Vikram University, Ujjain

Board of studies in Computer science

SYLLABUS of MCA(Computer Science) Programme

[Choice Based Credit System & Grading System (CBCS& GS)]

Exclusively for University Teaching Department (ICS,VUU)

(Effective from Academic Session 2018-19)

[Modified as according to the provision of "Ordinance 14 : Choice Based Credit System"

In the meeting of Board of studies in Computer science held on 30/07/2018 and (Effective the Academic Session 2018-19)

VIKRAM UNIVERSITY,UJJAIN

BOARD OF STUDIES IN COMPUTER SCIENCE

THREE YEAR MCA (FULL TIME) PROGRAMME of UTD (ICS,VUU)

[Choice Based Credit System & Grading System (CBCS& GS)]

(Effective from Academic Session 2018-19)

COURSE STRUCTURE

MCA - FIRST SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Inter nal	Max Marks	Credits* C	Distribution of Credits L	T	P
1	Core Course	MCA-101	Discrete Mathematical structure	60	40	100	6	4	2	
		MCA-102	Operating system & system software	60	40	100	6	4		2
2	Course for Ability Enhancem ent & skill Developme nt (AE & SD)	MCA-103	Entrepreneurship Development	60	40	100	4	4		
			Choose any one From MCA 104- E1 and 104- E2							
3	Elective Discipline Centric	MCA 104-E1	Computer organisation & Architecture	60	40	100	6	4	2	
		MCA 104-E2	System Analysis and Design	60	40	100	6	4	2	
			Choose any one From MCA 105-E1 , 105-E2 and 105-E3							
4	Elective Generic Categories	MCA 105-E1	Object oriented programming using C++	60	40	100	6	4	2	
		MCA 105-E2	Financial Accounting and Organisational Behaviour	60	40	100	6	4	2	
		MCA 105-E3	Any Course from Massive Open Online Courses (MOOCs)available at SWAYAM	60	40	100	6	4	2	
5		MCA-106	Comprehensive Viva Voce	50	-	50	04 Virtual (VR)			
			Total			550	28+4	20	06	02

(C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials & Practical Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial) and two hours (120 minutes) for practical

Note: (1) The students will have the choice to opt a course under the category of Elective Courses available within the UTD (ICS, VUU) or in other UTDs but from same level of the programmes. (2)An alternative choice will also be available to the students to opt a course in each semester under elective-generic category including skill development course from Massive Open Online Courses (MOOCs) available at SWAYAM plate form. (3) The student can also opt a course under Elective- Discipline Centric category from Massive open online courses (MOOCs) available at SWAYAM plate form. In such cases, the provisions "Ordinance 14 : Choice Based Credit System" shall be applicable and the conditions mentioned therein will need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.

MCA - SECOND SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Inter nal	Max Marks	Credits*	Distribution of Credits		
							C	L	T	P
			Core Courses							
1	Core Course	MCA-201	Data Structure Using C++	60	40	100	6	4		2
		MCA-202	Data Base Management System	60	40	100	6	4	2	
2	Course for Ability Enhancem ent & skill Developme nt (AE & SD)	MCA-203	Communication Skills	60	40	100	4	4		
			Choose any one From MCA 204- E1 and 204- E2							
3	Elective Discipline Centric	MCA 204-E1	Theory of Computation	60	40	100	6	4	2	
		MCA 204-E2	Internet Programming	60	40	100	6	4	2	
			Choose any one From MCA 205-E1 , 205-E2 and 205-E3							
4	Elective Generic Categories	MCA 205-E1	Computer Oriented Optimization Technique	60	40	100	6	4	2	
		MCA205-E2	Computer System Architecture and parallel Processing	60	40	100	6	4	2	
		MCA 205-E3	Any Course from Massive Open Online Courses (MOOCs)availabl e at SWAYAM	60	40	100	6	4	2	
5		MCA-206	Comprehensive Viva Voce	50	-	50	04 Virtual (VR)	20	06	02
			Total			550	28+04			

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*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial) and two hours (120 minutes) for practical

Note: (1) The students will have the choice to opt a course under the category of Elective Courses available within the UTD (ICS, VUU) or in other UTDs but from same level of the programmes. (2)An alternative choice will also be available to the students to opt a course in each semester under elective-generic category including skill development course from Massive Open Online Courses (MOOCs) available at SWAYAM plate form. (3) The student can also opt a course under Elective- Discipline Centric category from Massive open online courses (MOOCs) available at SWAYAM plate form. In such cases, the provisions "Ordinance 14 : Choice Based Credit System" shall be applicable and the conditions mentioned therein will need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.

MCA - THIRD SEMESTER

SN	Course Type	Course code	Title	End term sem Exam	Internal	Max Marks	Credits*	Distribution of Credits		
							C	L	T	P
1	Core Course	MCA-301	Theory of Compiler Design	60	40	100	6	4	2	
		MCA-302	Data Communication and Computer Network	60	40	100	6	4		2
2	Course for Ability Enhancement & skill Development (AE & SD)	MCA-303	Personality Development	60	40	100	4	4		
Choose any one From MCA 304- E1 and 304- E2										
3	Elective Discipline Centric	MCA 304-E1	Computer Graphics and Multimedia	60	40	100	6	4	2	
		MCA 304-E2	Distributed Computing	60	40	100	6	4	2	
Choose any one From MCA 305-E1, 305-E2 and 305- E3										
4	Elective Generic Categories	MCA 305- E1	Programming with Visual Basic .NET	60	40	100	6	4	2	
		MCA 305- E2	Simulation and Modelling	60	40	100	6	4	2	
		MCA 305-E3	Any Course from Massive Open Online Courses (MOOCs)available at SWAYAM	60	40	100	6	4	2	
5		MCA-306	Comprehensive Viva Voce	50	-	50	04 Virtual (VR)			
			Total			550	28+04	20	06	02

C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials & Practical Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial) and two hours (120 minutes) for practical

Note: (1) The students will have the choice to opt a course under the category of Elective Courses available within the UTD (ICS, VUU) or in other UTDs but from same level of the programmes. (2)An alternative choice will also be available to the students to opt a course in each semester under elective-generic category including skill development course from Massive Open Online Courses (MOOCs) available at SWAYAM plate form. (3) The student can also opt a course under Elective- Discipline Centric category from Massive open online courses (MOOCs) available at SWAYAM plate form. In such cases, the provisions "Ordinance 14 : Choice Based Credit System" shall be applicable and the conditions mentioned therein will need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.

MCA - FOURTH SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Internal	Max Marks	Credits* C	Distribution of Credits L	T	P
1	Core Course	MCA-401	Data Mining and Data Warehousing	60	40	100	6	4		2
		MCA-402	Artificial Intelligence	60	40	100	6	4	2	
2	Course for Ability Enhancem ent & skill Developme nt (AE & SD)	MCA-403	Tourism management	60	40	100	4	4		
	Choose any one From MCA 404- E1 and 404- E2									
3	Elective Discipline Centric	MCA 404-E1	Introduction Web Technology	60	40	100	6	4	2	
		MCA 404-E2	Cloud Computing	60	40	100	6	4	2	
	Choose any one From MCA 405-E1 ,405-E2 and 405- E3									
4	Elective Generic Categories	MCA 405-E1	ASP.NET Technology using C#	60	40	100	6	4	2	
		MCA405-E2	Mobile Computing	60	40	100	6	4	2	
		MCA 405-E3	Any Course from Massive Open Online Courses (MOOCs)available at SWAYAM	60	40	100	6	4	2	
5		MCA-406	Comprehensive Viva Voce	50	-	50	04 Virtual (VR)			
			Total			550	28+04	20	06	02

C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials & Practical Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial) and two hours (120 minutes) for practical

Note: (1) The students will have the choice to opt a course under the category of Elective Courses available within the UTD (ICS, VUU) or in other UTDs but from same level of the programmes. (2)An alternative choice will also be available to the students to opt a course in each semester under elective-generic category including skill development course from Massive Open Online Courses (MOOCs) available at SWAYAM plate form. (3) The student can also opt a course under Elective- Discipline Centric category from Massive open online courses (MOOCs) available at SWAYAM plate form. In such cases, the provisions "Ordinance 14 : Choice Based Credit System" shall be applicable and the conditions mentioned therein will need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.

