Faculty of Commerce & Business Management, Kakatiya University, Warangal

Paper DSC 103: FUNDAMENTALS OF INFORMATION TECHNOLOGY

Hours Per Week: 6 (4T+2P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: To understand the basic concepts and terminology of informationtechnology and to identify issues related to informationsecurity.

UNIT-I: INTRODUCTION TO COMPUTERS:

Introduction,Definition,Characteristicsofcomputer,EvolutionofComputer,BlockDiagramOf a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations ofcomputer.

Role of I/O devices in a computer system.**Input Units:** Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, **Output Units:** Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printers and its types, Plotters, types of plotters, Sound cards,Speakers.

UNIT -II: COMPUTER ARITHMETIC & STORAGE FUNDAMENTALS:

Binary,Binary Arithmetic, Number System: Positional & Non Positional, Binary,Octal, Decimal, Hexadecimal, Converting from one number system to another.

Primary Vs Secondary Storage, Data storage & retrieval methods.**Primary Storage:** RAM ROM, PROM, EPROM, EEPROM. **Secondary Storage:** Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

UNIT-III: SOFTWARE:

Software and its needs, Types of S/W. **System Software**: Operating System, Utility Programs - Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. **Application S/W** and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w.

UNIT-IV: OPERATING SYSTEM:

Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.

Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.

UNIT-V: DATA COMMUNICATION:

Data, Communication, Basic Networking Devices, Communication Process, Data Transmission speed, Communication Types(modes), Data Transmission Medias, Modem and its working, characteristics, Typesof Networks, LAN Topologies, Computer Protocols, Concepts relating to networking.

SUGGESTED READINGS:

Computer Fundamentals : P.K.Sinha

Prof. K. Raji Reddy	Prof. P. Varalaxmi	Dr. K. Rajender
Dr. S. Narasimha Chary	Mr. M. Sumaiah	Dr. S. Narayana Swamy
Dr. Ramavath Ravi	Dr. D. Thiruvengala Chary	Dr. G. Shashidhar Rao

Department of Commerce & Business Management, Kakatiya University, Warangal.

Paper DSC 203:PROGRAMMING WITH C & C++

Hours Per Week: 5 | Credits: 5
Exam Hours: 1 ½ | Marks: 50U+35P+15I

Objective:*Fundamental Concepts of Programming in C and Object Oriented Programming in C++.*

UNIT-I: **Introduction:** Computer of Languages- Flow charts-algorithms-History of C language – Basic Structure–Programming Rules –Commonly used library functions - Executing the C Program - Pre-processors in "C"- Keywords & Identifiers – Constants – **Variables:** Rules for defining variables - Scope and Life of a Variable–-**Data types** - Type Conversion - Formatted Input and Output operations. **Operators:** Introduction – Arithmetic – Relational – Logical – Assignment - Conditional - Special - Bitwise -Increment / Decrement operator.

UNIT-II: Conditional statements: Introduction - If statements - If-else statements – nested if-else – break statement-continue and exit-statement - goto-statement-Switch statements. **Looping statements:** Introduction-While statements – Do-while statements - For Statements-nested loop statements.

UNIT-III: Functions: Definition and declaration of functions- Function proto type-return statement- types of functions and Built-in functions.**User-defined functions:** Introduction-Need for user defined Function and Components of functions. **Arrays:** Introduction-Defining an array-Initializing an array-One dimensional array- Multi dimensional array. **Strings:** Introduction–Declaring and initializing string- and Handling Strings -String handling functions. **Pointers:** Features of pointers- Declaration of Pointers- advantages of pointers.

UNIT-IV: Structures: Features of Structures - Declaring and initialization of Structures – Structure within Structure-Array of Structures- Enumerated data type. **Unions**-Definition and advantages of Unions comparison between Structure & Unions.
Object Oriented Programming: Introduction to Object Oriented Programming - Structure of C++ –Simple program of C++-Differences between C & C++

UNIT-V: Classes and Objects: Data Members-Member Functions - Object Oriented- Class-Object- Encapsulation-Abstraction concepts-Polymorphism (Function overloading and Operator Overloading) Inheritance- (Inheritance Forms and Inheritance Types).

SUGGESTED READINGS:

1. Programming with C&C++ :IndrakantiSekhar,V.V.R.Raman&V.N.Battu, Himalaya Publishers.
2. Programming in ANSI C: Balagurusamy, McGraw Hill.
3. Mastering C: K.R. Venugopal, McGraw Hill.
4. C: The Complete Reference: H.Schildt, McGraw Hill.
5. Let Us C: Y.Kanetkar, BPB.
6. Objected Oriented Programming with C++: E. Balagurusamy, McGraw Hill.

Faculty of Commerce & Business Management, Kakatiya University, Warangal.

Paper DSC 303: RELATIONAL DATABASE MANAGEMENT SYSTEMS

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *to acquire basic conceptual background necessary to design and develop simple database system, Relational database mode, ER model and distributed databases, and to write good queries using a standard query language called SQL.*

UNIT-I: BASIC CONCEPTS: Database Management System - File based system - Advantages ofDBMS over file based system - Database Approach - Logical DBMS Architecture - Three level architecture of DBMS or logical DBMS architecture - Need for three level architecture - Physical DBMS Architecture - Database Administrator (DBA) Functions & Role - Data files indices and Data Dictionary -Types of Database. Relational and ER Models: Data Models - Relational Model – Domains - Tuple and Relation - Super keys - Candidate keys - Primary keys and foreign key for the Relations - Relational Constraints - Domain Constraint - Key Constraint - Integrity Constraint - Update Operations and Dealing with Constraint Violations - Relational Operations - Entity Relationship (ER) Model – Entities – Attributes – Relationships - More about Entities and Relationships - Defining Relationship for College Database - E-R Diagram - Conversion of E-R Diagram to Relational Database.

UNIT-II: DATABASE INTEGRITY AND NORMALISATION: Relational Database Integrity - TheKeys - Referential Integrity - Entity Integrity - Redundancy and Associated Problems – Single Valued Dependencies – Normalisation - Rules of Data Normalisation - The First Normal Form -The Second Normal Form - The Third Normal Form - Boyce Codd Normal Form - Attribute Preservation - Lossless-join Decomposition - Dependency Preservation. File Organisation : Physical Database Design Issues - Storage of Database on Hard Disks - File Organisation and Its Types - Heap files (Unordered files) - Sequential File Organisation - Indexed (Indexed Sequential) File Organisation - Hashed File Organisation

- Types of Indexes - Index and Tree Structure - Multi-key File Organisation - Need for Multiple Access Paths - Multi-list File Organisation - Inverted File Organisation.

UNIT-III: STRUCTURES QUERY LANGUAGE (SQL): Meaning–SQL commands – Data Definition Language - Data Manipulation Language - Data Control Language - Transaction Control Language - Queries using Order by – Where - Group by - Nested Queries. Joins – Views – Sequences - Indexes and Synonyms - Table Handling.

UNIT-IV: TRANSACTIONS AND CONCURRENCY MANAGEMENT: Transactions – Concurrent Transactions - Locking Protocol - Serialisable Schedules - Locks Two Phase Locking (2PL) - Deadlock and its Prevention - Optimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning - Kinds of failures - Failure controlling methods - Database errors - Backup & Recovery Techniques - Security & Integrity - Database Security - Authorization.

UNIT-V: DISTRIBUTED AND CLIENT SERVER DATABASES: Need for Distributed Database Systems - Structure of Distributed Database - Advantages and Disadvantages of DDBMS - Advantages of Data Distribution - Disadvantages of Data Distribution - Data Replication - Data Fragmentation. Client Server Databases: Emergence of Client Server Architecture - Need for Client Server Computing - Structure of Client Server Systems & its advantages.

ADVANCED TOPICS: Overview: Parallel Database - Multimedia Database - Mobile Database - Web Database - Multidimensional Database. Data Warehouse - OLTP Vs OLAP - NoSQL Database. **LAB:** SQL QUERIES BASED ON VARIOUS COMMANDS.

SUGGESTED READINGS: 1)Database Systems: R.Elmasri& S.B. Navathe, Pearson.; 2)Introduction to DatabaseManagement System: ISRD Group, McGraw Hill.; 3) Database Management System: R.Ramakrishnan&J.Gehrke, McGrawHill.; 4) Modern Database Management: J.A.Hoffer,V.Rames&H.Topi, Pearson.;5) Database System Concepts: Silberschatz,Korth&Sudarshan,McGrawHill.6) Simplified Approach to DBMS: Parteek Bhaia, Kalyani Publishers.

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Kakatiya University, Warangal

Faculty of Commerce & Business Management,

B.Com. IV Semester -Paper DSC 403: WEB TECHNOLOGIES

(Only for B.Com (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective:*To gain skills of usage of Web Technologies to design Web pages.*

UNIT-I: INTRODUCTION:

Art of creating a web site - Markup language (HTML) – Hypertext - Formatting text - Forms & formulating instructions & formulation elements – Commenting code – Anchors - Back grounds – Images - Hyperlinks – Lists –Tables – Frames - Web design principles.

UNIT-II: AN OVER VIEW OF DYNAMIC WEB PAGES & DYNAMIC WEB PAGE:

An over view of dynamic web pages and dynamic web page technologies: Introduction to Dynamic HTML programing - Cascading style sheets (CSS) - Basic syntax and structure -Events handling - Changing Text and Attributes - Dynamically changing style - Text Graphics and placements - Creating multimedia effects with filters and Transactions.

UNIT-III: JAVA SCRIPT&EVENTS AND EVENT HANDLERS:

Java Script: Introduction - Client side Java script - Server side Java script - Core features - Data types and variables – Operators - Expressions and statements – Functions – Objects – Array - Date and math related objects - Document object model - Event handling.

Events And Event Handlers: General information about Events – Event – OnAbort – OnClick - Ondbl click - Ondrag drop – Onerror - Onfocus - Onkey Press – Onkey Up – Onload - Onmouse Down – Onmouse Move - Onmouse Out – Onmouse Over - Onmove - Onrest – Onresize - Onselect - On submit - Onunload.

UNIT-IV: HYPER TEXT PRE PROCESSOR (PHP):

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT-V: EXTENSIBLE MARKUP LANGUAGE (XML)& JSP:

Extensible Markup Language (XML): Introduction - Creating XML Documents - XML style Sheet - Hyperlinksin XML Document Object Model - XML Query Language.

JSP: Introduction to JSP:The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

LAB WORK: CREATING A WEBSITE WITH DYNAMIC FUNCTIONALITY USING CLIENT-SIDE AND SERVER SIDE SCRIPTING.

SUGGESTED READINGS:

1. Web Technology: Pradeep Kumar, HPH
2. Internet & World Wide Web How to Program: Deitel&Deitel, Pearson.
3. Web programming: Chris Bates.
4. HTML & XML An Introduction NIIT, PHI.
5. HTML for the WWW with XHTML & CSS: Wlizabeth Castro, Pearson

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Kakatiya University, Warangal.

Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503b: E-COMMERCE

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *to acquire conceptual and application knowledge of ecommerce.*

UNIT-I: INTRODUCTION:

E-Commerce: Meaning - Advantages & Limitations - E-Business: Traditional & Contemporary Model, Impact of E-Commerce on Business Models - Classification of E-Commerce: B2B - B2C - C2B - C2C - B2E - Applications of Ecommerce: E-Commerce Organization Applications - E-Marketing - E-Advertising - E-Banking - Mobile Commerce - E-Trading - E-Learning - E-Shopping.

UNIT-II:FRAMEWORK OF E-COMMERCE:

Framework of E-Commerce: Application Services - Interface Layers - Secure Messaging - Middleware Services and Network Infrastructure - Site Security - Firewalls & Network Security - TCP/IP – HTTP - Secured HTTP – SMTP - SSL.

Data Encryption: Cryptography – Encryption – Decryption - Public Key - Private Key - Digital Signatures - Digital Certificates.

UNIT-III:CONSUMER ORIENTED E-COMMERCE APPLICATIONS:

Introduction - Mercantile Process Model: Consumers Perspective and Merchant's Perspective - Electronic Payment Systems: Legal Issues & Digital Currency - E-Cash & E-Cheque - Electronic Fund Transfer (EFT) - Advantages and Risks - Digital Token-Based E-Payment System - Smart Cards.

UNIT-IV:ELECTRONIC DATA INTERCHANGE:

Introduction - EDI Standards - Types of EDI - EDI Applications in Business – Legal - Security and Privacy issues if EDI - EDI and E-Commerce - EDI Software Implementation.

UNIT-V: E-MARKETING TECHNIQUES:

Introduction - New Age of Information - Based Marketing - Influence on Marketing - Search Engines & Directory Services - Charting the On-Line Marketing Process - Chain Letters - Applications of 5P's (Product, Price, Place, Promotion, People) E-Advertisement - Virtual Reality & Consumer Experience - Role of Digital Marketing.

Lab work: *Using Microsoft Front Page Editor and HTML in Designing a Static Webpage/Website.*

SUGGESTED READINGS:

1. Frontiers of Electronic Commerce: Ravi Kalakota, Andrew B Whinston, Pearson
2. E-Commerce: Tulasi Ram Kandula, HPH.
3. Electronic Commerce, A Managers' Guide: Ravi Kalakota, Andrew B Whinston
4. E-Commerce & Computerized Accounting: Rajinder Singh, Er. KaisarRasheed, Kalyani
5. E-Commerce & Mobile Commerce Technologies: Pandey, SaurabhShukla, S. Chand

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Kakatiya University, Warangal.

Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE603a: MULTIMEDIA SYSTEMS

(Only for B.Com (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective:*To acquire the knowledge of multimedia systems.*

UNIT-I: MEDIA AND DATA STREAMS:

Properties of multimedia systems, Data streams characteristics: Digital representation of audio, numeric instruments digital interface Bark concepts, Devices, Messages, Timing Standards Speech generation, analysis and transmission.

UNIT-II: DIGITAL IMAGE&ANIMATIONS:

Digital Image: Analysis, recognition, transmission, **Video**: Representation, Digitalization, transmission.

Animations: Basic concepts, animation languages, animations control transmission.

UNIT-III: DATA COMPRESSION STANDARDS&STORAGE:

Data Compression Standards: JPEG, H-261, MPEG DVI

Optical storage devices and Standards: WORHS, CDDA, CDROM, CDWO, CDMO.

Real Time Multimedia, Multimedia file System.

UNIT-IV: MULTIMEDIA COMMUNICATION SYSTEM, DATABASES&SYNCHRONIZATION:

Multimedia Communication System: Collaborative computing session management, transport subsystem, QOS, resource management.

Multimedia Databases: Characteristics, data structures, operation, integration in a database model.

Synchronization: Issues, presentation requirements, reference to multimedia synchronization, MHEG.

UNIT-V: MULTIMEDIA APPLICATION:

Media preparation, Composition, integration communication, consumption, entertainment.

SUGGESTED READINGS:

1. Ralf Steninmetz, KlaraHahrstedt, *Multimedia: Computing, Communication and Applications,* PHI PTR Innovative Technology Series.
2. John F.KoegelBufford, *Multimedia System*, Addison Wesley, 1994.
3. Mark Elsom – Cook, *Principles of Interactive Multimedia* , Tata Mc-Graw Hill, 2001.
4. Judith Jefcoate, *Multimedia in Practice: Technology and Application* , PHI 1998.

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B.Sc., BOTANY

First Year, I -Semester

Paper-I

Microbial Diversity and Lower Plants

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

Theory Syllabus **(60 hours)**

UNIT – I **(15 hours)**

1) **Bacteria**: Structure, nutrition, reproduction and economic importance. Brief account of Archaebacteria, Actinomycetes and Mycoplasma with reference to little leaf of Brinjal and Papaya leaf curl

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

3) An outline of plant diseases of important crop plants caused by bacteria and their control with reference to Angular leaf spot of cotton and Bacterial blight of Rice.

UNIT-II **(15 hours)**

1) General characters, structure, reproduction and classification of algae (Fritsch)

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

3) Structure and reproduction of the following:
Chlorophyceae- Volvox, Oedogonium and Chara.
Phaeophyceae- Ectocarpus
Rhodophyceae- Polysiphonia.

UNIT-III **(15 hours)**

1) General characters and classification of fungi (Ainsworth).

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

3) Economic importance of lichens

UNIT-IV **(15 hours)**

1) **Bryophytes:** Structure, reproduction, life cycle and systematic position of Marchantia, Anthoceros and Polytrichum, Evolution of Sporophyte in Bryophytes.

2) **Pteridophytes**: Structure, reproduction, life cycle and systematic position of Rhynia, Lycopodium, Equisetum and Marsilea.

3) Stelar evolution, heterospory and seed habit in Pteridophytes.

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References:

1) Alexopolous, J. and W. M. Charles. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.
2) Mckane, L. and K. Judy. 1996. Microbiology – Essentials and Applications. McGraw Hill, New York.
3) Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
4) Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
5) Sambamurthy, A. V. S. S. 2006. A Textbook of Plant Pathology. I. K. International Pvt. Ltd., New Delhi.
6) Sambamurthy, A. V. S. S. 2006. A Textbook of Algae. I. K. International Pvt. Ltd., New Delhi.
7) Sharma, O. P. 1992. Textbook of Thallophyta. McGraw Hill Publishing Co., New Delhi.
8) Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
9) Vashishta, B. R., A. K. Sinha and V. P. Singh. 2008. Botany for Degree Students: Algae. S. Chand& Company Ltd, New Delhi.
10) Vashishta, B. R. 1990. Botany for Degree Students: Fungi, S. Chand & Company Ltd, New Delhi.
11) Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
12) Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.
13) Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Palcobotany. S. Chand & Company Ltd, New Delhi.
14) Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). . Chand & Company Ltd, New Delhi.
15) Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
16) Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
17) Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
18) Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.

Practical Syllabus (45 hours)

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

Practical Model Paper

Max. Marks: 25

Time : 3 hrs

1. Identify the given components **'A'&'B'** in the algal mixture .
   Describe with neat labeled diagrams & give reasons for the classifications. 2 X 2 = 4M
2. Classify the given bacterial culture **'D'** using Gram – staining technique. 3M
3. Take a thin transverse section of given diseased material **'E'**.
   Identify & describe the symptoms caused by the pathogen. 4M
4. Identify the given specimens **'F', 'G' & 'H'** by giving reasons .
   (Fungal-1, Bacteria-1 & Viral-1) 3 X 1 = 3M
5. Comment on the given slides **'I' & 'J'** (Algae-1, Fungi-1) 2 X 2 = 4M
6. Identify the given specimen **'K' &** slide **'L'** (Bryophytes & Pteridophytes) 2 X 2 = 4M
7. Record 3M

B.Sc., BOTANY

First Year, II -Semester

Paper-II
Gymnosperms, Taxonomy of Angiosperms and Ecology

DSC-1B **Credits-4**

Theory Syllabus

UNIT-I

1) Gymnosperms: General characters, structure, reproduction and classification (Sporne's). Distribution and economic importance of Gymnosperms.
2) Morphology of vegetative and reproductive parts, systematic position and life cycle of Pinus and Gnetum,
3) Geological time scale Introduction to Palaeobotany, Types of fossils and fossilization, Importance of fossils.

(15 hours)

UNIT-II

1) Introduction: Principles of plant 4ystematic, Types of classification: Artificial, Natural and Phylogenetic; Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantl classification systems. An introduction to Angiosperm Phylogeny Group (APG).
2) Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy.
3) Nomenclature and Taxonomic resources: An introduction to ICN, Shenzhen code – a brief account. Herbarium: Concept, techniques and applications.

(15 hours)

UNIT-III

1) Systematic study and economic importance of plants belonging to the following families: Polypetalae Annonaceae, Capparidaceae, Rutaceae, Fabaceae (Faboideae/Papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae
2) Gamopetalae: Apiaceae, Asteraceae, Asclepiadaceae, Lamiaceae, Monochalmydeae: Amaranthaceae, Euphorbiaceae
3) Monocotyledons: Orchidaceae, Poaceae and Zingeberaceae.

(15 hours)

UNIT-IV

1. Component of eco system, energy flow, food chain and food webs.
2. Plants and environment, ecological adaptations of plants, Hydrophytes, Xerophytes and Mesophytes
3. Plant Succession serial stages, modification of environment, climax formation with reference to Hydrosere and Xerosere.

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Practical Syllabus (45 hours)

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

Practical Model Paper

Max. Marks: 25

Time ; 3 hrs

1. Identify the given components **'A'&'B'** in the algal mixture .
   Describe with neat labeled diagrams & give reasons for the classifications. 2 X 2 = 4M
2. Classify the given bacterial culture **'D'** using Gram – staining technique. 3M
3. Take a thin transverse section of given diseased material **'E'**.
   Identify & describe the symptoms caused by the pathogen. 4M
4. Identify the given specimens **'F', 'G' & 'H'** by giving reasons .
   (Fungal-1, Bacteria-1 & Viral-1) 3 X 1 = 3M
5. Comment on the given slides **'I' & 'J'** (Algae-1, Fungi-1) 2 X 2 = 4M
6. Identify the given specimen **'K' &** slide **'L'** (Bryophytes & Pteridophytes) 2 X 2 = 4M
7. Record 3M

References:

1. Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.
2. Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany. S. Chand & Company Ltd, New Delhi.
3. Sporne, K. R. 1965. Morphology of Gymnosperms. Hutchinson Co., Ltd., London.
4. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). . Chand & Company Ltd, New Delhi.
5. Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
6. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
7. Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
8. Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.
9. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany for Degree Students: Gymnosperms. Chand & Company Ltd, New Delhi.
10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
11. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi
12. Stace, C. A. 1989. Plant Taxonomy and Biostatistics (2nd Ed.). Edward Arnold, London.
13. Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.
14. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
15. Davis, P. H. and V. H. Heywood. 1963. Principles of Angiosperm Taxonomy. Oliver and Boyd, London.
16. Heywood, V. H. 1965 . Plant Taxonomy. ELBS , London.
17. Heywood, V. H. and D. M. Moore (Eds). 1984. Current Concepts in Plant Taxonomy. Academic Press, London.
18. Jeffrey, C. 1982. An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge. London.
19. Michael, S. 1996, Ecology, Oxford University Press, London
20. Odum, E.P. 1983. Basics of Ecology, Saunder's International Students Edition, Philadelphia.
21. Sharma P.D. 1989. Elements of Ecology, Rastogi Publications, Meerut

Practical Syllabus (45 hours)

1. Study of Morphology (vegetative and reproductive structures) of the following taxa:
   Gymnosperms - Pinus and Gnetum.
2. Study of Anatomical features of Pinus needle and Gnetum stem by preparing double stained permanent mounts.
3. Fossil forms using permanent slides / photographs: Cycadeoidea.
   Systematic study of locally available plants belonging to the families prescribed in theory Syllabus (Minimum of one plant representative for each family)
4. Study of morphological and anatomical characteristics of locally available plant species (Eichhorinia, Hydrilla, Pistia, Nymphaea, Asparagus, Opuntia, Euphorbia melii)
5. Demonstration of herbarium techniques.
6. Candidate has to submit at least 30 herbarium sheets.

Practical Model Paper

Time : 3 hrs **Max. Marks: 50**

1. Prepare a mount of the given material ' **A** ' (Hydrophytes /Xerophytes)
   Draw diagram & give reasons for identification. 8M
2. Prepare a double stained permanent mount of the given material ' **B** ' (Gymnosperms)
   Draw diagram & give reasons for identification. 10M
3. Identify the given specimens **C & D** (Gymnosperms /Xerophytes) 2 X 4 =8M
4. Identify the given slides **E&F** (Gymnosperms /Xerophytes) 2 X 4 =8M
5. Technical description of the given plant twig ' A ' 10M
6. Herbarium 3M
7. Record 3M

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B.Sc. BOTANY II Year
SEMESTER – III

PLANT ANATOMY AND EMBRYOLOGY

Theory:	4 Hours/Week;	Credits: 4	Marks: 100 (Internal: 20; External: 80)
Practical:	3 Hours/Week	Credits: 1	Marks: 25

UNIT – I

Meristems: Types, histological organization of shoot and root apices and theories.

1. Tissues and Tissue Systems: Simple, complex and special tissues.
2. Leaf: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths.

UNIT –II

4. Stem and root anatomy: Vascular cambium - Formation and function.
5. Anomalous secondary growth of Stem -*Achyranthes, Boerhaavia, Bignonia, Dracaena;* Root— *Beta vulgaris.*
6. Wood structure: General account. Study of local timbers — Teak *(Tectona grandis),* Rosewood, *(Dalbergia latefolia),* Red sanders, *(Pterocarpus santalinus)* Nallamaddi *(Terminalia tomentosa)* and Neem *(Azadirachta indica).*

UNIT-III

7. History and importance of Embryology.
8. Another structure, Microsporogenesis and development of male gametophyte.
9. Ovule structure and types; Megasporogenesis; types and development of female gametophyte.

UNIT- IV

10. Pollen morphology, pollination and fertilization, Pollination Types, Pollen - pistil interaction, Double fertilization.
11. Seed - structure appendages and dispersal mechanisms.
12. Endosperm - Development and types. Embryo - development and types; Polyembryony and Apomixis -- an outline.

References:

1. Bhattacharya et. al. 2007. A textbook of Palynology, Central, New Delhi.
2. Bhojwani, S. S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.), Vikas Publishing House, Delhi.
3. M.R.Saxena- A textbook of Palynology.
4. Vashista- A textbook of Anatomy.
5. P.K.K.Nair- A textbook of Palynology.
6. Esau, K. 1971. Anatomy of Seed Plants. John Wiley and Son, USA.
7. Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verleg, Berlin.
8. Kapil, R. P. 1986. Pollination Biology. Inter India Publishers, New Delhi.
9. Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.
10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press

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SEMESTER – III

PLANT ANATOMY AND EMBRYOLOGY
PRACTICAL

1. Demonstration of double stain technique.
2. Preparation of double stained Permanent slides

   Primary structure: Root - *Cicer, Canna;* Stem — *Tridax, Sorghum*

   Secondary structure: Root — *Tridax* sp.; Stem —*Pongarnia*

   Anomalous secondary structure:

   Stem: *Achyranthes, Boerhavia, Bignonia, Dracaena*

   Root*: Beta vulgaris*
3. Stomatal types using epidermal peels (Dicots).
4. Structure of anther and microsporogenesis using permanent slides.
5. Structure of pollen grains using whole mounts - *Hibiscus, Acacia* and Grass).
6. Pollen viability test using Evans Blue — *Hibiscus*
7. Study of ovule types and developmental stages of embryo sac.
8. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot embryos using permanent slides.
9. Isolation and mounting of embryo (using *Cymopsis / Senna / Crotalaria)*

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SEMESTER – IV

CELL BIOLOGY AND PLANT PHYSIOLOGY

Theory: 4 Hours/Week Credits: 4 Marks: 100 (Internal: 20; External: 80)
Practical: 3 Hours/Week Credits: 1 Marks: 25

UNIT I: Plant cell envelops: Ultra structure of cell wall, molecular organization of cell membranes.

1. Models of membrane structure, Functions, fluidity and Selective permeability of the membranes.
2. Cell Organelles: Structure and semiautonomous nature of Mitochondria and Chloroplast.
3. Structure and role of endoplamic reticulum, ribosomes, golgi complex, lysosomes, peroxisomes and glyoxisomes.

UNIT-II

Nucleus: Ultra structure, types and functions of DNA & RNA.

4. Chromosomes: Morphology, organization of DNA in a chromosome, Euchromatin and Heterochromatin, Karyotype. Special types of chromosomes: Lampbrush and Polytene chromosomes.
5. Extra nuclear genome: Mitochondrial DNA and Plastid DNA.. Plasmids.
8. Cell division: Cell and its regulation; mitosis, meiosis and their significance

UNIT- III

9. Plant -Water Relations: Physical properties of water, diffusion, imbibitions, osmosis; osmotic and pressure Potential, absorption and transport of water.
10. Mineral Nutrition: Essential macro and micro mineral nutrients, and symptoms of mineral deficiency.
11. Transpiration; Stomatal structure and movement. Mechanism of phloem transport. Mechanism of phloem transport.
12. Enzymes: Nomenclature, Characteristics, Classification and factors regulating enzyme activity.

UNIT- IV

13. Photosynthesis: Photosynthetic pigments, Mechanism of photosynthetic electron transport and evolution of oxygen, Photophosphorylation . Carbon assimilation pathways: C3, C4 and CAM.
14. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle and electron transport system.
15. Nitrogen Metabolism: Biological nitrogen fixation
16. Physiological effects of Phytohormones: Auxins, gibberellins, cytokinins, ABA, ethylene and Brassinosteroids

References:

1. Sharma, A. K. and A. Sharma. 1999. Plant Chromosomes: Analysis, Manipulation and Engineering. Harward Academic Publishers, Australia.
2. Shukla, R. S. and P. S. Chandel. 2007. Cytogenetics, Evolution, Biostatistics and Plant Breeding. S.Chand & Company Ltd., New Delhi.
3. Verma, P. S. and V. K. Agrawal. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Company Ltd., New Delhi. 1. Hopkins, W. G. 1995.
4. Introduction to Plant Physiology. John Wiley & Sons Inc., New York, USA
5. Jain, J.L., S. Jain and Nitin Jain. 2008. Fundamentals of Biochemistry. S. Chand & Company Ltd., New Delhi.
6. Pandey, B. P. 2007. Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S. Chand & Company Ltd., New Delhi.
7. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc.,USA.
8. Taiz, L. and E. Zeiger. 1998. Plant Physiology (2nd Ed.). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
9. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

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B.Sc. BOTANY II Year

SEMESTER – IV

CELL BIOLOGY AND PLANT PHYSIOLOGY PRACTICAL

1. Demonstration of cytochemical methods: Fixation of plant material and nuclear staining for mitotic and meiotic studies.
2. Study of various stages of mitosis using cytological preparation of Onion root tips.
3. Study of various stages of meiosis using cytological preparation of onion flower buds.
4. Study of ultra structure of cell organelles using photographs. Chloroplast, Mitochondria, Nucleus, Ribosomes, Endoplasmic reticulum and Golgi complex.
5. Study of Special types of Chromosomes (Polytene chromosome and Lampbrush chromosomes-Permanent slide) ✓
6. Determination of osmotic potential of vacuolar sap by Plasmolytic method using leaves of *Rheodiscolor / Tradescantia.*
7. Determinion of rate of transpiration using Cobalt chloride method
8. Determination of stomatal frequency using leaf epidermal peelings / impressions
9. Determination of catalase activity using potato tubers by titration method
10. Separation of chloroplast pigments using paper chromatography technique
11. Estimation of protein by Biurette method
12. Mineral deficiency- Detail study of Micronutrients and Macro nutrients
13. Identification of C_3,C_4 and CAM plants.

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UNDER GRADUATE COURSES (UNDER CBCS 2021 – 2022 ONWARDS)
B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V: (B) ECONOMIC BOTANY
(DSE-1: ELECTIVE)

Theory: 4 Hours/Week; Credits: 4 Marks: 100 (Internal: 20; External: 80)
Practical 3 Hours/Week; Credits: 1 Marks: 25

UNIT - I

Origin of Cultivated Plants: Major plants introduction, Crop domestication and examples of crops / varieties

1. Vegetables: Nutritional and Commercial values of root crops, leafy and fruit vegetables.
2. Millets: Nutrient significance of Sorghum, Finger millet, Pearl millet, Foxtail millet.
3. Cereals: Rice, Wheat and maize - Origin, morphology and uses.

UNIT – II

4. Legumes: General account, importance to man and ecosystem.
5. Fruits and nuts: Commercial and nutritional value of South Indian fruits. Cashew nut, Almond and Walnut.
6. Sugars & Starches: Morphology and processing of sugarcane, products and by-products of sugarcane industry. Potato – morphology, propagation & uses.
7. Spices: Listing of important spices, part used, economic importance with special reference to fennel, saffron, clove and black pepper

UNIT – III

8. Beverages: Tea, Coffee (morphology, processing & uses)
9. Edible oils & Fats: General description, extraction, uses and health implications of groundnut, sunflower, coconut, linseed, and mustard.
10. Essential Oils: General account, extraction methods, comparison with fatty oils & their uses.
11. Natural Rubber: Para-rubber - tapping, processing and uses.

UNIT – IV

12. Drug-yielding plants: Therapeutic and habit-forming drugs with special reference to *Cinchona*, *Digitalis, Papaver* and *Cannabis.*
13. Tobacco processing, uses and health hazards
14. Timber plants: General account with special reference to teak and pine
15. Fibres: Classification based on the origin of fibres, extraction methods and uses of Cotton and Jute.

B. Lalitha Ki

Suggested Readings

1. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
2. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
3. Chrispeels, M.J. and Sadava, D.E. (2003). Plants, Genes and Agriculture. Jones & Bartlett Publishers.
4. B.P. Pandey (2007). Economic Botany, S. Chand & Company Ltd. New Delhi. 17/e.

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B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V:: (B) ECONOMIC BOTANY PRACTICAL
(DSE-1: ELECTIVE)

1. Study of economically important plants: Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests.
2. Identification and study on nutrient values of locally available vegetables, millets and cereals.
3. Study on nutrient values and commercial status of Cashew nut, Almond and Walnut.
4. Uses and health implications of groundnut, sunflower, coconut, linseed, Brassica and Coconut.
5. Study of economically important plants : Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests
6. Study of products of economic importance included unit wise.
7. Collection vegetable twigs and preparation of Herbarium.
8. Identification of starch granules.
9. Estimation of iodine number of different oils.
10. Quantitative estimation and comparative study of proteins in millets and cereals.

B. Lalitakri

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.SC. BOTANY III YEAR

SEMESTER – VI

PAPER-2B: TISSUE CULTURE AND BIOTECHNOLOGY

(DSE-2: ELECTIVE)

Theory:	4 Hours/Week;	Credits: 4	Marks: 100 (Internal: 20; External: 80)
Practical:	3 Hours/Week	Credits: 1	Marks: 25

UNIT - I

1. Tissue culture: Introduction, sterilization procedures, explants, culture media- composition and preparation; Nutrients and hormone requirements. Micropropagation.
2. Organ culture: Totipotency, Induction of callus, Shoot, leaf culture, Anther culture, Ovule and Embryo culture.
3. Callus culture and isolation and fusionof protoplast culture
4 Organogenesis, Somatic and Zygotic embryogenesis

UNIT- II

5. Applications of tissue culture: Production of pathogen free plants and stress resistant plants, somaclonal variants and synthetic seeds.

