

Osmania University

Faculty of Informatics

Two years MCA Program
Master of Computer Applications 2022-23

Syllabi for Semesters – I and II
With Effect from Academic Year 2022 – 2023

Osmania University
Hyderabad

SCHEME OF INSTRUCTION
MASTER OF COMPUTER APPLICATIONS (MCA)
SEMESTER- I

| SN o | Course Code | Course Title | Hours/ Week | | | Scheme of Examination | | | | No of Credits |
|-------------------|----------------|---|----------------|---|---|--------------------------|-----|-----|-------------------|------------------|
| | | | | | | Max Marks | | | Duration (hrs) | |
| | | | | | | L | T | P | CIE | |
| THEORY | | | | | | | | | | |
| 1 | PCC101 | Discrete Mathematics | 4 | - | - | 30 | 70 | 100 | 3 | 4 |
| 2 | PCC102 | Data Structures using C | 4 | - | - | 30 | 70 | 100 | 3 | 4 |
| 3 | PCC103 | Object Oriented Programming using Java | 3 | 1 | - | 30 | 70 | 100 | 3 | 4 |
| 4 | PCC104 | Computer Architecture | 3 | | - | 30 | 70 | 100 | 3 | 3 |
| 5 | PCC105 | Probability & Statistics | 3 | 1 | - | 30 | 70 | 100 | 3 | 4 |
| 6 | MGC106 | Managerial Economics and Accountancy | 3 | | - | 30 | 70 | 100 | 3 | 3 |
| PRACTICALS | | | | | | | | | | |
| 7 | LCC151 | Data Structures using C Lab | - | - | 3 | 25 | 50 | 75 | 3 | 1.5 |
| 8 | LCC152 | Java Programming Lab | - | - | 3 | 25 | 50 | 75 | 3 | 1.5 |
| 9 | HSC153 | Soft Skills Lab | - | - | 2 | 25 | 50 | 75 | 3 | 1 |
| | | | 20 | 2 | 8 | 255 | 570 | 825 | 27 | 26 |

| Abbreviation | Full Form | Abbreviation | Full Form |
|--------------|------------------------------|--------------|--------------------------------|
| PCC | Professional Core Course | CIE | Continuous Internal Evaluation |
| PEC | Professional Elective Course | SEE | Semester End Evaluation |
| MGC | Management Course | L | Lecture |
| LCC | Laboratory Core Course | P | Practical |

Note : Each lab should be made with 30 students for batch

SCHEME OF INSTRUCTION
MASTER OF COMPUTER APPLICATIONS (MCA)
SEMESTER – II

| SNo | Course Code | Course Title | Hours/ Week | | | Scheme of Examination | | | | No of Credits |
|------------|-------------|-----------------------------------|-------------|---|---|-----------------------|-----|----------------|-----|---------------|
| | | | L | T | P | Max Marks | | Duration (hrs) | Cr | |
| THEORY | | | L | T | P | CIE | SEE | Total Marks | SEE | Cr |
| 1 | PCC 201 | Operating Systems | 4 | | - | 30 | 70 | 100 | 3 | 4 |
| 2 | PCC 202 | Database Management System | 4 | - | - | 30 | 70 | 100 | 3 | 4 |
| 3 | PCC 203 | Design and Analysis of Algorithms | 3 | 1 | - | 30 | 70 | 100 | 3 | 4 |
| 4 * | PCC 204 | Data Engineering with Python | 4 | - | - | 30 | 70 | 100 | 3 | 4 |
| 5 | PCC 205 | Machine Learning | 3 | - | - | 30 | 70 | 100 | 3 | 3 |
| 6 | MGC 206 | Operations Research | 3 | | - | 30 | 70 | 100 | 3 | 3 |
| PRACTICALS | | | | | | | | | | |
| 7 | LCC 251 | Operating Systems Lab | - | - | 3 | 25 | 50 | 75 | 3 | 1.5 |
| 8 * | LCC 252 | Data Engineering with Python | - | - | 3 | 25 | 50 | 75 | 3 | 1.5 |
| 9 | LCC 253 | Database Management Systems Lab | - | - | 3 | 25 | 50 | 75 | 3 | 1.5 |
| 10 | SIP 321 | Summer Internship/ Mini Project* | - | - | - | - | - | | - | - |
| | | | 21 | 1 | 9 | 255 | 570 | 825 | 27 | 26.5 |

