

# Government College of Engineering, Aurangabad

## Master of Computer Application

### [ Syllabus Structure ]

#### F.Y.M.C.A.

#### Part – I

Course Code	Name of Subject	Teaching Scheme Hours/Week			Examination Scheme - Marks					
		L	P	Total credits	Test	Assignment	End Sem	Practical	Term Work	Total
MCA101	Computer Programming using C	4	--	4	20	20	60		--	100
MCA102	Behavioral Science and Organizational Skills	4	--	4	20	20	60	--	--	100
MCA103	Data Structures	4		4	20	20	60	--	--	100
MCA104	Mathematics	4	--	4	20	20	60	--	--	100
MCA105	Web Programming Lab	2	4	4	--	--	--	50	50	100
MCA106	Lab : Computer Programming using C	--	2	1	--	--	--	25	25	50
MCA107	Lab : Data Structures	--	2	1	--	--	--	25	25	50
	Total of Part I	18	8	22	80	80	240	200	--	600
	Total Credit Point	18	4	22						

#### Part – II

Course Code	Name of Subject	Teaching Scheme Hours/Week			Examination Scheme - Marks					
		L	P	Total credits	Test - I	Assignment	End Sem	Pract	Term Work	Total
MCA108	Accounts & Financial Management	4	--	4	20	20	60	--	--	100
MCA109	Discrete Mathematics	4	--	4	20	20	60	--	--	100
MCA110	Object Oriented Programming & System	4	--	4	20	20	60	--	--	100
MCA111	Computer Graphics	4	--	4	20	20	60	--	--	100
MCA112	Communication skills	2	4	4	--	--	--	50	50	100
MCA113	Lab : Object Oriented Programming & Systems	--	2	1	--	--	--	25	25	50
MCA114	Lab : Computer Graphics	--	2	1	--	--	--	25	25	50
	Total of Part II	18	8	22	80	80	240	100	100	600
	Total Credit Point	18	4	22						

#### MCA101 - Computer Programming using C

Teaching Scheme :  
Lectures : 4 hrs/week

Examination Scheme :  
Test : 20 Marks  
Assignment : 20 Marks  
End Sem. Exam. : 60 Marks

1. Introduction to C Language: Why C , variables and constants, data types, keywords, storage classes, header files. [8]
2. Operators: Arithmetic, assignment, precedence, associativity, compound assignment, modular, mixed operands & type conversions, casts, increment, decrement, Bitwise operators AND, OR, NOR, Control structures: Conditional executions, if, nested if, switch, goto, for, while, do while. [8]
3. Functions: Passing arguments to function, returning values from function, Local & Global concept. [8]
4. Arrays & Pointers: Definition, passing array to function, searching an element in an array, sorting an array, two dimensional array, string manipulation, pointer, Definition, notation, pointer and arrays, pointer and strings, passing argument by value and reference. [8]
5. Structures : introduction to structures, array of structures, pointers and structures, file handling and unions [8]

**Text/Reference books:**

1. C: The Complete Reference by Herbert Schildt. McGraw Hill
2. Let us C by Yashwant Kanitkar. BPB Publication
3. Programming in C by Avinash Pande. MIT Press

## MCA102 - Behavioral Science & Organizational Skills

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Introduction to organizational behavior, the challenge facing management, Approaches to organizational behavior, framework and organizational behavior Framework, The early practice of management, Organizational special scientific managers, Human relations movement, Approach to-management, Functions of a management. Planning: Importance of planning in an organization, types of plans — Objectives, Strategies, Policies, Decision—making. [8]
2. Organization — Organization structures, Classical, Neoclassical and modern theories of organization, line staff and functional organization, authority and responsibility, span of control, centralization and decentralization, The organizational design, Socio-technical systems, organizational effectiveness. [8]
3. Conflict: Sources and types of conflict in organization, conflict management. [8]
4. Motivation — Primary and secondary motives, Maslaw's theory of motivation, Herzberg's two factor theory, leadership— it's theories and skills, styles of management leadership. Job satisfaction — measuring job satisfaction, factors influencing job satisfaction, Outcomes of job satisfaction with respect to productivity, turnover, absenteeism etc Job enrichment, job rotation, MBO technique, management of change. [8]
5. Control— It's significance to the organization, Steps: setting of an effective control system, how to make control acceptable, characteristics of an effective control system Communication - Process of communication, its importance, barriers to Communication ways of improving communication significance to an organization. [8]

### Text/Reference Books :

1. Organisation behaviour - Fred Luthans McGraw Hill
2. Principles of management - Econiz Ueihrich
3. Management - Stermer and Freeman
4. Principle of management - Terry Franklin AITBS
5. Principle of management - Tripathy and Reddy TMH

## MCA103 - Data Structures

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1] Introduction to data structure & The Stack & Queues - [8]  
The Arrays as an ADT: Using One-Dimensional Arrays, Using Two-Dimensional Arrays, Using Multidimensional Arrays, Classes in C++: The Class Rational, Using the class Rational, Implementing the methods, Overloading, Inheritance, Constructors, Definition and Examples, Primitive Operation, The stack as an ADT, The queue and its sequential representation, The queue as an ADT, Basic Definition and examples: Infix, Postfix, and Prefix, Program to evaluate a Postfix expression, Limitations of the program

2] Linear Data Structure & their representation [8]  
Definition, concept, operation on linked lists, Circular linked lists  
Doubly linked lists, Operations like insertion, deletion, insertion in order, searching, updating , Applications of linked lists such as polynomial manipulation, Comparison of singly linked, circularly linked & doubly linked list

3] Trees and Graphs [8]  
Definition, Basic terminology, operation on binary trees, linked storage representation for binary search trees, Basic operation on binary search tree such as creating a binary search tree, searching, modifying an element, inserting & deleting the element, destroy a binary search tree, tree traversals ,in-order, pre-order, post-order , tree application for expression evaluation & for solving sparse matrices.  
Definitions, basic terminology, matrix representation & implementation of graphs, graph travels, DFS, BFS, Shortest path, spanning tree

4] Sorting & searching [8]  
Different sorting tech, classification on the basis of big-O notation, tech such as straight selection sort, bubble sort, merge sort, quick sort, heap sort, shell sort, radix sort, comparisons between different sorting techniques  
Sequential searching, binary searching, height balanced trees 2-3 tree, B trees, B+ trees

5] Storage Management [8]  
Automatic List Management: Reference count method, Garbage collection, variations of garbage collection, Dynamic Memory management: Compaction of Blocks of Storage, First Fit, Best Fit, Worst Fit, Freeing Storage Blocks, Buddy Tag Method, Buddy System

### Text/Reference Books :

Data Structures using C and C++ 2ed by Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum (Pearson Edition)

## **Tutorials (The Difficulty level should be as given below or above than this)**

1] Companies and people often buy and sells stocks. Often they buy the same stock for different prices at different times. Say a person owns 1000 shares a certain stock (such as Checkpoint), she may have bought the stock in amounts of 100 shares over 10 different times with 10 different prices.

We will analyze two different methods of accounting -- Fifo and Lifo accounting used for determining the "cost" of a stock. This information is typically calculated when a stock is sold to determine if a profit / loss was made. In our version of Fifo accounting, the price of a commodity is averaged starting with the first purchase of that item. Say we sell 250 shares of a stock, according to this method, the purchase price is determined by averaging the prices on the first 250 shares bought. In our version of Lifo accounting, the price of a commodity is averaged starting with the last purchase of that item. Say we sell 250 shares of a stock, according to this method, the purchase price is determined by averaging the prices on the last 250 shares bought.

In this assignment, you will be using a queue for storing data for Fifo accounting, and a stack for Lifo accounting. You should use an array based implementation for your stack based implementation and a linked list for implementing your queue.

Both your stack and queue should have records with the following fields:

The name of the stock (a string or int)

The number of shares of a stock (an int)

The purchase price (can be a decimal)

You can assume that the first element of the structure is the security bought first, the second was bought second, etc.

Your program should have the user able to enter information about various stocks, the amount of shares, and the price. The user can then enter a query about a certain stock and the cost according to the Lifo and Fifo accounting methods for a certain number of shares.

The following could be your menu:

Press 1 to enter a new stock

Press 2 to find the Lifo and Fifo price for a stock.

If 1 is pressed, the user needs to enter the stock symbol, and the number of shares, and the price.

If 2 is pressed, the user needs to enter the stock symbol being queried and the number of shares in question.

2] Implement a polynomial class that uses a doubly-linked list to store the polynomial's terms. Each node of the list holds the coefficient and exponent for one term. The terms are kept in order from smallest to largest exponent. Each polynomial also maintains a pointer to the most recently accessed node.

