

## **WEB TECHNOLOGY**

### **MCA 501**

#### **Unit-I**

History of the web, Growth of the Web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber laws, Web project, Web Team, Team dynamics.

#### **Unit-II**

Communication Issues, the Client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

#### **Unit-III**

HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML.

JavaScript: Introduction, Documents, Documents, forms, Statements, functions, objects in JavaScript, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

#### **Unit IV**

XML: Introduction, Displaying an XML Document, Data Interchange with an XML document, Document type definitions, Parsers using XML, Client-side usage, Server Side usage.

#### **Unit V**

Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

#### ***Text Book:***

1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Sharma & Sharma, "Developing E-Commerce Sites", Addison Wesley
3. Ivan Bayross, "Web Technologies Part II", BPB Publications.

#### ***References:***

1. Shishir Gundavarma, "CGI Programming on the World Wide Web", O'Reilly & Associate.
2. DON Box, "Essential COM", Addison Wesley.
3. Greg Buczek, "ASP Developer's Guide", TMH.

## **MULTIMEDIA SYSTEM**

### **MCA 502(1)**

#### **Unit I**

Evolution of Multimedia and its objects, Scope of multimedia in business & work, Production and planning of Multimedia applications.

Multimedia hardware, Memory & Storage Devices, Communication Devices, Multimedia Software, Presentation and object generation tools,

Video, sound, Image capturing, Authoring Tools, Card & Page Based Authoring Tools.

### **Unit II**

Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under Windows environment, Audio & Video Capture.

### **Unit III**

Macromedia products, Basic drawing techniques, Advance animation techniques, Creating multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

### **Unit IV**

Digital Audio Concepts, Sampling variables, Loss Less compression of sound, Lossy compression & Silence compression.

### **Unit V**

Multimedia monitor bitmaps, Vector drawing, Lossy graphic compression, Image file formatic animations Image standards, J P E G compression, Zig Zag coding,

Video representation, colors, video compression, MPEG standards, MHEG standard, recent development in multimedia.

Multimedia Application Planning, Costing, Proposal preparation, and Financing-Case study of a typical industry.

### **References:**

1. Andreas Halzinger, "Multimedia Basics", Vo-I to Vo-III, Firewall Media, New Delhi.
2. Tay Vaughan, "Multimedia Making It work", Tata McGraw Hill.
3. Buford, "Multimedia Systems", Addison Wesley.
4. Agarwal and Tiwari, "Multimedia Systems", Excel.
5. Rosch, "Multimedia Bible", Sams Publishing
6. Sleinreitz, "Multimedia Systems", Addison Wesley
7. Ken Milburn, John Croteau, "Flash 4 web special Effects, Animation & Design Handbook", Dreamtech Press.
8. John Villamil-Casanova & Louis Molina, "Multimedia-Production, Planning & Delivery", PHI

## **DISTRIBUTED DATABASE SYSTEM MCA 502(2)**

### **Unit-1**

Introduction to Distributed Data system, Distributed Database Architecture, Distributed Data base Design, Transaction processing Concurrency Control techniques, Security.

## **Unit-2**

Types of Data Fragmentations, Fragmentation and allocation of fragments, Distribution transparency, access primitives, integrity constraints.

## **Unit-3**

Grouping and aggregate function, Query processing , Equivalence transformation of queries.

## **Unit-4**

Evaluation, parametric queries, Query optimization, Join and general queries.

## **Unit-5**

### **Management of Distributed transaction and concurrency control:**

Distributed Date base Administration, Catalogue Management Authorisation, Security and protection. Examples of distributed database systems. Cost Analysis

### **References:**

1. Ceri & Palgathi, “Distributed Database System”, McGraw Hill.
2. Raghu Rama Krishnan and Johannes Gechrib, “Database Management Systems”, Mc Graw Hill.
3. Date C. J, “An Introduction to Database System, Vol1 & II”, Addition Wesley.
4. Korth, Silbertz, Sudarshan , “Database Concepts”, McGraw Hill.
5. Elmasari , Navathe, “Fundamentals of Data Base Systems”, Addition Wesley.
6. Data C. J , “An Introduction to Database System” , Addition Wesley
7. RamaKrishnan , Gehke, “Database Management System”, McGraw Hill

## **ERP SYSTEMS MCA 502(3)**

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### **Unit-I**

Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

### **Unit-II**

ERP Domain, ERP Benefits classification, Present global and Indian market scenario, milestones and pitfalls, Forecast, Market players and profiles,

Evaluation criterion for ERP product, ERP Life Cycle: Adoption decision, Acquisition, Implementation, Use & Maintenance, Evolution and Retirement phases, ERP Modules.