6. Induction of hairy roots and its applications in production of secondary metabolites.
7. Haploidy and triploids,Cryopreservation and Germplasm Conservation.
8 .Somatic hybrids and Cybrid

UNIT- III

9. Biotechnology: Introduction, history, scope and applications.
10. rDNA technology: Basic aspect of gene cloning, Enzymes used in gene cloning. Restriction enzymes, Ligases, Polymerases.
11. Gene cloning: Recombinant DNA, Bacterial Transformation and selection of recombinant clones, vectors- cloning vehicles (Plasmid, Cosmids, Bacteriophages, & Phasmids; Eukaryotic Vectors (YAC) Gene Construct; Applications of rDNA technology.

UNIT - IV:

10. Gene Libraries: construction of genomic and cDNA libraries, Polymerase Chain Reaction (PCR) and its applications.
11. Methods of gene transfer-*Agrobacterium* mediated Direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment.

12. Application of transgenics in improvement of crop productivity and quality traits. Pest resistant transgenic crops (Bt-cotton & Bt-brinjal); herbicide resistant plants (Roundup Ready soybean); crops with quality traits (Flavr Savr tomato, Golden rice).

References:

1. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004.
2. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press (India) Private Limited, Hyderabad.
4. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
5. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
6. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
7. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India). Private Limited, Hyderabad..
8. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
9. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA.
10. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
12. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
13. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
14. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K.5th edition.
15. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

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B.SC. BOTANY III YEAR

SEMESTER – VI

PAPER-2B: TISSUE CULTURE AND BIOTECHNOLOGY PRACTICAL

(DSE-2: ELECTIVE)

Major Experiments

1. Isolation of plant DNA (Tomato)
2. Production of synthetic seeds /Encapsulation of embryo
3. Preparation of plant tissue culture medium - MS medium
4. Isolation of protoplasts.

Minor Experiments

1. Callus induction
2. Demonstration of Micropropagation/multiple shoots
3. Anther culture
4. PCR – Demonstration
5. Study of biotechnology products: Samples of antibiotics and vaccines
6. Photographs of Gene transfer methods.
7. Instruments used in Biotechnology lab- Autoclave, Laminar air flow, Hot air oven and Incubator.
8. Demonstration of *in vitro* sterilization and inoculation methods using leaf and nodal explants of tobacco, *Datura*, *Brassica* etc.

Spotting

1. Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs.
2. Study of methods of gene transfer through photographs: *Agrobacterium*-mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment.
3. Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato through photographs.
4. Restriction digestion and gel electrophoresis of plasmid DNA.

B.Sc.
CHEMISTRY

FIRST YEAR

PAPER - I :

1) Inorganic Chemistry - I
2) Physical Chemistry - I
3) Organic Chemistry - I
4) General Chemistry - I

SECOND YEAR

PAPER - II :

1) Inorganic Chemistry - II
2) Organic Chemistry - II
3) Physical Chemistry - II
4) General Chemistry - II

THIRD YEAR

PAPER - III :

1) Inorganic Chemistry - III
2) Organic Chemistry - III
3) Physical Chemistry - III

PAPER - IV :

1) Physio Chemical Methods of Analysis
2) Drugs, Cormulations, Pesticide and Green Chemistry
3) Macromolecules and Catalysis

B.Sc. Chemistry

FIRST YEAR

PAPER - I

UNIT - I : Inorganic Cheistry - I

1. **s-block elements :** General characteristics of groups I & II elements, diagonal relationship between Li & Mg, Be & Al.

2. **p-block elements :**

   General characteristics of elements of groups 13, 14, 15, 16 and 17

   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, graphitic compounds.

   Group-15 : Preparation and reactions of hydrazine, hydroxylamine, phosphazenes.

   Group-16 : Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content.

   Group-17 : Inter halogen compounds and pseudo halogens

3. **Organometallic Chemistry**

   Definetion and classification of organometallic compounds, nomenclature, preparation, properties and applications of alkyls of 1, 2 and 13 group elements.

UNIT-II : Organic Chemistry-I

1. **Structural theory in Organic Chemistry**

   Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O, NH_3 & $AlCl_3$).

   Bond polarization : Factors influencing the polarization of covalent bonds, electro negativity - inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance 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, carbanions, carbenes and nitrenes.

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples (mechanism not required).

2. Acyclic Hydrocarbons

alkanes- IUPAC Nomenclature of Hydrocarbons. Methods of preparation: Hydrogenation of alkynes and alkenes, Wurtz reaction, Kolbe's electrolysis, Corey- House reaction. Chemical reactivity - inert nature, free radical substitution mechanism. Halogenation example- reactivity, selectivity and orientation.

Alkenes - Preparation of alkenes (a) by dehydration of alcohols (b) by dehydrohalogenation of alkyl halides (c) by dehalogenation of 1,2 dihalides (brief mechanism), Saytzeff rule. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markovnikov's rule, addition of H_2O, HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markovnikov's addition). Oxidation - hydroxylation by $KMnO_4$, OsO_4, peracids (via epoxidation) hydroboration, Dienes - Types of dienes, reactions of conjugated dines - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acedtylides). Preperation of higher acetylenes, Metal ammonia reductions Physical properties. Chemical reactivity - electrophilic addition of X_2, HX, H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4, reduction and Polymerisation reaction of acetylene.

3. Alicyclichydrocarbons (Cycloalkanes)

Nomenclature, Preparation by Freunds methods, heating dicarboxylic metal salts. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

4. Benzene and its reactivity

Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene.

Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Napthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)

Reactions - General mechanism of electrophilic substitution, 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 (Electronic interpretation of various groups like NO_2 and Phenolic). Orientation of (i). Amino, methoxy and methyl groups (ii). Carboxy, nitro, nitrile, carbonyl and Sulfonic acid groups. (iii). Halogens (Explanation by taking minimum of one example from each type).

5. Polynuclear Hydrocarbons -

Structure of naphthalene and anthracene (Molecular Orbital diagram and resonance energy) Any two methods of preparation of naphthalene and reactivity. Reactivity towards electrophilic substitution. Nitration and sulfonation as examples.

UNIT - III : Physical Chemisty-I

I Gaseous state

Compression factors, deviation of real gases from ideal behavior. Van der Waal's equation of state. P-V Isotherms of real gases, Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. The van der Waal's equation and the critical state. Relationship between critical constants and van der Waal's constants. The law of corresponding states and reduced equation of states. Joule Thomson effect. Liquefaction of gases: i) Linde's method and ii) Claude's method.

II Liquid state

Intermolecular forces, structure of liquids (qualitative description). 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.

III Solid state

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. Bravis lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Determination of crystal structure by Bragg's method and the power method. Indexing of planes and structure of NaCl and KCl crystals. Defects in crystals. Stoichiometric and non-stoichiometric defects. Band theory of semoconductors. Extrinsic and intrinsic semiconductors, n- and p-type semiconductors and their applications in photo electrochemical cells.

IV Solutions

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_2O, ethanol-water systems and fractional distillation. Partially miscible liquids-phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consulate temperature. Immiscible liquids and steam distillation.

Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

V Colloids and surface chemistry

Definition of colloids. Solids in liquids (sols), preparation, purifications, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

Adsorption: Physical adsoption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption

UNIT - IV : General Chemistry - I

1. Atomic Structure and elementary quantum mechanics

Blackbody radiation, Planck's radiation law, photoelectric effect, Compton effect, de Broglie's hypothesis, Heisenberg's uncertainty

principle. Postulates of quantum mechanics. Schrodinger wave equation and a particle in a box, energy levels, wave functions and probability densities. Schrodinger wave equation for H-atom. Separation of variables, Radial and angular functions, hydrogen like wave functions, quantum numbers and their importance.

2. Chemical Bonding

Valence bond theory, hybridization, VB theory as applied to ClF_3, BrF_5, $Ni(CO)_4$, XeF_2. Dipole moment - orientation of dipoles in an electric field, dipole moment, induced dipole moment, dipole moment and structure of molecules. Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, HCl, CO and NO). Comparision of VB and MO theories.

3. Stereochemistry of carbon compounds

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. Stereoisomerism, Stereoisomers: enantiomers, diastereomers- definition and examples. Conformational and configurational isomerism- definition. Conformational isomerism of ethane and n-butane.

Enantiomers: Optical activity- wave nature of light, plane polarised light, interaction with molecules, optical rotation and specific rotation. Chiral molecules- definition and criteria= absence of plane, center, and Sn axis of symmetry- asymmetric and disymmetric molecules. Examples of asymmetric molecules (Glyceraldehyde, Lactic acid, Alanine) and disymmetric molecules (trans - 1,2-dichloro cyclopropane).

Chiral centers: definition- molecules with similar chiral carbon (Tartaric acid), definition of mesomers- molecules with dissimilar chiral carbons (2,3- dibromopentane). Number of enantiomers and mesomers- calculation.

D.L. and R.S configuration for asymmetric and disymmetric molecules. Cahn-Ingold-Prelog rules. Racemic mixture- racemisation and resolution techniques.

Diastereomers: definition- geometrical isomerism with reference to alkenes- cis, trans and E,Z- configuration.

4. General Principles of Inorganic qualitative analysis

Solubility product, common ion effect, characteristic reactions of anions, elimination of interfering anions, separation of cations into groups, group reagents, testing of cations

LABORATORY COURSE - I

Practical Paper - I : Inorganic Chemistry)

Qualitative Analysis and Inorganic preparations :

Analysis of mixtures containing two anions (one simple and one interfering)and two cations (of different groups) from the following:

Anions: Carbonate, sulfide, sulphate, chloride, bromide, iodide, acetate, nitrate, oxalate, tartrate, borate, phosphate, arsenate* and chromate*.

Cations: Lead, copper, bismuth, cadmium, tin, antimony, iron, aluminum, zinc, manganese, nickel, cobalt, calcium, strontium, barium, potassium and ammonium.

*not to be given for examination.

Preparations: Any three of the following inorganic preparations:

1) Ferrous ammonium sulphate
2) Tetrammine copper (II) sulphate
3) Potassium trisoxalato chromate
4) Potash alum $KAl(SO_4)_2.\ 12H_2O$
5) Hexammine cobalt (III) chloride.

SECOND YEAR

PAPER - II

UNIT - I : Inorganic Chemistry - I

I. **Chemistry of d-block elements :** 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 and e.m.f. Comparative treatment of second and third transition series with their 3d analogues. Study of Ti, Cr and Cu triods in respect of electronic configuration and reactivity of different oxidation states.

II. **Chemistry of f-block elements:** Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties, spectral properties and separation of lanthanides by ion exchange and solvent extraction methods. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, position of actinides in the periodic table, comparison with lanthanides in terms of magnetic properties, spectral properties and complex formation.

III. **Theories of bonding in metals :** Valence bond theory, Explanation of metallic properties and its limitations, Free electron theory, thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

IV. **Metal carbonyls and related compounds** - EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni. Metal nitrosyls and metallocenes (only ferrocene).

UNIT - II : Organic Chemistry - II

1. **Halogen compounds**

Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aralkyl, allyl, vinyl, benzyl halides.

Chemical Reactivity, formation of RMgX

Nucleophilic aliphatic substitution reaction-classification into SN^1 and SN^2.

Energy profile diagram of S_N1 and S_N2 reactions. Stereochemistry of S_N2 (Walden inversion) S_N1 (Racemisation). Explanation of both by taking the example of optically active alkyl halide - 2bromobutane. Ease of hydrolysis - comparision of alkyl, benzyl, alkyl, vinyl and allyl halides

2. Hydroxy compounds

Nomenclature and classification of hydroxy compounds.

Alcohol: Preparation with hydroboration rection, Grignard synthesis of alcohols.

Phenols : Preparation i) from diazonium salt, ii) from aryl sulphonates, iii) from cumene.

Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water.

Chemical properties :

a. acidic nature of phenols.
b. formation of alkoxides/phenoxides and their reaction with RX.
c. replacement of OH by X using PCl_5, PCl_3, PBr_3, $SOCl_2$ and with $HX/ZnCl_2$.
d. esterification by acids (mechanism).
e. dehydration of alcohols.
f. oxidation of alcohols by CrO_3, $KMnO_4$
g. special reaction of phenols: Bromination, Kolbe-Schmidt reaction, Riemer-Tiemann reaction, Fries rearrangement, Azocoupling.

Identification of alcohols by oxidation with $KMnO_4$, ceric ammonium nitrate, lucas reagent and phenols by reaction with $FeCl_3$.

Polyhydroxy compounds: Pinacol-Pinacolone rearrangement.

3. Carbonyl compounds

Nomenclature of aliphatic and aromatic carbonyl compounds, structure of the carbonyl group.

Synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3- dithianes, synthesis of ketones from nitriles and from carboxylic acids.

Physical properties: absence of hydrogen bonding, keto-enol tautomerism, 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, g) Alcohols-formation of hemiacetal and acetal.

Halogenation using PCl_5 with mechanism.

Base catalysed reactions: a) Aldol, b) Cannizzaro reaction, c) Perkin reaction, d) Benzoin condensation, e) Haloform reaction, f) Knoevenagel reaction.

Oxidation of aldehydes- Baeyer- Villiger oxidation of ketones.

Reduction: Clemmensen reduction, Wolf-Kishner reduction, MPV reduction, reduction with $LiAlH_4$ and $NaBH_4$.

Analysis of aldehydes and ketones with a) 2,4-DNP test, b) Tollen's test, c) Fehling test, d) Schiff test, e) Haloform test (with equation).

4. Carboxylic acids and derivatives

Nomenclature, classification and structure of carboxylic acids.

Methods of preparation by
a) hydrolysis of nitriles, amides and esters.
b) 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, acidity-strength of acids with examples of trimethyl acetic acid and trichloroacetic acid. Relative differences in the acidities of aromatic and aliphatic acids.

Chemical properties: Reactions involving H, OH and COOH groups-salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt-Eistert synthesis, halogenation by Hell-Volhard-Zelinsky reaction

Derivatives of carboxylic acids: Reaction of acid chlorides, acid anhydrides, acid amides, esters (mechanism of the hydrolysis of esters by acids and bases).

5. Active methylene compounds

Acetoacetic esters: preparation by Claisen condensation, keto-enol tautomerism. Acid hydrolysis and ketonic hydrolysis.

hydrolysis and ketonic hydrolysis.

Preparation of
a) monocarboxylic acids
b) dicarboxylic acids.

Reaction with urea
Malonic ester: preparation from acetic acid.
Synthetic applications: Preparation of
a) monocarboxylic acids (propionic acid and n-butyric acid).
b) dicarboxylic acids (succinic acid and adipic acid).
c) □□-unsaturated carboxylic acids (crotonic acid).

Reaction with urea.

6. Exercises in interconversion

UNIT - III : Physical chemistry - II

1. Phase rule

Concept of phase, components, degree of freedom. Definition of Gibbs phase rule. Phase equilibrium of one component - water system. Phase equilibrium of two-component system, solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, desilverisation of lead. Solid solutions- compound with congruent melting point- (Mg-Zn) system, compound with incongruent melting point - NaCl- water system. Freezing mixtures.

2. Dilute solutions

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. Determinattion of

molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties. Van't Hoff factor, degree of dissociation and association.

3. Electrochemistry

Specific conductance, equivalent conductance, measurement of 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-Onsagar's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorf's method. Application of conductivity measurements- determination of dissociation constant (K_a) of an acid, determination of solubility product of sparingly soluble salt, conductometric titrations.

Types of reversible electrodes- the gas electrode, metal-metal ion, metal-insoluble salt and redox electrodes. Electrode reactions, Nernst equation, single electrode potential, standard Hydrogen electrode, reference electrodes, standard electrode potential, sign convention, electrochemical series and its significance. Reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurements. Computation of cell EMF. Applications of EMF measurements, Calculation of thermodynamic quantities of cell reactions (□G, □H and K). Determination of pH using quinhydrone electrode, Solubility product of AgCl. Potentiometric titrations.

UNIT - IV : General Chemistry - II

1. Molecular summetry

Concept of symmetry in chemistry-symmetry operations, symmetry elements. Rotational axis of symmetry and types of rotational axes. Planes of symmetry and types of planes. Improper rotational axis of symmetry. Inversion centre. Identity element. The symmetry operations of a molecule form a group. Flow chart for the identification of molecular point group.

2. Theory of quantitative analysis

a Principles of volumetric analysis. Theories of acid-base, redox, complexometric, iodometric and precipitation titrations, choice of indicators for these titrations.

b) Principles of gravimetric analysis: precipitation, coagulation, peptization, coprecipitation, post precipitation, digestion, filtration and whashing of precipitate, drying and ignition, precipitation from homogenous solutions, requirements of gravimetric analysis.

3. Evalution of analytical data

Theory of errors, idea of significant figures and its importance, accuracy - methods of expressing accuracy, error analysis and minimization of errors, precision - methods of expressing precision, standard deviation and confidence limit.

4. Introductory treatment to:

a) Pericyclic Reactions

Concerted reactions, Molecular orbitals, Symmetry properties HOMO, LUMO, Thermal and photochemical pericyclic reactions. Types of pericyclic reactions - electrocyclic, cycloaddition and sigmatropic reactions - one example each.

b) Synthetic strategies

Terminology - Disconnection (dix), Symbol ( ), synthon, synthetic equivalent (SE), Functional group interconversion (FGI), Linear, Convergent and Combinatorial syntheses, Target molecule (TM). Retrosynthesis of the following molecules
a) acetophenone 2) cyclohexene 3) phenylethylbromide

c) Asymmetric (Chiral) synthesis

Definitions-Asymmetric synthesis, enantiometric excess, diastereoimetric excess. stereospecific reaction, definition, example, dehalogenation of 1,2-dibromides by I, stereoselective reaction, definition, example, acid catalysed dehydration of 1-phenylpropanol

LABORATORY COURSE - II

Practical Paper - II : Inorganic Chemistry)

I. Titrimetric analysis :

1) Determination of carbonate and bicarbonate in a mixture
2) Determination of Fe(II) using $K_2Cr_2O_7$
3) Determination of Fe(II) using $KMnO_4$ with oxalic acid as primary standard.
4) Determination ofCu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard
5) Determination of Zinc using EDTA
6) Determination of hardness of water
7) Determination of Zinc by ferrocyanide

II. Gravimetric analysis (any three of the following)

1) Determination of barium as barium sulphate
2) Determination of sulphate as barium sulphate
3) Determination of lead as lead chromate
4) Determination of nickel as Ni-DMG complex
5) Determination of magnesium as magnesium pyrophosphate.

THIRD YEAR

PAPER - III

UNIT - I : Inorganic Chemistry - III

1. **Coordination Chemistry :** IUPAC nomenclature, bonding theories review of Werner's theory and Sidgwick's concept of coordination, Valence bond theory, geometries of coordinatiaon numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal filed theory, splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - factors affecting crystal - field splitting energy, merits and demerits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

2. Spectral and magnetic properties of metal complexes: Electronic absorption spectrum of $(Ti(H_2O)6)^{3+}$ ion. Types of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility - Gouy method.

3. Reactivity of metal complexes: Labile and inert complexes, ligand substitution reactions - S_N1 and S_N2, substitution reactions of square planar complexes - Trans effect and applications of trans effect.

4. Stability of metal complexes: 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.

5. Hard and soft acids bases (HSAB) : Classification, Pearson's concept of hardness and softness, application of HSAB principles - Stability of compounds / complexes, predicting the feasibility of a reaction.

6. Bioinorganic chemistry : Essential elements, biological significance of Na, K, Mg, Ca, Fe and Chloride (Cl). Metalloporphyrins - Hemoglobin, structure and funtion, chlorophyll, structure and role in photosynthesis.

UNIT - II : Organic Chemistry-III

1. **Nitrogen compounds**

Nitro hydrocarbons : Nomenclature and classification - Nitro hydrocarbons - structure. Tautomerism of nitroalkanes leading to

acid and keto form. Preparation of Nitroalkanes. Reactivity - Halogenation, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Michael addition and reduction.

Amines (aliphatic and aromatic): Nomenclature, Classification into 1^0, 2^0, 3^0. Amines and Quarternary ammonium compounds. Prepaative methods-1. Amonolysis of alkyl halides. 2. Gabriel synthesis. 3. Hoffman's bromamide reduction reaction (mechanism). 4. 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-aquous medium), steric effects and substituent effects. Use of amine salts as phase transfer catalysts. Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) reaction with nitrous acid of 1^0, 2^0,3^0 (Aliphatic and aromatic amines). Electrophilic substitutions of Aromatic amines - Bromination and Nitration oxidation of aryl and 3^0 amines.Diazotization Cyanides and isocyanides: Nomenclature (Aliphatic and aromatic) structure. preparation of cyanides from a) Alkyl halides b) from amides c) from aldoximes. Preparation of isocyanides from Alkyl halides and Amines. Properties of cyanides and isocyanides, a) hydrolysis b) addition of Grignard reagent iil) reduction iv) oxidation.

2. heterocyclic compounds

Introduction and definition: Simple 5 membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole. Importance of ring system - presence in important natural products like hemoglobin and chlorophyll. Numbering the ring systems as per Greek letter and Numbers. Aromatic character - 6-electron system (four-electrons from two double bonds and a pair of non-bonded electrons from the hetero atom). Tendency to undergo substitution reactions.

Resonance structures: Indicating electron surplus carbons and electron deficient heteroatom. Explanation of feebly acidic character of pyrrole, electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions. Reactivity of furan as 1,3-diene, Diels Alder reactions (one example). Sulphonation of thiophene purification of Benzene obtained from coal tar). Preparation of furan, Pyrrole and thiophene from 1,4-

dicarbonyl compounds only, Paul-Knorr synthesis, structure of pyridine, Basicity - Aromaticity - Comparison with pyrrole - one method of preparation and properities - Reactivity toward Nucleophilic substitution reaction - chichibabin reaction.

3. Carbohydrates

Monosaccharides: All discussion to be confined to (+) glucose as an example of aldo hexoses and D(-) fructose as example of ketohexoses. Chemical properties and structural elucidation: Evidences for straight chain pentahydroxy aldehyde structure (Acetylation, reduction to n-hexane, cyanohydrin formation, reduction of Tollen's and Fehling's reagents and oxidation to gluconic and saccharic acid). Number of optically active isomers possible for the structure, configuration of glucose based on D-glyceraldehyde as primary standard (no proof for configuration is required). Evidence for cyclic structure of glucose. Decomposition of cyclic structure (Pyranose structure, anomeric Carbon and anomers). Proof for the ring size (methylation, hydrolysis and oxidation reactions). Different ways of writing pyranose structure (Haworth formula and chair conformation formula). Structure of fructose: Evidence of 2-ketohexose structure (formation of penta acetate, formation of cyanohydrin its hydrolysis and reduction by HI to give --carboxy-n-hexane). Same osazone formation from glucose and fructose, Hydrogen bonding in osazones, cyclic structure of fructose (Furanose structure and Hawroth formula).

Interconversion of Monosaccharides: Aldopentose to aldo hexose-eg: Arabinose to D-Glucose, D-Mannose (Kiliani - Fischer method), Epimers, Epimerisation - Lobry de bruyn van Ekenstein rearrangement. Aldohexose to Aldopentose eg: D-glucose to D-arabinose by Ruff's degadation. Aldohexose (+) (glucose) to ketohexose (-) (Fructose) and Ketohexose (Fructose) to aldohdexose (Glucose).

4. Amino acids and proteins

Introduction : Definition of Amino acids, classification of Amino acids into alpha, beta, and gama amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis : General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, Valine and Leucene)

by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis.

Physical properties : Optical activity of naturally occurring amino acids: L-configuration, irrespective of sign rotation, Zwitterion 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.

5. Mass Spectrometry :

Basic principles - Molecular ion / parent ion, fragment ions / daughter ions. Theory formation of parent ions. Representation of mass spectrum. Identification of parent ion, (M + 1), (M + 2), base peaks (relative abundance 100%). Mass spectra of ethylbenzene, acetophenone, n-butylamine and 1-propanol

UNIT - III : Physical Chemistry - III

1. Chemical kinetics

Rate of reaction, factors influencing the rate of a reaction-concentration, temperature, pressure, solvent, light, catalyst. Experimental methods to determine the rate of reaction. Definition of order and molecularity. Derivation of rate constants for first, second and zero order reactions and examples. Derivation for half life period. Methods to determine the order of reactions. Effect of temperature on rate of reaction Arrhenius equation, concept of activation energy. Theories of reaction rates-collision theory-derivation of rate constant for biomolecular reaction. The transition state theory (Elementary treatment).

2. Photochemistry

Difference between thermal and photochemical processes. Laws of photochemistry-grothus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield. Photochemical hydrogen-chlorine, hydrogen-bromine reaction. Jablonski diagrm depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative process (internal conversion, intersystem crossing). Photosensilized reactions - energy transfer processes (simple example).

3. Thermodynamics

The first law of themodynamics : Statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule's law Joule-Thomson effect and coefficient. Calculation of w, q, dE and dH for the expansion of perfect gas under Isotherm 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. Thermodynamic scale of temperature. Concept of entropy, entropy as a state function, entropy changes in cyclic, reversible, and irreversible processes and reversible phase change. Calculation of entropychanges with changes in V & T and P & T. Entropy changes in spontaneous and equilibrium processes.

The Gibbs (G) and Helmholtz (A) energies. A & G as criteria for thermodynamic equilibrium and spontaneity-advantage over entropy change. Gibbs equation and Variation of G with P and T.

PAPER - IV :
CHEMISTRY AND INDUSTRY

UNIT - I : Physico Chemical Methods of analysis

1. Seperation Techniques

1. Chromatography : Classification of chromatography methods, principles of differential migration adsorption phenomenon, Nature of adsorbents, solvent systems, Rf values, factors effecting Rf values.

   a) Paper chromatography : Principles, Rf Values, Experimental procedures, choice of paper and solvent systems, development of chromatogram - ascending, descending and radial. Two dimensional chromatography, applications.

   b) Thin layer Chromatography (TLC): Advantages. Principles, factors effecting Rf values. Experiment procedures. Adsorbents and solvents. Preparation of plates. Development of the chromatogram. Detection of the spots. Applications.

   c) Column Chromatigraphy : Principle, experimental procedures, Stationary and mobile Phase, Separation technique. Applications.

2. Spectrophotometry

General features of absorption - spectroscopy , Beer-Lambert's law and its limitations, trasmittance, Absorbance, and molar absorptivity.

Double beam spectrophotometer. Application of Beer-Lambert law for quantitative analysis of

1. Chromium in $K_2Cr_2O_7$
2. Mangnanese in $KMnO_4$
3. Iron (III) with thiocyanate.

3. Molecular spectroscopy

(i) Electronic spectroscopy :

Interaction of electromagnetic radiation with molecules and types of molecular spectra. Potential energy curves for bonding and antibonding molecular orbitals. Energy levels of molecules (□□ □□n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore.

(ii) Infra red spectroscopy

Energy levels of simple harmonic oscillator, molecular vibration spectrum, selection rules. Determination of force constant. Qualitative relation of force constant to bond energies. Modes of vibrations in like CO CO_2 & H_2O molecules. Characteristic absorption bands of various functional groups. Finger Print nature of infrared specturm.

(iii) Proton magnetic resonance spectroscopy (^{1}H-NMR)

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, ethonol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

(iv) Spectral interpretation

Interpretation of IR, UV-Visible, ^{1}H-NMR and mass spectral data of the following compounds 1. Phenyl acetylene 2. Acetophenone 3. Cinnamic acid 4. Para-nitro aniline.

UNIT - II : Drugs, formulations, pesticides and green chemistry

1. Drugs

1. Introduction: Drug, Disease (definition), Historical evolution, Sources - Plant, Animal synthetic, Biotechnology and human gene therapy

2. Terminology: Pharmacy, Pharmocology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME, Receptors - brief teartment) Metabolites and anti metabolites.
3. Nomenclature: Chemical name, Generic name and trade names with examples.
4. Classification: Classification based on structures and therapeutic activity with one example each.
5. Synthesis: Synthesis and therapeutic activity of the following drugs., L-Dopa, chloroquin, Omeprazole, Albuterol and ciprofloxacin.
6. Drug Development : Pencillin, Separation and isolation, structures of different pencillins.
7. Monographs of drugs: Eg Paracetamol, Sulpha methoxazole (Tablets).

2. Formulations

1. Need of conversion of drugs into medicine. Additives and their role (Brief account only)
2. Different types of formulations.

3. Green Chemistry

Introduction : Definition of green Chemistry, need of green chemistry, basic principles of green chemistry.

Green synthesis : Evalution of the type of the reation i) Rearrangements (100% atom economic), (ii) Addition reaction (100% atom economic), pericyclic reactions (No by-product).

Selection of solvent :

i) Aqueous phase reactions ii) reactions in ionic liquids iii) Solid supported synthesis iv) Solvent free reactions (solid phase reactions)

Microwave and Ultrasound assisted green synthesis :

1) Aldol condensation
2) Cannizzaro reaction
3) Diels-Alder reactions
4) Strecker synthesis

5) Willaimson synthesis
6) Dieckmann condensation

UNIT - III: (polymers, material science, and catalysis)

1. **Polymers**

Classification of polymers, chemistry of polymerization, chain polymerization, step polymerization, coordination polymerization - tacticity (isotactic, syndiotactic, atactic poly propelene). Molecular weight of polymers - number average and weight average molecular weight, degree of polymerization, determination of molecular weight of polymers by viscometry, Osmometry : mechanism of free radical polymerization, Preparation and industrial application of polyethylene, PVC, Teflon, polyacrylonitrile, terylene and Nylon-66.

2. **Material Science :**

Properties and applications of nano-materials.

3. **Catalysis**

Homogeneous and heterogeneous catalysis, comparison with examples. Kinetics of specific acid catalyzed reactions, inversion of cane sugar. Kinetics of specific base catalyzed reactions base catalyzed conversion of acetone to diacetone alcohol. Acid and base catalyzed reactions hydrolysis of esters, mutarotation of glucose. Enzyme catalysis: Classification, characteristics of enzyme catalysis. Kinetics of enzyme catalyzed reactions-Michael's Menten law, significance of Michael's constant (K_m) and maximum velocity (V_{max}). Factors affecting enzyme catalysis effect of temperature, pH, concentration and inhibitor. Catalytic efficiency, Mechanism of oxidation of ethanol by alcohol dehydrogenase.

LABORATORY COURSE - III

Practical Paper - III : Organic Chemistry

I. Synthesis of Organic Compounds

i. Aromatic electrophilic substitution Nitration: Preparation of nitro benzene and p-nitro acetanilide, Halogenation: Preparation of p-bromo acetanilide and 2,4,6- tribromo phenol.

ii. Diazotization and coupling: Preparation of pheyl azo □-napthol

iii. Oxidation: Preparation of benzoc acid frombenzyl chloride

iv. Reduction: Preparation of m-nitro aniline from m-dinitro benzene

v. Esterfication: Preparation of methyl para nitro benzoate from p-nitro Benzoic Acid.

vi. Methylations : Preparation of □-napthyl methyl ether

vii. Condensation: Preparation of benzilidine aniline

2. Thin layer Chromatography

i. Preparation of the TLC plates. Checking the purity of the compounds by TLC.

ii. Seperation of ortho and p-nitro aniline mixture by column chromatography.

3. Organic Qualitative Analysis :

i. Identification of an organic compound through the functional group analysis. Determination of melting point and preparation of suitable derivatives.

i. Aniline+Naphthalene ii. Benzoicacid+Benzophenone.
iii. p-cresol-chlorobenzene

ii. Separation of two component mixture Benzoic acid+benzophenone

4. Demonstration experiments

1. Steam distillation experiment: Separation of ortho and para nitro phenols 2) Microwave assisted Green synthesis, two example: 1. Hydrolysis of Benzamide 2. Oxidation of Toluene.

LABORATORY COURSE - IV

Practical Paper - IV : Physical Chemistry

1. Chemical Kinetics

i. Kinetic study of Acid Catalyzed hydrolysis of methyl acetate and determination of rate constant - Graphical method.

ii. Kinetic study of Acid catalysed Acetone - Iodine reaction and determination of rate constant - Graphical method.

iii. Kinetic study of persulphate iodide reaction and determination rate constant - Graphical method

2. Distribution law

i. Determination of distribution coefficient of iodine between water and carbon Tetrachloride.

ii. Determination of molecular state and partition coefficient of benzoic acid in Toluene and water.

3. Electrochemistry

i. Determination of concentration of HCl conductometrically using standard NaOH solution.

ii. Determination of concentration of acetic acid conductometrically using standard NaOH solution.

iii. Determination of solubility and solubility product of $BaSO_4$.

iv. Determination of redox potentials of Fe2+ by potentiometric titration of ferrous ammonium sulphate vs. $KMnO_4$.

4. pH metry

i. Preparation of phosphate buffer solutions

ii. pH metric titration of weak acid, acetic acid with strong base NaOH and calculation of dissociation constant.

5. Colorimetry

i. Verification of Beer-Lambert law for $KMnO_4$ $K_2Cr_2O_7$ and determination of concentration of the given solution

ii. Verification of Beer-Lambert law for $CuSO_4$ and determination of concentration of the given solution.

6. Adsorption

i. Surface tension and viscosity of liquids

ii. Adsorption of acetic acid on animal charcoal, verification of Freundlich isotherm

7. Project work :

i. Collection of spectral data of a minimum of six compounds belonging to different functional groups and submission of the report. (other than those included in the syllabus)

Note : Apart from the experiments (1 to 6) the project work (7) shall also be included in the University Examination.