***Summer Internship/ Mini Project** : After second semester, the students are expected to do summer internship/ Mini Project and Its grade will be credited in the third semester memo after evaluation.

| Abbreviation | Full Form | Abb | Full Form |
|--------------|--------------------------------------|-----|--------------------------------|
| PCC | Professional Core Course | CIE | Continuous Internal Evaluation |
| PEC | Professional Elective Course | SEE | Semester End Evaluation |
| HSC | Humanities and Social Science Course | L | Lecture |
| LCC | Laboratory Core Course | P | Practical |

Note : Each lab should be made with 30 students for batch

SCHEME OF INSTRUCTION
MASTER OF COMPUTER APPLICATIONS (MCA)
SEMESTER- III

| SNo | Course Code | Course Title | Hours/ Week | | | Scheme of Examination | | | No of Credits |
|-------------------|-------------|------------------------------------|----------------|----------|----------|-----------------------|------------|----------------|---------------|
| | | | | | | Max Marks | | Duration (hrs) | |
| THEORY | | | L | T | P | CIE | SEE | SEE | Cr |
| 1 | PCC301 | Software Engineering | 4 | - | - | 30 | 70 | 3 | 4 |
| 2 | PCC302 | Computer Networks | 4 | - | - | 30 | 70 | 3 | 4 |
| 3 | PCC303 | Data Science | 3 | 1 | - | 30 | 70 | 3 | 4 |
| 4 | PCC304 | Web Technologies | 3 | | - | 30 | 70 | 3 | 3 |
| 5 | PEC** | Professional Elective–I | 3 | - | - | 30 | 70 | 3 | 3 |
| 6 | PEC** | Professional Elective–II | 3 | - | - | 30 | 70 | 3 | 3 |
| PRACTICALS | | | | | | | | | |
| 7 | LCC351 | Computer Networks Lab | - | - | 3 | 25 | 50 | 3 | 1.5 |
| 8 | LCC352 | Software Engineering Lab | - | - | 3 | 25 | 50 | 3 | 1.5 |
| 9 | LCC353 | Data science Lab | - | - | 3 | 25 | 50 | 3 | 1.5 |
| 10 | SIP321 | Summer Internship/ Mini Project | - | - | - | 50 | | - | 2 |
| | | | 20 | 1 | 9 | 305 | 570 | 27 | 27.5 |

| | | | |
|-------------------------------|------------------------------|-----------------------------------|--------------------------------|
| Professional Electives | Course Code-PEC** | Professional Elective -1 | |
| | PEC311 | Information Security | |
| | PEC312 | Distributed Systems | |
| | PEC313 | Internet of Things | |
| | PEC314 | Information Retrieval System | |
| Professional Electives | Course Code-PEC** | Professional Elective – II | |
| | PEC321 | Network Security | |
| | PEC322 | Software Quality Testing | |
| | PEC323 | Image Processing | |
| | PEC324 | Natural Language Processing | |
| Abbreviation | Full Form | Abbreviation | Full Form |
| PCC | Professional Core Course | CIE | Continuous Internal Evaluation |
| PEC | Professional Elective Course | SEE | Semester End Evaluation |
| MGC | Management Course | L | Lecture |
| LCC | Laboratory Core Course | P | Practical |

SCHEME OF INSTRUCTION

MASTER OF COMPUTER APPLICATIONS (MCA)

