SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,
NANDED.
Draft Syllabus for M.C.A. (Master of Computer Application)
M.C.A. FIRST YEAR
With effect from 2011-12

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS		TOTAL MARKS (A+B)	DURATION OF EXAM
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (B)		
SEMESTER 1:							
MCA.S1.1	FUNDAMENTALS OF IT	4		100	25	125	3
MCA.S1.2	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	4		100	25	125	3
MCA.S1.3	PROGRAMING IN C	4		100	25	125	3
MCA.S1.4	PRINCIPLES OF MANAGEMENT	4		100	25	125	3
MCA.S1.5	COMMUNICATION AND SOFT SKILLS	4		100	25	125	3
MCA.S1.PR1	COMP LAB 1 (C)		3	50		50	3
MCA.S1.PR2	COMP LAB (VB)		3	50		50	3
MCA.S1.PR3	COMP LAB I (GROUP DISCUSSION)			25		25	
TOTAL MARKS						750	
SEMESTER 2:							
MCA.S2.1	OPERATING SYSTEMS	4		100	25	125	3
MCA.S2.2	COMBINATORICS AND GRAPH THEORY	4		100	25	125	3
MCA.S2.3	OBJECT ORIENTED PROGRAMMING WITH C++	4		100	25	125	3
MCA.S2.4	DATA STRUCTURE	4		100	25	125	3
MCA.S2.5	DBMS THROUGH ORACLE	4		100	25	125	3
MCA.S2.PR1	COMP LAB (C+ +)		3	50		50	3
MCA.S2.PR2	COMP LAB (ORACLE)		3	50		50	3
MCA.S2.PR3	COMP LAB (SEMINAR)			25		25	
TOTAL MARKS						750	

Total 1st year Marks (1st sem+2nd Sem)=1500

M.C.A. SECOND YEAR
With effect from 2012-13

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS		TOTAL MARKS (A+B)	DURATION OF EXAM
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (B)		
SEMESTER 3:							
MCA.S3.1	LINUX OPERATING SYSTEM	4		100	25	125	3
MCA.S3.2	COMPUTER NETWORKS	4		100	25	125	3
MCA.S3.3	CORE JAVA	4		100	25	125	3
MCA.S3.4	RESEARCH METHODOLOGY AND PROJECT MANAGEMENT	4		100	25	125	3
MCA.S3.5	SOFTWARE ENGINEERING AND TESTING	4		100	25	125	3
MCA.S3.PR1	COMP.LAB.1 (JAVA)		3	50		50	3
MCA.S3.PR2	COMP.LAB.2 (LINUX)		3	50		50	3
MCA.S3.PR3	COMP.LAB.3 (SERVEY)			25		25	3
			TOTAL MARKS			750	
SEMESTER 4:							
MCA.S4.1	ADVANCE DATABASE MANAGEMENT SYSTEM	4		100	25	125	3
MCA.S4.2	MANAGEMENT INFORMATION SYSTEM	4		100	25	125	3
MCA.S4.3	ADVANCE JAVA PROGRAMMING	4		100	25	125	3
MCA.S4.4	NETWORK SECURITY	4		100	25	125	3
MCA.S4.5	ELECTIVE-I I) ECOMMERCE II) HUMAN COMPUTER INTERFACE	4		100	25	125	3
MCA.S4.PR1	COMP.LAB.4 (JAVA)		3	50		50	3
MCA.S4.PR2	COMP.LAB.5 (ORACLE)		3	50		50	3
MCA.S3.PR3	COMP.LAB.6 (SEMINAR)			25		25	3
			TOTAL MARKS			750	

Total 2nd year Marks (3rd sem+4th Sem)=1500

M.C.A. THIRD YEAR
With effect from 2013-14

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS		TOTAL MARKS (A+B)	DURATION OF EXAM
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (B)		
SEMESTER 5:							
MCA.S5.1	INTERNET PROGRAMING	4		100	25	125	3
MCA.S5.2	VB.NET AND ASP.NET	4		100	25	125	3
MCA.S5.3	DATAWAREHOUSING	4		100	25	125	3
MCA.S5.4	MOBILE COMMUNICATION	4		100	25	125	3
MCA.S5.5	ELECTIVE-II I) MULTIMEDIA TECHNOLOGY II) DIGITAL IMAGE PROCESSING	4		100	25	125	3
MCA.S5.PR1	COMP.LAB.1 (IP)		3	50		50	3
MCA.S5.PR2	COMP.LAB.2 (VB.NET)		3	50		50	3
MCA.S3.PR3	COMP.LAB.3 (MINI PROJECT)			25		25	3
TOTAL MARKS						750	
SEMESTER 6:							
MCA.S6.1	Project Work					750	
	TOTAL MARKS					750	

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

Total 3rd year Marks (5th sem+6th Sem)=1500

M.C.A. FIRST YEAR
With effect from 2011-12

MCA.S1.1- FUNDAMENTALS OF IT

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction** • Computer Definition • Uses • Characteristics • Generation Of Computer • Block Diagram Of Computer • Input Devices: Keyboard, Point and Draw devices, Data Scanning devices, Digitizer, Electronic card reader, Voice Recognition device, Vision input device • Output Devices: Monitor, Printer, Plotter, Screen Image Projector, Voice Response System • Primary and Secondary memory • Cache and Virtual memory • Classification of computer	10
2.	**Software** • System Software / Application Software • Compilers, Interpreters, assemblers • Linker, 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.	12
3.	**Operating System Fundamentals** • Functions of OS • Roots of MS-DOS • The Kingdom of Dos 1. ROM Software 2. ROM Startup Routines 3. ROM-BIOS Routines 4. ROM BASIC Routines 5. ROM Extension Routines • Booting • Physical Structure of Disk • Logical Structure of Floppy Disk • Detailed Boot – Time Operations	10
4.	**Networking Concepts**	10

	• Data Communication Concepts • Classification – Serial/Parallel, simplex, half duplex, full duplex. • Communication Media – Wired/microwave, E-mail. • LAN, WAN, MAN, Internet, intranet (Basic Concepts) • Topologies • Protocols(Introduction) • Media Access Methods – Ethernet, Arcnet (no Architecture) • Communication Process • OSI – Layers(Introduction)	
5.	**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	8

Suggested Readings:

1. Computer Fundamentals: By P.K. Sinha.
2. Operating System Concepts: By Peterson
3. Operating System: By Donovan
4. Computer Networking: By Tenaunbaum
5. Personal Computer Interfaces: By Michel Hordeski - McGrow Hill

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MCA.S1.2- MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

