tata McGraw Hill
6. H.L Ahuja, Business Economics, Sultan Chand & Sons
7. Mankiw, Principles of Economics, Cengage Publications
8. Mithani, Fundamentals of Business Economics, Himalaya Publishing House
9. A.V. R. Chary, Business Economics, Kalyani Publishers, Hyderabad.

## Office Automation Tools

### Unit-I

**MS-Excel:** features of Ms-Excel, Parts of MS-Excel window, entering and editing data in worksheet, number formatting in excel, different cell references, how to enter and edit formula in excel, auto fill and custom fill, printing options.

### Unit-II

**Formatting options:** Different formatting options, change row height, formulae and functions.  
**Functions:** Meaning and advantages of functions, different types of functions available in Excel.

### Unit-III

**Charts:** Different types of charts, Parts of chart, chart creation using wizard, chart operations, data maps, graphs, data sorting, filtering. Excel sub totals, scenarios, what-if analysis, **Macro:** Meaning and advantages of Macros, creation, editing and deletion of macros - Creating a macro, how to run, how to delete a macro.

### Unit-IV

**MS Access: Creating a Simple Database and Tables:** Features of Ms-Access, Creating a Database, Parts of Access. **Tables:** table creation using design view, table wizard, data sheet view, import table, link table. **Forms:** The Form Wizard, design view, columnar, tabular, data sheet, chart wizard.

### Unit –V

**Finding, Sorting and Displaying Data:** Queries and Dynasts, Creating and using select queries, Returning to the Query Design, Multi-level sorts, Finding incomplete matches, showing All records after a Query, saving queries - Crosstab Queries. **Printing Reports:** Form and Database Printing.  
**Relational Databases:** Flat Versus Relational, Types of Relationships, Viewing Relationships, Defining and Redefining Relationships, Creating and Deleting Relationships.

### Reference Books:

1. Ron Mansfield, Working in Microsoft Office, Tata McGraw Hill(2008)
2. EdBott, Woody Leonhard, Using Microsoft Office 2007, Pearson Education(2007)
3. Sanjay Saxena, Microsoft Office, 4.Microsoft Office, BPB Publications

### Semester - III

#### DSC 1 C 3.1 - Corporate Accounting

##### Unit-I

**Accounting for Share Capital** - Issue, forfeiture and reissue of forfeited shares- concept & process of book building. **(Problems only)**

##### Unit-II

**Issue and Redemption of Debentures** - Employee Stock Options – Accounting Treatment for Convertible and Non-Convertible debentures (preparation of Journal and Ledger). **(Problems only)**

##### Unit –III

**Valuation of Goodwill and Shares:** Need and methods - Normal Profit Method, Super Profits Method – Capitalization Method - Valuation of shares - Need for Valuation - Methods of Valuation - Net assets method, Yield basis method, Fair value method (including problems).

##### UNIT – IV

**Company Final Accounts:** Preparation of Final Accounts – Adjustments relating to preparation of final accounts – Profit and loss account and balance sheet – Preparation of final accounts using computers (including problems).

##### Unit –V

**Provisions of the Companies Act, 2013** relating to issues of shares and debentures - Preparation of Balance Sheet and Profit and Loss Account – Schedule-III. Issue of rights and bonus shares - Buyback of shares (preparation of Journal and Ledger). **(Problems only)**

##### Reference Books:

1. Corporate Accounting – Haneef & Mukherji,
2. Corporate Accounting – RL Gupta & Radha swami
3. Corporate Accounting – P.C. Tulsian
4. Advanced Accountancy: Jain and Narang
5. Advanced Accountancy: R.L. Gupta and M.Radhaswamy, S Chand.
6. Advanced Accountancy : Chakraborty
7. Modern Accounting: A. Mukherjee, M. Hanife Volume-II McGraw Hill
8. Accounting standards and Corporate Accounting Practices: T.P. Ghosh Taxman
9. Corporate Accounting: S.N. Maheswari, S.R. Maheswari, Vikas Publishing House.
10. Advanced Accountancy: Arutanandam, Raman, Himalaya Publishing House.
11. Advanced Accounts: M.C. Shukla, T.S. Grewal, S.C. Gupta, S. Chand & Company Ltd.,
12. Management Accounting: Shashi K. Gupta, R.K. Sharma, Kalyani Publishers.

