

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED.
Draft Syllabus of M.C.A. FIRST YEAR

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS				TOTAL MARKS (A+M)	DURATION OF EXAM Hours
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (M)	Term Work	Practical		
SEMESTER 1:									
MCA.101	Information Technology	4	---	100	25	--	--	125	3
MCA.102	Computers Origination & Architecture	4	---	100	25	--	--	125	3
MCA.103	C Programming.	4	---	100	25	--	--	125	3
MCA.104	Mathematical Foundation Of Computer Science	4	---	100	25	--	--	125	3
MCA.105	Data Structure	4	---	100	25	--	--	125	3
MCA 106	Comp. Lab 1 (C+ D.S)	---	4	---	---	25	25	50	3
MCA 107	Comp. Lab 2 (VB)	---	4	---	---	25	25	50	3
MCA 108	Group Discussion					25			
TOTAL		20	8	500	125	75	50	750	
SEMESTER 2									
MCA.109	Operating System	4	---	100	25	---	---	125	3
MCA.110	Management Function	4	---	100	25		---	125	3
MCA.111	Object Oriented Programming With C++	4	---	100	25	---	---	125	3
MCA.112	Database Management System	4	---	100	25	---	---	125	3
MCA.113	Combinational Graph Theory	4	---	100	25	---	---	125	3
MCA.114	Comp.Lab.3 (Programming in "C++")	---	4	---	---	25	25	50	3
MCA.115	Comp.Lab.4 (PL/SQL)	---	4	---	---	25	25	50	3
MCA116	Survey and Seminar	---	---	---	---	25	---	25	
TOTAL		20	8	500	125	75	50	750	
TOTAL MARKS (SEMESTER 1 + SEMESTER 2)								1500	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED.
Draft Syllabus of M.C.A. Second YEAR

CODE NO	SUBJECT TITLE	TEACHING PERIODS/WEEK		MAXIMUM MARKS				TOTAL MARKS	DURATION OF EXAM. Hours
		Theory	Practical	Theory/practical	Internal Test Marks	Term Work	Practical		
SEMESTER 3 :									
MCA 201	Windows Prog. Using MFC	4	---	100	25	---	---	125	3
MCA 202	Vb.Net Programming	4	---	100	25	---	---	125	3
MCA 203	Software Engineering	4	---	100	25	---	---	125	3
MCA 204	Multimedia Technology	4	---	100	25	---	---	125	3
MCA 205	Computer Network	4	---	100	25	---	---	125	3
MCA 206	Comp. Lab. 1 (VC++)	---	4	---	---	25	25	50	3
MCA 207	Comp. Lab. 2 (Vb.Net)	---	4	---	---	25	25	50	3
MCA 208	Group Discussion	---	---	---	---	25	---	25	---
TOTAL		20	8	500	125	75	50	750	---
SEMESTER 4:									
MCA 209	Linux	4	---	100	25	---	---	125	3
MCA 210	Java Programming	4	---	100	25	---	---	125	3
MCA 211	Web Technology	4	---	100	25	---	---	125	3
MCA 212	Project management	4	---	100	25	---	---	125	3
MCA 213	Elective-I a)Design analysis algorithm b)Mobile Communication	4	---	100	25	---	---	125	3
MCA 214	Comp. Lab. 3 (Java)	---	4	---	---	25	25	50	3
MCA 215	Comp. Lab. 4 (Asp+ Linux)	---	4	---	---	25	25	50	3
MCA 216	Seminar on Advance Current Technical Topic	---	---	---	---	25	---	25	---
TOTAL		20	8	500	125	75	50	750	---
TOTAL MARKS (SEMESTER 3 + SEMESTER 4)								1500	---

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED.									
Draft Syllabus of M.C.A. THIRD YEAR									
CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS				TOTAL MARKS (A+M)	DURATION OF EXAM Hours
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (M)	Term Work	Practical		
SEMESTER 5:									
MCA.301	Cyber Law and IT Security	4	---	100	25	---	---	125	3
MCA.302	Advance Database Management System with Oracle	4	---	100	25	---	---	125	3
MCA.303	AI & Neural Network	4	---	100	25	---	---	125	3
MCA.304	Software Testing	4	---	100	25	---	---	125	3
MCA.305	Elective-II a) Management Information System b) Modelling & Simulation	4	---	100	25	---	---	125	3
MCA.306	Comp.lab.1 (ADBMS with Oracle)	---	4	---	---	25	25	50	3
MCA.307	Comp.lab.2 (System Installation & Maintenance)	---	4	---	---	25	25	50	3
MCA.308	Mini. Project			---	---	25	---	25	
TOTAL		20	8	500	125	75	50	750	

SEMESTER 6:		
MCA 309	Project Work	750
TOTAL MARKS (SEMESTER 5 + SEMESTER 6)		1500

Project Work Distribution:

Module	Maximum Marks	Minimum Marks
Project Work	300	120
Project Report	100	40
Seminar on Project Work	50	20
Internal Assessment	100	40
Project Demonstration with Presentation	100	40
Viva	100	40
Total	750	300

MCA101**Information Technology****(100 MARKS)****(TOTAL LECTURES: 50)****1.Introduction**

- Computer Definition, uses, block diagram, functions of ALU, input /output scanner, plotter, keyboard, mouse, MICR, bar decoder, OCR, joy stick, monitor
- History & generation with computer classification.
- Different Input/Output, Storage Devices (Primary as well as Secondary)
- Cache, Virtual Memory (Concept)

2.Data Representation

- Need for binary, octal, hexa and their inter conversion.
- First & Second compliment, Binary Arithmetic –Addition, subtraction, multiplication, division.
- Different number system – BCD, EBCDIC, ASCII.

3. Boolean Algebra

- Demorgan's Theorem, Duality Theorem, Algebra Rules, Logic Circuits, AND, OR, NAND, NOR, NOT, XOR, XNOR, Flip-flops, Registers, Accumulators.

4.Software

- System Software / Application Software
- Compilers, Interpreters, assemblers
- Linder, Loader
- Programming Language Paradigm - High Level, Low level
- Files - Types & operations
- File Organization & accessing techniques – indexed, sequential, hashed.
- File Handling functions – sorting, merging, indexing & updating.
- Concept of file allocation table.

5.Operating System Fundamentals

- Functions of OS
- Roots of MS-DOS
- The Kingdom of Dos
 - o ROM Software
 - o ROM Startup Routines
 - o ROM-BIOS Routines
 - o ROM BASIC Routines
 - o ROM Extension Routines
- Booting

6.Disk Basics

- Physical Structure of Disk
- Logical Structure of Floppy Disk
- Detailed Boot – Time Operations

7.Networking Concepts

- Data Communication Concepts
- Classification – Serial/Parallel, simplex, half duplex, full duplex.
- Communication Media – Wired/microwave, E-mail.
- LAN, WAN, MAN, Internet, intranet (Basic Concepts)
- Hardware/Software Components required for LAN
- Topologies
- Protocols(Introduction)
- Media Access Methods – Ethernet,Arcnet(no Architecture)
- Communication Process
- OSI – Layers(Introduction)

Text Books:

1. Computer Fundamentals: By P.K. Sinha.
2. Computer Today: By Sendor.
3. Digital Electronics: By R.P. Jain
4. Operating System Concepts: By Peterson
5. Operating System: By Donovan
6. Computer Networking: By Tenaunbaum
7. Computer Today: By Basendra

MCA.102**Computer Organization & Architecture****(100 MARKS)****(TOTAL LECTURES: 50)****1. Microprocessor:**