TOTAL MARKS :100 **TOTAL LECTURES :50**

Sr. No.	Topic	No. of Lect.
1.	**Mathematical Logic** • Propositions • Logical Connectives and compound Propositions • Truth Tables • Logical Equivalence • Algebra Of Propositions • Conditional Propositions • Converse, Contra positive and Inverse • Biconditional Statements • Negation Of Compound Statements • Tautologies, Contradictions and Contingency • Methods Of Proof • Predicate Calculus	10
2.	**Boolean Algebra and Logic Circuits** • Boolean Algebra • Unique Features • Basic Operations • Boolean Functions • De-Morgan's Theorem • Logic Gates • Sum Of Products and Product Of Sums Forms • Normal Form • Expression of Boolean Function as a Canonical Form • Simplification of Boolean Expression • Boolean Expression From Logic and switching Network • Implementation Of Logic Expressions With Logic gates and switching Circuits • Functionally Complete Sets • Karnaugh Map Method For Simplification Of Boolean Expression	10
3.	**Crisps sets and fuzzy sets** • Introduction • Crisps sets • Fuzzy sets • Containment • Normal fuzzy set • Support of fuzzy set • Alpha Cut set • Basic operation of fuzzy sets • Fuzzy Cartesian product • Fuzzy relation	6

4.	**Relations And Functions** • Relations On Sets • Types Of Relations • Properties Of Relations • Representation Of Relation • Relational Database • Functions • Classification Of Functions • Types Of Functions • Composition Of Functions • Some Special Functions	10
5.	**Groups Rings And Field** • Binary Operations • Group • Groupoid, Semi Group and Monoid • Sub Group • Cyclic Group • Permutation Group • Homomorphism and Isomorphism Of groups • Ring, Sub Ring • Fields	8
6.	**Elements Of Coding Theory** • Introduction • Definitions • Group Codes • Parity-Check and Generator Matrix • Hamming Codes	6

Suggested Readings:

1. Text Book of Discrete mathematics. By swapan Kumar sarkar (S Chand and company)
2. Fuzzy sets uncertainty and Information By George J. Klir, 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 Busby R.
7. Concept of discrete mathematics By sahni's.
8. Discrete mathematical structure with Application By Tremblay J.P.
9. Practical foundation of mathematics by Taylor.

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MCA.S1.3- PROGRAMMING IN C

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to 'C' Language** • History • Structures of 'C' Programming • Function as building blocks	2
2.	**Language Fundamentals** • Character set • Tokens • Keywords , Identifiers • Variables and Constant • Data Types • Comments • Types of operators • Operator Precedence and Associativity • Expression • Statement and types of statements	3
3.	**Built-in function and control structure** • Console based I/O and related built-in I/O function: printf( ), scanf( ),getch( ), getchar( ), putchar( ) • Concept of header files • Preprocessor directives : • Control Structures 1.Decision making structures : 2. Loop Control structures: 3.Other statements : Break, Continue, Goto, exit	6
4.	**Functions** • Basic types of function • Declaration and definition • Function call • Types of function • Parameter passing: Call by value & Call by reference • Scope of variables • Storage classes • Recursion	5
5.	**Arrays** • One dimensional array : 1. Definition, declaration and initialization 2. Accessing array elements 3. Displaying array elements 4. Sorting arrays 5. Arrays and function 6. Memory representation of array • Two Dimensional array & Multidimensional array	5
6.	**Pointers**	5

	• Definition and declaration, Initialization of pointer • Indirection operator, address of operator • Pointer arithmetic • Dynamic memory allocation • Arrays and pointers • Function and pointers	
7.	**Strings** • Definition, declaration and initialization of strings • standard library functions : • Implementation without using standard library Functions	4
8.	**Structures** • Definition and declaration • Variables initialization • Accessing fields and structure operations • Nested structures • Union : Definition and declaration. • Differentiate between Union and structure	5
9.	**C Preprocessor** • Definition of Preprocessor • Macro substitution directives • File inclusion directives • Conditional compilation	5
10.	**File handling** • Definition of Files, Opening modes of files • Standard function: fopen( ), fclose( ), eof( ), fseek( ), rewind( ) • Using text files: fgetc( ), fputc( ), fprintf( ), fscanf( )	5
11.	**Graphics in C** • The display adapters • Setting the text modes • Graphics modes • Saving Bit Images, Graphics Color	5
12.	**Command line arguments**	1

Suggested Readings:

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

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MCA.S1.4- PRINCIPLES OF MANAGEMENT

TOTAL MARKS: 100 **TOTAL LECTURES :50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to Management** • Definition • Nature & scope • Characteristics of management • Importance of Management, Administration & Organization • Management Process & Levels of Management.	5
2.	**Evolution of Management thoughts** • Contribution of F.W. Taylor , Henry Fayol , Peter Drucker, etc	2
3.	**Different Schools of Management Thought** • Management process school • Empirical School • Human Behavior School • Social School • Systems Management School • Contingency School	7
4.	**Planning** • Definition • Characteristics, Nature, Importance, limitations. • Types of Plans:(Standing and Single Use Plans) • Planning Process	5
5.	**Organizing** • Concept • Definition • Process of organization • Principles of organization • Authority, Responsibility, and Delegation • Forms of organization. • Centralization and Decentralization	7
6.	**Leadership** • Concept of Leadership • Definition • Qualities of Leadership • Leadership Styles • Motivation, Meaning, Definition • Theories of Motivation1. Maslow's Need Hierarchy • McClellands's Need Theory • Herzeberg's Two Factor Theory • McGregor's Theory "X' and Theory 'Y"	7
7.	**Controlling:** • Concept • Definition	5

	• Principles of Controlling • Objectives of controlling • Importance of Controlling	
8.	**Staffing** • Human Resource Planning • Recruitment • Selection • Training • Induction • Training and development • Performance appraisal methods	6
9.	**Quality Concepts** • Total Quality Management • ISO • Quality Circle	3
10	**Social Responsibility of Business** • Definition • Responsibilities towards owners, workers, consumers, suppliers, state, society etc.	3

Suggested Readings:

1. Essentials Of Managementl: Harold Koontz ,Heinz Weihrich, Tata Mcgraw Hill.
2. Principles And Practice Of Management: Dr.S.C.Saxena, Sahitya Bhavan Publications.
3. Principles Of Management: R.N.Gupta, S.Chand & Company

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MCA.S1.5 COMMUNICATION & SOFT SKILLS

