



SYLLABUS
For
MCA COURSE
(w.e.f Session 2010-2011)



DEPARTMENT OF COMPUTER ENGINEERING

**YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY
FARIDABAD**



MCA- 101 Mathematical Foundation of Computer Science

MCA I Semester

No. of Credits: 5

L T P Total

5 0 0 5

Sessional: 40 Marks

Theory: 60 Marks

Total : 100 Marks

Duration of Exam: 3 Hours

Note :- Five question will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Relation: Relations, Properties of Binary relation, Matrix representation of relations, Equivalence relations, Partial order relation. **Function:** Types, Composition of function, Recursively defined function.

Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, Subgroup, Cyclic group, Cosets, Normal Subgroups, Lagrange's Theorem, Permutation groups.

Unit-II

Propositional Logic: Boolean Algebra, Propositions, logical operations, Tautologies, Contradictions, Logical implication, Logical equivalence, Normal forms, Theory of Inference and deduction. Predicate Calculus : Predicates and quantifiers, Mathematical Induction.

Unit-III

Lattices and Boolean Algebra: Introduction, Partially Ordered Set, Hasse diagram, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Complemented and Distributive lattices.

Unit-IV

Graphs: Introduction to graphs, Directed and undirected graph , Homomorphic and Isomorphic graphs, Subgraph , Cot Points and Bridges , Multigraph and Weighted graph, paths and circuits, Shortest path in weighted graphs, Eulerian path and circuits ,Hamilton paths and circuits, planar graphs. Euler's Formula

Unit-V

Introduction to defining language, Kleene Closure, Arithmetic expressions, Chomsky Hierarchy, Regular expressions, Generalized Transition graph. Conversion of regular expression to Finite Automata, NFA, DFA, Conversion of NFA to DFA. Optimizing DFA, FA with output : Moore machine, Mealy machine, Conversions.

Suggested Readings :

1. C.L.Liu : Elements of Discrete Mathematics McGraw Hill.



2. Lipschutz, Seymour : Discrete Mathematics, Schaum's Series.
 3. Babu Ram : Discrete Mathematics, Vinayek Publishers, New Delhi.
 4. Trembley, J.P. & R. Manohar : Discrete Mathematical Structure with Application to Computer Science, TMH.
 5. Kenneth H. Rosen : Discrete Mathematics and its applications, TMH.
 6. Doerr Alan & Levasseur Kenneth; Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd.
 - 7 Theory of Computer Science; K.L.P. Mishra. N. Chandrasekaran
 8. Hopcroft J.E., Ullman J.D. : Introduction to Automata theory, Languages and Computation, Narosa Publishing House, New Delhi.
 9. Any other book(s) covering the contents of the paper in more depth.
- Note :** Latest and additional good books may be suggested and added from time to time



MCA- 102 Computer Fundamentals and Programming in C

MCA I Semester

| | | |
|-------------------|-------------------|-----------|
| No. of Credits: 5 | Sessional: | 40 Marks |
| L T P Total | Theory: | 60 Marks |
| 5 0 0 5 | Total : | 100 Marks |
| | Duration of Exam: | 3 Hours |

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

UNIT –I

An Overview of Computer System and Operating Systems: Fundamentals: Evolution of computers, Hardware organization of a computer. Introduction to microprocessors, generation of microprocessors, commonly used CPUs. Input/Output Devices, Input/output ports and connectors.

Different Number Systems:- Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, and their inter- conversions.

Operating System Basics: Introduction to Operating system, Functions of an Operating Systems, Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows XP, working with Windows. Introduction to computer viruses.

UNIT -II

Basic Introduction to Programming Languages:-

Machine Language, Assembly Languages, High level Languages, Types of high level languages, Compiler, Interpreter, Assembler, Loader, Linker, Relationship between Compiler, Loader and Linker.

Basic Introduction to Computer Networks:-

Data Communication, modulation, Network devices, LAN, LAN topologies, WAN, OSI Reference model. Introduction to Internet and protocols: TCP/IP ref. model, Backbone network, Network connecting devices. Hypertext documents, HTTP, DNS, Network Security.



Unit-III

An Overview of C:

Constants, Variables and Data types, operators and Expressions, managing I/O operations, Decision Making and branching, Decision Making and looping, Arrays, Character Arrays and Strings, User Defined Functions.

Structure and Union in C:

Defining structure, declaring variables, Accessing structure members, structure initialization, copying and comparing structures variables, operations on individual members, Array of structure, structure with structure, unions, size of structure.

Unit -IV

Pointers in C:

Introduction, Understanding Pointers, Accessing the address of a variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a variable through its pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factors, pointers and Arrays, Pointer and Character Strings, Arrays of Pointers, Pointers as Function Arguments, Functions Returning Pointers, Pointers to Functions.

Dynamic Memory Allocation and File Management in C:-

Introduction, Dynamic memory allocation, allocating a block of memory: Malloc, allocating multiple blocks of memory: Calloc. Releasing the used space: Free, Altering the size of block: Realloc, Defining and opening file, closing file, I/O operation on files, error handling during I/O operations, Random Access to files and command line arguments.

Text Books:

1. Fundamental of Information Technology by A.Leon & M.Leon.
2. UNIX Concepts and Application(4/e) by Sumitabha Das
3. Programming Languages (4th Edition) by Pratt IW
4. Fundamentals of Computers and Programming with C by A. K. Sharma Dhanpat Rai publications
5. Computer Networks (4th Edition) by Andrew S. Tanenbaum

Reference Books:

1. Digital Principles and Application by Donald Peach, Albert Paul Malvino
2. Operating System Concepts, (6th Edition) by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne.



MCA- 103 Digital Design

MCA I Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Number System : Binary, Octal, Hexadecimal and Decimal. 1's and 2's Complements, Inter-conversion of numbers. Codes : BCD Code, Excess-3 Code, Gray code, Alphanumeric Codes, Parity Bits, Hamming Code, Floating Point Numbers. Binary Arithmetic : Basic Rules of Binary Addition and Subtraction, Addition and Subtraction Using 2's Complement Method, Binary Multiplicity - repeated Left shift and Add Algorithm, Binary Division - Repeated Right Shift and Subtract Algorithm.

Unit-II

Positive and Negative Logic, Truth Tables, Logic Gates, Boolean Algebra, Boolean Expressions-Variables and Literals, Theorem of Boolean Algebra, Minimization Techniques, SOPs & POSs Boolean Expressions, Quine-McCluskey Tabular Method, Karnaugh Map Method.

Unit-III

Combinational Circuits, Implementing Combinational Logic, Arithmetic Circuits- Basic Building Blocks, Adder- Subtractor, BCD Adder, Magnitude Comparator, Parity Generator and Checker, Demultiplexers and Decoders, Encoders, Code Converters . SR Flip Flops: SR, D, JK, T, Master Slave Flip Flop Synchronous and Asynchronous Inputs.