- Components of Microprocessor
- Interfaces & their Tasks
- Microprocessor Control Signals (Address, Data and controls)
- Buses and characteristics
- Input/Output Ports
- Memories and cache basics
- CPU Organization (Pentium Family)
- Instruction & Execution Cycle

2. Computer Architecture

- 32 bit AND 64 bit Architecture
- RISC Architecture Vs CISC
- Languages Directed architecture
- Pipelining
- Super Scalar Processors

3. Interfacing

- Buses For interfacing (ISA, EISA, PCI)
- I/O Interfacing
- I/O Ports
- Address Decoding
- DMA Controllers
- Transceivers
- Add on Hardware Interfacing
- Interrupts and interrupts setting

4. Serial & Parallel Interfaces

- Port Characteristics
- Functioning of I/O Chips – Serial I/O Chips, UART Chips, 8250 Chip
- Communication Controllers
- Handshaking, Zero-wire Handshaking for parallel interfaces
- Debouncing
- Programmable I/O interfaces PIOs.
- Programmable Peripheral interfaces PIAs
- Disk & Drive Interfaces and controllers
- Analog Interfaces
- A to D Converters

5. Device Drivers

- Need for Device Drivers
- Defining Ports & Buffers for Device Drivers
- Initializing Ports thru Programming
- Interfacing Devices with system Program thru Device Drivers
- Programming Sockets and Ports

6. Performance Evaluation

- SPEC marks, Transaction processing Benchmark.

Text Books:

1. Personal Computer Interfaces: By Michel Horddeski - McGraw Hill
2. Microprocessor & Microcomputer based systems Design: By M.Rafiquzzamal
3. Computer system & Architecture (3rd Edition)Prentice Hall Of India :Mano m.
4. Computer Organization & Design : By Pal Chaudhary P
5. Introduction to Digital Computer Design :By V.Rajaraman & Radhakrishnan
6. Computer Organization & Architecture :By W.Stalling

MCA.103**C Programming****(100 MARKS)****(TOTAL LECTURES: 50)****1. Basics of C programming**

- Constants, Variables, Data Types
- Operators and Expression
- Managing Input and output operators

2. Decision Making

- If and If-else Statements
- Else – if Ladder
- Switch Statements
- The?: operators
- Goto statements
- While, Do-while and For statements

3. Array and Functions

- One Dimensional, Two Dimensional, & Multidimensional Arrays
- Initializing the arrays
- C Functions
- User Defined functions
- Nesting of functions
- Recursion
- Functions with arrays

4. Strings and Arrays

- Single and Multi dimensional arrays
- Character Array as strings
- Functions of Strings, Writing C programs using arrays for strings manipulation

5. Pointers

- Definition and use of pointers
- Address operator, pointer variable, pointer arithmetic
- Arrays of pointers
- Passing arrays to functions, pointers and functions
- Pointer constants, string library functions, pointers to functions

6. Structures and Unions

- Declaring and using Structures
- Operations on Structures
- Arrays of structures
- User defined data type-pointer to structure
- Difference between Unions and structures
- Operations on a union, C programming example with structure & unions

7. Dynamic Memory Allocation and linked list

- Library functions for Dynamic Memory allocation
- Dynamic multidimensional arrays Self Referencing Structures
- Writing C program using Library calls for Dynamic Memory Allocations.
- Advantages & its types
- Applications of Linked list

8.The Preprocessors

- Macro Substitution
- File Inclusion
- Compiler Control Directives
- ANSI Additions

9.Files

- Introduction-File Structure
- File handling functions
- File types
- Unbuffered and Buffered files
- File's Error Handling
- Low level file I/O Redirection and Piping

10.Graphics in C

- The display adapters
- Setting the text modes
- Graphics modes
- Saving Bit Images, Graphics Color

TEXT BOOKS

1. How to solve it by computer - R.G.Dromy(Prentice Hall of India)
2. Programming With C - K.R.Venugopal and Sundeep R Prasad(Tata McGraw hill)

REFERENCE BOOK

1. C - The complete Reference Herbert Schildt TMH
2. The C Programming Language Kerningham and Ritchie
3. Understanding Pointers in C - Y.Kanetkar

MCA. 104.**Mathematical Foundation of computer Science****(100 MARKS)****(TOTAL LECTURES: 50)**

1. **Mathematical Logic:-**
 - Proposition, compound proposition, logical Equivalence Algebra of proposition, conditional proposition converse contra positive and inverse.
 - Biconditional statement, Tautologies and contradictions normal forms, method of proof, fallacies, predicate calculus. Paradoxes,
 - Goldel's theorem modal dynamic, intuitionistic situation Applications prolong, program verification.
2. **Boolean Algebra and logic circuits:**
 - Boolean Algebra, Unique feature, Basic operation Boolean function, Logic gates,
 - expression of Boolean function as a canonical form. Simplification of Boolean expression by Algebraic method.
 - Functionally complete sets, karnaugh map method for simplification Boolean expression.
3. **Crisp sets and fuzzy sets:-**
 - Introduction, crisp sets, the notation of fuzzy sets Basic concept of Fuzzy sets, classical logic,
 - Fuzzy logic operation on fuzzy sets. Fuzzy relations.
4. **Relation and functions:-**
 - Relation on sets, some operations on sets types of relation, properties, relational data base function,
 - classification of functions. Some special function, growth of functions.
5. **Posets and Lattices:**
 - Groupoids, groups, many sorted Algebras partially ordered sets,
 - lattice, Lattice as Algebraic system, sub lattices, some special lattices.

References.

1. Text Book of Discrete mathematics. By swapan Kumar sarkar (S Chand and company)
2. Fuzzy sets uncertainty and Information By George J. Kibir, Tina A. Folger. (Prentice Hall of India.)
3. Logic for C.S. By Gallier.
4. Discrete maths by stant.
5. Discrete maths by Tremblay manohar.
6. Discrete mathematical structures for computer science By Kolman B and
7. Busby R.
8. Concept of discrete mathematics By sahani's.
9. Discrete mathematical structure with Application By Tremblay J.P.
10. Practical foundation of mathematics by Taylor.

MCA.105

DATA & FILE STRUCTURES**(100 MARKS)****(TOTAL LECTURES: 50)****1. Introduction :**

- Definition of an algorithm
- Problems to Programs Abstract Data Type
- Data Structures - Run time of a program and its calculation
- Basic Data Types
- Lists and their Implementation
- Singly linked lists
- Doubly linked lists
- Circularly linked lists
- Stacks - Queues - Dqueues and Circular Queues
- Mappings - Stacks and Recursive Procedures

2. Trees :

- Basic Terminology - The Tree
- Various Types of Implementation of Trees
- Binary Trees - Their Properties - Representations - Implementation
- Binary Tree Traversals - Threaded Binary Trees
- Expressions Trees - Conversion from n-ary tree to a Binary Tree
- Implementation of Priority Queues and their Implementation
- Binary Search Trees - Tries - 2-3 Trees - their implementation - Insertion and Deletion

3. Graphs :

- Basic Definitions of Directed and Undirected Graphs
- Their representations and Implementations
- Graph Traversals - Storing Components
- Their Implementations - Insertion and Deletion

4. Searching & Sorting :

- The Internal Sorting Model
- Bubble Sort - Quick Sort - Heap Sort - Merging Sort
- Insertion Sort - Radix Sort - Selection sort
- Internal searching algorithms
- External Searching and sorting algorithms

5. File Processing Environment:

- External storage devices
- Records, files, Record organization
- Compaction & database
- Introductory overview of database management system

6. File Organization

- Sequential files
- Index Sequential files
- Inverted list & multi list

Text Books

1. An Introduction to data structures with applications By Jaun-Paul tremblay, Paul G. Soranson(Tmh)
2. Theory & Problems of data structures By Seymour Lipsenutz(Tmh)
3. Data Structures & Program design in c By Robert L. Kruse,Bruse P. Leung, Cloris L. Tondo(PHI)
4. A V Aho, JE Hopcroft, JD Ullman, "Data Structures and Algorithms", Addition Wesley Publishing Company.