## DSC 2C 3.2- Business Statistics

### **Unit 1: Introduction to Statistics:**

Definition, importance and limitations of statistics - Collection of data - Schedule and questionnaire – Frequency distribution – Tabulation -Diagrammatic and graphic presentation of data using Computers (Excel).

### **Unit 2: Measures of Central Tendency:**

Characteristics of measures of Central Tendency-Types of Averages – Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Deciles, Percentiles, (Problems only )

### **Unit 3: Measures of dispersion and Skewness:**

Properties of dispersion-Range-Quartile Deviation –Mean Deviation-Standard Deviation-Coefficient of Variation-Skewness definition-Karl Pearson's and Bowley's Measures of skewness-Normal Distribution.

### **Unit 4: Measures of Relation:**

Meaning and use of correlation – Types of correlation-Karlpearson's correlation coefficient – Spearman's Rank correlation-probable error- Calculation of Correlation by Using Computers

### **Unit 5: Index Numbers:**

Index Numbers-Methods of Construction of Index Numbers – Price Index Numbers – Tests of Adequacy of Index Numbers – Cost of Index Numbers. **(Problems only)**

### **References:**

- |  |                                |
|--|--------------------------------|
| 1. Business Statistics                         | Reddy, C.R, Deep Publications. |
| 2. Statistics-Problems and Solutions           | Kapoor V.K.                    |
| 3. Fundamentals of Statistics                  | Elhance.D.N                    |
| 4. Statistical Methods                         | Gupta S.P                      |
| 5. Statistics                                  | Gupta B.N.                     |
| 6. Fundamentals of Statistics                  | Gupta S.C                      |
| 7. Statistics-Theory, Methods and Applications | Sancheti,D.C. &Kapoor V.K      |
| 8. Business Statistics                         | J.K.Sharma                     |
| 9. Business Statistics                         | Bharat Jhunhunwala             |
| 10. Business Statistics                        | R.S.Bharadwaj                  |

## Programming IN C

### Unit- I

**Introduction to Algorithms and Programming Languages:** Algorithm – Key features of Algorithms – Some more Algorithms – Flow Charts. **Introduction to C:** Structure of C Program –Writing the first C Program – File used in C Program – Compiling and Executing C Programs –Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting.

### Unit-II

**Decision Control and Looping Statements:** Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Go to Statement.

### Unit- III

**Arrays:** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations on Array – one dimensional array for inter-function communication – Two dimensional Arrays –Operations on Two Dimensional Arrays, **Strings:** Introduction String and Character functions.

### Unit- IV

**Functions:** Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive function.

### Unit-V

**Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function. **Structure, Union, and Enumerated Data Types:** Introduction – Nested Structures – Arrays of Structures – Structures and Functions - Unions – Enumerated Data Types.

### Reference Books:

1. ReemaThareja, Introduction to C programming, Oxford University Press.
2. E Balagurusamy, Programming in ANSI C Tata McGraw-Hill, Sixth Edition.
3. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Publisher, 2002.
4. Henry Mulish & Hubert L.CooReemaThareja: The Spirit of C: An Introduction to Modern Programming, Jaico Publishing House,1996.

**Semester - IV**  
**DSC ID 4.1- Accounting for Service Organizations**

**Unit-I: Non-Trading/ Service Organizations**

Non profit entities-Features of nonprofit entities-Accounting process-Preparation of summaries – Receipt and payment account – Meaning and special features – Procedure of preparation – Uses and Limitations.

Income and expenditure account – Features – Procedure for preparation – Preparation of Balance Sheet **(Problems only)**

**Unit – II Single Entry or Accounts from Incomplete Records:**

Single Entry - Features-Books and accounts maintained-Recording of transactions-Ascertainment of Profit.(Statement of Affairs method only). **(Problems only)**

**Unit – III - Bank Accounts**

Bank Accounts – Books and Registers to be maintained by Banks – Slip System of Posting – Rebate on bills discounted – Schedule of advances – Non forming assets –Banking Regulation Act, 1969 - Legal Provisions Relating to preparation of Final Accounts. **(Problems only)**

**Unit-IV: Insurance Companies**

Life Insurance Companies –Preparation of Revenue Account, Balance Sheet (including problems) – LIC Act, 1956.