MCA - FIFTH SEMESTER

S N	Course Type	Course code	Title	End term sem Exam	Internal	Max Marks	Credits* C	Distribution of Credits L	T	P
1	Core Course	MCA-501	Design and Analysis of Algorithm	60	40	100	6	4		2
		MCA-502	Network Security	60	40	100	6	4	2	
2	Course for Ability Enhancement & skill Development (AE & SD)	MCA-503	Project Management with Java (Minor Project)	60	40	100	4	2		2
	Choose any one From MCA 404- E1 and 404- E2									
3	Elective Discipline Centric	MCA 504-E1	Internetwork Application	60	40	100	6	4	2	
		MCA 504-E2	Internet of Things(IOT)	60	40	100	6	4	2	
	Choose any one From MCA 405-E1 ,405-E2 and 405- E3									
4	Elective Generic Categories	MCA 505-E1	Cyber Security	60	40	100	6	4	2	
		MCA505-E2	Software Testing and Project Management	60	40	100	6	4	2	
		MCA 505-E3	Any Course from Massive Open Online Courses (MOOCs)available at SWAYAM	60	40	100	6	4	2	
5		MCA-506	Comprehensive Viva Voce	50	-	50	04 Virtual (VR)			
			Total			550	28+04	18	06	04

C=Credit Per Week) / (L = Lectures Per Week)/ (T & PW =Tutorials & Practical Work per week)

*One Credit is equivalent to one hour (60 minutes) of teaching (lecture or tutorial) and two hours (120 minutes) for practical

Note: (1) The students will have the choice to opt a course under the category of Elective Courses available within the UTD (ICS, VUU) or in other UTDs but from same level of the programmes. (2)An alternative choice will also be available to the students to opt a course in each semester under elective-generic category including skill development course from Massive Open Online Courses (MOOCs) available at SWAYAM plate form. (3) The student can also opt a course under Elective- Discipline Centric category from Massive open online courses (MOOCs) available at SWAYAM plate form. In such cases, the provisions "Ordinance 14 : Choice Based Credit System" shall be applicable and the conditions mentioned therein will need to be satisfied by the student if they opt courses from Massive Open Online Courses (MOOCs) available at SWAYAM plate form.
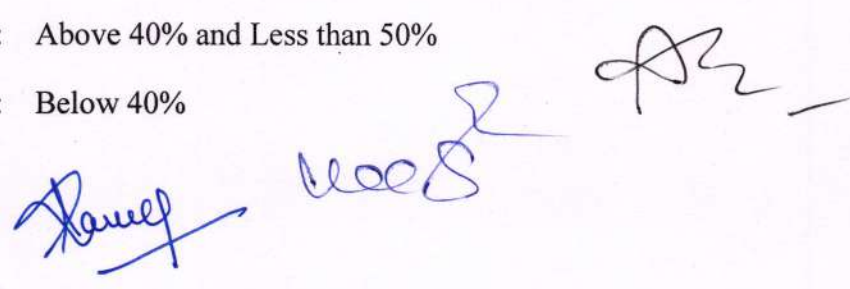
MCA - SIXTH SEMESTER (Project Work)

S N	Course Type	Course code	Title	End term sem Exam	Inter nal	Max Mark s	Credits*	Distribution of Credits		
							C	L	T	P
1	Project Work	MCA-600	Preparation and submission of Synopsis/ Proposal		50	50	3			
2		MCA-601	Preparation and submission of Progress Report I		50	50	3			
3		MCA-602	Preparation and submission of Progress Report 2		50	50	3			
4		MCA-603	Presentation of Project Work (Int)		50	50	3			
5		MCA- 604	Final Viva-voce examination	60	40	100	6			
6		MCA-605	Valuation of Dissertation	60	40	100	6			
7		MCA-606	Final presentation/ Seminar	60	40	100	6			
			Total			500	30			

System Development Project (Here student is required to undertake six months system development project in the Industry or in a computer Organization and submit a detailed project report).

First Division   :   65% and Above

Second Division   :   Above 50% and Less than 65%

Third Division   :   Above 40% and Less than 50%

Fail   :   Below 40%

MCA 101: Discrete Mathematical Structures

UNIT 1

Set Theory: Introduction, Sets and Elements, Universal Set and Empty Set, Subsets, Venn Diagrams. Relations: Introduction, Product Sets, Relations, Pictorial Representation of Relations, Composition of Relations, Types of Relations, Partial Ordering Relations.

UNIT 2

Functions: Introduction, One-to-One, Onto, and Invertible Functions, Cardinality. Logic and Propositional Calculus: Introduction, Propositions and Compound Propositions, Basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions.

UNIT 3

Counting: Introduction, Basic Counting Principles, Factorial Notation, Binomial Coefficients, Permutations and Combinations. Pigeon hole Principle.

UNIT 4

Graph Theory: Introduction, Graphs and Multigraphs, Subgraphs, Paths, Connectivity, Weighted Graphs, Complete, Regular and Bipartite Graphs. Directed Graphs: Introduction, Rooted Trees, Graph Algorithms: Depth first and Breadth-First Searches.

UNIT 5

TREES AND CUT - SETS : Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits. Rooted Trees, Path Lengths in Rooted Trees, Binary Search Trees. Spanning Trees, Minimum Spanning Trees.

Reference Books:

1. Elements of Discrete Mathematics, C.L.Liu, Second Edition, TMH

2. Discrete Mathematics and its applications, Kenneth H. Rosen, (Fifth Edition), Tata McGraw Hill Publishing Company.

3. Theory and Problems of Discrete Mathematics, Semmour Lipschutz, Marc Lipson, Second Edition, Schaum's Outline, T.M.H.

MCA 102: Operating System and System Software

UNIT 1

Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling. Types of Operating System: Bare machine, Batch Processing, Real Time, Multitasking & Multiprogramming, timesharing system. File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization, sharing & implementation issues.

UNIT 2

Process: Concept, Process Control Blocks(PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock Process Management in Linux.

UNIT 3

Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Structure & implementation of Page table.Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

UNIT 4

Mass Storage Structure: Disk Structure, Disk Scheduling- FCFS, SSTF, SCAN Scheduling, Disk Management, Swap-Space Management. Distributed operating system:-Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory(DSM), Basic Concept of Parallel Processing & Concurent Programming.

UNIT 5

System software and application software, layered organization of system software. Assemblers, Macros, Compilers, Cross compilers, Linking and loading, Relocation. Case study of Unix, Linux & Windows

Reference Books:

1. Operating Systems Concepts, A. Silberschatz, P.Galvin, G.Gagne, John Wiley & Sons, Inc.
2. Systems Programming and Operating Systems (Part II - Operating Systems), Dhamdhere, 2nd Edition, TMH
3. Donovan, J.J. : System programming, Mcgraw Hill,1972.
4. Dhamdhere. D.M.: Introduction to system software, Tata Mcgraw Hill Publ.comp. 1986

MCA 103: Communication Skill

UNIT 1

Definition of Language, nature of language, Characteristics of Human Language. Varieties of English Language: British, American, Indian, Australian etc., English for specific and special purposes.

UNIT 2

Meaning and process of communication, importance of effective communication, communication skills, barriers to communication, Animal and human communication, Methods of communication (Verbal & Non-Verbal).

UNIT 3

Objectives of communication, types of communication, principles of communication, essentials of effective communication. Media of communication: written, oral, face-to-face, visual, audio-visual, merits and demerits of written and oral communication, preparing for oral presentation.

UNIT 4

Basic skills of communication, listening to and Understanding, Extended natural speech in business situations (Both face to face and on the telephone), Understanding standard American, British and Indian accents, speaking with correct, Pronunciation, English Consonants, English Vowels, Speaking with right accent.

UNIT 5

Developing communication skills, interview- how to face and how to conduct. Planning and preparing to speak, Strategies for making powerful openings in presentations and conducting presentations, Body Language, Voice Modulations.

Reference Books:

1. Essentials of Business Communication by Rajendra Pal and J.S.Korilahalli, Sultan Chand & Sons Publishers, New Delhi.
2. Business Communications by U.S. Rai & S.M.Rai, Himalaya Publishing House.
3. Writing a Technical Paper by Menzal and D.H.Jones, McGraw Hill, 1960.
4. Business Communication : Strategy and Skill, Prentice Hall New Jersey, 1987.

MCA 104 E1: Computer Organization and Architecture

UNIT 1

Binary Systems: Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes. Boolean Algebra and Logic Gates: Boolean Functions, Digital Logic Gates. Simplification of Boolean Functions: The Map Method, Two and Three Variable Maps, Four Variable Map, Product of Sums Simplification, NAND and NOR Implementation, Don't-Care Conditions.

UNIT 2

Combinational Logic: Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure. Combinational Logic with MSI and LSI: Binary Parallel Adder, Decoders, Multiplexers. Sequential Logic: Introduction, Flip-Flops, Triggering of Flip-Flops.

UNIT 3

Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters. Processor Logic Design: Introduction, Processor Organization, Arithmetic Logic Unit, Design of Arithmetic Circuit, Design of Logic Circuit, Design of Arithmetic Logic Unit, Status Register, Design of Shifter, Processor Unit.

UNIT 4

Microcomputer System Design: Introduction, Microprocessor Organization, Basic Concept of Instruction, Instruction Types, Micro Instruction Formats and Addressing Modes, Subroutines Interrupt, Fetch and Execution cycle, Hardwired control unit, Micro-programmed Control unit-microprogram sequencer Control Memory, Sequencing and Execution of Micro Instruction.