Recommended Text Books and Reference Books :

Inorganic Chemistry

1. Concise Inorganic Chemistry by J.D. Lee
2. Basic Inorganic Chemistry by Cotton and Wilkinson
3. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
4. Inorganic Chemistry by R R Heslop and P.L. Robinson
5. Modern Inorganic Chemistry by C F Bell and K A K Lott
6. University Chemistry by Bruce Mohan
7. Qualitative Inorganic analysis by A.I. Vogel
8. A textbook of qualitative inorganic analysis by A.I. Vogel.
9. Inorganic Chemistry by J.E. Huheey
10. Inorganic Chemistry by Chopra and Kapoor
11. Coordination Chemistry by Basalo and Johnson
12. Organometallic Chemistry - An introduction by R.C. Mehrotra and A. Singh
13. Inorganic Chemistry by D.F. Shriver, P.W. Atkins and C.H. Langford
14. Inorganic Chemistry by Philips and Williams, Lab Manuals
15. Introduction to inorganic reactions mechanisms by A.C. Lockhart
16. Theoretical inorganic chemistry by McDay and J. Selbin
17. Chemical bonding and molecular geometry by R.J. Gillepsy and P.L. Popelier

18. Advanced Inorganic Chemistry By Gurudeep Raj
19. Analytical chemistry by Gary D Christian, Wiley India.
20. Analytical Chemistry by G.L. David Krupadanam, et al, Univ. Press
21. Selected topics in inorganic chemistry by W.D. Malik, G.D. Tuli, R.D. Madan
22. Concepts and models of Inorganic Chemistry by Bodie Douglas, D. McDaniel and J. Alexander
23. Modern Inorganic Chemistry by William L. Jolly
24. Concise coordination chemistry by Gopalan and Ramalingam
25. Satyaprakash's modern inorganic chemistry by R.D. Madan

Organic Chemistry :

1. Organic Chemistry By R T Morrison and R.N. Boyd
2. Organic Chemistry by T.J. Solomons
3. Organic Chemistry by L.G. Wade Sr
4. Organic Chemistry by D. Cram, G.S. Hammond and Herdricks
5. Modern Organic Chemistry by J.D. Roberts and M.C. Caserio
6. Textbook of Organic Chemistry by Ferguson
7. Problems and their solutions in organic Chemistry by I.L. Finar
8. Reaction mechanisms in Organic Chemistry by S.M. Mukherji and S.P. Singh
9. A guide book to mechanisms in Organic Chemistry by Peter Sykes
10. Organic spectroscopy by J.R. Dyer
11. Organic Spectroscopy by William Kemp
12. Fundamentals of organic synthesis and retrosynthetic analysis by Ratna Kumar kar
13. Comprehensive practical organic qualitative analysis by V.K. Ahluwalia & Sumta Dhingra
14. Comprehensive practical organic chemistry: Preparation and quantitive analysis by V.K. Ahluwalia and Reena Agarwal.
15. Organic Chemistry by Janice Gorzynski
16. Organic Chemistry by Stanley H Pine
17. Fundamentals of Organic Chemistry by John Mc Murray, Eric Simanek
18. Organic Chemistry by Francis A Carey
19. Text book of Organic Chemistry by K.S. Mukherjee
20. Organic Chemistry by Bhupinder Mehta & Manju Mehta

21. Organic Chemistry by L.G. Wade Jr, Maya Shankar Singh
22. Elementary organic spectroscopy by Y.R. Sharma
23. Chemistry & Industry by Gurdeep R. Chatwal
24. Applied Chemistry by Jayashree Ghosh
25. Drugs by David Krupadanam
26. Pharmacodynamics by R.C. Srivastava, Subit Ghosh
27. Analytical Chemistry by David Krupadanam
28. Green Chemistry - V.K. Ahluwalia
29. Organic Synthesis by V.K. Ahluwalia and R. Agarwal
30. New trends in Green Chemistry - by V.K. Ahulwalia & M. Kidwai
31. Industrial Chemistry by B.K. Sharma
32. Industrial Chemistry by Banerji
33. Industrial Chemistry by M.G. Arora
34. Industrial Chemistry by O.P. Veramani & A.K. Narula
35. Synthetic Drugs by O.D. Tyagi & M. Yadav
36. Medicinal Chemistry by Ashutoshkar
37. Medicinal Chemistry by P. Parimoo
38. Phaarmcology & Pharmacotherapeutics by R.S. Satoshkar & S.D. Bhandenkar
39. Medicinal Chemistry by Kadametal P-I & P-II
40. European Pharmacopoeia
41. Vogel's Qualitative organic analysis.
42. Laboratory manual of Organic Chemistry by Raj K Bansal

Physical Chemistry Books :

1. Physical chemistry A molecular approach by Donald A. Mcquarrie and John. D. Simon
2. Physical chemistry by G M Barrow
3. Principles of physical chemistry by Prutton and Marron
4. Physical chemistry by Peter Atkins, Julio D. Paula
5. Physical Chemistry by Ira N Levine
6. Elements of Physical Chemistry by Peter Atkins, Julio D. Paula
7. Text Book of Physical Chemistry by P.L. Soni, O.P. Dharmarha and Q.N. Dash
8. Solid State Chemistry and its applications by Anthony R.West

9. Text book of physical chemistry by k L Kapoor
10. Thermodynamics for Chemists by S Glasston
11. Chemical Kinetics by K J Laidler
12. An Introduction to Electrochemisty by S. Glasston
13. Physical Chemistry through problems by S.K. Dogra
14. Thermodynamics by J. Jayaram and J.C. Kuriakose
15. Introductory Quantum Chemistry by A.K. Chandra
16. Physical Chemistry by J.W. Moore
17. Kinetics and mechanism by J.W. Moore and R.G. Pearson
18. Fundamentals of photochemistry by K.K. Rohtagi Mukharjee
19. Chemical thermodynamics by R.P. Rastogi and S.S. Misra
20. Advanced physical chemistry by Gurudeep Raj
21. Physical chemistry by G.W. castellan
22. Physical chemistry by Silbey, Alberty and Bawendi.
23. Elements of physical chemistry by S. Glasstone
24. Text book of physical chemistry by S. Glasstone
25. Fundamentals of Molecular spectroscopy by C.N. Banwell and E.M. McCash
26. Nanochemistry by Geoffrey Ozin and Andre Arsenault
27. Catalysis : Concepts and green applications by Gadi Rotherberg
28. Green Chemistry: Theory and practice by P.T. Anastas and J.C. Warner
29. Polymer Science by Gowriker, Viswanathan and Jayadev Sridhar
30. Introduction Polymer Chemistry by G.S. Misra
31. Polymer Chemistry by Bilmayer
32. Kinetics and Mechanism of Chemical Transformations by Rajaram and Kuriacose.
33. Senior practical physical chemistry by Khosla

16-17
19-20
21-22

2019-2020 [I Sem]

Faculty of Commerce & Business Management, Kakatiya University, Warangal.

Paper DSC 101: FINANCIAL ACCOUNTING – I

Objective: *To acquire conceptual knowledge of basics of Accounting and preparation of final accounts of sole trader.*

UNIT-I: ACCOUNTING PROCESS:

Financial Accounting: Introduction – Definition – Evolution – Functions - Advantages and Limitations – Users of Accounting Information - Branches of Accounting – Accounting Principles: Concepts and Conventions - Accounting Standards – Meaning – Importance – List of Accounting Standards issued by ASB - Accounting System - Types of Accounts – Accounting Cycle – Journal - Ledger and Trial Balance (Including problems)

UNIT-II: SUBSIDIARY BOOKS:

Meaning –Types: Purchases Book - Purchases Returns Book - Sales Book - Sales Returns Book - Bills Receivable Book - Bills Payable Book – Cash Book: Single Column, Two Column, Three Column and Petty Cash Book - Journal Proper (Including problems)

UNIT-III: BANK RECONCILIATION STATEMENT:

Meaning - Need - Reasons for differences between cash book and pass book balances – Favourable and over draft balances – Ascertainment of correct cash book balance (Amended Cash Book) - Preparation of Bank Reconciliation Statement (Including problems)

UNIT-IV: RECTIFICATION OF ERRORS AND DEPRECIATION:

Capital and Revenue Expenditure – Capital and Revenue Receipts: Meaning and Differences - Differed Revenue Expenditure. Errors and their Rectification: Types of Errors - Suspense Account – Effect of Errors on Profit (Including problems)

Depreciation (AS-6): Meaning – Causes – Difference between Depreciation, Amortization and Depletion - Objectives of providing for depreciation – Factors affecting depreciation – Accounting Treatment – Methods of depreciation: Straight Line Method - Diminishing Balance Method (Including problems)

UNIT-V: FINAL ACCOUNTS:

Final Accounts of Sole Trader: Meaning - Uses - Preparation of Manufacturing, Trading and Profit & Loss Account and Balance Sheet – Adjustments – Closing Entries (Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Company.
2. Principles & Practice of Accounting: R.L.Gupta&V.K.Gupta, Sultan Chand.
3. Accountancy-I: S.P. Jain & K.L Narang, Kalyani Publishers.
4. Accountancy–I: Tulasian, Tata McGraw Hill Co.
5. Advanced Accountancy-I: S.N.Maheshwari& V.L.Maheswari, Vikas.
6. Financial Accounting: Jawahar Lal, Himalaya Publishing House.

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PRINCIPAL
Government Degree College
ETURNAGARAM
Mulugu Dist-506166

Paper DSC 103: FUNDAMENTALS OF INFORMATION TECHNOLOGY

Hours Per Week: 6 (4T+2P) **Credits:** 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: To understand the basic concepts and terminology of informationtechnology and to identify issues related to informationsecurity.

UNIT-I: INTRODUCTION TO COMPUTERS:

Introduction,Definition,Characteristicsofcomputer,EvolutionofComputer,BlockDiagramOf a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations ofcomputer.

Role of I/O devices in a computer system.**Input Units:** Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, **Output Units:** Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printers and its types, Plotters, types of plotters, Sound cards,Speakers.

UNIT -II: COMPUTER ARITHMETIC & STORAGE FUNDAMENTALS:

Binary,Binary Arithmetic, Number System: Positional & Non Positional, Binary,Octal, Decimal, Hexadecimal, Converting from one number system to another.

Primary Vs Secondary Storage, Data storage & retrieval methods.**Primary Storage:** RAM ROM, PROM, EPROM, EEPROM. **Secondary Storage:** Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

UNIT-III: SOFTWARE:

Software and its needs, Types of S/W. **System Software**: Operating System, Utility Programs - Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. **Application S/W** and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w.

UNIT-IV: OPERATING SYSTEM:

Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.

Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.

UNIT-V: DATA COMMUNICATION:

Data, Communication, Basic Networking Devices, Communication Process, Data Transmission speed, Communication Types(modes), Data Transmission Medias, Modem and its working, characteristics, Typesof Networks, LAN Topologies, Computer Protocols, Concepts relating to networking.

SUGGESTED READINGS:

Computer Fundamentals : P.K.Sinha

Prof. K. Raji Reddy	Prof. P. Varalaxmi	Dr. K. Rajender
Dr. S. Narasimha Chary	Mr. M. Somaiah	Dr. S. Narayana Swamy
Dr. Ramavath Ravi	Dr. D. Thiruvengala Chary	Dr. G. Shashidhar Rao

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(II SEM)

Faculty of Commerce & Business Management, Kakatiya University, Warangal

Paper DSC 201: FINANCIAL ACCOUNTING-II

Objective: *To acquire Accounting knowledge of bills of exchange and other business accounting methods.*

UNIT-I: BILLS OF EXCHANGE:
Bills of Exchange – Definition - Distinction between Promissory note and Bills of exchange - Accounting treatment of Trade bills: Books of Drawer and Acceptor- Honour and Dishonour of Bills - Renewal of bills - Retiring of bills under rebate - Accommodation bills (Including problems)

UNIT-II: CONSIGNMENT ACCOUNTS:
Consignment - Meaning – Features - Proforma invoice - Account sales - Del credere commission-Accounting treatment in the books of the consignor and the consignee - Valuation of consignment stock -Treatment of Normal and abnormal Loss - Invoice of goods at a price higher than the cost price (Including problems)

UNIT-III: JOINT VENTURE ACCOUNTS:
Joint Venture - Meaning – Features - Difference between Joint Venture and Consignment - Accounting Procedure - Methods of Keeping Records for Joint Venture Accounts - Method of Recording in co-ventures books - Separate Set of Books Method - Joint Bank Account - Memorandum Joint Venture Account (Including problems)

UNIT-IV: ACCOUNTS FROM INCOMPLETE RECORDS:
Single Entry System - Meaning – Features - Difference between Single Entry and Double Entry systems - Defects in Single Entry System - Books and accounts maintained - Ascertainment of Profit - Statement of Affairs and Conversion method (Including problems)

UNIT-V: ACCOUNTING FOR NON-PROFIT ORGANIZATIONS:
Non- Profit Organization - Meaning - Features - Receipts and Payments Account - Income and Expenditure Account - Balance Sheet (Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Co.
2. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
3. Accountancy–I: Tulasian, Tata McGraw Hill Co.
4. Accountancy–I: S.P. Jain & K.L Narang, Kalyani.
5. Advanced Accountancy-I: S.N.Maheshwari&V.L.Maheswari, Vikas.
6. Advanced Accountancy: M Shrinivas& K Sreelatha Reddy, Himalaya Publishers.
7. Financial Accounting: M.N Arora, Tax Mann Publications.

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PRINCIPAL
Government Degree College
ETURNAGARAM
Mulugu Dist-506165

Paper DSC 201: FINANCIAL ACCOUNTING-II

Objective: To acquire Accounting knowledge of bills of exchange and other business accounting methods.

UNIT-I: BILLS OF EXCHANGE:
Bills of Exchange – Definition - Distinction between Promissory note and Bills of exchange - Accounting treatment of Trade bills: Books of Drawer and Acceptor- Honour and Dishonour of Bills - Renewal of bills - Retiring of bills under rebate - Accommodation bills (Including problems)

UNIT-II: CONSIGNMENT ACCOUNTS:
Consignment - Meaning – Features - Proforma Invoice - Account sales - Del credere commission-Accounting treatment in the books of the consignor and the consignee - Valuation of consignment stock -Treatment of Normal and abnormal Loss - Invoice of goods at a price higher than the cost price (Including problems)

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Joint Venture - Meaning – Features - Difference between Joint Venture and Consignment - Accounting Procedure - Methods of Keeping Records for Joint Venture Accounts - Method of Recording in co-ventures books - Separate Set of Books Method - Joint Bank Account - Memorandum Joint Venture Account (Including problems)

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Single Entry System - Meaning – Features - Difference between Single Entry and Double Entry systems - Defects in Single Entry System - Books and accounts maintained - Ascertainment of Profit - Statement of Affairs and Conversion method (Including problems)

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Non- Profit Organization - Meaning - Features - Receipts and Payments Account - Income and Expenditure Account - Balance Sheet (Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Co.
2. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
3. Accountancy–I: Tulasian, Tata McGraw Hill Co.
4. Accountancy–I: S.P. Jain & K.L Narang, Kalyani.
5. Advanced Accountancy-I: S.N.Maheshwari&V.L.Maheswari, Vikas.
6. Advanced Accountancy: M Shrinivas& K Sreelatha Reddy, Himalaya Publishers.
7. Financial Accounting: M.N Arora, Tax Mann Publications.

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Paper DSC 202: BUSINESS LAWS

Objective: To understand basics of contract act, sales of goods act, IPRs and legal provisions applicable for establishment, management and winding up of companies in India.

UNIT-I: INDIAN CONTRACT ACT:

Agreement and Contract - Essentials of a valid contract - Types of contracts - Offer and Acceptance - Essentials of valid offer and acceptance - Communication and revocation of offer and acceptance - Consideration - definition - Essentials of valid consideration - Modes of Discharge of a contract - Performance of Contracts - Breach of Contract - Remedies for Breach - Significance of Information Technology Act

UNIT-II: SALE OF GOODS ACT AND CONSUMER PROTECTION ACT:

Contract of Sale: Essentials of Valid Sale - Sale and Agreement to Sell – Definition and Types of Goods - Conditions and Warranties - Caveat Emptor - Exceptions - Unpaid Seller - Rights of Unpaid Seller. Consumer Protection Act 1986: Definition of Consumer - Person - Goods - Service - Consumer Dispute - Consumer Protection Councils - Consumer Dispute Redressal Agencies - Appeals

UNIT-III: INTELLECTUAL PROPERTY RIGHTS:

Trade Marks: Definition - Registration of Trade Marks - Patents: Definition - Kinds of Patents - Transfer of the Patent Rights - Rights of the Patentee - Copy Rights: Definition - Rights of the Copyright Owner - Terms of Copy Right - Copy Rights Infringement - Other Intellectual Property Rights: Trade Secrets - Geographical Indications

UNIT-IV: MANAGEMENT OF COMPANIES AND MEETINGS:

Director: Qualification - Disqualification - Position - Appointment - Removal - Duties and Liabilities - Loans - Remuneration - Managing Director - Corporate Social Responsibility - Corporate Governance. Meeting: Meaning - Requisites - Notice - Proxy - Agenda - Quorum - Resolutions - Minutes - Kinds - Shareholder Meetings - Statutory Meeting - Annual General Body Meeting - Extraordinary General Body Meeting - Board Meetings

UNIT-V: WINDING UP:

Meaning - Modes of Winding Up - Winding Up by tribunal - Voluntary Winding Up - Compulsory Winding Up - Consequences of Winding Up - Removal of name of the company from Registrar of Companies - Insolvency and Bankruptcy code - 2016.

SUGGESTED READINGS:

1) Company Law: ND Kapoor, Sultan Chand and Co.
2) Company Law: Rajashree. – HPH
3) Business Law - Kavitha Krishna, Himalaya Publishing House
4) Business Laws – Dr. B. K. Hussain, Nagalakshmi - PBP
5) Company Law: Prof. G. Krishna Murthy, G. Kavitha, PBP
6) Company Law and Practice: GK Kapoor& Sanjay Dhamija, Taxmann Publication.
7) Company Law: Bagrial AK, Vikas Publishing House.

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Kakatiya University, Warangal

Faculty of Commerce & Business Management

B.Com. III Semester - Paper SEC1 (a): PRINCIPLES OF INSURANCE

Objectives: *To make Students to learn Principles of Insurance.*

UNIT I: RISK MANAGEMENT AND INSURANCE:

Risk Management -Types of Risks - Actual and Consequential Losses - Management of Risks - Different Classes of Insurance - Importance of Insurance - Management of Risk by Individuals and Insurers - Fixing of Premiums – Reinsurance - Role of Insurance in Economic Development and Social Security - Constituents of Insurance Market - Operations of Insurance Companies - Operations of Intermediaries - Specialist Insurance Companies - Role of Regulators - Common and specific terms in Life and Non-Life Insurance - Understanding Insurance Customers - Customer Behavior at Purchase Point - Customer Behavior when Claim Occurs - Importance of Ethical Behavior

UNIT II: INSURANCE CONTRACT AND INSURANCE PRODUCTS:

Insurance Contract Terms - Principles of Insurance: Principle of Insurable Interest, Principle of Indemnity, Principle of Subrogation, Principle of Contribution, Relevant Information Disclosure, Principle of utmost Good Faith, Relevance of Proximate Cause - Life Insurance Products: Risk of Dying Early - Risk of Living too Long - Products offered - Term Plans - Pure Endowment Plans - Combinations of Plans - Traditional Products - Linked Policies - Features of Annuities and Group Policies - General Insurance Products: Risks faced by Owner of Assets - Exposure to Perils - Features of Products Covering Fire and Allied Perils - Products covering Marine and Transit Risks - Products covering Financial Losses due to Accidents - Products covering Financial Losses due to Hospitalization - Products Covering Miscellaneous Risks

SUGGESTED READINGS:

1. Principles of Insurance : A Publication of the Insurance Institute of India
2. Principles of Insurance : Telugu Academy, Hyderabad
3. Guide to Risk Management : Sagar Sanyal
4. Principles of Insurance : Dr V Padmavathi,Dr V Jayalakshmi - PBP
5. Insurance and Risk Management: P.K. Gupta
6. Insurance Theory and Practice : Tripathi PHI.
7. Principles of Insurance Management: Neelam C Gulati, Excel Books

Suggested Websites: 1) www.irda.gov.in **2)** www.polocyholder.gov.in **3)** www.irdaindia.org.in

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Kakatiya University, Warangal

Faculty of Commerce & Business Management,.

B.Com. III Semester - Paper SEC2 (a): PRACTICE OF LIFE INSURANCE

Objective: *To make students to learn Practice of Life Insurance.*

UNIT-I: INTRODUCTION TO LIFE INSURANCE AND TYPES OF LIFE INSURANCE POLICIES AND PREMIUM CALCULATION: Meaning evolution, growth and principles of Life Insurance –Life Insurance Organizations in India – Competition and Regulation of Life Insurance - Types of Life Insurance Policies – Term, Whole Life, Endowment, Unit Linked and with or without Profit Policies – Customer Evaluation – Policy Evaluation – Group and Pension Insurance Policies – Special features of Group Insurance/Super Annuation Schemes – Group Gratuity Schemes. Computation of Premiums - Meaning of Premium, its calculation- Rebates – Mode of Rebates – Large sum assured Rebates – Premium Loading – Rider Premiums – Computation of Benefits – Surrender value – Paid up value.

UNIT-II: SETTLEMENT OF CLAIMS RISK & UNDERWRITTINGS AND FINANCIAL PLANNING & TAX SAVING: Settlement of claims: Intimation Procedure, documents and settlement procedures - Underwriting: The need for underwriting – Guiding principles of Underwriting – Factors affecting Insurability – Methods of Life Classification – Laws affecting Underwriting - Financial Planning and taxation: Savings – Insurance vis-à-vis- Investment in the Units Mutual Funds, Capital Markets – Life Insurance in Individual Financial Planning – Implications in IT treatment.

SUGGESTED READINGS:

1. Practice of Life Insurance: Insurance Institute of India, Mumbai.
2. Insurance and Risk Management: P.K.Gupta, Himalaya Publishing House, Mumbai.
3. Fundamentals of Life Insurance Theories and Applications: Kanika Mishra, Prentice Hall
4. Principles of Life Insurance – Dr. V. Padmavathi, Dr. V. Jayalakshmi - PBP
5. Managing Life Insurance: Kutty, S.K., Prentice Hall of India: New Delhi
6. Life and Health Insurance: Black, Jr. Kenneth and Harold Skipper Jr., Prentice Hall, Inc., England.
7. Life Insurance: Principles and Practice: K.C. Mishra and C.S. Kumar, Cengage Learning, New Delhi.
8. Life Insurance in India: Sadhak, Respose Books, New Delhi.

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Kakatiya University, Warangal

Faculty of Commerce & Business Management,.

B.Com. III Semester - Paper DSC 301: ADVANCED ACCOUNTING

Objective: *To acquire accounting knowledge of partnership firms and joint stock companies*

UNIT-I: PARTNERSHIP ACCOUNTS-I:

Meaning - Partnership Deed - Capital Accounts (Fixed and Fluctuating) - Admission of a Partner - Retirement and Death of a Partner (Excluding Joint Life Policy)(Including problems)

UNIT-II: PARTNERSHIP ACCOUNTS-II:

Dissolution of Partnership - Insolvency of a Partner (excluding Insolvency of all partners) - Sale to a Company (Including problems)

UNIT-III: ISSUE OF SHARES, DEBENTURES, UNDERWRITING AND BONUS SHARES:

Issue of Shares at par, premium and discount - Pro-rata allotment - Forfeiture and Re-issue of Shares - Issue of Debentures with Conditions of Redemption - Underwriting: Meaning – Conditions - Bonus Shares: Meaning - SEBI Guidelines for Issue of Bonus Shares - Accounting of Bonus Shares (Including problems)

UNIT-IV: COMPANY FINAL ACCOUNTS AND PROFIT PRIOR TO INCORPORATION:

Companies Act, 2013: Structure - General Instructions for preparation of Balance Sheet and Statement of Profit and Loss - Part-I: Form of Balance Sheet - Part-II: Statement of Profit and Loss - Preparation of Final Accounts of Companies - Profits Prior to Incorporation - Accounting treatment (Including problems)

UNIT-V: VALUATION OF GOODWILL AND SHARES:

Valuation of Goodwill: Need - Methods: Average Profits method, Super Profits method and Capitalization Method -Valuation of Shares: Need - Net Assets method, Yield method and Fair Value Method. (Including problems)

SUGGESTED READINGS:

1. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
2. Advanced Accountancy: Shukla and Grewal, S.Chand & Co.
3. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons.
4. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
5. Advanced Accountancy: Dr. G. Yogeshwaran, Julia Allen - PBP
6. Accountancy–III: Tulasian, Tata McGraw Hill Co.
7. Advanced Accountancy: Arulanandam; Himalaya.
8. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers.

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Kakatiya University, Warangal

Faculty of Commerce & Business Management,.

B.Com. III Semester - Paper DSC 301: ADVANCED ACCOUNTING

Objective: *To acquire accounting knowledge of partnership firms and joint stock companies*

UNIT-I: PARTNERSHIP ACCOUNTS-I:

Meaning - Partnership Deed - Capital Accounts (Fixed and Fluctuating) - Admission of a Partner - Retirement and Death of a Partner (Excluding Joint Life Policy)(Including problems)

UNIT-II: PARTNERSHIP ACCOUNTS-II:

Dissolution of Partnership - Insolvency of a Partner (excluding Insolvency of all partners) - Sale to a Company (Including problems)

UNIT-III: ISSUE OF SHARES, DEBENTURES, UNDERWRITING AND BONUS SHARES:

Issue of Shares at par, premium and discount - Pro-rata allotment - Forfeiture and Re-issue of Shares - Issue of Debentures with Conditions of Redemption - Underwriting: Meaning – Conditions - Bonus Shares: Meaning - SEBI Guidelines for Issue of Bonus Shares - Accounting of Bonus Shares (Including problems)

UNIT-IV: COMPANY FINAL ACCOUNTS AND PROFIT PRIOR TO INCORPORATION:

Companies Act, 2013: Structure - General Instructions for preparation of Balance Sheet and Statement of Profit and Loss - Part-I: Form of Balance Sheet - Part-II: Statement of Profit and Loss - Preparation of Final Accounts of Companies - Profits Prior to Incorporation - Accounting treatment (Including problems)

UNIT-V: VALUATION OF GOODWILL AND SHARES:

Valuation of Goodwill: Need - Methods: Average Profits method, Super Profits method and Capitalization Method -Valuation of Shares: Need - Net Assets method, Yield method and Fair Value Method. (Including problems)

SUGGESTED READINGS:

1. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
2. Advanced Accountancy: Shukla and Grewal, S.Chand & Co.
3. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons.
4. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
5. Advanced Accountancy: Dr. G. Yogeshwaran, Julia Allen - PBP
6. Accountancy–III: Tulasian, Tata McGraw Hill Co.
7. Advanced Accountancy: Arulanandam; Himalaya.
8. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers.

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Faculty of Commerce & Business Management,.

B.Com. III Semester - Paper DSC 302: BUSINESS STATISTICS -I

Objective: *To inculcate analytical and computational ability among the students.*

UNIT-I: INTRODUCTION:

Origin and Development of Statistics - Definition - Importance and Scope - Limitations of Statistics - Distrust of Statistics.

Statistical Investigation: Planning of statistical investigation - Census and Sampling methods - Collection of primary and secondary data - Statistical errors and approximation - classification and Tabulation of data - Frequency distribution

UNIT – II: DIAGRAMMATIC AND GRAPHIC PRESENTATION:

Diagrammatic presentation: One Dimensional and Two Dimensional Diagrams - Pictograms - Cartograms - Graphic presentation: Technique of Construction of Graphs - Graphs of Frequency Distribution - Graphs of Time Series or Histograms

UNIT-III: MEASURES OF CENTRAL TENDENCY:

Introduction -Significance - Arithmetic Mean - Geometric Mean - Harmonic Mean – Mode - Median - Quartiles and Percentiles - Simple and Weighted Averages - Uses and Limitations of different Averages

UNIT-IV: MEASURES OF DISPERSION, SKEWNESS AND KURTOSIS:

Measures of Dispersion: Significance - Characteristics - Absolute and Relative Measures – Range - Quartile Deviation - Mean Deviation- Standard Deviation - Coefficient of Variation Measures of Skewness - Karl Pearson's Coefficient of Skewness - Bowley's Coefficient of Skewness - Kelly's Measure of Skewness - Kurtosis: Mesokurtosis, Platy kurtosis and Leptokurtosis

UNIT-V: CORRELATION:

Meaning -Types - Correlation and Causation - Methods: Scatter Diagram - Karl Person's Coefficient of Correlation - Probable Error and Interpretation of Coefficient of Correlation - Rank Correlation - Concurrent Deviation Method

SUGGESTED READINGS:

1. Statistics for Management: Levin & Rubin, Pearson
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Statistics: E. Narayanan Nadar, PHI Learning
4. Business Statstics –I: Dr. Obul Reddy, Dr. D. Shridevi - PBP
5. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
6. Business Statistics: K. Alagar, Tata McGraw Hill
7. Fundamentals of Statistical: S. P Gupta, Sultan Chand
8. Business Statistics: J. K. Sharma, Vikas Publishers
9. Business Statistics: S. L Aggarwal, S. L. Bhardwaj, Kalyani Publications

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Kakatiya University, Warangal
Faculty of Commerce & Business Management,

B.Com. IV Semester - Paper SEC3 (a): PRACTICE OF GENERAL INSURANCE

Objective: *To make the student understand general policies and accounting.*

UNIT I: GENERAL INSURANCE POLICIES:

Introduction to General Insurance-Origin of general insurance—Classification of General Insurance Companies—Indian and International Insurance Market—various roles in Insurance industry—Policy Documents and forms—insurance proposals and forms—General Insurance Products-Fire, Marine, Motor, Liability, Personal Accident and Specialty Insurance, Engineering and other insurance.

UNIT II: UNDERWRITING, PREMIUMS, CLAIMS AND INSURANCE RESERVES AND ACCOUNTING:

Concept of Underwriting—Underwriting Process—Risk sharing and its methods—risk management and steps involved in it—Rating and Premiums—concept of soft and hard markets—Concept of Claim-understanding the process of claim management—claims fraud and fraud prevention—Insurance reserves and accounting—different types of reserves of insurance companies—reserving process followed by insurance companies—Insurance accounting.

SUGGESTED READINGS:

1. Practice of General Insurance – Insurance Institute of India.
2. Practice of General Insurance – D.S. Vittal-HPH.
3. Principles & Practice of Insurance- Dr. P. Periasamy – HPH.
4. Risk Management: A Publication of the Insurance Institute of India.
5. Practice of General Insurance: Dr. V. Padmavathi, Dr. V. Jayalakshmi, PBP.
6. Insurance Theory and Practice: Tripathi PHI
7. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
8. Risk Management and Insurance : Trieschman, Gustavson and Hoyt
9. South Western College Publishing Cincinnati, Ohio.

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Kakatiya University, Warangal
Faculty of Commerce & Business Management,

B.Com. IV Semester - Paper SEC4 (a): REGULATION OF INSURANCE BUSINESS

Objective: *To equip the students with the knowledge regarding Insurance Business Regulations.*

UNIT I: INSURANCE LEGISLATION IN INDIA:

History of life and non-life insurance legislation—nationalization—insurance reforms—insurance business Act, 1972—IRDA and its functions including licensing functions—Web aggregators—regulation for intermediaries—CCS-SPV-PoS-insurance repositories-TPAs—Role and duties of surveyors—Origin and development of micro-insurance—regulation of ULIPs— pension schemes—money laundering—KYC—methods of receipt of premium—Exchange control regulations relating to General and Life Insurance—IRDA Health Insurance Regulations, 2016—Health plus life combo products.

UNIT II: POLICY HOLDERS RIGHTS OF ASSAINGMENT, NOMINATION AND TRANSFER:

Assignment and transfer of insurance policies—provisions related to nomination—repudiation— Fraud—protection of policyholder interest—stages in insurance policy-presale stage-post sale stage-free look period—grievance redressal—claim settlement—key feature document—dispute resolution mechanism—insurance ombudsman—solvency margin and investments— international trends in insurance regulation.

SUGGESTED READINGS:

1. Regulation of Insurance Business – Insurance Institute of India
2. Regulation of Insurance Business – D.S. Vittal, HPH
3. Regulation of Insurance Business: Dr. V. Padmavathi, PBP
4. Risk Management : A Publication of the Insurance Institute of India
5. Insurance Theory and Practice: Tripathi PHI
6. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
7. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
8. South Western College Publishing Cincinnati, Ohio.
9. Insurance Management – S.C. Sahoo & S.C. Das-HPH.

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Faculty of Commerce & Business Management,

B.Com. IV Semester - Paper DSC 401: INCOME TAX

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee.*

UNIT–I: INTRODUCTION:

Direct and Indirect Taxes – Canons of Taxation - Features and History of Income Tax in India – Definitions and Basic Concepts of Income Tax: Assessee – Deemed Assessee – Assessee-in-default – Assessment Year – Previous Year - Person – Agricultural Income – Heads of Income – Gross Total Income – Total Income – Incomes Exempt from Tax. Residential Status and Scope of Total Income: Meaning of Residential Status – Conditions applicable to an Individual Assessee – Incidence of Tax – Types of Incomes (Theory only)

UNIT–II: INCOME FROM SALARIES:

Definition of Salary – Characteristics of Salary – Computation of Salary Income: Salary u/s 17(1) – Annual Accretion – Allowances – Perquisites – Profits in lieu of Salary – Deductions u/s. 16 – Problems on computation of Income from Salary

UNIT–III: INCOME FROM HOUSE PROPERTY:

Definition of House Property – Exempted House Property incomes– Annual Value – Determination of Annual Value for Let-out House and Self-occupied House – Deductions u/s.24 – Problems on computation of Income from House Property

UNIT–IV: PROFITS AND GAINS OF BUSINESS OR PROFESSION:

Definition of Business and Profession – Procedure for computation of Income from Business – Revenue and Capital nature of Incomes and Expenses – Allowable Expenses u/s. 30 to 37 – Expenses expressly disallowed – Deemed Profits – Miscellaneous provisions u/s 44. Depreciation: Meaning – Conditions for charge of depreciation – Problems on computation of Income from Business. Income from Profession: Rules– procedure – problems on computation of Income from Profession.

UNIT–V: CAPITAL GAINS AND INCOME FROM OTHER SOURCES:

Introduction - Meaning – Basis of charge – Short term and Long term Capital Assets – Transfer – Deemed Transfer –Determination of Cost of Acquisition – Procedure for computation of Long-term and Short-term Capital Gains/Losses – Exemptions in respect of certain Capital Gains u/s. 54 – Problems on computation of capital gains – Income from Other Sources - General Incomes u/s. 56(1) – Specific Incomes u/s. 56(2) – Dividends u/s. 2(22) – Winnings from lotteries Puzzles, cross world puzzles, Races – Interest on Securities – Gifts received by an Individual – Casual Income – Family Pension – Rent received on let out of Furniture- Plant and Machinery with/without Building – Deductions u/s. 57. (Theory only)

SUGGESTED READINGS:

1. Income Tax Law and Practice: V.P. Gaur & D.B Narang, Kalyani Publishers.
2. Taxation: Dr. M.N. Ravi, PBP.
3. Direct Taxes Law & Practice: Dr. Vinod K. Singhania & Dr. Kapil Singhania, Taxmann
4. Income Tax: B.B. Lal, Pearson Education.
5. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.