**Unit – V - Insurance Claims for Loss of Stocks only**

Fire loss claims - Claims for loss of goods - Average clause - Steps calculation. **(Problems only)**

**Suggested Readings**

1. Corporate Accounting – RL Gupta & M. Radha Swami
2. Corporate Accounting – P.C. Tulsian
3. Company Accounts : Monga, Girish Ahuja and Shok Sehgal
4. Advanced Accountancy: Jain and Narang
5. Advanced Accountancy : R.K. Gupta and M. Radhaswamy
6. Advanced Accountancy : Chakraborty
7. Advanced Accountancy: S.P. Iyengar
8. Modern Accounting: A. Mukherjee, M. Hanife McGraw Hill Company Ltd., New Delhi.
9. Accounting standards and Corporate Accounting Practices: T.P. Ghosh Taxman
10. Corporate Accounting: S.N. Maheswari, S.R. Maheswari, Vikas Publishing.
11. Advanced Accountancy: Arutanandam, Raman, Himalaya Publishing House.
12. Advanced Accounts: M.C. Shukla, T.S. Grewal, S.C. Gupta, S. Chand.

## **DSC 2D 4.2 - Business Laws**

### **Unit-I: Contract:**

Meaning and Definition of Contract-Essential elements of valid Contract -Valid, Void and Voidable Contracts - Indian Contract Act, 1872.

### **Unit-II: Offer and Acceptance:**

Definition of Valid Offer, Acceptance and Consideration -Essential elements of a Valid Offer, Acceptance and Consideration.

### **Unit-III: Capacity of the Parties and Contingent Contract:**

Rules regarding to Minors contracts - Rules relating to contingent contracts - Different modes of discharge of contracts-Rules relating to remedies to breach of contract.

### **Unit-IV: Sale of Goods Act 1930:**

Contract of sale – Sale and agreement to sell – Implied conditions and warranties – Rights of unpaid vendor.

### **Unit-V: Cyber Law and Contract Procedures - Digital Signature - Safety Mechanisms.**

### **References:**

1. J. Jayasankar, Business Laws, Margham Publication. Chennai -17
2. Kapoor ND, Mercantile Law , Sultan Chand
3. Balachandram V, Business law Tata
4. Tulsian , Business Law Tata
5. Pillai Bhagavathi, Business Law , S.Chand.
6. Business Laws, Maruthi Publishers

### **DSC3D: Object Oriented Programming with C++**

#### **Unit - I Object Oriented Programming**

Introduction: Programming Language generations, Object Oriented Paradigm, Basic Concepts of OOPs, Benefits of OOPs, Applications of OOPs, Object Oriented Languages, Difference between OOPs and Procedure Oriented Programming.

#### **Unit – II C++ Basics, Streams based I/O**

Introduction to C++, Difference between C and C++, A brief history of C++, General Structure of a C++ program, C++ tokens: Keywords, identifiers, Constants, variables, Strings, Operators in C++. Data types in C++. Special Operators in C++- Scope resolution operator. Streams Based I/O: input function – cin>>, output function – cout<< .

#### **Unit – III Functions, Arrays and Structures, Pointers**

Functions: Types of functions. Inline functions, Function- overloading, Introduction to arrays: Declaration of arrays – Different types of arrays: One Dimensional Array, Two Dimensional Array. Character arrays and strings. Structures – Pointers.

#### **Unit - IV Classes and Objects**

Classes – Objects , Defining a class, defining member functions, member function with object as arguments and argument as return type, array of objects, friend function and friend class.

#### **Unit - V Constructors, Destructors and Inheritance**

Constructors and Destructors - characteristics of constructor, constructor types – Default Parameterized, copy and dynamic constructor overloading, Operator overloading. Derived Classes: Syntax of derived classes, Access to the base class, Overloading inherited member function, multiple inheritance.

#### **Reference Books**

1. Object Oriented Programming with C++ - M.T. Somashekara, D.S.Guru, H.S. Nagendraswamy, K.S. Manjunatha, PHI 2nd Edition
2. Object Oriented Programming with C++ - E. Balagurusamy, 4th Edition, Tata Mc Graw Hill Publication
3. Object Oriented Programming in C++ - Robert Lafore, 4th Edition, Pearson Education
4. Object-Oriented Programming with ANSI and Turbo C++

## Semester - V

### DSC - 1E 5.1 Cost Accounting

**Unit-I:Introduction:** Distinguish between Financial Accounting, Cost Accounting and management accounting - Cost Concepts and Classification – Cost Centre and Cost Unit – Preparation of Cost Sheet.