## MCA104 - Mathematics

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Sequence and series : Bounded and Unbounded Sequences ,Convergent ,divergent and osculating Sequences, Monotonic Sequences, limit of Sequence ,convergence to monotonic Sequences, infinite series, comparison test, D' Alembert's Ration test, Cauchy's root test, Raabe's test. [8]

2.Linear Equations and Matrices, Determinants, Linear Inequalities and Convex sets:

Inverse of a matrix by elementary row transformation, rank of a matrix, solution of system of linear simultaneous equations, reduction of normal form, characteristics roots and vectors of a matrix, Cayley Hamilton Theorem, Determinants of transpose matrix and of product of two matrices, Cramer's rule, linear inequalities, Convex sets and their properties, Simplex method for linear programming. [8]

3.Vector Spaces and linear mapping: Vector Spaces Subspaces, linear Combinations, linear span ,row space of a matrix, sums and direct sums, basis and

dimension, linear dependence, dimension and subspace, coordinate vector linear mappings ,kernel and image of linear mapping, linear map as a vector space, choice of a basis in vector space, representation of linear maps matrices, relation between linear mapping and system of linear equations. [8]

4.Inner product spaces and norms: Inner product, lengths, angles, direction cosine, application to line and plane geometry, norms ,introduction to orthonormal basis and Gram-Schmidt process. [8]

5.Quadratic forms: Symmetric matrices and quadratic forms, effect of linear transformation, rational reduction to diagonal invariance of index,positive definiteness, orthogonal reduction of  $2 \times 2$  quadratic forms. [8]

### Text/Reference Books:

1. Linear Algebra: Seymour Lipchutz. TMH Publication
2. Linear Algebra: Mangalgi S.R.and Daftari D.K.
3. Higher Engineering Mathematics:Dr. B. S. Grewal. Khanna Publication

## **MCA105 - Web Programming Lab**

Teaching Scheme :

Lectures : 2 hrs/week

Practical : 4 hrs/week

Examination Scheme :

Pract. Exam. : 50 Marks

Term Work : 50 Marks

- |                                    |      |
|------------------------------------|------|
| 1. Overview of Internet Technology | (03) |
| 2. Detail Study of HTML and DHTML  | (07) |
| 3. Introduction to JavaScript      | (05) |

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

A minimum 06 experiments and a mini project of a web application should be developed using HTML and Javascript.

Practical Examination will consist of Performance and Viva-voice Examination

The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

**Text/Reference Books –**

1. The Complete Reference HTML - TMH
2. Professional Javascript For Web Developers - Wrox Press
3. Sams Teach Yourself Javascript in 24 Hours

## **MCA106 – Lab : Computer Programming using C**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Write a program for finding greatest number among three numbers
2. Write a program for Matrix Multiplication
3. Write a program for factorial of a number.
4. Write a program for Fibonacci series.
5. Write a program for bit wise operators.
6. Write a program for swapping two numbers using Pass by value and pass by reference
7. Write a program for string manipulations.
8. Write a program for operations in file handling.

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA107 – Lab : Data Structure**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

- 1] Implement stack & queue in C++
- 2] Implement circular queue in C++
- 3] Implement stack & queue using Linked List
- 4] Implement Linked representation for binary trees
- 5] Write a program for tree traversal techniques
- 6] Implement Linked representation of graphs
- 7] Implement graphs traversal techniques
- 8] Write programs for sorting techniques
- 9] Implement Binary search tree

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA108 - Accounting and Financial Management**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Principle of Accounting:

Introduction to accounts-journal, journal entry, types of accounts, Rules of journal entries, ledgers, Assets, liabilities, owner's equity trading account, control accounts, limitations. [8]

### 2. Assets & Working Capital :

Fixed assets and depreciation, assets acquisition, disposal replacement, intangible assets, funds, cash flows. [8]

### 3. Interpreting accounts and financial statements:

Use of ratios in interpreting trading account and financial statements, limitations and other methods. [8]

### 4. Standards of Control:

Variable Costs, fixed costs, cost-volume profit analysis, break even, marginal and Full Costing, contributing, standard costing, analysis of variance, computer accounting and algorithms. [8]

### 5. Budgeting and forecasting, Project Appraisal:

Characteristics of budgets, definition, advantages, preparation, forecasting, long term, short term. Method of Capital investment, decision making, discounted cash flow, internal rate of return payback, rate of return, sensitivity analysis, cost of capital. [8]

### **Text/Reference Books –**

1. Advanced Accounting by Batilboi Standard Accountancy publication
2. Financial Management by I.M. Pande. TMH Publication
3. Cost accounting by S.P.Jain, K.L.Narang. McMillan Publication

## **MCA109 - DISCRETE MATHEMATICS**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

End Sem. Exam. : 60 Marks

Assignment : 20 Marks

1. Sets & Propositions: Combination of sets, finite & infinite sets, mathematical induction, Principle of inclusion & exclusion, propositions, multisets. [8]
2. Permutation, Combinations & Discrete Probability: The rules of sum & product, permutation, combinations, generation of permutation & combinations, discrete probability, conditional probability. [8]
3. Relation & functions: A relational model for databases, properties of binary relations, Equivalence relations & partitions, partial ordering relation & lattices chains & antichains, job scheduling problem, functions & pigeonhole principle. [8]
4. Graphs: Basic terminology, multigraphs, weighted graph, paths& circuits, shortest path in weighted graph, Eulerian path & circuit, Hamiltonian path & circuits, traveling salesman problem, factors of a graph, planner graph. [8]
5. Trees: Trees, rooted trees, path length in rooted trees, prefix codes, binary search tree, spanning tree & cutsets, minimum spanning tree, transport network. [8]

### **Text/Reference books :**

- 1) Elements of Discrete Mathematics by C.L.Liu. McGraw Hill
- 2) Discrete Mathematical Structures with application to computer science by Trembly Manohar. McGraw-Hill

## MCA110 - Object Oriented Programming and System

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Introduction to OOPS:

[8]

Advantages of OOPS language & development platform, Basic programming construction functions, program statements preprogramming directives, include directives, header files ,I/O statement variables, manipulators, Loops & Decisions, Arrays , Structures, Functions

### 2. Objects and Classes:

[8]

Class as Data type, Object as function arguments, Encapsulation, Data hiding overloaded constructors, object as argument, returning object from function, static class data, Constructors, destructors.

### 3. Operator Overloading:

[8]

Overloading unary and binary operators, Overloading binary operators, multiple overloading, comparison operators, conversion between basic types, conversion between objects of different classes conversion between basic types, conversion between basic types between objects of different classes .

### 4. Inheritance and Polymorphism:

[8]

Derived class and base class-specifying the derived class, accessing base class member, derived class constructors, overriding member functions public and private inheritance-access combinations classes and structures accessing specifies, levels of inheritance-multiple inheritance. Run time and compile time polymorphism.

### 5. Files and streams, Templates in C++:

[8]

Streams-stream class hierarchy, stream classes-string I/O Writing strings, detecting end of file, character I/O Object I/O,I/O with multiple objects-the fstream class, "open" function-file pointers-specifying position, specifying the offset, the calling function, error handling-redirection-redirecting input, "carr" and "clog" objects, IOS flags        Template classes for Stack, vector, linked list.

### Text/Reference books

1. Object oriented programming in Turbo C++ by E. Balguruswami McGraw Hill
2. Object oriented analysis and design with application by Grady Booch Benjamin-Cummings Publishing Co

### Reference Web Sites

1. [www.cplusplus.com/doc/tutorial/](http://www.cplusplus.com/doc/tutorial/)
2. [www.smartdraw.com/tutorials/software-uml/uml.html](http://www.smartdraw.com/tutorials/software-uml/uml.html)  
(pages 1-12)

## Assignments (The Difficulty level should be as given below or above than this)

### 1] Problem Description:

Design and implement a small "set computer." This set computer must be capable of maintaining at least 10 variable names, each of which represents a new set. Each set has a number of basic operations: add, intersection, union and difference.

Each element of a set is represented by a single character (ie, the set vowels contains a, e, i, o, and u). Elements, variables and commands are case sensitive. Sets do not recognize multiple copies of the same element but it is not an error to add an element that already is in the set. Elements may only consist of lowercase alphabets.

A small command parser reads data from the standard input and takes the appropriate action. The robustness of the parser is not important. You may assume that you will only be presented validly formatted commands of appropriate lengths. You should not assume that the commands make sense (for example, trying to place elements in an undeclared variable).

#### The commands are:

**new** VARNAME

Creates a new variable called VARNAME.