MCA.106

Comp. Lab 1 (C+ D.S)

(50 MARKS)

* Any Ten Practical based on Syllabus.

MCA.107

Comp. Lab 2 (VB)

(50 MARKS)

* Any Ten Practical based on Syllabus.

MCA.108

Group Discussion

(25 MARKS)

MCA 109

OPERATING SYSTEMS**(100 MARKS)****(TOTAL LECTURES: 50)**

- 1. Introduction to Operating System:**
 - Definition of Operating System
 - Functions of Operating System
 - Multi-user, Multiprocessing
 - Multiprogramming:
 - Time Sharing Systems, Real Time Systems
 - Hierarchical of Operating System
 - Virtual Computer
 - Hardware Interface- The CPU, Memory and addressing. Interrupts and I/O Devices
- 2. Memory Management:**
 - Single Contiguous
 - Partition Allocation
 - Relocatable Partitioned
 - Page Memory Management
 - Demand Paged & segmented Memory Management
- 3. Process Management:**
 - What is process
 - Context Switching
 - Process Control Block
 - Job Scheduling & process scheduling
 - Process Synchronization
 - Race Condition
 - Deadlocks
- 4. Device Management:**
 - Techniques of Device Management
 - Dedicated, Shared, Virtual Devices
 - Device Characteristics
 - Channels & Control Units
 - I/O traffic Controller.
- 5. File Systems**
 - A Simple file system
 - General Model of file system
 - Symbolic file system
- 6. Parallel Processing**
 - Introduction, What is Parallel Processing
 - Difference between distributed & parallel processing
 - Advantages of parallel processing
- 7. Design Techniques**
 - Operating systems and design
 - Design problems
 - Design techniques
 - Two –Level Implementation
 - Interface Design
 - Connection in protocols

Reference Books:

1. Operating System By Stuart .E. Madnick & John. J. Donovan
2. Operating System By Milan Milenkovic (Ibm Corporation)
3. Operating System By Achyuts Godbole
4. Operating System By H.M. Deitel
5. Operating Systems A Design Oriented Approach By Charles Crowley
Tata Mcgraw- Hill Edition

MCA 110

INTRODUCTION TO MANAGEMENT FUNCTION

1 Introduction to management

- Definition, Nature & scope, Concepts of management
- Administration & Organization
- Management Process & Levels Of Management.

2 Evolution of Management thoughts

- Contribution of F.W. Taylor , Henri Fayol , Peter Druker, Henry Mintzberg, Tom Peters etc

3 Various schools of management/ approaches to management

4 Planning

- Scope, Importance, limitations, procedure of planning
- Types of plans: Mission objective, policy, Strategy Procedure and rule
- Types of Planning: strategic and tactical

5 Organizing

- Procedure and principles, span of control, concepts of authority and responsibilities , delegation and decentralization line , Staff and functional authority
- Types of organization structural

6 Leading

- Leadership theories, Traits and styles
- Motivation – Theories of Maslow, McGregor , Herzberg , McLeland, Lawler -Porter model

7 Controlling: Process and types of control

8 Recent trends and theories :

- Fads in management ,critical study of concept like reengineering , MBO, Empowerment etc

9 HRD Systems

- Goal, mechanism and design
- Man power planning recruitment selection, induction
- Training and development, Performance appraisal systems, counseling
- Globalization and Liberalization: preparing for multinational HRD managers

10 Introduction to TQM, ISO, Quality systems

Reference books

1. Essentials of management Harold Kontz Wehrich
2. Principles and practice of management Saxena
3. Management stoner
4. Principles of and practice of management Shejwlakar and Ghanekar

MCA 111**OBJECT ORIENTED PROGRAMMING WITH C++****(100 MARKS)****(TOTAL LECTURES: 50)****1. Introduction**

- Concept, Benefits and Application of OOP
- Structure of C++ Programming
- Tokens, expressions and control structures keywords, identifiers, data types & operators in C++

2. Functions in C++:

- Function Prototyping
- Call by reference
- Return by reference
- Inline Functions
- Default arguments
- Function overloading
- Friend and Virtual functions.

3. Class and Objects

- Classes
- Friend classes
- Static class members
- Nested classes
- Local classes
- Memory allocation for objects
- Array to objects
- Objects as function arguments
- Constructors and destructors

5. Inheritance, Pointers, Virtual functions and Polymorphism

- Single, Multilevel multiple, hierarchical and hybrid inheritance
- Virtual base classes
- Abstract classes
- Pointer to objects, pointer to derived class
- Operator overloading

6. C++, I/O System Basics

- C++ streams, C++ stream classes
- Formatted I/o, Unformatted I/O operations
- Overloading <<and >>, creating own inserters
- Extractor and manipulator functions.

7. C++ File I/O and Array Based I/O:

- Classes for file stream operations
- Opening and closing of file, detecting EOF
- Random access, I/O status
- Array based class, Array based I/O stream, random access with in the array
- Dynamic arrays
- Custom extractors and inserters.

8. Templates and Exception Handling:

- Generic functions
- Templates, class Templates, functions Templates
- Member function templates, template arguments
- exception handling function templates, template arguments
- exception handling fundamentals, exception handling options
- catching all exceptions, restricting exceptions and rethrowing exceptions.

9. Object Oriented System Development:

- Procedure Oriented paradigms
- Procedure Oriented Development Tools
- Object Oriented paradigms
- Object Oriented notations and Graphs
- Steps in Object Oriented Analysis
- steps in Object Oriented design, implementation, prototyping paradigms.

Reference Books:

1. Object Oriented Programming with C++ - E. BALAGURUSWAMY
2. C++ The Complete Reference - HERBERT SCHILDT
3. A Treatise on Object Oriented Prog. Using C++ - B. CHANDRA
4. Serial communication-A C++ developers guide - NELSON

MCA.112**DATABASE MANAGEMENT SYSTEM****(100 MARKS)****(TOTAL LECTURES: 50)****1. DBMS objectives and architectures.****2. Data Models**

- Conceptual Model
- ER Model
- Object oriented model
- UML Logical data model
- Relational, Object oriented, Object relational

3. Physical Data Models

- Clustered, UnClustered files
- indices (sparse & dense), B+ tree, join indices,
- Hash & inverted files, Grid files
- Bulk loading, external sort
- Time complexities file selection criteria.

4. Relational database design

- Schema design
- Normalization theory
- Functional Dependencies
- Loss less join property
- join dependencies higher normal forms, integrity rules
- relational operators, relational completeness, relational algebra, Relational calculus

5. Object oriented database design

- Objects, methods, query languages, implementations
- Comparison with relational systems
- Object orientation in relational database systems
- Object support in current relational database systems
- Complex object model, implementation techniques

6. Mapping Mechanism

- Conceptual to logical schema
- key issues related to for physical schema mapping

7. DBMS concepts

- ACID Property, Concurrency control
- Recovery mechanisms
- Case study integrity, views & Security, integrity constraints
- views management, data security

8. Query processing, Query optimization

- Heuristic and rule based optimizers
- Cost estimates, transaction management

9. Case study

- ORACLE/POSTGRES DBMS packages
- Understanding the transaction processing concurrency and recovery protocol
- Query processing & optimization mechanisms through appropriate queries in SQL and PLSQL.