**Unit-II: Elements of Cost:** Materials: Material control – Selective control, ABC technique – Methods of pricing issues – FIFO, LIFO, Weighted average, (problems only ).

**Unit-III: Labour:** Labour: Control of labor costs – Methods of remuneration – labour incentives schemes – Time rate halsey plan, Rowan plan , piece rate- F.W Taylor and Merrick multiple piece rate method (problems only )

**Unit-IV: Methods of Costing:** Job costing And contract costing – (problems only).

**Unit -V: Marginal costing :** Marginal Costing – BEP,P/V ratio, Margin of safety (problems only)

#### References:

1. S.P. Jain and K.L. Narang – Advanced Cost Accounting, Kalyani Publishers, Ludhiana.
2. M.N. Aurora – A test book of Cost Accounting, Vikas Publishing House Pvt. Ltd.
3. S.P. Iyengar – Cost Accounting, Sultan Chand & Sons.
4. Nigam & Sharma – Cost Accounting Principles and Applications, S.Chand & Sons.
5. S.N .Maheswari – Principles of Management Accounting.
6. I.M .Pandey – Management Accounting, Vikas Publishing House Pvt. Ltd.
7. Sharma & Shashi Gupta – Management Accounting, Kalyani Publishers. Ludhiana.

## **DSC 2E 5.2 ADVANCED ACCOUNTING –I**

### **UNIT-I:- Self –balancing System:**

Meaning, Advantages of self balancing system- preparation of sales ledger adjustment account, purchase ledger adjustment account and General ledger adjustment account. ( Problems only)

### **Unit –II:- Royalty**

Royalties- preparation of minimum rent account, Royalties account, short working accounts and Land lord account ( Problems only)

### **UNIT – III :- Insolvency Accounting**

Insolvency of an Individual- Preparation of statement of affairs, and deficiency account. (problems only)

### **UNIT – IV:- Partnership Accounts-I**

Nature- deed- Types of Capital accounts (Fixed and fluctuating), Calculation of goodwill, Revaluation of assets and liabilities of firm- Admission of a partner (problems only)

### **UNIT-V:- Partnership Accounts-II**

Retirement of a partner- Death of a partner- Dissolution of a partnership firm- Garner Vs Murray Case (problems only)

### **Reference Books:**

1. Advanced Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons
2. Corporate Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons
3. Accountancy-I- S.P.Jain and K.L.Narang, Kalyani Publications
4. Advanced Accountancy- M.C.Shukla and T.S. Grewal, Sultan Chand & Sons

### DSC 3E 5.3 Commercial Geography

**Unit –I: The Earth:** Internal structure of the Earth – Latitude – Longitude – Realms of the Earth – Evolution of the Earth – Environmental pollution - Global Warming - Measures to be taken to protect the Earth.

**Unit -II: India – Agriculture:** Land Use - Soils - Major crops – Food and Non-food Crops – Importance of Agriculture – Problems in Agriculture – Agriculture Development.

**Unit -III: India – Forestry:** Forests – Status of Forests in Andhra Pradesh – Forest (Conservation) Act, 1980 – Compensatory Afforestation Fund (CAF) Bill, 2015 - Forest Rights Act, 2006 and its Relevance – Need for protection of Forestry.

**Unit -IV: India – Minerals and Mining:** Minerals – Renewable and non Renewable – Use of Minerals – Mines – Coal, Barites, etc. – Singareni Coal mines and Mangampeta Barites - District-wise Profile.

**Unit-V: India – Water Resources – Rivers:** Water resources - Rationality and equitable use of water – Protection measures - Rivers - Perennial and peninsular Rivers - Interlinking of Rivers - Experience of India and Andhra Pradesh.

#### References:

1. Shabiar Ahmad; Quazi ,Natural Resource Consumption and Environment Management, APH Publishing Corporation.
2. Tarachand, Economic and Commercial Geography of India, Vikas Publishing House.
3. Dr. S. Sankaran, Commercial Geography, Margam Publications, Chennai.
4. C. B. Memoria, Commercial Geography, Lal Agarwal & Co.
5. C. B. Memoria, Economic and Commercial Geography, Lal Agarwal & Co.
6. Vinod N. Patel, Commercial Geography, Oxford Book Company

## **DSC 4E 5.4 GOODS & SERVICE TAX FUNDAMENTALS-I**

**Unit I: Introduction:** Overview of GST - Concepts – Limitations of VAT – Need for Tax Reforms - Justification for introduction of GST - Shortcomings and advantages at the Central Level and State Level on introduction of GST- Process of Introduction of GST - Constitutional Amendments.