UNIT 5

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory. Input Output Organization: Peripheral Devices, Input-Output Interface, Direct Memory Access (DMA), Input-Output Processors (IOP), Structure of Multiprocessor- Inter-processor Arbitration, InterProcessor Communication and Synchronization. Memory in Multiprocessor System, Concept of Pipelining, Vector Processing, Array Processing, RISC And CISC, Study of Multicore Processor – Intel, AMD.

Reference Books:
1. Digital Logic and Computer Design, M. Morris Mano, P.H.I., Eastern Economy Edition.
2. Computer System Architecture (3rd ed..), M.Morris Mano, P.H.I., Eastern Economy Edition.
3. Computer Architecture and Organization, J.P. Hays, McGraw Hill.
4. Digital Principle and Applications, Malvino and Leach
5. Digital Computer Fundamentals, Thomas C. Bartee

MCA 104 E2: System Analysis and Design

UNIT 1

Overview of system analysis and design, system development life cycle, project selection, feasibility analysis, design, implementation, testing and evaluation.

UNIT 2

Feasibility study- Technical and economical feasibility, cost and benefit analysis.

UNIT 3

System requirement specification and analysis: Fact finding techniques, Data flow diagrams, Data dictionaries, process organisation and interactions, decision analysis, decisin trees and tables.

UNIT 4

Detailed design- Modularisation, module specification, file design, system development involving data bases. System Control and Quality Assurance- reliability and maintenance.

UNIT 5

Software design and documentation tools, top-down ,bottom-up and variants. Units and integration testing, testing practices and plans. System controls , Audit trails.

Reference Books:

1. James,A.S.: Analysis of design of Information systems,Mcgraw Hill 1986.

2. Ludeberg, M., Golkuhl, G. and hilsson,A. : Information systems development, Asystematis approach, Prentice Hall international 1981.

3. lesson,M.: System analysis and design, science research associates,1985

4. Sempriv,P.C.: System analysis-Definition Process and Design,1982

5. Richard,D.: System analysis design,Irwin Inc.1979.

6. Awad,E. Homewood : System analysis and design,Awad,Irwin 1979.

MCA 105 E1: Object Oriented Programming Using C++

UNIT 1

Object Oriented Systems Development : Introduction to traditional programming with C. Objectives of OOP, Object Oriented Analysis, Object Oriented Programming in C++: Concepts of Objects, Classes, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding and Message passing.

UNIT 2

Object modeling, Dynamic modeling, Events, Status, Scenarios, Event hate diagrams, Operations, State diagrams, Functional Models, Dataflow diagrams, Constraints specification, Relation of object, Functional and Dynamic models.

UNIT 3

Tokens, Expressions and Control Structures, Classes and Objects, Overloading and information hiding, Function overloading, Operator overloading in C++, Memory Management: Constructors, Overloading of constructors, copy constructors, destructors.

UNIT 4

Inheritance : Inheritance, Derived and base classes, Single, Multilevel, Hierarchical, Hybrid Inheritance, Protected member, overriding member function, class hierarchies, multiple inheritance, Containership

UNIT 5

Polymorphism : virtual functions, late binding, pure virtual functions, abstract classes, friend functions, friend classes, static functions, this pointer, templates, function templates, Class templates.

Reference Books:

1. Object-Oriented Programming with C++: E. Balagurusamy, TMH, 2005
2. Object Oriented Programming in C++, Robert Lafore, Galgotia Publication.
3. Object Oriented Programming, Tomothy Budd, Pearson education.
4. Object Oriented Modelling and Design, J. Rambaugh, M. Blaha, W. Premerlani, F. Eddy, W. Lorensen, P.H.I.

MCA 105 E2: Financial Accounting and Organizational Behavior

UNIT-1

Introduction to organization and individuals. what is an organization, components of organization, nature and variety of organization in terms objective, structure etc., Model of analyzing organizational phenomena.

UNIT-2

Organizational and business variables, organization in the Indian context, institutions and structure. Basic roles in an organization etc. Perception attitudes. Motives: achievement, poser, affiliation.

Unit –3

The basic Financial Accounts, types of accounts, Rules of Entries of transactions, Journals. Cash Book – Types, Format of Cash Book, Balancing of Cash Book, Subsidiary books – Purchase, Sales. Purchase return and sales return. Ledger, posting of entries, Trial Balance, Rectification of errors, adjustment entries. Depreciation and Inflation.

Unit -4

Principles of Cost Accounting, Valuation of Stocks, Allocation of Overheads, Methods of material issues.

Unit -5

Inventory account and store record, inventory or stock control and cost accounting. Department demand and supply method of stock control. Classification and condition of material Report on material handling. Overview of computerized accounting process – Introduction to accounting system software, their features and some basic operations.

Reference Books:
1. Mazda, Engineering Management, Addisen Wesley
2. S P Gupta, Management Accounting
3. I.M.Pandey, Financial Management, Vikas Publication

MCA 201 : Data Structures Using C++

UNIT 1

Stack and Queue: Introduction –Common operations on data structures, Types of data structures, Data structures & Programming, contiguous implementations of stack, various operations on stack, various polish notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue; linked implementation of stack and queue- operations

UNIT 2

General List: list and it's contiguous implementation, it's drawback; singly linked list-operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays.

UNIT 3

Trees: definitions-height, depth, order, degree, parent and child relationship etc; Binary Trees- various theorems, complete binary tree, almost complete binary tree; Tree traversals-preorder, in order and post order traversals, their recursive and non recursive implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.

UNIT 4

Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search, indexed sequential search, interpolation search; hashing-basics, methods, collision, resolution of collision, chaining; Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous list, shell sort, heap sort, tree sort.

UNIT 5

Graphs: related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist; traversal schemes- depth first search, breadth first search; Minimum spanning tree; shortest path algorithm; kruskals & dijkstras algorithm. Miscellaneous features Basic idea of AVL tree- definition, insertion & deletion operations; basic idea of B-tree- definition, order, degree, insertion & deletion operations; B+-Tree- definitions, comparison with B-tree; basic idea of string processing.

Reference Books:

1. Introduction to Data Structures and Algorithms with C ++, GLENN W.ROWE, Prentice Hall India, 2003
2. Data Structures and Algorithms, Alfred V. Aho, John E. Hopecraft, Jaffrey D. Ullman, Pearson education
3. M. Tenenbaum, "Data Structures using C & C++", Pearson Pub
4. Venkatesan , Rose, "Data Structures" Wiley India Pvt.Ltd
5. Pai; Data structure and algorithm , TMH Publications
6. T.H.Coreman,"Introduction to algorithm",PHI.

MCA 202 : Database Management System
Unit 1

DBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach, Advantages, of database systems, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Overall Database Structure, Functions of DBA and designer, ER data model:Entitles and attributes, Entity types, Defining the E-R diagram,Concept of Generalization, Aggregation and Specialization. transforming ER diagram into the tables. Various other data models object oriented data Model, Network data model, and Relational data model, Comparison between the three types of models.

Unit 2

Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Intension and Extension, Relational Query languages:SQL-DDL, DML, integrity constraints, Complex queries, various joins, indexing, triggers, Relational algebra and relational calculus, Relational algebra operations like select, Project,Join, Division, outer union. Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations.

Unit 3

Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and losless join, problems with null valued and dangling tuples, multivalued dependencies.Query Optimization: Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

Unit 4

Transaction Processing Concepts: - Transaction System, Testing of Serilizability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures. Log based recovery. Checkpoints deadlock handling. Concurrency Control Techniques: - Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control, validation based protocol, multiple granularity. Multi version schemes, Recovery with concurrent transaction. Introduction to Distributed databases, data mining, data warehousing, Object Technology and DBMS, Comparative study of OODBMS Vs DBMS . Temporal, Deductive, Multimedia, Web & Mobile database.