10. Web based data model

- XML, DTD
- Query languages, X path, X query

11. Advanced Topics

- Other database systems, distributed, parallel and memory resident, temporal and spatial databases.
- Introduction to data warehousing, Online analytical processing, Data mining
- Bench marking related to DBMS packages, Database administration

TEXTBOOKS

1. Database System Concepts By Silberschatz, Korth and Sudershan, McGraw Hill Company
2. Database Management Systems By Raghuram Ramakrishnan, Johannes Gehrke, 2002
3. Principles of Database Systems Vol. I & Vol. II, J.D. Ullman, Rockville

MCA. 113.**COMBINATIONAL AND GRAPH THEORY****(100 MARKS)****(TOTAL LECTURES: 50)**

1. **Graph theory:**
 - Graphs, definition and examples, Incidence and degree, Isomorphism, sub graphs, weighted graph, Eulerian graphs,
 - Hamiltonian graphs, walk, paths and circuits. Connectedness, algorithm, shortest path Algorithm, Chinese postman problem, traveling salesman problem.
2. **Trees:**
 - Definition and properties of tree, pendent vertices, center of a tree, rooted and Binary tree, Spanning trees, fundamental circuits, cut sets and cut vertices,
 - fundamental cut sets. Connectivity and separativity, maxflow mincut theorem.
3. **Planar and dual graphs:**
 - Combinatorial vs. geometric graphs planar graphs, kuratowski's two graphs Different representations of a planar graph,
 - Detection of planarity, Geometric dual, combinatorial dual.
4. **Matrix representation of graphs:-**
 - Incidence matrix,
 - Adjuncy matrix and their properties.
5. **Coloring:**
 - Chromatics number, chromatic polynomial,
 - The four colour problems
6. **Directed graphs:-**
 - Types of diagraph, Directed Paths,
 - Euler diagraph, directed trees,arborscence, Tournaments.
7. **Application of graphs:**
 - Signal flow graph, graphs in markov processes,
 - Graphs in computer programming.
8. **Combinatorics:**
 - Introduction, fundamental principles,
 - Permutation and combination pigeohole principle,
 - Recurrence relation, generating functions.

References:-

1. Graph Theory with Application to Engineering and computer science.
By Narsingh deo (by PHI)
2. Graph theory with Application, Bondy, J.A. and U.S.R. murty (mac millan)
3. Text Book of discrete mathematics by swapan kumar sarkar (sultan chand & company)
4. Concrete mathematics it foundation for computer science, Graham R.M.D.I knuth & U. patashnik [1989) Addison Wesleyly.

MCA. 114.

Comp.Lab.3 (Programming in "C++")

(50 MARKS)

* Any Ten Practical based on Syllabus.

MCA. 115.

Comp.Lab.4 (PL/SQL)

(50 MARKS)

* Any Ten Practical based on Syllabus.

MCA. 116.

Survey and Seminar

(25 MARKS)

*** Seminar based on any latest topic based other than Syllabus.**

Swami Ramanand Terrth Marathwada University ,Nanded

Draft syllabus of M.C.A. SECOND YEAR

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		Theory	Practical	Theory/practical	Internal Test Marks	Term Work	Practical		
SEMESTER 3 :									
MCA 201	Windows Prog. Using MFC	4	---	100	25	---	---	125	3
MCA 202	Vb.Net Programming	4	---	100	25	---	---	125	3
MCA 203	Software Engineering	4	---	100	25	---	---	125	3
MCA 204	Multimedia Technology	4	---	100	25	---	---	125	3
MCA 205	Computer Network	4	---	100	25	---	---	125	3
MCA 206	Comp. Lab. 1 (VC++)	---	4	---	---	25	25	50	3
MCA 207	Comp. Lab. 2 (Vb.Net)	---	4	---	---	25	25	50	3
MCA 208	Group Discussion	---	---	---	---	25	---	25	---
TOTAL		20	8	500	125	75	50	750	---
SEMESTER 4:									
MCA 209	Linux	4	---	100	25	---	---	125	3
MCA 210	Java Programming	4	---	100	25	---	---	125	3
MCA 211	Web Technology	4	---	100	25	---	---	125	3
MCA 212	Project management	4	---	100	25	---	---	125	3
MCA 213	Elective-I a)Design analysis algorithm b)Mobile Communication	4	---	100	25	---	---	125	3
MCA 214	Comp. Lab. 3 (Java)	---	4	---	---	25	25	50	3
MCA 215	Comp. Lab. 4 (Asp+ Linux)	---	4	---	---	25	25	50	3
MCA 216	Seminar on Advance Current Technical Topic	---	---	---	---	25	---	25	---
TOTAL		20	8	500	125	75	50	750	---
TOTAL MARKS (SEMESTER 3 + SEMESTER 4)								1500	---

MCA 201

Windows programming using MFC

(Total Lectures: 50)

- 1. Overview of Ms windows:** Comparison of other operating system, History of window, Windows as user and programming environment, available tools & applications, Visual development tools for windows programming.
- 2. Windows Architecture:** Windows Architecture, Non-preemptive multitasking system, Event-driven programming, Messaging, concept of callbacks: Dynamic Linking & Resource sharing.
- 3. Overview of windows programming:** Window based Applications
- 4. Messages:** Input-keyboard Messages, Mouse messages, Timer messages, child controls, control class
- 5. Windows Resources:** Icons, cursors, Bitmaps, Fonts ,Menus, Accelerators, String Accelerator
- 6. Dialog Boxes:** Model and Modeless window procedures and dialog procedures
- 7. Messages:** Message flow, Messages processing, programs control, Hook function
- 8. Graphics Devices Interface:** Graphics Devices Interfaces, Device context, Mapping modes, Raster operations, GDI object, paint brush etc., Drawing Graphics
- 9. Bitmaps- Metafiles**
- 10. Fonts-Printing**
- 11. Clip Board:** Clip Board Function, Using clipboard with text, using clipboard with Bitmap.
- 12. Multiple Document Interfaces:** MDI Architecture, MDI function
- 13. Dynamic Data Exchange:** DDE,DDEML Atoms, DDE messaging protocols, DDEML functions and transactions
- 14. Dynamic Link Libraries:** static and dynamic Linking ,How to create DLLs.

Text Books

1. Hands on programming windows series (All 7 vol) By Braden (BPB)
2. Writing windows Application from start to finish by Edson(BPB)
3. Windows Rapid Application Development by saran(BPB)
4. Windows programming with Borland C++ by Oualline(BPB)
5. Windows programming primer(GP)

MCA 202
VB.NET programming
(Total Lectures: 50)

- 1. Welcome to Visual Basic.NET :** Windows versus Dos programming, Installing Visual Basic.NET IDE, Creating a simple Application Using the Help system
- 2. The Microsoft.Net Framework:** Microsoft's Reliance on windows, Writing software for windows, Writing software for windows, Common Language Runtime, the common type system and common Language specification.
- 3. Writing Software's:** Information and data, variables, comments and white space , Data types, storing variables, Methods.
- 4. Controlling the flow:** Making decisions, the if statement, Select case, Loops.
- 5. Working with data structures** – Understanding Arrays, understanding Enumerations, understanding constants, structures, Working with collections and Lists, Building lookup table with Hash table, Advanced array manipulation
- 6. Building Windows Applications :** Responding to Events, Building sample Application.
- 7. Displaying Dialog Boxes-** The message Dialog Box, The open dialog control, the save dialog control, the Font Dialog control, the color dialog control, the print dialog control.
- 8. Creating Menus** – Understanding Menu Features, creating menus, context menus.
- 9. Debugging and Error Handling:** Major Error types, Debugging, Error Handling.
- 10. Building Objects:** Understanding objects, Building Classes, Reusability, our first object, constructors, Inheritance, The framework classes.