**Unit II: GST:Principles – Models of GST:** Austrian, Canadian, Kelkar-Shah – Bagchi-Poddar - Comprehensive structure of GST model in India: Single, Dual GST–Transactions covered under GST.

**Unit-III: Taxes and Duties:** Subsumed under GST - Taxes and Duties outside the purview of GST: Tax on items containing Alcohol – Tax on Petroleum products -Tax on Tobacco products - Taxation of Services

**Unit-IV: Inter-State Goods and Services Tax:** Major advantages of IGST Model –Interstate Goods and Service Tax: Transactions within a State under GST – Interstate Transactions under GST - Illustrations.

**Unit-V: Time of Supply of Goods & Services:** Value of Supply - Input Tax Credit –Distribution of Credit -Matching of Input Tax Credit - Availability of credit in special circumstances- Cross utilization of ITC between the Central GST and the State GST.

### **References:**

1. Goods and Services Tax in India – Notifications on different dates.
2. GST Bill 2012.
3. Background Material on Model GST Law, Sahitya Bhawan Publications, Hospital Road, Agra - 282 003.
4. The Central Goods and Services Tax Act, 2017, NO. 12 OF 2017 Published by Authority, Ministry of Law and Justice, New Delhi, the 12th April, 2017.

## Database Management System

### Unit-I

**Overview of Database Management System:** Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management Systems, Classification of Database Management System.

### Unit-II

File-Based System, Drawbacks of File-Based System , DBMS Approach, Advantages of DBMS, Data Models Components of Database System, Database Architecture, DBMS Vendors and their Products.

### Unit-III

**Entity–Relationship Model:** Introduction, The Building Blocks of an Entity–Relationship, Classification of Entity Sets , Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization, aggregation and composition, CODD’S Rules, Relational Data Model, Concept of, Relational Integrity.

### Unit-IV

**Structured Query Language:** Introduction, History of SQL Standard, Commands in SQL, Data types in SQL, Data Definition Language (DDL), Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, Set Operations.

### Unit –V

**PL/SQL:** Introduction, Structure of PL/SQL, PL/SQL Language Elements ,Data Types, Control Structure,, Steps to Create a PL/SQL Program, Iterative Control ,Cursors , Steps to Create a Cursor, Procedure, Function, Exceptions Handling.

#### Text Books:

1. S.Sumathi, S. Esakkirajan, Fundamentals of Relational Database Management Systems
2. Ivan Bayross, SQL, PL/SQL, The programming language of Oracle, BPB Publications

#### Reference Books:

1. Paneerselvam: Database Management Systems, PHI.
2. Bipin C. Desai, “An Introduction to Database Systems”, Galgotia Publications.
3. Korth, Database Management systems.
4. Navathe, Database Management systems.

## Web Technology

### Unit-I

**HTML:** Basic HTML, Document body, Text, Hyper links, adding more formatting, Lists, Tables using images. **More HTML:** Multimedia objects, Frames, Forms towards interactive, HTML document heading detail.

### Unit-II

**Cascading Style Sheets:** Introduction, using Styles, simple examples, your own styles, properties and values in styles, style sheet, formatting blocks of information, layers.

### Unit-III

**Introduction to JavaScript:** What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. **Objects in JavaScript:** Data and objects in JavaScript, regular expressions, exception handling.

### Unit-IV

**DHTML with JavaScript:** Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.

### Unit-V

**XML:** defining data for web applications, basic XML, document type definition, presenting XML, document object model. Web Services.

### Text Books:

1. Web Technology, Chris Bates, Wiley publications

### Reference books:

1. Uttam Kumar Roy, Web Technologies, Oxford University Press.
2. Black Book HTML 5.0
3. Complete reference HTML 5.0
4. Web Technology, PHI Publications.

## SEMESTER –VI

### DSC IF 6.1 GOODS AND SERVICE ACT & CUSTOMER ACT-II

**Unit-I: Registration and Filing**–Registration of Assesses Under GST - Persons liable for registration - Compulsory registration in certain cases - Procedure for registration - Deemed registration - GST Rate Structure.

**Unit-II: Administration:** Officers under GST Act: Appointment and Powers of officers- Administration of officers of State tax or Union-territory tax – Accounts and Records – Retention of Records – Audit by Tax Authorities.