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Faculty of Commerce & Business Management,

B.Com. IV Semester - Paper DSC 402: BUSINESS STATISTICS - II

Objective: *to inculcate analytical and computational ability among the students.*

UNIT-I: REGRESSION:

Introduction – Definition – Types – Uses - Correlation Vs. Regression - Regression Lines– Regression Equations - Using Regression Lines for Prediction.

UNIT-II: INDEX NUMBERS:

Introduction - Uses - Types - Problems in the Construction of Index Numbers - Methods of Constructing Index Numbers - Simple and Weighted Index Number (Laspeyre - Paasche, Marshall – Edgeworth) – Quantity of Volume Index Numbers – Value Index Numbers -Tests of Consistency of Index Number: Unit Test - Time Reversal Test Factor Reversal Test - Circular Test - Base Shifting - Splicing and Deflating of Index Numbers. Consumer Price Index Number – Need – Utility – Construction – Method.

UNIT-III: TIME SERIES:

Introduction –Definition – Utility - Components – Methods-Semi Averages - Moving Averages – Least Squares Method - Deseasonalisation of Data – Uses and Limitations of Time Series.

UNIT-IV: PROBABILITY:

Introduction - Definition – Probability Concepts - Experiment – Types of Events - Approaches to Probability: Classical – Empirical – Subjective - Axiomatic - Theorems of Probability: Addition – Multiplication - Baye's Theorem - Basics of Set Theory – Permutations & Combinations.

UNIT-V: THEORITECAL DISTRIBUTIONS:

Meaning – Importance –Types of Theoretical Distributions -Binomial Distribution: Introduction – Assumptions – Expansion – Constants -Fitting of Binomial Distribution - Poisson Distribution: Introduction – Features – Assumptions – Uses and importance – Models and Probability of Poisson Distributions – Constants - Fitting of Poisson Distribution. Normal Distribution: Concept – Properties - Importance - Central Limit Theorem - Fitting of a Normal Curve (Areas Method Only).

SUGGESTED READINGS:

1. Statistics for Management: Levin & Rubin, Pearson,
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Business Statistics: Theory & Application, P. N. Jani, PHI Learning
4. Business Statics – II: Obul Reddy, D. Shridevi - PBP
5. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
6. Business Statistics: K. Alagar, Tata Mc Graw Hill

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Kakatiya University, Warangal
Faculty of Commerce & Business Management,
B.Com. IV Semester - Paper DSC 403: CORPORATE ACCOUNTING

Objective: *To acquire knowledge of AS-14 and preparation of accounts of banking and insurance companies.*

UNIT-I: COMPANY LIQUIDATION:
Meaning – Modes - Contributory Preferential Payments – Statements of Affairs - Liquidator's Remuneration - Preparation of Liquidator's Final Statement of Account (Including problems)

UNIT-II: AMALGAMATION (AS-14):
Amalgamation: In the nature of Merger and Acquisition – Calculation of Purchase Consideration – Accounting Treatment in the books of transferor and transferee companies. (Including problems)

UNIT-III: INTERNAL RECONSTRUCTION AND ACQUISITION OF BUSINESS:
Internal Reconstruction: Accounting treatment – Preparation of final statement after reconstruction- Acquisition of business when new set of books are opened- Debtors and Creditors taken over on behalf of vendors- When same set of books are continued(Including problems)

UNIT-IV: ACCOUNTS OF BANKING COMPANIES:
Books and Registers maintained – Slip system of posting – Rebate on Bills Discounted – Non-Performing Assets – Legal Provisions relating to final accounts – Preparation of Final Accounts. (Including problems)

UNIT-V: ACCOUNTS OF INSURANCE COMPANIES AND INSURANCE CLAIMS: Introduction – Formats-Revenue Account–Net Revenue Account - Balance Sheet - Valuation - Balance Sheet – Net Surplus – General Insurance - Preparation of final accounts with special reference to Life Insurance - Insurance claims- Meaning – Loss of Stock and Assets – Average Clause – Treatment of Abnormal Loss - Loss of Profit. (Including problems)

SUGGESTED READINGS:

1. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
2. Accountancy–III: Tulasian, Tata McGraw Hill Co.
3. Advanced Accountancy: Arulanandam; Himalaya
4. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers
5. Advanced Accounting (Vol-II): Chandra Bose, PHI

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper GE: BUSINESS ECONOMICS

Objective: *To acquire knowledge for application of economic principles and tools in business practices.*

UNIT-I: INTRODUCTION:

Business Economics: Meaning - Nature – Characteristics - Importance and Role - Micro & Macro Economics - Scope - Objectives - Concepts used in Business Economics -Law of Diminishing marginal utility - Law of Equi-marginal utility.

UNIT- II: DEMAND ANALYSIS:

Meaning – Function - Factors influencing Demand -Types of Demand -Demand Curve - Law of Demand –Exceptions to the law of demand-Elasticity of Demand: Concept - Types of elasticity of demand-price, income and cross Elasticity of Demand –measurement of elasticity—arc and point methods—Importance of various Elasticities of Demand

UNIT-III: SUPPLY ANALYSIS:

Law of Supply - Factors influencing Supply - Market Equilibrium- Consumer Surplus - Theory of Consumer behavior - Utility and indifference curve analysis.

UNIT–IV: PRODUCTION ANALYSIS:

Concept of Production –production function-Total Production - Marginal Production - Average Production – Returns to a factor- Law of Variable Proportions - Law of Returns to Scale – Isocost – Isoquants - Economies and Dis-economies of Scale.

UNIT-V: COST AND REVENUEANALYSIS:

Theory of Cost - Concepts of Cost - Short run and Long run cost curves - Traditional and Modern Approaches -Revenue Curves–relationship between total marginal and average revenues- --Break Even Analysis—Meaning – Assumptions – Uses and Limitations.

SUGGESTED READINGS:

1. Business Economics: V. G. Mankar, Himalaya Publishing House
2. Managerial Economics: Vanith Agrawal, Pearson Education
3. Business Economics: H. L. Ahuja, S. Chand & Co. Ltd.
4. Business Economics : R. K. Lekhi, Kalyani Publishers
5. Business Economics: D. M. Mithani, Himalaya Publishing House
6. Business Economics: P. N. Chopra, Kalyani Publishers
7. Essential of Business Economics: D. N. Dwivedi, Vikas Publishers

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 501 (a) : COST ACCOUNTING

Objective: *To make the students acquire the knowledge of cost accounting methods.*

UNIT-I: INTRODUCTION:

Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Essentials of a good cost accounting system- Difference between Cost Accounting and Financial Accounting – Cost concepts – Cost Classification. (Theory Only)

UNIT-II: MATERIAL:

Direct and Indirect Material cost – Inventory Control Techniques – Stock Levels – EOQ – ABC Analysis – JIT - VED - FSND - Issue of Materials to Production – Pricing methods: FIFO - LIFO with Base Stock and Simple and Weighted Average methods. (Problems)

UNIT-III: LABOUR AND OVERHEADS:

Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages (only Incentive Plans): Halsey, Rowan, Taylor Piece Rate and Merrick Multiple Piece Rate Methods.
Overheads: Classification - Methods of Allocation - Apportionment and Absorption of overheads. (Problems)

UNIT-IV: UNIT AND JOB COSTING:

Unit Costing: Features - Cost Sheet – Tender and Estimated Cost Sheet.
Job Costing: Features - Objectives – Procedure - Preparation of Job Cost Sheet. (Problems)

UNIT-V: CONTRACT AND PROCESS COSTING:

Contract Costing: Features – Advantages - Procedure of Contract Costing – Guidelines to Assess profit on incomplete Contracts. Process Costing: Meaning – Features – Preparation of Process Account – Normal and Abnormal Losses. (Problems)

SUGGESTED READINGS:

1. Cost Accounting: Jain and Narang, Kalyani
2. Cost Accounting: Srihari Krishna Rao, Himalaya
3. Cost and Management Accounting: Prashanta Athma, Himalaya
4. Cost Accounting: Dr. G. Yogeshweran, PBP.
4. Cost Accounting: Jawaharlal, Tata Mcgraw Hill.
5. Cost Accounting: Theory and Practice: Banerjee, PHI

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 501 (b): FINANCIAL PLANNING & PERFORMANCE

Objective: *To make students to understand the Financial Planning & Performance.*

UNIT I: STRATEGIC PLANNING:

Strategic planning: Meaning – Characteristics – Environmental Scanning – Strategic Planning Vs. Tactical Planning – Strategic Planning Process

Annual profit plan and supporting schedules: Operational budgets - Financial budgets - Capital budgets - Financial statement projections - Cash flow projections.

UNIT II: BUDGETING AND FORECASTING:

Budgeting Concepts: Operations and performance goals - Characteristics of a successful budget process - Resource allocation - Forecasting techniques: Regression analysis - Learning curve analysis - Expected value - Budgeting Methodologies: Annual business plans (master budgets) - Project budgeting - Activity-based budgeting - Zero-based budgeting - Continuous (rolling) budgets - Flexible budgeting – Meaning & Prioblems.

UNIT III: COST AND VARIANCE ANALYSIS:

Cost and Variance Analysis: Comparison of actual to planned results - Use of flexible budgets to analyze performance - Management by exception - Standard Cost System: Use of standard cost systems - Analysis of variation from standard cost expectations

UNIT IV: PERFORMANCE MEASURES:

Performance Measures: Product profitability analysis - Business unit profitability analysis - Customer profitability analysis - Return on investment - Residual income - Investment base issues - Key performance indicators (KPIs) - Balanced scorecard - Responsibility Centers and Reporting Segments: Types of responsibility centers - Transfer pricing - Reporting of organizational segments

UNIT V: TECHNOLOGY AND ANALYTICS:

Information Systems: Accounting information systems - Enterprise resource planning systems - Enterprise performance management systems - Data Governance: Data policies and procedures - Life cycle of data - Controls against security breaches - Technology-enabled finance transformation: System Development Life Cycle - Process automation - Innovative applications

Data analytics: Business intelligence - Data mining - Analytic tools - Data visualization

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 1: Planning, Performance & Analytics
2. Strategic Management and Business Policy: Globalization, Innovation and Sustainability, 15th edition; Wheelen, Thomas L., et. al.; Prentice Hall
3. Cost Management: A Strategic Emphasis, 6th edition; Blocher, Edward, J., Stout, David E., Juras, Paul E., and Cokins, Gary; McGraw Hill
4. Horngreen's Cost Accounting: A Managerial Emphasis, 16th edition; Charles T., Datar, Srikant, and Rajan, Madhav; Pearson
5. Quantitative Methods for Business, 13th Edition; Anderson, David, R., Sweeney, Dennis J., Williams, Thomas A., Camm, Jeff, and Martin, R. Kipp; Cengage Learning
6. Management Accounting: An Integrative Approach; McNair-Connolly, C.J., Merchant, Kenneth A.; IMA.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 502 (a): COMPUTERIZED ACCOUNTING

Objective: *To make the students to acquire the knowledge of computer software*

UNIT I: MAINTAINING CHART OF ACCOUNTS IN ERP:

Introduction-Getting Started with ERP - Mouse/Keyboard Conventions-Company Creation-Shut Company-Select a Company-Alter Company Details-Company Features and Configurations-F11: Company Features-F12: Configuration-Chart of Accounts-Ledger-Group-Ledger Creation-Single Ledger Creation-Multi Ledger Creation-Altering and Displaying Ledgers-Group Creation-Single Group Creation-Multiple Group Creation-Displaying Groups and Ledgers-Displaying Groups-Display of Ledgers-Deletion of Groups and Ledgers – P2P procure to page.

UNIT II: MAINTAINING STOCK KEEPING UNITS (SKU):

Introduction-Inventory Masters in ERP - Creating Inventory Masters-Creation of Stock Group-Creation of Units of Measure-Creation of Stock Item-Creation of Godown-Defining of Stock Opening Balance in ERP Stock Category-Reports.

UNIT III: RECORDING DAY-TO-DAY TRANSACTIONS IN ERP:

Introduction-Business Transactions-Source Document for Voucher-Recording Transactions in ERP - Accounting Vouchers-Receipt Voucher (F6)-Contra Voucher (F4)-Payment Voucher (F5)-Purchase Voucher (F9)-Sales Voucher (F8)-Debit Note Voucher-Credit Note (Ctrl+F8)-Journal Voucher (F7).

UNIT IV: ACCOUNTS RECEIVABLE AND PAYABLE MANAGEMENT: Introduction-Accounts Payables and Receivables-Maintaining Bill-wise Details-Activation of Maintain Bill-wise Details Feature-New Reference-Against Reference-Advance-On Account-Stock Category Report-Changing the Financial Year in ERP.

UNIT V: MIS REPORTS:

Introduction-Advantages of Management Information Systems-MIS Reports in ERP - Trial Balance - Balance Sheet-Profit and Loss Account-Cash Flow Statement-Ratio Analysis-Books and Reports - Day Book-Receipts and Payments-Purchase Register-Sales Register-Bills Receivable and Bills Payable.

SUGGESTED READINGS:

1. Computerised Accounting: Garima Agarwal, Himalaya
2. Computerised Accounting: A. Murali Krishna, Vaagdevi publications
3. Computerised Accounting: Dr. G. Yogeshweran, PBP.
4. Implementing Tally ERP 9: A.K Nadhani and K.K Nadhani, BPB Publications
5. Computerised Accounting and Business Systems: Kalyani Publications
6. Manuals of Respective Accounting Packages
7. Tally ERP 9: J.S. Arora, Kalyani Publications.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 502 (b): FINANCIAL DECISION MAKING - I

Objective: *To make students to understand the Financial Decision Making.*

UNIT I: FINANCIAL STATEMENT ANALYSIS

Basic Financial Statement Analysis: Common size financial statements - Common base year financial statements - Financial Ratios: Liquidity - Leverage - Activity - Profitability – Market Profitability analysis: Income measurement analysis - Revenue analysis - Cost of sales analysis - Expense analysis - Variation analysis - Impact of changes in accounting treatment - Accounting and economic concepts of value and income - Earnings quality

UNIT II: FINANCIAL MANAGEMENT

Risk & Return: Calculating return - Types of risk - Relationship between risk and return Long-term Financial Management: Term structure of interest rates - Types of financial instruments - Cost of capital - Valuation of financial instruments

UNIT III: RAISING CAPITAL

Raising Capital: Sources of Long term Capital: Equity, Preference, Debt - Financial institutions - Initial and secondary public offerings - Dividend policy - Lease financing

UNIT IV: WORKING CAPITAL MANAGEMENT

Managing working capital: Cash management - Marketable securities management - Accounts receivable management - Inventory management - Short-term Credit: Types of short-term credit - Short-term credit management

UNIT V: CORPORATE RESTRUCTURING AND INTERNATIONAL FINANCE

Corporate Restructuring: Mergers and acquisitions - Bankruptcy - Other forms of restructuring International Finance: Fixed, flexible, and floating exchange rates - Managing transaction exposure - Financing international trade.

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 2: Strategic Financial Management
2. Interpretation and Application of International Financial Reporting Standards; Mackenzie, Bruce, Coetsee, Danie, Njikizana, Tapiwa, Chamboko, Raymond, Colyvas, Blaise,and Hanekom, Brandon; Wiley
3. Financial Reporting & Analysis, 13th edition; Gibson, Charles H.; South-Western Cengage Learning
4. Financial Statement Analysis, 10th edition; Subramanyam, K.R., and Wild, John L.; McGraw Hill
5. Principles of Corporate Finance, 11th edition; Brealey, Richard, A., Myers, Stewart C., and Allen, Franklin; McGraw Hill

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 502 (c) : INTERNATIONAL TAX & REGULATION

Objective: *To make students to understand the International Tax & Regulation..*

UNIT I: TAXATION OF INDIVIDUALS:

Individual Income Tax Return: Filing Status - Cash basis and Accrual basis. Gross Income: Wages, Salaries, Bonus, Commission, Fees & Tips - Interest & Dividend Income Business Income - Capital Gains & Losses - Passive Income - Farming Income - Deductions: Adjustments - Deductions from AGI - Calculating Tax: Tax Credits - Alternative Minimum Taxes - Other Taxes - Estimated Tax penalty

UNIT II: PROPERTY TRANSACTIONS & DEPRECIATION:

Capital Gains & Losses - Gains & Losses from Sale of Long-term Business property - Depreciation & Amortization

UNIT III: TAXATION OF CORPORATIONS:

C-Corporations: Formation - Income Tax Return - Income - Deductions - Reconciliation of Taxable Income with books - Calculating Tax - Corporate Earnings & Distributions - Corporate Liquidation & Reorganizations - S-Corporations: Eligibility criteria - Income Tax Return - Shareholder basis - Earnings and Distribution - Termination of Election

UNIT IV: TAXATION OF OTHER ENTITIES:

Partnerships: Formation - Income Tax Return - Partner basis - Partnership Distributions - Sale of Partnership Interest by a Partner - Termination of Partnership - Estate, Trust & Gift Taxation: Estate and Trust Fiduciary Income Tax Return - Estate Tax Return - Gift Tax Return - Generation-skipping transfer Tax - Tax Exempt Organizations: Formation - Income Tax Return

UNIT V: STATUTORY REGULATIONS, ACCOUNTANT RESPONSIBILITIES, BUSINESS STRUCTURES:

Federal Security Regulations: Securities Act of 1933 - Securities Exchange Act of 1934 - Other federal security regulations - Professional & Legal Responsibilities: Accountant Common Law Liabilities - Accountant Statutory Liabilities - Accountant Liabilities for Privileged Information - Accountant Criminal Liabilities - Employment Regulations - Environmental Regulations - Antitrust Regulations - Business Structures: Sole Proprietorships - Partnerships - Corporations

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Regulation, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Regulation, Wiley
3. Internal Revenue Code: Income, Estate, Gift, Employment and Excise Taxes, CCH Tax Law Editors
4. Federal Income Tax: Code and Regulations--Selected Sections, Martin B. Dickinson, Wolters Kluwer
5. Federal Income Taxation by Katherine Pratt and Thomas D. Griffith, Wolters Kluwer

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503 (a) : AUDITING

Objective: *to understand meaning and elements of auditing and gain knowledge for execution of audit.*

UNIT-I: INTRODUCTION:

Auditing: Meaning – Definition – Evolution – Objectives – Importance - Types of Audit – Standards of Auditing – Procedure for issue of standards by AASB.

UNIT–II: AUDITOR AND EXECUTION OF AUDIT:

Appointment – Qualification and Disqualification – Qualities – Remuneration – Removal – Rights – Duties – Civil and Criminal Liabilities of Auditors – Commencement of Audit – Engagement Letter – Audit Program – Audit Note Book – Audit Workbook – Audit Markings.

UNIT–III: INTERNAL CONTROL, INTERNAL CHECK AND INTERNAL AUDIT: Meaning and Objectives of Internal Control – Internal Check and Internal Audit – Internal Check Vs. Internal Audit – Internal Control vs. Internal Audit.

UNIT–IV: VOUCHING:

Meaning – Objectives – Types of Vouchers – Vouching of Trading Transactions – Vouching Cash Transaction – Auditing in an EDP Environment.

UNIT–V: VERIFICATION AND VALUATION OF ASSETS:

Meaning and Definition – Distinction – Verification and Valuation of various Assets and Liabilities – Audit Committee – Role of Audit Committee – Audit Reports.

SUGGESTED READINGS:

1. Principles and Practice of Auditing: RG Saxena, Himalaya Publishing House.
2. Auditing and Assurance for CA Integrated Professional Competence: SK Basu, Pearson.
3. Auditing : Mahitha HPH
4. Auditing: Dr. Nazia Sultana, PBP.
5. Auditing: Aruna Jha, Taxmann Publications.
6. Auditing Principles, Practices & Problems: Jagdish Prakash, Kalyani Publishers.
7. Auditing and Assurance: Ainapure & Ainapure, PHI Learning.
8. Principles and Practice of Auditing: Dinkar Pagare, Sultan Chand & Sons.
9. Fundamentals of Auditing: Kamal Gupta and Ashok Arora, Tata McGraw-Hill
10. A Hand Book of Practical Auditing: B.N. Tandon etal., S. Chand.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503 (b) : ADVANCED CORPORATE ACCOUNTING

Objective: *To gain knowledge of AS-19 & 21 and format accounts.*

UNIT-I: HOLDING COMPANIES (AS-21):

Nature – Legal requirements – Capital and Revenue Profit/Reserves/Losses – Minority Interest – Cost of Control or Goodwill – Capital Reserve – Inter Company Transactions – Un-realized Profit on Unsold stock - Revaluation of Assets – Interim Dividend by Subsidiary Companies - Debentures in Subsidiary Companies – Consolidated Balance Sheet.

UNIT-II: ELECTRICITY COMPANIES (DOUBLE ACCOUNTING SYSTEM):

Meaning of Double Account System – Final Accounts - Calculation of Reasonable Return and Disposal of Surplus – Replacement of an Asset.

UNIT-III: ACCOUNTING FOR PRICE LEVEL CHANGES:

Introduction – History – Limitations – Profit measurement under different systems of accounting – Methods of Accounting for Price Level Changes: Current Purchasing Power (CPP) – Current Cost Accounting (CCA).

UNIT-IV: LEASE ACCOUNTS (AS-19):

Meaning – Terminology – Advantages and Disadvantages – Types: Financial and Operating Lease – Accounting Treatment in the books of both the parties.

UNIT-V: HUMAN RESOURCE ACCOUNTING & SOCIAL RESPONSIBILITY ACCOUNTING:

Human Resource Accounting: Definition – Objectives – Assumptions – Advantages and Limitations – Approaches - Human resource accounting in India (Theory only).

Social Responsibility Accounting: Meaning – Nature – Need – Objectives – Accounting Concepts – Indicators of Social Performance (Theory only).

SUGGESTED READINGS:

1. Corporate Accounting: R.L.Gupta, M.Radha Swamy, Sultan Chand
2. Advanced Carporate Accounting: Srilatha Reddy, Himalaya
3. Advanced Carporate Accounting: Dr. Thangapandi, PBP
3. Advanced Accounting: Tulsania, TataMcGraw-hill Publishing Company
4. Corporate Accounting: Jain & Narang, Kalyani Publications
5. Advanced Accounting: S.M.Shukla, Sahitya Bhavan
6. Corporate Accounting: Prashanta Athma, Himalaya Publishers.
7. Advanced Accounting (Vol. II): Chandra Bose, PHI

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503 (c) : FINANCIAL MANAGEMENT

Objective: *To understand basics in Financial Management.*

UNIT–I: INTRODUCTION:

Financial Management: Meaning - Nature and Scope – Importance - Objectives - Profit Maximization vs Wealth Maximization – Traditional Functions of Finance Manager – Changing Role of Finance Manager – Relationship between Financial Management and Other Management Areas (Theory).

UNIT–II: FINANCIAL PLANNING:

Sources of Finance - Financial Planning: Meaning and Definition – Objectives – Characteristics – Process – Factors - Limitations (Theory).

UNIT–III: CAPITALIZATION:

Meaning of Capital and Capitalization – Sources of Capital - Theories of Capitalization – Over Capitalization: Meaning - Causes – Consequences - Remedies - Under Capitalization: Meaning – Causes – Consequences - Remedies - Comparison of Under and Over Capitalization – Watered Stock (Theory).

UNIT–IV: COST OF CAPITAL:

Meaning and Definition – Significance – Classification of Costs – Problems in Determination of Cost of Capital – Cost of Debt - Cost of Perpetual and Redeemable Debt - Cost of Preference Capital - Cost of Equity Capital – Cost of retained earnings - Weighted Average Cost of Capital (Simple Problems).

UNIT–V: CAPITAL STRUCTURE:

Meaning – Importance – Factors – Types – Optimal Capital Structure – Theories of Capital Structure: Net Income Approach - Net Operating Income Approach - Traditional Approach - Modigliani and Miller Approach (Simple Problems).

SUGGESTED READINGS:

1. Financial Management: I M Pandey, Vikas Publishing House Pvt Ltd.
2. Financial Management: M.Y. Khan & P.K. Jain, Tata McGraw-Hill
3. Financial Management: Shashi K. Gupta & R.K. Sharma, Kalyani Publishers,
4. Financial Management: Prasanna Chandra , McGraw Hill
5. Financial Management: Rustagi, Taxman Publications.
6. Financial Management: Tulsian, S. Chand.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503a: MANAGEMENT INFORMATION SYSTEM

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits:** 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To equip the students with finer nuances of MIS.*

UNIT–I: INTRODUCTION TO MIS:

The Technical and Business Perspective, Organization Structure, Evaluation of MIS through Information System, The Decision Making Process , System Approach to Problem Solving, The Structure of Management Information System, MIS Organization within the Company.

UNIT-II: INFORMATION SYSTEMS FOR DECISION MAKING:

Evolution of an Information System, Basic Information Systems, Decision Making and MIS, Decision Assisting Information System, Concepts of Balanced MIS Effectiveness and Efficiency Criteria.

UNIT-III: DEVELOPMENT OF MIS:

Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS. *Enterprise Resource Planning:* Introduction, Basics of ERP, Evolution of ERP, Enterprise Systems in Large Organizations, Benefits and Challenges of Enterprise Systems, *E-Enterprise System :* Introduction: Managing the E-enterprise, Organisation of Business in an E-enterprise, E-business, E-commerce, E-communication, E-collaboration.

UNIT-IV: ADVANCED MIS:

Concepts, Needs and Problems in Achieving Advanced MIS, DSS., Business intelligence + process management, systems development, and security.

UNIT-V: COLLABORATION, IMPACT & PITFALLS IN MIS:

Collaboration processes and information systems, Impact of Web 2.0 and social media on business process, Pitfalls in MIS Development: Fundamental Weakness, Soft Spots in Planning and Design Problems.

SUGGESTED READINGS:

1.Murdic, Rose and Clagett- Information Systems for Modern Management, PHI, New Delhi.
2.Process, Systems, and Information, David M. Kroenke,
3. MIS Cases Decision Making with Application Software, 4th Edition, Lisa Miller
4.Laudon-Laudon- Management Information Systems, Pearson Education, New Delhi.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503b: E-COMMERCE

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits:** 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *to acquire conceptual and application knowledge of ecommerce.*

UNIT-I: INTRODUCTION:

E-Commerce: Meaning - Advantages & Limitations - E-Business: Traditional & Contemporary Model, Impact of E-Commerce on Business Models - Classification of E-Commerce: B2B - B2C - C2B - C2C - B2E - Applications of Ecommerce: E-Commerce Organization Applications - E-Marketing - E-Advertising - E-Banking - Mobile Commerce - E-Trading - E-Learning - E-Shopping.

UNIT-II:FRAMEWORK OF E-COMMERCE:

Framework of E-Commerce: Application Services - Interface Layers - Secure Messaging - Middleware Services and Network Infrastructure - Site Security - Firewalls & Network Security - TCP/IP – HTTP - Secured HTTP – SMTP - SSL.

Data Encryption: Cryptography – Encryption – Decryption - Public Key - Private Key - Digital Signatures - Digital Certificates.

UNIT-III:CONSUMER ORIENTED E-COMMERCE APPLICATIONS:

Introduction - Mercantile Process Model: Consumers Perspective and Merchant's Perspective - Electronic Payment Systems: Legal Issues & Digital Currency - E-Cash & E-Cheque - Electronic Fund Transfer (EFT) - Advantages and Risks - Digital Token-Based E-Payment System - Smart Cards.

UNIT-IV:ELECTRONIC DATA INTERCHANGE:

Introduction - EDI Standards - Types of EDI - EDI Applications in Business – Legal - Security and Privacy issues if EDI - EDI and E-Commerce - EDI Software Implementation.

UNIT-V: E-MARKETING TECHNIQUES:

Introduction - New Age of Information - Based Marketing - Influence on Marketing - Search Engines & Directory Services - Charting the On-Line Marketing Process - Chain Letters - Applications of 5P's (Product, Price, Place, Promotion, People) E-Advertisement - Virtual Reality & Consumer Experience - Role of Digital Marketing.

Lab work: *Using Microsoft Front Page Editor and HTML in Designing a Static Webpage/Website.*

SUGGESTED READINGS:

1. Frontiers of Electronic Commerce: Ravi Kalakota, Andrew B Whinston, Pearson
2. E-Commerce: Tulasi Ram Kandula, HPH.
3. Electronic Commerce, A Managers' Guide: Ravi Kalakota, Andrew B Whinston
4. E-Commerce & Computerized Accounting: Rajinder Singh, Er. KaisarRasheed, Kalyani
5. E-Commerce & Mobile Commerce Technologies: Pandey, SaurabhShukla, S. Chand

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503C: MOBILE APPLICATIONS

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits:** 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To understand and apply the mobile applications.*

UNIT-I: INTRODUCTION:

What is Android, Android versions and its feature set The various Android devices on the market, The Android Market application store ,Android Development Environment - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs), the Android Software Stack, The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files,

UNIT-II: MOBILE SOFTWARE:

Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project , Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes, Launching Your Application: The AndroidManifest.xml File,

Creating Your First Android Application, Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components.

Android Manifest XML: Declaring Your Components, Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool.

UNIT-III: MOBILE DISPLAY:

Displaying Text with Text View, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with Seek Bar, Working with Menus using views, Gallery, Image Switcher, Grid View, and Image View views to display images, Creating Animation, Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers

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UNIT-IV: MOBILE APPLICATIONS:

Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers, An Overview of Threads, The Application Main Thread, Thread Handlers, A Basic Threading Example, Creating a New Thread, Implementing a Thread Handler, Passing a Message to the Handler. Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email

Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geo coding and Map-Based Activities, Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures

UNIT-V: MOBILE APP DEVELOPMENT & INSTALLATION:

Introduction to Windows Phone App Development, Installing the Windows Phone SDK, Creating Your First XAML for Windows Phone App. Understanding the Role of XAP Files, the Windows Phone Capabilities Model, the Threading Model for XAML-Based Graphics and Animation in Windows Phone, Understanding the Frame Rate Counter, The Windows Phone Application Analysis Tool, Reading Device Information, Applying the Model-View-View Model Pattern to a Windows Phone App, Property Change Notification, Using Commands

SUGGESTED READINGS:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014.
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD Publishers, 2015
3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580
4. AnubhavPradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

Web Resource :

Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017.
https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details (Download pdf file from the above link)

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper PR : RESEARCH METHODOLOGY & PROJECT REPORT

Objective: *To introduce the basics of conducting research in social sciences.*

UNIT-I: INTRODUCTION, MEASUREMENT AND HYPOTHESIS TESTING:

Meaning of Research-Steps involved- Identification of Problem- Steps involved in the selection of problem-Research Design-Meaning and Types- Measurement Levels/Scales - Scaling Techniques-Hypothesis-Meaning - Types – Testing Procedure.

UNIT-II: PARAMETRIC AND NON-PARAMETRIC TESTS AND RESEARCH REPORT:

Introduction - t-Test - F-Test - Chi Square Test - Anova (One-Way Anova, Two-Way Anova).
Contents of a Research Report. (Concepts only)

SUGGESTED READINGS:

1. Research Methodology: Himalaya Publications.
2. Methodology of Research in Social Sciences: Krishna Swamy,
3. Research Methodology: Kothari & Garg, New Age Publication
4. Research Methodology: Paneerselvam R, PHI
5. Reading in Research Methodology in Commerce & Business Management: Achalapathi KV,
6. Research Methodology: Sashi.K Gupta, Praneeth Rangi, Kalyani Publishers.

GUIDELINES FOR PROJECT WORK

1) Project work is a part of the prescribed curriculum to B. Com students.
2) Project work is allotted to a group of 4 students.
3) During the IV semester, students are expected to undergo internship at a business firm/ Government Department /Software organization/Voluntary organization as per the guidance of teacher concerned.
4) Students should get a certificate from the organization.
5) At the end of Semester-VI, the project reports would be evaluated by the external examiner designated by the Controller of Examinations, from the panel submitted by the Board of Studies in Commerce. The Examiner would evaluate the project reports for a maximum of 35 marks and conduct Viva-Voce examination for 15 marks. The award lists duly signed would be sent the Controller of Examinations.
6) Examiners will examine the following in the project report: i) Survey/Analysis on the topic chosen; ii) Method of data collection; iii) Presentation: Style, Comprehensiveness, graphs, charts etc.; iv) Analysis and inference and implications of the study; v) Bibliography.
7) Students must ensure that they maintain **regular contact with their supervisor** and also that they provide the supervisor with drafts of their work at regular intervals.
8) Students are required to submit a project report on a topic related/connected with trade, industry & commerce. Project can be done by taking the information from the select organization focusing on areas like marketing, finance, human resource, operations, general management etc.
9) Project should be a practical, in-depth study of a problem, issue, opportunity, technique or procedure or some combination of these aspects of business. The Students are required to define an area of investigation, assemble relevant data, analyse the data, draw conclusions and make recommendations.

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ORGANISATION OF PROJECT REPORT

1) Project report should be presented in the following sequence:
i) Title page; ii) Student's declaration; iii) Supervisor's certificate; iv) Internship certificate; V. Abstract; vi) Acknowledgements; vii) Table of contents; viii) List of tables; ix) List of figures; x) List of appendices.

2) Chapter Design should be as follows:

Chapter-I: **Introduction**: this chapter includes the research problem, need for study/significance of the project, objectives, methodology (hypotheses, statistical tools, data source, scope, sample, chapter design).

Chapter-II: **Company Profile:** this chapter should contain a brief historical retrospect about the entity of your study.

Chapter-III: ***D*ata Analysis and interpretation:** this chapter should present the data analysis and inferences.

Chapter-IV: **Conclusion and Suggestions**: This Chapter should give an overview of the project, conclusions, implications, recommendations and scope for further research.

Bibliography: lists the books, articles, and websites that are referred and used for research on the topic of the specific project. Follow Harvard style of referencing.

Appendices: the data, used to prepare the tables for analysis, may not be feasible to incorporate as part of chapters, may given as appendices.