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**Oral Communication: Speaking with Correct Pronunciation/ Paralanguage** • Phonemes: English Vowels and Consonants • Syllable, Accent, Intonation • Word and Sentence Transcription • Reading Phonetic Transcription	10
2.	**Communication Techniques** • Importance of communication • Types/Methods of communication: Verbal and Non-verbal • Process of communication: One way and two way, horizontal, vertical, upward, downward • Barriers to communication and overcoming barriers • Use of audio-visual aids for effective communication	8
3.	**Developing Creative Writing** • Note Taking & Note Making Skills • Essay Writing • Précis Writing • Oral Presentation Principles	8
4.	**Correspondences** • Business Letters: Enquiry, Placing Supply Order, Complaint, Adjustment, Circular, Memo • Curriculum Vitae and Effective Profiling • British and American Format of Letters	8
5.	**Career Skills** • Interviews: concept, purpose, types, procedure. • Group Discussions: preparation and practice • Meeting: notice, agenda, minutes • Seminars: preparation and presentation	8
6.	**Soft Skills and Interpersonal Skills** • Concepts of Self: Personality Development, Self Awareness and Self Assessment, Self Confidence, Self Esteem, Values, Attitudes etc. • Stress Management • Managing Time • Meditation • Improving Personal Memory	8

Suggested Readings:

1) English for Practical Purposes
Z. N. Patil, B. S. Valke, Ashok Thorat, Zeenat Merchant

2) Business Communication
Urmila Rai and S.M. Rai

3) Personality Development and Communicative English
Dr. S.R. Pandya and Dr. Pratima Dave Shastri

4) Better English Pronunciation
J D O'Connor

5) Oxford Guide to Effective Writing and Speaking
John Seely

6) 7 Habits of Highly effective People
Stephen Covey

7)Think and growth
Napoleon Hill

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MCA.S2.1 - OPERATING SYSTEMS

TOTAL MARKS :100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**Introduction** • Introduction to OS • OS as resource manager • History of OS:-first to fourth generation (simple batch system, Time sharing systems, Real-time systems, parallel systems, distributed system) • OS services • User operating system interface • System call and types of system calls	8
2.	**Process Management** • Process Definition Process state Process control block Process scheduling • Multithreaded programming overview Benefits Multithreading models Windows xp threads Linux threads • Process scheduling criteria and Scheduling algorithm • Deadlocks Deadlock characterization Methods for handling deadlocks Deadlock prevention Deadlock avoidance Deadlock detection Recovery from deadlock	8
3.	**Memory management** • Background • Swapping • Contiguous memory allocation • Paging and segmentation Pentium segmentation Pentium paging • Virtual memory management • Demand paging • Page replacement • Allocation of frames • Thrashing	8
4.	**File system** • File concept • Access methods • Directory structure • File system mounting	6

	• File sharing and Protecting	
5.	**Device management** • Overview OS mass storage structure • Disk structure, disk attachment • Disk scheduling • Swap space management • RAID structure	6
6.	**Input/Output system** • Overview • I/O hardware • Application I/O interface • Kernel I/O interface	6
7.	**Distributed OS** • Motivation • Types of distributed OS • Network structure • Network topology • Communication structure	6

Suggested Readings:

1. Operating System By Stuart .E. Madnick & John. J. Donovon
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

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MCA.S2.2- COMBINATORICS AND GRAPH THEORY

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**Graph Theory** • Graphs • Incidence And Degree • Isomorphism • Sub Graphs • Weighted Graph • Eulerian Graph, Hamiltonian Graphs • Walk, Paths and Circuits • Connected Graph • Shortest Path Algorithm • Chinese Postman Problem • Traveling Salesman Problem • Trees • Center Of Tree • Rooted And Binary Tree • Spanning Trees • Fundamental Circuits, Cut Sets And Cut Vertices • Connectivity and Separativity, Max Flow Min Cut theorem	15
2.	**Matrix Representation Of Graphs** • Incidence Matrix • Circuit Matrix • Path Matrix • Adjacency Matrix	5
3.	**Coloring Covering And Partitioning** • Chromatic Number • Chromatic Partition • Chromatic Polynomial • Covering • The Four Color Problem	6
4.	**Directed Graphs** • Definition And types Of Digraphs • Digraphs And Binary Relations • Euler Digraphs • Trees With Directed Edges • Arborescence, Tournaments	8
5.	**Vector Spaces Of Graphs** • Sets With one Operation • Sets With Two Operation • Modular Arithmetic and Galois Fields • Vectors and vector Spaces • Vector Space Associated With A Graph	7
6.	**Combinatorics** • Introduction	9

	• The Fundamental Principals • Permutation and Combination • Pigeonhole Principal • Recurrence Relations • Generating Functions	

Suggested Readings:

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 in foundation for computer science, Graham R.M.D.I knuth & U.patashnik [1989) Addison Weslely

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MCA.S2.3- OBJECT ORIENTED PROGRAMMING WITH C++

TOTAL MARKS :100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**1. Introduction** • Concept, Benefits and Application of OOP • Structure of C++ Programming • Tokens, expressions and control structures keywords, Identifiers, data types & operators in C++.	4
2.	**Functions in C++** • Function Prototyping • Call by value, Call by reference • Return by reference • Inline Functions • Default arguments • Function overloading • Friend and Virtual functions	6
3.	**Class and Objects** • Introduction to classes and creating objects • Friend classes • Static class members • Nested classes • Local classes • Memory allocation for objects • Array to objects • Objects as function arguments • Constructors and destructors	6
4.	**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
5.	**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	6
6.	**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	8

	• Custom extractors and inserters	
7.	**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.	8
8	**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.	6

Suggested Readings:

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

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MCA.S2.4- DATA STRUCTURE

TOTAL MARKS :100 **TOTAL LECTURES :50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to Algorithm** • Introduction to Algorithm • The efficiency of Algorithms • Analysis of Algorithms – overview of Space and Time Complexities • Amortized Complexity • Asymptotic Notations(Big O, Omega, Theta) • Practical Complexity • Performance Measurements • Writing of some fundamental algorithms for exchange , counting , summation .	5
2.	**Introduction to data structures** • Introduction to data structures • Basic terminology • Primitive data structure operations • Overview of STACKS, QUEUES, LINKED LISTS, BINARY TREES and GRAPHS (Basic Definition , Representations, Characteristics , Types, Applications)	5
3.	**Tree** • Minimum Spanning Trees • Growing a minimum spanning tree • The algorithms of Kruskal and Prim	5
4.	**Graphs** • DFS and BFS algorithms associated with Graphs • Single-source shortest Paths • The Bellman-ford algorithm • Single-source shortest paths in directed acyclic graphs • Dijkstra algorithm All-pairs shortest paths • Shortest-paths and matrix multiplication • The Floyd-Warshall algorithm • Johnson's algorithm for sparse graphs	6
5.	**Sorting and Searching** • Introduction to searching and sorting problems • Linear search , Binary search • Selection sort , Bubble sort , Insertion sort , Merge sort • Complexities of searching and sorting algorithms • Hash Techniques	5
6.	**Divide and Conquer Techniques** • Divide and conquer • General method • Binary search • Merge sort • Quick sort	6