### **Unit- III**

Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

### **Unit- IV**

Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

### **Unit- V**

Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.

### **References**

1. A. Lexis Leon, "Enterprise Resource Planning", TMH
2. Brady, Manu, Wegner, "Enterprise Resource Planning", TMH

## **ADVANCED CONCEPTS IN DATABASE SYSTEMS MCA 502(5)**

### **Unit-I**

Query Processing, Optimization & Database Tuning:

Algorithms For Executing Query Operations.Heuristics For Query Optimizations, Estimations Of Query Processing Cost, Join Strategies For Parallel Processors, Database Workloads, Tuning Decisions, DBMS Benchmarks, Clustering & Indexing, Multiple Attribute Search Keys, Query Evaluation Plans, Pipelined Evaluations, System Catalogue In RDBMS.

### **Unit-II**

Extended Relational Model & Object Oriented Database System:

New Data Types, User Defined Abstract Data Types, Structured Types, Object Identity, Containment, Class Hierarchy, Logic Based Data Model, Data Log, Nested Relational Model And Expert Database System.

### **Unit-III**

### **Distributed Database System:**

Structure Of Distributed Database, Data Fragmentation, Data Model, Query Processing, Semi Join, Parallel & Pipeline Join, Distributed Query Processing In R \* System, Concurrency Control In Distributed Database System, Recovery In Distributed Database System, Distributed Deadlock Detection And Resolution, Commit Protocols.

#### Unit –IV

Enhanced Data Model For Advanced Applications:

Database Operating System, Introduction To Temporal Database Concepts, Spatial And Multimedia Databases, Data Mining, Active Database System, Deductive Databases, Database Machines, Web Databases, Advanced Transaction Models, Issues In Real Time Database Design.

#### **Unit-V**

### **Introduction To Expert Database And Fuzzy Database System:**

**Expert DataBases:** Use of Rules of Deduction in Databases, Recursive Rules.

**Fuzzy DataBases:** Fuzzy Set & Fuzzy Logic, Use Of Fuzzy Techniques to Define Inexact and Incomplete DataBases.

#### **References**

1. Majumdar & Bhattacharya, “Database Management System”, TMH.
2. Korth, Silbertz, Sudarshan, “ Database Concepts”, McGraw Hill.
3. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addison Wesley.
4. Data C J,” An Introduction To Database System”, Addison Wesley.
5. Ramakrishnan, Gehrke, “Database Management System”, McGraw Hill.
6. Bernstein, Hadzilacous, Goodman, “ Concurrency Control & Recovery”, Addison Wesley.
7. Ceri & Palgatti, “Distributed Databases”, McGraw Hill.

## **NET FRAMEWORK AND C# MCA 503**

### **Unit-I**

**The .NET framework:** Introduction, Common Language Runtime, Common Type System, Common Language Specification, The Base Class Library, The .NET class library Intermediate language, Just-in-Time compilation, garbage collection, Application installation & Assemblies, Web Services, Unified classes.

### **Unit-II**

C# Basics: Introduction, Data Types, Identifiers, variables & constants, C# statements, Object Oriented Concept, Object and Classes, Arrays and

Strings, System Collections, Delegates and Events, Indexes Attributes, versioning.

### **Unit-III**

C# Using Libraries: Namespace-System, Input Output, Multi-Threading, Networking and Sockets, Data Handling, Windows Forms, C# in Web application, Error Handling.

### **Unit-IV**

Advanced Features Using C#: Web Services, Windows services, messaging, Reflection, COM and C#, Localization.