Unit 5

Study of Relational Database Management Systems through Oracle/Postgres SQL/MySQL: Architecture, physical files, memory structures, background process. Concept of table spaces, segments, extents and block. Dedicated server, multi threaded server. Distributed database, database links, and snapshot. Data dictionary, dynamic performance view.Security, role management, privilege management, profiles, invoker defined security model. SQL queries, Data extraction from single, multiple tables equi-join, non equi-join, self-join, outer join. Usage of like, any, all, exists, in Special operators. Hierarchical queries, inline queries, flashback queries. Introduction of ANSI SQL, anonymous block, nested anonymous block, branching and looping constructs in ANSI SQL. Cursor management: nested and parameterized cursors, Oracle exception handling mechanism. Stored procedures, in, out, in out type parameters, usage of parameters in procedures. User defined functions their limitations. Triggers, mutating errors, instead of triggers

Reference Books:

1. Date C J, "An Introduction To Database System", Pearson Educations

2. Korth, Silbertz, Sudarshan, "Fundamental of Database System", McGraw Hill

3. Rob, " Data Base System:Design Implementation & Management", Cengage Learninig

MCA 203: Computer Hardware and Networking

Unit 1

Introduction to computers, classification, generations, applications. Basic blocks of a digital computer. Hand Tools Basics and Specifications. Types of cabinets, relation with mother board form factor. Precautions to be taken while opening and closing PC cabinet. Main devices, components, cards, boards inside a PC(to card or device level only). Types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC. Precautions to be taken while removing and/or reconnecting cables inside a PC

Unit 2

Types of I/O devices and ports on a standard PC for connecting I/O devices. Function of keyboard, Function of Mouse, Function of monitor, Function of Speakers and Mic, Function of serial port, parallel port, brief principle of communication through these ports, types of devices that can be connected, interface standards, connectors, cable. Method of ensuring firm connection, Types of Processors and their specifications Memory devices, Semiconductor memories, Principle of working of Hard disk drive, cylinder, capacity, read write head, HDD interface IDE, SCSI-I/2/3 comparative study. Partitioning hard disk (primary and extended partitions) Precautions to be taken while fitting drives into bays and bay inside PC cabinet. CMOS setting(restrict to drive settings only).

Unit 3

Installing UNIX / LINUX - Preparing functional system UNIX/LINUX - Adding new users, software, material components - Making back-up copies of the index and files - Dealing with the files and indexes, Basic Linux commands. - Linux file system, The Shell, Users and file permissions, VI editor, X window system, Filter Commands, Processes, Shell Scripting. Types of software. Functions of an operating system. Disk operating system. Version of a software, Service pack, Updating of OS, Different configurations of Computer system and its peripherals. Software Installation – Pre-installation - Prerequisites, Install procedure, Rollback or Uninstall procedure, Tests. Post-installation – Backup procedure & specifications, Restore procedure, Periodical view check. Awareness of legal aspects of using computers such as copyright, patent etc.

Unit 4

OSI Model - The functions of different layers in OSI model, Network Components – Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches, Access point, etc. – their types, functions, advantages and applications. IP Routing in Network RIP IGRP Protocols, TCP/IP, FTP, Telnet etc., Theory on Setting IP Address(IP4/IP6) & Subnet Mask, Classes of IP Addressing.

Unit 5

Concept of Internet. Architecture of Internet. DNS Server. Internet Access Techniques, ISPs and examples(Broadband/Dialup/ Wifi). Concept of Social Networking Sites, Video Calling & Conferencing. UTM and Firewall. Concept of Server, client, node, segment, backbone, host etc. Analog and Digital transmission, Network Interface Card, Crimping tools and Color standards for Straight crimping and Cross crimping Functions of NIC, Repeaters, Hub, Switches, Routers, Bridges, Router etc.

Reference Books:

1. PC Hardware: The Complete Reference Paperback – 2017 by Craig Zacker and John Rourke
2. "Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance" by James K L

MCA 204 E1: Theory of Computation

UNIT 1

Automata: Basic machine, FSM , Transition graph, Transition matrix, Deterministic and nondeterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata. Regular Sets and Regular Grammars: Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Myhill- Nerode theorem Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT 2

Regular Expressions, Two-way Finite Automata, Crossing Sequence of Two way Finite Automata Finite Automata with Output, Applications of Finite Automata, Closure Properties of Regular Sets.

UNIT 3

Context Free Grammars: Motivation and Introduction, Context-free Grammars, Derivation trees and Ambiguity, Normal Forms (Chomsky Normal Form and Greibach Normal forms), Unit Production Chomsky Normal Forms, The existence of inherently ambiguous context-free languages, Closure properties of Context Free Languages, Construction of Reduced Grammars, Elimination of null production.

UNIT 4

Pushdown Automata: Definition of PDA, Deterministic Pushdown Automata, PDA corresponding to given CFG, CFG corresponding to a given PDA. Context Free Languages: The pumping lemma for CFL's, Closure properties of CFL's, Decision problems involving CFL's.

UNIT 5

Turing Machines: Introduction, TM model, representation and languages acceptability of TM Design of TM, Universal TM & Other modification, Church's hypothesis, composite & iterated TM. Turing machine as enumerators. Properties of recursive & recursively enumerable languages, Universal Turing Machine.

Reference Books:

1. Introduction to Automata Theory, Languages & Computation, J E Hopcraft & JD Ullman, Narosa Publications.
2. Theory of Computer Science, KLP Mishra & N Chandra Sekhar, PHI
3. Mathematical Foundations of Computer Science, Beckman
4. John C Martin, "Introdution to languages and theory of computation", McGraw Hill
5. Anami & Aribasappa , " Formal Languages and Automata Theory",Wiley India

MCA 204 E2: Internet Programming

UNIT 1
Introduction to Internet Programming- Client-Server model, Browsers-Graphical and Hypertext Access to the Internet, HTTP–Hyper Text Transfer Protocol (how it actually works), The Phases of Web Site Development

UNIT 2
Creating Internet World Wide Web pages- HTML - Hypertext Markup Language , Basic HTML Concepts, HTML: Structured Language ,headers, body, html tags, tables , Text, graphics, sounds, video clips, multi- media ,Client side image mapping

UNIT 3
HTML forms programming: Building a form, Text fields and value, size, max length html buttons, radio, checkboxes, Selection lists.
CSS: Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of <div>& <span>

UNIT 4
Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods User defined & Predefined functions, DOM objects, Window Navigator, History, Location, Event handling, Validations On Forms

UNIT 5
Intro & features of XML, XML writing elements, attributes etc. XML with CSS, DSO, XML Namespaces XML, DTD, XML Schemas, Writing Simple sheets using XSLT, SAX & DOM Parsers, SOAP Introduction.

Reference Books:
1. Joe Fawcett,Danny Ayers,Liam R.E. Quin, "Beginning XML" Wrox Press, 5th Ed., 2012
2. Deitel & Deitel, "XML how to program", Pearson, 2000
3. Hofstetter fred , "Internet Technology at work", Osborne pub. , ISBN : 9780072229998, 2004
4. Ivan Bayross , "HTML, DHTML, JavaScript, Perl & CGI" ,BPB pub. 3rd Ed.,2004
5. Ivan Bayross, "Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI", BPB pub., 2nd Ed., 2000

MCA 205 E1: Computer Oriented Optimization Techniques

UNIT-1

Optimization and Operations Research: Linear Simultaneous Equations, Solution of Simultaneous Equations by Gauss-Jordan method, Linear Programming: Introduction, Formulation of LP Problems, Assumptions and Applications of linear programming.

UNIT-2

Graphical Solution of LP Problems, Important geometric properties of LP Problems, Principles of simplex methods, Computational Procedure of Simplex Methods, Two Phase Method.

UNIT-3

Duality in Linear Programming: Concepts of duality, Definition of Primal-Dual Problems, General rules for Converting Primal into It's Dual, Duality Theorems, Dual simplex method, sensitivity analysis.

UNIT-4

Special types of Linear programming problems- Transportation and Assignment problems.

UNIT-5

Integer Linear Programming: Introduction, Importance of Integer Programming Problems, Definitions, Branch and Bound techniques, Computational demonstration of Branch and Bound Method.

Reference Books:

1. Hiller, F.S. & Liberman,G.J. : Introduction to Operations Research ,2nd Edn. Holdewn Day Inc. London, 1974.
2. Tara, H.A. : Operation Research,3rd Edn. McMillan Publishing Company, 1982.
3. Bightler, C.S. & Phillips ,D.T. : Foundation of Optimization, 2nd Edn. Prentice-Hall,1979.
4. McMillan Claude Jr. : Mathematical programming ,2nd Edn. Wiley series ,1979

MCA 205 E2: Computer System Architecture and Parallel Processing

UNIT 1

Flynn's Classification, System Attributes to Performance, Parallel computer models Multiprocessors and multicomputer, Multivector and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks

UNIT 2

Instruction set architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization- memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System :Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

UNIT 3

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling – score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscalar pipeline design, Super pipeline processor design.

UNIT 4

Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector Instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization: distributed memory model and shared memory model. Principles of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors

UNIT 5

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments

Reference Books:

1. Kai Hwang, "Advanced computer architecture", TMH. 2013 - 14
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3. V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning
5. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing.
6. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH.

MCA 301 : Theory of Compiler Design

UNIT 1

Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, LEX. The roll of lexical analyzer, design of lexical analyzer.

UNIT 2

Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR,LALR, LR),Parser generation.Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

UNIT 3

Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions. Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table.

UNIT 4

Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

UNIT 5

Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

Reference Books:

1. Aho, ullman :   Principles of compiler design.
2. Raghavan, Compiler Design, TMH Pub.

3. Louden. Compiler Construction: Principles and Practice, Cengage Learning

4. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.

