

MCA Syllabus for Affiliated Colleges

New Syllabus w.e.f. (2014-15)

Credit distribution and details of CGPA System

M. C. A. First Year [Two Semesters]

Semester I				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA-101	Information Technology	1	3	4
MCA-102	Computer Architecture and Organization	1	3	4
MCA-103	Programming Methods	1	3	4
MCA-104	Introduction to Management function	1	3	4
MCA-105	Mathematical Foundations of Computer Science	1	3	4
MCA-106	Lab-1. Programming Methods using C	0	2	2
MCA-107	Lab-2. Soft Computing(IT)	0	2	2
MCA-108	Seminar -1 on Current Topic and Trends	1	0	1
Total Credits		6	19	25

Semester II				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA-201	Information system Analysis and Design	1	3	4
MCA -202	Data structures and Algorithm	1	3	4
MCA -203	Oral and Written Communication skills	1	3	4
MCA -204	Data Base Management System	1	3	4
MCA -205	Graph Theory	1	3	4
MCA -206	Lab- 3 (Data Structure)	0	2	2
MCA -207	Lab- 4 DBMS (My SQL)	0	2	2
MCA -208	Group Discussion	1	0	1
Total Credits		6	19	25

M. C.A. Second Year

Semester III				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA -301	Operating system	1	3	4
MCA -302	Foundations of OOPs	1	3	4
MCA -303	Management Information System Security	1	3	4
MCA-304	Data Communication	1	3	4
MCA-305	Probability and Statistics	1	3	4
MCA-306	Lab-5 Operating system Windows and Linux	0	2	2
MCA-307	Lab-6 (OOPs)	0	2	2
MCA-308	Seminar -2 on Current Topic and Trends	1	0	1
	Total Credits	6	19	25

Semester IV				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA-401	Software Engineering	1	3	4
MCA-402	Project Management	1	3	4
MCA-403	Advance Programming Techniques	1	3	4
MCA-404	Computer Network	1	3	4
MCA-405	Machine Learning	1	3	4
MCA-406	Lab-7 Advance Programming Techniques	0	2	2
MCA-407	Lab-8 Machine Learning	0	2	2
MCA-408	Industrial Talk / Visit /Seminar	1	0	1
	Total Credits	6	19	25

M. C.A. Third Year

Semester V				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA-501	Web Programming and Design	1	3	4
MCA-502	Information Security	1	3	4
MCA-503	Internetworking Protocols	1	3	4
MCA-504	Elective- I	1	3	4
A	E-Commerce			
B	Multimedia			
C	Cyber Forensic			
MCA-505	Elective-II	2	2	4
A	Cloud Computing			
B	Data Mining			
C	Compiler Design			
MCA-506	Practical -9 (Web Programming)	0	2	2
MCA-507	Practical 10 (Internetworking Protocol)	0	2	2
MCA-508	Mini Project	1	0	1
Total Credits		06	19	25

Semester VI				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA-601	Project Work**	13	12	25

MCA CGPA Syllabus (2014-15) for affiliated colleges

Semester	Internal Credits	External Credits	Total Credits
I	06	19	25
II	06	19	25
III	06	19	25
IV	06	19	25
V	06	19	25
VI	13	12	25
Total Credits	43	107	150

MCAS-101 Information Technology

(4 Credits)

Unit 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

Unit 2. Computer Memory

Primary and Secondary memory, Memory Hierarchy, Auxiliary Memory, Associate Memory, Cache Memory, Virtual Memory, Classification of computer

Unit 3. 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 alloc

Unit 4. 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 –

Unit 5. 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), Topologies, Protocols(Introduction), Media Access Methods – Ethernet, Arcnet (no Architecture), Communication Process, OSI – Layers(Introduction)

Unit 6. 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

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 - McGraw Hill

MCA -102 Computer Architecture & Organization

(4 Credits)

Unit 1. Number system

Introduction to Number system, Binary, Octal, Hexadecimal, binary-complement representation, BCD-ASCII, conversion of numbers from one Number system to the other, binary arithmetic. , Signed numbers, 1's and 2's complement method,

Unit 2. Logic Gates

Basic Logic Gates – Basic Theorems and Properties of Boolean Algebra – NAND, NOR implementation – Sum of Products – Product of Sums, Karnaugh map, Tabulation Method, Don't Care Conditions. Full Adder, Half Adder,

Unit 3. Processor Organization

General Register Organization - ALU - Instruction codes - Instruction Formats - Stack Organization - Addressing modes

Unit 4. Control Unit

Register transfer and micro operations, Timing and Control, Control Memory, micro programming, Hard wired control

Unit 5. 8085 Microprocessor

Internal Architecture, Instruction Set, Assembly Language programming

Unit 6. Input – Output organization

Peripheral Devices, Input – Output interface , Asynchronous Data Transfer (Strobe & Handshaking Method), Modes of Transfer ,Priority Interrupt , DMA ,

Suggested Readings:

1. M. Morris Mano, "Digital Logic and Computer Design", PHI.
2. M. Morris Mano, "Computer system architecture" Third Edition, PHI/ Pearson Education.
3. Albert Paul Malvino, Donald P. Leach, "Digital Principles and Applications", Tata Mc GrawHill Pub. Company Ltd.
4. J.P.Hayes, "Computer Architecture and Organization" Tata Mc Graw Hill Pub. Company Ltd

MCA-103 Programming Methods

(4 Credits)

Unit 1. Language Fundamentals

Introduction to Languages, Basic types of languages (Machine, Assembly, High level Languages), History of C Programming, Structures of 'C' Programming, Function as building blocks Character set, Tokens, Keywords, Identifiers, Variables and Constant, Data Types, comments, Types of operators, Operator Precedence and Associativity, Expression, Statement and types of statements

Unit 2. Built-in function and control structure

Console based I/O and related built-in I/O function: printf(), scanf(), getch(), getchar(), putchar() Control Structures, Decision making structures, Loop Control structures, Other statements : Break, Continue, Goto, exit

Unit 3. . 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 Arrays: One dimensional array :. Definition, declaration and initialization, . Accessing array elements, Displaying array elements, Sorting arrays, Arrays and function, . Memory representation of array, Two Dimensional array & Multidimensional array