Text Books:

- Beginning VB.NET 2003; Willis ,Cross Land and Blair.
- ASP.net & VB.net web programming- Math J. Croush (Pearson Education)

MCA 203**SOFTWARE ENGINEERING****(Total Lectures: 50)****1. The Product**

The Evolving role of software, software Myths

2. The process:

Software Engineering: a layered technology, the software process, Software process models, the Linear sequential model, the prototyping model, the RAD model, Evolutionary software model, Component Based Development, the Format methods model, Fourth generation techniques, process technology, product and process

3. Software process and project metrics:

Measures, metrics and indicators, Metrics in the process and project Domains, Software Measurement, Reconciling Different Metrics Approaches,

4. Software project planning:

Observation on Estimating, Project planning Objectives, Software scope, Resources, software project estimation, Decomposition techniques, Empirical estimation models, The Make/Buy decision

5. Risk analysis and management

Reactive vs. proactive risk strategies, Software Strategies, Risk identification, Risk Projection, Risk Refinement, Risk mitigation, Monitoring and Management.

6. Project scheduling and Tracking:

Basic concepts, The Relationship between People and Effort, defining a task for the software project.

7. Software Quality Assurance

Quality concepts, the quality management, software quality assurance, software reviews.

8. Software configuration management

Software configuration management, The SCM process, Identification of objects in the software Configuration, version control, change control, configuration Audit.

8. Design concepts and principles

Software design and software engineering, the design process, Design principles, Design concepts.

9. Architectural Design

Software architecture, Data design.

Texts Books

1. “An Integrated Approach to Software Engineering”, Pankaj Jalote, IIIrd Edition, Narosa Publishing House.
2. “Software Engineering: Principles and Practices”, Waman S. Jawadekar, Tata McGraw-Hill.
3. “Software Engineering: A Practitioner’s approach”, Roger S. Pressman, McGraw-Hill.
4. “Software Engineering:”, Ian Sommerville, Pearson Education.
5. “Fundamentals of Software Engineering”, Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, PHI.

MCA 204

Multimedia Technology

(Total lectures: 50)

1. Introduction

Branch overlapping Aspects of Multimedia, Content, Global structure, Multimedia Literature

2. Multimedia: Media and Data Stream

Medium, Main properties of a multimedia system, multimedia, traditional Data stream Characteristics, Data stream Characteristics for continuous media, information units

3. Sound/Audio

Basic sound concepts, Music, speech,

4. Images and Graphics

Basic concepts, Computer Image processing

5. Video and Animation

Basic concepts, Television, Computer-based animation

6. Data compression

Storage space, Coding requirements, source Entropy and Hybrid encoding, some Basic compression Techniques, Jpeg, H. 261, MPEG, DVI

7. Optical storage Media

Basic Technology, Compact Disk Read only Memory, CD-ROM Extended architecture, Further CD-ROM based developments, Compact disk write once., Compact Disk Magneto Optical8

8. User Interfaces

General Design Issues, Current Work, Extension through audio and video, Audit at user Interface, user Friendliness as primary Goal

9. Document, hypertext and MHEG

Text Books:

1. Multimedia computer communication-stein Metz and Nahrstedt
2. Multimedia system Design- Thakarr
3. Multimedia Computing Communication & Application-Ralf Strinmrpz
4. Multimedia System- Bufford John F(Pearson Education Asia)
5. Multimedia Magic-S Gokul(BPB Publication)

MCA 205
COMPUTER NETWORK

(Total lectures: 50)

Unit 1

Introduction to Computer Networks, Protocol hierarchies, Design issues for the layers, Interfaces and Services, the TCP/IP reference model, the comparison of the OSI and TCP reference models.

Unit 2

Transmission media, Wireless transmission, the telephone system, Narrowband ISDN, Broadband ISDN and ATM.

Unit 3

Data Link layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols.

Unit 4

ALOHA, Carrier Sense Multiple Access Protocols, Collision free protocols.

Unit 5

IEEE Standard 802.3 and Ethernet, IEEE standard 802.4: Token Bus, IEEE 802.5: Token Ring.

Unit 6

Transparent Bridges, Source Routing Bridges.

Unit 7.

Comparison of Virtual Circuit and Datagram Subnets, Optimality Principle, Routing Algorithms, General Principles of Congestion control, Congestion prevention policies, Inter networking.

Unit 8

The Transport Service, Elements of transport protocols.

Unit 9

Network Security, DNS, SNMP, Electronic Mail, The world wide web Multimedia.

TEXT BOOK:

- 1 Computer Networks Third Edition By Andrew S. Tanenbaum.
- 2 John Freer Pitman, Computer communication and network,, Computer system series,. (1980)
- 3 Sitnie, Computer Network (TCP/IP), Tata McGraw Hill. (1996), India.
- 4 Willams Stallings, .Data & computer communications Pearson Education Asia , Sixth Edition – 2002
- 5 R.S. Rajesh, K.S. Easwarakumar & R. Balasubramanian-Computer Networks - Funtamentals and Applications– First Edition , Vikas Publications New Delhi, 2002

MCA 206

Comp. lab 1 (VC++)

(50 marks)

* Any ten Practical assignment based on syllabus.

MCA 207

Comp. lab 2 (Vb. Net)

(50marks)

* Any ten Practical assignment based on syllabus.

MCA 208

*** Group Discussion**

(25 marks)

MCA 209

Linux

(Total Lectures:50)

1. Introduction

Installation, installing Red Hat Linux 7.1, special installations, shell fundamentals.

2. Learning the basics

Understanding Linux 's Disk structure, Basic Disk file and commands, Printing with Linux, Performing Common Linux tasks, recompiling Linux Kernel.

3. An overview of X Windows

What is X window ? Microsoft vs x windows, x servers, window managers desktop environments, What is Motif?

4. Introduction to GNOME

Logging in ,developing mouse technique, using windows, using Menus and main menus .using panel, Accessing Disk drivers, exploring GNOME configuration options.

5. Creating and Maintaining User accounts

User accounts, adding, modifying, disabling, deleting user accounts, the function of Groups.

6. TCP/IP Linux Networking

Understanding TCP/IP Networking, TCP/IP configuration, File sharing, Internet servers.

7. Security

Understanding Linux security, security terminology, the goal of information security, Linux security, the layered approach to information security.

8. Samba

An introduction to SMB/CIFS, windows networking and the development of samba, integration of TCP/IP and SMB/CIFS, SMB/CIFS Terminology, structure of SMB/CIFS network .Installing Samba.

Text Book:

1)Linux Complete (**bpb publication**) 2nd edition.