5. Mak, writing compiler & Interpreters, Willey Pub.

MCA – 302 DATA COMMUNICATION AND COMPUTER NETWORKS

UNIT - 1

Network goals and application, Network structure, Network services, Example of networks and Network Standardization, Networking models : centralized, distributed and collaborative. Network Topologies : Bus, Star, Ring, Tree, Hybrid : Selection and Evaluation factors.

UNIT -2

Theoretical Basis for Data communication, Transmission media, Twisted pair (UTP, STP), Coaxial Cable, Fiber optics : Selection and Evaluation factors. Line of Sight Transmission, Communication Satellites. Analog and Digital transmission. Transmission and switching, frequency division and time division multiplexing , STDM, Circuit switching, packet switching and message switching,

UNIT - 3

Brief Overview of LAN (Local Area Network) : Classification. Brief overview of Wide Area Network (WAN) . Salient features and differences of LAN with emphasis on : Media, Topology, Speed of Transmission, Distance, Cost. Terminal Handling, Polling, Token passing, Contention. IEEE Standards : their need and developments.

UNIT - 4

Open System : What is an Open System ? Network Architectures, ISO-OSI Reference Model, Layers : Application, Presentation, Session, Transport, Network, Data Link & Physical . Physical Layer - Transmission, Bandwidth, Signaling devices used, media type. Data Link Layer - : Addressing, Media Access Methods, Logical link Control, Basic algorithms/protocols.

UNIT - 5

Network Layer : Routing : Fewest-Hops routing; Type of Service routing, Updating Gateway routing information. Brief overview of Gateways, Bridges and Routers, Gateway protocols, routing daemons. OSI and TCP/IP model. TCP/IP and Ethernet. The Internet : The structure of the Internet, the internet layers, Internetwork problems. Internet Standards.

Reference Books:

1. Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1985.processing, Prentice Hall,1983.

2. Black : Computer Networks : Protocols, standords and Interfaces, Prentice Hall International

MCA 303 : Software Engineering

Unit-I

System Concept: Definition, Characteristics, Elements of system, Physical and abstract system open and closed system, man-made information systems,**System Development Life Cycle:** Various phases of system development, Considerations for system planning and control for system success. **System Planning:** Base tor planning a system, Dimensions of Planning.

Initial Investigation: Determining users requriments and analysis, fact finding process and techniques.**Feasibility study:** Determination of feasibility study, Technical, Operational & Economic Feasibilities, System performance constraints, and identification of system objectives, feasibility report. **Cost/Benefit Analysis:** Data analysis cost and benefit analysis of a new system. Categories determination and system proposal.

Unit-II

Tools of structured Analysis: Logical and Physical models context, diagram, data dictionary, data diagram, form driven methodology, IPO and HIPO charts, Gantt charts, system model, pseudo codes, Flow charts, system flow chart, run flow charts etc., decision tree, decision tables, data validation. **Input/ Output and Form Design:** Input and output form design methodologies, menu, screen design, layout consideration.

Management standards Systems analysis standards, Programming standards, Operating standards. Documentation standards User Manual, system development manual, programming manual, programming specifications, operator manual.

Unit-III

System testing & quality: System testing and quality assurance, steps in system implementation and software maintenance. System security: Data Security, Disaster/ recovery and ethics in system development, threat and risk analysis, System audit.

Organisation of EDP: Introduction, Job Responsibilities & duties of EDP, Personnel- EDP manager, System Analyst, Programmers, Operators etc. Essential features in EDP Organization.**Selection of Data Processing Resources:** purchase, lease,rent-advantages and disadvantages. Hardware and software procurement – In-house purchase v/s hiring and lease.

Unit-IV

The Software Product and Software Process: Software Engineering - A Layered Technology, **Software Process Models:** Linear Sequential Model. Prototyping Model, RAD Model Evolutionary Software Process Models: Incremental Model, Spiral Model Component Assembly Model, Formal Methods, Fourth-Generation Techniques.

Systems Engineering: The Systems Engineering Hierarchy, Information Engineering, Information Strategy Planning, Business Area Analysis, **Product Engineering Requirement Analysis Modeling:** Analysis Concepts and Principles, The Elements of the Analysis Model Data Modifying, Functional Modeling and Information Flow and Behavior Modeling, Mechanics of Structured Analysis, Data Dictionary.

Unit-V

Principles, and Methods: TheSoftwareDesignProcess:Design Principles, Design Concepts, Effective Modular Design, Design Heuristics, Design Documentation, Design Methods: Data Design, Architectural Design, Interface Design, Human Computer Interface Design, Procedural Design.

Software Testing Methods: Software Testing Fundamentals,Test Case Design, Black-BoxTesting, White-Box Testing, Software Testing Strategies: Verification and Validation, Strategic Issues, Unit Testing, Integration Testing, Validation Testing, System Testing.

Software Process and Project Metrics: Measures, Metrics and indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics of Software Quality.

Reference Books:
1. System Analysis & Design by V K Jain, Dreamtech Press
2. Modern System Analysis &Design by A Hoffer. F George- S Valaciahlow Priced Edn. Pearson Education.
3. Information Technology & Computer Applications. by V.K.Kapoor, Sultan Chand & Sons, New Delhi.
4. Software Engineering: A Practitioner's Approach by P, S. Pressman Fourth edition 1997,McGraw- HW pub.

MCA 304 E1: Computer Graphics and Multimedia

UNIT 1

Overview of Graphic Systems: Display Devices, Refresh Cathode-Ray Tubes, Random-Scan and Raster-Scan Monitors, Color CRT Monitors, Direct-View Storages Tubes, Plasma-Panel Displays, LED and LCD Monitors. Hard-Copy Devices: Printers, Plotters. Interactive Input Devices.

UNIT 2

Output Primitives: Points and Lines, Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Antialiasing Lines, Circle-Generating Algorithms, Circle Equations, Bresenham's Circle Algorithm, Character Generation. Attribute of Output Primitives: Line Styles, Line Types, Line Width, Line Color. Color and Intensity: Color Tables, Gray Scale. Area Filling: Scan-Line Algorithm.

UNIT 3

Two Dimensional Transformations: Basic Transformations, Translation, Scaling, Rotation. Matrix Representations and Homogeneous Coordinates. Composite Transformations: Translations, Scalings, Rotations, Scaling Relative to a Fixed Point, Rotation about a Pivot Point, General Transformation Equation. Windowing and Clipping: Windowing Concepts, Cliiping Algorithms, Line Clipping, Polygon Clipping, Area Clipping, Text Clipping, Window to Viewport Transformation.

UNIT -4

Viewing in 3D: Three dimensional transformation, Translation, Scaling, Rotation. Matrix Representations projections : Parallel, prospective, view points . Colour Model.

UNIT 5

Introduction to Multimedia, Multimedia Components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia Data and File Formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation Tools, Authoring Tools. Computer Aided Design. Graphs Charts and Models. Computer Art, Computer Animation, Graphical User Interface, Graphics for Home use, Image Processing.

Reference Books:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, PHI 2nd Edition
2. Multimedia Making it Works, Third Edition: Tay Vaughan, Tata-McGraw-Hill
3. Procedural Elements of Computer Graphics, Rogers, McGraw Hill
4. Principles of Interactive Computer Graphics, Newman and Sproull, McGraw Hill
5. Mathematical Elements of Computer Graphics, Rogers, McGraw Hill

MCA–304- E2 Distributed Computing

Unit-1

Introduction to Distributed Systems: Goal of Distributed Systems, Hardware and Software concepts, the client server model, Remote procedure call, remote object invocation, message and stream oriented communications.

Unit-2

Process and synchronization in distributed system: Threads, Client Server codes, migration, clock synchronization, mutual exclusion, Bully and Ring algorithm, Distributed transactions.

Unit-3

Consistency, Replication, fault tolerance and security: Object replication, data centric, consistency model, client centric consistency models, introduction to fault tolerance, process resilience, recovery, distributed security architecture, security management, KERBEROS, secure socket layer, cryptography.

Unit-4

Distributed Object based and file systems : CORBA, Distributed COM, Goals and Design Issues of Distributed file system, types of distributed file system, sun network file system.

Unit-5

Distributed shared memory, DSM servers, shared memory consistency model, distributed document based systems, the world wide web, distributed coordination based system: JNI.

Reference Books:

1. Andrew S Tannebaum, " Distributed System Principles and Paradigms" Pearson Education.
2. Robert J. " Distributed Processing System", Prentice Hall.

MCA 305 E1 PROGRAMMING WITH VISUAL BASIC.NET

UNIT–1

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser.

UNIT–2

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable, Number of Argument, Optional Argument, Returning value from function. Control flow statements: conditional statement, loop statement. Msgbox & Inputbox.

UNIT–3

Working with Forms : Loading, showing and hiding forms, controlling One form within another. Using MDI form. Windows Form Control (with Properties, Methods and events): Textbox, Rich Text Boxes, Label, Link Label, Button, Checkbox, Radio Button, Panel, Group Box, Picture Box, Listbox, Combobox, Check Listbox, scroll bar, Timer. Advance Controls: Menus, Context Menus , Built-in Dialog Box: OpenFileDilog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog, Printing. ListView, TreeView, toolbar, StatusBar.