Unit 4. Pointers and string Handling

Definition and declaration, Initialization of pointer, Indirection operator, address of operator Pointer arithmetic, Dynamic memory allocation, Arrays and pointers, Function and pointers Strings: Definition, declaration and initialization of strings, standard library functions : Implementation without using standard library Functions

Unit 5. Structures,

Definition and declaration, Variables initialization, Accessing fields and structure operations Nested structures, Union : Definition and declaration. Differentiate between Union and structure

Unit 6. C Processor and file Handling

C Preprocessor: Definition of Preprocessor, Macro substitution directives, File inclusion directives, Conditional compilation File handling: Definition of Files, Opening modes of files Standard function: fopen(), fclose(), eof(), fseek(),rewind() Using text files: fgetc(), fputc(), fprintf(), fscanf()

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

MCA -104 Introduction to Management functions (4 Credits)

Unit 1. Introduction to Management

Definition, Characteristics of management, Importance of Management, Administration , Management thoughts: Contribution of F.W. Taylor , Henry Fayol , Peter Drucker, etc Management process school, Systems Management School,

Unit 2. Planning and Controlling

Planning: Definition, Characteristics, Nature, Importance, Types of Plans:(Standing and Single Use Plans) , Planning Process Controlling: Concept, Definition, Principles of Controlling, Objectives of controlling, Importance of Controlling

Unit 3. Organizing

Concept, Definition, Process of organization, Principles of organization, Authority, Responsibility and Delegation, Forms of organization. Centralization and Decentralization

Unit 4. Leadership and Motivation

Concept of Leadership, Definition, Qualities of Leadership, Leadership Styles Motivation: Meaning and Definition, Theories of Motivation1. Maslow's Need Hierarchy McGregor's Theory "X" and Theory "Y"

Unit 5. Staffing

Human Resource Planning, Recruitment, Selection, Training, Training and development, Performance appraisal methods

Unit 6. Quality Concepts and Social responsibility of Business

Total Quality Management, ISO, Quality Circle Social Responsibility of Business: Definition, Responsibilities towards owners, workers, consumers, suppliers, state, society etc.

Suggested Readings:

1. Essentials Of Management: 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

MCA-105 Mathematical Foundation of Computer Science (4 Credits)

Unit 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

Unit 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

Unit 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

Unit 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

Unit 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,

Unit 6. Elements Of Coding Theory

Introduction, Definitions, Group Codes, Parity-Check and Generator Matrix

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 and 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.

MCA-106 Lab-1 Programming Method using C

MCA-107 Lab-2 Soft Computing (IT)

MCA-108 Seminar -1 on Current Topic and Trends

MCA-201 Information System Analysis and Design

(4 Credits)

Unit 1. System

Definition, Characteristics, elements and types of system. System Development Life Cycle, Role of system analyst, Initial investigation, Feasibility study-Technical, economic and behavioral feasibility, Cost and Benefit analysis.

Unit 2. System Analysis

Problem Definition, Information requirements, Information gathering tools, Tools of structured Analysis – Data Flow Diagrams, Data Dictionary, Decision Tree, Decision tables and structured

Unit 3. System Design and File Organization

Structured Design, Input design, and Output design, Form Design. File Organization: Sequential Indexed Sequential, Chaining and Inverted list organization.

Unit 4. System Implementation

Implementation Plan, activity network for conversion, combating resistance to change

Unit 5. System Testing

Test Plan AND test data, types of system test.

Unit 6. Hardware/Software Selection

Procedure for selection, Major phases in selection, Make v/s buy decision, Criteria for software selection.

Suggested Readings:

1. Awad, EM: System Analysis and Design, Galgotia Publications Pvt. Ltd
2. Gane and Sarson: Structured System Analysis and Design.
3. Silver, GA, Silver, ML: System Analysis and Design, Addison-Wesley Publishing Co

MCA – 202 Data structures and Algorithm

(4 Credits)

Unit 1. Introduction to Algorithm

Introduction to Algorithm, The efficiency of Algorithms, Analysis of Algorithms, overview of Space and Time Complexities, some fundamental algorithms for exchange , counting , summation .

Unit 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)

Unit 3. Tree and Graph

Minimum Spanning Trees, Growing a minimum spanning tree, The algorithms of Kruskal and Prim Graphs : DFS and BFS algorithms associated with Graphs, Single-source shortest Paths, The Bellman-ford algorithm,

Unit 4. 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.

Unit 5. Divide and Conquer Techniques

Divide and conquer, General method, Binary search, Merge sort Strassen's matrix multiplication

Unit 6. Advanced Data Structure

Introduction to Greedy method, The general method, Container loading knapsack problem, Introduction to Dynamic Programming, General method Introduction to NP Theory

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

MCA-203 Oral and Written Communication Skills

(4 Credits)

Unit 1. Oral Communication

Speaking with Correct Pronunciation/ Paralanguage ,Phonemes: English Vowels and Consonants Syllable, Accent, Intonation Word and Sentence Transcription Reading Phonetic Transcription

Unit 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

Unit 3. Developing Creative Writing

Note Taking & Note Making Skills, Essay Writing, Précis Writing, Oral Presentation Principles

Unit 4. Correspondences

Business Letters: Enquiry, Placing Supply Order, Complaint, Adjustment, Circular, Memo, Curriculum Vitae and Effective Profiling, British and American Format of Letters

Unit 5. Career Skills

Interviews: concept, purpose, types, procedure. Group Discussions: preparation and practice Meeting: notice, agenda, minutes Seminars: preparation and presentation

Unit 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

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

MCA- 204 Data Base Management System

(4 Credits)

Unit 1. Introduction to DBMS

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

Unit 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

Unit 3. Relational algebra and Normalization

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 Various normal forms and normalization process, First normal form, second normal form, third normal form, Basic concept of query execution.

Unit 4. Security aspects and Integrity mechanism

Basic threats, General defense mechanism, Authorization, identification and authentication policies, Discussions on roles of DBA, data dictionary, Basic integrity threats, General integrity model, Domain level constraints , referential constraints. .