**Unit-III: Assessment:** Self-assessment - Provisional assessment –Security of Returns - Assessment of Non-filers of returns - Assessment of Unregistered persons –Audit and Assessment – Other features of Dual GST model.

**Unit-IV: Levy and Exemption of Tax:**Chargeability – Collection at Source –E-Commerce - Composition Levy - Tax under Central GST and State GST - Zero-rating of Exports – GST on Imports –Returns under GST –Taxation of Services–Remission of Tax - Adjustment and Refund of GST.

**Unit- V: Customs Act:** Types of Custom Duties- Valuation for Customs Duty- Tariff Value- Customs Value- Methods of Valuation for Customs - Problems on Custom Duty Assessment.

**References:**

1. Goods and Services Tax in India – Notifications on different dates
2. Customs Law Manual and Customs Tariff of India- R K Jain.
3. Background Material on Model GST Law, Sahitya Bhawan Publications, Hospital Road, Agra - 282 003.
4. The Central Goods and Services Tax Act, 2017, NO. 12 OF 2017 Published by Authority, Ministry of Law and Justice, New Delhi, the 12<sup>th</sup> April, 2017.

## DSC 2F 6.2 AUDITING

**Unit-I: Auditing:** Meaning – Objectives – Importance of Auditing – Auditing as a Vigil Mechanism – Role of Auditor in checking corporate frauds.

**Unit-II: Types of Audit:** Based on Ownership and time - Independent, Financial, Internal, Cost, Tax, Government, Secretarial audits.

**Unit-III: Planning of Audit:** Steps to be taken at the commencement of a new audit - Audit programme - Audit note book - Internal check, internal audit and internal control.

**Unit-IV: Vouching and Investigation:** Vouching of cash and trading transactions - Investigation, Auditing vs. Investigation

**Unit-V: Company Audit and Auditors Report:** Auditor's Qualifications – Appointment and Reappointment – Rights, duties, liabilities and disqualifications - Audit report: Contents – Preparation - Relevant Provisions of Companies Act, 2013.

### References:

1. S.Vengadamani, "Practical Auditing", Margham Publications, Chennai.
2. Ghatalia, "Principles of Auditing", Allied Publishers Pvt. Ltd., New Delhi.
3. Pradeesh Kumar, Baldev Sachdeva & Jagwant Singh, "Auditing Theory and Practice, Kalyani Publications, Ludhiana.
4. N.D. Kapoor, "Auditing", S. Chand, New Delhi.
5. R.G. Saxena, "Principles and Practice of Auditing", Himalaya Publishing House, New Delhi.
6. Jagadesh Prakesh, "Principles and Practices of Auditing" Kalyani Publications, Ludhiana.
7. Kamal Gupta and Ashok Gupta, "Fundamentals of Auditing", Tata McGraw Hill
8. B.N. Tondan, "Practical Auditing", S.Chand, New Delhi.

### DSC 3F 6.3 MANAGEMENT ACCOUNTING

**Unit–I: Management Accounting:** Interface with Financial Accounting and Cost Accounting - Financial Statement analysis and interpretation: Comparative analysis – Common size analysis and trend analysis (including problems).

**Unit–II: Ratio Analysis:** Classification, Importance and limitations - Analysis and interpretation of Accounting ratios - Liquidity, profitability, activity and solvency ratios (including problems).

**Unit–III: Fund Flow Statement:** Concept of fund: Preparation of funds flow statement. Uses and limitations of funds flow analysis (including problems).

**Unit–IV: Cash Flow Statement:** Concept of cash flow – Preparation of cash flow statement - Uses and limitations of cash flow analysis (including problems).

**Unit–V: Standard Cost:** Material variance only (including Problems).

**References:**

1. S.N. Maheswari, A Textbook of Accounting for Management, S. Chand Publishing, New Delhi.
2. I.M Pandey, “Management Accounting”, Vikas Publishing House, New Delhi,
3. Shashi K. Gupta & R.K. Sharma, “Management Accounting: Principles and Practice”, Kalyani Publishers, Ludhiana.
4. Jawahar Lal, Accounting for Management, Himalaya Publishing House, New Delhi.
5. Charles T. Horngren, [et.al.](#), “Introduction to Management Accounting” Person EducationIndia, New Delhi, 2002.
6. Murthy & Guruswamy – Management Accounting, Tata McGraw Hill, New Delhi.
7. Dr. Kulsreshtha & Gupta – Practical problems in Management Accounting.
8. Bhattacharya, D., “Management Accounting”, Pearson Education India, New Delhi.
9. S.P. Gupta – Management Accounting, S. Chand Publishing, New Delhi.