	• Strassen' s matrix multiplication	
7.	**Greedy Techniques** • The Greedy method • The general method • Container loading knapsack problem • Job sequence with deadlines • Optimal storage on tapes	6
8.	**Amortized Analysis** • Amortized Analysis • Aggregate Analysis • The Accounting Method	3
9.	**Dynamic Programming** • Dynamic Programming • General method	3
10.	**NP Theory** • NP completeness • Polynomial Time • Polynomial Time Verification • NP Completeness and reducibility • NP completeness proofs • NP completeness problems	6

Suggested Readings:

1. How to solve it by Computers, R.G. Dromey , 8th Edition , Pearson Education
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahani, S.
3. Rajasekaran , 2nd Edition , Universities Press Inc
4. Data Structures, Lipschutz , Tata McGraw Hills
5. Introduction to Algorithms, Corman , Leiserson and others, 2nd edition , PHI

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MCA. S2.5– DBMS THROUGH ORACLE

TOTAL MARKS: 100 **TOTAL LECTURES:50**

Sr.no.	Topic	No. Of lect.
1.	**Introduction** • Basics of database systems, problems in traditional file oriented approach • Three level architecture of DBMS • General architecture of DBMS , discussions on various modules in it	4
2.	**Data models** • Concept of abstraction and data model • Introduction of entity relationship model, elements of the e-r model, types of entities, relationships, modeling examples using e-r model • Introduction to relational model , elements of the relational model , modeling examples using relational models , e-r to relational conversion • Keys and their types	6
3.	**Relational algebra** • Relational algebra: basics of relational algebra, unary and binary operators including set operators , cross product , division etc • Join and its types , nested loop join method • Relational calculus, tuple relational calculus, domain relational calculus. • Introduction to data retrieval languages like qbe, quel, sql • Discussions on sql	6
4.	**Normalization** • Overview of relational model • Anomalies in databases • Functional dependencies – determinant, partial, full, transitive • Various normal forms and normalization process • First normal form, second normal form, third normal form • Boyce-codd normal form • Lossy and lossless joins • Multi-valued dependency, fifth normal form	6
5.	**Security aspects** • Basic threats • General defense mechanism • Authorization, identification and authentication policies • Discussions on roles of DBA, data dictionary	4
6.	**Integiry mechanism** • Basic integrity threats • General integrity model • Domain level constraints , referential constraints	4

7	**Query execution** • Steps in query processing, various algorithms for selection, join operators • Understanding cost issues in queries • Optimization of queries- rule based and heuristics • Query evaluation plans, pipelined evaluations	5
8.	**Transaction management** • Transaction and states, acid properties • Schedules, types of schedules, view and conflict serilizability issues , conflict serilizability testing mechanism • Dead locks and resolving deadlocks	5
9.	**Concurrency control** • Needs • Use of locks, lock protocols – s, x, binary, 2pl, graph based, granularity • Concurrency control by timestamps, • Concurrency control by validation. • Concurrency control by optimistic scheduling, multi version schemes	6
10.	**Recovery management** • Types of failures • Log based recovery – deferred and immediate mode • Check points, shadow page tables • Backup	4

Suggested Readings:

- Raghu Ramakrishnan/Johannes Gehrke, "Database Management Systems", Tata Mc Graw Hill.
- Silber Schatz. Korth, "Database System Concepts", Tata Mc Graw Hill.
- ShamKanth B. Navathe, "Fundamental of DataBase System", Pearson Education.
- Database management System, Bipin desai
- Oracle by Ivan N. Bayross
- Oracle PL/SQL Programming by Scott Urmann

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M.C.A. SECOND YEAR
With effect from 2012-13

MCA.S3.1- Linux Operating System

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to RED Hat Linux** • Advantages of Linux • Other Linux distributions • Red Hat Linux Installation • Concept of Linux loader • Hardware Requirements	5
2.	**Working with Linux** • Linux file system • Shells, Text editors • Changing User Information • File Permissions • Virtual Consoles	7
3.	**The X Window System** • Basic X window system • Configuring X window systems • Starting X • Selecting & using X window	5
4.	**Managing Services** • Linux Boot Process • System services and run levels • Controlling services at boot with administrative tools • Starting and stopping services manually	5
5.	**Managing Software & System Resources** • Using RPM for software management • Using RPM on the command line • Extracting a single file from & RPM file • Graphical Package Management • System monitoring tools	8
6.	**Printing with Linux** • Configuring & managing print services • Local printer installation • Network printer installation • Linux printing commands • Using the Common UNIX Printing System (CUPS) • Console print control	8
7.	**Network Connectivity** • Networking with TCP/IP • Hardware devices for networking • Using RED HAT Linux network configuration tools	6

	• Using DHCP [Dynamic Host Configuration Protocol] • Using the network file system • Wireless networking	
8.	**Introduction to DNS & Samba** • Introduction to DNS • Essential DNS concepts • Configuring namespaces with DNS • Installing Samba • Configuring Samba • Running the Samba Server	6

Suggested Readings:

1] Red Hat Linux Unleashed by Bill Ball, David Pitts
2] Fedora Unleashed by Bill Ball

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MCA.S3.2-COMPUTER NETWORKS

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr.no.	Topic	No. Of lect.
1.	**Introduction and concepts of computer network** • Introduction to computer networks • Uses of computer networks • Protocol hierarchies • Design issue for the layers • TCP/IP reference model • Comparison of OSI & TCP/IP reference model	6
2.	**Physical layer** • Transmission media • Wireless transmission • Telephone system structure • Modem, ADSL & wireless • Switching	6
3.	**Data link layer** • Data-link layer issue • Error detection and correction • Examples of Data-Link Protocols	6
4.	**Ethernet** • Introduction of Ethernet • Ethernet cabling • Fast Ethernet • Gigabyte Ethernet	6
5.	**Network layer** • Network layer design issue • Routing algorithm • Optimality principles • Shortest path routing	6
6.	**Internetworking** • Internetworking concepts • How network differ • How network can be connected • Connectionless internetworking • Tunneling • Inter-network routing • Fragmentation • IP protocol & IP addresses	6
7.	**Performance issue** • Performance issue of computer network • Performance problem in computer network • Network performance measurement	7
8	**Domain name system** • Introduction to Domain Name System (DNS)	7

	• Resource records • Name server • URL	

Suggested Readings:

1. Computer Network (Fourth Edition of Pearson) by Andrew S. Tenanbaum.
2. Computer Communication and Network by John Freer Pitman (1980).