Unit 5. Concurrency control

Basic concept of Transaction management, 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

Unit 6. Recovery management

Types of failures, Log based recovery – deferred and immediate mode, Check points, shadow page tables

Backup

Suggested Readings:

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

MCA-205 Graph Theory

(4 Credits)

Unit 1. Introduction to graphs:

Definition and examples of graphs, finite and infinite graphs, Incidence and degree, isolated vertex, pendent vertex and null graph, Isomorphism, Subgraphs, Walks, Paths, and circuits, Connected graphs, Disconnected graphs, components, Euler graphs, operations on graphs, Hamiltonian paths and circuits, Traveling Salesman problem.

Unit 2. Trees and fundamental circuits:

Definition and properties of trees, pendent vertices in a tree, distance and centers in a tree, rooted and binary trees, Spanning trees, fundamental circuits, cut sets and cut vertices, fundamental cut sets, Connectivity and separability, Network flows.

Unit 3. Planar and dual graphs:

Combinatorial vs. geometric graphs, planar graphs, Kuratowski's two graphs, Different representations of a planar graph

Unit 4. Matrix representation of graphs:

Incidence matrix, circuit matrix, path matrix, Adjacency matrix and their properties.

Unit 5. Directed graphs:

Definition and types of diagraphs, Directed Paths, Euler diagraphs, trees with directed edges.

Unit 6. Graph theoretic algorithms:

Some basic algorithms, shortest path algorithms

Suggested readings:

Textbook: Graph theory with applications to Engineering and Computer Science, Narsingh Deo, PHI

Reference Books:

1. A first look at Graph theory, John Clark and Derek Allan Holton Allied Publishers Ltd.
2. Graph Theory: F. Harare, Addison Wesley.

MCA-206 Lab -3 Data Structure

MCA-207 Lab-4 DBMS

MCA-208 Group discussion

MCA-301-Operating System (4 Credits)

Unit-1 Introduction

Introduction: System structure, user perspective, operating system services, system commands, assumption about Hardware, Shell Programming: Bourne shell and C shell programming, variables, constants, environments, control structures, shell scripts examples

Unit-2 Introduction to Kernel

Architecture of Unix Operating system, System concepts, kernel data structures, system administration,

Unit-3 Internal Representation of files

Inodes, Structure of a regular file, Directories, super block, Inode assignment to new file, allocation of disk blocks

Unit-4 System Calls for the file System

Open, Read, Write, file and recording locking, close, file creation, creation of special files, change directory and change root.

Unit-5 Structure of process

Process states & Transition, layout of system memory, layout of the kernel, Context of process, saving the context of the process, SLEEP

Unit-6 Process Control

Process creation, signals, process Termination, awaiting process termination, invoking other programs, UID of a process, changing the size of a process, The shell, system boot and the init process.

Suggested Readings:

1. The Design of the Unix operating System *by Maurice J. Bach*
2. Unix System Administration A Beginner's Guide *by Steve Maxwell publishing by McGraw-Hill/Osborne*
3. Learning the Unix Operating By Jerry Peek, Grace Todino & John Strang; ISBN 1-56592-390-1, 4th Ed. O'REILLY
4. William Stallings, Operating Systems, Prentice Hall.
5. Harvey M. Deitel, An introduction to operating systems. Addison-Wesley.

MCA-302 Foundations of OOPs (4 Credits)

Unit-1 Principle of OOP's

Procedural Vs Object Oriented Programming ,Classes, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism , Tokens, Keywords, Identifiers & Constants, Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator,

Unit-2 Basics of C++

A Brief History of C & C++ ,C Vs C++ ,A Simple C++ Program ,Application of C++ , Structure & Class ,Compiling & Linking , Defining Member Functions ,Making an Outside Function Inline ,Nesting of Member Functions, Private Member Functions, input and output statement.

Unit-3 Decision making, control structure and Functions

IF Structure, For, while, do-while, switch structure, The Main Function, Function Prototyping, Call by Reference, Call by Address, Call by Value, Return by Reference ,Inline Function,

Unit-4 Constructor & Destructor

Constructor ,Parameterized Constructor ,Multiple Constructor in a Class ,Constructors with Default Arguments ,Dynamic Initialization of Objects, Copy Constructor ,Dynamic Constructor ,Const Object ,Destructor

Unit-5 Operator Overloading & Type Conversion

Defining operator Overloading, Overloading Unary Operator ,Overloading Binary Operator, Overloading Binary Operator Using Friends ,Manipulating of String Using Operators, Type Conversion, Rules for Overloading Operators

Unit-6 Inheritance

Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance ,Virtual Base Classes, Abstract Classes ,Constructor in Derived Classes, Nesting of Classes

Suggested readings:

- 1.C++: The Complete Reference Herbert Schildt
- 2.Let us C++ Kanetkar
- 3.Object Oriented Programming with C++ E. Balagurusamy
- 4.C++ Primer Stanley Lippman & Lajoi
- 5.C++ Programming Language Bjarne Stroustrup
- 6.C++ Programming Bible Al Stevens & Clayton Walnut

MCA-303 Management Information System (4Credits)

Unit-1 Management Information system

Need, Purpose and objectives- contemporary approaches to MIS – Information as a strategic resource- use of information for competitive advantage- capital MIS as an instrument for the organizational change.

Unit-2 Information Management and Decision Making

Model of Decision Making – Classical, administrative and Herbert Simon's Models, Attributes of Information & its relevant to decision making – Types of Information.

Unit-3 Information Technology

Definition, IT Capabilities and their organizational impact – Telecommunication and Networks – Types and Topologies of Networks – IT in enabled Services such as call Centers, Geographical Information System etc.

Unit-4 DBMS & Systems Analysis and Design

Data warehousing and Data mining, System Development Life Cycle – Alternative Systems Building Approaches – Proto Typing Development Strategies-Structured Analysis - Prototyping- Rapid Developing Tools – CASE Tools –Object oriented systems (only introduction to these tools and techniques).

Unit-5 Decision Support System

Group Support System – Executive Information Systems - Executive Support Systems – Experts Systems and Knowledge based Experts Systems – Artificial Intelligence.

Unit-6 Management Issues in MIS

Information Security and controls- Quality assurance – Ethical and Social Dimension – Intellectual Property Rights as related to IT services/ IT products – Managing Global Information Systems.