### **Unit-V**

**Advanced Features Using C#:** Distributed Application in C#, XML and C#, Unsafe Mode, Graphical Device Interface with C#, Case Study (Messenger Application)

#### ***Text Books***

1. Shibi Panikkar and Kumar Sanjeev, “C# with .NET Frame Work”, Firewall Media.
2. Shildt, “C#: The Complete Reference”, TMH

#### ***Reference Books***

1. Jeffrey Richter, “Applied Microsoft .Net Framework Programming”, (Microsoft)
2. Fergal Grimes, “Microsoft .Net for Programmers”, (SPD)
3. TonyBaer, Jan D. Narkiewicz, Kent Tegels, Chandu Thota, Neil Whitlow, “Understanding the .Net Framework”, (SPD)
4. Balagurusamy, “Programming with C#”, TMH

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## **SOFTWARE ENGINEERING**

### **MCA 504**

**Unit-I Introduction:** Introduction to software engineering, Importance of software, The evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

**Unit-II Software Requirement Specification:** Analysis Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

**Software-Design:** Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach, functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional

independence, Software Architecture, Transaction and Transform Mapping, Component – level Design, Forth Generation Techniques

**Unit-III Coding:** Top-Down and Bottom –Up programming, structured programming, information hiding, programming style and internal documentation.

**Testing:** Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification & validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

**Unit-IV Software Project Management:** The Management spectrum- (The people, the product, the process, the project), cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

**Unit-V Software Reliability & Quality Assurance:** Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM.

**CASE (Computer Aided Software Engineering):** CASE and its Scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

### **References**

1. Pressman, Roger S., “Software Engineering: A Practitioner’s Approach Ed. Boston: McGraw Hill, 2001
2. Jalote, Pankaj, “Software Engineering Ed.2”, New Delhi: Narosa 2002
3. Schaum’s Series, “Software Engineering”, TMH
4. Ghezzi, Carlo and Others, “Fundamentals of Software Engineering”, PHI
5. Alexis, Leon and Mathews Leon, “Fundamental of Software Engineering”, Vikas
6. Sommerville, Ian, “Software Engineering”, AWL, 2000
7. Fairly, “Software Engineering”, New Delhi: TMH
8. Pfleuger, S, “Software Engineering”, Macmillan, 1987

## **ADVANCED COMPUTER NETWORKS MCA 505(1)**

### **Unit 1:**

Introduction: Overview of computer network, seven-layer architecture, TCP/IP suite of protocol, etc. Mac protocols for high-speed LANS, MANs & WIRELESS LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet etc.)

Fast access technologies. (For example, ADSL, Cable Modem, etc.)

**Unit 2:**

IPv6: why IPv6, basic protocol, extension & option, support for QoS, security, etc, neighbor discovery, auto-configuration, routing. Change to other protocols. Application programming interface for IPv6. 6bone.

**Unit 3:**

Mobility in network. Mobile. Security related issues.

IP Multicasting. Multicasting routing protocols, address assignments, session discovery, etc.

**Unit 4:**

TCP extensions for high-speed networks, transaction-oriented application, other new option in TCP.

**Unit 5:**

Network security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

**References:**

1. W. R. Stevens, "TCP/IP illustrated, Volume 1: The protocols", Addison Wesley 1994.
2. G. R. Wright. "TCP/IP illustrated, Volume 2: The implementation", Addison Wesley 1995

**REAL TIME SYSTEM**

**MCA 505(2)**

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**Unit-I**

**Introduction to Real Time Systems, Priorities, Embedded Systems, Task, Classification & Requirements, Deadlines, Soft, Hard.**

**Unit-II**

Firm Real Time Systems, Introduction to Real Time Operating Systems, Task Management, Inter Process Communication, Case Studies of Maruti II, HART OS, VRTX etc.

**Unit-III**

Characterizing Real Time Systems and Task, Task Assignment & Scheduling Theory, Fixed and Dynamic Priority Scheduling  
Uniprocessor (RM and EDF), Multiprocessor (Utilization Balancing, Next-fit for RM & Bin-Packing Assignment for EDF) Scheduling

## **Unit-IV**

Programming Languages and Tools, Real Time Databases

Real Time Communication, FDDI, Specification and Verification using Duration Calculus, Flow Control, Protocols for Real Time (VTCSMA, Window, IEEE 802.3, IEEE 802.4, IEEE 802.5, Stop and Go Protocol, Media Access Protocol),

## **Unit-V**

Fault, Fault Classes, Fault Tolerant Real Time System, Clocks, Clock Synchronization, Issues in Real Time Software Design.