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MCA.S3.3- CORE JAVA

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**Evolution Of Java** • Java History • Java Features • How Java differ from c and c++ • Java and Internet • Java And World Wide Web • Web Browsers • Java Hardware And Software Requirements • Java Support System	6
2.	**Overview Of Java Language** • Java Program Structure • A simple Java Program • Java Token • Java Statements • Java Installation And Configuration • Java Virtual Machine • Command Line Arguments	6
3.	**Fundamental Programming Structure In Java:** • Data Types • Variables and constants • Operators: Increment Decrement Operators, Relational And Boolean Operators, Bitwise Operators, Mathematical Functions • String Method • Substrings • Control Flow : Conditional Statements, Looping statement • Arrays: Introduction, One Dimensional Array, Two Dimensional Array	6
4.	**Objects and Classes:** • Introduction to object oriented Programming • Defining Class • Adding class • First Step With Constructor • Static Members • Inheritance • Polymorphism • Dynamic Binding • Abstract Class	6
5.	**Packages:** • Introduction • Creating Packages • Adding Packages • Using Packages	6
6.	**Interfaces:**	6

	• Introduction • Defining Interface • Implementation Inner Class	
7.	**Multithreading:** • Introduction • Creating Thread • Stopping and blocking Thread • Thread Life Cycle	7
8	**Applet programming** • Introduction • Difference Between Applets and application • Applet Life Cycle	7

Suggested Readings:

- 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

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MCA.S3.4- RESEARCH METHODOLOGY & PROJECT MANAGEMENT

TOTAL MARKS 100 **TOTAL LECTURES 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to Research Methodology** • Meaning and definition of Research • Characteristics of Research • Objectives of research • Types of research • Process and steps of research	7
2.	**Process of Selection and formulation of Research Problem** • Problem Selection/Identification of the problem • Sources of research problems • Criteria of good research problem • Principles of research problem • Hypothesis, Meaning & characteristics of good hypothesis	7
3.	**Data Collection and Analysis** • Main forms of Data Collection Responses • Methods of data collection • Analysis of data • Types of analysis • Statistical tools and analysis • Interpretation of data • Need and importance • Technique of interpretation	8
4.	**Concept of Project Management** • Meaning of project • Characteristics of a project • Project levels • Types of projects • Project cycle • Meaning & phases of project management • Need of Project Management	8
5.	**Project Formulation** • Feasibility analysis • Technical analysis • Profitability analysis and financial analysis-cost of project • Means of financing & estimates of sales & production	5
6.	**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	5
7.	**Project Management Information System (PMIS)**: • Significance of PMIS in project management • Planning & control	5

	• Design of project management information system • Importance of materials & equipment in PMIS	
8.	**Project Scheduling & Control:** • Meaning of project scheduling & project control • Network techniques to project management –PERT & CPM • Gantt charts	5

Suggested Readings:

1. Research Methodology And Project Work By Dr Mahesh A Kulkarni, Nirali Prakashan, Mumbai,
2. Research Methodology By N Thanulingon, Himalaya Pbulication, Mumbai
3. Metodology Of Research In Social Sciences By O.R Krishnaswami, M Rangnathan.
4. Project Management By S. Chaudhary, Tata Mcgraw Hill.
5. Project – Preparation, Appraisal, Budgeting & Implementation Prasanna Chandra, Tata Mcgraw Hill.
6. Project Management – A Development Perspective B.B. Goel, Deep & Deep.
7. Project Management By Vasant Desai
8. Principles Of Software Engineering Management Tom Gilb, Finzi Susannah Addison-Wesley, England, 1988.
9. Managing A Programming Project" Prentice Hall, New Jersey, 1981.

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MCA.S3.5- SOFTWARE ENGINEERING AND TESTING

TOTAL MARKS:100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**Software & Software Engineering** • The nature of software • The Unique nature of Web Apps • Software Engineering • Software Processes • Software practice • Software myths	4
2.	**Process Models** • A Generic process model • Process assessment & improvement • Prescriptive process models • Specialized Process models • The Unified Process models	10
3.	**Agile Development** • What is Agility • Agility & the cost of Change • What is agile process	3
4.	**Understanding Requirements** • Requirement engineering • Establishing groundwork • Eliciting requirements • Building requirement model • Requirement Analysis	5
5.	**Design Concepts** • Design within the context of S.E. • The Design Process • Design Concepts • Design Model	5
6.	**Web App Design** • Web App Design Quality • Design goals • A Design pyramid for Web App • Web App. Interface Design	4
7.	**Quality Concepts & Software Quality Assurance** • What is Quality • Software Quality • Achieving software quality • Elements of SQA, • SQA Tasks, Goals, & Metrics • Formal Approaches to SQA	4
8.	**Software Testing strategies & techniques** • A strategic approach to software testing • Strategic issues • Test Strategies for conventional software	10

	• Test strategies for Web Apps • System Testing • Internal & External view of testing • White box testing • Basis path testing • Black box testing • Testing concept for Web App	
9.	**Risk Management** • Reactive Vs Proactive risk strategies • Software risks • Risk identification • Risk projection • Risk management • Risk Mitigation, Monitoring & Management	5

Suggested Readings:

1. Software Engineering – A Practitioner's Approach By Roger S. Pressman (McGraw Hill) 7th Edition
2. Software Engineering – A Practitioner's Approach By Roger S. Pressman (McGraw Hill) Sixth Edition

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MCA.S4.1- ADVANCE DATABASE MANAGEMENT SYSTEM

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**OODBMS & ORDBMS** • Overview of Object-Oriented concepts & characteristics • Objects, OIDs and reference types • Database design for ORDBMS • Comparing RDBMS, OODBMS & ORDBMS	5
2.	**Advance Database Management System –Concepts & Architecture** • Spatial data management • Web based systems, Overview of client server architecture, • Databases and web architecture, N-tier, Architecture, Business logic – SOAP • Multimedia databases • Mobile database	5
3.	**Introduction Oracle** • Oracle Internal Data types • Data Definition Language • Data manipulation Language • Transaction control and data control Language • QUERIES AND SQL FUNCTIONS • Operators in SQL *Plus • SQL *Plus Functions	6
4.	**Set Operators, Joins & Subqueries** • Set operators • Relating data through join concept • Usage of sub queries	3
5.	**Constraints** • Introduction to integrity constraint • Implementation of constraint • Primary Key constraint • Referential integrity constraint	4
6.	**Locks And Table Partitions** • Concept of locking • Table partition	2
7	**Database Objects** • Synonym, Sequences, Alter sequences • View • Index	4
8	**Enhancements In Oracle** • ORDBMS VS. RDBMS • Concept of object oriented programming • Features of object oriented programming encapsulation • Inheritance, Polymorphism, Advantages of object	7