TECHNICAL SPECIFICATIONS OF THE PROJECT

1) Project should be typed on **A4 white paper**, and be **1.5 spaced.**

2) All pages should be **numbered**, and numbers should be placed at the centre of the bottom of the page.

3) All tables, figures and appendices should be consecutively numbered or lettered, and suitably labeled.

4) 3 bound copies & **a soft-copy** should be handed in to the **principal/director of your college/institute** at the time of submission.

5) bibliography and referencing: Referencing is necessary to avoid plagiarism, to verify quotations and to enable readers to follow-up and read more fully the cited author's arguments. Reference is given within the text of the project as well as at the end of the project. The basic difference between citation and a reference list (bibliography) is that the latter contains full details of all the in-text citations.

- ☐ **Citation** provides brief details of the author and date of publication for referencing the work in the body of the text.
- ☐ **Reference list** is given at the end of the text and is a list of all references used with additional details provided to help identify each source.

Proper referencing is as crucial aspect of your project. You are therefore strongly advised to talk to your supervisor about this, in order to make sure that your project report follows the appropriate referencing system.

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 601 (a): COST CONTROL AND MANAGEMENT ACCOUNTING

Objective: *To be acquaint with Cost Control techniques, Managerial Accounting decision-making techniques and reporting methods.*

UNIT-I: INTRODUCTION TO MANAGEMENT ACCOUNTING & MARGINAL COSTING:
Meaning and Importance of Management Accounting – Marginal Cost Equation – Difference between Marginal Costing and Absorption Costing – Application of Marginal Costing – CVP Analysis – Break Even Analysis: Meaning – Assumptions – Importance - Limitations. Marginal Costing for Decision Making-Make or Buy – Add or Drop Products – Sell or Process Further – Operate or Shut-down – Special Order Pricing – Replace or Retain. (Including Problems)

UNIT-II: BUDGETARY CONTROL AND STANDARD COSTING:
Budget: Meaning – Objectives – Advantages and Limitations – Essentials of Budgets - Budgetary Control - Classification of Budgets - Preparation of Fixed and Flexible Budgets. Standard Costing: Meaning – Importance – Standard Costing and Historical Costing - Steps involved in Standard Costing. Variance Analysis: Material variance - Labour variance - Overhead variance. (Including Problems)

UNIT-III: TECHNIQUES OF FINANICAL STATEMENT ANALYSIS:
Meaning – Objectives - Techniques: Comparative Statement, Common Size Statement, Trend Analysis. Ratios- Meaning, Objectives and Classification—Computation of Activity, Liquidity, Solvency and Profitability Ratios. (Including Problems)

UNIT-IV: FUNDS FLOW ANANLYSIS:
Concept of Funds – Meaning and Importance – Limitations – Statement of Changes in Working Capital – Statement of Sources and Application of Funds. (Including Problems)

UNIT-V: CASH FLOW ANALYSIS (AS-3):
Meaning – Importance – Differences between Funds Flow and Cash Flow Statements – Procedure for preparation of Cash Flow Statement. (Including Problems)

SUGGESTED READINGS:

1. Management Accounting- Principles & Practice: Sharma RK & Shashi K. Gupta, Kalyani
2. Advanced Managerial Accounting: Srihari Krishna Rao, Himalaya
3. Advanced Managerial Accounting: Dr. Sundaram, PBP
3. Advanced Management Accounting: Robert S. Kaplan & Anthony A. Atkinson, Prentice-Hall
4. Management Accounting: Rustagi R.P, Galgotia
5. Managerial Accounting: Ronald W. Hilton, TMH

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 601 (b): FINANCIAL CONTROL

Objective: *To make students to understand the Financial Control.*

UNIT I: EXTERNAL FINANCIAL REPORTING DECISIONS (AS PER US GAAP & IFRS):
Financial Statements: Balance sheet - Income statement - Statement of Comprehensive Income - Statement of changes in equity - Statement of cash flows - Integrated reporting

UNIT II: RECOGNITION, MEASUREMENT, VALUATION, AND DISCLOSURE (AS PER US GAAP & IFRS) :
Assets, Liabilities & Equity: Asset valuation - Valuation of liabilities - Equity transactions - Income: Revenue recognition - Income measurement - Major differences between U.S. GAAP and IFRS

UNIT III: COST MANAGEMENT:
Measurement concepts: Cost behavior and cost objects - Actual and normal costs - Standard costs - Absorption (full) costing - Variable (direct) costing - Joint and by-product costing - Costing Systems: Joint and by-product costing - Job order costing - Process costing - Activity-based costing - Life-cycle costing -Overhead costs: Fixed and variable overhead expenses - Determination of allocation base - Allocation of service department costs

UNIT IV: SUPPLY CHAIN MANAGEMENT AND BUSINESS PROCESS IMPROVEMENT:
Supply chain management: Lean resource management techniques - Enterprise resource planning (ERP) - Theory of constraints - Capacity management and analysis - Business Process Improvement: Value chain analysis - Value-added concepts - Process analysis, redesign, and standardization - Activity-based management - Continuous improvement concepts - Best practice analysis - Cost of quality analysis - Efficient accounting processes

UNIT V: INTERNAL CONTROLS:
Governance, Risk & Compliance: Internal control structure and management philosophy - Internal control policies for safeguarding and assurance - Internal control risk - Corporate governance - External audit requirements - System Controls & Security Measures: General accounting system controls - Application and transaction controls - Network controls - Backup controls - Business continuity planning

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 1: Planning, Performance & Analytics
2. Intermediate Accounting, 17th edition; Kieso, Donald E., Weygandt, Jerry J., and Warfield, Terry D.; Wiley
3. Management Accounting: An Integrative Approach; McNair-Connolly, C.J., Merchant, Kenneth A.; IMA

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 601(c) : INTERNATIONAL FINANCIAL REPORTING - II

Objective: *To make students to understand the International Financial Reporting.*

UNIT I: PENSIONS & POST-EMPLOYMENT BENEFITS (AS PER US GAAP & IFRS):

Defined contribution pension plans - Defined benefit pension plans: Pension obligations - Pension plan assets - Net pension expense - Other Post-retirement benefits

UNIT II: INCOME TAXES (AS PER US GAAP & IFRS):

Income tax expense: Current income tax expense - Deferred income tax expense - Deferred taxes on balance sheet: Deferred tax assets - Deferred tax liabilities - Specific accounting - considerations: Net Operating Losses (NOL) - Investee's undistributed dividends

UNIT III: EQUITY (AS PER US GAAP & IFRS):

Equity accounts: Common Stock - Preferred Stock - Additional Paid-In Capital - Retained Earnings - Accumulated Other Comprehensive Income - Treasury Stock - Specific accounting considerations: Share-based Payments to Employees - Equity Securities Classified as Debt Presentation of Equity: On Balance sheet - On Statement of Changes in Equity - Earnings per Share (EPS): Basic EPS - Diluted EPS

UNIT IV: SELECT TRANSACTIONS (AS PER US GAAP & IFRS):

Business Combinations and Consolidations: Acquisitions - Non-controlling Interest - Intercompany Transactions - Variable Interest Entities (VIE) - Foreign currency: Remeasurement – Translation

UNIT V: NOT-FOR-PROFIT AND GOVERNMENTAL ACCOUNTING AND REPORTING (AS PER US GAAP):

Not-for-Profit (NFP) Entities: NFP Financial Statements - Contribution Revenue - Specific Accounting Considerations - Colleges and Universities - Voluntary Health and Welfare Organizations - Health Care Organizations - Governmental Entities: Fund types (Governmental funds, Proprietary funds, Fiduciary funds) - Modified Accrual Accounting - Inter-fund transactions - Government Financial Reporting

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Financial Accounting & Reporting, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Financial Accounting and Reporting, Wiley
3. IFRS & US GAAP Best Practices in Accounting World: GAAP Analysis, Rajesh Dhawan
4. Transparency in Financial Reporting: A concise comparison of IFRS and US GAAP 1st Edition, Ruth Ann McEwen, Harriman House Ltd.
5. IFRS and US GAAP: A Comprehensive Comparison, Steven E. Shamrock, Wiley

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 602(a): THEORY AND PRACTICE OF GST

Objective: *to equip the students with the knowledge regarding Theory and Practice of GST.*

UNIT I: INTRODUCTION TO GST:

Introduction – GST - Taxes Subsumed under GST -Determination of Tax - Registration -Process of Registration - Cancellation and renovation of registration - Supply of Goods and Services - Transition to GST - Registered Business -Availed Input Tax Credit -Unavailed CENVAT credit and Input VAT on capital goods-Availing the input credit held in closing stock -Invoicing -Tax Invoice - Bill of Supply - Credit Note, Debit Note and Supplementary Invoice-Transportation of goods without issue of Invoice - Input Credit Mechanism - Input Tax - GST Returns - Payment of Tax.

UNIT II: GETTING STARTED WITH GST:

Introduction - Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST - Intrastate Supply of Goods-Intrastate Inward Supply -Intrastate Outward Supply -Interstate - Interstate Outward Supply - Return of Goods -Purchase Returns -Sales Returns -Supplies Inclusive of Tax -Defining Tax Rates at Master and Transaction Levels - Defining GST Rates at Stock Group Level-Defining GST Rate at Transaction Level -Hierarchy of Applying Tax Rate Details –Reports.

UNIT III: RECORDING ADVANCED ENTRIES, GST ADJUSTMENT AND RETURN FILING:

Introduction -Accounting of GST Transactions -Purchases from Composition Dealer -Purchases from Unregistered Dealers-Exports -Imports -Exempted Goods -SEZ Sales -Advance Receipts and payments - Mixed Supply and Composite Supply under GST -Mixed Supply of Goods -Composite Supply of Goods -GST Reports - Generating GSTR- Report in ERP -Input Tax Credit Set Off -GST Tax Payment -Time line for payment of GST tax -Modes of Payment -Challan Reconciliation -Exporting GSTR- return and uploading in GST portal.

UNIT IV: GETTING STARTED WITH GST (SERVICES):

Introduction -Determination of supply of services -Determining the Place of Supply of Services - Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods - Intrastate Inward Supply-Intrastate Outward Supply -Interstate Supply -Interstate Outward Supply - Interstate Inward Supply -Interstate Outward Supply of Services -Cancellation of Services - Cancellation of Inward Supplies -Cancellation of Outward Supply of Services -Defining Tax Rates at Master and Transaction Levels.

UNIT V: RECORDING ADVANCED ENTRIES AND MIGRATION TO ERP:

Introduction - Accounting Multiple Services in a Single Supply - Recording Partial Payment to Suppliers -Outward Supplies - Recording Outward Supply with Additional Expenses - Supply of services -Business to consumers - Time of Supply of Services - Place of Supply of Services - Determining place of supply of services - Exempt Supply of Services under GST -Export Supply of Services - Reverse Charge on Services under GST - Advance Receipts from Customers under GST - Advance Receipt and issuing Invoice on same month -Advance Receipt and issuing Invoice on different month - Reversal of GST on account of cancellation of advance receipt - Generating GSTR-Report in ERP - Input Tax Credit Set Off - Migration to ERP - Activate Goods and Services Tax (GST) in ERP - Set up GST rates - Update Masters - Update party GSTIN/UIN - Creation of GST Duty ledgers.

SUGGESTED READINGS:

1. Taxmann's Basics of GST
2. Taxmann's GST: A practical Approach
3. Theory & Practice of GST, Srivathsala, HPH
4. Theory & Practice of GST: Dr. Ravi M.N, PBP.

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 602(b): FINANCIAL DECISION MAKING - II

Objective: *To make students to understand the Financial Decision making.*

UNIT I: DECISION ANALYSIS:

Cost/volume/profit analysis: Breakeven analysis - Profit performance and alternative operating levels - Analysis of multiple products - Marginal Analysis: Sunk costs, opportunity costs and other related concepts - Marginal costs and marginal revenue - Special orders and pricing - Make versus buy - Sell or process further - Add or drop a segment - Capacity considerations

UNIT II: PRICING:

Pricing decisions: Pricing methodologies - Target costing - Elasticity of demand - Product life cycle considerations - Market structure considerations

UNIT III: RISK MANAGEMENT:

Enterprise Risk: Types of risk - Risk identification and assessment - Risk mitigation strategies - Managing risk

UNIT IV: INVESTMENT DECISIONS:

Capital budgeting process: Stages of capital budgeting - Incremental cash flows - Evaluating uncertainty - Capital investment method analysis: Net present value - Internal rate of return - Payback - Comparison of investment analysis methods

UNIT V: PROFESSIONAL ETHICS:

Business ethics: Moral philosophies and values - Ethical decision making - Ethical considerations for management accounting and financial management professionals: IMA's Statement of Ethical Professional Practice - Fraud triangle - Evaluation and resolution of ethical issues - Ethical considerations for the organization: Organizational factors and ethical culture - IMA's Statement on Management Accounting, —Values and Ethics: From Inception to Practice|| - Ethical leadership - Legal compliance - Responsibility for ethical conduct - Sustainability and social responsibility.

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 2: Strategic Financial Management
2. Cost Management: A Strategic Emphasis, 6th edition; Blocher, Edward, J., Stout, David E., Juras, Paul E., and Cokins, Gary; McGraw Hill'
3. Horngreen's Cost Accounting: A Managerial Emphasis, 16th edition; Charles T., Datar, Srikant, and Rajan, Madhav; Pearson
4. Principles of Corporate Finance, 11th edition; Brealey, Richard, A., Myers, Stewart C., and Allen, Franklin; McGraw Hill

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 602 (c): INTERNATIONAL AUDITING

Objective: *To make students to understand the International Auditing.*

UNIT I: ETHICS, PROFESSIONAL RESPONSIBILITIES AND GENERAL AUDITING PRINCIPLES:
Introduction to Auditing: Generally Accepted Auditing Standards (GAAS) - International Standards of Auditing (ISA) - Ethics, independence and professional conduct: AICPA Code of Professional Conduct - Sarbanes-Oxley Act (SOX), 2002 - Public Company Accounting Oversights Board (PCAOB) – Securities Exchange Commission (SEC) - International Standards - Engagement Understanding and Acceptance: Pre-Engagement Acceptance Activities - Engagement Letter - Auditor's communication with those charged with governance Quality Control: Statements on Quality Control Standards (SQCS) - Elements of a System of Quality control

UNIT II: ASSESSING AUDIT RISK AND DEVELOPING A PLANNED RESPONSE:
Audit Risk: Inherent Risk - Control Risk - Detection Risk - Fraud Risk: Fraudulent financial reporting - Misappropriation of assets - Fraud risk factors - Auditor's consideration of fraud
Planning the Audit: Audit Strategy - Audit Plan - Internal Controls: Auditor's Consideration of Internal Control - Operating Cycles - Internal Control Reports and Communications

UNIT III: PERFORMING FURTHER PROCEDURES AND OBTAINING AUDIT EVIDENCE:
Audit Evidence: Management's Assertions - Sufficient & Appropriate Audit Evidence - Audit Evidence determined by Risk of Material Misstatement (RMM) - Substantive Procedures: Revenue cycle - Expenditure cycle - Production cycle - Payroll cycle - Investing cycle - Financing cycle - Opening Balances - Illegal Acts - Related Parties - Contingencies - Estimates & Fair Value Measurements - Subsequent Events - Omitted Procedures & Subsequent Discovery of Facts - Using the Work of Others - Evaluating Audit Findings - Audit Documentation - Management Representation Letter - Audit Sampling: Sampling Risks - Attributes Sampling - Classical Variables Sampling - Probability Proportional to Size (PPS) Sampling

UNIT IV: AUDIT REPORTING:
Audit Reports: Unmodified opinion - Unmodified Opinion with Emphasis-of-matter and/or Other-matter paragraph - Qualified Opinion - Adverse Opinion - Disclaimer of Opinion - Audit Reporting Considerations: Audit of Comparative financial statements - Supplementary Information - Audit of Group financial statements - Audit of Single financial statements & Specific financial statement elements, accounts or items - Audit of Special Purpose financial statements - Audit of financial statements prepared using financial reporting framework of another country

UNIT V: OTHER ENGAGEMENTS:
Accounting & Review Services: Preparation of financial statements - Compilation engagement – Review engagement - Attestation Engagements: Examination - Review Agreed-upon Procedures - Governmental Auditing: Governmental Auditing Standards - Single Audit Act

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Auditing and Attestation, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Auditing and Attestation, Wiley
3. Auditing: A Risk Based-Approach to Conducting a Quality Audit, Karla M Johnstone, Audrey A. Gramling and Larry E. Rittenberg, Cengage Learning

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 603(a): ACCOUNTING STANDARDS

Objectives: *To make the students acquire the knowledge and application of Indian Accounting Standards.*

UNIT-I: INTRODUCITON:

Introduction to Accounting – Concept of Accounting Theory – Role of accounting theory - Classification of Accounting Theory – Deductive and inductive approach in theory formulation – Accounting Principles: Concepts and Conventions - Accounting standard: Concept – Evolution. (Theory only)

UNIT-II: STANDARDS RELATING TO FINANCIAL REPORTING & DISCLOSURE:

Ind AS-101: First time adoption of Indian Accounting Standards – Ind AS-1: Presentation of Financial Statements - Ind AS-7: Cash Flow Statements (Including problems) – Ind AS-8:

Accounting Policies, Changes in Accounting Estimates and Errors – Ind AS-10: Events after the Balance Sheet Date -- Ind AS-24: Related Party Disclosures – Ind AS- 34: Interim Financial Reporting - Ind AS-105: Non-current assets held for sale and discontinued operations – Ind AS- 108: Operating Segments.

UNIT-III: STANDARDS PROVIDING GUIDANCE ON FINANCIAL STATEMENT ITEMS:

Ind AS-2: Inventories (Including simple problems) -- Ind AS-11: Construction contracts (Including simple problems) - Ind AS-12: Income taxes – Ind AS-16: Property, Plant and Equipment – Ind AS-17: Leases (Including simple problems) - Ind AS-18: Revenue – Ind AS-20: Accounting for Government Grants and Disclosure of Government Assistance – Ind AS-23: Borrowing Costs – Ind AS-38: Intangible Assets.

UNIT-IV: STANDARDS RELATING TO BUSINESS ACQUISITIONS AND CONSOLIDATIONS:

Ind AS-28: Investments in Associate and Joint Ventures - Ind AS-103: Business Combinations – Ind AS-110: Consolidated Financial Statements – Ind AS-111: Joint Arrangements – Ind AS- 112: Disclosure of interest in other entities

UNIT-V: FINANCIAL REPORTING:

Financial reporting – Concept -- Development in Financial reporting objectives: True blood Report (USA) – The Corporate Report (UK) – Stamp Report (Canada) - Objectives of Financial Reporting – Qualities of Financial Reporting - Recent trends in Corporate Reporting in India. (Theory only)

SUGGESTED READINGS:

1. Rawat D.S. —Ind ASs Converged IFRS|| Taxmann Allied Services Private Limited.
2. Accounting Theory and Practice: Jawaharlal, Himalaya Publishing Company
3. Accounting Standards: Rawat D.S, Taxmann Allied Services Private Limited
4. IFRS Concepts and Applications: Kamal Garg, Bharat Law House Pvt. Limited
5. Accounting Theory: Porwal L.S, TataMcGraw-Hill Publishing Company
6. Accounting Theory & Management Accounting: Jain S.P. &Narang K.L, Kalyani

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Faculty of Commerce & Business Management,

B.Com. VI Semester - PAPER DSE – 603 (B): CORPORATE GOVERNANCE

Objective: *To acquaint the student with the finer nuances of Corporate Governance.*

UNIT-1: CORPORATE GOVERNANCE: Evolution and Significance: Corporate Governance: Meaning – Definition - Evolution – Historical Perspective of Corporate Governance – Nature and Scope of Corporate Governance – Need for Corporate Governance – Essentials of Corporate Governance – Objectives of Corporate Governance - Benefits and Limitations of Corporate Governance - Structure – Theories.

UNIT – II: CORPORATE GOVERNANCE COMMITTEES AND MODELS:
CG Committees: Cadbury Committee, Greenbury Committee, Hampel Committee, Sarbanes-Oxley Act, 2002, Blue Ribbon Committee, King Committee, Kumara Mangalam Birla Committee, Narayana Murthy Committee, CII Task Force Committee – CG Models : Anglo-American, German, Japanese and Indian Model.

UNIT - III: CORPORATE GOVERNANCE AND SOCIAL RESPONSIBILITY:
Corporate Social Reporting – Meaning – Types of CSR - Role of CSR towards Society – Employees, Government, Stakeholders and Consumers – Nature of CSR – CSR Principles and Strategies - Models – Best Practices of CSR - CSR: Indian Perspective – Sachar Committee Report.

UNIT - IV: ACCOUNTABILITY IN CORPORATE GOVERNANCE:

Definition – Importance - Accounts and Financial Reporting - Stakeholders Influence - Social Responsibility and Accountability - Reflection of Stakeholder's Accountability in Legislation.
Guidance on Stakeholders and Shareholders Interest. Role of Top Management in Corporate Governance. Role of Auditors in Corporate. Role of Shareholders & Other Stakeholders in Corporate Governance.

UNIT – V: ISSUES IN CORPORATE GOVERNANCE :
Role of Promoters - Nominee Directors - Mismanagement –Corporate Frauds - Negligent Role of Auditors – Banks- Supervision and Control of Stock Exchanges – Whistle Blowing Policy - RBI – Ministry of Corporate Affairs – Towards Building Ethical and Sustainable Organization.

SUGGESTED READINGS:

1. Business Ethics and Corporate Governance, (2017) Prof. K. Viyyanna Rao, Dr. G. Nagaraju I.K., International Publishing House Pvt. Ltd,
2. Corporate Governance,(2014), Bholanath Dutta and S.K. Podder - Vision Book house,
3. Business Ethics,(2005)2ND Edition, R.V. Badi N.V. Badi,Vrinda Publication pvt Ltd
4. Business Ethics An Indian Perspective, 2015, A. C. Fernando - Pearson
5. Business Ethics and Corporate Governance, Reprint 2013, C.S.V. Murthy – Himalaya Publication
6. Corporate Governance,(2004) H.R. Machiraju, Himalaya Publication House

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 603(C) : INVESTMENT MANAGEMENT

Objective: *To familiarize with concepts of risk and return relating to Investment.*

UNIT–I: INTRODUCTION:

Investment Management: Meaning and Definition – Objectives - Scope – Investment Vs Speculation – Investment Vs Gambling - Factors affecting Investment Decisions – Investment Alternatives - Types of Investors (Theory).

UNIT–II: RISK AND RETURN:

Meaning of Risk – Risk Vs Uncertainty – Causes of Risk – Types of Risks – Risk and Return of Single Asset – Ex-Ante and Ex-Post – Risk-Return Relationship – Risk-Return Trade off (Simple Problems).

UNIT–III: MARKET INDICES:

Concept of Index – Methods of computing stock indices – Leading Stock Price Indices in India – Sensex and Nifty – Uses of Market Index (Simple Problems).

UNIT–IV: TIME VALUE OF MONEY:

Concept - Techniques - Compounding Techniques - Doubling Period - Multiple Compounding Period - Present Value Techniques (Simple Problems).

UNIT–V: PORTFOLIO ANALYSIS:

Traditional Vs Modern - Rationale of Diversification - Markowitz portfolio theory - Effect of combining the securities - Measurement of expected return and risk of portfolio (Simple Problems).

SUGGESTED READINGS:

1. Investment Management (Text and Cases): V.K. Bhalla, S. Chand & Company.
2. Security Analysis and Portfolio Management: Shashi K. Gupta & Rosy Joshi, Kalyani Publishers.
3. Investment Management: Dr. V.A. Avadhani, Himalaya Publishing House.
4. Fundamentals of Investment Management: Preeti Singh, Himalaya Publishing House
5. Security Analysis and Portfolio Management: Kevin, PHI.
6. Investment Analysis and Portfolio Management: Prasanna Chandra, Tata McGraw-Hills
7. Investment Management, Prashanta Athma: Kalyani Publications.
8. Security Analysis and Portfolio Management: Madhumati Ranganathan, Pearson.
9. Investment Management: Masheswari, PHI.
10. Security Analysis and Portfolio Management: Dhanesh Khatri, Trinity Press.

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE603a: MULTIMEDIA SYSTEMS

(Only for B.Com (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits:** 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective:*To acquire the knowledge of multimedia systems.*

UNIT-I: MEDIA AND DATA STREAMS:

Properties of multimedia systems, Data streams characteristics: Digital representation of audio, numeric instruments digital interface Bark concepts, Devices, Messages, Timing Standards Speech generation, analysis and transmission.

UNIT-II: DIGITAL IMAGE&ANIMATIONS:

Digital Image: Analysis, recognition, transmission, **Video:** Representation, Digitalization, transmission.

Animations: Basic concepts, animation languages, animations control transmission.

UNIT-III: DATA COMPRESSION STANDARDS&STORAGE:

Data Compression Standards: JPEG, H-261, MPEG DVI

Optical storage devices and Standards: WORHS, CDDA, CDROM, CDWO, CDMO.

Real Time Multimedia, Multimedia file System.

UNIT-IV: MULTIMEDIA COMMUNICATION SYSTEM, DATABASES&SYNCHRONIZATION:

Multimedia Communication System: Collaborative computing session management, transport subsystem, QOS, resource management.

Multimedia Databases: Characteristics, data structures, operation, integration in a database model.

Synchronization: Issues, presentation requirements, reference to multimedia synchronization, MHEG.

UNIT-V: MULTIMEDIA APPLICATION:

Media preparation, Composition, integration communication, consumption, entertainment.

SUGGESTED READINGS:

1. Ralf Steninmetz, KlaraHahrstedt, *Multimedia: Computing, Communication and Applications,* PHI PTR Innovative Technology Series.
2. John F.KoegelBufford, *Multimedia System*, Addison Wesley, 1994.
3. Mark Elsom – Cook, *Principles of Interactive Multimedia* , Tata Mc-Graw Hill, 2001.
4. Judith Jefcoate, *Multimedia in Practice: Technology and Application* , PHI 1998.

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 603b: CYBER SECURITY

(Only for B.Com (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits:** 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective *To understand the cyber security, detection, network security, the law and cyber forensic.*

UNIT-I: INTRODUCTION TO CYBER SECURITY, CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS:

Introduction to Cyber Security: Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

Cyber Security Vulnerabilities: Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness.

Cyber Security Safeguards: Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

UNIT-II: SECURING WEB APPLICATION, SERVICES AND SERVERS:

Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

UNIT-III: INTRUSION DETECTION AND PREVENTION:

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

UNIT-IV: CRYPTOGRAPHY AND NETWORK SECURITY:

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

UNIT-V: CYBERSPACE AND THE LAW, CYBER FORENSICS:

Cyberspace and The Law: Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Cyber Forensics: Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.

SUGGESTED READINGS:

1. Ramandeepkaurnagra, Cyber laws and Intellectual Property Rights, Kalyani Publishers, 7e,
2. Nina Godbole&SunitBelapureCyber Security, Wiley India Pvt Ltd, 2012.
3. Gerald. R. Ferrera, Reder and linchtenstein, Cyber laws – Text and Cases,3e, Cengage learning

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Faculty of Commerce & Business Management,

B.Com. VI Semester - Paper DSE 603c: DATA ANALYTICS

(Only for B.Com (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits:** 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective:*To l*earn the different ways of data Analysis, data streams, mining and clustering and visualization.

UNIT-I: INTRODUCTION TO BIG DATA:

Introduction to Big Data Platform – Challenges of conventional systems – Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting – Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT-II: DATA ANALYSIS:

Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics – Rule induction – Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

UNIT-III: MINING DATA STREAMS:

Introduction to Streams Concepts – Stream data model and architecture – Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window – Realtime Analytics Platform(RTAP) applications – case studies – real time sentiment analysis, stock market predictions.

UNIT-IV: FREQUENT ITEMSETS AND CLUSTERING:

Mining Frequent itemsets – Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

UNIT-V: FRAMEWORKS AND VISUALIZATION:

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases – S3 – Hadoop Distributed file systems – Visualizations – Visual data analysis techniques, interaction techniques; Systems and applications:

SUGGESTED READINGS:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets,Cambridge University Press, 2012.
3. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analystics, John Wiley & sons, 2012.

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KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.A. ECONOMICS II Year

SEMESTER – III

PAPER – III STATISTICS FOR ECONOMICS

(Discipline Specific Course)

Theory: 5 Hours/Week; Credits: 5 Marks: 100 (Internal: 20; External: 80)

Module– I: Introduction to Statistics

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

Module– II: Measures of Central Tendency and Dispersion

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

Module– III: Correlation and Regression

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

Module– IV: Index Numbers

Meaning and Uses – Aspects and Difficulties in the Construction of Index Numbers - Types of Index Numbers –Methods of Index Numbers - Laspayer, Paasche and Fisher.

Module– V: Analysis of Time Series

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

Reference Books:

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

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.A. ECONOMICS I Year

SEMESTER – I

PAPER – I MICRO ECONOMICS

(Discipline Specific Course)

Theory: 5 Hours/Week; Credits: 5 Marks: 100 (Internal: 20; External: 80)

Module-I: Consumer Behaviour:

Cardinal Approach to Utility Analysis - Ordinal utility Analysis - Properties of Indifference curves - concept of budget line - equilibrium of consumer - price consumption curve - income consumption curve - derivation of demand curve with the help of Indifference Curves' Analysis - Concepts of price - income and substitution effects.

Module-II Production Analysis

Concept of Production Function - Linear and homogeneous production function - Short run and long run production function – Law of Variable Proportions - Laws of Returns to Scale - Properties of iso-product curves - concept of factor price line - analysis of least cost input combination - concepts of expansion path and economic region of production - Properties of Cobb-Douglas Production Function.

Module-III: Cost and Revenue Analysis

Cost concepts: Accounting, real, opportunity, explicit costs - Total cost- total fixed cost - total variable cost - average cost - average fixed cost - average variable cost - marginal cost and the relationship between average and marginal cost - derivation of long run average cost curve - Economies of scale: internal and external - Revenue concepts: total - average and marginal - relationship between Average revenue & marginal revenue and price elasticity of demand.

Module--IV: Analysis of Market Structure:

Concepts & Classification of Markets –Basic Features of Perfect Competition - Monopoly-Equilibrium of a monopolist – Concept of Price discrimination & degrees of price discrimination-Monopolistic competition – characteristics - concepts of product differentiation and selling cost - Equilibrium under Monopolistic competition – Oligopoly- characteristics of oligopoly – Prince and output determination – Analysis of Kinked Demand Curve – Concept of Duopoly - Cournot's version of duopoly.

Module-V: Analysis of Business Firm and Profit

Characteristics of a business firm, objectives of business firm: profit maximization, sales revenue maximization, market share maximization, growth maximization. Profit concepts: Accounting and economic; break-even point and profit –volume analysis

References:

1. M L Seth : Micro Economics
2. M L Jhingoan: : Micro Economics
3. H L Ahuja: : Modern Micro Economics
4. Koutsainies; : Modern Micro Economics
5. Stonier and Hague : Micro Economics
6. Salvatore : Micro economics
7. Schaum Series : Micro economics
8. Pyndick : Micro economics
9. Gregory Mankiw : Principles of Micro Economics

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.A. ECONOMICS I Year

SEMESTER –II

PAPER – II MACRO ECONOMICS

(Discipline Specific Course)

Theory: 5 Hours/Week; Credits: 5 Marks: 100 (Internal: 20; External: 80)

Module– I: Introduction

Macro Economics – Concept of Circular Flow of Incomes –National Income Analysis: Concepts and Components – Methods of Measurement –Difficulties and Limitations in the Estimation of National Income.

Module– II: Theories of Income and Employment

Classical Theory of Income and Employment - Keynesian Theory of Income and Employment- Effective Demand – Consumption Function- Average Propensity to Consume (APC) and Marginal Propensity to Consume (MPC) – Factors Determining Consumption Function – Savings Function- Average Propensity to Save and Marginal Propensity to Save – Concepts of Multiplier and Accelerator

Module– III: Investment & Theories of Interest Rate

Capital and Investment- Types of Investment- Determinants of Level of Investment – Marginal Efficiency of Capital and Marginal Efficiency of Investment- Neo-Classical and Keynesian Theories of Interest.

Module – IV: Supply of Money & Demand for Money

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

Module– V: Inflation & Trade Cycles

Inflation: Concept, Types, Causes and Measurement – Effects of Inflation – Measures to Control Inflation – Concepts of Phillips Curve, Deflation and Stagflation – Trade Cycles: Concept, Causes and Phases of trade cycle.

Reference Books:

Ackley, G (1976) : Macro Economics: Theory and Policy, Macmillan, New York
Shapiro, E (1996) : Macro Economic Analysis, Galgotia Publications, New Delhi
Hansen A H (1953): A Guide to Keynes, McGraw Hill, New York
Keynes JM (1936) : The General Theory of Employment, Interest and Money,
MC Vaish : Macro Economic Theory
HL Ahuja : Macro Economic Theory & Policy
Vanitha Agarwal : Macro Economic Theory & Policy, Pearson Education
HL Ahuja : Macro Economic Analysis
Gupta, SB : Monetary Economics: Institutions, Theory and Policy
M.L. Seth : Macro Economics, Lakshmi Narain Agarwal, Agra, 2006

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.A. ECONOMICS II Year

SEMESTER – IV

PAPER – IV INDIAN ECONOMY

(Discipline Specific Course)

Theory: 5 Hours/Week; Credits: 5 Marks: 100 (Internal: 20; External: 80)

Module I: Structure of the Indian economy:

Indian Economy at the time of Independence - Changes in the Composition of National Income and Employment - Natural Resource base - Land, Water, Forest, Mineral and Metal Resources - Population: Size, Growth and Composition and their implications for Indian economy.

Module II: Indian Agriculture:

Importance of Agriculture - Trends in Agricultural Production and Productivity. Land Reforms - Green Revolution - Agricultural Finance - Agricultural Marketing - Agricultural Price Policy - Food Security in India.

Module III: Indian Industry:

Importance of Industrialization - Trends in Industrial Production - Industrial Policy Resolutions - 1948, 1956, 1991 - Role of Public and Private Sectors - Formal and Informal Sectors in Industry.

Module IV: NIIT AAYOG:

Evolution of Planning Commission – Failures and Demise of planning commission - Genesis of NITI Aayog: structure and composition of NIIT Aayog, Functions and objectives of NIIT Aayog, Differences between NIIT Aayog and planning commission - NIIT Aayog role in strategic planning and development.