SEMESTER- IV

| SNo | Course Code | Course Title | Hours/ Week | | Scheme of Examination | | | No of Credits |
|-------------------|----------------|-----------------------------------|----------------|-----------|-----------------------|------------|----------------|---------------|
| | | | | | Max Marks | | Duration (hrs) | |
| THEORY | | | L | P | CIE | SEE | SEE | Cr |
| 1 | PEC** | Professional Elective –III | 3 | - | 30 | 70 | 3 | 3 |
| 2 | PEC** | Professional Elective –IV | 3 | - | 30 | 70 | 3 | 3 |
| 3 | OE** | Open Elective | 2 | - | 30 | 70 | 3 | 2 |
| PRACTICALS | | | | | | | | |
| 4 | Proj401 | Project Work | - | 24 | 50 | 100 | 3 | 12 |
| | | Total | 8 | 24 | 140 | 310 | 12 | 20 |

Professional Electives

| Course Code- PEC** | Professional Elective – III |
|-------------------------------|------------------------------------|
| PEC411 | Block Chain Technologies |
| PEC412 | Big Data Analytics |
| PEC413 | Cloud Computing |
| PEC413 | Deep Learning |

| Course Code- PEC** | Professional Elective – IV |
|-------------------------------|-----------------------------------|
| PEC421 | Cyber Security |
| PEC422 | Digital Forensics |
| PEC423 | Optimization Techniques |
| PEC424 | Enterprise Architecture |

Course Code-

OE**

OE 431

OE 432

OE 433

OE 434

OE 435

OE 436

Open Elective

Professional Ethics

Constitution of India

Disaster Management

Organization Behaviour

Intellectual Property & Cyber Law

Environmental Science

| | |
|------------------------------------|--------------------|
| Instruction | 4 Periods per week |
| Duration of University Examination | 3 Hours |
| University Examination | 70 Marks |
| Sessional | 30 Marks |
| Credits | 4 |

Course Objectives:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Use division into cases in a proof.
4. Use counterexamples.
5. Apply logical reasoning to solve a variety of problems

Course Outcomes:

1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
3. For a given a mathematical problem, classify its algebraic structure
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
5. Develop the given problem as graph networks and solve with techniques of graph theory.

UNIT -I

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

UNIT-II

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.

UNIT-III

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. **Proof Techniques:** Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

UNIT-IV

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

UNIT-V

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

Suggested readings :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, TataMcGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.
4. J.P. Tremblay and R. Manohar, “Discrete Mathematical Structure and It’s Application to Computer Science”, TMG Edition, Tata McGraw-Hill
5. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum’s Outlines Series, Seymour Lipschutz, Marc Lipson.

PCC102

Data Structures using C

Credits : 4

Instruction 4L hrs per week
CIE 30 marks

Duration of SEE 3 hours
SEE 70 marks

Course Objectives

1. To learn the features of C
2. To learn the linear and non-linear data structures
3. To explore the applications of linear and non-linear data structures
4. To learn to represent data using graph data structure
5. To learn the basic sorting and searching algorithms

Course Outcomes - Upon completion of the course, students will be able to:

1. Implement linear and non-linear data structure operations using C
2. Suggest appropriate linear / non-linear data structure for any given data set.
3. Apply hashing concepts for a given problem
4. Modify or suggest new data structure for an application
5. Appropriately choose the sorting algorithm for an application

UNIT I - C PROGRAMMING BASICS

Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in C – Managing Input and Output operations – Decision Making and Branching – Looping statements. Arrays – Initialization – Declaration – One dimensional and Two-dimensional arrays. Strings- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT II - FUNCTIONS, POINTERS, STRUCTURES AND UNIONS

Functions – Pass by value – Pass by reference – Recursion – Pointers – Definition – Initialization – Pointers arithmetic. Structures and unions – definition – Structure within a structure – Union – Programs using structures and Unions – Storage classes, Pre-processor directives.

UNIT III - LINEAR DATA STRUCTURES

Arrays and its representations

Stacks and Queues – Applications

Linked lists – Single, circular and doubly Linked list-Application

UNIT IV - NON-LINEAR DATA STRUCTURES

Trees – Binary Trees – Binary tree representation and traversals , – Applications of trees.