UNIT–4

Object oriented Programming: Classes & objects, constructor, destructor, inheritance. Access Specifiers, Interfaces, Polymorphism. Exception Handling: using Try, Catch, Finally, Throw Keywords. Graphics Handling: Using Graphics & Pen classes for drawing colors and figures. File Handling: Opening or Creating a File, Writing & Reading Text.

UNIT–5

Database programming with ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid.

Generate Reports Using CrystalReportViwer.

Reference Books:

1. VB.NET Programming Black Book by steven holzner –dreamtech publications
2. Mastering VB.NET by Evangelos petroutsos-·BPB publications
3. Introduction to .NET framework-Worx publication

MCA-305 E2 Simulation & Modeling

Unit-1

Definition of Simulation: Type of Simulation (Continuous and Discrete), Definition of Models, Types of Model, Comparing model data with real system data. Why to use Simulation? Simulation is used for solving real life problem.

Unit-2

Limitation of Simulation techniques, phases of simulation model, Data Generation, Book keeping, Events types simulation (Numerical Problem), Generation of Random Number, Monte Carlo Simulation (Numerical Problem).

Unit-3

Continuous system simulation: Continuous system models, Differential equations, Hybrid computer, Continuous System simulation Languages, Simulation of an Auto pilot, real time simulation. Probability concept of simulation: numerical evaluation of continuous probability function, continuous uniformly distributed random numbers. the rejection method, discrete simulation language, simulation of telephone system.

Unit-4

Simulation Application to inventory control, Queuing Problem, Capital Budgeting, Financial Planning, Advantages and disadvantages of Simulation, Scope of Simulation Techniques.

Unit-5

Introduction to Simulation Tools: NS2, OPNET, QUALNET and NETSIM, Overview of OPNET, Characteristics of OPNET, Installation of OPNET simulator, Designing of Simulation Setup using OPNET etc.

Reference Books:

1. System Simulation , G. Gordan, PH
2. Introduction to Simulation, T.A. Payer, Mcgraw Hill

MCA-401 Data Mining and Data Warehousing

UNIT-1

Introduction : Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas. Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules.

UNIT -2

Clustering paradigms; Partitioning algorithms like K-Medioid, CLARA,CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS. Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

UNIT -3

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

UNIT-4

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT -5

The vicious cycle of Data mining, data mining methodology, measuring the effectiveness of data mining data mining techniques. Market baskets analysis, memory based reasoning, automatic cluster detection, link analysis, artificial neural networks, generic algorithms, data mining and corporate data warehouse, OLA

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.

2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

MCA-402 Artificial Intelligence

UNIT-1

Introduction of Artificial Intelligence: What is AI ? The Importance of AI. AI and related fields. Introduction to Natural Language Processing . Basic Problem solving methods: Production systems-state space search, control strategies, Breadth first search, Depth first search, Heuristic search, Hill Climbing techniques: Best First search, forward and backward reasoning.

UNIT-2

Knowledge : General Concepts, Definition and Importance of Knowledge, Knowledge based system, representation of Knowledge, Knowledge Organization , Knowledge Manipulation , Acquisition of Knowledge. Introduction to Expert System: Definition, Characteristics, Importance and Applications of Expert System, structure of Expert System. Case study of MYCIN & DENDRAL.

UNIT-3

LISP AND AI PROGRAMMING LANGUAGES : Introduction to LISP : Syntax and Numeric Functions, Basic List Manipulation Functions in LISP , Functions, Predicates, and Conditionals, Input, Output, and Local Variables, Iteration and Recursion, Property List and arrays, PROGLOG and Other AI Programming Languages.

UNIT-4

FORMALIZED SYMBOLIC LOGICS : Introduction , Syntax and Semantics for Propositional Logic , Syntax and Semantics for FOPL , Properties of Wffs , Conversion to Clausal Form, Inference Rules , The Resolution Principle , Representations Using Rules.

UNIT-5

Neural Network: Basic structure of neuron, perception, feed forward and back propagation, Hopfield network.

BOOKS :

1. Dan W. Patterson: Introduction to Artificial Intelligence and Expert System, Prentice Hall.

2. Stuart Russell, Peter Norvig: Artificial Intelligence: A Modern Approach, Pearson New International Edition

3. Elaine Rich and Kevin Knight: Artificial Intelligence

4. Charniak, E. : Introduction of Artificial Intellegence, Narosa publ. House.

5. Winston,P.H. : LISP, NArosa publ. House.

6. clark, K.L. : Micro Prolog , Prentice Hall india.1987.

MCA 403 : Mobile Application Development

Unit-1

Mobile Communication Fundamentals Introduction, issues in mobile communications, Wireless telephony: cellular concept, GSM: air interface, channel structure, location management: HLR-VLR, handoffs, channel allocation in cellular systems, CDMA, GPRS, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, Mobile IP, WAP: Architecture, protocol stack, applications.

Unit-2

Mobile Applications Development Frameworks and Tools Introduction of Mobile Applications, Types and Benefits of a Mobile App, Mobile Platforms, deployment on Apple iOS with versions, Android, Windows phone application using development platforms: worklight, kendo, Appcon, Xcode, Xpage, Architecture of Mobile Software Applications, N-Tier Client–Server Frameworks and Tools, Java, BREW, Windows CE, WAP, Symbian EPOC, Publishing Frameworks, Mobile User Interface Design, Building Generic User Interfaces, mobile apps in the cloud.

Unit-3

Mobile Agents and Peer-to-Peer Architectures for Mobile Applications Mobile Agents for Mobile Computing, Applications of Mobile Agents to Mobile Applications and Implementation Tools, Techniques for Agent-Based Software, Peer-to-Peer Applications for Mobile Computing, security and fault tolerance.
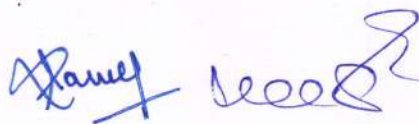
Unit-4

Synchronization and Replication of Mobile Data Taxonomy of Replication and Synchronization, Data Replication and Synchronization for Mobile Applications, SyncML, WebDAV, Mobile Agents, Replication, and Synchronization, Location Information Modeling, Problems with Building Location-Based Applications, Utilizing Location-Based Services with Mobile Applications, UML-Based Development Cycle for Mobile Applications, Architectural Patterns for Mobile Applications.

Unit-5

Testing Mobile Applications, Validating the Mobile Use Cases before Development, The Effect of the Dimensions of Mobility on Software Testing, Stress Testing and Scalability Issues, Testing Location-Based Functionality, Android as your mobile platform, installation, Configuring of Eclipse and the Android SDK, Additional SDK Components, application layout and Android app development, Android user interface elements, Android Virtual Device, Connection to Google play.

Reference Books :

1. Reza b'far, Mobile computing Principles Designing and developing Mobile applications with Uml and xml, Cambridge University press.

2. Jeff Mcwherter, Scott Gowell, Professional Mobile application development, Wrox, John Wiley & Sons, Inc..

MCA 404 E1 INTRODUCTION TO WEB TECHNOLOGY

UNIT-1

HTML : WWW, Web page , URL, HTML : HTML elements, HTML Source. JAVA : Java features : Java vs. C and C++, Java and Internet, Java & www, Java Environment, Java Tools, Java-Enabled Browsers. Java language : Constants, Variables and Data Types , Program Structure, tokens, statements. Implementing Java program, operators and expression : Arithmetic, Relational, Assignment, logical, Bit wise, Special, operator precedence.

UNIT-2

Decision making and branching: If - else, nested if, else-if ladder , switch statement. Decision making and looping : while , do, for. Classes and Object : defining, adding, creating , accessing, overriding. Arrays, strings and vectors. Interfaces, packages.

UNIT-3

Multithreaded programming : Creating, extending, stopping & blocking a thread. Thread life cycle. Exception handling : Error types, Exception syntax, using exception for debugging.

UNIT-4

Applet Programming : Applets vs. applications, building applet code, applet life cycle. executable applet, web page designing, adding applet to HTML file. Running parameter passing to applets.

UNIT-5

Introductory Graphics Programming : class, Lines , Rectangle, Circles, Ellipes, Arcs, Polygons, Line Graphs. I/O in Java : Streams, stream classes, Byte and Character stream classes. I/O exceptions, Interactive I/O

Reference Books :

1. Programming With JAVA : A Primer : Tata McGraw Hill : E. Balagurusamy

2. Java Complete Reference : Herbert Schieldt

MCA–404 E2 Cloud Computing

Unit-1

Historical development, Vision of Cloud Computing, Characteristic of Cloud Computing As Per NIST, Cloud Computing Reference Model, Cloud computing Environments, Cloud service requirements, cloud and dynamic infrastructure, cloud adaptation and rudiments. Overview of cloud application: ECG Analysis in the cloud, Protein Structure prediction, Gene Expression Data Analysis, Satellites Image Processing, CRM and ERP, Social networking.