Module-V Service Sector and Economic Reforms:

Concept, Components, Trends and Role of Service Sector - Infrastructural Development- Transport, Banking, Insurance, and Information Technology - Economic Reforms- Liberalization, Privatization, and Globalization- A critical evaluation.

References:

1. SK Misra and Puri : Indian Economy, Himalaya Publishing House.
2. Ishwar C Dhigra : The Indian Economy: Environment and Policy, SC Chand & Sons, New Delhi
3. KPM Sundaram : Indian Economy
4. PK Dhar : Growing Dimensions of Indian Economy, Kalayani Publisher.

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B.A. (ECONOMICS) SYLLABUS
Semester - VI
Discipline Specific Elective

Paper –VI (A) INTERNATIONAL ECONOMICS

Module - I: Theories of International Trade:
Theories of absolute advantage, comparative advantage and opportunity costs; Theorem of factor price equalization; - Heckscher - Ohlin theory of trade, Leointif Paradox.

Module - II: Trade and Growth
Gains from Trade.-Trade as an Engine of Economic Growth. Concepts of Terms of Trade-Factors affecting Terms of Trade- Singer-Prebish secular deterioration of Terms of Trade.

Module- III: Tariff and Non-Tariff Barriers to Trade
The basic analysis of Tariffs, Quotas, Protection and Imperfect Competition, Optimum tariff. Customs unions, trade barriers, Arguments for and against a Tariff.

Module- IV: Balance of Payments
Concepts and Components of BOP, Equilibrium and disequilibria in Balance of payments, Types of Disequilibria. Remedial measures to control disequilibrium. Causes of Devaluation. Direction and Composition of Foreign trade, Export and Import Policies of India.

Module – V: Internal Factor movements
International Movement of labor, international lending and world debt crisis, Foreign Direct Investment.

References:

1. Soderston B (1990): International Economics, Macmillan Press Ltd. London
2. Kindle Berger C P (1986): International Economics RD Irwin Concepts wood
3. Vaish MC&Sudhama Singh (2000): International Economics, Himalaya Publishing House, New Delhi
4. Francis Cherunilam: International Economics 4th Edition
5. Mithani DM (2000): International Economics, Himalaya, Mumbai
6. Desai:International Economics, Himalaya, New Delhi.

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WARANGAL-506 009. (T.S.)

B.A. (ECONOMICS) SYLLABUS
Semester - V
Discipline Specific Elective

Paper – V (B)
PUBLIC ECONOMICS

Module - I: Introduction
Meaning and importance of Public finance -Evolution of public finance. Multiple theories of public household-Public and Private goods-Markets mechanism in public and private goods. State as an agent of planning and development

Module- II: Public Expenditure
Theories of public expenditure- Wagner' s law of increasing state activities – Peacock Wisemans hypothesis- Principle of Maximum Social advantage –Growth and pattern of public expenditure, Effects of public expenditure-Cost benefit analysis.

Module- III: Taxation & Public Debt
Approaches to taxation- Benefit approach, Ability to pay approach and Neutrality approach- Elasticity and buoyancy of taxation-incidence and shifting of taxation-Types and classification of taxes and VAT, Approaches to public debt.

Module- IV: Fiscal Policy & Federal Finance
Definition of fiscal policy and its objectives; Fiscal Policies for redistribution of income and wealth and stabilization – fiscal policies in a developing country, federal financial structure and its main features – Direct taxes-Income tax-Corporate tax. Indirect tax structure- –GST

Module- V: Budget
Budget – Classification of budgets –Economic, Functional, organizational, classification of budgets- performance programming and zero based budgets- surplus, balanced and deficit budgets- Concepts of budget deficit and their implications – State and Central budgets. Fiscal crisis and Fiscal sector reforms in India

References

1. Atkinson, A Band J.E Siglitz (1980) : Lecturers on Public Economics, Tata McGraw Hill, New York.
2. Auerbach, A J and M. Feldson (Eds.) (1985): Handbook of Public Economics, Vol. 1, North Holland, Amsterdam.
3. Buchanan, J M (1970): The Public Finances, Richard D Irwin, Homewood.
4. Goode, R (1986): Government Finance in Developing Countries, Tata McGraw Hill, New Delhi.
5. Houghton, J M (1970): The Public Finance: Selected Readings, Penguin, Harmondsworth.
6. Jha, R (1998): Modern Public Economics, Routledge, London.
7. Menutt, P (1996): The Economics of Public Choice, Edward Elgar, U.K.
8. Musgrave, R A and P.B. Musgrave (1976): Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyo.
9. S K Singh Public Economics
10. Om prakash Public Economics

B.A. (ECONOMICS) SYLLABUS
Semester – V
Discipline Specific Elective

Paper -V (A)
AGRICULTURAL ECONOMICS-

Module-I
Nature and scope of agricultural economics - Factors affecting agricultural development, technological, institutional and general -Interdependency between agriculture and industry.

Module-II
Concept of production function: input and product relationship in farm production. Resource use and efficiency - Production function analyses in agriculture - Factor combination and resource substitution.

Module-III
Growth and productivity in Indian agriculture - Recent trends in agricultural growth in India Agrarian reforms and their role in economic development - Inter-state variations in growth of output and productivity; cropping pattern shifts - Supply of inputs - Pricing of inputs and role of subsides.

Module-IV
Systems of farming - farm size and productivity relationship in Indian Agriculture - New agriculture strategy and Green revolution and its impact.

Module-V
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

Reference Books:

1. Sadhu An, Singh Amarjit and Sing Jasbir (2004) Fundamental of Agriculture Economics, Himalaya Publishing House, Delhi.
2. Lekhi RK and Sigh Joginder, Agriculture Economics, Kalyani Publishers.
3. Government of India (1976) , Report of the National commission on Agriculture, New Delhi
4. Bilgrami, S.A.R. (1996) Agriculture Economics Himalaya Publishing House, Delhi.
5. Dantwala, M.L. et al (1991) Indianan Agriculture Development since Independence, Oxford& IBH, New Delhi.

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B.A. (ECONOMICS) SYLLABUS
Semester – V
Discipline Specific Elective

Paper -V (A)
AGRICULTURAL ECONOMICS-

Module-I
Nature and scope of agricultural economics - Factors affecting agricultural development, technological, institutional and general -Interdependency between agriculture and industry.

Module-II
Concept of production function: input and product relationship in farm production. Resource use and efficiency - Production function analyses in agriculture - Factor combination and resource substitution.

Module-III
Growth and productivity in Indian agriculture - Recent trends in agricultural growth in India Agrarian reforms and their role in economic development - Inter-state variations in growth of output and productivity; cropping pattern shifts - Supply of inputs - Pricing of inputs and role of subsides.

Module-IV
Systems of farming - farm size and productivity relationship in Indian Agriculture - New agriculture strategy and Green revolution and its impact.

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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

Reference Books:

1. Sadhu An, Singh Amarjit and Sing Jasbir (2004) Fundamental of Agriculture Economics, Himalaya Publishing House, Delhi.
2. Lekhi RK and Sigh Joginder, Agriculture Economics, Kalyani Publishers.
3. Government of India (1976) , Report of the National commission on Agriculture, New Delhi
4. Bilgrami, S.A.R. (1996) Agriculture Economics Himalaya Publishing House, Delhi.
5. Dantwala, M.L. et al (1991) Indianan Agriculture Development since Independence, Oxford& IBH, New Delhi.

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B.A. (ECONOMICS) SYLLABUS
Semester - VI
Discipline Specific Elective

Paper –VI (B) DEVELOPMENT ECONOMICS

Module- I: **Economic Development and Growth:**
Concepts of Economic Growth and Development- Measurement of Economic Development: Per Capita Income, Basic Needs, Physical Quality of Life Index, Human Development Index and Gender Empowerment Measure. Role of State and Market in Economic Development

Module- II: **Factors in Economic Development:**
Factors effecting Economic Development-Characteristics of developing Countries- Population and Economic Development - Theories of Demographic Transition. Human Resource Development and Economic Development

Module- III: **Theories of Economic Development:**
Lewis, Rodan, Nurkse's Balanced Growth Strategy, Hirsch man's Un-balanced Growth Strategy.

Module- IV: **Investment Criteria**
Choice of Techniques – Capital, labour and appropriate technology – Allocation of resources – Investment Criteria – Role of labour orientation methods in the development of third world countries – Role of capital formation in developing countries - Role of Technology in Economic Development.

Module V : Financing Economic Development External resources - FDI, Foreign aid vs. trade, technology inflow, MNC activity in developing countries; Borrowings - domestic and external; Burden of borrowing - IMF and World Bank.

References:

1. Mier, Gerald, M : Leading issues in Economic Development, OUP, Delhi
2. Todaro, Micheal P : Economic Development in the third world, Orient Longman, Hyderabad
3. Ghatak Subrata : Introduction to development economics
4. Sukumoy chakravarthy : Development Planning- ndian Experience, OUP, Delhi
5. Misra &Puri : Economic Development and Planning, Theory and practice

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DEPARTMENT OF ENGLISH
KAKATIYA UNIVERSITY
SYLLABUS FOR I YEAR (I SEMESTER) GENERAL ENGLISH
AT UNDERGRADUATE LEVEL
w.e.f **(under CBCS from 2019-2020)**

Text Book Entitled - *English for Advancement* for I Year (Sem I & II) 4 Credits
Published by Orient BlackSwan

UNIT ONE (SHORT FICTION)	**TEXT**	**AN ASTROLOGER'S DAY by R.K.NARAYAN**
	GRAMMAR	NOUNS AND PRONOUNS
	VOCABULARY	WORD ROOTS
	READING COMPREHENSION	HAZARDS OF FOOD COLOURING
	PRONUNICATION	CONSONANTAL SOUNDS
	LANGUAGE SKILLS	TYPES OF LISTENING
	SOFT SKILLS	MOTIVATION AND GOAL-SETTIN
UNIT TWO (PROSE)	**TEXT**	**OF STUDIES by FRANCIS BACON**
	GRAMMAR	ADJECTIVES
	VOCABULARY	FUNNY SIDE OF ENGLISH
	READING COMPREHENSION	PLEASURES OF IGNORANCE by ROBERT LYND
	PRONUNICATION	VOWEL SOUNDS
	LANGUAGE SKILLS	CONVERSATION SKILLS
	SOFT SKILLS	TIME MANAGEMENT
UNIT THREE (POETRY)	**TEXT**	**A POISON TREE by WILLIAM BLAKE**
	GRAMMAR	ADVERBS
	SPELLING	COMMONLY MISSPELT WORDS

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	READING COMPREHENSION	VALUES IN LIFE by RUDYARD KIPLING
	PRONUNCIATION	PHONETIC TRANSCRIPTION
	SOFT SKILLS	EMOTIONAL INTELLIGENCE & SOCIAL CONSCIOUSNESS
UNIT FOUR (DRAMA)	**TEXT**	**THE RISING OF THE MOON by LADY GREGORY**
	GRAMMAR	VERBS
	PRONUNICIATION	INTONATION
	READING COMPREHENSION	HAZRATH URS
	LANGUAGE SKILLS	SPEAKING : JAM
	VALUE ORIENTATION	SELF-DISCOVERY

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DEPARTMENT OF ENGLISH
KAKATIYA UNIVERSITY
SYLLABUS FOR I YEAR (II SEMESTER) GENERAL ENGLISH
AT UNDERGRADUATE LEVEL
(under CBCS from 2019-2020)

UNIT ONE (SHORT FICTION)	**TEXT**	**WITH THE PHOTOGRAPHER by STEPHEN LEACOCK**
	GRAMMAR	PREPOSITIONS
	VOCABULARY	PREFIXES AND SUFFIXES
	READING COMPREHENSION	SPORTS, POLITICS AND DEMOCRACY by ARIO BIMO UTOMO
	PRONUNICATION	STRESS
	LANGUAGE SKILLS	INTRODUCING ONSELF IN FORMAL AND INFORMAL SITUATIONS
	SOFT SKILLS	LATERAL THINKING
UNIT TWO (PROSE)	**TEXT**	**A TREATISE ON GOOD MANNE AND GOOD BREEDING by JONATHAN SWIFT**
	GRAMMAR	CONJUNCTIONS
	VOCABULARY	SYNONYMS
	READING COMPREHENSION	THE ECONOMIC POWER OF LANGUAGE by GABRIELLE HOGAN-BRUN
	PRONUNICATION	STRESS AND PRACTICE IN PHONETIC TRANSCRIPTION
	LANGUAGE SKILLS	LISTENING COMPREHENSION

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	SOFT SKILLS	ATTITUDE
UNIT THREE (POETRY)	**TEXT**	**ODE ON SOLITUDE by ALEXANDER POPE**
	GRAMMAR	KINDS OF SENTENCE
	SPELLING	PLURALS
	READING COMPREHENSION	JADAV PAYENG: THE FOREST MAN OF INDIA
	PRONUNCIATION	ASSIMILATION
	SOFT SKILLS	TEAM WORK
UNIT FOUR (DRAMA)	**TEXT**	**A MARRIAGE PROPOSAL by ANTON CHEKOV**
	GRAMMAR	COMMON MISTAKES
	PRONUNICIATION	ELISON
	READING COMPREHENSION	HOW I BECAME A PUBLIC SPEAKER? by GEORGE BERNARD SHAW
	LANGUAGE SKILLS	PRESENTATIONS
	VALUE ORIENTATION	SELF-CONFIDENCE

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KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.A/B.COM/BBA/B.SC ENGLISH II YEAR

SEMESTER – III

PAPER – III: **ENGLISH**

Theory: **3 Hours/Week;** **Credits: 3** **Marks: 100 (Internal: 20; External: 80)**

Prescribed Textbook entitled: English for Excellence
Published by Orient BlackSwan

UNIT I: GENDER EQUALITY

1. "Achieving Gender Equality in India: What Works, and What Doesn't" by Smriti Sharma
2. "They Shut me up in Prose" by Emily Dickinson
3. Prepositions
4. Phrasal Verbs

UNIT II: GENDER ROLES

1. "The Wonder Story of Kalpana Saroj" by Rakhi Chakraborthy
2. "The Kitchen" by Vimala
3. Voice
4. Technical Vocabulary

UNIT III: ENDING VIOLENCE AGAINST WOMEN

1. "What is my Name?" by P.Sathyavathi
2. "Voice of the Unwanted Girl" by Sujatha Bhatt
3. Connectives
4. Idioms

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.A/B.COM/BBA/B.SC ENGLISH II YEAR

SEMESTER – IV

PAPER – IV: **ENGLISH**

Theory: 3 Hours/Week; Credits: 3 Marks: 100 (Internal: 20; External: 80)

Prescribed Textbook entitled: English for Excellence
Published by Orient BlackSwan

UNIT I: RENEWABLE AND NON-RENEWABLE RESOURCES

1. Jadav Payeng
2. "The Tame Bird was in a Cage" by Rabindranath Tagore
3. Reported Speech
4. Commonly Confused Words

UNIT II: ECOSYSTEMS AND ENVIRONMENTAL POLLUTION

1. "Climate Change and Global Warming" by Michael Shafer
2. "A Requiem for Earth" by O.N.V.Kurup
3. Conditionals
4. Suffixes

UNIT III: CONSERVATION AND BIODIVERSITY

1. "The Ungrateful Man: A Conversation between Trees " by Swathi Shenoy
2. "The Felling of the Banyan Tree" by Dilip Chitre
3. Common Errors
4. Collocations

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

DEPARTMENT OF ENGLISH

Under Graduate Courses (Under CBCS 2021– 2022 onwards)

GENERAL ENGLISH III-YEAR, V- SEMESTER

B.A., B.COM., B.Sc., B.B.A., B.C.A.,B.A(L).

PAPER – V: ENGLISH

COMMUNICATION SKILLS

English through Human Values and Ethics

Theory: 3 Hours/Week; Credits: 3 Marks: 75 (Internal: 15; External: 60)

Unit1	PROSE	Tolerance is a Moral Virtue – Rivka T. Witenberg
	POEM	How Happy is the Little Stone – Emily Dickinson
	LANGUAGE	Paragraph Writing
Unit 2	PROSE	When Cities were Nature's Haven – Harini Nagendra
	POEM	Where the Mind is Without Fear – Rabindranath Tagore
	LANGUAGE	Note-making
Unit 3	PROSE	Why we Love Holiday Rituals and Traditions – Dimitris Xygalatas
	POEM	Sonnets are Full of Love – Christina Rossetti
	LANGUAGE	Public Speaking

PRESCRIBED TEXTBOOK: *English for Career*: A Course book for Undergraduate Learners

Eds. K. Purushotham, M. Rajeshwar and R. Meghana Rao. Published by Orient Blackswan.2021.

Approved

27-12-2021

Dr. B. Krishnaiah

EXTERNAL MEMBER

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Ms. P. Nirmala

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R. Meghana Rao

27/12/2021

Dr. R. Meghana Rao

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GENERAL ENGLISH III-YEAR, VI- SEMESTER

B.A., B.Com. B.Sc., B.B.A., [redacted] B.A(L).

PAPER – VI : ENGLISH

COMMUNICATION SKILLS

English for Employability skills

Theory: 3 Hours/Week; Credits: 3; Marks: 75 (Internal: 15; External: 60)

Unit 1	PROSE	Sreelakshmi Suresh
	POEM	For whom the Bell Tolls – John Donne
	LANGUAGE	Official Letters
Unit 2	PROSE	How Work can be Made Meaningful – Katie Bailey
	POEM	Teamwork – Edgar Albert Guest
	LANGUAGE	Job Application Letters and Curriculum Vitae
Unit 3	PROSE	How the Corona-virus Sparked a Wave of Innovation – Sreevas Sahasranamam
	POEM	See it through – Edgar Albert Guest
	LANGUAGE	Email etiquette

PRESCRIBED TEXTBOOK: *English for Careers*: A Course book for Undergraduate Learners

Eds. K. Purushotham, M. Rajeshwar and R. Meghana Rao. Published by Orient Blackswan, 2021.

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23/12/2021

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - I
History of India (From Earliest Times to c.700 CE)
(DSC-101) Discipline Specific Course - Paper – I
(With Effect from ~~2019-2020~~) 2020-2021

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

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

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

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

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

Recommended Books:

A.L. Basham, *The Wonder that was India*, Rupa & Co., New Delhi, 2001.
Allchin, Bridget & Raymond, *The Rise of Civilization in India and Pakistan*, CUP, New Delh 1996.
E.H. Carr, *What is History?* Penguin Books, England, 1990.
Majumdar, R.C., *History and Culture of the Indian People*, Vols. 1, II & & III.
Romila Thapar, *Asoka and the Decline of the Mauryas*, OUP, New Delhi, 1995.
Romila Thapar, *Early India (From the earliest to AD 1300)*.
Romila Thapar, *A History of India*, Vol. I, Penguin Books, New Delhi, 1990.
Upinder Singh, *A History of Ancient and Medieval India*.

Head.

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[R. SUMALATHA]

(S. Ganapathirao)

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TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - II
History of India (c.700-1526 CE)
(DSC-201 - Discipline Specific Course) - Paper – II
~~(2019-2020)~~ 2020-21

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

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

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

Module-IV: Kakatiyas – Polity – Administration - Society and Economy - Literature and Religion – Art and Architecture – Yadavas – Hoysalas and Pandyas – Their contribution to South Indian Culture.

Module-V: Vijayanagara – A Brief survey of Political History – Polity - Administration - Society and Economy – Religion – Art and Architecture – Language and Literature - The Brief History of Bahamanis and their Contribution to the Deccan Culture.

Recommended Books:

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

Telugu:
A. Bobbili and others, *Bharatha Desha Charitra upto A.D. 1526*, Telugu Academy, Hyderabad 2003.
D.D. Kosambi, *Bharatha Desha Charitra Parichaya Vyasalu*, Hyderabad Book Trust, Hyderabad 1996.
B.A. First & Second Year *Indian History* Text Books (English & Telugu Medium-CBCS) 2017-18

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TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - III
History of India (1526-1857 CE)
(DSC - Discipline Specific Course - Paper – III
(~~2019-2020~~) 2020-21

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

Module-II: Rise of Regional Powers - Marathas – Shivaji his Military Achievements, and his Administration – The Rise of Peshwas – and their role in Maratha History - The Third Battle of Panipat – The Rise of Sikhs. – Ranjit Singh – Rise of Princeley States – Hyderabad – Avad - Junagarh – Mysore – Kashmir.

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

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

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

Recommended Books:

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

Telugu:

B. Laxminarayana Rao, *Bharatadesa Swathantra Charitra* (Part-3), (Trans.), Telugu Academy, 2005.
Bipan Chandra, *Adhunika Bharatadesa Charitra* (Translation Sahavasi), Hyderabad Book Trust.
B.A. First & Second Year Indian History Text Books (English & Telugu Medium-CBCS) 2016-17.
J. Durga Prasad and Others, *Bharatadesa Charitra (1526-1964 A.D.)*, Telugu Academy, 2006.
V. Rama Krishna Reddy, *Bharatadesa Charitralo Mukhya Ghattalu*, Telugu Academy, 2005.

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TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - IV
History of India (1858-1964 CE)
(DSC - Discipline Specific Course-401) - Paper – IV
~~(2019-2020)~~ 2020-21

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

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

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

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

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

Recommended Books:

A.R. Desai, *Social Background of Indian Nationalism*, Popular Prakashan Pvt. Ltd., Mumbai, 2002.
Bipan Chandra (et.al.), *India's Struggle for Independence*, Penguin Books, Kolkata, 2001.
Bipan Chandra, *A History of Modern India*.
Kenneth Jones, *Social and Religious Reform Movements in India*.
R.C. Majumdar (ed.), *A History and Culture of India People*, Bharatiya Vidya Bhavan Series (Relevant Vols.).
R.C. Majumdar, H.C. Raychaudhuri & K. Datta, *An Advanced History of India*, Macmillan, Madras, 1995.
S. Gopal, *Jawaharlal Nehru – A Biography*.
Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.
Tarachand, *A History of the Freedom Movement in India*, Four Volumes.
V.D. Mahajan, *Modern Indian History*.

Telugu:

B. Vijaya Bharati, *Mahatma Jyothirao Phule* (Translation), Hyderabad Book Trust, 2004.
Bhoopati Laxminarayana Rao, *Bharatadesa Swathantra Charitra* (Part – 3), (Translation), Telugu Academy, 2005.
Bipan Chandra, *Adhunika Bharatadesa Charitra* (Translation Sahavasi), Hyderabad Book Trust.
J. Durga Prasad and Others, *Bharatadesa Charitra (upto 1526-1964 A.D.)*, Telugu Academy, 2006.
V. Rama Krishna Reddy, *Bharatadesa Charitralo Mukhya Ghattalu*, Telugu Academy, 2005.

[B. SUMALATHA]

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TELANGANA STATE
B.A. HISTORY SYLLABUS
Semester - V

History of the Modern World (From 1453 CE to 1964 CE)

(DSE - Discipline Specific Elective-501 (A) - Paper – V
~~(2019-2020)~~ 2021 - 22

Aug

Unit-I: Decline of Medieval Socio-Political, Religious, Economic conditions - Characteristic features of Renaissance - Significance of Reformation and Counter Reformation movements in Europe - Geographical Discoveries and Rise of Colonialism – Colonization of America - Mercantilism and Commercial Revolution. Emergence of Nation States in Europe – Spain – France – England – Russia – Austria – Italy and Prussia - Nature of Absolute Monarchies and Feudalism in Europe and Asia.

Oct Nov

Sep

Unit-II: Age of Revolutions – Glorious Revolution (1688) - American Revolution (1776) - French Revolution (1789) – Napoleon – Wars – Reforms- Revolutions of 1830 and 1848 - Industrial Revolution.

Oct

Unit-II: Rise of Capitalism – Impact on Asia and Africa – Colonization of Africa - Asia and Latin America - Entry of European Powers in China – Opium Wars – Revolution in China – Boxer Revolt - Sun-Yat-Sen – Mao's Communist Revolution - Meizi Restoration and Modernization of Japan- Unification Movements in Germany and Italy.

Dec

Nov

Unit-IV: World between 1914-1945 Rivalry among colonial powers Imperialist Hegemony - Causes and consequences of first World War – World between the Wars - League of Nations - Russian Revolution – Causes and consequences. Fascism in Italy, Nazism in Germany, Militarism in Japan – Nationalist and Communist Movements in China - Role of Sun-Yat-Sen and Mao-Tze-Dung.

Jan

Dec

Unit-V: Causes and consequences of Second World War – UNO, Its Contribution to World Peace – Decolonization and National Liberation Movements in Asia, Latin America and Africa – NAM – its Origin – Aims, Importance..

Feb

Recommended Books:

Arun Bhattacharjee, *History of Modern Europe*, Vol. II.
C.J.H. Hayes, *Europe since 1870 A.D.*, Vol. II.
C.J.H. Hayes, *Europe upto 1870 A.D.*, Vol. I.
Fischer, *A History of Europe*.
J.M. Roberts, *History of the World*, New York, 1976.
Peter Moss, *Modern World History*, Hampshire, 1978.
Taylor, A.J.P., *The Struggle for Mastery in Europe*.
Thompson, D., *Europe Since Napoleon*.
V.D. Mahajan, *History of Modern Europe since 1789*.

Telugu:

Badriraju Sheshagiri Rao and Others, *Adhunika Prapancha Charitra*, Telugu Academy, 2002.
Y. Vaikuntham., *Prapancha Charitra*, Telugu Academy.

[B-SUMALATHA]

TELANGANA STATE
B.A. HISTORY SYLLABUS
Semester - VI

(A) History and Culture of Telangana (From earliest times to 2014 CE)

(DSE - Discipline Specific Elective-601 A
~~(2019-2020)~~ 2021-22

Unit-I: Sources – Pre-History of Telangana – Asmaka Janapada and the Culture of Ancient Telangana – Jainism and Buddhism – Brief Political Survey of Satavahanas – Ikshvakus, Vishnukundins – Medieval Telangana from Kakatiyas to Qutb Shahis – Popular Revolts – Sammakka-Sarakka, Sarvai Papanna – Society, Economy and Culture, Fairs, Festivals, Folk, Batukamma, Bonalu, Urs, Moharram, etc. Telangana Food, Festivals, Arts, Folksongs, Symbols, Musical Instruments, Composite Culture.

Unit-II: Foundation of Asaf Jahi Dynasty – A Brief Survey of The Political History of Asaf Jahis from 1724-1857 – Salarjungs Reforms and their Importance Mir Mahboob Ali Khan and Mir Osman Ali Khan – Modernization of Hyderabad under them – Growth of TRanspotation and Communication, Public Health, Industries and Osmania University – Public Health – Hospitals – Social, Cultural and Political Awakening in Telangana – Press, Journalism and Library Movements – Nizam Andhra Jana Sangham – Arya Samaj and Its Activities – Ittehadul Muslimin Party – Bhagya Reddy Varma and Dalit Movements.

Unit-III: Political Developments in Hyderabad State 1900 to 1942 – The Andhra Maha Sabha – Hyderabad State Congress – Mulki-Non-Mulki Issue (1930) - Vandemataram Movement – Comrades Association, Student and Workers Organisations and Movements - Communist Party and Its Activities – The Role of Women in Hyderabad Freedom Movement.

Unit-IV: Anti-Nizam and Anti-Feudal Movements - Telangana Peasants Armed Struggle – Adivasis Revolt – Kumaram Bheem – Razakars and their Activities – Police Action - Formation of Popular Ministry under Burgula Rama Krishna Rao - Assertion of Mulki Identity and the City College Incident (1952) - Merger of Telangana and the Formation of Andhra Pradesh, (1956).

Unit-V: Discrimination, Dissent and Protest - Violation of Gentlemen's Agreement - Agitation for Separate Telangana State: Formation of TPS – Role of Intellectuals, Students, Employees in 1969 Movement - Second Phase Movement for Separate Telangana – Formation of Various Associations – Telangana Aikya Vedika – Telangana Jana Sabha – Telangana Rashtra Samiti (2001) – Mass Mobilization – Sakala Janula Samme – Millennium March – Sagaru Haram, Chalo Assembly – December 2009 Declaration and the Formation of Telangana State, June 2014.

Recommended Books:

Bhangya Bhukya, *The Subjugated Nomads*, Hyderabad, 2010.
Goutham Pingle, *The Fall and Rise of Telangana*, Hyderabad, 2014.
H. Rajendra Prasad, *Asaf Jahis*, Hyderabad, 2006.
I. Thirumali, *Against Dora and Lord*, New Delhi, 2008.
I. Thirumali, *Telangana – Andhra*, Delhi, 2010.
Kingshuk Nag, *Battle Ground Telangana*, Hyderabad, 2010.
Lalitha & Susie Tharu, *We were Making History*, Kali for Women, New Delhi.

2.1 Differential and Integral Calculus

DSC-1A **BS:101**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to some basic notions in differential calculus.
Outcome: By the time students complete the course they realize wide ranging applications of the subject.

Unit- I
Partial Differentiation: Introduction - Functions of two variables - Neighbourhood of a point (a, b) - Continuity of a Function of two variables, Continuity at a point - Limit of a Function of two variables - Partial Derivatives - Geometrical representation of a Function of two Variables - Homogeneous Functions.

Unit- II
Theorem on Total Differentials - Composite Functions - Differentiation of Composite Functions - Implicit Functions - Equality of $f_{xy}(a, b)$ and $f_{yz}(a, b)$ - Taylor's theorem for a function of two Variables - Maxima and Minima of functions of two variables – Lagrange's Method of undetermined multipliers.

Unit- III
Curvature and Evolutes: Introduction - Definition of Curvature - Radius of Curvature - Length of Arc as a Function, Derivative of arc - Radius of Curvature - Cartesian Equations - Newtonian Method - Centre of Curvature - Chord of Curvature.
Evolutes: Evolutes and Involutes - Properties of the evolute.
Envelopes: One Parameter Family of Curves - Consider the family of straight lines - Definition - Determination of Envelope.

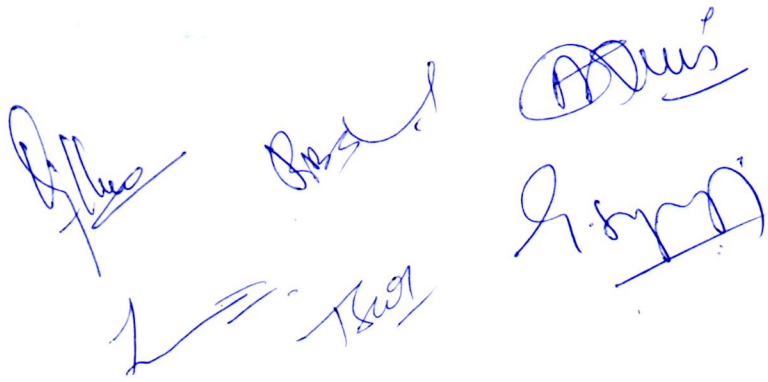
Unit- IV
Lengths of Plane Curves: Introduction - Expression for the lengths of curves $y = f(x)$ - Expressions for the length of arcs $x = f(y)$; $x = f(t)$, $y = \varphi(t)$; $r = f(\theta)$
Volumes and Surfaces of Revolution: Introduction - Expression for the volume obtained by revolving about either axis - Expression for the volume obtained by revolving about any line - Area of the surface of the frustum of a cone - Expression for the surface of revolution - Pappus Theorems - Surface of revolution.

Text:

- Shanti Narayan, P.K. Mittal *Differential Calculus, S.CHAND, NEW DELHI*
- Shanti Narayan *Integral Calculus, S.CHAND, NEW DELHI*

References:

- William Anthony Granville, Percey F Smith and William Raymond Longley; *Elements of the differential and integral calculus*
- Joseph Edwards , *Differential calculus for beginners*
- Smith and Minton, *Calculus*
- Elis Pine, *How to Enjoy Calculus*
- Hari Kishan, *Differential Calculus*



2.2 Differential Equations

DSC-1B **BS:201**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.
Outcome: After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science.

Unit- I
Differential Equations of first order and first degree: Introduction - Equations in which Variables are Separable - Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form - Linear Differential Equations - Differential Equations Reducible to Linear Form - Exact differential equations - Integrating Factors - Change in variables - Total Differential Equations - Simultaneous Total Differential Equations - Equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

Unit- II
Differential Equations first order but not of first degree: Equations Solvable for p - Equations Solvable for y - Equations Solvable for x - Equations that do not contain x (or y)- Equations Homogeneous in x and y - Equations of the First Degree in x and y - Clairaut's equation.
Applications of First Order Differential Equations : Growth and Decay - Dynamics of Tumour Growth - Radioactivity and Carbon Dating - Compound Interest - Orthogonal Trajectories
.

Unit- III
Higher order Linear Differential Equations: Solution of homogeneous linear differential equations with constant coefficients - Solution of non-homogeneous differential equations $P(D)y = Q(x)$ with constant coefficients by means of polynomial operators when $Q(x) = be^{ax}, b\sin ax/b\cos ax, bx^k, Ve^{ax}$ - Method of undetermined coefficients.

Unit- IV
Method of variation of parameters - Linear differential equations with non constant coefficients - The Cauchy - Euler Equation - Legendre's Linear Equations - Miscellaneous Differential Equations.
Partial Differential Equations: Formation and solution- Equations easily integrable - Linear equations of first order.