Suggested Readings:

1. Management Information Systems-Laudon 7th Edition, Pearson Education , Asia.
2. Management Information Systems, Jawadekar Tata McGraw Hill.
3. Management Information Systems, Davis and Olson, Tata McGraw Hill.
4. Management Information Systems, Jayant Oke.

MCA-304 Data Communication (4 Credits)

Unit-1 Communication Fundamentals

Definition, Characteristics, components of Data communication system, Analog signal, noise, digital signal, conversion of analog to digital signal : Sampling, Quantizing, encoding.

Unit-2 Modulation

Modulation process: Analog modulation (Amplitude modulation, frequency modulation, phase modulation) , digital Modulation (Amplitude shift keying, Frequency shift keying, Phase shift keying, Quadrature phase shift keying,) Hybrid modulation

Unit-3 Multiplexing

Frequency division multiplexing, Time division multiplexing, Primary Mux, Higher order mux

Unit-4 Transmission media

Characteristics: Noise, attenuation, group delay, interference, guided transmission media (Copper cables, Fiber Optics cables) Unguided media(domestic radio, satellite communication, mobile radio.

Unit-5 Communication Model

Line connections, Transmission modes: Asynchronous transmission, synchronous transmission, Transmission techniques: Simplex, Half duplex, Full duplex.

Unit-6 Switching

Circuit, message, packet, Internet connection through PSTN, IEEE 802.3 Ethernet Frame Structure

Suggested Readings:

1. Data communication fundamentals- tilak De Silva
2. Data Communication and Networking, fourth edition- Behrouz A Forouzan, McGraw-Hill Forouzan Networking Series
3. Data communication and Computer Network- Er.Sourav Kumara Giri.
4. Data Communication and Computer Networks- Dr. P. Premchand

MCA-305 Probability and Statistics (4 Credits)

Unit-1 Basic Statistics

Measures of central tendency; Measures of dispersion; Moments, Skewness and Kurtosis, Linear correlation, Karl Pearson's coefficient of Correlation, Rank correlation. Simple linear regression model, coefficient of determination. Multiple linear regression models: least square procedures for model fitting, a matrix approach to least squares.

Unit-2 Probability Theory

Sample space, Events, Axioms of Probability, Addition and multiplication theorems on probability, Independent events, Conditional probability, Bayes Theorem

Unit-3 Random variables and Distribution

Random variables, Probability density functions and distribution functions, Marginal density functions, Joint density functions, mathematical expectations, moments and moment generating functions. Discrete probability distributions- Binomial, Poisson distribution, Continuous probability distributions- Uniform distribution and Normal distribution.

Unit-4 Testing of hypothesis I: Null and alternative hypothesis, types of errors, level of significance, critical region, Large sample tests: Testing of hypothesis concerning mean of a population and equality of means of two populations.

Unit-5 Testing of hypothesis II: Small sample tests: t Test-for single mean, difference of means. Paired t-test, Chi-square test, F test - test for equality of two population variances. Estimation: Point estimation, interval estimation and central limit theorem (Statement only).

Unit-5 Analysis of Variance: One-way classification fixed effects model, comparing variances, pair wise comparisons, randomized complete block design.

Suggested Readings:

1. Probability & Statistics for Engineers and Scientists, Walpole, Myers, Myers, Ye. Pearson Education.
2. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill
3. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Trivedi, Prentice Hall of India.
4. Probability and statistics for engineers: Erwin Miller And John E.Freund. Prentice-Hall of India / Pearson, Sixth edition.
5. Text book of Probability and Statistics by Dr.Shahnaz Bathul, V.G.S.Publishers 2003.
6. Susan Milton and Jesse C. Arnold Introduction to Probability and Statistics Fourth edition, TMH.
7. William Mendenhall, Robert J Beaver, Barbara M Beaver Introduction to Probability and Statistics 12th edition, Thomson.
8. Introduction to Mathematical Statistics -Robert V. Hogg &Allen T. Craig.
9. Fundamentals of Statistics: S.C.Gupta, 6th 2004, Himalaya Publications.
10. Introduction to Probability and Statistics, Medenhall, Thomson Learning,

MCA-306 Lab-5 Operating System windows and Linux (4Credits)
MCA-307 Lab-6 (OOPs) (4 Credits)
MCA-308 Seminar -2 on Current Topic and Trends (1 Credits)

MCA IV Semester CGPA

MCA-401 Software Engineering (4 Credits)

Unit-1 Product and Process

Evolving role of Software, Software Characteristics, Software Applications, Crisis on the Horizon, Software Myths, A layered Technology, software process model, Evolutionary software process models, Component based development, fourth generation techniques, process and product.

Unit-2 Managing Software Project

Introduction, Project Management Concepts, Software Process and Project Metrics.

Unit-3 Conventional Methods for Software Engineering

Introduction, System Engineering, Analysis Concepts and Principles, Analysis Modeling.

Unit-4 Software Design concept

Design Concepts and Principles, Architectural Design, User Interface Design, Component-level Design.

Unit-5 Software Testing Techniques

Software testing Strategies, Testing tactics.

Unit-6 Object- Oriented Software Engineering

Introduction, Object-Oriented Concepts and principles, Objected-Oriented Analysis, Object-Oriented Design, Object-Oriented Testing, Technical Metrics for Object-Oriented Systems.

Suggested Readings:

1. Pressman, *Software Engineering a Practitioners Approach*, 5th Edition, TMH.
2. Jalota Pankaj, *An integrated approach to software Engineering*, Narosa Pub.
3. Jawadkar, *Software Engineering*, TMH Pub.
4. Sommerville, *Software Engineering* , Pearson Education.

MCA -402 Project Management (4 Credits)

Unit-1 Fundamentals of Project Management

Definition, Characteristics of Project, Types of Project, Project Phases, Project management Process, Project life cycle

Unit-2 Project formulation

Significance of project formulation, Project formulation, Feasibility analysis, technical analysis and financial analysis, cost of project, financing and estimates of sales of project.

Unit-3 Risk and Uncertainty Decisions

Project risk, types of project risk, identifying the risk, risk category, methods using risk identification,, Project risk Analysis, qualitative analysis and quantitative analysis, sensitivity analysis, break even analysis, cost of capital and capital budgeting.