## **References**

1. Krishna, C.M, “Real Time Systems”, McGraw Hill
2. Jane W.S. Liu, “Real Time Systems”, Pearson Education Asia
3. Levi and Agarwal, “Real Time Systems”, McGraw Hill
4. Mathi & Joseph, “Real Time System: Specification, Validation & Analysis”, PHI

## **PRINCIPLES OF USER INTERFACE DESIGN**

### **MCA 505(3)**

**Unit I User-Interface:** Goals of User-Interface Design, Human factors in user interface design, Theories, Principles, and Guidelines, Goals of Systems Engineering, Accommodation of Human Diversity, Goals for Our Profession, High Level Theories, Object-Action Interface model, Principle 1: Recognize the Diversity, Principle 2: Use the Eight Golden Rules of Interface Design, Principle 3: Prevent Errors, Guidelines for Data Display, Guidelines for Data Entry, Balance of automation and Human Control, Practitioner’s Summary, Researcher’s Agenda.

**Management Issues:** Introduction, Organizational; Design to Support Usability, The three Pillars of Design, Development Methodologies, Ethnographic Observation, Participatory Design, Scenario Development, Social Impact Statement for Early Design Review, Legal issues, Expert Reviews, Usability, testing and Laboratories, Surveys, Acceptance tests, Evaluation During Active Use, Controlled Psychologically Oriented Experiments, Practitioner’s Summary, Researcher’s agenda.

**Unit II Tools Environment, and Menus:** Introduction, Specification Methods; Interface-Building Tools, Evaluation and critiquing Tools. Direct Manipulation and virtual Environments: Introduction, Examples of Direct manipulation systems, Explanations of Direct manipulation, Visual Thinking and Icons, Direct Manipulation Programming, Home Automation, Remote Direct manipulation, Virtual Environments Menus: Task-Related Organization, Item Presentation Sequence, Response Time and Display

Rate, Fast Movement through Menus, Menu Layout, From Fillin, Dialog boxes, Command-Organization strategies, The Benefits of Structure, Naming and Abbreviations, Command Menus, Natural Language in Computing, Practitioners Summary, Researcher's Agenda.

**Unit III Interaction Devices, Response Times, Styles and Manuals:** Interaction Devices, Introduction, Keyboards and Function Keys, Pointing Devices, speech Recognition, Digitization, and Generation, Image and Video displays, Printers. Response Time and Display Rate: Theoretical; Foundations, Exceptions and attitudes, User Productivity, variability, Presentation Styles and Manuals: Introduction, Error messages, Nonanthropomorphic Design, Color of Manuals, Help: Reading From paper Versus from Displays, Preparation of Printed manuals, Preparation of Online Facilities, Practitioner's Summary, Researcher's Agend.

**Unit IV Multiple-Windows, Computer-Supported Cooperative work, Information's search and www Multiple-Windows Strategies:** Introduction, Individual-Window Design, Multiple-window Design, Coordination by Tightly-Coupled Windows, Image Browsing and Tightly-Coupled Windows, Personal Role Management and Elastic Windows Computer-Supported Cooperative Work; Introduction, Goals of Cooperation, Asynchronous Interactions: Different Time, Different Place, Synchronous Distributed: Different Place, Same Time, Face to Face: Same Place, Same Time, Applying CSCW to Education.

**Unit V Information Search and Visualization:** Introduction, Database Query And Phrase Search in Textual Documents, Multimedia Document Searches, Information Visualization, Advanced Filtering. Hypermedia and the World wide Web: Introduction, Hypertext and Hypermedia, World Wide Web, Genres and Goals and Designers, Users and Their Tasks, Object Action Interface Model for Web Site Design, Practitioner's summary, Researcher's Agenda.

**References:**

1. Ben Shneiderman, "Designing the User Interface", Addison-Wesley
2. Alan J Dix et al, "Human-Computer Interaction", PHI
3. Eberts, "User Interface Design", PHI
4. Wilber O Galitx, "An Introduction to GUI Design Principles and Techniques", John-Wiley

**MOBILE COMPUTING  
MCA 505(4)**

**Unit I**

Issues in Mobile Computing, Wireless Telephony, Digital Cellular Standards, Bluetooth Technology, Wireless Multiple Access Protocols, Channel Allocation in Cellular Systems.

### **Unit II**

Data Management Issues: Mobility, Wireless Communication and Portability, Data Replication and Replication Schemes, Basic Concept of Multihopping, Adaptive Clustering for Mobile Network, Multicluster Architecture.

### **Unit III**

Location Management, Location Based Services, Automatically Locating Mobile Uses, Locating and Organizing Services, Issues and Future Directions, Mobile IP, Comparison of TCP and Wireless.

### **Unit IV**

Transaction Management, Data Dissemination, Cache Consistency, Mobile Transaction Processing, Mobile Database Research Directions, Security Fault Tolerance for Mobile N/W.