	Orientation Object Object in oracle • Abstract data type • Object views • Nested tables	
9.	**Introduction To Pl/Sql** • Introduction to PL/SQL, Advantages of PL/SQL, • Architecture of PL/SQL. Introduction to PL/SQL block, Datatypes and their usage Scaler • data types, Boolean, Binary_integer, Number • Variables, Constants, Character raw, Rowed, Composite datatype. • User defined data types Attributes, %type, %rowtype, Control structures • Conditional control, Iterative control, Simple loop, While loop • For loop, Sequential control. • EXCEPTION, User-predefined EXCEPTION • Predefined EXCEPTION, THE EXCEPTION INIT program • Raise application – error, • Cursor management	7
10.	**Subprograms And Packages** • Subprograms, Procedures, parameters • The package specification, Package body • Calling package subprograms • Database programming using: 1. Using VB (ADODC) 2. Java – JDBC programming concept	7

<u>Suggested Readings</u>:

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

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MCA.S4.2- MANAGEMENT INFORMATION SYSTEM

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to Management Information System** • Overview of Management Information System. • Structure of Management Information system. • MIS: Support to Management • MIS and the user. • Management as a control system.	5
2.	**Information Systems Technology** • Hardware, Software & communication technology for information systems. • Transaction processing, office automation, Information processing control functions.	8
3.	**Conceptual Foundation** • The decision-making process. • Concepts of information. • Human as Information processors. • Systems concepts, planning & control.	8
4.	**E-business Enterprise** • Introduction • Organization of business in an E-enterprise. • E-business, E-Commerce E-communication & E-collaboration	5
5.	**Information Security Challenges in E-enterprises** • Security Threats & Vulnerability • Controlling Security Threats & Vulnerability • Management Security Threat in E-Business • Disaster Management • MIS & Security challenges	5
6.	**Development, Implementation and Management of MIS Resources.** • Developing and implementing application systems. • Quality assurance and evaluation of information systems. • MIS: Development process model.	8
7	**Application of MIS to E-business** • Application in Manufacturing Sector. MIS for Personnel Management, Financial Management, Production management, Raw Materials management & Marketing management. • Application in Service Sector Introduction, Service concept, service process cycle and analysis, customer service design, service management system.	7
8	**Case Study** • Tata home finance Ltd.	4

Suggested Readings:

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.

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MCA.S4.3- ADVANCE JAVA PROGRAMMING

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction To Java** • Introduction • Java Magic: Byte Code • Java Buzzwords • Java Virtual Machine • Using super keyword • Dynamic method dispatch • Final classes & methods • Interfaces: Multiple Inheritance 1. Defining Interface 2. Extending Interface 3. Implementing Interface 4. Accessing Interface Variables. • Packages.	8
2.	**Multithreaded Programming** • Life cycle of thread • Using thread methods • Thread Exception • Thread priority • Thread Synchronization • Implementing the 'Runnable' interface.	5
3.	**The Applet Class** • Applet basics • Applet architecture • An applet skeleton • Simple applet display method • Requesting repainting • The HTML APPLET tag • Passing parameters to applets.	4
4.	**Event Handling** • The delegation event model • Event handling mechanism • Event class 1. ActionEvent class 2. The KeyEvent class 3. The MouseEvent class 4. The WindowEvent class • Adapter class	**5**
5.	**Introduction To AWT** • AWT classes • Working with frame window • Creating a frame window in an applet • Working with graphics • Working with color	6

	• Working with fonts • Control fundamentals • Understanding layout managers	
6	**A Tour of Swing** • JApplet • JIcons & Labels • Textfields • Buttons • Combo Boxes • Scrollpanes • Trees • Tables • Menu Bars & Menus • Tool Bars • Dialog Boxes • File dialog • Progress Bar	7
7	**Database Programming** • The design of JDBC 1. JDBC driver types • JDBC Installation • Basic JDBC programming concept	4
8	**Java Beans** • Introduction to Java Bean • Advantages of Java beans • Application Builder tools • Using BDK • JAR files	4
9	**Servlets** • The life cycle of a servlets • Using Tomcat for server development • A simple servlet • Using cookies • Session Tracking	4
10	**Java Server Pages** • Introduction to java server pages • A simple JSP example • Scripting.	3

Suggested Readings:

1. Programming with java A Primer Fourth Edition by E Balagurusamy.
2. The Complet Reference Java Fifth Edition by Herbert Schildt(TATA McGRAW HILL)
3. Core Java VOLII 7th Edition by Cay S. Harstmann,Gary Carnell.
4. Core Servlets & Java Server Pages by Marty Hall,Larry Brown.

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MCA.S4.4- NETWORK SECURITY

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. Of Lect.
1.	**Introduction** • Introduction Of Network Security • Security Attacks And Services • Model For Network Security	7
2.	**Cryptography** • Introduction To Cryptography • Substitution Ciphers • Transposition Ciphers • One-Time Pads • Quantum Cryptography • Fundamentals Principles Of Cryptography	7
3.	**Symmetric Key Algorithm** • DES-Data Encryption Standards • AES dvanced Encryption Standards • Cryptanalysis	7
4.	**Public Key Algorithm** • Public-Key Algorithm • RSA • Digital Signature • Management Of Public Key • Public-Key Infrastructure(PKI)	7
5.	**Communication Security** • Introduction Of Communication Security • IP Security • Firewalls • Virtual Private Networks(VPN) • Wireless Security • Bluetooth Security	7
6.	**Web Security** • Web- Security • Threats • Secure Naming • Secure Sockets Layers (SSL • Mobile Code Security	7
7.	**System Security** • System Security • Viruses • Malicious Program • Nature Of Viruses • Types Of Viruses • Antivirus Approaches • Advanced Anti-Virus Techniques	8

Suggested Readings:

1. Computer Network (Fourth Edition of Pearson) by Andrew S. Tenanbaum.
2. network security essentials by William stalling(pearson publication)
3. Cryptography and Network Security by William stalling(pearson publication)

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ELECTIVE –I
MCA.S4.5- I) E COMMERCE