MCA 210**JAVA Programming****(Total lectures: 50)****1. Introduction**

Introduction to Java - Features of Java - Object oriented concepts - Data types - Variables - Arrays - Operators - Control statements

2. Basics of Java

Classes - Objects - Constructors - Overloading method - Access control - Static and final methods - Inner Classes - Inheritance - Overriding methods - Using super abstract class-- String class-- String objects - String buffer - Char Array

3. Packages and Interfaces

Packages , Access protection , Importing packages, Interfaces

4. Exception Handling

Exception-Handling fundamentals, Exception types, uncaught exceptions, using try and catch, Multiple catch clauses, Nested try statements, throw ,throws ,finally, Java's Built in Exceptions

5. Applets

Applet basics, Applet architecture, applet skeleton, simple applet display methods, Requesting repainting, Using the status window, the Html APPLET Tag, get Document Base and get Code Base

6. Input/Output &Networking

Networking Basics, Java and the Net, Inet Address, TCP/IP client sockets, url connection, TCP/IP server sockets, Datagram

7. Multithreaded programming

The Java Thread Model, Thread priorities, synchronization, messaging, the thread class and run able interface, creating a thread, creating multiple threads, thread priorities, suspending resuming and stopping threads

8.Using Awt, Layout managers and menus

Control fundamentals ,labels, Using Buttons ,Applying check boxes, checkbox group, choice controls, Using Lists, Managing scrollbars, Using a Text field, Using a Text area ,Understanding Layout managers

TEXT BOOKS

- Naughton and H.Schildt - "**Java 2 - The complete reference**" - Fourth edition.-2002

S.Horstmann, Gary Cornell - "**Core Java 2 Volume I - Fundamentals**" - Addison Wesley – 2001

Arnold and J.Gosling - "**The java programming language**" - Second edition Art

Gittleman – "**Ultimate Java Programming**" –Wiley Publications-2002

**MCA 211
WEB TECHNOLOGY**

(Total Lectures: 50)

1. Asp fundamentals:

Software Requirements, Installing a personal web server, Installing IIS, IIS features, Share Information more efficiently on web, creating web-based Business Application, Bring server Os functionality to the web, Securing web services, Hardware Requirements, Asp for Non-Microsoft platforms, Asp connection with IIS, HTML version of Internet service Manager, What's new in ASP ,Built in objects

2. Understanding Request and response objects

The Asp Request object, Requesting Information from Forms, Requesting Information from Query String Collection, Requesting Information from Server variables, Cookies, Client certificates, The Asp Response Object, sending Information to a client: Response. write, Response. Cookies, Other response Object methods and Properties, Buffering and Page Redirection, Catching and Expiring procedures and classes

3. Understanding vbscript Language

Scripting, Vbscript, Understanding variables ,Integrating script in HTML documents, Role of forms in scripting, the option explicit statement, client side and server side scripting, converting variable types, using operators, Message boxes, accessing objects, Using built in functions and statements, program control statements

4. Understanding Procedures and Classes

Understanding procedures ,sub procedures ,Functions, Classes, Private variables, properties, Methods ,Events and Using classes

5. Session and Application objects

The session object, The application object, Using session and application object

6. ADO connection object

Data Access components, Universal Data Access Architecture, The Application object, Using session and Application object

7. ADO Record set object

Introduction ,creating a record set object, Opening a record set ,Moving through a record set, The Fields collection, Using ADO record set, Bookmarks, Filtering Record sets,. Modifying record sets The Get String Method, Page size , page count, catch size and Absolute properties

8. ADO command object

Introduction, creating a command object, using a store procedure, using stored procedures with parameters, return values, output parameters and the command object.

Reference Books:

- Web Design Technology –D.P. NAGPAL

MCA 212

Project Management

(Total lectures: 50)

1. Concept of Project Management:

Meaning of project, characteristics of a project, project levels, types of projects, meaning & phases of project management, project interface management.

2. Project Formulation:

Feasibility analysis, technical analysis, profitability analysis and financial analysis-cost of project, means of financing & estimates of sales & production.

3. Risk & Uncertainty Decisions:

Sensitivity analysis, break even analysis, cost of capital and capital budgeting.

4. Project Scheduling & Control:

Meaning of project scheduling & project control, network techniques to project management – PERT & CPM, Gantt charts.

5. Introduction to Software Project Management:

The nature of software production, key objectives of effective management, quality, productivity, risk reduction, the role of the software project manager.

6 . Project Management Information System (PMIS):

Significance of PMIS in project management, planning & control, Design of project management information system, importance of materials & equipment in PMIS.

Texts Books:

1. Project Management

- By S. Chaudhary, Tata McGraw Hill.

2. Project – Preparation, Appraisal, Budgeting & Implementation

- Prasanna Chandra, Tata McGraw Hill.

3. Project Management – A Development Perspective

- B.B. Goel, Deep & Deep.

4. Project Management

- Vasant Desai

5. Principles of software Engineering Management

- Tom Gilb, finzi Susannah Addison-Wesley, England, 1988.

6. “Managing A Programming Project”

-Prentice Hall, New Jersey, 1981.

MCA 213 Elective-I**a)Data Analysis and Algorithm****(Total lectures: 50)****1. Introduction**

What is an algorithm, algorithm and specification, performance analysis, Randomized Algorithm?

2. Divide and conquer

General method, binary search, finding the maximum and minimum, merger sort, quick sort, selection, strassen's matrix multiplication, convex hull

3. The Greedy method

The general method, knapsack problem, tree vertex splitting, job sequence with deadlines, minimum cost spanning trees, optimal storage on tapes, optimal merger patterns

4. Np-hard and Np-complete problems

Basic concepts, cook's theorem, Np-hard graph problems, Np-hard scheduling problem, Np-hard code generation problems, some simplified Np-hard problems

5. Elementary graph algorithms

Representation of graphs, Breadth-first search, Depth-first search, topological sort, strongly connected components

6. Minimum spanning trees

Growing a minimum spanning tree, the algorithms of kruskal and prim

7. Single-source shortest Paths

The Bellman-ford algorithm, single-source shortest paths in directed acyclic graphs, Dijkstra algorithm, difference constraints and shortest path, proofs of shortest path properties,

8. All-pairs shortest paths

Shortest-paths and matrix multiplication, the floyd-warshall algorithm, Johnson's algorithm for sparse graphs

Text Books:

- 1. Introduction to Algorithms-Cormen, Leiserson, Rivest, Stein**
- 2. Computer Algorithms-Horowitz sahani**

MCA 213 Elective-I**b) Mobile Communication****(Total Lectures:50)****1. Wireless Transmission**

History and application of wireless communication, Frequencies or Radio Transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum.

2. Medium access control

Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA, Comparison of S/T/F/CDMA

3. Telecommunication System

GSM, DECT, TETRA, UMTS and IMT-2000

4. Satellite System

History, Application, Basics, Routing, Localization, Handover, Examples

5. Broadcast System

Overview, Cyclical repetition of data ,Digital audio broadcasting, Digital video broadcasting, Convergence of broadcasting and mobile Communications.

6. Wireless LAN

Infra red vs radio transmission, Infrastructure and ad-hoc network, IEEE 802.11, HYPERLAN, Bluetooth.

7. Mobile network layer

Mobile IP, dynamic host configuration protocol, mobile ad-hoc networks.

8. Mobile transport layer

Traditional TCP, classical TCP improvements, TCP over 2.5/3g wireless networks ,performance enhancing proxies.

TEXT BOOKS:

1) Mobile communications 2nd Edition by **Jochen Schiller**

MCA 214

Comp. lab 3 (java)

(50 marks)

* Any ten Practical assignment based on syllabus.

MCA 215

Comp. lab 2 (ASP +Linux)

(50marks)

* Any fifteen Practical assignment based on syllabus.