Unit-2

Cloud Computing Architecture: Cloud Reference model types of cloud, cloud interpretability and standards, scalability and fault tolerance, cloud solutions, cloud eco- system, cloud business process management, cloud service management, cloud offerings, cloud analytics, testing under control, virtual desktop infrastructure.

Unit-3

Cloud Management and virtualization and technology Resilliency, Provisioning, Asset Management, Concepts of MAP reduce, Cloud governance, High availability and disaster recovery, virtualization, fundamentals concepts of compute storage, networking, desktop and application virtualization, virtualization benefits, sever virtualization, block and file level storage virtualization, hypervisor management software, infrastructure requirements, virtual LAN (VLAN), and virtual SAN (VSAN) and their benefits.

Unit-4

Cloud security: Cloud information security fundamentals, cloud security services, design principles, Secure cloud software requirements, policy implementations, cloud computing security challenges, virtualization security management, cloud computing security architecture.

Unit-5

Market based Management of clouds, federated clouds/ inter cloud: Characterization and definition, Cloud federation status, third party cloud services. Case study: Google App Engine, Hadoop, Amazon, Aneka.

Reference Books:

1. Tomar Saurabh, Cloud Computing, Wiley Pub.
2. Selvi : Mastermind Cloud Computing, TMH, Pub.

MCA – 405 E1 ASP. NET TECHNOLOGY USING C#

UNIT -1

Software quality and reliability, software project management, project planning, measurement and metrics, cost estimation. Scheduling and tracking, team management, risk analysis, project management tools and techniques, PERT, CPM. Software Quality Assurance: factors and components. Configuration management, software maintenance issues and techniques, software reuse, client-sever software development

Unit-2

Overview of ASP.NET framework, Understanding ASP.NET Controls, Applications, Web servers, installation of IIS. Web forms, web form controls -server controls, client controls, web forms & HTML, Adding controls to a web form ,Buttons, Text Box , Labels, Checkbox, Radio Buttons, List Box, etc. Running a web Application, creating a multiform web project.

Unit-3

Form Validation: Client side validation, server Side validation, Validation Controls : Required Field Comparison Range. Calendar control, Ad rotator Control, Internet Explorer Control. State management- View state, Session state, Application state,

Unit-4

Architecture of ADO.NET, Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class, DataAdapter Class, Dataset Class. Display data on data bound Controls and Data Grid. Database Accessing on web applications: Data Binding concept with web, creating data grid, Binding standard web server controls. Display data on web form using Data bound controls.

Unit-5

Writing datasets to XML, Reading datasets with XML.Web services: Introduction, Remote method call using XML, SOAP, web service description language, building & consuming a web service, Web Application deployment. Overview of C#, C# and .NET, similarities & differences from JAVA, Structure of C# program Language features: Type system, boxing and unboxing, flow controls, classes, interfaces, Serialization, Delegates, Reflection.

Reference Books:

1. Pressman R.S. Sofware Engineering: A Practitioner's Approach, MGH

2. Pankaj Jalote. An Intergrated Approach to Software Engineering, Narosa

3. VB.NET Black Book by steven holzner –dreamtech

4. ASP.NET Unleashed

5. C# programming – wrox publication

6. C# programming Black Book by Matt telles.

MCA – 405 E2 MOBILE COMPUTING

UNIT 1

Overview of the emerging fields of mobile computing; Historical perspectives (mainly from the perspective of radio), Mobile applications, Limitations, Health Concerns, Cordless phone, Land mobile vs. Satellite vs. In-building communications systems, Frequencies for radio transmission. Characteristics of Cellular Systems, Mobility support in cellular telephone networks, Personal Communications Systems/Personal Communications Networks, Wireless Personal Area Network, Wireless Local Area Network and Internet Access.

UNIT 2

Mobile communication: Fiber or wire based transmission, Wireless Transmission - Frequencies, Signals, Antennas and Signal Propagation, Modulation Techniques, Multiplexing techniques, Coding techniques. Cellular structure, Voice Oriented Data Communication GSM, CDMA. GSM Architecture, Authentication & security, frequency hopping.

UNIT 3

Satellite Systems: History, Application, and Basics of Satellite Systems: LEO, MEO, GEO, Routing, Handover, VSAT, installation & Configuration. Cyclic repetition of data, Digital Audio Video Broadcasting, Multimedia object transfer Protocol, Wireless LAN topologies, requirements. Physical layer, MAC sub-layer, IEEE802.11.HIPERLAN: Protocol architecture, layers, Information bases and networking, Bluetooth.

UNIT 4

Basics of Discrete Event Simulation, Application and Experimentation, Simulation models. Case Study on Performance Evolution of IEEE 802.11 WLAN configuration using Simulation, Mobile IP, goals, assumptions requirements, entities and terminology, IP packet delivery, tunneling and encapsulation, Feature and format of IPv6, DHCP, TCP over Wireless. Characteristic of Ad Hoc networks, Applications, need for routing, routing classification, Wireless sensor networks, classification and Fundamentals of MAC protocol for wireless sensor networks.

UNIT 5

Economical Benefits of Wireless Networks, Wireless Data Forecast, Charging issues, Role of Government, Infrastructure manufacturer, Enabling Applications Mobile operating System, HTTP versus HTML. WML,XML application for wireless handheld devices. UWB systems Characteristics, Current approaches for security.

Reference Books:

1. Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.
2. Wireless And Mobile Systems, D. P. Agrawal,Qing-An zeng, Thomson publication.

MCA 501 Design and Analysis of Algorithms

Unit – 1

Introduction and Review: What is an Algorithm, Algorithm's Performance, order architecture: Θ-Notation, **O-Notation, Ω-Notation,** Algorithm Analysis: time space complexities, **Worst-case Complexity, Average-case Complexity.**

Unit – 2

Divide and conquer: Structure of divide-and –conquer algorithms: examples, Binary search, quick sort, Analysis of divide and conquer, run time recurrence relations.

Unit – 3

Graph Searching and Traversal: Overview, Traversal methods: depth first and breadth first search.**Greedy Method**: Overview of the greedy method, Minimum spanning trees, Single source shortest paths.

Unit – 4

Dynamic programming: The general method, principle of optimality, difference between dynamic programming and greedy method, Applications: optimal binary search trees, **Back tracking**: The general method, 8-queens problem.

Unit-5

Branch and Bound Algorithm: The **Branch and bound** method, FIFO and LIFO branch and bound, LC (Least Cost) search, Traveling Salesman Problem, LCBB on Traveling Salesman Problem.

Reference Books:

1. Fundamentals of Computer Algorithms By Ellis Horowittz and Sartaj Sahni, Galgotia Publications.
2. Ullman "Analysis and Design of Algorithm" TMH
3. Goodman " Introduction to the Design & Analysis of Algorithms, TMH-2002
4. Sara Basse, A.V. Gelder, " Computer Algorithms, " Addison Wesley
5. T.H. Cormen, Leiserson, Rivert and stein, " Introduction of Computer algorithm, " PHI
6. E. Horowitz, S. Sahni, and S. Rajsekaran, "Fundamentals of Computer Algorithms, " Galgotia Publication.

MCA – 502 NETWORK SECURITY

Unit -1

Convention Encryption : Conventional Encryption Model , Stenography , Classical Encryption Techniques, Simplified DES , Block Cipher Principles , The Data Encryption Standard, The Strength of DES , Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Conventional

Unit -2

Encryption algorithms: Public Key Encryption And Hash Functions Public Key Cryptography , Principles of Public Key Cryptosystems , The RSA Algorithm , Key Management , Diffie Hellman Key Exchange , Elliptic Curve Cryptography.

Unit -3

Message Authentication and Hash Functions Authentication Requirements, Authentication Functions, Message Authentication Codes , Hash Functions , Security of Hash Functions

Unit -4

Hash And Mac Algorithms MD5 Message Digest Algorithm , Secure Hash Algorithm (SHA-I) , RIPEMD ,HMAC

Unit -5

Digital Signatures and Authentication Protocols Digital Signatures , Authentication Protocols -Digital Signature Standard Authentication Applications , IP Security , Web Security Intruders, Viruses and Worms Intruders , Viruses and Related Threats Firewalls Firewall Design Principles , Trusted Systems

Reference Books :

1. William Stallings, "Cryptography and Network Security", Second edition, Prentice Hall, 1999.

2. Atul Kahate, "Cryptography and Network Security," TMH

3. William Stallings, "Cryptography and Network Security",Third Edition, Pearson Ed

4. Introduction to network security, Krawetz, Cengage

MCA–503 Project Management with JAVA

UNIT-1

The Java Environment: History of Java: Comparison of Java and C++; Java as an object oriented language: Java buzzwords; A simple program, its compilation and execution; the concept of CLASSPATH; Basic idea of application and applet; **Basics**: Data types; Operators- precedence and associativity; Type conversion; The decision making – if, if..else, switch; loops – for, while, do…while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords. **Object Oriented Programming in Java**: Class; Packages; scope and lifetime; Access specifies; Constructors; Copy constructor; this pointer; finalize () method; arrays; Memory allocation and garbage collection in java keywords **Inheritance** : Inheritance basics, method overriding, dynamics method dispatch, abstract classes.