**DSC 4F 6.4 ADVANCED ACCOUNTING-II****UNIT-I:- Hire purchase – installment purchase accounting**

Hire Purchase system- Calculation of interest- Accounting procedure for preparation of Hire Purchase Accounts – Installment purchase system ( problems only)

**UNIT-II:- Branch Accounts:**

Branch Accounting- Debtors system- stock and debtors system- invoice price method (excluding independent and foreign branch). ( problems only)

**UNIT-III:- Internal Reconstruction:**

Meaning- Reasons and factors for reconstruction procedure for capital reduction- preparation of post reconstruction balance sheet and capital reduction account (excluding surrender of shares) (problems only)

**UNIT-IV:- Liquidation:**

Meaning – liquidation expenses- Liquidator's remuneration – preparation of Liquidator's final statement of account ( problems only)

**UNIT-V:- Profits Prior to Incorporation of Company:**

Profits prior to incorporation of Company- Accounting treatment (problems only)

**Reference Books:**

- 1.Advanced Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons
- 2.Corporate Accounting- R.L.Gupta and M.Radha Swamy, Sultan Chand & Sons
- 3.Accountancy-I- S.P.Jain and K.L.Narang, Kalyani Publications
- 4.Advanced Accountancy- M.C.Shukla and T.S. Grewal, Sultan Chand & Sons

## E-COMMERCE

### Unit-I

**Electronic Commerce Environment and Opportunities:** Background, The Electronic Commerce Environment, Electronic Market place Technologies. **Mode of Electronic Commerce:** Electronic Data Interchange, Migration to Open EDI, Electronic Commerce with WWW/Internet, Commerce Net Advocacy, Web Commerce going forward.

### Unit-II

**Approaches to Safe Electronic Commerce:** Secure Transport Protocols, Secure Transactions, Secure Electronic Payment Protocol (SEPP), Secure Electronic transaction (SET), Certificates for authentication Security on Web Servers and Enterprise Networks.

### Unit-III

**Electronic Cash and Electronic Payment Schemes:** Internet Monetary Payment & Security Requirements, Payment and Purchase Order Process, On-line Electronic cash. **Internet / Intranet Security Issues and Solution:** The need for Computer Security, Specific Intruder Approaches, Security Strategies, Security Tools, Encryption, Enterprise Networking and Access to the Internet, Antivirus Programs, Security Teams.

### Unit-IV

**Master Card / Visa secure Electronic Transaction:** Introduction, Business Requirements, Concepts, Payments Processing. **E-Mail and Secure E-Mail technologies for Electronic Commerce:** Introduction The Means of Distribution, A Model for Message Handling, E-Mail Handling, Multipurpose Internet Mail Extensions, Message Object Security Services, Comparisons of Security Methods, MIME and Related Facilities for EDI over the Internet.

### Unit-V

**Internet Resources for Commerce Introduction:** Introduction, Technologies for Web Servers, Internet Tools Relevant to Commerce, Internet Applications for Commerce, Internet Charges, Internet Access and Architecture.

### Text Books

Web Commerce Technology Handbook, by Daniel Minoli, Emma Minoli, McGraw-Hill

### Reference Books

1. David Whiteley, "E-Commerce", Tata McGraw Hill, 2000.

## PHP and My SQL

**Unit-I: Building blocks of PHP:** Variables, Data Types, Operators and Expressions, Constants.

**Flow Control Functions in PHP:** Switching Flow, Loops, Code Blocks and Browser Output. **Working with Functions:** Defining Functions, Calling functions, returning the values from User- Defined Functions, Variable Scope, Saving State between Function calls with the Static statement, more about arguments.

**Unit-II: Working with Arrays:** Arrays, Creating Arrays, Some Array-Related Functions. **Working with Objects:** Creating Objects, Object Instance. **Working with Strings, Dates and Time:** Formatting Strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

**Unit-III: Working with Forms:** Creating Forms, Accessing Form - Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads.

**Unit-IV: Working with Files and Directories:** Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen (), Running Commands with exec(), Running Commands with system ( ) or passthru ( ).

**Working with Images:** Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

**Unit-V: Interacting with MySQL using PHP:** MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data.

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