Unit-4 Project scheduling and Control

Definition of Project scheduling, Project controls and importance, Network techniques of Project Management: Gantt chart, CPM, PERT

Unit-5 Software Project Management

Nature of Software and Software Development, software between computers and people, software quality, Software quality assurance, relation between software quality and software productivity, risk reduction, Role of project manager in software development

Unit-6 Project Management Information System (PMIS)

Concept of PMIS, components of PMIs, choosing and implementing PMIS, benefit of PMIS. Common errors managing PMIS

Suggested readings:

1. Project Management, S. Chaudhary, Tata McGraw Hill
2. Project-Preparation, Appraisal, Budgeting and Implementation, Prassna Chandra, Tata McGraw Hill.
3. Software Project Management , Bob Hughes and Mike Cotterell, Tata McGraw Hill
4. Software Projrct Management : Areal-world Guide to Success, Joel Henry, Pearson education.

MCA-403 Advanced Programming Techniques (4 Credits)

Unit-1 Introduction to Internet Programming

Client Server model, Browsers - Graphical and Hypertext Access to the Internet, HTTP – Hyper Text Transfer Protocol.

Unit-2 Creating Internet, World Wide Web pages

HTML – Hyper Text Markup Language, Headers, body, html tags, tables Text, graphics, sounds, video clips, multi-media, Client side image mapping, web page counters, HTML resources, HTML converters and tools.

Unit-3 HTML forms and scripting

Building a form, Text fields and value, size, maxlength, html buttons, radio, checkboxes, prechecked. Selection lists, Introduction to CGI scripting. Action and Method - GET and POST. HTML form interface with CGI scripts. Automating processing such as info forms and email. Programming CGI interfacing via forms.

Unit- 4 Introduction to Java

Introduction to Java, Javac, Java class libraries, JDK, jdbc, Java Byte Codes. Classes and Objects, Applets, Applet parameter passing Control Structures. Basic Windows, mouse and buttons Events, the Java event model. Basic I/O. JAR Files, Java archiver.

Unit- 5 Advanced Java Programming

Graphic User Interface with AWT. AWT calls, Windows, dialog boxes, pop-up menus. Graphics. Using a Layout manager. Manipulating Images. Image animation..

Unit-6 XML Technologies

XHTML(Extensible HTML) - A stricter and cleaner XML based version of HTML. XML DOM (XML document object model)- A standard document model for accessing and manipulating XML.

Suggested readings:

1. Deitel and Deitel. "Java - How to Program", Addison-Wesley Press,
2. “Web Technologies” by Kahate Godbole.
3. “Database and XML Technologies” by A.W. Ganczarski.
4. Scott Oaks and Henry Wong. "[Java Threads](#)", O'Reilly and Associates Publishing, Sebastopol, CA.
5. Gary Cornell, Cay Horstmann. "Core Java", SUN Soft Press Publishing, Mountain

MCA-404 Computer Networks (4 Credits)

Unit-1 Introduction

Uses of Computer Networks, Network hardware, Software, OSI Reference model, example of network.

Unit -2 Physical Layer

Guided and unguided transmission media, wireless communication, communication satellites, public switched telephone network, the mobile telephone system

Unit-3 Data link layer

Data link layer design issues, error detection and correction, elementary data link protocols, sliding window protocols, protocols verification, examples of data link protocols: HDLC

Unit -4 Medium access control sub layer

Channel allocation problem, multiple access protocols: AIOHA, CSMA, CSMA/CD Ethernet, wireless LAN, Broadband wireless, Bluetooth

Unit- 5 Network layer

Design issues, Routing algorithm, optimality principle, shortest path routing, Flooding

Unit -6 Distance vector routing, Link state routing, Hierarchical routing, multicast routing, congestion control algorithms

Suggested readings:

1. A. S. Tanenbaum, *Computer Network*, PHI Pub.
2. Forouzan, *Computer Network*, TMH.
3. Black, *Computer Network*, PHI Pub.
4. Douglas E, Comer, *Internetworking with TCP/IP*, PHI Pub.

MCA -405 Machine Learning (4 Credits)

Unit – 1 Introduction to Fuzzy Sets & Crisp Sets

Fuzzy Sets: Basic Types, Fuzzy Sets: Basic Concepts, Fuzzy Sets Vs Crisp Sets, Additional Properties of alpha cuts, Presentation of fuzzy sets.

Unit – 2 Operations on Fuzzy Sets

Fuzzy complements, Fuzzy Union, Fuzzy Intersections, Crisp & Fuzzy Relation, Binary Fuzzy Relation, Binary Relation on single set, Fuzzy Equivalence Relations, Fuzzy Compatibility Relation

Unit – 3 Introduction to ANN

Biological Neuron and Artificial Neuron Model, McCulloch-Pits Neuron Model, Perceptron Classification, Linearly Separability, XOR Problem, Overview of Neural Network, Architecture, Learning Rules, Supervised Learning, Unsupervised Learning, Perceptron Learning, Reinforcement Learning, Delta Learning Rule.

Unit – 4 Multilayer Feed forward

Generalized Delta Learning, Back propagations training algorithm and derivation of weight, Variant in Back propagations.

Unit – 5 Fuzzy System and Neuro Fuzzy System

Fuzzy neurons, Fuzzy Neural Network, Fuzzy associative memory

Unit-6 Application of Fuzzy Sets and Neural Network

Feature Extraction, Application in Pattern Recognition, Introduction to Multibiometric Identification System.