Binary Search Trees , AVL trees.

Graph and its representations – Graph Traversals.

UNIT V - SEARCHING AND SORTING ALGORITHMS

Linear Search – Binary Search.

Sorting: Selection Sort, Bubble Sort, Insertion sort , Merge sort , Quick Sort

Hashing, Types of Hashing. Collision resolution techniques

Suggested Readings:

1. Brian W. Kernighan / Dennis Ritchie ,The C Programming Language ,Second Edition , Pearson 2015
2. Pradip Dey and Manas Ghosh, —Programming in C, Second Edition, Oxford University Press, 2011.
3. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C, Second Edition, University Press, 2008.
4. Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1996
5. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms, Pearson Education, 1983.

PCC103 Object Oriented Programming using Java

Credits : 4

Instruction 3L hrs per week
CIE 30 marks

Duration of SEE 3 hours
SEE 70 marks

Course Objectives

1. Learn the basics of object oriented programming
2. Study Java I/O mechanisms
3. Explore Java API
4. Develop graphics based Java programs
5. Learn swing framework

Course Outcomes

1. Explain OOPs features and concepts
2. Write basic Java programs
3. Write I/O programs in Java
4. Use various built-in Java classes and methods
5. Create window based Java programs

UNIT-I

Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, Data Type, Variables and Arrays, Operators, Control statements, Classes, Methods, Inheritance, Packages and Interfaces, Inner Classes.

UNIT-II

I/O basics, Stream and Byte classes, Character Streams, Reading Console input and output, Print Writer Class, String Handling, Exceptions Handling, Multithreaded Programming.

UNIT-III

Exploring Java Language, Collections Overview, Collections Interfaces, Collections Classes, Iterators, Random Access Interface, Maps, Comparators, Arrays, Legacy classes and interfaces, Sting Tokenizer, BitSet, Date, Calendar, Timer.

UNIT-IV

Introducing AWT working With Graphics: AWT Classes, Working with Graphics.

Event Handling: Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.

AWT Controls: Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Handling events by Extending AWT Components, Exploring the controls, Menus and Layout Managers.

UNIT-V

Introduction to Swing Package, Java I/O classes and interfaces, Reading and Writing Files, Serialization, Introduction to Java Network Programming, Object Class, Exploring Image package.

Suggested Readings:

1. Herbert Schildt, **The Complete Reference Java**, 9th Edition, Tata McGraw Hill, 2005.
2. Bruce Eckel, **Thinking in Java**, 4th Edition, Pearson Education
3. Dietel and Dietel, **Java: How to Program**, 5th Edition, Prentice Hall
4. James M Slack, **Programming and Problem solving with JAVA**, Thomson Learning, 2002
5. C Thomas Wu, **An Introduction to Object Oriented programming with Java**, Tata McGraw Hill, 2005.
6. Kathy Sierra, Bert Bates, **Head First Java**, 2nd Edition, **A Brain-Friendly Guide**, Publisher: O'Reilly Media, February 2005.

PCC104

Computer Architecture

Credits : 3

Instruction 3 hrs per hrs weeks..
CIE 30 marks

Duration of SEE 3 hours
SEE 70 marks

Course Objectives

1. Learn the basics of data representation
2. Study register transfer micro operations
3. Explore CPU
4. Comprehend computer arithmetic algorithms
5. Learn I/O organization

Course Outcomes

1. Apply data representation methods
2. Write logic diagrams for microoperations
3. Write general register organization diagrams
4. Analyze computer arithmetic algorithms.
5. Explain I/O organization

UNIT -I

Data Representation: Data types, Complements, Fixed and Floating Point representations, and Binary codes.

Overview of Computer Function and Interconnections: Computer components, Interconnection structures, Bus interconnection, Bus structure, and Data transfer.

UNIT-II

Register Transfer Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic, Logic and Shift micro operations, Arithmetic Logic Shift Unit. **Basic Computer Organization and Design:** Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instruction, Input-Output and Interrupt.