### **Unit V**

What is Ad-hoc Network? , Problems with Message Routing in Wireless Ad-hoc Mobile Networks, Routing scheme based on signal strength, Dynamic State Routing (DSR), Route Maintenance and Routing error, Fisheye Routing (FSR), Ad-hoc on Demand Distance Vector (ADDV)

### **Text Books & References:**

1. Shambhu Upadhyaya, Abhijeet Chaudhary, Kevin Kwiat, Mark Weises, "Mobile Computing", Kluwer Academic Publishers
2. UWE Hansmann, Lothar Merk, Martin-S-Nickious, Thomas Stohe, "Principles of Mobile Computing", Springer International Edition

## **NEURAL NETWORK MCA 505(5)**

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### **Unit – I**

Introduction: Neural network, Human brain, biological and artificial Neurons, model of Neuron Knowledge representation, Artificial intelligence and Neural network, Network architecture, Basic Approach of the working of ANN – training, Learning and generalization.

### **Unit – II**

Supervised learning: Single- layer networks, perception-linear separability, limitations of multi layer network architecture, back propagation algorithm (BPA) and other training algorithms, applications of adaptive multi-layer

network architecture, recurrent network, feed-forward networks, radial-basis-function (RBF) networks.

### **Unit – III**

Unsupervised learning: Winner-takes-all networks, Hamming networks, maxnet, simple competitive learning vector-quantization, counter-propagation network, adaptive resonance theory, Kohonen's self organizing maps, principal component analysis.

### **Unit – IV**

Associated models: Hopfield networks, brain-in-a-box network, Boltzman machine.

### **Unit - V**

Optimization methods: Hopfield networks for-TSP, solution of simultaneous linear equations, Iterated gradient descent, simulated annealing, genetic algorithm.

#### ***Text Books:***

1. Simon Haykin, "Neural Networks – A Comprehensive Foundation", Macmillan Publishing Co., New York, 1994.
2. K. Mahotra, C.K. Mohan and Sanjay Ranka, "Elements of Artificial Neural Networks", MIT Press, 1997 – Indian Reprint Penram International Publishing (India), 1997

#### ***Reference Books:***

1. A Cichocki and R. Unbehauen, "Neural Networks for optimization and Signal processing", John Wiley and Sons, 1993.
2. J.M. Zurada, "Introduction to Artificial Neural networks", (Indian edition) Jaico Publishers, Mumbai, 1997.
3. Limin Fu. "Neural Networks in Computer Intelligence", TMH.

## **PROGRAMMING LAB MCA 171**

**L T P  
0 0 3**

- Write C program to find largest of three integers.
- Write C program to check whether the given string is palindrome or not.
- Write C program to find whether the given integer is
  - (i) a prime number
  - (ii) an Armstrong number.
- Write C program for Pascal triangle.

- Write C program to find sum and average of n integer using linear array.
- Write C program to perform addition, multiplication, transpose on matrices.
- Write C program to find fibonacci series of iterative method using user-defined function.
- Write C program to find factorial of n by recursion using user-defined functions.
- Write C program to perform following operations by using user defined functions:
  - (i) Concatenation
  - (ii) Reverse
  - (iii) String Matching
- Write C program to find sum of n terms of series:  

$$n - n*2/2! + n*3/3! - n*4/4! + \dots\dots\dots$$
- Write C program to interchange two values using
  - (i) Call by value.
  - (ii) Call by reference.
- Write C program to sort the list of integers using dynamic memory allocation.
- Write C program to display the mark sheet of a student using structure.
- Write C program to perform following operations on data files:
  - (i) read from data file.
  - (ii) write to data file.
- Write C program to copy the content of one file to another file using command line argument.

**ORGANIZATION LAB**  
**MCA 172**

**LT 1**  
**0 0 3**

- Study and Bread Board Realization of Logic Gates. K-Map, Flip-Flop equation, realization of characteristic and excitation table of various Flip Flops.
- Implementation of Half Adder, Full Adder and Subtractor.
- Implementation of Ripple Counters and Registers.
- Implementation of Decoder and Encoder circuits.
- Implementation of Multiplexer and D-Multiplexer circuits.