Suggested readings:

1. Fuzzy Sets and Fuzzy Logic Theory and Application *By- George J. Klir, Bo Yuan*
2. Fuzzy Sets Uncertainty and Information *By- George J. Klir, Tina A. Floger*
3. Introduction to the Theory of Neural Competition *By- John hertz, Krogh and Richard Addison Wesely*
4. Artificial Neural Systems *By Jack M. Zurada West Publishing Company, 1992.*
5. Fuzzy Logic with Engineering Applications', *By Timothy J. Ross, 'McGraw Hill, 1997.*
6. Neural Networks A CLASS ROOM APPROACH *By Satish Kumar, Tata McGraw – Hill Publishing.*
7. Laurance Fausett, 'Fundamentals of Neural Networks', Pearson Education, 2004.
8. David Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Pearson Education, 2007.
9. J.S.R.Jang, C.T.Sun and E.Mizutani, ' Neuro- Fuzzy and Soft Computing' Pearson Education, New Delhi, 2004
10. Jacek M. Zurada, 'Introduction to Artificial Neural Systems', Jaico Publishing home, 2002.
11. John Yen and Reza Langari, 'Fuzzy Logic – Intelligence, Control and Information'

MCA-406 Lab-7 Advance Programming Techniques (4Credits)

MCA-407 Lab-8 Machine Learning (4 Credits)

MCA-408 Industrial visit/Seminar (1Credits)

Seminar is, generally, a form of academic instruction, at a department or university. Students may engage in original research, exploration, practice, and/or synthesis of ideas. Results are exchanged through reports, demonstrations, and/or discussions.

A seminar may include a presentation by the student. Students are expected to prepare for and participate actively in seminars by giving a paper, answering questions or discussing subject matter in front of Head and faculty.

The idea behind the seminar system is to familiarize students more extensively with the methodology of their chosen subject and also to allow them to interact with examples of the practical problems that always crop up during research work.

It is essentially a place where assigned readings are discussed, questions can be raised and debates conducted. It is relatively informal, at least compared to the lecture system of academic instruction.

MCA III Year V Semester

MCA 501 -Web Programming and Design

4 Credits

Unit -1 Introduction to Dynamic Web Content

HTTP and HTML: Berners-Lee's Basics, the Benefits of PHP, MySQL, and JavaScript, The Apache Web Server Setting up a Development Server : What is a WAMP, MAMP, or LAMP?, Installing a WAMP on Windows, Installing a LAMP on Linux, Working Remotely, Using a Program Editor, Using an IDE

Unit- 2 Introduction to PHP

Incorporating PHP within HTML, The Structure of PHP, Expressions and Control Flow in PHP , Expressions, Operators, Conditionals, Looping, Implicit and Explicit Casting, PHP Dynamic Linking

Unit- 3 PHP Functions and Objects

PHP Functions, Including and Requiring Files, PHP Version Compatibility, PHP Objects, PHP Arrays : Basic Access, The foreach...as Loop, Multidimensional Arrays, Using Array Functions,

Unit -4 Practical PHP

Using printf, Date and Time Functions, File Handling, Introduction to MySQL: MySQL Basics, Summary of Database Terms, Accessing MySQL via the Command Line, Indexes

Unit- 5 Accessing MySQL Using PHP

Querying a MySQL Database with PHP, Practical MySQL,

Unit- 6 Form Handling

Building Forms, Retrieving Submitted Data,

Recommended Books

1. Learning PHP, MySQL, and JavaScript By Robin Nixon (Published by O'Reilly Media, Inc.,)
2. PHP Cookbook 2nd Edition By Adam Trachtenberg and David Sklar
3. PHP: The Good Parts By Peter B. MacIntyre
4. Visual Quickpro Guide PHP 6 And MySQL 5 By Larry Ullman
5. PHP Solutions Dynamic Web Design Made Easy (2006) By David Powers
6. Learning PHP and MySQL By Michele E. Davis and Jon A. Phillips
7. Learning PHP, MySQL, and JavaScript By Robin Nixon

MCA-502: Information Security

Credits: 4

Course Objectives

- To understand the basic categories of threats to computer and network.
- To understand intrusion and intrusion detection.
- To defend the need for protection, security, and the role of ethical consideration in computer use.
- To describe efficient basic number algorithms.
- To discuss the fundamental ideas and algorithms of secret key, cryptography and public-key cryptography.

Unit – 1. Introduction to Cryptography

Active vs. passive attacks, Layers and cryptography, Authorization, Viruses, Worms, Trojan horses, The multi level model of security, Legal issues, What is cryptography? Breaking an encryption scheme, Types of cryptographic functions, Secret key cryptography, Public key cryptography, Hash algorithms.

Unit- 2. Secret Key Cryptography

Generic block encryption, Data encryption standards, International data encryption algorithm, Advanced encryption standard.

Unit –3. Modes of Operation, Hashes and Message Digests

Encrypting a large message, Generating MACs, Multiple encryptions DES, MD2, MD4, MD5, SHA-1, HMAC.

Unit – 4 Public Key Algorithms

Modular arithmetic, RSA, Diffie-Hellman, Digital signature standard, Elliptic curve cryptography.

Unit –5 Number Theory and Authentication

Password based and Cryptographic based authentication protocol.

Unit – 6 Cryptographic Standards

Kerberos, PKI, IPsec.

Text Books

1. Kaufman Charlie, Perlman Radia, Speciner Mike, *Network Security: Private Communication in public World*, PHI publication, 2001.
2. William Stallng, *Network Security Essentials: Applications and Standards*, 2nd edition, Prentice Hall publication, 2002.
3. William Stallng, *Cryptography and Network Security*, Prentice Hall publication, 2003.

Reference Books

1. Vyless, *Internet Security Protocol*, Pearson publication.
2. Comer D.E., *Internetworking with TCP/IP*, 5th edition, Pearson publication, 2006.
3. Morrison, *Information Security-An Overview*, PHI publication, 1995.
4. Hunter, Berlin, *Information Security Handbook-Computer communications and Networks*, Springer publication, 2007.

MCA-503 Inter-networking Protocols

4 Credits

Unit - 1

Review of Networking Technologies and Internetworking Concepts and Architectural Model: Application level and network level interconnection, Properties of the internet, Internet architecture, Interconnection through IP routers.

Unit - 2

Internet Addresses, Mapping Internet Addresses to Physical Addresses (ARP) & Determining an Internet Addresses at Startup (RARP): Universal identifiers, Three primary classes of IP addresses, Network and broadcast addresses, Limited broadcast, Dotted decimal notation, Weakness in internet addressing, Loopback addresses, Address resolution problem, Two types of physical addresses, Resolution through direct mapping, Resolution through dynamic binding, Address resolution cache, ARP to other protocols, Reverse address resolution protocol, Timing RARP transaction, Primary and backup RARP servers.