UNIT-III

Micro programmed Control: Control memory, Address Sequencing, Micro program example, Design of Control Unit.

Central Processing Unit: General Register Organization, Stack Organization, Instruction formats, Addressing modes, Data Transfer and Manipulation, and Program control.

Computer Arithmetic: Addition and Subtraction, Multiplication, Division, and Floating Point Arithmetic Operations.

UNIT-IV

Memory Organization: Memory Hierarchy, Main Memory, RAM and ROM, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management hardware.

UNIT-V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), I/O Processor, Serial Communication.

Pipeline Processing: Arithmetic, Instruction and RISC Pipelines.

Assessing and Understanding Performance: CPU performance and its factors, Evaluating performance.

Suggested Readings

1. Morris Mano M, **Computer System Architecture**, Pearson Education India, 3rd Edition, 2007.
2. William Stallings, **Computer Organization and Architecture**, PHI, 7th Edition, 2008.
3. David A Patterson, John L Hennessy, **Computer Organization and Design**, Morgan Kaufmann, 5th Edition, 2013.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, **Computer Organization**, Tata McGraw-Hill Education, 5th Edition, 2002

PCC105

Probability & Statistics

Credits : 4

Instruction 3L hrs per week
CIE 30 marks

Duration of SEE 3 hours
SEE 70 marks

Course Objectives

1. Understand the Linear Algebra concepts through vector spaces.
2. Basic concepts of probability and concepts of various discrete and continuous probability distributions.
3. Learning sampling procedure and various kinds of estimate techniques.
4. Learning hypotheses testing and acquiring knowledge of basic statistical Inference and its applications.
5. The concept of association between two variables and forecast future values by regression equations.

Course Outcomes

1. Understanding of Linear Algebra will boost the ability to understand and apply various data science algorithms.
2. Calculate probabilities by applying probability laws and theoretical results, knowledge of important discrete and continuous distributions, their inter relations with real time applications.
3. Understanding the use of sample statistics to estimate unknown parameters.
4. Become proficient in learning to interpret outcomes.
5. Compute and interpret Correlation Analysis, regression lines and multiple regression analysis with applications.

UNIT-I

Vector Spaces - Vector Spaces and Subspaces -Null Spaces, Column Spaces and Linear Transformations. Linearly Independent Sets - Bases - Coordinate Systems.

UNIT-II

Probability - Basic terminology, Three types of probability, Probability rules, Statistical independence, statistical dependency, Bayes' theorem.

Probability Distributions - Random variables, expected values, binomial distribution, Poisson distribution, normal distribution, choosing correct distribution.

UNIT-III

Sampling and Sampling Distributions - Random sampling, Non-Random Sampling distributions, operational considerations in sampling.

Estimation - Point estimates, interval estimates, confidence intervals, calculating interval estimates of the mean and proportion, t-distribution, determination of sample size in estimation.

UNIT-IV

Testing Hypothesis - one sample tests - Hypothesis testing of mean when the population standard deviation is known, powers of hypotheses test, hypotheses testing of proportions, hypotheses testing of means when standard deviation is not known.

Testing Hypotheses - Two sample tests - Tests for difference between means - large sample, small sample, with dependent samples, testing for difference between proportions – Large sample.

UNIT-V

Chi-square and Analysis of Variance - chi-square as test of independence, chi-square as a test of goodness of fit, analysis of variance, inferences about a population variance, inferences about two population variances.

Regression and Correlation – Simple Regression - Estimation using regression line, correlation analysis, making inferences about population parameters, limitations, errors and caveats in regression and correlation analysis. Multiple Regression and correlation analysis. Finding multiple regression equations and making inferences about population parameters.