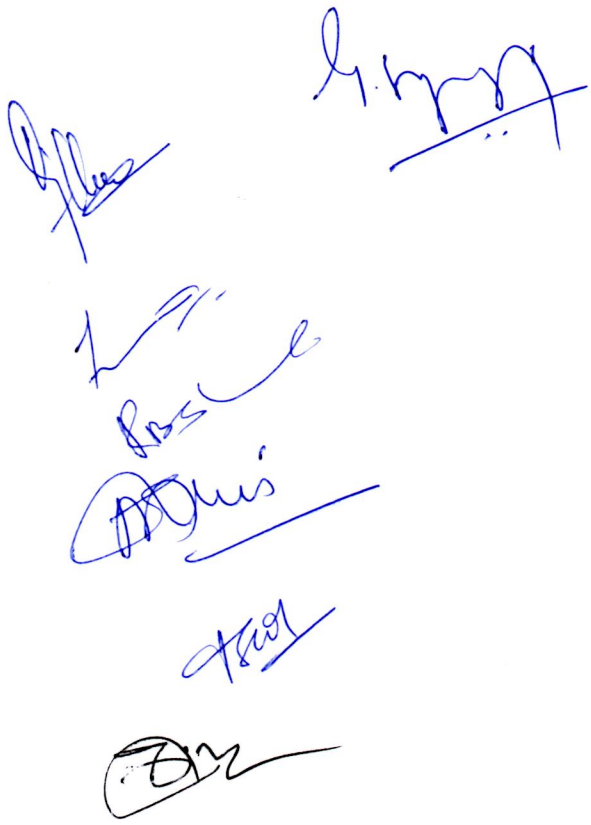
Text:

- Zafar Ahsan,*Differential Equations and Their Applications*

References:

- Frank Ayres Jr, *Theory and Problems of Differential Equations.*

- Ford, L.R ; *Differential Equations.*
- Daniel Murray, *Differential Equations.*
- S. Balachandra Rao, *Differential Equations with Applications and Programs.*
- Stuart P Hastings, J Bryce McLeod; *Classical Methods in Ordinary Differential Equations.*



KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (w.e.f. academic year 2019-20 batch onwards)

B.Sc. MATHEMATICS II Year

SEMESTER – III

REAL ANALYSIS

Theory: 5 credits and Tutorials: 0 credits Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.

Outcome: After the completion of the course students will be in a position to appreciate beauty and applicability of the course.

UNIT- I

Sequences: Limits of Sequences- A Discussion about Proofs-Limit Theorems for Sequences-Monotone Sequences and Cauchy Sequences -Subsequences-Limit sup's and Limit inf's - Series-Alternating Series and Integral Tests.

UNIT- II

Continuity: Continuous Functions -Properties of Continuous Functions -Uniform Continuity - Limits of Functions

UNIT- III

Differentiation: Basic Properties of the Derivative - The Mean Value Theorem - L'Hospital Rule - Taylor's Theorem.

UNIT- IV

Integration: The Riemann Integral - Properties of Riemann Integral-Fundamental Theorem of Calculus.

Text:

Kenneth A Ross, Elementary Analysis-The Theory of Calculus

References:

1] S.C. Malik and Savita Arora, Mathematical Analysis, Second Edition, Wiley Eastern Limited, New Age International (P) Limited, New Delhi, 1994.

2] William F. Trench, Introduction to Real Analysis

3] Lee Larson , Introduction to Real Analysis I

4] Shanti Narayan and Mittal, Mathematical Analysis

5] Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; Elementary Real analysis

6] Sudhir R., Ghorpade, Balmohan V., Limaye; A Course in Calculus and Real Analysi

ALGEBRA

Theory: 5 credits and Tutorials: 0 credits Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.

Outcome: On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects.

UNIT- I

Groups: Definition and Examples of Groups- Elementary Properties of Groups-Finite Groups - Subgroups -Terminology and Notation -Subgroup Tests - Examples of Subgroups.

Cyclic Groups: Properties of Cyclic Groups - Classification of Subgroups Cyclic Groups.

UNIT- II

Permutation Groups: Definition and Notation -Cycle Notation-Properties of Permutations -A

Check Digit Scheme Based on D_5. Isomorphisms ; Motivation- Definition and Examples - Cayley's Theorem Properties of Isomorphisms -Automorphisms-Cosets and Lagrange's Theorem Properties of Cosets 138 - Lagrange's Theorem and Consequences-An Application of Cosets to Permutation Groups -The Rotation Group of a Cube and a Soccer Ball.

UNIT- III

Normal Subgroups and Factor Groups: Normal Subgroups-Factor Groups -Applications of Factor Groups -Group Homomorphisms - Definition and Examples -Properties of Homomorphisms -The Fifirst Isomorphism Theorem.

Introduction to Rings: Motivation and Definition -Examples of Rings -Properties of Rings - Subrings.

Integral Domains: Definition and Examples - Fields Characteristics of a Ring.

UNIT- IV

Ideals and Factor Rings: Ideals -Factor Rings -Prime Ideals and Maximal Ideals.

Ring Homomorphisms: Definition and Examples-Properties of Ring-Homomorphisms.

Text:

Joseph A Gallian, Contemporary Abstract algebra (9th edition)

References:

1] Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R,Basic Abstract Algebra 2] Fraleigh, J.B, A Fifirst Course in Abstract Algebra.
3] Herstein, I.N, Topics in Algebra
4] Robert B. Ash, Basic Abstract Algebra
5] I Martin Isaacs, Finite Group Theory
6] Joseph J Rotman, Advanced Modern Algebra

Linear Algebra

(w.e.f. academic year 2019-20 batch onwards)

DSC-V

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The students are exposed to various concepts like vector spaces,bases, dimension, Eigen values etc.
Outcome: After completion this course students appreciate its interdisciplinary nature.

Unit- I

Vector Spaces: Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space

Unit- II

Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation

Unit- III

Diagonalization: -Eigenvectors and Linear Transformations -Complex Eigenvalues - Applications to Differential Equations.

Unit- IV

Orthogonality and Least Squares : Inner Product, Length, and Orthogonality -Orthogonal Sets -Orthogonal Projections - The Gram-Schmidt Process.

Text:

David C Lay,Linear Algebra and its Applications 4e

References:

1] S Lang, Introduction to Linear Algebra

2] Gilbert Strang , Linear Algebra and its Applications

3] Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence; Linear Algebra

4] Kuldeep Singh; Linear Algebra.

5] Sheldon Axler; Linear Algebra Done Right

(C) Analytical Solid Geometry

(w.e.f. academic year 2019-20 batch onwards)

DSE - VI

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students learn to describe some of the surfaces by using analytical geometry.
Outcome: Students understand the beautiful interplay between algebra and geometry.

Unit- I

Sphere: Definition-The Sphere Through Four Given Points-Equations of a Circle- Intersection of a Sphere and a Line-Equation of a Tangent Plane-Angle of Intersection of Two Spheres-Radical Plane.

Unit- II

Cones and Cylinders: Definition-Condition that the General Equation of second degree Represents a Cone-Cone and a Plane through its Vertex -Intersection of a Line with a Cone.

Unit- III

The Right Circular Cone-The Cylinder- The Right Circular Cylinder.

Unit- IV

The Conicoid: The General Equation of the Second Degree-Intersection of Line with a Conicoid-Plane of contact-Enveloping Cone and Cylinder.

Text:

Shanti Narayan and P K Mittal, Analytical Solid Geometry (17e)

References:

1] Khaleel Ahmed, Analytical Solid Geometry

2] S L Loney , Solid Geometry

3] Smith and Minton, Calculus

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – VI

PAPER – VI :: (A) ELECTRONICS

(DSE-2: ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

Unit - I

Band theory of P-N junction: Energy band in solids (band theory), valence band, conduction band and forbidden energy gap in solids, insulators, semi conductors and pure or intrinsic semiconductors and impure or extrinsic semi-conductors. N-type semi-conductors, P-type semi-conductors, Fermi level, continuity equation.

Diodes: P-N junction diode, Half-wave, full-wave and bridge rectifier. Zener diode & its characteristics. Zener diode as voltage regulator.

UNIT-II

Bipolar Junction Transistor (BJT) – p-n-p and n-p-n transistors, current components in transistors, CB, CE and CC configurations – transistor as an amplifier -RC coupled amplifier – Frequency response (Qualitative analysis).

Feedback concept & Oscillators: Feedback, General theory of feedback–Concepts of oscillators, Barkhausen's criteria, Phase shift oscillator – Expression for frequency of oscillation.

UNIT-III

Special devices- Construction and Characteristics: Photo diode - Shockley diode -Solar cell, Opto-couplers - Field Effect Transistor (FET) - FET as an Amplifier - Uni Junction Transistor (UJT), UJT as a relaxation oscillator - Silicon controlled rectifier (SCR) - SCR as a switch.

UNIT-IV

Digital Electronics

Binary number system, conversion of binary to decimal and vice-versa.Binary addition and subtraction (1's and 2's complement methods).Hexadecimal number system.Conversion from binary to hexadecimal and vice-versa, Decimal to hexadecimal and vice-versa.

Logic gates:

OR, AND, NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive – OR gate (EX-OR). De Morgan's Laws – Verification.

NOTE: Problems should be solved from every chapter of all units.

Suggested Books:

1. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*
2. Principles of Electronics by V.K. Mehta – *S. Chand & Co.*
3. Basic Electronics (Solid state) – B. L. Theraja , S. Chand & Co.
4. A First Course in Electronics- Anwar A. Khan&Kanchan K. Dey, PHI.
5. Physics of Semiconductor Devices- S. M. Sze
6. Physics of Semiconductors- Streetman.
7. Basic Electronics – Bernod Grob.
8. Basic Electronics for B.Sc (Physics) III Year, 2019, Telugu Academy
9. Digital Principles & Applications – A.P. Malvino and D.P. Leach

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – VI

PAPER – VI:: (A) ELECTRONICS PRACTICALS

(DSE-2: ELECTIVE)

1. Construction of logic gates (AND, OR, NOT, gates) with discrete components– Truth table Verification
2. AND, OR, NOT – gates constructions using universal gates – Verification of truth tables.
3. Constructionof NAND and NOR gates with discrete components and truth table verification
4. Characteristics of a Transistor in CE configuration
5. R.C. coupled amplifier – frequency response.
6. Verification of De Morgan's Theorem.
7. Zener diode V-I characteristics.
8. P-n junction diode V- I characteristics.
9. Zener diode as a voltage regulator
10. Construction of a model D.C. power supply
11. R C phase shift Oscillator –determination of output frequency

Note: Minimum of eight experiments should be performed.

Suggested Books:

1. B.Sc. Practical Physics – C. L. Arora – S. Chand & Co.
2. Viva-voce in Physics – R.C. Gupta, Pragathi Prakashan, Meerut.
3. Laboratory manual for Physics Course by B.P. Khandelwal.
4. Practical Physics by M. Arul Thakpathi by Comptex Publishers.
5. B.Sc. practical physics – Subbi Reddy.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – VI

Paper – VI:: (B) APPLED OPTICS

(DSE-2: ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT I

Principles of LASER

Emission and absorption of Radiation, -Einstein Relations- Pumping Mechanism- optical feedback- Laser rate equation for two, three and Four level Lasers, pumping threshold condition- Principle of Lase beams. Classification of LASER Systems- Gas, Liquid and Solid Lasers He-Ne and Argon Lasers, their energy level schemes- Ruby Laser and YAG laser, GA-As Laser and their applications in various fields.

UNIT II

Holography

Basic principle of Holography- Recording of amplitude and phase. The recording medium- reconstruction of original wave front- Image formation by wave front reconstruction- Gaber Hologram- limitations of Gaber Hologram-Fourier Transform Hologram-Volume Hologram- Applications of holograms.

UNIT III

Fourier and Non-Linear Optics: Thin lens as phase transformation-thickness function-various types of lenses- Fourier transforming properties of lenses-Object placed In front of the lens- Object placed behind the lens.

Non-Linear Optics: harmonic generation- second hormonic generation-phase matching condition- Optical mixing- parametric generation of Light- Self focusing of light.

Unit IV: Optical Fibers (14 Hrs)

Fiber types and their structures. Ray optic representation, Acceptance angle and numerical aperture. Step index and graded index fibers. Sigle mode and multi-mode fibers. Fiber materials for glass fibers and plastic fibers. Signal attenuation in optical fibers. Absorption, Scattering and bending losses in fibers, core and cladding losses. Material dispersion, wave guide dispersion, inter modes distortion and pulse broadening.

Note:-Problems should be solved at the end of every chapter of all units

Suggested Books:

1. Optoelectronics an Introduction-Wilson & JFB Hawkes 2nd edition
2. Introduction to Fourier optics-JW Goodman
3. Lasers and Non linear Optics--BB Laud
4. Optical electronics – Ghatak and Thyagarajan
5. Principles of Lasers- O. Svelto
6. Optical fiber communication -By Geradkeiser
7. Optical fiber communication-by John M Senior(PHI)

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – VI

Paper – VI:: (B) APPLED OPTICS PRACTICALS

(DSE-2: ELECTIVE)

1. Study of the Profile of a laser beam
2. Determination of the diameter of a thin wire using laser
3. Determination of wavelength of He-Ne laser by transmission grating
4. Construction and recording of a Hologram
5. Study of Fourier transforming properties of lenses
6. Study of second harmonic generation by KDP crystal
7. Measurement of numerical aperture of an optical fiber
8. Measurement of coupling losses in optical fiber
9. Measurement of bending losses in optical fiber
10. Study of audio signal transmission through optical fiber
11. To study the interference of light using optical fiber

Note: Minimum of eight experiments should be performed.

Suggested Books:

1. Introduction to fourier Optics- J Goodman
2. Optical Fiber Communication- john M senior
3. Principles of Lasers-by O.Svelto
4. Modern Optics by Grant Fowles
5. Principles of Optics byBorn & Wolf
6. Fundamentals of Optics by Jekins& White

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (A) MODERN PHYSICS

(DSE-1: ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT - I

SPECTROSCOPY

Atomic Spectra: Introduction - Drawbacks of Bohr's atomic model – Sommerfeld's elliptical orbits -relativistic correction (no derivation). Stern & Gerlach experiment, Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules – spectra of alkali atoms, doublet fine structure, Zeeman Effect, Paschen-Back Effect and Stark Effect (basic idea).

Molecular Spectroscopy: Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule. Determination of inter nuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman effect, classical theory of Raman effect. Experimental arrangement for Raman effect and its applications.

UNIT – II

Quantum Mechanics

Inadequacy of classical Physics: Spectral radiation - Planck's law (only discussion). Photoelectric effect - Einstien's photoelectric equation. Compton's effect - experimental verification.

Matter waves & Uncertainty principle: de Broglie's hypothesis - wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing de Brogile waves of electron in Bohr orbits. Heisenberg's uncertainty principle for position and momentum (x and p_x), Energy and time (E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Complementary principle of Bohr.

Schrodinger Wave Equation

Schrodinger time independent and time dependent wave equations. Wave function properties - Significance. Basic postulates of quantum mechanics. Operators, eigen functions and eigen values, expectation values.

UNIT - III

Nuclear Physics

Nuclear Structure: Basic properties of nucleus - size, charge, mass, spin, magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p, n-n, and n-p scattering (concepts), nuclear forces. Nuclear models - liquid drop model, shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger – Nuttal law. Gammow's theory of alpha decay. Geiger – Nuttal law from Gammow's theory. Beta spectrum - neutrino hypothesis,

Particle Detectors: GM counter, proportional counter, scintillation counter.

UNIT:IV

Solid State Physics & Crystalography

Crystal Structure: Crystalline nature of matter, Crystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, FCC, CsCl, NaCl, diamond and ZincBlende)

X-ray Diffraction: Diffraction of X -rays by crystals, Bragg's law, Experimental techniques - Laue's method and powder method.

Bonding in Crystals: Types of bonding in crystals - characteristics of crystals with different bondings. Lattice energy of ionic crystals- determination of Madelung constant for NaCl crystal, Calculation of Born Coefficient and repulsive exponent. Born-Haber cycle.

Suggested books:

1. Modern Physics by G. Aruldhas & P.Rajagopal. Eastern Economy Edition.
2. Concepts of Modern Physics by ArthurBeiser.Tata McGraw-Hill Edition.
3. Modern Physics by R. Murugeshan and Kiruthiga SivaPrasath.S. Chand & Co.
4. Nuclear Physics by D.C. Tayal, Himalaya PublishingHouse.
5. Molecular Structure and Spectroscopy by G.Aruldhas. Prentice Hall of India, New Delhi.
6. Spectroscopy -Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand -Himalaya Publishing House.
7. Third Year Physics – Telugu Academy.
8. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nanomaterials)-Prentice-hall of India Pvt. Ltd.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (A) MODERN PHYSICS PRACTICALS

(DSE-1: ELECTIVE)

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To determine the ionization potential of mercury.
5. To determine the absorption lines in the rotational spectrum of Iodine vapour.
6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
7. To setup the Millikan oil drop apparatus and determine the charge of an electron.
8. To show the tunneling effect in tunnel diode using I-V characteristics.
9. To determine the wavelength of laser source using diffraction of single slit.
10. To determine the wavelength of laser source using diffraction of double slits.
11. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating
12. To determine the value of e/m for electron by long solenoid method.
13. Photo Cell – Determination of Planck's constant.
14. To verify the inverse square law of radiation using a photo-electric cell.
15. To find the value of photo electric work function of a material of the cathode using a photo-electric cell.
16. Measurement of magnetic field – Hall probe method.
17. To determine the dead time of a given G.M. tube using double source.
18. Hydrogen spectrum – Determination of Rydberg's constant
19. Energy gap of intrinsic semi-conductor
20. G. M. Counter – Absorption coefficients of a material.
21. To draw the plateau curve for a Geiger Muller counter.
22. To find the half-life period of a given radioactive substance using a G.M. Counter.

Reference Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Edn, 2011,Kitab Mahal

Note: Minimum of eight experiments should be performed.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (B) COMPUTATIONAL PHYSICS

(DSE-1: Elective)

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT I

Programming in C

Flow charts, algorithms, Integer and floating-point arithmetic, precision, variable types, arithmetic statements, input and output statements, control statements, executable and non-executable statements, arrays, Repetitive and logical structures, Subroutines and functions, operation with files, operating systems, Creation of executable programs.

UNIT II

Numerical methods of Analysis

Solution of algebraic and transcendental equation, Newton Ramphan method, Solution of simultaneous linear equations. Matrix inversion method, Interpolation, Newton and Lagrange formulas, Numerical differentiation. Numerical integration, Trapezoidal, Simpson and gaussian quadrature methods, Least square curve fitting, Straight line and Polynomial fits.

UNIT III

Numerical solution of ordinary differential equations

Eulars and Runge kutta methods, simulation. Generation of uniformly distributed random integers, statistical tests of randomness. Monte-Carlo evaluation of integrals and error analysis, Non-uniform probability distributions, Importance sampling, Rejection method.

UNIT IV

Computational methods

Metropolis algoritham, Molecular diffusion and Brownian motions, Random walk problems and their Montecarlo simulation. Finite element and Finite difference methods. Boundary value and initial value problems, density functional methods.

Note: Problems should be solved at the end of every chapter of all units

Suggested Books:

1.Computational methods in Physics and Engineering: Wong
2. Computer Oriented Numerical methods:Rajaraman
3. Computer Programming in Fortran 77: Rajaraman
4.Applied Numerical Analysis: Gerald
5. A Guide to Manto -Carlo simulationsi Statistical Physics: Land

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (B) COMPUTATIONAL PHYSICS PRACTICALS

(DSE-1: Elective)

1. Jacobi Method of Matrix diagonalization
2. Solution of Transcendental or Polynomial equations by the Newton Raphson metho
3. Linear curve fitting and calculation of linear correlation coefficients
4. Matrix Simulation: Subtraction and Multiplication.
5. Matrix Inversion and solution of simultaneous equations
6. Lagrange interpolation based on given input data
7. Numerical integration using the Simpsons method.
8. Numerical integration using the Gaussian quadrature method.
9. Solution of first order Differential Equation using Runge-kutta method.
10. Numerical first order differentiation of a given function.
11. Fast Fourier transform
12. Monte Carlo Integration
13. Use of a package for data generation and graph plotting.
14. Test of Randomness for random numbers generators.

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

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Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.Sc. PHYSICS II Year

SEMESTER – IV

PAPER – IV:: WAVES AND OPTICS

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT-I:

Waves

Fundamentals of Waves -Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport, transverse impedance.

Longitudinal vibrations in bars- wave equation and its general solution, Special cases: (i) bar fixed at both ends, ii) bar fixed at the midpoint, iii) bar free at both ends, iv) bar fixed at one end, Transverse vibrations in a bar - wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

UNIT II:

Interference

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light.

Interference by division of wave front: Fresnel's biprism – determination of wave length of light. Determination of thickness of a transparent material using biprism – change of phase on reflection – Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non-reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes) – Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1,D_2 lines and thickness of a thin transparent plate.

UNIT III:

Diffraction:

Introduction – Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhofer diffraction due to double slit – Fraunhofer diffraction pattern with N slits (diffraction grating).

Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction-Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

UNIT IV:

Polarization

Polarized light : Methods of Polarization, Polarization by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewster's law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

NOTE: *Problems should be solved at the end of every chapter of all units.*

Suggested books

1. **Optics** by AjoyGhatak. *The McGraw-Hill companies*.
2. **Optics** by Subramaniyam and Brijlal. *S. Chand & Co*.
3. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
4. **Optics and Spectroscopy**. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co*.
5. **Second Year Physics** – *Telugu Academy.*
1. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand& Co. Publications*.
2. **Feyman's Lectures on Physics** Vol. 1, 2, 3 & 4. *Narosa Publications*.
3. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*
4. K. Ghatak, **Physical Optics'**
5. D.P. Khandelwal, **Optical and Atomic Physics'** (Himalaya Publishing House, Bombay,1988)

11. Jenkins and White: **'Fundamental of Optics'** (McGraw-Hill)
12. Smith and Thomson: **'Optics'** (John Wiley and sons).

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.Sc. PHYSICS II Year

SEMESTER – IV

PAPER – IV:: WAVES AND OPTICS PRACTICALS

1. Thickness of a wire using wedge method.
2. Determination of wavelength of light using Biprism.
3. Determination of Radius of curvature of a given convex lens by forming Newton's rings.
4. Resolving power of grating.
5. Study of optical rotation- polarimeter.
6. Dispersive power of a prism
7. Determination of wavelength of light using diffraction grating minimum deviation method.
8. Wavelength of light using diffraction grating – normal incidence method.
9. Resolving power of a telescope.
10. Refractive index of a liquid and glass (Boys Method).
11. Pulfrich refractometer – determination of refractive index of liquid.
12. Wavelength of Laser light using diffraction grating.
13. Verification of Laws of a stretched string (Three Laws).
14. Velocity of Transverse wave along a stretched string
15. Determination of frequency of a bar- Melde‟s experiment

***Note**: Minimum of eight experiments should be performed Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.*

Suggested Books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastav.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.Sc. PHYSICS II Year

SEMESTER – III

PAPER – III: ELECTROMAGNETIC THEORY

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT I

Electrostatics

Electric Field:- Concept of electric field lines and electric flux, Gauss's law (Integral and differential forms), application to linear, plane and spherical charge distributions, Conservative nature of electric field 'E', Irrotational field. Electric potential: Concept of electric potential, relation between electric potential and electric field, potential energy of a system of charges, Energy density in an electric field, Calculation of potential from electric field for a spherical charge distribution.

UNIT II

Magnetostatics

Concept of magnetic field 'B' and magnetic flux, Biot-Savart's law, 'B' due to a straight current carrying conductor, Force on a point charge in a magnetic field, Properties of B, curl and divergence of B, solenoidal field, Integral form of Ampere's law, Applications of Ampere's law: field due to straight, circular and solenoidal currents. Energy stored in magnetic field. Magnetic energy in terms of current and inductance, Magnetic force between two current carrying conductors, Magnetic field intensity, Ballistic Galvanometer: Torque on a current loop in a uniform magnetic field, working principle of B.G., current and charge sensitivity, electromagnetic damping, critical damping resistance.

UNIT III:

Electromagnetic Induction and Electromagnetic waves

Faraday's laws of induction (differential and integral form), Lenz's law, self and mutual Induction, Continuity equation, modification of Ampere's law, displacement current, Maxwell equations, Maxwell's equations in vacuum and dielectric medium, boundary conditions, plane wave equation: transverse nature of EM waves, velocity of light in vacuum and in medium, Poyinting's theorem.

UNIT IV:

Varying and alternating currents

Growth and decay of currents in LR, CR and LCR circuits - Critical damping, Alternating current, relation between current and voltage in pure R, C and L-vector diagrams - Power in ac circuits. LCR series and parallel resonant circuit-Q-factor, AC & DC motors-single phase, three phase (basics only).

Network Theorems

Passive elements, Power sources, Active elements, Network models: T and π Transformations, Superposition theorem, Thevenin's theorem, Norton's theorem. Reciprocity theorem and Maximum power transfer theorem (Simple problems).

Suggested Books:

1. Fundamentals of electricity and magnetism By Arthur F. Kip (McGraw-Hill, 1968)
2. Electricity and magnetism by J. H. Fewkes & John Yarwood. Vol. I (Oxford Univ. Press, 1991).
3. Introduction to Electrodynamics, 3rd edition, by David J. Griffiths, (Benjamin Cummings, 1998).
4. Electricity and magnetism By Edward M. Purcell (McGraw-Hill Education, 1986)
5. Electricity and magnetism. By D C Tayal (Himalaya Publishing House,1988)
6. Electromagnetics by Joseph A.Edminister 2nd ed.(New Delhi: Tata McGraw Hill, 2006).

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.Sc. PHYSICS II Year

SEMESTER – III

PAPER – III: ELECTROMAGNETIC THEORY PRACTICALS

1. To verify the Thevenin's Theorem
2. To verify Norton Theorem
3. To verify Superposition Theorem
4. To verify maximum power transfer theorem.
5. To determine a small resistance by Carey Foster's bridge.
6. To determine the (a) current sensitivity, (b) charge sensitivity, and (c) CDR of a B.G.
7. To determine high resistance by leakage method.
8. To determine the ratio of two capacitances by De Sauty's bridge.
9. To determine self-inductance of a coil by Anderson's bridge using AC.
10. To determine self-inductance of a coil by Rayleigh's method.
11. To determine coefficient of Mutual inductance by absolute method.

Note: Minimum of eight experiments should be performed.
Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books:

1. B. L. Worsnop and H. T. Flint Advanced Practical Physics, Asia Publishing House, New Delhi.
2. Indu Prakash and Ramakrishna, A Text Book of Practical Physics, Kitab Mahal

Subject: Physics

B.Sc. Semester II-Theory Syllabus
Paper – II : Thermal Physics
(W.E.F the academic year 2019-2020)

56 hrs

Unit – I

1. **Kinetic theory of gases: (6)**

   Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

2. **Thermodynamics: (8)**

   Basics of thermodynamics-Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature-Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

Unit – II

3. **Thermodynamic potentials and Maxwell's equations: (7)**

   Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas.Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

4. **Low temperature Physics: (7)**

   Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type.

Unit – III

5. **Quantum theory of radiation: (14)**

   Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of

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radiation - Planck's law – deduction of Wein'sdistribution law, Rayleigh-Jeans law, Stefan's law from Planck's law.
Measurement of radiation using pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

Unit – IV

6. Statistical Mechanics: (14)

Introduction, postulates of statistical mechanics. Phase space, concept of ensembles and some known ensembles ,classical and quantum statistics and their differences, concept of probability, Maxwell-Boltzmann's distribution law -Molecular energies in an ideal gas-Maxwell-Boltzmann's velocity distribution law, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Application of B-E distribution to Photons-planks radiation formula, Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

Textbooks

1. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007.*
2. **Second Year Physics** – *Telugu Academy.*
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co.*
4. **Heat and Thermodynamics** by Mark W.Zemansky 5th edition McGraw - Hill
5. **Heat and Thermodynamics** by D.S. Mathur.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education.*
2. B.B. Laud **"Introduction to statistics Mechanics"**(Macmillan 1981)
3. F.Reif: **"Statistical Physics "**(Mcgraw-Hill,1998)
4. K.Haung: **"Statistical Physics "**(Wiley Eastern 1988)

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42 hrs
(3 hrs / week)

II SEMESTERPracticals Paper – II :
Thermal Physics

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Determination of Thermo emf
6. Cooling Curve of a metallic body (Null method)
7. Resistance thermometer. To Determine temp coeff resistance
8. Thermal expansion of solids
9. Study ofconversionof mechanical energy into heat.
10. Determine the Specific of a solid (graphite rod)
11. Thermistor Characteristics. Calculation of A and B

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, AnchalSrivastava

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B.Sc. (Physics)Semester I-Theory Syllabus
Paper – I: Mechanics

56 hrs

(w. e. from academic year 2019-20)
(CBCS)

Unit – I

1. Vector Analysis (14)

Scalar and vector fields, gradient of a scalar field and its physical significance.Divergence and curl of a vector field and related problems.Vector integration, line, surface and volume integrals.Stokes, Gauss and Greens theorems-simple applications.

Unit – II

2. Mechanics of Particles (07)

Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section.

3. Mechanics of rigid bodies (07)

Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor.Euler's equation, precession of a top, Gyroscope.

Unit – III

4. Centralforces (14)

Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws, Coriolis force and its expressions.

Unit – IV

5. Special theory of relativity (14)

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

NOTE: Problems should be solved at the end of every chapter of all units.

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Textbooks

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008.*
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007.*
3. **First Year Physics** - *Telugu Academy.*
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill.*
5. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition.*
6. **Theory of relativity - Resnick**

Reference Books

1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005.*
3. **An introduction to Mechanics** by Daniel Kleppner& Robert Kolenkow. *The McGraw Hill Companies.*
4. **Mechanics**. Hans &Puri. *TMH Publications.*

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Question paper pattern

FIRST SEMESTER PRACTICALS **36 hrs**
(3 hrs / week)

Practical Paper – I : Mechanics

1. Study of a compound pendulum determination of 'g' and 'k'.
2. Y' by uniform Bending
3. Y by Non-uniform Bending.
4. Moment of Inertia of a fly wheel.
5. Measurement of errors –simple Pendulum.
6. 'Rigidity moduli by torsion Pendulum.
7. Determine surface tension of a liquid through capillary rise method.
8. Determination of Surface Tension of a liquid by different methods.
9. Determine of Viscosity of a fluid.
10. Calculation of slope and intercept of a Y= mX +C by theoretical method

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. "Practical Physics" R.K Shukla, AnchalSrivastava

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B.A Political Science
I st Semester
Paper - I
Understanding Political Theory

Political Theory

- What is Political Theory, Evolution, Nature , Significance
- Debates on Political Theory

  a) Normative b) Contemplative c) Explanatory

What is Political?

- State: Theories of origin of the state, Divine, Social Contract, Evolution Theories
- Power and Authority
- Authoritative allocation of Values
- Sovereign state : Challenges

Political Values and Theoretical Perspective

- Liberty :- A) Liberal B) Marxist C) Feminist
- Equality :- A) Liberal B) Marxist C) Feminist
- Justice :- A) Liberal B) Marxist C) Feminist

Political Ideologies

- Liberalism
- Nationalism
- Multiculturalism

Political Institutions and Functions

- Legislature, Executive and Judiciary
- Political Parties, Pressure Groups, Media

B.A Political Science
II st Semester
Paper - II
Western Political Thought

Unit- I Greek Political Thought

- Greek Political Thought – Sophists
- Plato:- Concept of Justice , Ideal State , Education and Communism.
- Aristotle :- Forms of Governments, On revolution , Slavery , Best state

Unit- II : Medieval and Early Modern Thought

- Thomas Aquinas :- Theory of Laws, Christianized Aristotle
- Church – State Controversy
- Niccolo Machiavelli – Human Nature , StateCraft

Unit- III Social Contractualists

- Thomas Hobbes :- Individualism and Absolute (State) Sovereignty
- John Locke :- Natural Rights Limited Government
- J. J. Rousseau :- Romanticism, General will , Popular Sovereignty

Unit- IV : Utilitarian Thought

- Jeremy Bentham :- Utilitarian Principles; Hedonism
- J. S. Mill :- On liberty , Representative Government

Unit- V : Philosophy of Dialectics

- G.W. F. Hegal :- Dialectics Purpose of History Geist (Spirt) and State
- Karl Marx:- Historical Materialism, Class war and Revolution.