**add** VARNAME ELEMENT

Adds ELEMENT to VARNAME.

**print** VARNAME

Displays the elements contained in the set VARNAME.

- VARNAME1 VARNAME2

Prints the elements in VARNAME1 that aren't in VARNAME2 (difference).

| VARNAME1 VARNAME2

Prints the elements that are in either VARNAME1 or VARNAME2 (union).

& VARNAME1 VARNAME2

Prints the elements that are in both VARNAME1 and VARNAME2 (intersection).

**quit**

Quits the program.

#### Format of Output :

Action: Any command that references a variable that has not been declared with **new**.

Output: Could not locate variable VARNAME.

Action: A print command or any command that results in the contents of a set being displayed. Output:

Each element of the set should be displayed in ascending alphabetical order. The contents of the set should be surrounded by braces with a single space between each element, { or }.

For example: { a e i o u } or for an empty set { }

Action: Any command that references a variable that hasn't been declared with **new**.

Output: Could not located variable VARNAME.

Action: Successful creation of new variable.

Output: Variable VARNAME created.

Action: Unsuccessful creation of new variable.

Output: New variable failed.

Action: Successful addition of new element to a set.

Output: Added ELEMENT to VARIABLE.

Action: Unsuccessful addition of new element to a set.

Output: Unable to add ELEMENT to VARIABLE.

Action: A set operation fails to complete.

Output: Action failed.

**Valid Assumptions:**

You may assume that:

1. No command verb will be larger than 10 characters.
2. No variable name will be larger than 10 characters
3. Not more than 10 variables are required.
4. Only valid command verbs will be used (but not necessarily correct in context - ie, adding to a variable that hasn't been created.)

**Constraints:**

1. You must use an ordered linked list to implement the storage of set data. You must implement the linked list yourself - you can **not** use the standard library.
2. You must implement the sets yourself. You can not use the standard library. The program will be tested on Linux.
3. To make the assignment smaller, it is not necessary to implement the body of any delete function. Ie., you should define that such an operation exists but don't write the code. This does **not** include destructors.
4. All output shall be printed to the standard output (cout).

## MCA111- COMPUTER GRAPHICS

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Computer Graphics System:

Video display devices, Raster scan display, Video Controller, Display Processor, Random Scan Display Systems, Color CRT Monitors, Graphics Monitors and Workstations, DVST, Flat Panel Display, 3D Viewing devices, Input Devices. [8]

2. Graphics Output Primitives:

Line drawing algorithms: DDA, Bresenham's line drawing algorithm, Frame buffer, functions, different attributes, pen and brush, color, circle generation, Ellipse generation algorithms of sections, Splines, curves, color gray scale levels, character generation, attributes. [8]

3. Two Dimensional Transformations, Clipping and windowing :

Translation, Rotation, Scaling, Matrix representation and Homogeneous Coordinates, composite transformations, pivot point scaling, reflection, shear, Line Clipping algorithm, mid point sub division windowing transformation, clipping polygon, interior/exterior clipping, text clipping [8]

4. Graphical user interface environment and interactive methods:

Windows and icons, multiple skill levels, consistency minimization, back-up and error handling, feedback, logical classification of input devices, Interactive picture construction techniques, Basic positioning methods, constraints, grids, gravity field, rubber methods, dragging, painting and drawing, Virtual reality environments. [8]

5. Three concepts and Object representation, Computer Animation:

Different 3D display methods, Parallel projection, perspective projection and depth cueing, B-splines, Super ellipsoids, Bezier curves, Fractal geometry methods, classification of fractals. Design of animation sequences, animation functions, morphing, simulation. [8]

### Text/Reference Books:

1. Computer Graphics: Donald Hearn and M. Pauline Baker, PHI
2. Computer Graphics: James D. Foley, Andries Van Dam, Steven, K. Feiner, John F. Hughes, Addison Wesley 1997.
3. <http://www.cs.rit.edu/~ncs/Courses/570.shtml>

## **MCA112-Communication Skills –**

Teaching scheme:  
Theory: 2 Hrs/Week  
Practical: 4 hrs/week

Examination Scheme:

Term Work : 100 Marks

### 1. Rapid Review of Grammar

1. Fundamentals of Grammar (Articles, preposition, Tenses etc)
2. Correction of common errors
3. Using phrases and idioms

[5]

### 2. Technical précis Writing

1. Importance's of précis Writing
2. Techniques of précis writing
3. One word substitution
4. précis of short units
5. précis of passages

[10]

### 3. Oral Communication

Written communication  
Business correspondence

[5]

## **Text/Reference Books :**

1. A Remedial English grammar for foreign student – F.T. Wood ( McMillan publication )
2. Professional Communication skill  
Pravil S. R. Bhatia, S. Bhatia (S Chand & Co.)
3. Communication Techniques & skill – R.K. Chadda
4. Living English Structure – Allan Walter
5. Better English Pronunciation – J. D. O'Connor

## **Practical :**

Group Discussion and public speech  
Assignments on Unit I, II & III

## **MCA113 – Lab : Object Oriented Programming & System**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

- 1] Write a program to demonstrate different types of constructors.
- 2] Write a program for overloading various unary operators.
- 3] Write a program for overloading various binary operators.
- 4] Write a program for type conversion (basic to class, class to basic ,class to class)
- 5] Write a program for multiple inheritance
- 6] Write a program for hybrid inheritance
- 7] Write a program for polymorphism(virtual function)
- 8] Write a program for templates

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA114 – Lab : Computer Graphics**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

- 1] Write a program for DDA Line drawing Algorithm
- 2] Write a program for Bresenham's Line drawing Algorithm
- 3] Write a program for polygon filling
- 4] Write a program for 2 D transformation
- 5] Write a program for 3 D transformation
- 6] Write a program for Line clipping Algorithm
- 7] Write a program for Bezier curves
- 8] Program on Animation

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

**S.Y.M.C.A. Structure**  
**Part – I**

Course Code	Name of Subject	Teaching Scheme Hours/Week			Examination Scheme - Marks					
		L	P	Total Credits	Test	Assignment	End Sem	Practical	Term Work	Total
MCA201	Computer Network	4	--	4	20	20	60	--	--	100
MCA202	Programming in Java – I	4	--	4	20	20	60	--	--	100
MCA203	Microprocessor Fundamentals and interfacing	4	--	4	20	20	60	--	--	100
MCA204	Software Engineering	4	--	4	20	20	60	--	--	100
MCA205	Database Management System	4	--	4	20	20	60	--	--	100
MCA206	Lab : Programming in Java – I	--	2	1	--	--	--	25	25	50
MCA207	Lab : Microprocessor Fundamentals and interfacing	--	2	1	--	--	--		50	50
	Total of Part I	20	4	22	100	100	300	50	50	600
	Total Credit Point	20	2	22						

**Part – II**

COURSE CODE	Name of Subject	Teaching Scheme (Hours/Week)			Marks					
		L	P	Total Credits	Test	Assignment	End Sem	TW	Pract	Total
MCA208	Programming in Java-II	4	--	4	20	20	60	--	--	100
MCA209	Enterprise Information Systems	4	--	4	20	20	60	--	--	100
MCA210	Operating System	4	--	4	20	20	60	--	--	100
MCA211	Design & Analysis of Algorithm	4	--	4	20	20	60	--	--	100
MCA212	User Interface Design Lab	2	2	3	--	--	--	25	25	50
MCA213	Lab : Programming in Java-II	--	2	1	--	--	--	25	25	50
MCA214	Lab : Operating System	--	2	1	--	--	--	25	25	50
MCA215	Lab : Design & Analysis of Algorithm	--	2	1	--	--	--	25	25	50
	Total of Part I	18	8	22	80	80	240	50	150	600
	Total Credit Point	18	4	22						

## MCA201 – Computer Network

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Introduction

Overview of computer network, Network hardware and software, Reference model- OSI and TCP/IP and their comparison Network layer-network layer design issues , various routing Algorithms and congestion control algorithms , networking layer in the internet . [8]

### 2. Transport layer

The transport services, elements of transport protocols, internet transport protocols, ATM –AAL layer protocols, Performance issues. [8]

### 3. TCP/IP

TCP/IP architecture, the internet protocols, IPv6, DHCP and Mobile IP , internet routing protocols , multicast routing ,The network layer in ATM networks [8]

### 4. The Application layer

Network security – principle of cryptography, secret key and public key algorithm, digital signatures, Domain name system-The DNS name space , resource records, name server, simple network management Protocol –SNMP model, Electronic mail- architecture and services, Message formats and message transfer, email privacy Usenet news- user view of Usenet and Usenet implementation [8]