Unit-IV

Ripple Counter vs. Synchronous Counter, Modulus of a Counter, Up/ Down Counters, Decade and BCD Counters, Shift Register : SISO, PISO, PIPO, PISO, Universal Shift Register, Controlled shift Registers.

Unit-V

Programmable Logic Devices: RAM, ROM, PLA, PAL, CPLD, FPGA



Suggested Readings

1. Mano, M.M. : Digital Logic and Computer Design, Prentice- Hall of India.
2. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
3. Stallings, William : Computer Organisation & Architecture.
4. Mano, M.M. : Digital Design, Prentice-Hall of India.
6. R P Jain : Digital Electronics, TMH.



MCA- 104 Internet and Web Designing

MCA I Semester

No. of Credits: 5
L T P Total
4 0 0 4

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction to Internet and WWW, Hypertext Transfer Protocol (HTTP), URL, HTML: Internet Language, Understanding HTML, Create a Web Page, Linking to other Web Pages, Publishing HTML Pages, Text Alignment and Lists, Text Formatting Fonts Control, E-mail Links and link within a page, Creating HTML Forms.

Unit-II

Creating Web Page Graphics, Putting Graphics on a Web Page, Custom Backgrounds and Colours, Creating Animated Graphics. Web Page Design and layout, Advanced Layout with Tables, Using Style Sheets. Introduction to Client side programming using Java script

Unit-III

DNS working, Configuring Internet Connection, Connecting LAN to Internet. Single User, Multi User, Server, Workstation, Client-Server environment, E-Mail Concepts - configuring E-Mail Program, Sending and Receiving Files through E-Mail, Fighting Spam, Sorting Mail, and Avoiding E-Mail Viruses.

Unit-IV

Architecture of Web Browsers, Different setting for browser, Surfing the Net, Online Chatting , Messaging, and Conferencing Concepts, E-Mail mailing lists, Usenet newsgroup concepts- Reading usenet newsgroups, internet Relay Chat, Instant messaging, Web-Based chat rooms and discussion boards, Voice and Video conferencing. streamlining Browsing, Keeping track of Favorite Web Sites, Web Security, Privacy, and Site-Blocking. Search Engines, Categories of search Engines, Searching Criterion, Searching the Web – Audio and Video on the Web.



Suggested Readings :

1. Dick Oliver: Tech Yourself HTML 4 in 24 Hours, Techmedia.
2. Craig Zacker : 10 minutes Guide to HTML Style Sheets, PHI.
4. Gill, Nasib Singh : Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi.
6. Margaret Levine Young : Internet - The Complete Reference.
7. Harley Hahn : The Internet - Complete Reference, TMH.



MCA- 105 Data Base Management Systems

MCA I Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I:

Introduction: Overview of database Management System; Various views of data, data Models, Introduction to Database Languages. Advantages of DBMS over file processing systems,

Database Languages - DDL, DML. Database Access for applications Programs, data base Users and Administrator, Database system Structure, Storage Manager, Query Processor, History of Database Systems.

Introduction to Client/Server architecture, three levels architecture of Database Systems, E-R Diagram (Entity Relationship), Attributes and Entity sets, Relationship and Relationship sets, mapping Constraints, Keys, Reduction of E-R diagram into tables. Additional features of ER Model, Conceptual Design for Large enterprises.

Unit-II

Relational Model: Introduction to the Relational Model, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, and Logical data base Design, Introduction to views, Destroying/altering Tables and Views, Introduction to SQL.

Relational Algebra and Calculus: Relational Algebra, Selection and projection set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus-Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and Calculus.

Unit-III

Normalization: Data bases. Schema refinement, Problems Caused by redundancy, Decompositions, Problem related to decomposition, Functional dependencies, FIRST, SECOND, THIRD Normal forms, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Schema refinement in Data base Design, Multi valued Dependencies, Forth Normal Form.

Unit-IV

Overview of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of transaction, Lock Based Concurrency Control, Performance Locking, Introduction to Crash recovery.



Concurrency Control: Serializability and recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques, Concurrency without Locking.

Concepts of object oriented database management systems, Distributed Data Base Management Systems, parallel Databases, data mining & data warehousing.

Suggested Readings:

1. Raghurama Krishnan: Data base Management Systems, Johannes Gehrke, Tata McGraw Hill Latest Edition.
2. Siberschatz, Korth: Data base System Concepts, McGraw Hill, and latest edition.
3. P. Radha Krishna: Database Management Systems, HI-TECH Publications.
4. C.J. Date: Introduction to Database Systems, Pearson, Education.
5. Rob & Coronel: Data base Systems design, Implementation, and Management, latest Edition, Thomson.
6. Elmasri Navate: Data base Management System, Pearson Education.



MCA- 201 Data Structures

MCA II Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Overview of 'C': Introduction, Flow of Control, Input output functions, Arrays and Structures, Functions.

Data structures and Algorithms: an overview: concept of data structure, choice of right data structures, types of data structures, basic terminology Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.

Arrays: Searching Sorting: Introduction, One Dimensional Arrays, **Operations Defined:** traversal, selection, searching, insertion, deletion, and sorting. Multidimensional arrays, address calculation of a location in arrays.

Searching: Linear search, Recursive and Non recursive binary Search.

Sorting: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Shell sort, Heap sort

Stacks and queues: Stacks, array representation of stack, Applications of stacks. Queues, Circular queues, array representation of Queues, Deque, priority queues, Applications of Queues.

Unit-II

Pointers and Linked Lists: Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.

Linked Lists: Concept of a linked list, Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks, linked Queues.

Unit-III

Trees and Graphs: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, Application of trees.



Graphs: Introduction, terminology, ‘set, linked and matrix’ representation, Graph traversal techniques: BFS, DFS, operations on graphs, Minimum spanning trees, Applications of graphs.