TOTAL MARKS 100 **TOTAL LECTURES 50**

Sr. No.	Topic	No. of Lect.
1.	**Electronic Commerce: Technology & Prospects Lectures** • Introduction • Definition Electronic Commerce • Applications of Electronic Commerce • Advantages & Disadvantages of Electronic Commerce • Incentives for Engaging in Electronic Commerce • The Mechanisms of Electronic Commerce • Conclusion	3
2.	**EDI** • Definition of EDI • Electronic Data Interchange (EDI) • EDI would Benefit Business Relationships between organizations • Network Enabled business Practices • Applications of EDI • EDI Advantages • EDI Disadvantages • EDI Model • Protocol, Encryption, Data Standards Used in EDI	5
3.	**Intranets & Extranets** • Definition, Advantages, Disadvantages Of Intranets • Components of Intranet Information Technology Structure • Extranet & Intranet differences • Role of Intranets in Business Applications • Definition of Extranets • Application of Extranets • Intranet / Internet • VPN (Virtual Private Network)	6
4.	**Business Models & Electronic Market** • Five Extended Business Models • Electronic Business storefront • Informediary • Trust Intermediary • Electronic Business Enabler	5
5.	**Wireless Application Protocol (WAP)** • Introduction, Definition to WAP • The future is WAP • Mobility and Ecommerce • Public key infrastructure (PKI) • Mobile Computing • Stages of Mobile Computing	6

	• Third Generation Mobiles	
6.	**E-payments Systems** • Types of Electronic payment Systems • Payment types, Receipts of types • Traditional & modern Payments System • Steps for Electronic Payment • Payment Security • Problems With traditional Payment methods • Net banking • The Shopping Process & Advantages of Pay seal	6
7.	**E-Security** • Electronic Security • Attacking methods • Cryptography, hackers • Secure Electronic transactions (SET) • Secure Socket Layers • Network Security	5
8.	**E-CRM, E-SCM, Knowledge Management** • E-CRM Architecture • Applications • Introduction, goals & application of E-SCM • Introduction, goals & application of Knowledge management	4

Suggested Readings:

1. E-commerce by C.S.V MURTY Himalaya Publication
2. E-commerce By Parag Diwan & Sunil Sharma Excel Books

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ELECTIVE-I
MCA.S4.5- II) HUMAN COMPUTER INTERFACE

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction** • Human factors of interactive software • Goods of system engineering • User interface design • Motivation human factors in design	6
2.	**Principles and Guidelines** • Usability paradigms • Object action interface • Principles and rules • Guidelines for data entry and display	6
3.	**Design Process** • Managing design process • Design Methodologies • Participatory design • Usability and tests • Acceptability tests • Software tools • Specification methods	7
4.	**Dialog Notation Design** • Visual thinking and icons • Direct manipulation programming • Virtual • Environments • Item presentation sequence • Layout • Form fill-in dialog boxes	6
5.	**Implementation Support** • Individual window design • Multiple window design • Coordination, image browsing • Command organization • Command menus • Natural languages in compiling • Window manages and user interfaces	7
6.	**Interactive Device** • Keyboards • Speech recognition • image & video displays • Response time and Display Rate	5
7.	**Documentation** • Presentation styles • Balancing function	5

	• Error interactions handling, error • Printed manuals • online facilities	
8.	**Computer Supported Co-operation** • Goals of Co-operation • Asynchronous interactions • Synchronous distributed • Application to education and social uses	3
9.	**Information search and Visualization** • Database query and phase search in documents • Multimedia document searches • Information visualization • Advanced filtering • Hypertext and hypermedia • Users and their tasks • Object action interface model for website design	5

Suggested Readings:

1. Designing the user interface By Ben shnelderman, Pearson Education Asia.
2. Human Computer interaction, 2/e
   Alan J Dix, Janet E. Finlay, G.D. Abowd and Rusell Beale,Prentice Hall.
3. Elements of User interface design
   Theo Mandel, JW and Son.
4. Essential Guide To User Interface Design
   Willbert Galitz, JW.

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M.C.A. THIRD YEAR
With effect from 2013-14

MCA.S5.1- INTERNET PROGRAMMING

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Understanding Javascript** • Scripts & programs • Introducing Javascript • How Javascript fits into a web page. • Browsers & Javascript • Adding Javascript statement • Storing data in variables • Calculating the result • Adding script to a web page • Testing the script • Modifying the script	10
2.	**How JavaScript Program Work** • Understanding objects • Handling events • Conditional statements • Loops • Using function • Using variables	7
3.	**Introduction to PHP** • Basic Syntax • Sending Data to the Web Browser • Understanding PHP, HTML, and White Space • Writing Comments	4
4.	**Programming with PHP** • Creating an HTML Form • Handling an HTML Form • Managing Magic Quotes • Conditionals and Operators • Validating Form Data	5
5.	**Creating Dynamic Web Sites** • Including Multiple Files • Making Sticky Forms • Creating and Calling Your Own Functions • Variable Scope • Date and Time Functions Sending Email	6
6.	**Error Handling and Debugging** • General Error Types and Debugging • Displaying PHP Errors • Adjusting Error Reporting in PHP	6

	• Creating Custom Error Handlers • Logging PHP Errors • PHP Debugging Techniques	
7.	**Using PHP with MySQL** • Modifying the Template • Connecting to MySQL and Selecting the Database • Executing Simple Queries • Retrieving Query Results • Ensuring Secure SQL • Counting Returned Records • Updating Records with PHP	8
8.	**Cookies and Sessions** • Using Cookies • Using Sessions • Sessions and Cookies • Improving Session Security	4

Suggested Readings:

1. PHP and MySQL for Dynamic Web Sites: Visual Quickpro Guide, Second Edition by Larry Ullman
2. Programming PHP By Rasmus Lerdorf, Kevin Tatroe, Peter MacIntyre
3.JavaScript in 24 hours(SAMSTeach Yourself)) by Michael Moncur Second Edition.
4. Mastering JavaScript & Jscript by James Jaworski.