Unit3 – 3 Internet Protocol

Connectionless Datagram Delivery and Internet Protocol: Routing IP Datagram:

The concepts of unreliable delivery, Connectionless delivery system, Purpose of the internet protocol, The internet datagram, Routing in an internet, Direct and indirect delivery, Table driven IP routing, Next hop routing, Default routes, Host specific routes, The IP routing algorithm, Handling incoming datagrams, Establishing routing tables.

Unit – 4 Internet Protocol

Error and Control Message (ICMP) and Subnet and Supernet Address Extension: The internet, Control message protocols, Error reporting versus error detection, ICMP message format, Detecting and reporting various network problems through ICMP, Transparent router, Proxy ARP, Subnet addressing, Implementation of subnets with masks representation, Routing in the presence of subnets, A unified algorithm.

Unit – 5 User Datagram Protocol (UDP)

Format of UDP message, UDP pseudo header, UDP encapsulation and protocols layering and the UDP checksum computation, UDP multiplexing, De-multiplexing and ports.

Unit – 6 Reliable Stream Transport Service (TCP)

The transmission control protocol, Ports, Connections and endpoint, Passive and active opens, The TCP segment format, TCP implementation issues.

Text Books

1. Douglas E. Comer, *Internetworking with TCP/IP: Principles, Protocols and Architecture*, Volume 1, 5th edition, PHI publication, 2006.
2. Behrouz A. Forouzan, *TCP-IP Protocol Suite*, 3rd edition, Mc-Graw Hill publication, 20

Reference Books

1. Comer, *Internetworking with TCP-IP Vol. 3*, 2nd edition, Pearson publication, 2001.
2. W. Richard Stevens, *Unix Network Programming: Interprocess Communications*, Volume 2, 2nd edition, PHI publication, 1999.

3. William Stalling, *SNMP SNMPv2, SNMPv3, and RMON 1 and 2*, 2nd edition, Pearson Education publication, 2001.

4. Hunt Craig, *TCP-IP Network Administration*, 3rd edition, PHI publication, 2002.

Elective- I: MCA-504 -A: E-Commerce

(4 Credits)

Unit -1. Introduction to E-Commerce

Electronic Commerce Framework, Electronic Commerce and Media Convergence, Anatomy of E-Commerce, Electronic Commerce Applications. The Network Infrastructure for Electronic Commerce: Components of the I-way, Network Access Equipment, Global information Distribution Networks.

Unit -2.The Internet as a Network Infrastructure

The Internet Terminology, NSFNET Architecture and components, National Research and Education Network, Internet Governance. The Business of Internet Commercialization: Telco/Cable/On-Line Companies, National Independent ISPs, Regional Level ISPs, Local level ISPs, Internet Connectivity options.

Unit -3. Electronic Commerce and the World Wide Web

Architectural Framework for Electronic Commerce, Technology behind the Web, Security and the Web, Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications, Mercantile Process Model.

Unit 4. Electronic Payment Systems

Types of Electronic Payment Systems, Digital Token based Electronic Payment Systems, Credit Card Based Electronic Payment Systems, Risk and Electronic Payment Systems, Designing Electronic Payment Systems. Inter Organizational Commerce and EDI: Electronic Data Interchange, EDI Applications in Business, EDI: Legal, Security and Privacy issues.

Unit 5. Advertising and the Marketing on the Internet

The New Age of Information, Advertising on Internet, Information search and retrieval, Electronic Commerce Catalogs, Information filtering.

Unit 6. On-Demand Education and Digital Copyrights

Computer Based Education and Training, Technological Components of Education on demand, Digital Copyrights. Software Agents: Characteristics and Properties of Agents, the Technology behind Software Agents, Browsers and Software Agents.

Suggested Readings:

1. Frontiers of Electronic Commerce, Ravi Kalakota, Andrew B. Whinston, Pearson Education.
2. E-Commerce: Business, Technology, Society, Ken Laudon, Jeffrey Travis, Prentice Hall.

Elective- I :MCA-504 –B- MULTIMEDIA SYSTEM

(4 Credits)

Unit -1 Introduction to Multimedia System

Multimedia elements, Multimedia applications, Global structure, Technologies for Multimedia systems.

Unit- 2 Multimedia: Media & Data Streams

Multimedia: media & data streams, Properties, Traditional data stream characteristics, Data stream characteristics for continuous media, Information units.

Unit -3 Sound / Audio

Sound Concepts, Music: MIDI Concepts, MIDI devices, MIDI messages, MIDI software, Speech: Speech generation, Speech Analysis, Speech Transmission.

Image And Graphics Digital Image Representation, Image Formats, Graphics Formats, Image Processing: Image Synthesis, Image Analysis, Image Transmission.

Unit -4 Video & Animation

Basic concepts, Television (Conventional systems, Enhanced definition systems, High Definition system), Computer based Animation.

Unit -5 Data Compression

Storage space, Coding requirements, Source Entropy & Hybrid coding, Basic compression techniques, Introduction to following compression techniques: JPEG, H.261 (PX64), MPEG ,DVI

Unit- 6 Optical Storage Media & Retrieval Technologies

Basic Technology, Video Disk & other WORMS, CD ROM, CD ROM Extended Architecture, Compact Disk Magneto optical.

Suggested Readings:

1. Multimedia System Design By P. K. Andleigh, Kiran Thakrar.
2. Multimedia Computing Communication & Application. By Ralf Steinmetz, & Klaranashtedt. (Pearson Education)

Elective- I : MCA-504-C- Cyber Forensics

(4 Credits)

Unit -1 Forensics Fundamentals

Introduction to Forensics, Use of Forensics, Forensics assistance to Human, Forensics Services, Benefits of Forensics.

Unit- 2 Types of Forensics

Types of Forensic Technology in various domain, Spyware, Adware, Encryption Methods and Vulnerabilities, Data Protection, Internet Tracing Methods, Avoiding Pitfalls with Firewalls.

Unit -3 Types of Forensic Systems

Internet Security System, Intrusion Detection Systems, Firewall Security Systems, Network security Systems, Network Disaster Recovery, Public Key Infrastructure, Wireless Network Security, Satellite Encryption Security, Net Privacy.

Unit -4 Vendor and Forensics Services

Occurrence of Cyber Crime, Cyber Detectives, Forensics Investigation Services, Forensic Process Improvement.