B.A Political Science

III rd Semester

Paper - III

Indian Political Thought

Unit- I State and Society in Ancient India

- Manu – Features of Manusmriti, Origins of Varna, Varna Dharma
- Buddha – Dhamma , Sangha , Eightfold path
- Kautilya- Saptanga Theory , Mandala Theory , Statecraft

Unit-II Medieval Political Thought

- Basava- Anubhava Mantapa , Gender Equality
- Ziauddin Barani- Theory of Kingship (Ideal Sulthan) , Ideal Polity

Unit- III RenaissanceThought

- Raja Ram Mohan Roy - Colonial Encounters , Brahma Samaj
- Jyothi Rao Phule- Gulam Giri , Satya Shodhak Samaj , Education

Unit-IV Reformist Thought

- M. K. Gandhi – Satyagraha , Trusteeship , Problem of Political Obligation
- Dr. B. R. Ambedkar- Who are Shudras ? , Annihilation of Caste

Unit-V Socialist Thought

- M.N. Roy- Radical Humanism
- Jawaharlal Nehru- Democratic Socialism
- R.M. Lohia – Concept of Four Pillars of State(Chaukhamba Model)

Prof. G. Veeranna.
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B.A Political Science

IV th Semester

Paper - IV

Constitution and Politics of India

Unit- I Constitutional Development in India

- Brief overview of Nationalist Movement
- Evolution of Indian Constitution -1909 Act ,1919 Act ,1935Act.
- Philosophical Foundations of the Indian Constitution – Liberal, Gandhian, Socialist

Unit- II : Institutional Framework

- Union Government – Executive; Legislature; Judiciary
- State Government - Executive; Legislature; Judiciary

Unit- III Federal Politics

- Union- State Relations : Legislative, Administrative, Financial
- Recent trends in Union - State Relations

Unit- IV : Electoral Politics in India

- Political Parties a) National : INC, BJP, CPM, BSP
  b) Regional : DMK, Akali Dal, TDP, TRS
  c) Recent Trends in Party System
- Election Commission & Electoral Reforms

Unit- V : Issues in Indian Politics

- Debates on Secularism – Majority Communalism, Minority Communalism
- Caste in Politics and Politicization of caste
- Gender in Indian Politics
- Issues of Minorities – Sachar Committee

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B.A Political Science

Vth Semester

Paper- V (A)

International Relations

Unit- I	International Relations – Nature , Evolution and Scope; State and Non- State Actors in IR , Westphalian State and Sovereign State system and its characteristics
Unit-II	European conquest of Asia and Africa – Its Impact on society, culture, economy (European colonialism)First World War and Second World War Decolonization and its consequences ; Rise of the Developing world ;Neo- colonialism
Unit- III	Cold War ;Détente ; End of the Cold War ;Disintegration of the Soviet Union ; American Hegemony
Unit-IV	India's Foreign Policy: Determinants; features; Non- Alignment
Unit-V	India's Relations with USA; China; Pakistan; Sri Lanka and Nepal

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B.A Political Science

VI th Semester

Paper – VI (A)

Global Politics

Unit- I	Power , Elements of Power , Balance of Power ,Growing importance of Soft Power
Unit-II	Security, Collective Security, Bipolarity , Multipolarity, Unipolarity
Unit- III	Human Rights; Agencies of human Rights Protection; Terrorism , Environmental Issues
Unit-IV	World Bank and IMF; UNCTAD; North – South Dialogue and South – South Co- operations; WTO
Unit-V	Disarmament, Arms Race , Arms control , NPT, CTBT, MTCR Proliferation of Small Arms, WMDs

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KAKATIYA UNIVERSITY, WARANGAL
B.A., B.Sc., B.Com. & B.B.A (CBCS)
Syllabus - 2020
Telugu (Second Language)
4th Semester

Unit -I ప్రాచీన పద్యభాగం

1) నారద గానమాత్సర్యం - పింగళి సూరన
2) వాగ్దాన భంగం - అసూరి మరింగంటి వేంకట నరసింహాచార్యులు
3) నారసింహ శతకం - ధర్మపురి శేషప్ప

Unit -II ఆధునిక పద్యభాగం

1) నరుడ నేను, నరుడ నేను - కాళోజీ
2) ఆ స్తగీతం - దేవరకొండ బాలగంగాధర తిలక్
3) దేవరకొండ దుర్గం - డా॥ ముకురాల రామారెడ్డి

Unit -III వచన విభాగం

1) అర్ధరాత్రి అరుణోదయం - దాశరథి రంగాచార్య
2) సి.పి బ్రౌన్ సాహిత్య సేవ - జూనమద్ది హనుమచ్ఛాస్త్రి
3) మన గ్రామ నామాలు - డా॥ కపిలవాయి లింగమూర్తి
4) నివురు తొలగిన నిప్పు - పోల్కంపల్లి శాంతాదేవి
5) కొండమల్లెలు - ఇల్లిందల సరస్వతీదేవి

పాఠ్యగ్రంథం: తెలుగు అకాడమీ వారి "సాహితీ కిన్నెర" తెలుగు వాచకం

29-8-2020
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KAKATIYA UNIVERSITY, WARANGAL
B.A., B.Sc., B.Com. & B.B.A (CBCS)
Syllabus - 2021-2022
Telugu (Second Language)
5th Semester

Unit -I కవితా ప్రక్రియలు

1) పద్యం
2) పాట
3) వచన కవిత
4) మినీ కవితా రూపాలు,
   హైకూ, నానీలు మినీ కవితలు
5) రుబాయీలు, గజల్

Unit -II తెలుగు వ్యాసం

6) వ్యాసం నిర్వచనం, లక్షణాలు
7) తెలుగు వ్యాస పరిణామక్రమం
8) వ్యాస రచనా పద్ధతులు
9) వ్యాస రచన భాషా ప్రయోగాలు
10) వ్యాసం -వస్తు వైవిధ్యం

Unit -III వచన సాహిత్యం

11) అధ్యయన-సంస్కృతి
12) సాహిత్య అధ్యయనం ప్రయోజనాలు
13) ముందుమాట
14) పుస్తక సమీక్ష
15) జానపద సాహిత్య పరిచయం

17/6/2021
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Board of Studies in Telugu
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WARANGAL-T.S.

KAKATIYA UNIVERSITY, WARANGAL
B.A., B.Sc., B.Com. & B.B.A (CBCS)
Syllabus - 2021-2022
Telugu (Second Language)
6th Semester

Unit -I **సాహిత్య ప్రక్రియల పరిచయం**

1) నాటకం
2) నవల
3) కథానిక
4) జీవిత చరిత్ర
5) ఉపన్యాస కళ

Unit -II **జర్నలిజంలో మౌలికాంశాలు**

6) వార్త - నిర్వచనం, లక్షణాలు
7) లీడ్ - ఎడిటింగ్
8) వార్తా కథనాలు
9) అనువాదం
10) ఇంటర్వ్యూలు

Unit -III **ప్రాజెక్టు పరిచయం**

11) ప్రాజెక్టు
12) అధ్యయనం
13) పరికల్పన
14) నివేదిక

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WARANGAL

C.B.C.S Pattern Syllabus from 2019-2010 onwards
B.A., B.Sc., B.Com. & B.B.A.
2nd Semester IInd Languages - Telugu

Unit -I ప్రాచీన కవిత్వం

1) గజేంద్ర మోక్షం-పోతన
2) హనుమత్ సందేశం-మొల్ల
3) సుభాషితాలు-ఏనుగు లక్ష్మణ కవి

Unit -II ఆధునిక కవిత్వం

1) స్నేహలత లేఖ-రాయప్రోలు సుబ్బారావు
2) అంతర్వాదం-దాశరథి కృష్ణమాచార్యులు
3) ప్రపంచపదులు-దా॥ సి.నారాయణరెడ్డి
4) అల్విదా-కౌముది

Unit -III వచన విభాగం

1) యుగాంతం-నెల్లూరి కేశవ స్వామి
2) ఎంకన్న - ఆచార్య పాకాల యశోదారెడ్డి
3) మామిడి పండు - సురవరం ప్రతాపరెడ్డి
4) మా ఊరుపోయింది-దేవులపల్లి వేంకట కృష్ణశాస్త్రి

Unit -IV ఛందస్సు

ఉత్పలమాల, చంపకమాల, శార్దూలం, మత్తేభం, ఆటవెలది, తేటగీతి, ద్విపద, సీసం, కందం, ఉత్సాహం, తరళం, ప్రస్తార, మహాప్రస్తార, ముత్యాలసరం

KAKATIYA UNIVERSITY, WARANGAL
B.A., B.Sc., B.Com. & B.B.A (CBCS)
Syllabus - 2020
Telugu (Second Language)
3rd Semester

Unit -I **ప్రాచీన పద్యభాగం**

1) ధర్మజుని వాక్చాతుర్యం - తిక్కన
2) విభీషణ శరణాగతి - గోన బుద్ధారెడ్డి
3) గుణనిధి కథ - శ్రీనాథుడు

Unit -II **ఆధునిక పద్యభాగం**

1) రైతు ప్రశస్తి - వానమామలై జగన్నాథాచార్యులు
2) గురుదక్షిణ - అంబటి లక్ష్మీనరసింహారాజు
3) గుడిసెలు కాలిపోతున్నై - దా॥ బోయి భీమన్న

Unit -III **అలంకారాలు**

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

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

పాఠ్యగ్రంథం: తెలుగు అకాడమీ వారి "సాహితీ కిన్నెర" తెలుగు వాచకం

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C.B.C.S Pattern Syllabus from 2019-2010 onwards
B.A., B.Sc., B.Com. & B.BA
1st Semester IInd Languages - Telugu

Unit -I ప్రాచీన కవిత్వం

1) శకుంతలోపాఖ్యానం- నన్నయ
2) గోదగూచి కథ - పాల్కురికి సోమనాధుడు
3) సంవరణుడి తపస్సు-అద్దంకి గంగాధరుడు

Unit -II ఆధునిక కవిత్వం

1) కాసులు-గురజాడ అప్పారావు
2) రాజు-కవి-దా.గుఱ్ఱం జాషువా
3) గంగిరెద్దు-దా పల్లా దుర్గయ్య
4) జయభేరి-శ్రీ శ్రీ

Unit -III వచన కవిత్వం

రుద్రమదేవి (నవల) - ఒద్దిరాజు సోదరులు

Unit -IV భాషా భాగాలు-వ్యాకరణం

పర్యాయ పదాలు, నానార్థాలు, సంధులు, సమాసాలు, తెలుగు వాక్యం

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – I

ANIMAL DIVERSITY – INVERTEBRATES

(Core Paper –I)

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Protozoa

1.1.1 General Characters and Classification of Protozoa up to Orders with examples
1.1.2 Type Study –***Elphidium***
1.1.3 Locomotion and Reproduction
1.1.4 Epidemiology of Protozoan diseases – Amoebiasis, Giardiasis, Leishmaniasis, Malaria

1.2 Porifera

1.2.1 General characters and Classification of Porifera up to Orders with examples
1.2.2 Type study - ***Sycon***
1.2.3 Canal system in Sponges
1.2.4 Types of Cells and Spicules in Porifera.

UNIT – II

2.1 Cnidaria

2.1.1General characters and Classification of Cnidaria up to classes with examples
2.1.2 Type study -***Obelia***
2.1.3 Polymorphism in Cnidarians with examples
2.1.4 Corals and Coral Reef formation

2.2 Helminthes

2.2.1 General characters and Classification of **Platyhelminthes** up to classes with examples
2.2.2 Type study -***Schistosoma***
2.2.3 General characters and Classification of **Nemathelminthes** up to classes with examples
2.2.4 Type study –***Dracanculus;*** Parasitic Adaptations in Helminthes

UNIT– III

3.1 Annelida

3.1.1 General characters and Classification of Annelida up to classes with examples
3.1.2 Type study – ***Hirudinaria granulosa***
3.1.3 Evolutionary significance of Coelome and Coelomoducts and Metamerism
3.1.4 Economic Importance of Annelida (Polychaeta, Oligochaeta and Hirudinea)

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Chairperson
Board of Studies
Department of Zoology & Sericulture Unit
KAKATIYA UNIVERSITY - WGL-506009 (T.S)

3.2Arthropoda

3.2.1 General characters; Classification of Arthropoda upto classes with examples
3.2.2Type study –***Palaemon***(Prawn)
3.2.3Crustacean Larvae; Insect metamorphosis; Useful and Harmful Insects
3.2.4***Peripatus***- Structure and affinities

UNIT – IV

4.1 Mollusca

4.1.1 General characters; Classification of Mollusca upto classes with examples
4.1.2Type study -***Pila*** (Snail)
4.1.3 Pearl formation; Torsion and Detorsion in Gastropods
4.1.4 Molluscs as Bio-indicators, Vectors and Pests; Economic importance

4.2 Echinodermata

4.2.1 General characters and Classification of Echinodermata upto classes with examples
4.2.2 Type study- ***Star Fish***
4.2.3Echinoderm larvae and their evolutionary significance
4.2.4 Autotomy, Regeneration and Symmetry of Echinoderms

Suggested Readings:

1. **L.H. Hyman** '*The Invertebrates' Vol I, II and V.* – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S.** Verma'*Invertebrate Zoology'* S. Chand and Company.
4. **R.D. Barnes** '*Invertebrate Zoology'* by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.**, '*Invertebrate structure and Function'* by ELBS.
6. **P.S. Dhami and J.K. Dhami.**Invertebrate Zoology. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell**'*A text book of Zoology'* by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).***Invertebrate Zoology*, V Edition"

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Department of Zoology & Sericulture Unit
KAKATIYA UNIVERSITY - WGL-506009 (T.S)

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – I

ANIMAL DIVERSITY - INVERTEBRATES (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

1. Study of museum slides / specimens/models (Classification of animals up to orders)

i) **Protozoa:***Amoeba, Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoebahistolytica, Plasmodium vivax*

ii) **Porifera**:*Sycon, Spongilla,Euspongia, Sycon*- T.S &L.S, Spicules, Gemmule

iii) **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*

iv) **Platyhelminthes:***Planaria, Fasciolahepatica, Fasciola*larval forms – Miracidium, Redia, Cercaria, *Echinococcusgranulosus, Taeniasolium, Schistosomahaematobium*

v) **Nemathelminthes:***Ascaris(Male & Female), Drancunculus, Ancylostoma,Wuchereria*

vi) **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva

vii) **Arthropoda:** *Cancer, Palaemon,* Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae -Nauplius, Mysis,Zoea,Mouth parts of male & female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.

viii) **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva

ix) **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria,Antedon,* Bipinnaria larva

2. Demonstration of dissection / dissected / virtual dissection:
Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst

3. Laboratory Record work shall be submitted at the time of practical examination

4. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the abovementioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

5. Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals:

1. Practical Zoology- Invertebrates by S.S.Lal
2. Practical Zoology – Invertebrates by P.S.Verma
3. Practical Zoology –Invertebrates by K.P.Kurl

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – I

ANIMAL DIVERSITY – INVERTEBRATES

(Core Paper –I)

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Protozoa

1.1.1 General Characters and Classification of Protozoa up to Orders with examples
1.1.2 Type Study –***Elphidium***
1.1.3 Locomotion and Reproduction
1.1.4 Epidemiology of Protozoan diseases – Amoebiasis, Giardiasis, Leishmaniasis, Malaria

1.2 Porifera

1.2.1 General characters and Classification of Porifera up to Orders with examples
1.2.2 Type study - ***Sycon***
1.2.3 Canal system in Sponges
1.2.4 Types of Cells and Spicules in Porifera.

UNIT – II

2.1 Cnidaria

2.1.1General characters and Classification of Cnidaria up to classes with examples
2.1.2 Type study -***Obelia***
2.1.3 Polymorphism in Cnidarians with examples
2.1.4 Corals and Coral Reef formation

2.2 Helminthes

2.2.1 General characters and Classification of **Platyhelminthes** up to classes with examples
2.2.2 Type study -***Schistosoma***
2.2.3 General characters and Classification of **Nemathelminthes** up to classes with examples
2.2.4 Type study –***Dracanculus;*** Parasitic Adaptations in Helminthes

UNIT– III

3.1 Annelida

3.1.1 General characters and Classification of Annelida up to classes with examples
3.1.2 Type study – ***Hirudinaria granulosa***
3.1.3 Evolutionary significance of Coelome and Coelomoducts and Metamerism
3.1.4 Economic Importance of Annelida (Polychaeta, Oligochaeta and Hirudinea)

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3.2Arthropoda

3.2.1 General characters; Classification of Arthropoda upto classes with examples
3.2.2Type study –***Palaemon***(Prawn)
3.2.3Crustacean Larvae; Insect metamorphosis; Useful and Harmful Insects
3.2.4***Peripatus***- Structure and affinities

UNIT – IV

4.1 Mollusca

4.1.1 General characters; Classification of Mollusca upto classes with examples
4.1.2Type study -***Pila*** (Snail)
4.1.3 Pearl formation; Torsion and Detorsion in Gastropods
4.1.4 Molluscs as Bio-indicators, Vectors and Pests; Economic importance

4.2 Echinodermata

4.2.1 General characters and Classification of Echinodermata upto classes with examples
4.2.2 Type study- ***Star Fish***
4.2.3Echinoderm larvae and their evolutionary significance
4.2.4 Autotomy, Regeneration and Symmetry of Echinoderms

Suggested Readings:

1. **L.H. Hyman** '*The Invertebrates' Vol I, II and V.* – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S.** Verma'*Invertebrate Zoology'* S. Chand and Company.
4. **R.D. Barnes** '*Invertebrate Zoology'* by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.**, '*Invertebrate structure and Function'* by ELBS.
6. **P.S. Dhami and J.K. Dhami.**Invertebrate Zoology. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell**'*A text book of Zoology'* by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).***Invertebrate Zoology*, V Edition"

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – I

ANIMAL DIVERSITY - INVERTEBRATES (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

1. Study of museum slides / specimens/models (Classification of animals up to orders)

i) **Protozoa:***Amoeba, Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoebahistolytica, Plasmodium vivax*

ii) **Porifera**:*Sycon, Spongilla,Euspongia, Sycon*- T.S &L.S, Spicules, Gemmule

iii) **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*

iv) **Platyhelminthes:***Planaria, Fasciolahepatica, Fasciola*larval forms – Miracidium, Redia, Cercaria, *Echinococcusgranulosus, Taeniasolium, Schistosomahaematobium*

v) **Nemathelminthes:***Ascaris(Male & Female), Drancunculus, Ancylostoma,Wuchereria*

vi) **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva

vii) **Arthropoda:** *Cancer, Palaemon,* Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae -Nauplius, Mysis,Zoea,Mouth parts of male & female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.

viii) **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva

ix) **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria,Antedon,* Bipinnaria larva

2. Demonstration of dissection / dissected / virtual dissection:
Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst

3. Laboratory Record work shall be submitted at the time of practical examination

4. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the abovementioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

5. Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals:

1. Practical Zoology- Invertebrates by S.S.Lal
2. Practical Zoology – Invertebrates by P.S.Verma
3. Practical Zoology –Invertebrates by K.P.Kurl

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B.Sc. ZOOLOGY I Year

SEMESTER – II

ANIMAL DIVERSITY – VERTEBRATES

(Core Paper – II)

Theory	**4 Hours/Week**	**4 Credit**	**Internal marks = 20**
Practical	**3 Hours/Week**	**1 Credit**	**External Marks = 80**

UNIT – I

1.1 Hemichordata

1.1.1 General characters and Classification of Hemichordates upto classes with examples
1.1.2*Balanoglossus*- Structure and affinities
1.1.3. Larval Significance (Tornaria)

1.2. Protochordata

1.2.1 General Characters and Classification of Chordates up to orders with examples
1.2.2 Salient features of Urochordata; Retrogressive metamorphosis in Urochordata
1.2.3 Salient features and affinities of Cephalochordata
1.2.4 General Characters of Cyclostomata; Comparison of *Petromyzon*and *Myxine*

UNIT – II

2.1 Pisces

2.1.1 General characters of and Classification of Pisces up to orders with examples
2.1.3*Scoliodon*- Digestive,Respiratory, Circulatory and Nervous system
2.1.4 Types of Scales, Types of Fins
2.1.5 Migration in Fishes

2.2 Amphibia

2.2.1 General characters and Classification of Amphibians up to orders with examples.
2.2.2***Rana tigrina***- Respiratory, Circulatory and Nervous systems
2.2.3 Parental care in Amphibians; Neoteny and Paedogenesis
2.2.4 Metamorphosis in Amphibians and its hormonal control

Unit – III

3.1 Reptilia

3.1.1 General characters and Classification of Reptilia up to orders with examples
3.1.2***Calotes***–Digestive,Respiratory, Circulatory and Nervous systems
3.1.3 Temporal fossa in Reptiles and its evolutionary importance
3.1.4 Distinguished characters of Poisonous and Non-poisonous snakes

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3.2 Aves

3.2.1 General characters and Classification of Aves upto orders with examples.
3.2.2***Columba livia***- Digestive, Respiratory,Circulatory and Nervous systems
3.2.3 Migration in Birds
3.2.4 Flight adaptation in Birds

Unit – IV

4.1 Mammalia

4.1.1 General characters and Classification of Mammalia upto orders with examples
4.1.2***Rabbit***- Digestive, Respiratory,Circulatory and Nervous systems
4.1.3Dentition in Mammals
4.1.4 Aquatic adaptations in Mammals

Suggested Readings:

1. **E.L.Jordan and P.S. Verma**'*Chordate Zoology*' -. S. Chand Publications.

2. **Mohan P.Arora**. '*Chordata – I*, Himalaya Publishing House Pvt.Ltd.

3. **Marshal, Parker and Haswell**'*Text book of Vertebrates*'. ELBS and McMillan, England.

4. **Alfred Sherwood Romer**. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS CollegePublishing, Saunders College Publishing

5. **George C. Kent, Robert K. Carr**. *Comparative Anatomy of the Vertebrates*, 9th ed. McGrawHill.

6. **Kenneth Kardong***Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed,'McGraw Hill.

7. **J.W. Young**, *The Life of Vertebrates*, 3rd ed, Oxford University press.

8. **Harvey Pough F, Christine M. Janis, B. Heiser,** *Vertebrate Life,* Pearson, 6th ed, Pearson Education Inc.2002.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – II

ANIMAL DIVERSITY - VERTEBRATES (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

I. Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Hemichordata:** *Balanoglossus, Tornmaria larva*
2. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
3. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
4. **Pisces:** *Sphyrna, Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Auguilla, Protopterus,* Scales: Placoid, Cycloid, Ctenoid
5. **Amphibia:** *Ichthyophis, Amblystoma, Siren,Hyla, Rachophous,Bufo, Rana,* Axolotal larva
6. **Reptilia :** *Draco, Chemaeleon, Gecko, Uromastix, Vipera russeli, Naja, Bungarus, Enhydrina, Typhlops, Ptyas, Testudo, Trionyx, Crocodilus*
7. **Aves:** Archaeopteryx, *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo* ,Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
8. **Mammalia:** *Ornithorthynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,* Hedgehog;
9. **Histology:**T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lung, Artery, Vein, Bone T.S, Spinal Cord. T.S.

II. Osteology:
Rabbit – Axial Skeleton (Bones of Skull and Vertebral Column),
Varanus, Pigeon and Rabbit - Appendicular skeleton (Bones of Limbs and Girdles

III. Demonstration of dissection / dissected / virtual dissection: Labeo / Tilapia
1. Digestive system 2. Brain, Weberian Oscicles3. V, VII, IX, X cranial nerves

IV. Laboratory Record work shall be submitted at the time of practical examination

V. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

VI. Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals:

1. **S.S.Lal,** Practical Zoology – Vertebrata
2. **P.S.Verma,** A manual of Practical Zoology– Chordata

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY II Year

SEMESTER – III

ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR

Theory	**4 Hours/Week**	**4 Credit**	**Internal marks = 20**
Practical	**3 Hours/Week**	**1 Credit**	**External Marks = 80**

UNIT – I

1.1 Digestion

1.1.1 **Enzymes:** Definition, Classification, Inhibition, Regulation
1.1.2 Digestion of Carbohydrates, Proteins, Lipids and Cellulose
1.1.3Absorption and Assimilation of digested food
1.1.4 Role of Gastrointestinal hormones in digestion

1.2 Excretion, Homeostasis and Osmoregulation

1.2.1 Classification of Animals on the basis of excretory products: Ammonotelic, Ureotelic, and Uricotelic; Structure and function of Nephron
1.2.2Urine formation and Counter current mechanism
1.2.3 Concept and Mechanism of Homeostasis
a) Hormone regulation of Blood Glucose levels in Human being
b) Water and Ionic Regulation by Marine and Fresh water Animals
c) Thermo regulation in Human being
1.2.4. Osmoregulation in Marine, Fresh and Brackish water Animals

UNIT – II

2.1 Respiration

2.1.1Definition of Respiration, Respiration mechanism, External, Internal and Cellular Respiration.
2.1.2 Respiratory Pigments; Transport of Oxygen, Oxygen dissociation curves, and Bohr's Effect;
2.1.3 Transport of Carbon dioxide, Chloride shift
2.1.4 Regulation of Respiration; Nervous and Chemical Mechanism

2.2 Circulation

2.2.1 Types of Circulation Open and Closed; Structure of Mammalian Heart
2.2.2 Types of Hearts: Myogenic and Neurogenic
2.2.3 Heart functions - Conduction and Regulation of Heart beat, Regulation of Heart rate; ECG
2.2.4 Tachycardia and Bradycardia; Blood Clotting mechanism

UNIT– III

3.1 Muscle Contraction

3.1.1Types of Muscles
3.1.2 Ultra structure of skeletal muscle fibre
3.1.3 Mechanism and Chemical changes during Muscle Contraction (Sliding filament theory)
3.1.4 Twitch Tetanus summation and Treppe fatigue

3.2 Nerve Impulse

3.2.1 Structure of Neuron
3.2.2 Nerve impulse - Resting potential, Threshold potential and Action potential, Conduction of Nerve impulse
3.2.3 Transmission of Nerve impulse
3.2.4 Synapse and Synaptic transmission; Neurotransmitters-EPSP, IPSP

3.3 Endocrine System

3.3.1 Endocrine glands - Structure, secretions and functions of Pituitary gland
3.3.2 Thyroid, Parathyroid, Adrenal glands and Pancreas
3.3.3 Hormone action and Concept of Secondary messengers
3.3.4 Male and Female Hormones; Hormonal control of Menstrual cycle in human beings

UNIT – IV

4.1 Animal Behaviour

4.1.1 Types of Behaviour- Innate and Acquired; Instinctive and Motivated behaviour
4.1.2 Taxes, Reflexes, Tropisms

4.2 Learning and Memory

4.2.1 **Types of Learning**: Trial and Error Learning, Imprinting, Habituation
4.2.2 **Conditioning:** Classical Conditioning; Instrumental conditioning, Examples of Conditioning, Pavlov's Experiment

4.3 Social Behaviour and Communication

4.3.1 Social behaviour of insects (Dance language of honey bees)Colonial Existence of Bees and Termites; Pheromones

4.4 Biological Rhythms

4.4.1 Biological Clocks, Circadian Rhythms; solar and lunar Rhythms; Circannual Rhythms

Suggested Readings:

1. **Gerard J. Tortora and Sandra Reynolds Garbowski** *Principles of Anatomy and Physiology*, Tenth Ed., John Wiley & Sons
2. **Arthur C. Guyton MD**, *A Text Book of Medical Physiology*, Eleventh ed., JohnE. Hall, Harcourt Asia Ltd.
3. **William F. Ganong**, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
4. **Sherwood, Klandrof, Yanc, Animal** *Physiology*, Thompson Brooks/Coole, 2005.
5. **Sherwood, Klandrof, Yanc,** *Human Physiology*, Thompson Brooks/Coole, 2005.
6. **Knut Scmidt-Nielson,** *Animal Physiology***,** 5th edition, Cambridge Low Price Edition.
7. **Roger Eckert and Randal,** *Animal Physiology***,** 4th ed, Freeman Co, New York**.**
8. **Singh. H.R,** Text Book of Animal Physiology and Biochemistry
9. **Nagabhushanam**, Comparative Animal Physiology
10. **Veer Bal Rastogi,** Text Book of Animal Physiology
11. **Dasmann**, "Wild Life Biology"
12. **ReenaMathur,** "Animal Behaviour"
13. **Alocock,** "Animal Behaviour- an Evolutionary Approach

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY II Year

SEMESTER – III

ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Qualitative tests for identification of ammonia, urea and uric acid (Nitrogenous excretory products)
3. Zonation of gut in Cockroaches
4. Study on effect of pH and Temperature on salivary amylase activity
5. Study of permanent histological sections of mammalian endocrinal glands: Pituitary, Thyroid, Pancreas, Adrenal gland
6. Estimation of Haemoglobin by Sahli's method
7. Estimation of Blood Clotting time
8. Estimation of total protein by Biuret's method
9. Estimation of unit metabolism of fish

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

Tortora, G.J. and Derrickson, B.H. (2009).*Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.
Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill
Guyton, A.C. and Hall, J.E. (2011). T*extbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006).*Biochemistry*.VI Edition. W.H Freeman and Co.
Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009).*Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.
Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper'sIllustrated Biochemistry*. XXVIII Edition.Lange Medical Books/Mc Graw3Hill.

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – V

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Basics of Immune system

1.1.1 Cells of the Immune system and the Lymphoid organs (Primary and Secondary)

1.1.2 First line of defences-physical and chemical barriers; second line of defences – inflammation and phagocytosis.

1.1.3 Types of Immunity- Inherent (Active and Passive) and Acquired Immunity (Active and Passive) Humoral and Cell mediated immunity.

1.1.4 Major Histocompatibility complex (MHC)- structure and function of class I and Class II proteins. Significance of MHC in organ transplantation; MHC restriction

UNIT – II

2.1 Antibodies and Antigens and Immune system diseases

2.1.1 Antibodies(Immunoglobulins) – Structure, functions and classification, antibody diversity, Monoclonal antibodies and applications

2.1.2 Antigens structure, antigenic determinants/epitopes, haptens, adjuvants and antigenicity.

2.1.3 Antigen-antibody reactions; Agglutination; Precipitation, Opsonization, Cytotoxicity

2.1.4 Hypersensitivity reactions.
Autoimmunity and Immunodeficiency diseases.

Unit – III

3.1 Animal Biotechnology and Genetically modified organisms

3.1.1 Concept and Scope of Animal Biotechnology

3.1.2 Recombinant DNA Technology and its applications.

3.1.3 Cloning Vectors- Plasmids, Cosmids and shuttle vectors, Cloning methods(Cell, Animal and Gene cloning); Restriction enzymes and Ligases

3.1.4 Transgenesis – Methods of Transgenesis
Production of Transgenic animals- Sheep and Fish

Unit – IV

4.1 Applications of Biotechnology

4.1.1 In vitro fertilization and embryo transfer

4.1.2 Hybridoma technology – concepts and applications

4.1.3 Stem cells- Types and their applications

4.1.4 Recombinant insulin and human growth hormone; Polymerase Chain Reaction (PCR)
Animal Bioreactors- Concepts and Applications.

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Suggested Readings:

1. Text Book of Immunology – Ivan Riott
2. Text Book of Immunology – C.V.Rao
3. Text Book of Immunology – Nandinin Shetty
4. Text Book of Immunology – Kubey
5. Culture of Animal Cells – R. Ian Freshney, Wiley Liss
6. Biotechnology – S. Mitra
7. Animal Cell Culture - Practical Approach – Ed. John. RW. Masters, Oxford
8. Biotechnology – B.D.Singh
9. Brown, T.A. (1998). *Molecular Biology Labfax II: Gene Cloning and DNAAnalysis*. II Edition, Academic Press, California, USA.
10. Glick, B.R. and Pasternak, J.J. (2009). *Molecular Biotechnology - Principles and Applications of Recombinant DNA*. IV Edition, ASM press, Washington, USA.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – V

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

I. Immunology

1. Identification of Blood grouping (Demonstration of Agglutination) using kit.
2. Demonstration of Precipitation (VDRL/RPR) using kit.
3. Histological study of Lymphoid organs -Spleen, Thymus, Lymph node, Bone marrow (through prepared slides).
4. Enumeration of Total RBC from a given blood sample.
5. Enumeration of Total WBC from a given blood sample.
6. Enumeration of Differential count of WBC from a given blood sample.

II. Animal Biotechnology

1. Study the following techniques through Photographs / Virtual Lab

a) Identification of Vectors
b) Identification of Transgenic animals
c) DNA sequencing (Sanger's method)
d) DNA finger printing
e) Southern blotting
f) Western blotting

2. PCR (demonstration) on site or of site demonstration.

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

1. A Hand Book of Practical Immunology – **Ivan Riott**
2. Animal Biotechnology – **P.K. Gupta.**
3. Immunology, VI Edition. W.H. Freeman and Company **Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006).**
4. Immunology, VII Edition, Mosby, Elsevier Publication **David, M., Jonathan, B., David, R. B. and Ivan R. (2006).**
5. Cellular and Molecular Immunology. V Edition. Saunders Publication, **Abbas, K. Abul and Lechtman H. Andrew (2003.)**

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – VI

ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Ecology- I

1.1.1 Ecosystem Structure and Functions; Types of Ecosystems – Aquatic and Terrestrial
1.1.2 Bio-geo chemical nutrient cycles - Nitrogen, Carbon, Phosphorus and Water
1.1.3 Energy flow in ecosystem
1.1.4 Food chain, food web and ecological pyramids
1.1.5 Animal Associations-Mutualism; Commensalism;Parasitism; Competition, Predation

UNIT – II

2.1 Ecology – II

2.1.1 Concept of Species, Population dynamics and Growth curves
2.1.2 Community Structure and dynamics and Ecological Succession
2.1.3 Ecological Adaptations
2.1.4 Environmental Pollution- Sources, Effect and Control measures of Air, Water, Soiland Noise Pollution
2.1.5 Wildlife conservation - National Parks and Sanctuaries of India, Endangered species; Biodiversity and Hotspots of Biodiversity in India.

UNIT – III

3.1 Zoogeography

3.1.1 Zoogeographical regions
3.1.2 Climatic and faunal peculiarities of Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions
3.1.3 Wallace line, Discontinuous distribution
3.1.4 Continental Drift

Unit – IV

4.1. Evolution

4.1.1 Theories of Evolution – Lamarckism, Neo-Lamarckism, Darwinism, Neo-Darwinism, Modern synthetic theory, Evidences of Evolution.
4.1.2 Forces of Evolution–Natural Selection, Genetic drift, Gene flow, Genetic load, Organic variations,Hardy Weinberg Equilibrium.
4.1.3. Isolation –Premating and post mating isolating mechanisms.
4.1.4 Speciation: Methods of Speciation - Allopatric and Sympatric; Causes and Role of Extinction in Evolution.

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Suggested Readings:

1. Ecology – Himalaya Publising company – M.P Arora
2. Environmental Biology – P.D. Sharma
3. Environmental Ecology – P.R. Trivedi and Gurdeep Raj
4. Indian Wildlife Threats and Prervation – Buddhadev Sharma and Te Kumar
5. Ecology-Principles and Application II Edn. Cambridge Univ Press, London, Champan. JL and Re.iss MJ.
6. Environmental Studies, TATA McGraw Hill Com. New Delhi, Benny Joseph.
7. Fundamentals of Ecology Third Edn., Nataraj Publishers, Dehradun, Eugene.P. Odum.
8. Ecology and Animal Distribution, Veea Bala Rastogi.
9. Text Book of Ecology and Environment, P.K. Gupta.
10. Ecology and Wildlife Biology, Bhatnagar and Bansal.
11. Evolution 3rd Edn. Blackwell Publishing, Ridley, M (2004).
12. Evolutionary Biology, Addison –Wesley; Minkoff,E(1983).
13. *Evolution*. Cold Spring, Harbour Laboratory Press Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007).
14. *Evolution*. IV Edition. Jones and Bartlett Publishers; Hall, B. K. and Hallgrimsson, B. (2008).
15. *Evolution*, 2nd Edn, Oxford and IBH Publishing Co., New Delhi, Jan M. Savage.

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KAKATIYA UNIVERSITY
Under Graduate Courses (Under CBCS 2019 - 2022)
B.Sc. ZOOLOGY III Year
SEMESTER – VI

ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

Ecology

1. Determination of pH of Soil and Water.
2. Estimation of Salinity (Chlorides) of water in given samples.
3. Estimation of Carbonates and Bicarbonates in the given water samples.
4. Estimation of dissolved Oxygen of Pond water, sewage, effluents.
5. Identification of Zooplankton from different water bodies.
6. Study of Pond Ecosystem / Local polluted site – Report submission.

Zoogeography

1. Study of at least 3 endangered or threatened wild animals of India through photographs/specimens/models
2. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
3. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.

Evolution

1. Museum Study of fossil animals: **Peripatus; Coelacanth fish, Dipnoi fishes; Sphenodon; Archaeopteryx.**
2. Study of homology and analogy from suitable specimens and pictures
3. Problems on Hardy-Weinberg Law
4. Macroevolution using Darwin finches (pictures)

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

1. Ecology Student Lab Manual, Biology Labs – Robert Desharnais, JeffreyBell.
2. Ecology Lab manual – Darrell S Vodopich.

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