### 5. Multimedia Information and Networking

Lossless data compression, ,Video on Demand, Transmission in ATM network, Communication satellites. [8]

### Text/Reference Books:

- 1)Computer networks, Andrew .S. Tenonbaum, PHI
- 2) Communication networks- Fundamental concepts and key architectures, Alberto,Leon –Garcia and Indra widjaja, Tata Mc-Graw Hill

## MCA202 -Programming in Java-I

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### Tools Used –

JDK 1.4 / 1.5, TextPad / EditPlus, java, javac, jar, javaw, javap

1. Java Fundamentals – [8]
  - History, Bytecodes And The Java Virtual Machine, Application And Applets, Classes And Objects, The Java Class Libraries, The Java Development Kit (Jdk), Your First Java Application
  - Identifiers, Keywords & Types –
    - Variables And Assignments, Strings And Characters, Arithmetic Operators And Expressions, Type Conversion In Assignments, Comments
  - Arrays –
    - One-Dimensional Arrays, Multidimensional Arrays
2. Using Classes And Methods – [8]
  - The Structure Of A Method, Introducing Static Methods, Variables, Instance Methods And Variables, The Integer Class, The New Operator, Garbage Collection, Other Wrapper Classes, The String Buffer Class, Arrays Of Objects, Command Line Arguments, The System Class
  - Introducing Java's Control Statements –
    - The Statement, The If-Else Statement, Blocks Of Code, The For Statement
  - Operators –
    - Increment And Decrement Operators, Backslash Codes, Relational And Boolean Logical Operators, Ternary Operator, Nested If Statements, The Switch Statement, Variations Of The For Loop, The While Loop, The Do Loop, Nested LOOPS, The Break Statement, The Bitwise Operators
3. Java Memory Model – [8]
  - Call by Ref / Call By Value
  - Creating Classes –
    - The General Form Of A Class, Creating Simple Classes, Method Overloading, Adding Constructors, The This Keyword, Instance Variables And Methods, Static Variables And Methods, Local Variables And Variable Scope, Argument Passing, Introduction to Inner Classes
  - Inheritance –
    - Subclasses, Inheritance And Variables, Method Overriding, Inheritance And Methods, inheritance And Constructors, Class Modifiers, Variable Modifiers, Constructor Modifiers, Method Modifiers, Interface And Packages, Interfaces, Interface References, Interface Inheritance, The Instance Of Operator, Packages, Classpath, The Import Statement, Access Control And Packages
4. Exceptions – [8]
  - Exception Handling, Catch Block Searches, The Throw Statement, Exception And Error Classes, The Throws Clause, Multithreaded Programming, An Overview Of Threads, Creating Threads, Synchronization, Deadlock, Thread Communication
  - Introducing The Java Class Libraries –
    - The Random Class, The Date Class, The Calendar And Gregorian Calendar Classes, The Vector Class And Enumeration Interface, The Stack Class, Collection classes, The Hashtable Class, The String Tokenizer Class, Collection API, Study of methods of Object class
  - I/O Package –
    - Files and Directories, Overview Of Codes and Streams, Buffered Character Streams, The Print Writer Class, Byte Streams

## 5. Applets –

[8]

An Overview Of Applets, Your First Java Applet, The Life Cycle Of An Applet, The Graphics Class, Using Colors, Displaying Text, Using Applets In A Web Page

### Event Handling

The Delegation Event Model, Event Classes, Event Listeners, Adapter Classes, Advance Language Features, Inner Classes, Anonymous Inner Classes, The Abstract Window Toolkit, Labels, Buttons, Canvases, Check Boxes, Choices, Text Fields And Text Areas, Lists, Scroll Bars, Grid Layout, Panels, Windows And Frames, Menus And Menu Bars, Overview Of JFC (Java Foundation Classes), Swings & AWT Component Hierarchy

### **Text/Reference Books –**

1. Java 2 Complete Reference – Herbert Schildt and Patrick Naughton McGraw Hill
2. Programming with JAVA – E. Balgurusamy, 2<sup>nd</sup> Ed, TMH
3. Thinking in Java – Bruce Eckel - 3<sup>rd</sup> Edition Prentice-Hall
4. Java Swing, 2<sup>nd</sup> Edition by Dave Wood, Marc Loy, James Elliott, Brian Cole, Robert Eckstein O'Reilly
5. Core Java – Part 1 – Sun Microsystems press
6. A Programmer's Guide to Java Certification – Khalid Mughal, Rolf Rasmussen

## **MCA203 - Microprocessor Fundamentals and Interfacing**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. 8086 Architecture, Segmented memory, Pipelining and addressing modes [8]
2. Instruction set of 8086, Programming with 8086 [8]
  - Use of Assembler
  - Debug, Development cycle, debugging software
  - Modular Programming, Procedures
  - Develop
3. Designing 8086 CPU [8]
  - Basic 8086 CPU hardware design, Generating CPU clock and reset signals, Bus types and buffering techniques, 8086 minimum mode CPU module, 8086 maximum mode CPU module
4. Main memory design - SRAM, ROM interfacing [8]
  - Basic input output – Parallel, serial Programmed and interrupt driver I/O DMA
5. Peripheral Controllers [8]
  - 8255, 8259, 8279

### **Text/Reference Book –**

1. 8086 Family , Programming and interfacing – By John P. Uffenbeck, PHI 2001
2. Yu Chen Liu & Glenn A Gibson : Microcomputer Systems; The 8086/8088 Family, PHI

## MCA204 – Software Engineering

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

End Sem. Exam. : 60 Marks

Assignment : 20 Marks

1. History and overview: [8]

Indicate some important topic areas such as software process, requirements, specifications, design, testing, validation, evolution and project management, examples for software engineering approach, importance of language selection when doing software design, importance of testing and validation in software projects, explore some additional resources associated with software engineering, purpose and role of software engineering in computer engineering.

2. Software processes, requirements and specifications - [8]

Software life cycle and process models, Process assessment models, software process metrics for the development and maintenance of diverse software products, Requirements elicitation, Requirement analysis modeling techniques, functional and nonfunctional requirements, prototyping, Basic concepts of formal specification techniques

3. Software design: [8]

Fundamental design concepts and principles, software architecture, structured design, object-oriented analysis and design, component-level design, design for reuse.

4. Software testing and validation: [8]

Validation planning, testing fundamentals, including test plan creation and test case generation, black-box and white-box testing techniques, unit, integration, validation, and system testing.

5. Software evolution: [8]

Software maintenance: the different forms of maintenance, the associated disciplines and the role and the nature of the configuration management, characteristics of maintainable software, software reuse – strengths and weaknesses, reengineering.

### Text/Reference Books :

1. "Software Engineering" – Roger S. Pressman, TMH
2. Shrinivasan, Gopaldaswamy, "Software Testing" – Pearson Education
3. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
4. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
5. Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
6. Louise Tamres, "Software Testing", Pearson Education Asia, 2002

## **MCA205 - Database Management System**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Basic Concept & Data Models:

Data modeling ,Records and files, Abstraction and data integration, views , Independence, Components of DBMS, Advantages and Disadvantages of DBMS, Data associations, Entity Relationship model, Relational model. [8]

### 2. File Organization:

Introduction, serial files, sequential files, index sequential files, direct files, index using tree structure, logical and physical Pointers, Record placement. [8]

### 3. Relational Model and Relational Database Manipulation:

Attributes and domains, Tuples , Relations & Schemes, Relation Representation, integrity rules, Relational algebra, Relational Calculus, Data Manipulation using SQL and PL/SQL. [8]

### 4. Relational Database Design, Query Processing :

Normalization using Functional Dependency, Normalization using Join Dependency, Valued Dependencies, Domain by Normal Form, SNF. General Strategies for query processing, Transformation equivalent Expression evaluation, View Processing, Typical Query Processor. [8]

### 5. Crash Recovery:

Reliability, Transactions, Recovery in Centralized DBMS, Reflecting Updates to database and recovery, buffer management, virtual memory, Disaster Memory. [8]

### **Text/Reference Books:**

1. Database System Concept:Korth,Silbertz (TMH).
2. An Introduction to Database System: Bipin Desai. West Publication
3. Introduction to DBMS:C. J. Date (McGrawHill Pub)

## **MCA206 – Lab : Programming in Java – I**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Write a program to input an array of 10 elements and sort it with any sorting method
2. Write a program to add two matrices by using different methods, classes
3. Write a program to convert a digits into its word format using different method.
4. Write a program to collect the basic information of flowers. Define base class, derived class with different properties; inherit the basic properties from base class. Display the properties of flowers.
5. Write a program to collect the information about student, write method for validation in base class. Input faculty & marks of student with validation in derived class and in an interface, find the result of the student. Display the result of the student.
6. Create a package contains addition, geometric mean, and harmonic motion of array elements and use it in your program.
7. Write a program to throws exception and for throwing our own exception using try, catch and finally statement.
8. Write a program to implement single thread and multiple threads in single program. Do the operations on thread. Also create runnable interface on it.
9. Create a simple applet for drawing an ellipse, rectangle, menu etc. & Run in HTML
10. Write a program to create I/O file operations

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA207 – Lab : Microprocessor Fundamentals and Interfacing**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam : 25 Marks  
Term Work : 25 Marks

Minimum of eight experiments based on above curriculum. It should include medium to high level A complexity in program and application designs.