Suggested Reading

1. David C Lay, Linear Algebra and its Applications 4e
2. Richard I Levin, David S Rubin - Statistics for Management, Seventh Edition, PHI - 1997
3. R D Sharma “ Theory and Problems of Linear Algebra”, International Publishing House Pvt. Limited, 2011.
4. A K Sharma, “ Linear Algebra”, Discovery Publishing House Ltd., 2019.
5. Gilbert Strang, Linear Algebra and its Applications, 2010
6. S. C. Gupta and V. K. Kapoor , Fundamentals of Mathematical Statistics Sultan Chand & Sons, New Delhi.

PCC106

Managerial Economics and Accountancy

Credits : 3

Instruction 3 hrs per week
CIE 30 marks

Duration of SEE 3 hours
SEE 70 marks

Course Objectives

1. To learn important concepts of Managerial Economics and apply them to evaluate business decisions.
2. To understand various parameters that determine the consumers' behavior.
3. To evaluate the factors that affect production
4. To understand the concepts of capital budgeting and payback period.
5. To study the concepts of various book-keeping methods.

Course Outcomes

1. Apply the fundamental concepts of managerial economics to evaluate business decisions Understand types of Demand and factors related to it.
2. Identify different types of markets and determine price –output under perfect competition.
3. Determine working capital requirement and payback
4. Analyze and interpret financial statements through ratios

UNIT – I

Meaning and Nature of Managerial Economics: Managerial Economics and its usefulness to Engineers, Fundamental Concepts of Managerial Economics-Scarcity, Marginalism, Equi-marginalism, Opportunity costs, Discounting, Time Perspective, Risk and Uncertainty, Profits, Case study method.

UNIT – II

Law of Demand and Supply: Law of Demand, Determinants, Types of Demand; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand Forecasting, Law of Supply and Concept of Equilibrium. (Theory questions and small numerical problem can be asked)

UNIT – III

Theory of Production and Markets: Production Function, Law of Variable Proportion, ISO quants, Economics of Scale, Cost of Production (Types and their measurement), Concept of Opportunity Cost, Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price - Output determination under Perfect Competition and Monopoly (theory and problems can be asked)

UNIT – IV

Working Capital Management and Capital Budgeting: Concepts, Significance, determination and estimation of fixed and **variable**, working capital requirements, sources of capital.

Introduction to capital budgeting, methods – traditional and modern methods with problems.

(Theory questions and numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked)

UNIT – V

Accounting: Meaning-Significance-Principles of double entry book keeping, Journal, Ledger accounts, Subsidiary books, Trial Balance, preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios.

(Theory questions and numerical problems on preparation of final accounts, cash book, petty cash book, bank reconciliation statement, calculation of some ratios)

Suggested Readings:

1. Mehta P.L., Managerial Economics —Analysis, Problems and Cases, Sultan Chand & Sons Educational Publishers, 2011
2. Maheswari S.N., Introduction to Accountancy, Vikas Publishing House, 2005
3. Pandey I.M., Financial Management, Vikas Publishing House, 2009
4. S P Jain and K L Narang, “Financial Accounting”, Kalyan Publishers, 2018
5. M Hanif and A Mukherjee “Modern Accountancy”, McGraw Hill, 3rd Edition, 2018.

LCC151

Data Structures using C Lab

Credits : 1.5

Instruction 3P hrs per week
CIE 25 marks

Duration of SEE 3 hours
SEE 50 marks

Course Objectives

1. To understand and implement basic data structures using C
2. To apply linear and non-linear data structures in problem solving.
3. To learn to implement functions and recursive functions by means of data structures
4. To implement searching and sorting algorithms

Course Outcomes - Upon completion of the course, the students will be able to:

1. Write basic and advanced programs in C
2. Implement functions and recursive functions in C
3. Implement data structures using C
4. Choose appropriate sorting algorithm for an application and implement it in a modularized way

Programs

1. Basic C Programs – looping, data manipulations, arrays
2. Programs using strings – string function implementation
3. Programs using structures and pointers
4. Programs involving dynamic memory allocations
5. Array implementation of stacks and queues
6. Linked list implementation of stacks and queues
7. Application of Stacks and Queues
8. Implementation of Trees, Tree Traversals
9. Implementation of Binary Search trees
10. Implementation of Linear search and binary search
11. Implementation Insertion sort, Bubble sort, Quick sort and Merge Sort
12. Implementation Hash functions, Collision resolution techniques