Unit-IV

File Handling and Advanced data Structure: Introduction to file handling, Data and Information, File concepts, File organization, files and streams, working with files. AVL trees, Sets, list representation of sets, applications of sets, skip lists

Text Books:

- 1 Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
- 2 Data Structures using C by A. K. Sharma, Pearson

Reference Books:

- 1 Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- 2 Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- 3 Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- 4 Data Structures and Program Design in C By Robert Kruse, PHI,
- 5 Theory & Problems of Data Structures by Jr. Seymour Lipschetz, Schaum’s outline by TMH
- 6 Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- 7 Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H



MCA- 202 Computer Organization & Architecture

MCA II Semester

No. of Credits: 5

L T P Total

4 0 0 4

Sessional: 40 Marks

Theory: 60 Marks

Total : 100 Marks

Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Basic Principles: Boolean algebra and logic gates, Combinatorial logic blocks(Adders, Multiplexers, Encoders, Decoder), Sequential logic blocks(Latches, Flip-flops, registers, counters)

Unit-II

General system architecture:

Stored program control concept, Flynn's classification of computers(SISD, MISD, SIMD, MIMD), control and data path of a typical register based CPU, Bus structures, Fetch-Decode-Execute cycle(typically 3 to 5 stages), Instruction code, computer registers, computer instructions,

Unit III

Timing and Control Unit: Instruction cycle, type of instructions, memory reference, register reference, I/O reference, Hardwired controlled unit, Micro programmed controlled unit, Control memory and address sequencing

Unit IV

General Register Organization: Stack, Organization RISC Vs. CISC architectures, Addressing Modes: register, immediate, direct, indirect, indexed, Operations in the instruction set: Arithmetic and Logical, Data Transfer and Manipulation, Program Control

Unit V

Memory Hierarchy & I/O techniques: The need for memory hierarchy(Locality of reference) Main Memory, Associative Memory, Cache Memory, Auxiliary Memory, memory parameters (access/ cycle time, cost per bit) Virtual Memory, Memory Management Hardware



Input/output Organization : I/O performance metrics- MIPS, MFLOPS, Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access,

Unit-VI

Introduction to parallelism: Goals of parallelism(Exploitation of concurrency, throughput enhancement), Amdahl law, instruction level parallelism(pipelining, super scaling-basic features), processor level parallelism(multiprocessor systems overview)

Suggested Readings

1. Mano, M.M. : Digital Logic and Computer Design, Prentice- Hall of India.
2. Stallings, William : Computer Organization & Architecture.
3. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organization, University Science Press (Laxmi Publications), New Delhi.
4. Kai Hwang : Advanced Computer Architecture, McGraw Hill International.



MCA- 203 Computer Based Management System & E-Commerce

MCA II Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction to Management: The Management Processes: Planning, Organizing, Leading and Controlling, Management Levels: Top, Middle and Bottom, Management as an art, Management as a science, Management as a profession, Functional area of Management. The Management School: Scientific Management, Classical Management, Behavioral Management, Management Science, Systems Approach, Contingency Approach.

Unit-II

Management in 21st Century: Seven-S Model, Organization Structure, Communication Process, Strategy : Institutional, Operational, Total Quality Control (TQC). Total Quality Management (TQM), Electronic Data Interchange (EDI), Just-in-Time (JIT) Approach.

Unit-III

Applications of Management Information System : Types of Information System in Organizations : Transaction Processing System (TPS), Office System, Knowledge Work System (KWS), Decision Support System (DSS), Management Information System (MIS), Executive Support System (ESS).

Unit-IV

E-Commerce : Overview of E-Commerce, Benefits of E-Commerce, Impact of E-Commerce, Applications of E-Commerce, Business Models of E-Commerce, Electronic Payment System : Introduction to Payment System : Online Payment System, Pre-paid and postpaid Payment System. Security in E-Commerce: Transaction Security, Cryptology, Authentication Protocol, Digital Signature.



Suggested Readings :

1. Stoner, Freeman, Gilbert : Management, Latest, PHI Publication.
2. Kenneth, C. Laudon, Jane P. Laudon : Management Information System, Latest Edition, Pearson Education Publication.
4. P.T. Joseph : E-Commerce - A Managerial Perspective, PHI Publication.
5. Management Theory and Practice. C.B. Gupta
6. Information Technology for Management. Turban, Mclean, Wetherbe



MCA- 204 Object Oriented Programming Using C++

MCA II Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++ - syntax, data-type, variables, strings, functions, exceptions and statements, namespaces and exceptions, operators, Flow control, Functions, recursion. Arrays and pointers, structures.

Unit-II

Abstracting Mechanisms: Classes, private, public, constructors, destructors, member functions, static members, references etc. Class hierarchy derived classes.
Inheritance : simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

Unit-III

Prototypes, linkages, operator overloading, ambiguity, friends, member operators, operator function, I/O Operators etc. Memory management : new, delete, object copying, copy constructors, assignment operator, this input/output. Exception handling : Exceptions and derived classes, function exception declarations, Unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

Unit-IV

Templates and Standard Template library : template classes, declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type. Design using C++ design and development, design and programming. role of classes.



Suggested Books :

1. Herbert Schildts : C++ - The Complete Reference, Tata McGraw Hill Publications.
2. Balaguruswamy : Object Oriented Programming and C++, TMH.
3. Shah & Thakker : Programming in C++, ISTE/EXCEL.
4. Johnston : C++ Programming Today, PHI.
5. Olshevsky : Revolutionary Guide to Object Oriented Programming Using C++, SPD/WROX.
6. Object Oriented Programming and C++, Rajaram, New Age International.
7. Samanta : Object Oriented Programming with C++ & JAVA, PHI. Edition, Thomson.
6. Elmasri Navrate : Data base Management System, Pearson Education.
7. Mathew Leon : Data base Management System, Leon Vikas.
8. Connoley : Data base Systems, Pearson Education.



MCA- 205 Operating Systems

MCA II Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Operating System Introduction: Functions, Characteristics, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating-System services, System Calls, Virtual Machines.

Process and CPU Scheduling: Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Interposes Communication Scheduling Criteria, Scheduling Algorithm, Multiple-Processor Scheduling, Real-Time Scheduling.

Unit-II

Memory Management and Virtual Memory: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with Paging, Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithm, Allocation of Frames, Thrashing.

Unit-III

File System Interface and Implementation - Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

Process Management and Synchronization: The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problem of Synchronization, Critical Regions, Monitors.

Unit-IV

Deadlocks: System Model, Dead locks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

I/O Management - I/O software and its types, Disk Scheduling.



Shell Programming: Concept of shell, Types of shell, Editors for shell programming (e.g. vi), basics of Shell programming.

Case Study - UNIX, LINUX, and Windows NT.

Suggested Readings :

1. Silberschatz & Galvin : Operating System Concept, Wiley, Latest Edition.
2. Milan Milenkovic : Operating Systems, Tata McGraw – Hill Latest, Edition.
3. William Stallings : Operating Systems, PHI, Latest Edition.
4. Yashawant Kanetkar : Unix Shell Programming BPB.
5. A.S. Tanenbaum : Modern Operating Systems, Latest edition Pearson/PHI.



MCA- 205 Operating Systems

MCA II Semester

No. of Credits: 5

L T P Total

5 0 0 5

Sessional: 40 Marks

Theory: 60 Marks

Total : 100 Marks

Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Operating System Introduction: Functions, Characteristics, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating-System services, System Calls, Virtual Machines.