Suggestive List of Programs –

1. Mode 1 & 2 of 8255
2. Strobed keyboard mode of 8279
3. Sensor matrix mode of 8279
4. Scanned keyboard and decoded/encoded mode of 8279
5. Multiplex Seven segment display through 8255
6. Scanned key matrix interface through 8255
7. Minimum mode CPU design and program to generate difference frequency square waves at the output port of 8255. The frequency of TTL square wave should change upon activities of interrupt externally.
8. Design of Maximum mode of CPU board fit following –
  1. 10B mode
  2. SYSB mode
  3. RESB mode

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## MCA208 - Programming in Java-II

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

**Tools to be used** – JDK 1.4, Eclipse 3.x, MySQL, PostgreSQL, MySQL, PostgreSQL, Tomcat 5.x, JBoss 4.x, Ant 1.6.x, Struts 1.2

1. Introduction to Networking – [8]  
Basics Of Networking, Overview Of The Osi Model, Socket Programming, Client Sockets And Server Socket, Multicast Sockets  
Javabeans –  
Javabean Architecture, Bean Properties, Methods And Events, Bean Introspection
2. Java Database Connectivity [JDBC] – [8]  
DBMS Concepts, RDBMS & Understanding basic database design, SQL, Introduction To SQL, DDL, DML, Joins, JDBC, Basics Of Database Connectivity, Introduction To JDBC, JDBC Architecture, JDBC Interfaces, JDBC Exceptions, Prepared Statement, Callable Statement, Stored Procedure And Functions, Triggers  
Servlets –  
Introduction To Web Application Development, Server Side Programming, Introduction To Servlets, Comparing Servlets With CGI, Servlet Lifecycle, Servlet With Html, Server Side Includes, Servlet Chaining, HTTP Tunneling, Session Management, Servlets With JDBC, Inter Servlet Communication, Deployment Descriptor ( web.XML )
3. Remote Method Invocation [RMI] – [8]  
Introduction To Distributed Computing, RPC, Client Side And Server Side Proxies, Introduction To RMI, Stubs And Skeletons, The Process Of Creating A Simple RMI Application, Callbacks, Bootstrap Server, RMI With JDBC, RMI Packages
4. Enterprise Java Beans - [8]  
Architecture, Introduction To Session Beans, Characteristics, How To Write & Call Session Beans, Understanding EJB Security, Introduction To Entity Beans & its features, Example Server, Example Client, Transactions - Need, benefits, model, isolation
5. Introduction to Core Java design patterns – [8]  
Creational, Structural and Behavioral Design patterns  
Introduction to J2EE design patterns – Model View Controller, Data Access Object, Business Delegate, Front Controller  
Security  
Introduction to Internet Security Issues, Eavesdropping, Tampering, Impersonation, Spoofing, Misrepresentation

### Text/Reference Books:

1. Core Java Part 2 Advanced Features – Sun Microsystems press
2. J2EE™ Tutorial, The, 2nd Edition By Eric Armstrong, Jennifer Ball, Stephanie Bodoff, Stephanie Bodoff, Stephanie Bodoff, Debbie Carson, Ian Evans, Dale Green, Kim Haase, Eric Jendrock. Published by Addison Wesley
3. Java Design Patterns: A Tutorial by James W. Cooper Addison Wesley Pearson Press

**Reference:** Struts in Action – Ted Husted

## MCA209 - Enterprise Information System [EIS]

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### Course Content:

#### 1 Information and Management

Types of information, why do we need a computer based information system? Management structure, Management and information requirements, qualities of information.

Examples of Information Systems

[8]

Various functions in organizations, Information processing for a store- An overview, Varieties of information systems.

Information Systems Analysis & Design Overview:

Overview of design of an information system. The role and tasks of a systems analysts, Attributes of a systems analyst, Tools used by system analyst, System Development Life Cycle

#### 2 Information Gathering

[8]

Strategy to gather information, Information sources, Methods of searching for information, Interviewing techniques, Questionnaires, Other methods of information search, Case example-Hostel information system.

System Requirements Specification:

System requirements specification: Example, Data dictionary, Steps in Systems Analysis, Modularizing requirements specifications, Conclusions.

#### 3 Feasibility Analysis, Data flow diagrams:

Deciding on project goals, Examining alternative solutions, Evaluating proposed solution, Cost-benefit analysis, Pay back period, Feasibility report, System proposal. Symbols used in DFD's Describing a system with a DFD, Good conventions in developing DFDs Leveling of DFDs, Logical and Physical DFDs. Process Specifications - Process specification methods, structured English Some examples of process specification.

[8]

#### 4 Decision Making

Decision table terminology and development, Extended entry decision tables, Establishing the logical correctness of decision tables, Use of Karnaugh maps to detect logical errors in decision tables, Eliminating redundant specifications.

[8]

#### 5 Control, audit and security of information systems

[8]

Review of following standards – CMM, ISO 17799, ISO 27001, BS 7799

### Text/Reference Books :

1. Management Information Systems – Kenneth C. Laudon, Jane P. Laudon, 9<sup>th</sup> Ed. Pearson

## MCA210 - Operating System

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Introduction.

Batch Systems, Concepts of Multi-programming and Time sharing, parallel, Distributed and Real-Time Systems. Process concept, process scheduling, Co-operating processes, threads, interprocess communications, CPU scheduling criteria scheduling algorithms, Process Management

[8]

2. Input/ Output, Memory Management

Principles of I/O Hardware: I/O devices, Device controllers. Principles of I/O software: Goal of software, Interrupt handles, and Device drivers, Memory Management without swapping or paging use of multiprogramming, Swapping - Multiprogramming with variable partitions, memory management with bitmap lists, buddy system, Allocation of swap space, paging, segmentation and page replacement algorithms.

[8]

3. Introduction to Linux OS:

Introduction to Linux OS, Linux Background, Architecture of Linux OS.

File System:

File Structure of File System, pwd, ls, cat, mkdir, rmdir, chmod, cp, rm, mv commands, General purpose utilities of Linux like more, file, od, cmp, cp, diff, lp, cal, date, who, tty, sty commands.

[8]

4. Internal Representation of File and system calls:

Inodes, directories, algorithm for releasing an inode & assigning an inode structure of a regular file, direct & indirect blocks in inode, algorithm for conversion of a pathname to an inode, super block and it's structure.

File System Calls:

Open, crpat, read, write, fseek, pipe, dup, chair, chown, change, mode, state & stat.

[8]

5. The Structure of Process:

Process states & transitions, layout of system memory, the context of process, components of context, saving the context, context switch, duplicating a region with fork.

Process Control:

Process creations with fork, handling signals with signal command, kill & exit calls, system boot & the init process

[8]

### Text/Reference Books:

1. Operating systems, Design and Implementation: Andrew S.Tanenbaum(PHI Pub.)
2. Operating systems: Concepts : Abraham Siberschatz , Peter Galvin(Addision Pub.)
3. Operating Systems – By Nutt Pearson Publication
4. Operating systems: Concepts and Design – Milan Milenkovic(TMh Pub.)
5. Operating systems: Achyut Godbale(TMh Pub.)
- 6 Advance Programmers Guide to Unix – Stephan Prata.
- 7 The Design of Unix Operating System – Mourice Bach Pearson Publication

## **MCA211 - Design and Analysis of Algorithms**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Introduction, Divide and Conquer –

Algorithm performance analysis, complexity issues , Recurrences

Binary search, Mergesort, Quick sort, Heap Sort. [8]

### 2. The Greedy method :- 0/1 Knapsack problem, Job sequencing, Huffman Codes,

Minimal spanning trees, Topological Sorting. [8]

### 3. Dynamic Programming – All pairs shortest paths, Optimal binary search tree,

Traveling sales man problem, Flow shop scheduling. [8]

### 4. Back Tracking –

Eight Queens problem, Sum of subsets, Graph coloring [8]

### 5. Branch and Bound – Least cost Branch and Bound, FIFO Branch and Bound,

0/1 Knapsack Problem [8]

### **Text/Reference Books –**

1. Fundamentals of Computer Algorithm – Horowitz, Sahani, Rajasekaran

Galgotia Publications

2. Introduction to Algorithms - Cormen, Leiserson, Rivest, Stein

PHI

3. Design and Analysis of Algorithms – Aho Ulman , Hopcroft

Addison Wesley

Assignments are to be framed based on following topics.