UNIT-2

Interfaces : defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces. **Multithreading and Exception Handling:** Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception handling; The try, catch and throw; throws Constructor and finalizers in exception handling; Exception Handling.

UNIT-3

Applets: Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet.**The AWT:** The class hierarchy of window fundamentals; The basic user interface components Label, Button, Check Box, Radio Button, Choice menu, Text area, Scroll list, Scroll bar; Frame; Layout managers flow layout, Grid layout, Border layout, Card layout. **The Java Event Handling Model**: Java's event delegation model – lgnoring the event, Self contained events, Delegating. **Events**: The event class hierarchy; The relationship between interface, methods called, parameters and event source; Adapter classes; Event classes action Event, Adjustment Event, Container Event, Focus Event, Item Event, Key Event, Mouse Event, Text Event, Window Event.

UNIT-4

Input/Output : Exploring Java i.o., Directories, stream classes The Byte stream : Input stream, output stream, file input stream, file output stream, print stream, Random access file, the character streams, Buffered reader, buffered writer, print writer, serialization. **JDBC**: JDBC-ODBC bridge; The connectivity model; The driver manager; Navigating the result set object contents; java.sql Package; The JDBC exception classes; Connecting to Remote database.

UNIT-5

Networking & RMI: Java Networking : Networking Basics : Socket, Client server, reserved sockets, proxy servers, Inet address, TCP sockets, UDP sockets. ; RMI for distributed computing; RMI registry services; Steps of creating RMI Application and an example. **Collections:** The collections framework, collection interfaces, collection classes.

Reference Books:

1. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill

2. Deitel "Java- How to Program:" Pearson Education, Asia

MCA–504 E1 Internetwork Application

UNIT - 1

TCP/IP Model : Comparison with ISO -OSI reference model. TCP/IP Protocol Family: Transport : Transmission Control Protocol, TCP Header Format, UDP Routing : IP Addressing , limitations , Brief overview of IPV6 i.e. the next generation IP, IP header format. Network Addresses: ARP, Domain Name System (DNS), RARP.

UNIT-2

User Services /Applications : File Transfer Protocol (FTP) : Channel Connection, Command : internal & Users, Connections, debugging option with FTP, third party transfer, anonymous FTP, FTP Servers, TFTP, Telnet, BOOTP, Gateway Protocols : brief overview of EGP, CGP & IGP, Other protocols : NFS, NIS, RPC, SMTP, SNMP.

UNIT - 3

Internet : Uses, Goals/advantages, WWW, Intranet : Goals, benefits, how TCP/IP, bridges, routers, E-mail works in an intranet, Intranet and WWW : IP Networks, HTTP, Commands, Intranet applications : Overview of Web-Servers : essential & desirable features of a web server : authentication , authorization and encryption ; proxy services ; Subnetting an intranet.

UNIT-4

Overview of an intranet security system : Security and access policies, Server Security, Firewalls, General Security. WAN : overview of DDS, T-1, T-3 , Frame Relay, Sonet, SMDS, ATM Services, WAN implementation, Connecting the LANs : Bridges, routers, Accessing WAN, Message handling system : X.400 & X.500 , Message Transfer Agents (MTA), Mailbox.

UNIT-5

Development of the Socket Programming Interface : Socket Services, Creating a Socket , Binding the Socket , Connecting to the Destination , open Command , Sending Data , Receiving Data , Server Listening , Closing a Connection , Aborting a Connection , UNIX Forks.

Network services - file servers, message servers , Directory servers, print servers, application servers.

Reference Books:

Douglas J. Comer : Internetworking with TCP/IP (Vol I)

Richard Stevens : Unix Networking

MCA 504 E2 Internet of Things

Unit 1:

Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

Unit 2:

Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

Unit 3:

Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

Unit 4:

Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT , Actuator, Sensor data Communication Protocols ,Radio Frequency Identification Technology, Wireless Sensor Network Technology.

Unit 5:

IOT Design methodology: Specification -Requirement, process, model, service, functional & operational view.IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies: smart city streetlights control & monitoring.

Reference Book:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication

2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition ,Universal Press

3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.

4. Charless Bell "MySQL for the Internet of things", Apress publications.

5. Francis dacosta "Rethinking the Internet of things:A scalable Approach to connecting everything", 1st edition, Apress publications 2013.

6. Donald Norris"The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black", McGraw Hill publication

MCA 505 E1 Cyber Security

UNIT 1

Introduction of Cyber Crime, Challenges of cyber crime, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Internet Time Theft, Salami attack/Salami Technique,

UNIT 2

Web jacking, Online Frauds, Software Piracy, Computer Network Intrusions, Password Sniffing, Identity Theft, cyber terrorism, Virtual Crime, Perception of cyber criminals: hackers, insurgents and extremist group etc. Web servers were hacking, session hijacking.

UNIT 3

Cyber Crime and Criminal justice: Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cheating, Defamation, Harassment and E-mail Abuse, Other IT Act Offences, Monetary Penalties, jurisdiction and Cyber Crimes, Nature of Criminality, Strategies to tackle Cyber Crime and Trends.

UNIT 4

The Indian Evidence Act of 1872 v. Information Technology Act, 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of EEvidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

UNIT 5

Tools and Methods in Cybercrime: Proxy Servers and Anonymizers, Password Cracking, Key loggers and Spyware, virus and worms, Trojan Horses, Backdoors, DoS and DDoS Attacks , Buffer and Overflow, Attack on Wireless Networks, Phishing : Method of Phishing, Phishing Techniques.

Reference Books:

1. Principles of Cyber crime, Jonathan Clough Cambridge University Press

2. John R. Vacca, Computer Forensics:Computer Crime Scene Investigation, 2nd Edition, Charles River Media, 2005

3. Cyber Law Simplified, VivekSood, Pub: TMH.

4. Cyber Security by Nina Godbole, SunitBelapure Pub: Wiley-India

5. Information Warfare: Corporate attack and defense in digital world, William Hutchinson, Mathew Warren, Elsevier.

6. Cyber Laws and IT Protection, Harish Chander, Pub:PHI.

MCA 505 E2 : Software Testing and Project Managment

UNIT –1

Testing Basics and Development Models: Principals and context of testing in software production usability and accessibility. Testing phases of software project ,process models to represent different phases, software quantity Control and its relation with testing,validating and verification,software development life cycle models ,various development models.White box testing :white box testing – static testing ,structural testing-unit code functional testing ,code coverage testing, code complexity testing ,Black box testing .What ?Why and When to do black box testing ,requirement based testing ,positive and negative testing ,boundary value testing.Decision tables,equivalence portioning,state based or graph based testing ,compatibility testing user documentation testing ,domain testing.

UNIT-2

Integration testing ,introduction and types of integration testing ,scenario testing,defect bash system, and acceptance testing ,overview functional and non functional testing ,acceptance testing .overview of some software testing tools .Win runner,load runner,test director.

UNIT-3

Performance testing- introduction ,factors related to performance testing ,methodology for performing testing ,regression testing ,Ad hoc testing overview,buddy and pair testing ,.Exploratory testing ,interactive testing ,agile and extreme testing .testing of object oriented testing-introduction,difference in OO testing.

UNIT -4

Software project management :overview,software project management framework, software development life cycle, organization issue and project management ,managing process, project execution, problems in software projects, project management myths and its clarification .software project scope: need to scope a software project ,scope management process ,communication techniques and tools,communication methodology software requirement gathering and resource allocation ,requirement specification ,SRS document preparation , resource type for software projects ,requirement for resource allocation.

UNIT -5

Software project estimation :workbreakdown structure (WBS),steps in WBS ,measuring efforts for a project ,techniques for estimation –SLOC ,FP,COCOMO, and Delphi methods ,projects scheduling ;scheduling and its need ,scheduling basics,Gannt chart ,network scheduling techniques ,pert and CPM using a project management tools :Introduction to MS project 2000,managing task in Project 2000,tracing a project plan ,creating and displaying project information reports.

Books:

1.Software Testing: Principles and practice By Gopalaswamy and srinivasn,Pearson Education India.

2.Software Testing Tools: Covering Winrunner, Silk Test,Loadrunner,JMeter and TestDirector with case By Dr. K.V.K.K. Prasad ,ISBN:8177225324,Wiley Dreamtech,

3.Basics of Software project Management,Prentice Hall of India,ISBN 81-203-2490-0

4.Software project Management by Bob Huges & mike cotterell, Tata McGraw Hill.