Process and CPU Scheduling: Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Interposes Communication Scheduling Criteria, Scheduling Algorithm, Multiple-Processor Scheduling, Real-Time Scheduling.

Unit-II

Memory Management and Virtual Memory: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with Paging, Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithm, Allocation of Frames, Thrashing.

Unit-III

File System Interface and Implementation - Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

Process Management and Synchronization: The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problem of Synchronization, Critical Regions, Monitors.

Unit-IV

Deadlocks: System Model, Dead locks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

I/O Management - I/O software and its types, Disk Scheduling.



Shell Programming: Concept of shell, Types of shell, Editors for shell programming (e.g. vi), basics of Shell programming.

Case Study - UNIX, LINUX, and Windows NT.

Suggested Readings :

1. Silberschatz & Galvin : Operating System Concept, Wiley, Latest Edition.
2. Milan Milenkovic : Operating Systems, Tata McGraw – Hill Latest, Edition.
3. William Stallings : Operating Systems, PHI, Latest Edition.
4. Yashawant Kanetkar : Unix Shell Programming BPB.
5. A.S. Tanenbaum : Modern Operating Systems, Latest edition Pearson/PHI.



MCA- 301 Computer Graphics & Multimedia

MCA – III Semester

No. of Credits: 5

L T P Total

5 0 0 5

Sessional: 40 Marks

Theory: 60 Marks

Total : 100 Marks

Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

An Introduction Graphics System: Computer Graphics and Its Types, Application of computer graphics, Graphics Systems : Video Display Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors and Work Stations, Input Devices, Hard Copy Devices, Graphics Software.

Unit-II

Output Primitives and Attributes of Output Primitives : Output Primitive Points and Lines, Line Drawing Algorithms, Circle Generating Algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm, Cell Array, Character Generation, Attributes of Output Primitives : Line Attributes, Color and Grayscale Levels, Area fill Attributes, Character Attributes, Bundled Attributes, Anti-aliasing.

Unit-II

Two-dimensional Geometric Transformations: Basic Transformations, Matrix Representation and Homogeneous Coordinates, Composite Transformations, Reflection and Shearing. **Two-Dimension Viewing :** The viewing Pipeline, Window to view port coordinate transformation, Clipping Operations, Point Clipping, Line Clipping, Polygon Clipping, Text Clipping, Exterior Clipping Three-Dimensional Concepts : Three Dimensional Display Methods, 3D Transformations, Parallel Projection and Perspective Projection.

Unit- IV

Multimedia : Introduction to Multimedia : Classification of Multimedia, Multimedia Software, Components of Multimedia – Audio : Analog to Digital conversion, sound card fundamentals, Audio play backing and recording Video, Text : Hyper text, Hyper media and Hyper Graphics, Graphics and Animation : Classification of Animation.



Authoring Process and Tools. **Case Study:** A graphics software MatLab, Use of MatLab in graphics application, Features of MatLab, Generalize application by using MatLab.

Suggested Readings :

1. Donald Hearn and M. Pauline Baker : Computer Graphics, PHI Publications.
2. Plastock : Theory & Problem of Computer Gaphics, Schaum Series.
3. Foley & Van Dam : Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijasu, L.K. : Computer Graphics, Springer-Verleg. 6. S. Gokul : Multimedia Magic, BPB Publication.
7. Bufford : Multimedia Systems, Addison Wesley.
8. Jeffcoate : Multimedia in Practice, Prectice-Hall.



MCA- 302 Principles of Systems Programming & Compiler Design

MCA – III Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Evolution of the Components of Systems Programming: Assemblers, Loaders, Linkers, Macros, Compilers. Software Tools: Variety of Software tools, Text editors, Interpreters and program generators, Debug Monitor, Programming environment. Loader Schemes, compile and go loader, general loader schemes, absolute loader, Subroutine linkage, Reallocating loader, Direct Linkage Loader, Binders, Linkage loader, overlays.

Unit-II

Compiler : Phases of Compiler, Compiler writing tools, Lexical Analysis, Finite Automata, Regular Expression, From a Regular expression to an NFA, NFA to DFA, Design of Lexical Analyzer. Syntax Analyzer, CFG, Role of the Parser, CFG, Top Down Parsing, Recursive descent parsing, predictive parsers, Bottom up Parsing, Shift reduce, operator precedence parsers, LR Parsers.

Unit-III

Syntax directed definition: Construction of Syntax trees, Intermediate code generation, Intermediate Languages, Syntax trees, post fix form. Symbol table : contents of Symbol table, Data Structures for Symbol table; Runtime storage Administration.

Unit-IV

Code optimization and code generation: Principles sources of optimization, loop optimization, DAG Representation of Basic blocks, Code generation – problems in code generation, a simple code generator, Register allocation and Assignment, Peephole optimization.

Suggested Readings :

1. Donovan : Systems Programming, Tata McGraw Hill.
2. Dhamdhare: System Software, Tata McGraw Hill.
3. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: Compilers Principles, Techniques and Tools, Addison Wesley.
4. Alfred V. Aho and Jeffrey D. Ullman : Principles of Compiler Design, Addison Wesley.



MCA- 303 Artificial Intelligence & Expert Systems

MCA – III Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction and applications of artificial intelligence, Problem solving: Defining the problem as state space search, Production system, Problem characteristics, Problem system characteristics, Search techniques: Generate and test, Hill climbing, Best first Search, A* algorithm, Problem reduction, Constraint Propagation, Means-Ends-Analysis.

Unit-II

Knowledge representation: Level of representation, Knowledge representation schemes: Propositional logic, First Order Predicate Logic, Resolution using refutation, Unification, Semantic Nets, Frames, Conceptual Dependency, Scripts, Non- monotonic reasoning, Truth maintenance system. Fuzzy logic: Definition, Difference between process for fuzzy expert system, fuzzy controller,

Unit-III

Perception: Sensing, Speech recognition, Vision, Action, Neural Networks: Introduction, Comparison of artificial neural networks with biological neural networks, Learning in neural networks, Perceptrons, Back propagation networks, application of neural networks, Genetic algorithm.

Unit-IV

Natural Language and Expert system development life cycle: Introduction to Natural Language Processing, Expert system: Definition, Role of knowledge in expert system, Architecture of expert system, Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge engineer, Cognitive, behavior, Acquisition techniques, Introduction to Prolog Programming Language.

Suggested Readings :

1. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Elaine Rich, Kevin Knight: Artificial Intelligence, Tata McGraw Hill.
3. Carl Townsend : Introduction to Turbo Prolog, BPB.
4. Stamations V. Kartalopoulos: Understanding Neural Networks and Fuzzy Logic, PHI.