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MCA. S5.2– VB.NET AND ASP.NET

TOTAL MARKS 100 **TOTAL LECTURES 50**

Sr. No.	Topic	No. of Lect.
1.	**Welcome to Visual Basic.NET** • Windows versus Dos programming • Installing Visual Basic.NET IDE • Creating a simple Application Using the Help system	04
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.	04
3.	**Writing Software's** • Information and data • Variables • Comments and white space • Data types • Storing variables • Methods	04
4.	**Controlling the flow** • Making decisions • The if statement • Select case • Loops	04
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	04
6.	**Building Windows Applications** • Responding to Events • Building sample Application.	02
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.	04
8.	**Creating Menus** • Understanding Menu Features	04

	• Creating menus • Context menus	
9.	**Debugging and Error Handling:** • Major Error types • Debugging • Error Handling.	02
10.	**Working with ASP.NET** • The features of asp.net • Anatomy of ASP.NET pages • Introducing Web Forms • Vb.NET Web Applications and Other IDE Basics • Separating Content and Code-the Code –Behind Features • Application Configuration	06
11.	**ASP.NET Controls** • Using HTML Controls • Using Web Controls • Web Controls for Displaying and Formatting Data • Web Controls for Creating Buttons • Web Control for Inputting text • Web Control for selecting choices • Web Controls for Creating Lists • Creating a Simple ASP.NET Application	06
12.	**Validation Controls** • Data List Control • Building the XYZ Corporation Home page • User Controls • Saving State with the State Bag Object	06

Suggested Readings:

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

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MCA.S5.3- DATAWAREHOUSING

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction** • Basic Data Mining task • Data Mining Vs Knowledge discovery in databases • Data mining metrics • Social Implication of Data Mining	6
2.	**Related Concepts** • Database/OLTP systems • Information Retrieval • Decision Support Systems • Dimensional Modeling • OLAP • Web Search Engines	8
3.	**Data Mining Techniques** • Introduction • Statistical perspective on Data Mining • Decision Tree • Neural networks	6
4.	**Classification** • Introduction • Statistical based algorithms • Distance based algorithms • Decision tree based algorithms • Neural network based algorithm	8
5.	**Clustering** • Introduction • Hierarchical algorithms • Partitional algorithms • Clustering large databases	5
6	**Association Rules** • Introduction • Basic algorithms • Parallel and distributed algorithms	6
7	**Web Mining** • Introduction • Web content mining • Web structure mining • Web usage mining	6
8	**Introduction to Data Warehousing** • Data Warehousing – the only viable solution • Data Warehouse defined	4

Suggested Readings:

1. Data Mining – Introductory and Advanced Topics by Margaret H. Dunham & S. Shridhar
2. Data Warehousing Fundamentals by Paulraj Ponniah

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MCA.S5.4- MOBILE COMMUNICATION

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Wireless Transmission** • History and application of wireless communication • Frequencies for Radio Transmission • Signals • Antennas • Signal Propagation • Multiplexing • Modulation • Spread Spectrum.	8
2.	**Medium access control** • Motivation for a specialized MAC • SDMA • FDMA • TDMA • CDMA • Comparison of S/T/F/CDMA	8
3.	**Telecommunication System** • GSM • DECT • TETRA • UMTS and IMT-2000	6
4.	**Satellite System** • History • Application • Basics, Routing • Localization • Handover	6
5.	**Broadcast System** • Overview • Cyclical Repetition of data • Digital audio broadcasting • Digital Video broadcasting • Convergence of broadcasting and mobile Communications	8
6	**Wireless LAN** • Infra red vs radio transmission • Infrastructure and ad-hoc network • IEEE 802.11 • HYPERLAN • Bluetooth	6
7	**Mobile network layer** • Mobile IP • Dynamic host configuration protocol • Mobile ad-hoc networks	4

8	**Mobile transport layer** • Traditional TCP • Classical TCP improvements	4

Suggested Readings:

1. Data Mining – Introductory and Advanced Topics by Margaret H. Dunham & S. Shridhar
2. Data Warehousing Fundamentals by Paulraj Ponniah

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ELECTIVE -II
MCA.S5.5- I) MULTIMEDIA TECHNOLOGY

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr.No.	Topic	No. of Lect.
1.	**Multimedia Systems: An Introduction** • Introduction • Multimedia Elements • Multimedia Applications • Multimedia System Architecture • Evolving Technologies For Multimedia Systems • Multimedia Data Interface Standards • Multimedia Databases	5
2.	**Compression and Decompression** • The Need for Data Compression • Types of Compressions • Color, Gray scale and Still Image Compression:-JPEG,DCT • Video Image Compression:-H.261,MPEG,DVI • Audio Compression	6
3.	**Data and File Format Standards** • Rich Text Format, • TIFF File Format • Resource Interchange File Format(RIFF) • MIDI File Format • AVI File Format • MPEG Standards	5
4.	**Multimedia Input/Output Technologies** • Key Technologies issues • PEN Input • Video and Image Display Systems • Print Output Technologies • Image Scanners • Digital Voice and Audio • Digital Camera • Video images animation • Full Motion Video	7
5.	**Storage and Retrieval Technologies** • Magnetic media Technologies • Optical Media • Hierarchical Storage Management	6
6.	• **Multimedia Application Design** • Multimedia Application Classes • Types of Multimedia Systems • Virtual Reality Design • Components of Multimedia Systems • Organizing Multimedia Databases	6

7.	**Multimedia Authoring and User Interface** • Multimedia authoring systems • Hypermedia Application Design Considerations • User Interface Design • Object Display/Playback Issues	6
8.	• **Distributed Multimedia Systems** • Components of Distributed Multimedia System • Distributed Client-Server Operation • Multimedia Object Servers • Multiserver Network Topologies • Distributed Multimedia Databases	9

Suggested Readings:

1) **Multimedia Systems Design**- By Prabhat K Andleigh, Kiran Thakrar

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ELECTIVE-II
MCA.S5.5- II) DIGITAL IMAGE PROCESSING

TOTAL MARKS: 100 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction & Digital Image Fundamentals** • Introduction to DIP • Fundamental steps in DIP. • Components of an Image Processing System • Elements of Visual Perception • Structure of human eye • Image formation in the eye • Brightness, Adaptation and Discrimination • Lights and Electromagnetic Spectrum	9
2.	**Histogram Processing** • Histogram equalization • Histogram matching (specification) • Local histogram processing	5
3.	**Image Smoothing & Image Sharpening Using Frequency Domain Filters** Ideal lowpass filters • Butterworth lowpass filters • Gaussian lowpass filters • Ideal Highpass filters • Butterworth Highpass filters • Gaussian Highpass filters	6
4.	**Image Restoration & Reconstruction** A Model of the Image Degradation /Restoration Process Noise Models Inverse filtering	6
5.	**Color Image Processing** • Color Models • Pseudo color Image Processing • Color Transformation • Noise in color images • Color image compression	8
6.	**Wavelets & Multiresolution processing** • Image Pyramids • Subband coding • The haar transform	5
7.	**Image Compression** • Fundamentals • Image Compression model • Huffman coding • Golomb coding	6
8.	**Image Segmentation** • Edge linking and Boundary detection	5

	• Thresholding • Region based segmentation	

Suggested Readings:

1. R.C. Gonzalez R. E. Woods, *Digital Image Processing*, Third Edition, Pearson Education
2. Anil K. Jain, *Fundamentals of Image Processing*, PHI

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