1. Recursive and iterative( non recursive) algorithm for specific problem and there complexity measures(comparison expected).
2. Any two algorithm implementations using divide and conquer approach. Time complexity measure is to be obtained.
3. Minimal spanning Trees as an example of Greedy approach. ( Prime's Vs. Kruskal's approach)
4. Finding shortest path for multistage graph problem. (single source shortest path and all pairs shortest path.)
5. OBST as an example of dynamic programming.
6. Flow shop scheduling or knapsack's problem.
7. 8-Queen problem general backtracking method and recursive back tracking method and their comparison for space and time complexity.
8. Graph coloring problem or Algorithm implementation for `Traveling salesman' problem using -
  - (a) Dynamic programming approach.
  - (b) Back tracking using static/dynamic tree formulation.

## **MCA212 - User Interface Design Lab**

Teaching Scheme:

Theory : 2 hrs/week

Practical : 2 hrs/week

Examination Scheme:

Practical Exam : 25 Marks

Term Work : 25 Marks

Topics to Cover –

1. Introduction to .Net Framework, Base Classes, Common Language Runtime, Assemblies
2. Programming Visual Basic.NET Blocks: Variables, Data Types, Assignment and Arithmetic Operators, Comparison and Logical Operators, Control Structures, Loops and Arrays
3. Methods – Types, Method Data, Passing Arguments, Global Vs. Local, Access Modifiers, Polymorphism characteristics of methods
4. Classes and Objects , Interfaces
5. User Interface – MDI , Components and controls, Menus and toolbars, Responding and Collecting user input, Presentation and Informational Controls
6. ADO.NET , Exceptional Handling

A minimum 06 experiments and a mini project of a windows application should be developed using VB.NET features

Practical Examination will consist of Performance and Viva-voice Examination

The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

**Text/Reference Books –**

- 1) The Complete Reference Visual Basic .NET – TMH
- 2) Visual Basic .NET – Wrox Press

## **MCA213 – Lab : Programming in Java – II**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Write programs to implement different applications using java beans
2. Create a JDBC Connection with access database and print the records.
3. Write a Simple menu driven program using applet to insert, delete & modify the records from the database using JDBC connection and print the Reports.
4. Write a program using socket programming
5. Create a simple RMI Application
6. Write a program to create a simple servlet
7. Write a program to create servlet with JDBC
8. Write a programs using EJB Application

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA214 – Lab : Operating System**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Write a program on fork and vfork.
2. Write a program on File system calls.
3. Write a program on handling signals.
4. Write a program on CPU scheduling algorithms.
5. Write a program on File commands.
6. Write a program on exit and exit(0).
7. Write a assignment on memory management.
8. Write a assignment on structure of a process.

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## MCA215 – Lab : Design & Analysis of Algorithm

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Recursive and iterative( non recursive) algorithm for specific problem and there complexity measures(comparison expected).
2. Any two algorithms implementations using divide and conquer approach. Time complexity measure is to be obtained.
3. Minimal spanning Trees as an example of Greedy approach. ( Prime's Vs. Kruskal's approach)
4. Finding shortest path for multistage graph problem. (single source shortest path and all pairs shortest path.)
5. OBST as an example of dynamic programming.
6. Flow shop scheduling or knapsack's problem.
7. 8-Queen problem general backtracking method and recursive back tracking method and their comparison for space and time complexity.
8. Graph coloring problem or Algorithm implementation for `Traveling salesman' problem using -
  - (a) Dynamic programming approach.
  - (b) Back tracking using static/dynamic tree formulation

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## T.Y.M.C.A. Structure

### Part - I

Course Code	Name of Subject	Teaching Scheme (Hours/Week)			Marks					
		Lect	Pract.	Total credits	Test - I	Assignment	End Sem	TW	Pract	Total
MCA301	Cyber Securities & Cyber Laws	4	--	4	20	20	60	--	--	100
MCA302	Software Testing Techniques	4	--	4	20	20	60	--	--	100
MCA303	Advanced Database Management Systems	4	--	4	20	20	60	--	--	100
MCA304 To MCA307	Elective	4	--	4	20	20	60	--	--	100
MCA308	Seminar	--	6	3	--	--	--	50	--	50
MCA309	Lab : Software Testing Techniques	--	2	1	--	--	--	25	25	50
MCA310	Lab : Advanced Database Management Systems	--	2	1	--	--	--	25	25	50
MCA311 To MCA314	Lab : Elective	--	2	1	--	--	--	25	25	50
	Total of Part I	16	12	22	80	80	240	200	200	600
	Total Credit Point	16	6	22						

### Part – II

Course Code	Name of Subject	Teaching Scheme (Hours/Week)			Marks					
		L	P.	Total credit	Test	Assignment	End Sem	TW	Practical	Total
MCA315	Dissertation	--	22	22	--	--	--	100	100	200
	Total of Part II	--	22	22	--	--	--	100	100	200
	Total Credit Point	--	22	22						

#### Elective -

- MC304 - Multimedia Techniques
- MC305 - Artificial Neural Networks
- MC306 - Mobile Computing
- MC307 - Distributed Operating System

#### Elective Lab -

- MC311 – Lab :Multimedia Techniques
- MC312 - Lab : Artificial Neural Networks
- MC313 - Lab : Mobile Computing
- MC314 - Lab : Distributed Operating System

## MCA301 – Cyber Security & Cyber Laws

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Introduction To Cyber Security , Public Key Cryptography And RSA [8]  
Need for security, security attacks, security services, model for network security.  
Principles of public-key cryptosystems, the RSA algorithm, key management, Diffie-Hellman key exchange.
2. E-mail Security, IP Security And Web Search [8]  
Pretty Good Privacy, S/MIME, IP security architecture, web security considerations, SSL and TTL
3. CyberLaw [8]  
IT Act 2000(Detail): Objectives, provisions, offenses,
4. Cyber Crime And Investigation [8]  
Cyber crimes: crimes against the computer, crimes using a computer,  
Investigation Issues: cyber Forensics.
5. Professional Ethics [8]  
Property rights in Computer Software, Computers and Privacy, Crime, Abuse, And Hacker Ethics,  
Responsibility and Liability  
Solving Ethical Dilemmas, Discovering an Ethical Dilemma,  
Copyright Ethics over seas. Ethics Codes and Policies- The need for Codes and Policies, An Email Privacy,  
An Internet Use Policy

### Text/Reference Books:

- 1 Cryptography and network security- principles and applications –  
William Stallings – Third edition – Pearson education
- 2 Network Security – Complete reference  
Roberta bragg, Mark Rhodes, Keith Strassberg – Tata Mcgraw Hill
3. Cryptography and network security – Atul Kahate – Tata Mcgraw Hill
4. Network security – Chaile Kaufman, Radia Perlman Mike speciner Pearson education
5. Dr.R.K.tiwari P.k.Sastri, K.v. Ravikumar “ Computer crime and Compure Forensics” First Edition  
2002, Select publishers.
6. Computer Ethics and professional responsibility – Terrell Ward Bynum, Simon Rogerson