LCC152

Java Programming Lab

Credits : 1.5

Instruction 3P hrs per week
CIE 25 marks

Duration of SEE 3 hours
SEE 50 marks

Course Objectives

1. Learn how to write simple java programs
2. Learn how to write multithreaded programs
3. Learn how to write I/O programs
4. Learn how to write serialization programs
5. Learn how to write program using URL class

Course Outcomes

1. Be able to write simple java programs
2. Be able to write multithreaded programs
3. Be able to write I/O programs
4. Be able to write serialization programs
5. Be able to write URL class program

Programs

1. Write a program to calculate salary of n employees using concept of classes with constructors and methods.
2. Write a program to demonstrate e-commerce website using inheritance, abstract class and dynamic polymorphism.
3. Write a program to demonstrate various arithmetic calculations using packages.
4. Write a program to demonstrate client-server environment using multithreading.
5. Write a program to demonstrate mutual exclusion using thread synchronization.
6. Write a program to demonstrate Linked list class.
7. Write a program to demonstrate Hash set and Iterator classes.
8. Write a program to demonstrate Enumeration and Comparator interfaces.
9. Write a program to accept data and display output in key, value pair.
10. Write a program to create a registration form with different controls, menus and demonstrate event handling.
11. Write a program to copy data from one file to another file.
12. Write a program to merge contents of two files and display output on console.
13. Write a program to illustrate Serialization.
14. Write a program to retrieve web page using URL class.
15. Write a program to load and display image and perform gray scale.

HSC153

Instruction 2P hrs per week
CIE 25 marks

Soft Skills Lab

Credits : 1

Duration of SEE 3 hours
SEE 50 marks

Course Objectives

1. Learn conversational skills
2. Learn reading strategies
3. Learn time management
4. Learn stress management
5. Learn career planning

Course Outcomes

1. Express conversational skills
2. Specify reading strategies
3. Perform time management
4. Perform stress management
5. Explore career planning

Activities

1. Conversation skills, Listening dialogues from TV/radio/Ted talk/Podcast
2. Group discussion
3. Interview skills, Making presentation
4. Listening to Lectures and News Programmes, Listening to Talk show
5. Watching videos on interesting events on Youtube,
6. Reading different genres of texts ranging from newspapers to philosophical treatises
7. Reading strategies – graphic organizers, Reading strategies – summarizing
8. Reading strategies – interpretation, Reports
9. Cover letter, Resume,
10. Writing for publications, Letters, Memos, Emails and blogs
11. Civil Service (Language related), Verbal ability
12. Motivation, Self image
13. Goal setting, Managing changes
14. Time management, Stress management
15. Leadership traits
16. Team work
17. Career and life planning.
18. Multiple intelligences
19. Emotional intelligence
20. Spiritual quotient (ethics)
21. Intercultural communication
22. Creative and critical thinking
23. Learning styles and strategies

Suggested Readings:

1. Business English Certificate Materials, Cambridge University Press.
2. Graded Examinations in Spoken English and Spoken English for Work downloadable

materials from Trinity College, London.

3. International English Language Testing System Practice Tests, Cambridge University Press.
4. Interactive Multimedia Programs on Managing Time and Stress.
5. Personality Development (CD-ROM), Times Multimedia, Mumbai
6. Robert M Sherfield “Developing Soft Skills” 4th Edition, Pearson Education, 2009.

Web Sources

<http://www.slideshare.net/rohitjsh/presentation-on-group-discussion>

http://www.washington.edu/doi/TeamN/present_tips.html

<http://www.oxforddictionaries.com/words/writing-job-applications>

<http://www.kent.ac.uk/careers/cv/coveringletters.htm>

http://www.mindtools.com/pages/article/newCDV_34.htm