Unit -5 Forensic Evidence and Capture

Data Backup and Recovery , Data Recovery Solutions, Evidence Collection Options, Obstacles, Types and Rules of Evidence, Methods and Collection Steps, Evidence Processing Steps.

Unit- 6 Computer Forensic Analysis

Discovery of Electronic Evidence, Identification of Data, Reconstructing Past Events.

Suggested Readings:

1. Computer Forensics, Computer Crime Scene Investigation. By John R. Vacca, Charles River Media, INC.
2. Computer Forensics and Investigations, by Nelson, Phillips Enfiger, Steurat, Cengage Learning.

Elective-II: MCA- 505-A-CLOUD COMPUTING

Credit 4.

Unit –1 Introduction

Essentials, Benefits and need for Cloud Computing - Business and IT Perspective - Cloud and Virtualization - Cloud Services Requirements - Cloud and Dynamic Infrastructure – Cloud Computing Characteristics Cloud Adoption.

Unit – 2 Cloud Models

Cloud Characteristics - Measured Service - Cloud Models - Security in a Public Cloud Public versus Private Clouds - Cloud Infrastructure Self Service Cloud as a Service: Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy Cloud Design and Implementation using SOA - Conceptual Cloud Model - Cloud Service Defined

Unit – 3 Cloud Solutions

Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloud sourcing. Cloud Offerings: Information Storage, Retrieval, Archive and Protection - Cloud Analytics Testing under Cloud - Information Security - Virtual Desktop Infrastructure - Storage Cloud. Cloud Management: Resiliency – Provisioning - Asset Management - Cloud Governance – High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering.

Unit – 4 Cloud Virtualization Technology

Virtualization Defined - Virtualization Benefits – Server Virtualization - Virtualization for x86 Architecture - Hypervisor Management Software – Logical Partitioning (LPAR) - VIO Server - Virtual Infrastructure Requirements. Cloud Virtualization: Storage virtualization - Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Virtualized Data Center.

Unit –5 Cloud and SOA

SOA Journey to Infrastructure - SOA and Cloud - SOA Defined - SOA and IaaS - SOA-based Cloud Infrastructure Steps - SOA Business and IT Services.

Unit – 6 Cloud Infrastructure Benchmarking

OLTP Benchmark - Business Intelligence Benchmark - e-Business Benchmark - ISV Benchmarks - Cloud Performance Data Collection and Performance Monitoring Commands - Benchmark Tools.

Text Book:

1. Cloud Computing – Insight into New Era Infrastructure, Dr. Kumar Saurabh, Wiley India.

Reference Books:

1. Cloud Computing, Roger Jennings, Wiley India
2. Cloud Computing Explained, John Rhoton, Recursive Press
3. Cloud Computing Bible, Barry Sosinsky, Wiley
4. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Wiley
5. Cloud Computing for Dummies, Judith Hurwitz, Wiley Publishing.
6. The Cloud at your service, Rosenberg and Matheos, Manning Publications

Elective II: MCA-505-B: Data Mining

Credit 4

Unit-1 Introduction

Basic Data Mining task, Data Mining Vs Knowledge discovery in databases, Data mining metrics

Social Implication of Data Mining , **Related Concepts**

Unit-2 Data Mining Techniques

Introduction, Statistical perspective on Data Mining, Decision Tree, Neural networks

Unit-3 Classification

Introduction, Statistical based algorithms, Distance based algorithms, Decision tree based algorithms, Neural network based algorithm

Unit-4 Clustering

Introduction, Hierarchical algorithms, Partitional algorithms, Clustering large databases

Unit-5 Association Rules

Introduction, Basic algorithms, Parallel and distributed algorithms

Unit-6 Web Mining & Introduction to Data Warehousing

Introduction, Web content mining, Web structure mining, Web usage mining,

Suggested Readings:

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

References:

1. Raph Kimball, "Data Warehouse Toolkit", John Wiley and Sons Publications.
2. Michael. J. Berry, Gordon Linoff, "Data Mining Techniques: Marketing, Sales, Customer support", John Wiley and Sons.

Elective II: MCA-505-C Compiler Design

4 Credits

Unit – 1 Introduction to Compiling and Lexical Analysis

Definition, analysis of the source program, the phases of a compiler, the grouping of phases, Compiler- Construction tools, The role of the Lexical analyzer, Input buffering, Specification of Tokens, A Language for Specifying Lexical Analyzers, Design of a Lexical Analyzer generator.

Unit – 2 Syntax Analysis

The role of the Parser, Context-free grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Operator-precedence Parsing, LR-Parsers, Using Ambiguous Grammars, Parser Generators.

Unit – 3 Syntax-Directed Translation

Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-attributed definitions, Top-Down Translation, Bottom-Up Evaluation of Inherited attributes.

Unit – 4 Intermediate Code Generation

Intermediate Languages, Declarations, Assignment Statements, Boolean Expressions, Case Statements, Back patching, Procedure Calls.

Unit – 5 Code Generation

Issues in the Design of a Code Generator, The target Machine, Run-Time Storage Management, Basic Blocks and Flow Graphs, Next-Use Information, Simple Code Generator, Register allocation and Assignment, The DAG Representation of Basic Blocks, Generating Code from DAGs, Dynamic Programming, Code-Generation Algorithm, Code-Generators.

Unit – 6 Code Optimization

Peephole Optimization, Principal sources of optimization, Introduction to Global data flow analysis.

Text Books:

Aho, Sethi, Ullman, *Compilers-tools and Techniques*, Addison Wesley, 1987

Trembley, Sorenson, *Theory and Practice of Compiler Writing*, McGraw Hill, 1984.

Hopcroft, *Introduction to Automata Theory, Languages and Computation*, Pearson Publication.

Reference Books:

Paul G. Sorenson, *Compiler Writing*, Tata McGraw Hill.

Hunter, *The Essence of Compilers*, Pearson Publication.

Lewis, *Elements of the Theory of Computation*, Pearson Publication

MCA-506

Practical -9 (Web Programming)

MCA-507

Practical 10 (Internetworking Protocol)

MCA-508

Mini Project

MCA VI Semester

MCA-601 Project