## MCA302 - Software Testing Techniques

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Introduction – [8]  
What Is a Bug? Terms for Software Failures, Software Bug: A Formal Definition, why do bugs occur? The Cost of Bugs. What Exactly Does a Software Tester Do? What Makes a Good Software Tester? What Effort Goes Into a Software Product? What Parts Make Up a Software Product? Software Project Staff. Overview of Software Development Lifecycle Models. Big-Bang Model, Code-and-Fix Model. Waterfall Model. Spiral Model. Software Testing Terms and Definitions, Precision and Accuracy, Verification and Validation, Quality and Reliability, Testing and Quality Assurance (QA)
2. Fundamentals of Testing – [8]  
Black-Box and White-Box Testing, Static and Dynamic Testing, Static Black-Box Testing: Testing the Specification, Performing a High-Level Review of the Specification, Low-Level Specification Test Techniques, Test-to-Pass and Test-to-Fail, Equivalence Partitioning, State Testing, Other Black-Box Test Techniques, Static White-Box Testing: Examining the Design and Code  
Formal Reviews, Coding Standards and Guidelines, Generic Code Review Checklist, Dynamic White-Box Testing, Dynamic White-Box Testing Versus Debugging, Testing the Pieces- Unit and Integration Testing, Data Coverage, Code Coverage
3. Types of Testing – [8]  
Configuration Testing, Compatibility Testing, Foreign Language Testing, Usability testing, Testing the Documentation, Testing software security, Website testing, Automated Testing and Test Tools. Bug Bashes and Beta Testing.
4. Test Planning and Management – [8]  
Approaches to Managing Software Testing. Planning Your Test Effort. Writing and Tracking Test Cases. The Most Important Tests (mits) Method. Reporting What You Find. Using the Information in the Bug Tracking Database. Fundamental Metrics for Software Testing.
5. Risk Analysis and Data Analysis Methods – [8]  
Risk Analysis, Applied Risk Analysis, Path Analysis, Applied Path Analysis, Data Analysis Techniques, Software Quality Assurance

### Text/Reference Books:

1. Software Testing – Ron Patton
2. Software Testing Fundamentals: Methods and Metrics by Marnie L.Hutcheson

**Self Study Assignments on Software Testing could be done in Bugzilla (Open source bug tracking tool that could be deployed in the college LAN). A practical lab should include learning of a scripting language like Perl or Python.**

## MCA303 – Advance Database Management System

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Object Oriented Databases:

Persistent programming languages, object identity and its implementation, clustering, indexing, client server object basis, crash coherence. [8]

### 2. Distributed Databases: Query processing, semi joins, query optimization, concurrency control and heterogeneity issues. [8]

### 3. Components of SQL, Data and multitable retrieval: Oracle system architecture, process structures, database, initialization, control, data and redo log files, What is Client/Server? SQL plus commands, creating a report, compile, spool, join and break commands, table and column alias. [8]

### 4. Data definition and Administration features: Oracle locks, create, insert, drop, plan, data types, Data file management, Server parameter file (SPFile), online table redefinition, dynamic SGA, Constraint enhancement, Backup and recovery features. [8]

### 5. Web Database Connectivity: Execution model, JSP Scripting Elements: Expressions, Scriptlets, and Declarations, Implicit Objects, Connecting Oracle using JSP [8]

## Text/Reference Books:

- 1) Database system concepts: H. Korth and A. Siberchatz, S. Sudarshan (5e)TMH
- 2) Fundamentals of database systems: R. Elmasri, S. Navathe, Benjamin Cummings.
- 3) Oracle 9i: The Complete reference: Kevin Loney and George Koch, MGH Osborne media.
- 4) The Complete Reference JSP 2.0 , TMH
- 5) Java Server Pages , Larne Pekowsky, Addison Wesley
- 6) Oracle 9i: New features, Robert G Freeman, MGH Osborne media.
- 7) Oracle 9i: A beginner's guide, Michael Abeey, Michael Corey, Ian Abramson(Osborne McGraw hill)

## **MCA304 – Elective I ( Multimedia Techniques )**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Introduction, Media and Data Streams : Multimedia Elements ; Multimedia Applications; Multimedia Systems Architecture; Evolving Technologies for Multimedia Systems; Defining Objects for Multimedia Systems; Multimedia Data Interface Standards; The need for Data Compression; Multimedia Databases. Media : Perception Media, Representation Media, Presentation Media, Storage Media, Transmission Media, Information Exchange Media Presentation Spaces & Values, and Presentation Dimensions; Key Properties of Multimedia System: Discrete & Continuous Media, Independence Media, Computer Controlled Systems, Integration: Characterizing Data Streams: Asynchronous Transmission Mode, Synchronous Transmission Mode, Isochronous Transmission Mode; Characterizing Continuous Media Data Streams. [8]

2. Audio Technology :

Sound : Frequency, Amplitude, Sound Perception and Psychoacoustics ; Audio Representation on Computers; Three Dimensional Sound Projection; Music and MIDI Standards; Speech Signals ; Speech Output; Speech Input; Speech Transmission. [8]

3. Graphics and Images :

Capturing Graphics and Images Computer Assisted Graphics and Image Processing; Reconstructing Images; Graphics and Image Output Options. [8]

4. Video Technology & Computer-Based Animation:

Basics; Television Systems; Digitalization of Video Signals; Digital Television Basic Concepts; Specification of Animations; Methods of Controlling Animation; Display of Animation Transmission of Animation; Virtual Reality Modeling Language . [8]

5. Data Compression:

Storage Space: Coding Requirements ; Source, Entropy, and Hybrid Coding; Basic Compression Techniques; JPEG : Image Preparation, Lossy Sequential DCT-based Mode, Expanded Lossy DCT-based Mode, Lossless Mode, Hierarchical Mode; H261(Px64) and H.263: Image Preparation, Coding Algorithms, Data Stream, H.263+ and H.263; MPEG: Video Encoding, Audio Coding, Data Stream, MPEG-4, MPEG-7; Fractal Compression. [8]

### **Text/Reference Books :**

1. Ralf Steinmetz, Klara Narstedt, "Multimedia Fundamentals : Vol 1- Media Coding and Content Processing", Pearson Education/ PHI, 2nd Edition, 2003. (Chapters 2,3,4,5,6,7,8,9)

2. Prabhat K Andleigh, Kiran Thakrar Dragorad A. Milovanovic, " Multimedia Communication Systems: Techniques, Standards, and Networks", Pearson, 2002.

### **Reference Books –**

1. K.R.Rao Zoran S.Bojkovic and Dragorad A. Milovanovic, " Multimedia Communication Systems: Techniques, Standards, and Networks", Pearson, 2002

2. Nalin K Sharad," Multimedia information Networking" PHI,2002

## MCA305 – Elective I (Artificial Neural Network )

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1) Introduction to neural networks -

[8]

Trends in computing, why is brain so faster? Features of biological neural network structure of biological neurons, its basis. Principle of working.

History of neural network research, characteristics of neural networks terminology, models of neuron Mc Culloch – Pitts model, Perceptron, Adaline model, topology, Basic learning laws, Taxonomy of neural network architecture, Activation Dynamics models, synaptic Dynamics models, stability and convergence, recall in neural networks.

2) Feedforward neural network:

[8]

Architecture of feed forward network, single layer ANN, multilayer perceptron, back propagation learning, backpropagation algorithm, applications, Linear inseparability X-OR problem and solution, Analysis of pattern mapping networks summary of basic gradient search methods.

3) Basic functional units of ANN for pattern recognition tasks:

[8]

Basic feedforward , basic feed back and basic competitive learning neural network. Pattern association, pattern classification and pattern mapping tasks.

4) Feed back and Competitive learning neural networks :

[8]

Feed back neural networks:

Pattern storage networks, stochastic networks and simulated annealing, Boltzmann machine and Boltzmann learning, Competitive NN: Components of CL network pattern clustering and feature mapping network, ART networks.

5) Applications of ANN :

[8]

Pattern classification – Recognition of Olympic games symbols, Recognition of printed characters.

Neocognitron – Recognition of handwritten characters.

NETTalk : to convert English text to speech. Recognition of consonant vowel (CV) segments, texture classification and segmentation.

### Text/Reference Books –

1. Artificial neural Networks – B. Yegnanarayana – PHI Publications
2. Neural networks, Fuzzy logic and Genetic Algorithms – Synthesis & Applications) – S. Rajnsekaran, Vijayalakshmi Pari – PHI
3. Neural Networks – Satish kumar - Tata McGraw Hill.

**Tutorials:**

1. Consider two one-dimensional, Gaussian-distributed classes  $c_1$  &  $c_2$  that have a common variance equal to 1. their mean values are,  $m_1=-20$ ,  $m_2=20$ . these two classes are essentially linearly separable. Design a classifier that separates these two classes.
2. A basic limitation of the perceptron is that it cannot implement the XOR function. Explain the reason for this limitation. Use the back-propagation algorithm for computing a set of synaptic weights and bias levels for a neural network to solve the XOR problem.
3. Summarize the similarities and differences between Boltzman machine and a sigmoid belief network.
4. Consider a Hopfield network made up of five neurons, which is required to store the following three fundamental memories:  
 $a_1=[+1,+1,+1,+1,+1]^T$   
 $a_2=[+1,-1,-1,+1,-1]^T$   
 $a_3=[-1,+1,-1,+1,+1]^T$ 
  - i) Evaluate the 5-by-5 synaptic weight matrix of the network
  - ii) Use asynchronous updating to demonstrate that all three fundamental memories  $a_1$ ,  $a_2$  and  $a_3$ , satisfy the alignment condition.
  - iii) Investigate the retrieval performance of the network when it is presented with a noisy version of  $a_1$  in which the second element is reversed in polarity.
5. Explain how recognition of handwritten digits is closer to a classification type problem, whereas recognition of vowel sounds in continuous speech is closer to a feature mapping type of problem.