MCA- 304 Data Communication & Computer Networks

MCA – III Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Data Communication: Theoretical basis of data communication; analog and digital signals; asynchronous and synchronous transmission; data encoding and modulation, techniques, broadband and base band transmission; pulse code modulation, bandwidth, channel, baud rate of transmission; multiplexing; transmission medium; transmission errors, error detection and correction.

Unit-II

Network Classification and Data Communication Services: Local area networks, metropolitan area network, wide area network, wireless network, internetworking; switched multi-megabit data services, X.25, frame relay, narrow band and board ISDN asynchronous transfer modes. Network Reference Models: Layered architectures, protocol hierarchies, interface and services: ISO-OSI reference model, TCP/ IP reference model; internet protocol stacks.

Unit-III

Data link layer Functions and Protocols : Framing, error control, flow-control; sliding window protocol; HDLC; Data link layer of Internet and ATM. **Medium Access Control Sub-layer :** CSMA/CD protocol, switched and fast Ethernet, token ring, FDDI, IEEE standards for LAN and MAN; satellite networks.

Unit-V

Network functions and protocols: Switching mechanism: Circuit switching, message switching, packet switching, cell switching, routing and congestion control, TCP/IP protocol architecture. **Network Applications:** File transfer protocol, electronic mail, World Wide Web.

Suggested Readings:

1. A.S. Tanenbaum : Computer Networks (4th ed.), Prentice-Hall of India.
2. W. Tomasi : Introduction to Data Communications and Networking, Pearson, Education.
3. P.C. Gupta : Data Communications and Computer Networks, Prentice-Hall of India.



4. Behrouz Forouzan and S.C., Fegan : Data Communications and Networking, McGraw Hill.
5. L.L. Peterson and B.S. Davie : Computer Networks : A system Approach, Morgan Kaufmann.
6. William Stallings : Data and Computer Communications, Pearson Education.



MCA- 305 Object Technology (Java)

MCA – III Semester

No. of Credits: 4
L T P Total
4 0 0 4

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Object-Oriented Languages, Java's History, Creation of Java, Importance of Java for the Internet, Java's Magic : Byte-code, Its Features, Object-Oriented Programming in Java. Java Program Structure and Java's Class Library, Data Types, Variables and Operators, Operator Precedence. Selection Statements, Scope of Variable, Iterative Statement. Defining Classes & Methods, Constructors, Creating Objects of a Class, Assigning object Reference Variables, Variable this, Defining and Using a Class, Automatic Garbage Collection.

Arrays and Strings : Arrays, Arrays of Characters, String Handling Using String Class, Operations on String Handling Using, String Buffer Class.

Unit-II

Extending Classes and Inheritance : Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super-class Object Class. **Package & Interfaces:** Understanding Packages, Defining a package, Packaging up Your Classes, Adding Classes from a package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface. **Exception Handling :** The concept of Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions.

Unit-III

Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks Inter-thread communication, Deadlocks. **Input/Output in Java :** I/O Basic, Byte and Character Structures, I/ O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits. **Creating Applets in Java:** Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using The Status Window, The HTML APPLET Tag Passing Parameters to Applets.



Unit-IV

Working with Windows: AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet, Displaying Information within a Window.

Working with Graphics and Texts : Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics.

Suggested Readings :

1. The Complete Reference JAVA, TMH Publication.
2. Beginning JAVA, Ivor Horton, WROX Public.
3. JAVA 2 UNLEASHED, Tech Media Publications.
4. JAVA 2(1.3) API Documentations.



MCA- 401 Advanced JAVA Programming

MCA – IV Semester

| | | |
|-------------------|-------------------|-----------|
| No. of Credits: 5 | Sessional: | 40 Marks |
| L T P Total | Theory: | 60 Marks |
| 5 0 0 5 | Total : | 100 Marks |
| | Duration of Exam: | 3 Hours |

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script. XML : Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors : DOM and SAX. Review of Applets, Class, Event Handling, AWT Programming.

Unit-II

Introduction to Swing : Applet Handling Swing Controls like Icons – Labels– Buttons – Text Boxes– Combo– Boxes – Tabbed Pains – Scroll Pains – Trees– Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing. Java Beans : Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean info Interface, Constrained properties Persistence, Customizers, Java Beans API.

Unit-III

Introduction to Servlets: Lifecycle of a Servlet, JSDK The Servlet API, The javax.servelet Package, Reading Servlet parameters, Reading initialization parameters. The Javax. Servlet HTTP package, Handling Http Request & Responses, Using Cookies-session Tracking, Security Issues. Introduction to JSP, The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design With MVC Setting Up and JSP Environment : Installing the Java Software Development, Kit, Tomcat Server & Testing Tomcat.

Unit-IV

JSP Application Development : Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing– Displaying Values Using an Expression to Set an Attribute, Declaring variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages– Sharing Session and Application Data – Memory Usage Considerations. Database Access Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application– Specific Database Actions Deploying JAVA Beans in a JSP Page. Introduction to Struts framework.



Suggested Readings :

1. Dietel and Nieto: Internet and World Wide Web – How to Program? PHI/Pearson Education Asia.
2. Patrick Naughton and Herbert Schildt: The Complete Reference Java, Latest Edition, Tata Mc-Graw Hill.
3. Hans Bergstan : Java Server Pages.
4. Bill Siggelkow, S P D O' Reilly : Jakarta Struts, Cookbook.
5. Murach : Murach's beginning JAVA JDK 5, SPD.
6. Wang-Thomson: An Introduction to Web Design and Programming.
7. Knuckles : Web Applications Technologies Concepts-John Wiley.



MCA-402 Design of UNIX OS and Shell Programming

MCA – IV Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

UNIT-I: Theoretical Concepts and File system of UNIX:

Evolution of UNIX, Basic features of UNIX, Architecture of UNIX kernel: File subsystem and process control subsystem, UNIX Vs LINUX, Various flavors of UNIX and LINUX,

Parent-child relationship of files, Types of files, File system layout, data structures of the file subsystem; internal representation of files: inodes, accessing and releasing inodes, structure of regular files and directories, superblocks, inode and disk block assignment to a new file.

UNIT-II: Process Control System:

Concept of a process, state transitions, data structures, Context of a process, Layout of the system memory, process scheduler, scheduling parameters, Fair share scheduler.

Swapping: Data structures, implementation of swapping processes in and swapping out; Demand Paging: Data structures, page stealer process, fault handler.

UNIT-III: UNIX Shells and Commands:

Types of shells and their features, shell's interpretive cycle, Shell wild cards, Structure of UNIX command, Internal and external commands, Basic utilities, logging in and out, changing passwords, File and directory related Commands: Absolute and relative path names, Creation and deletion of files and directories, Compression of files, file permissions, basic operations on files, simple filters and advanced filters, printer commands, Process related commands, Communication related commands, I/O redirection: standard input, output and error, piping; Vi editor and related commands, TCP/IP networking commands.