**LT 1**  
**0 0 2**

**NUMERICAL TECHNIQUES LAB**  
**MCA - 173**

Write programs in C

- To implement floating point arithmetic operations i.e., addition, subtraction, multiplication and division.
- To deduce errors involved in polynomial interpolation. Algebraic and transcendental equations using Bisection, Newton Raphson, Iterative, method of false position, rate of conversions of roots in tabular form for each of these methods.
- To implement formulae by Bessels, Newton, Stirling, Langranges etc.
- To implement method of least square curve fitting.
- Implement numerical differentiation.
- Implement numerical integration using Simpson's 1/3 and 3/8 rules, trapezoidal rule.
- To show frequency chart, regression analysis, Linear square fit, and polynomial fit.

**NOTE-** Institutions are required to add four more experiments as per available expertise with them

**DATA STRUCTURE LAB**  
**MCA - 271**

**L T P**  
**0 0 3**

Write Program in C or C++ for following:

- Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.
- Searching programs: Linear Search, Binary Search.
- Array implementation of Stack, Queue, Circular Queue, Linked List.
- Implementation of Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.
- Implementation of Binary tree.
- Program for Tree Traversals (preorder, inorder, postorder).
- Program for graph traversal (BFS, DFS).
- Program for minimum cost spanning tree, shortest path.

**L T P**  
**0 0 3**

**UNIX/LINUX LAB**

### **MCA - 272**

- Write Shell Script for UNIX environment.
- Understanding of basic commands of UNIX administration, user authorization, grant of users right and privileges, backup and recovery.
- Source Code Control System understanding Lex and Yacc, debugger tools (Lint, make etc.)
- Write program in C for Process Creation, Parent/Child process relationship, forking of process. Inter Process Communication and socket programming implementation of exec system call, pipe, semaphore and message queue.

### **MICROPROCESSOR LAB**

#### **MCA - 273**

**L T P**

**0 0 2**

- Study of 8085 and 8086/8088 Kit.
- Assembly Language Programs for 8088 kit
  - (i) address and data transfer.
  - (ii) addition, subtraction.
  - (iii) block transfer.
  - (iv) find greatest numbers.
  - (v) find r's and (r-1)'s complements of signed and unsigned number
- Assembly Language Programs for 8086/8088
  - (i) Multiplication of two decimal/binary/hexadecimal/octal numbers.
  - (ii) Division of two decimal/binary/hexadecimal/octal numbers.
  - (iii) Conversion of lower case to upper case character.
- Test the performance of Booth's Algorithm for
  - (i) Signed numbers.
  - (ii) Unsigned numbers.

### **DBMS LAB**

#### **MCA - 371**

**L T P**

**0 0 3**

The programme to be implemented using SQL

1. Create Table, SQL for Insertion, Deletion, Update and Retrieval using aggregating functions.
2. Write Programs in PL/SQL, Understanding the concept of Cursors.

3. Write Program for Join, Union & intersection etc.
4. Creating Views, Writing Assertions, Triggers.
5. Creating Forms, Reports etc.
6. Writing codes for generating read and update operator in a transaction using different situations.
7. Implement of 2PL concerning central algorithm.
8. Developing code for understanding of distributed transaction processing.  
Students are advised to use Developer 2000 Oracle 8+ version for above experiments. However, depending on the availability of Software's students may use power builder/SQL Server/DB2 etc. for implementation.

**OOPS & ++ LAB**  
**MCA - 372**

**L T P**  
**0 0 3**

Write programs in C/C++ for

1. Program illustrating overloading of various operators.
2. Program illustrating use of Friend, Inline, Static Member functions, default arguments.
3. Program illustrating use of destructor and various types of constructor.
4. Program illustrating various forms of Inheritance.
5. Program illustrating use of virtual functions, virtual Base Class.
6. Program illustrating how exception handling is done.
7. Program implementing various kinds of sorting algorithms, Search algorithms & Graph algorithms.

**DESIGN AND ANALYSIS OF ALGORITHMS (DAA) LAB**  
**MCA - 373**

**L T P**  
**0 0 2**

Write Programs in C/C++ for

1. Creation of a binary search tree and insertion & deletion into it.
2. Creation of a Red Black tree and all the associated operations on it.
3. Implementing an AVL tree and all the associated operations on it.
4. Multiplication of two matrices using Strassen's Matrix Multiplication method.
5. Solving Knapsack problem.

6. Implementing shortest path algorithms (Dijkstra's and Bellman Ford Algorithm).
7. Finding the minimum cost Spanning Tree in a connected graph.
8. Solving 8 Queen's problem.

Finding the number of connected components in a Graph.