## **MCA306 – Elective I (Mobile Computing)**

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

1. Wireless and Mobile Network Architecture:

**[8]**

Principle of Cellular Communication, Overview 1G, 2G, 2.5G and 3G and 4G technologies. GSM Architecture and Mobility management, hand off management, Network signalling. Mobile Computing fundamental challenges, Mobile Devices –PDA and mobile OS, PalmOs, Win CE and Symbian.

2.Mobile IP Protocol Architecture:

**[8]**

Mobile IP and IP v 6 and its application in mobile computing. Cellular Digital Packet Data CDPD, VOIP, GPRS Services, Wireless Local Loop-WLL system.

3.Wireless Application Protocol (WAP):

**[8]**

The Wireless Application Protocol application environment, wireless application protocol client software, hardware and websites, wireless application protocol gateways, implementing enterprise wireless application protocol strategy,

4.Wireless Markup Language

**[8]**

An Introduction to Wireless Technologies, Markup Languages , An Introduction to XML, Fundamentals of WML., Writing and Formatting Text , Navigating Between Cards and Decks, Displaying Images, Tables, Using Variables, Acquiring User Input

5.Wireless Markup Language Script, Application of Mobile computing

**[8]**

An Introduction to WMLScript, WMLScript Control Structures, Events, Phone.com Extensions, Usability ASP and Dynamic WAP Sites, XML and XSLT, Dynamic WML Generation with ASP and XSLT, Developing WAP Applications using Emulators.

### **Text/Reference Books:**

1. Yi Bing Lin, “Wireless and Mobile Networks Architecture”, John Wiley.
2. Wrox “The Beginning WML and WML Script”, Wrox Publication
3. Tomasz Imielinski et.al, Mobile Computing, Kluwer Academic Press 1996.
4. Uwe Hansmann, Pervasive Computing Handbook. The Mobile World, IEE publication 2002
5. Jochen Burkhardt, et.al. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Addison Wesley, 2002

## MCA307 – Elective I (Distributed Operating Systems)

Teaching Scheme :

Lectures : 4 hrs/week

Examination Scheme :

Test : 20 Marks

Assignment : 20 Marks

End Sem. Exam. : 60 Marks

### 1. Fundamentals & Message Passing

[8]

Basic concept of distributed computing, Evolution of Distributed computing, Distributed computing system models, Issues in designing Distributed operating systems. Features of good message passing system, issues in IPC by message

Passing, Synchronization, buffering, Multi datagram messages, Encoding and decoding of message data, Process addressing , Failure handling, Group Communication.

### 2. Remote procedure calls

[8]

Introduction to RPC, The RPC model, Transparency of RPC, Implementing of RPC mechanism, Stub Generation, RPC messages, Marshaling Arguments and results, server management, Parameter passing semantics, Call Semantics, Communication protocols for RPC, Client Server Binding, Exception Handling, Security RPC in Heterogeneous Environments, Light Weight RPC, Optimizations for better performance.

### 3. Distributed Shared Memory & Synchronization

[8]

Introduction, General architecture of DSM system, Design and implementation issues of DSM, Granularity, Structure of shared memory space, Consistency models, Replacement strategy, Thrashing, Heterogeneous DSM, Advantages of DSM.

Need of synchronization, Clock synchronization, Event ordering, Mutual Exclusion, Deadlock, Election Algorithms.

### 4. Resource Management & Process Management

[8]

Desirable Features of Global scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach.

Introduction, Process migration, Threads in Distributed systems.

Distributed File System, Desirable features of Distributed file system, File models, File Accessing models , file sharing semantics, File caching schemes, File replication, Fault tolerance, Atomic transactions

### 5. Naming & Security

[8]

Features of Naming system, Fundamental terminology and concepts, System oriented names, Object locating mechanisms, human oriented names, Name caches, Naming and security, Potential attacks to computer systems, cryptography, Authentication, access control, Digital signatures.

### Text/Reference Books :

Distributed Operating systems Concept and Design By Pradeep K. Sinha Prentice-Hall

### Reference Book

Distributed systems: Principles and paradigms By Andrew Tanenbaum, Marteen Ven steen Prentice – Hall

## **MCA308 – Seminars**

Teaching Scheme :  
Practical : 6 hrs/week

Examination Scheme :  
Term Work : 50 Marks

The seminar will consist of a typewritten report covering the topic selected for the seminar. The candidate shall deliver seminar on the topic, which will be judged internally in the department by two examiners and the marks will be given accordingly.

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

4. Performance in the practical examination
5. Record of programs submitted by the candidate.

## **MCA309 – Lab : Software Testing Technique**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Study of testing tools
2. Test case design for functional testing
3. Test case design for loop testing
4. Test case design for synchronization
5. Test case design in batch mode
6. Testing of GUI application
7. Testing of object oriented application
8. Testing with Data Driver Wizard

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA310 – Lab : Advanced Database Management System**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam. : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

- 1) Installation of oracle server and client in the lab.
- 2) Perform practically DDL and DML sql commands.
- 3) Write a program to create report.
- 4) Write a program using PL/SQL block
- 5) Perform practically backup and recovery procedures.
- 6) Create simple Java server page and perform validations.
- 7) Connect JSP and Java Beans. Take any live example to perform operation.
- 8) Using JDBC connect Oracle database

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA311 – Lab : Elective [ Multimedia Techniques ]**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Write a program for data compression techniques.
2. Write a VRML program of creation of table & chair.
3. Write a VRML program of bouncing ball.
4. Write a VRML program of Creation of Cube.
5. Write a VRML program of switching on & off of bulb.
6. Write a VRML program of flight simulation system.
7. Write assignment on MIDI.
8. Write assignment on basic compression techniques.

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA312 – Lab : Elective [ Artificial Neural Network ]**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

1. Classification by two-layer perceptron
2. Classification by multilayer perceptron and backpropagation
3. Pattern association by feedforward and feedback network
4. Pattern recall by Hopfield model
5. Pattern association by Boltzman machine
6. Pattern clustering by Self Organizing Map
7. Pattern clustering by Learning Vector Unitization
8. Pattern clustering by Competitive neural network

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA313 – Lab : Elective [ Mobile Computing ]**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

- 1) Write a program to format a text.
- 2) Write a program to display data in tabular format.
- 3) Write a program for user input and navigation between cards.
- 4) Write a program to handle different events.
- 5) Write a program to convert currency.
- 6) Write a program to perform validation using WML script.
- 7) Write a program using phone.com.
- 8) Write a program to connect ASP and WML.

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
2. Record of programs submitted by the candidate.

## **MCA314 – Lab : Elective [ Distributed Operating System]**

Teaching Scheme :  
Practical : 2 hrs/week

Examination Scheme :  
Practical Exam : 25 Marks  
Term Work : 25 Marks

Minimum of 8 Programs should be completed which will be based on the subject and record for the same shall be submitted

Suggestive List of Programs –

- 1) Write a program to implement IPC by message passing..
- 2) Write a program to implement RPC mechanism.
- 3) Write a program to implement replacement strategy in DSM.
- 4) Write a program to implement an election algorithm.
- 5) Write a program to implement resource management by load balancing approach.
- 6) Write a program to implement resource management by load sharing approach.
- 7) Write a program for file sharing semantics.
- 8) Write a program for encryption and decryption of data.

Practical Examination will consist of Performance and Viva-voice Examination  
The assessment will be based on the following –

1. Performance in the practical examination
  2. Record of programs submitted by the candidate.
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**MCA315 – Dissertation**

Teaching Scheme :

Practical : 22 hrs/week

Examination Scheme :

Term Work : 100 Marks

Pract Exam : 100 Marks

The dissertation will consist of the work on the topic selected for the project .The project must be done individually. Project should be sponsored project.

The candidate is expected to select the project, do the requirements analysis, carry out the necessary design procedure and complete the implementation.

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The candidate will submit dissertation in triplicate to head of the institution.

**Term Work:**

The assessments of the term work should be done by two internal examiners, one of which will be the guide and the other will be HOD or senior staff member of the concerned branch of the institute.

**Practical Examination :**

Practical Examination will consist of a presentation along with the demonstration of the project. The said examination will be conducted by a panel of two examiners (one internal guide and one external examiner).

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