UNIT-IV: Shell Programming and System Administration:

Shell variables, interactive shell scripts, shell keywords, positional parameters, using shift on positional parameters, passing command line arguments, arithmetic operations, taking decisions, loop control structures.

The administrator privileges, maintaining security, user and group management, startup and shut down, Disk related commands, Backup and recovery, password aging, advanced administration commands.

References:

1. The Design of the UNIX Operating System: Maurice J Bach, PHI
2. UNIX: Concepts and Applications: Sumitabha Das, Tata McGraw Hill.
3. UNIX Shell Programming: Yashwant Kanetkar, BPB publications.



MCA- 403 Software Engineering

MCA – IV Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Software Engineering Paradigms: Software Characteristics, Software myths, Software Applications, Software Engineering Definitions, Software Process Models, Process iteration, Process activities, Computer-aided software engineering (CASE) and CASE Tools. Software Project Management : Management activities, Project planning, Project scheduling, Risk management and activities.

Unit-II

Software Requirements Engineering : Requirements Engineering Processes, Feasibility studies Requirements elicitation and analysis, Requirement validation, Requirements management. Software Requirements, Functional and non-functional requirements, User requirements, System requirements, Interface, specification, software requirement specification document. Specification language. Software Metrics and Measures - Process Metrics, Project metrics, Software Project Estimation Models- Empirical, Putnam, COCOMO models.

Unit-III

Software Design Process, Principles of s/w design, Design Strategies. Levels of s/w Design, Interface Design, Coding, Software Reuse, Computer Aided Software Engineering (CASE), CASE Tools. Software Testing, Software Reliability, Software Safety, Defect testing, Debugging Tools.

Unit-IV

Software Maintenance and its types, S/w Configuration Management, S/w Reuse, Software Evolution, Software Quality Assurance – plans & activities, Software Documentation.

Suggested Readings :

1. Pressman : Software Engineering, TMH.
2. Gill N.S. : Software Engineering, Khanna Book Publishing Co. (P) Ltd. N. Delhi.
3. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.



4. Chhillar Rajender Singh : Software Engineering : Testing, Faults, Metrics, Excel Books.
5. Ghezzi, Carlo : Fundaments of Software Engineering, PHI.
6. Fairely, R.E. : Software Engineering Concepts, McGraw-Hill.
7. Lewis, T.G.: Software Eginieering, McGraw-Hill.
8. Shere : Software Engineering & Management, Prentice Hall.



MCA- 404 Analysis & Design of Algorithms

MCA – IV Semester

| | | |
|-------------------|-------------------|-----------|
| No. of Credits: 5 | Sessional: | 40 Marks |
| L T P Total | Theory: | 60 Marks |
| 5 0 0 5 | Total : | 100 Marks |
| | Duration of Exam: | 3 Hours |

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-1

Brief Review of stacks, queues, graphs, binary search tree, Analysis of algorithms in terms of space and time complexity.

Unit-2:

Divide and Conquer: General method, searching algorithms, merge sort, quick sort, and selection sort analysis of algorithms for these problems.

Unit-3

Greedy Method: General method, knapsack problem, job sequencing with deadlines, minimum spanning trees, single source paths and analysis of these problems.

Unit-4

Dynamic Programming: General method, all pair shortest path, optimal binary search trees, 0/1 knapsack, the travelling salesman problem.

Unit-5

Back Tracking: General method, 8 queen's problem, graph colouring, sum of subsets, Hamiltonian cycles, and analysis of these problems.

Unit-6

Branch and Bound: Method, 0/1 knapsack and travelling salesman problem, efficiency considerations, NP hard, NP complete, cook's theorem.

Text Books:

1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.,
2. Introduction to Algorithms, Thomas H Cormen, Charles E Leiserson and Ronald L Rivest: 1990, TMH.
3. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
4. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986.
5. Johan Wiley & Sons, Writing Efficient Programs, Bentley, J.L., PHI.
6. Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetnieni, 1997, MGH.



MCA- 405 Visual Languages Programming

MCA – IV Semester

No. of Credits: 4
L T P Total
4 0 0 4

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Client Server Basics: Discover Client-Server and Other Computing Architectures, Understand File Server versus Client -Server Database Deployment, Learn About the Two Tier Versus Three Tire Client-Server Model.

Visual Basic Building Blocks and Default Controls: Forms, Using Controls, Exploring Properties, Methods and Events, Introduction To Intrinsic Controls, Working With Text, Working With Choices, Special Purpose Controls.

VB Advance Controls : Events, Menu bar, Popup Menus, Tool bar, Message box, Message Box, Input Box, Built-in Dialog Boxes, Creating MDI, Working with Menus.

Unit-II

VB Programming Fundamentals and Variables: Introduction to Variables, Variable Declaration. Arrays, Introduction to Constants and Option Explicit Statement, Assignment Statements, Working With Math Operations, Strings, Formatting Functions.

Controlling And Managing Program: All Control Statement, Loops, Error Trapping, Working With Procedures, Functions, Controlling How Your Program Starts, Common controls and control arrays: Introduction to common controls: Tree view, list view, tab strip
Creating and working with control arrays.

Visual Basic and databases: Understanding the Data Controls and Bound Controls, Introduction to Data Form Wizard, Introduce DAO, Working With Record sets, Record Pointer, Filter, Indexes, Sorts And Manipulation of Records.



Unit-III

Remote And ActiveX data Objects : Working with ODBC, RemoteData Objects And Remote data Control, Introducing ADO, ADOData Control, Using DataGrid Control And ActiveX Data Objects.

ActiveX Controls, Extending ActiveX Controls And Classes:

Creating, Testing, Compiling, Enhancing and User Drawn ActiveXControls, Using ActiveX Control Interface Wizard And Property PagesWizard, Introducing Ambient, Extender Objects, Creating PropertyPages, Building Class Modules, ActiveX DLL.

Unit-IV

Client-Server Development Tools : COM, Services Models,Development Tools Included with VB 6, Working With Source SafeProjects Reports And Packaging : Data Reports And Crystal Reports,Packaging A Standard EXE Project.

VB And Internal : Introduction to VBScript, Tools used withVBScript and VBScript Languages, Introduction to Active ServerPages, ASP Objets.

Suggested Readings :

1. McBride, P.K. : Programming in Visual Basic, BPB Publ.
 2. Holzner Steven : Visual Basic Programming, IDG Books India Ltd.
 3. Artiken : Visual Basic for Programming Explorer, Comdex.
 4. Visual Basic 6 Client/Server How-To
 5. Using Visual Basic 6.
 6. Any other book(s) covering the content of the paper in more depth.
- Note : Latest and additional good books may be suggested and added from time to time.