MCA 216

Seminar on Advance Current Technical Topic

(25 marks)

Swami Ramanand Terrth Marathwada University ,Nanded

Draft syllabus of M.C.A. THIRD YEAR

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS				TOTAL MARKS (A+M)	DURATION OF EXAM Hours
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (M)	Term Work	Practical		
SEMESTER 5:									
MCA.301	Cyber Law and IT Security	4	---	100	25	---	---	125	3
MCA.302	Advance Database Management System with Oracle	4	---	100	25	---	---	125	3
MCA.303	AI & Neural Network	4	---	100	25	---	---	125	3
MCA.304	Software Testing	4	---	100	25	---	---	125	3
MCA.305	Elective-II a) Management Information System b) Modelling & Simulation	4	---	100	25	---	---	125	3
MCA.306	Comp.lab.1 (ADBMS with Oracle)	---	4	---	---	25	25	50	3
MCA.307	Comp.lab.2 (System Installation & Maintenance)	---	4	---	---	25	25	50	3
MCA 308	Mini. Project			---	---	25	---	25	
TOTAL		20	8	500	125	75	50	750	

SEMESTER 6:		
MCA 309	Project Work	750
TOTAL MARKS (SEMESTER 5 + SEMESTER 6)		1500

Project Work Distribution:

Module	Maximum Marks	Minimum Marks
Project Work	300	120
Project Report	100	40
Seminar on Project Work	50	20
Internal Assessment	100	40
Project Demonstration with Presentation	100	40
Viva	100	40
Total	750	300

MCA.301
Cyber Law and IT Security

Max Marks:100

Total Lecturers:50

1 Object and Scope of the IT Act

- 1.1 Genesis
- 1.2 Object
- 1.3 Scope of the Act

2 Encryption

- 2.1 Symmetric Cryptography
- 2.2 Asymmetric Cryptography
- 2.3 RSA Algorithm
- 2.4 Public Key Encryption

3 Digital Signature

- 3.1 Technology behind Digital Signature
- 3.2 Creating a Digital Signature
- 3.3 Verifying a Digital Signature
- 3.4 Digital Signature and PKI
- 3.5 Digital Signature and the Law

4. E-Governance and IT Act 2000

- 4.1 Legal recognition of electronic records
- 4.2 Legal recognition of digital signature
- 4.3 Use of electronic records and digital signatures in Government and its agencies

5 Certifying Authorities

- 5.1 Need of Certifying Authority and Power
- 5.2 Appointment, function of Controller
- 5.3 Who can be a Certifying Authority?
- 5.4 Digital Signature Certifications
- 5.5 Generation, Suspension and Revocation Of Digital Signature Certificate

6 Domain Name Disputes and Trademark Law

- 6.1 Concept of Domain Names
- 6.2 New Concepts in Trademark Jurisprudence
- 6.3 Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming,
- 6.4 Jurisdiction in Trademark Dispute

7 Cyber Regulations Appellate Tribunal

- 7.1 Establishment & Composition Of Appellate Tribunal
- 7.2 Powers of Adjudicating officer to Award Compensation
- 7.3 Powers of Adjudicating officer to Impose Penalty

8 The Cyber Crimes

- 8.1 Tampering with Computer Source Documents
- 8.2 Hacking with Computer System
- 8.3 Publishing of Information Which is Obscene in Electronic Form
- 8.4 Offences : Breach of Confidentiality & Privacy
- 8.5 Offences : Related to Digital Signature Certificate

References:

- 1) Cyber Law in India by Farooq Ahmad – Pioneer Books
- 2) Information Technology Law and Practice by
Vakul Sharma – Universal Law Publishing Co. Pvt. Ltd.
- 3) The Indian Cyber Law by Suresh T Vishwanathan –
Bharat Law house New Delhi.
- 4) Hand book of Cyber & E-commerce Laws by P.M. Bakshi & R.K.Suri –
Bharat Law house New Delhi.
- 5) Guide to Cyber Laws by Rodney D. Ryder –
Wadhwa and Company Nagpur.
- 6) The Information Technology Act,2000 – Bare Act –
Professional Book Publishers – New Delhi.

MCA.302**Advance Database Management System with Oracle**

Max Marks:100

Total Lecturers:50

1 OODBMS & ORDBMS

- 1.1 Overview of Object-Oriented concepts & characteristics
- 1.2 Objects, OIDs and reference types
- 1.3 Database design for ORDBMS
- 1.4 Comparing RDBMS, OODBMS & ORDBMS

2 Advance Database Management System –Concepts & Architecture

- 2.1 Spatial data management
- 2.2 Web based systems, Overview of client server architecture,
- 2.3 Databases and web architecture, N-tier, Architecture, Business logic – SOAP
- 2.4 Multimedia databases
- 2.5 Mobile database

3. Introduction Oracle

- 3.1 Oracle Internal Data types
- 3.2 Data Definition Language
- 3.3 Data manipulation Language
- 3.4 Transaction control and data control Language
- 3.5 QUERIES AND SQL FUNCTIONS
- 3.6 Operators in SQL *Plus
- 3.7 SQL *Plus Functions

4 SET OPERATORS, JOINS & SUBQUERIES

- 4.1 Set operators
- 4.2 Relating data through join concept
- 4.3 Usage of sub queries

5 CONSTRAINTS

- 5.1 Introduction to integrity constraint
- 5.2 Implementation of constraint
- 5.3 Primary Key constraint
- 5.4 Referential integrity constraint

6 LOCKS AND TABLE PARTITIONS

- 6.1 Concept of locking
- 6.2 Table partition

7 DATABASE OBJECTS

- 7.1 Synonym, Sequences, Alter sequences
- 7.2 View
- 7.3 Index

8 ENHANCEMENTS IN ORACLE8

- 8.1 ORDMS VS. RDBMS
- 8.2 Concept of object oriented programming
- 8.3 Features of object oriented programming encapsulation
- 8.4 Inheritance, Polymorphism, Advantages of object orientation Object
Object in oracle8
- 8.5 Abstract data type
- 8.6 Object views
- 8.7 Nested tables

9 INTRODUCTION TO PL/SQL

- 9.1 Introduction to PL/SQL, Advantages of PL/SQL,
- 9.2 Architecture of PL/SQL. Introduction to PL/SQL block, Datatypes and their usage Scaler data types, Boolean, Binary_integer, Number
- 9.3 Variables, Constants, Character raw, Rowed, Composite datatype. User defined data types Attributes, %type, %rowtype, Control structures
- 9.4 Conditional control, Iterative control, Simple loop, While loop
For loop, Sequential control.
- 9.5 EXCEPTION, User-predefined EXCEPTION
- 9.6 Predefined EXCEPTION, THE EXCEPTION INIT program
- 9.7 Raise application – error,
- 9.8 Cursor management

10 SUBPROGRAMS AND PACKAGES

- 10. 1 Subprograms, Procedures, parameters
- 10.2 The package specification, Package body
- 10.3 Calling package subprograms
- 10.4 Database programming using:
 - 10.4.1 Using VB (ADODC)
 - 10.4.2 Java – JDBC programming concept

References:

1. SQL,PL/SQL, The programming Language of Oracle, 2nd Edition, by Ivan Bayross, BPB Publications.
2. Oracle Complete Reference, Tata McGraw Hill
3. Core Java 2, Vol-II Advanced Features, by Horstmann Cornell pearson Education

MCA.303

AI & NEURAL NETWORKS

Max Marks: 100

Total Lecturers: 50

1 Neural Networks

- 1.1 History of Neural Networks development. Introduction to expert systems.
- 1.2 Expert system vs neural networks. Biological Neurons. Artificial Neurons – Activation
- 1.3 Functions. Neural Networks concepts and architecture. Knowledge representation in neural networks. Artificial Intelligence and Neural Networks.

2. Learning Methods:

- 2.1 Categories of Learning – Supervised/ Unsupervised and Reinforcement learning Memory based learning.
- 2.2 Hebbian learning. Competitive learning. Boltzman learning. Statistical learning.