MCA- 501 .Net Technology

MCA – V Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Basic of the .net framework: .net architecture, managed code, assemblies, CLR, Execution of assemblies code, IL, JIT, .NET framework class library, common type system, common language specification, interoperability with unmanaged code.

Unit-II

Introduction to V.B. Net and C# :VB.Net : Net features, Data Types in C# : Data Types, Operators, Garbage Collection, Jagged Array, Collection (Array list, Hash table), Indexer (one Dimension) and property, Delegates and events (Multicasting, Multicasting Event). Exception Handling.

Unit-III

ADO.Net & Object Oriented Concepts (Using VB.net or C#) Basic window control, Architecture of ADO.Net, Comparison with ADO,.Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Data Grid Constructor, Destructor, Abstraction, Interface, polymorphism (Over loading and over ridding).

Unit-IV

ASP. Net : Anatomy of ASP .NET Page, Server Controls : label, dropdown list box, validation controls, list box, text box, radio button, check box, State Management : session caching, Authentication(window,.Net Passport, Forms Based), Authorization, web services, Advance Grid Manipulation.

Suggested Readings :

1. Jeffrey Richter, Francesco Balena : Applied .Net Framework Prog. In MS VB. Net, TMH Publications.
2. Herbert Schildt : Complete Reference C#, TMH Publication.
3. Michael Halvorsan : Microsoft Visual Basic.NET step by step,



PHI Publication.41 42 MAHARISHI DAYANAND UNIVERSITY ROHTAK SYLLABUS - MCA

4. G. Andrew Duthie : Microsoft ASP .Net With C#. Net step by step, PHI Publication.

5. Any other book(s) covering the contents of the paper in more depth.



MCA- 502 Software Testing & Quality Assurance

MCA – V Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Software Testing and the related concepts : significance and potential; Testability and features of Test cases. Software Testing techniques; WBT, BBT, Ticking Box testing; static analysis, symbolic testing, program mutation testing, input space, partitioning, functional program testing, data flow guided testing.

Unit-II

Software Testing Strategies : Approach, Issues, integration, incremental, System, alpha, Beta testing etc; Comparative evaluation of techniques : Testing tools; Dynamic analysis tools, test data generators, Debuggers test drivers etc. Technical Metrics for Software : Quality Factors, framework; Metrics for analysis, design, testing source code etc.

Unit-III

Object Oriented Testing : OOT strategies and issues, Test Case design, interface testing. Software Quality Assurance : concept, importance and essence; FTR, structured walk through technique etc.

Unit-IV

SW Reliability, validation, Software Safety and Hazards Analysis; Features affecting software quality, SQA Plan. Using project management software tools, Quality management, issue, standard and methods. ISO Quality models : ISO 9000 and SEICMM and their relevance.

Suggested Readings :

1. Meyers, G.: The art of Software Testing, Wiley-Inter Science.
2. Deutsch, Willis: Software Quality Engineering : A Total Technical and Management Approach, Prentice Hall.
3. Pressman : Software Engineering, TMH.
4. Gill N.S. : Software Engineering – Reliability, Testing and Quality Assurance, Khanna Book Publishing Co. (P) Ltd, N. Delhi.



5. Ghazz, Carlo : Fundamentals of Software Engineering, PHI.
6. Chhillar Rajender Singh : Software Engineering : Testing, Faults, Metrics, Excel Books.
7. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.
8. Doug Bell, Ian Murrey, John Pugh : Software Engineering-A Programming Approach, Prentice Hall.
9. Any other book(s) covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.



MCA- 503 Advanced Database Systems

MCA – V Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

The Extended Entity Relationship Model and Object Model : The ER-model revisited, Motivation for complex data types, User defined abstract data types and structured types, Object-Oriented Databases :Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, complex objects; Database schema design for OODBMS;OQL, Persistent programming languages; OODBMS architecture and storage issues; Transactions and Concurrency control, Example of ODBMS.

Unit-II

Object Relational and Extended Relational Databases: Database design for an ORDBMS - Nested relations and collections; Storage and access methods, Query processing and Optimization; Advance Querying and Information Retrieval Decision Support Systems, Information Retrieval Systems Data Analysis and OLAP, Data Mining.

Unit-III

Parallel and Distributed Databases and Client-Server Architecture :Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed database; Concurrency control and Recovery in distributed databases.

Unit-IV

Databases on Web and Semi Structured Data : Web interfaces to the Web, Overview of XML; XML Applications; The semi structured data model, Implementation issues, Enhanced Data Models for Advanced Applications; Active database concepts. Temporal database concepts; Spatial databases, Concepts and architecture; Deductive databases and query processing; Mobile databases, Geographic information systems, Multimedia databases.



Suggested Readings ;

1. Elmasri and Navathe, Fundamentals of Database Systems, Pearson Education.
2. Korth, Silberchatz, Sudarshan, Database System Concepts, McGraw-Hill.
3. C.J.Date, Longman, Introduction to Database Systems, Pearson Education.
4. Any other book(s) covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.



MCA- 504

Elective-1 (Choose from the List of electives)

MCA- 505

Elective-II (Choose from the List of electives)

Soft Skills -I (MCA-109) & II (MCA-208)

To develop following skills by way of self-study, student seminars, workshops, Extensions Lecturers, etc.

Communication Skills

Presentation Skills

Behavioral Skills

Active Listening

Body Language

Managerial Skills

Group Working Culture Skills

Giving and Receiving Feedback

Minor Project - I (MCA-408) & II (MCA-508)



Elective-I

MCA-504 Data Warehousing & Mining

MCA – V Semester

No. of Credits: 4
L T P Total
4 0 0 4

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Need for data warehouse, definition, goals of data warehouse, DataMart, Data warehouse, architecture, extract and load process, clean and transform data, star, snowflake and galaxy schemas for multidimensional databases, fact and dimension data, Designing fact tables, Partitioning, partitioning strategy– horizontal partitioning, vertical partitioning.

Unit-II

Data warehouse and OLAP technology, multidimensional data models and different OLAP operations, OLAP Server : ROLAP, MOLAP and HOLAP. Data warehouse implementation, efficient computation of data cubes, processing of OLAP queries, indexing OLAP data.

Unit-III

Data Preprocessing, data integration and transformation, data reduction, Discretization and concept Hierarchy Generation, Data mining primitives, Types of Data Mining, Data Mining query language, Architectures of data mining. Data generation & Summarization based characterization, Analytical characterization, Mining class comparisons, Mining descriptive statistical measures in large databases. Mining Association Rules in large databases : Association rule mining, single dimensional Boolean association rules from Transactional DBS. Multi level association rules from transaction DBS, multidimensional association rules from relational DBS and DWS, Correlation analysis, Constraint based association mining.

Unit-IV

Classification and Prediction : Classification by decision tree induction, Back propagation, Bayesian classification, classification based on association rules, Prediction, classifier accuracy, Cluster analysis, based methods, web mining, Temporal and spatial data mining.



Suggested Readings :

1. W.H.Inmon : Building Data Ware House, John Wiley & Sons.
2. S. Anahory and D. Murray : Data Warehousing, Pearson Education, ASIA.
3. Jiawei Han & Micheline Kamber : Data Mining - Concepts & Techniques, Harcourt India Pvt. Ltd. (Morgan Kaufmann Publishers).
4. Michall Corey, M. Abbey, I Azramson & Ben Taub : Oracle 8i Building Data Ware Housing, TMH.
5. I.H. Whiffen : Data Mining, Practical Machine Cearing tools & techniques with Java (Morgan Kanffmen)
6. Sima Yazdanri & Shirky & S. Wong : Data Ware Housing with



MCA-504 Soft Computing

MCA – V Semester

No. of Credits: 4
L T P Total
4 0 0 4

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction : Introduction to soft computing; introduction to biological and artificial neural network; introduction to fuzzy sets and fuzzy logic systems. Introduction to Genetic Algorithm, Genetic Operators and Parameters, Genetic Algorithms in Problem Solving, Theoretical Foundations of Genetic Algorithms, Implementation Issues.

Unit-II

Artificial neural networks and applications : Different artificial neural network models; learning in artificial neural networks; neural network applications in control systems. Neural Nets and applications of Neural Network.

Unit-III

Fuzzy systems and applications : Fuzzy sets, fuzzy reasoning; fuzzy inference systems; fuzzy control; fuzzy clustering; applications of fuzzy systems. Neuro-fuzzy systems : neuro-fuzzy modeling; neuro-fuzzy control.

Unit-IV

Applications : Pattern Recognitions, Image Processing, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval System, Share Market Analysis, Natural Language Processing.

Suggested Readings :

1. M. Mitchell : An Introduction to Genetic Algorithms, Prentice-Hall.
2. J.S.R. Jang, C.T. Sun and E.Mizutani : Neuro-Fuzzy and Soft Computing, PHI, Pearson Education.
3. Timothy J. Ross : Fuzzy Logic with Engineering Applications, McGraw-Hill.
4. Davis E. Goldberg : Genetic Algorithms : Search, Optimization



and Machine Learning, Addison Wesley.

5. S. Rajasekaran and G.A.V. Pai : Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI.

6. D.E. Goldberg : Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley.

7. Z. Michalewicz : Genetic Algorithms + Data Structures = Evolution Programs, Springer-Verlag.

8. N.K. Sinha & M.M. Gupta (Eds) : Soft Computing & intelligent Systems : Theory & Applications, Academic Press.

9. M.T. Hagan, H.B. Demuth, And M. Beale : Neural Network Design, Thompson Learning.

Note : Latest and additional good books may be suggested and added from time to time.



Elective –II

MCA-505 Computer Security

MCA – V Semester

No. of Credits: 5
L T P Total
5 0 0 5

Sessional: 40 Marks
Theory: 60 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

The Security Problem in Computing: The meaning of Computer Security, Computer Criminals, Methods of Defense, Elementary Cryptography: Symmetric and Non-symmetric keys Substitution Ciphers, Transpositions, Making "Good" Encryption Algorithms, The Data Encryption Standard, The AES Encryption. Algorithm, Public Key Encryptions, Uses of Encryption.

Unit-II

Program Security : Secure Programs, Non-malicious Program Errors, viruses and other malicious code, Targeted Malicious code, controls Against Program Threats, Protection in General-Purpose operating system protected objects and methods of protection, File protection Mechanisms, User Authentication Designing Trusted O.S : Security polices, models of security, trusted O.S. design, Assurance in trusted OS, Implementation examples.

Unit-III

Data bas Security: Security requirements, Reliability and integrity, Sensitive data, Inference, multilevel database, proposals for multilevel security. Security in Network : Threats in Network, Network Security Controls, Firewalls, Intrusion Detection Systems, Secure E-mail.

Unit-IV

Administering Security : Security Planning, Risk Analysis, Organizational Security policies, Physical Security. Legal Privacy and Ethical Issues in Computer Security.



Protecting Programs and data, Information and the law, Rights of Employees and Employers, Software failure, Computer Crime, Privacy, Ethical issues in Computer Security, Case studies of Ethics.

Suggested Readings :

1. P. Pfleeger, Shari Lawrence Pfleeger Charles: Security in Computing, PHI.
2. William Stallings : Cryptography & Network Security, Pearson Education.
3. Charlie Kaufman, Radia Perlman, Mike Speciner : Network Security, Private communication in a public world, PHI.
4. Douglas R. Stinson : Cryptography – Theory and Practice, CRC Press.
5. Bruce Schneier, Niels Ferguson : Practical Cryptography, Wiley Dreamtech India Pvt. Ltd.
6. Any other book(s) Covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.



MCA-505 Windows Programming & Visual C++

MCA – V Semester

No. of Credits: 5

L T P Total

5 0 0 5

Sessional: 40 Marks

Theory: 60 Marks

Total : 100 Marks

Duration of Exam: 3 Hours

Note: - Five questions will be set in all by examiner. At most of two internal choices can be provided.

Unit-I

Introduction to Windows Program. Message processing in Windows Programming. Message boxes, Menu and Accelerators. Dialog Box. Creating Icons, Cursor and Bitmaps.

Introduction to Child Window Controls. Check boxes, Static control, Radio Buttons, Scroll bars, Advance Window Controls : Toolbars up-down controls, Spin control, Progress bar, Tree view, Tab controls, Text and Font.

Unit-II

Working with Graphics, Consoles, Multitasking Process and Threads Clipboard Drag and Drops, Advance features of Windows Programming GDI Metafiles, Sound API, DLL.

Unit-III

Visual C++ Basic : Introduction, Building a Basic Application, SDI and MDI, View Document Architecture Using Microsoft Foundation Class (MFC) Library, Visual C++ Resources : Application Wizard, Accelerators and Menus, Toolbars.

Unit-IV

Visual C++ And Database Management : MFC programming without View Document Architecture, Data Access Objects (DAO) versus Open Database Connectivity (ODBC), Database building Overview, Building a Database Application using ODBC, Building a Database Application Using Oracle.

Suggested Readings :

1. Charles Petzold : Windows Programming, Microsoft Press.
2. Herbert Schildts : Windows Programming, TMH.



3. Murray : VC++, TMH.

4. Steve Holzner : Introduction to VC++.

5. Any other book(s) covering the contents of the paper in the depth.

Note : Latest and additional good books may be suggested and added