3. Neural Networks Models

- 3.1 Single Layer Perception
- 3.2 Least mean square algorithm perception Convergence theorem.

4. Multi layers perception

- 4.1 Introduction.
- 4.2 Back propagation Algorithm.
- 4.3 Stopping Criteria
- 4.4 Complexity of learning Generalization.

5. Hopfield Model

- 5.1 The Hopfield learning algorithm and its limitations.

6. Self Organizing Network

- 6.1 Introduction.
- 6.2 The Kohonen algorithm.
- 6.3 Neural networks applications.

7. Models and Processing

- 7.1 Biological Neurons and their artificial models
- 7.2 Models of Artificial Neural Networks
- 7.3 Neural Processing
- 7.4 Learning and Adaptation
- 7.5 Neural Network Learning Rules

References:

1. Simon Hayking: Neural Networks- A Comprehensive Foundation, Pearson Education , India, Second Edition, 2001.
2. Limin Fu: Neural Networks in Computer Intelligence, Mc-Graw Hill Publications.
3. Introduction to Artificial Neural Systems , Jacek M. Zurzda , Jaico Publishing House

MCA.304 Software Testing

Max Marks: 100

Total Lecturers: 50

1. Software Testing Process Maturity

1.1 The Six Essential of Software Testing.

1.2 The State of The Art and State of The Practice: Short Essentials, History of Very

New Discipline Where Exactly We Are New, How Should Testing Be Positioned.

1.3 The Clean-sheet Approach To Getting Started.

2 The Framework for Test Process Improvement

2.1 Establishing a Practical Perspective: What Are We Aiming For? All You Ever Wanted To Know About Errors, Definition of Testing, Tester Attitude, How Tester Do It?

2.2 Critical Choice What, When and How: Risk and Risk Management, Start Testing Early, Basic Forms of Testing, Process Verification and Validation, Testing Development Cycle and Real World Contracts, Effective Testing and Cost Effective Testing.

2.3 Critical Disciplines: Frameworks for Testing: Planning, Software Engineering Maturity and The SEI, Configuration Management Standards, Formal Documents, Testware, Measurement, Tools.

3 Testing Methods

3.1 Verification Testing: Basic Verification Methods, Getting Leverage on Verification, Verifying Documents at Different Phases, Success Factors.

3.2 Validation Testing: Validation Overview, Validation Methods, Validation Activities, Strategy for Validation Testing. Controlling Validation Cost. Testing Tasks, Deliverables and Chronology. Software Testing Tools: Categorizing Test Tools, Tool Acquisition.

4. Managing Test Technology

4.1 Organizational Approach to Testing: Structural Design Elements, Approaches to Organizing the Test Function, Selecting the Right Approach. Current Practices,

4.2 Trades and Challenges: GUIs, Usage Testing, Tester-to-Developer Ratios, Software Measures & Practices.

References:

1. Software Testing in Real World Improving The Process
Edward Kit, LPE Pearson
2. Introducing Software Testing
Louise Tamres
3. Effective Methods for Software Testing
William E. Perry
4. Software Testing Techniques
Baris Beizer

MCA.305
Elective -II

a) Management Information System

Max Marks: 100

Total Lecturers: 50

- 1 Introduction to Management Information Systems
 - 1.1 Overview of Management Information System.
 - 1.2 Structure of Management Information system.
 - 1.3 MIS: Support to Management
 - 1.4 MIS and the user.
 - 1.5 Management as a control system.
2. Information Systems Technology
 - 2.1 Hardware, Software & communication technology for information systems.
 - 2.2 Transaction processing, office automation, Information processing control functions.
3. Conceptual Foundations
 - 3.1 The decision-making process.
 - 3.2 Concepts of information.
 - 3.3. Human as Information processors.
 - 3.4 Systems concepts, planning & control.
- 4 E-business Enterprise
 - 4.1 Introduction
 - 4.2 Organization of business in an E-enterprise.
 - 4.3. E-business, E-communication & E-collaboration
5. Information Security Challenges in E-enterprises
 - 5.1 Security Threats & Vulnerability
 - 5.2 Controlling security threat and vulnerability.
 - 5.3 MIS & Security challenges
6. Development, Implementation and Management of MIS Resources.
 - 6.1 Developing and implementing application systems.
 - 6.2 Quality assurance and evaluation of information systems.
 - 6.3 MIS: Development process model.
7. Application of MIS to E-business
 - 7.1 Application in Manufacturing Sector.
MIS for Personnel Management, Financial Management, Production management, Raw Materials management & Marketing management.
 - 7.2 Application in Service Sector
Introduction, Service concept, service process cycle and analysis, customer service design, service management system.
8. Case Study
 - 8.1 Tata home finance Ltd.

References:

1. MIS: Conceptual Foundations, structure & development by Gordon B.Davis, Margrethe H.Olson, Tata McGraw Hill.
2. MIS, Text & Cases, Third Edition by Waman S. Jawadekar, Tata McGraw Hill.

MCA.305**Elective-II****b) MODELLING & SIMULATION**

Max Marks: 100

Total Lecturers: 50

1. Introduction

1.1 Nature of Simulation, systems, models & simulation. Discrete event simulation.

1.2 Simulation of a single-server queuing system, a inventory system.

1.3 Monte Carlo simulation.

2. Modelling Complex Systems :

2.1 List programming, Time shared computer model. Job-shop model.

2.2 Simulation software : Comparison, classification & features of simulation software. GPSS & SIMSCRIPT.

3. Review of Basic probability & statistics.

3.1 Principles of valid simulation modeling. Verification & validation.

3.2 Approach for developing valid & credible simulation models.

4. Useful Probability Distributions

4.1 Techniques for assessing sample independence.

4.2 Activity I,II & III.

4.3 Models of arrival processes.

5. Random number generators :

5.1 Linear congruential generators. Other kind of generators.

5.2 Testing random number generators.

5.3 Generating random variants : General approach.

(7 Hours)

6. Output data analysis for a single system

6.1 Transient & steady-state behavior.

6.2 Types of simulation.

6.3 Statistical analysis for terminating simulations, for steady state parameters.

6.4 Multiple measures of performance.

References:

(i) A.M. Law W.d. Kelton : Simulation, Modelling & Analysis, 2/e (Mcgraw Hill)

(ii) G. Gordan : System Simulation (PHI)

(iii) J.A. Payne : Introduction to Simulation (McGraw Hill)

MCA.306
Comp. Lab – 1 (ADBMS with Oracle)

Max Marks:25

Ten practical based on syllabus.

MCA.307
Comp. Lab – 2 [System Installation & Maintenance]

Max Marks:25

1. Installation of Windows XP.
2. Installation of Linux
3. Study of topologies
4. Study of protocols.
5. Study & preparation LAN cables & connectors.
6. Configuring LAN.
7. LAN administration.
8. Database server & client installation [MS-SQL / Oracle].
9. Implementing security using firewall.
10. Installation of various hardware drivers.

MCA 308
Mini Project

1. Mini project to be developed by individual student.
2. Project Report should contain following:
Abstract, Acknowledgement, Certificate, Index, Applications, Coding, output screens, conclusion and references/bibliography. [Minimum pages:30]

SEMESTER-VI**Project Work Distribution:**

Module	Maximum Marks	Minimum Marks
Project Work	300	120
Project Report	100	40
Seminar on Project Work	50	20
Internal Assessment	100	40
Project Demonstration with Presentation	100	40
Viva	100	40
Total	750	300