

SCHEME OF MCA COURSE

MCA FIRST SEMESTER :

Paper Code	Comp/ optional	Paper name	Credit	Theory		Sessional		Practical		Total
				MAX	Min	Max	Min	max	Min	
101MCA	C	Introduction to Information Technology	3	60	21	40	14			100
102MCA	C	Mathematical Foundations of Computer Science	3	60	21	40	14			100
103MCA	C	Programming and Problem solving using 'C & C++'	3	60	21	40	14			100
104MCA	C	Computer Organization and Assembly Language Programming	3	60	21	40	14			100
105MCA	O	E1:Organisational Behaviour	3	60	21	40	14			100
	O	E2:ERP & BPR Allied Concepts								
106MCA	C	Programming Laboratory in web technologies (HTML, CSS & java script)	3			40	14	60	21	100
107MCA	AE &SD	Seminar	1			100	35			100
108MCA	SE &SD	Assignment(Language/Yoga/Social work/Environment science/ Physical education)	1			100	35			100
109MCA	C	Comprehensive Viva –voce	4					100	35	100

Total Credit : #20+4 (Virtual Crédit)

MCA SECOND SEMESTER :

Paper Code	Comp/ optional	Paper name	Credit	Theory		Sessional		Practical		Total
				MAX	Min	Max	Min	max	Min	
201MCA	C	Operating Systems	3	60	21	40	14			100
202MCA	C	Database Management Systems	3	60	21	40	14			100
203MCA	C	Data Structures Using 'C' language	3	60	21	40	14			100
204MCA	C	Probability and Combinatorics	3	60	21	40	14			100
205MCA	O	E3:Software Engineering	3	60	21	40	14			100
	O	E4:Software Testing								
206MCA	C	Programming Laboratory in Python & Machine Learning	3			40	14	60	21	100
207MCA	AE & SD	Seminar	1			100	35			100
208MCA	AE & SD	Assignment(Language/Yoga/Social work/Environment science/ Physical education)	1			100	35			100
209MCA	C	Comprehensive Viva –voce	4					100	35	100

Total Credit : #20+4 (Virtual Crédit)

Jiwaji University Gwalior -- MCA -- session 2020-2022

MCA THIRD SEMESTER :

Paper Code	Comp/ optional	Paper name	Credit	Theory		Sessional		Practical		Total
				MAX	Min	Max	Min	max	Min	
301MCA	C	Computer Networks	3	60	21	40	14			100
302MCA	C	Unix & shell scripting	3	60	21	40	14			100
303MCA	O	E5: Cloud Computing	3	60	21	40	14			100
	O	E6: Internet of things								
304MCA	C	Computer based Numerical and Statistical Techniques	3	60	21	40	14			100
305MCA	C	Java Programming	3	60	21	40	14			100
306MCA	C	Project in PHP	3			40	14	60	21	100
307MCA	AE & SD	Seminar	1			100	35			100
308MCA	AE & SD	Assignment(Language/Yoga/Social work/Environment science/ Physical education)	1			100	35			100
309MCA	C	Comprehensive Viva –voce	4					100	35	100

Total Credit : #20+4 (Virtual Crédit)

MCA FOURTH SEMESTER :

Paper Code	Comp/ optional	Paper name	Credit	Theory		Sessional		Practical		Total
				MAX	Min	Max	Min	max	Min	
401MCA	C	Artificial Intelligence and Expert Systems	3	60	21	40	14			100
402MCA	O	E7: .Net Technology	3	60	21	40	14			100
	O	E8: Introduction to Oracle								
	O	E9: Dataware housing and data mining								
403MCA	C	Computer Graphics and Multimedia	3	60	21	40	14			100
404MCA	C	System Development Project	9			40	14	60	21	100
405MCA	AE & SD	Seminar	1			100	35			100
406MCA	AE & SD	Assignment(Language/Yoga/Social work/Environment science/ Physical education)	1			100	35			100
407MCA	C	Comprehensive Viva –voce	4					100	35	100

Total Credit : #20+4 (Virtual Crédit)



PROGRAMME SPECIFIC OUTCOME

Curriculum of Computer Application is designed to prepare post graduates to attain the following program specific outcomes:

- PSO1:** An ability to develop and manage Software's.
- PSO2:** An ability to practice or apply acquired knowledge of various subjects of computer application curriculum in professional employment areas.
- PSO3:** Display innovative ideas of software development in the field of information Technology.
- PSO4:** Explore global research opportunities for doctoral studies in the field of computer science & applications.
- PSO5:** Demonstrate skills of self employment based business by using front end and backend coding skills .
- PSO6:** Display their true potential and get endorsement through qualifying in various Central and State level competitive Examinations
- PSO7:** Acquire the ability to engage in self dependent and limit less learning of innovative theories and skills in the field of Computer science and applications.

101MCA: INTRODUCTION TO INFORMATION TECHNOLOGY

Course Outcomes: On completion of the course, students are expected

- CO1:** To develop a basic understanding of the field of IT, define the term "Information Technology" and recognize related areas.
- CO2:** To learn the emergence of IT, namely Computer Science, Information Systems, and Computer Engineering
- CO3:** To understand general idea of translators such as assemblers compilers and interpreters.
- CO4:** To study the functionality of Linkers & Loaders.
- CO5:** To have deep insight into the concepts of file organization and its types.

UNIT 1-Basic concepts of IT, concepts of Data & Info, data processing, history of computers (generation, type of languages), organization of computers, I/O devices, storage devices, system software, application software, utility packages, numerical based on storage devices. Concept of communication and network technology, Applications of IT.

UNIT 2-Assembler : Elements of assembly language programming, a simple assembly scheme, pass structure of assembler, design of two pass assemblers, a single pass assemblers. Macros & Macro Processors : Macro definition & Call, Macro expansion Nested macro calls, advanced macro facilities, design of macro processors

UNIT 3-Compilers & Interpreters : aspects of compilation, memory allocation, compilation of expression compilation of control structures, code optimization, interpreters. Software Tools : Software tools for program development, editors, debug monitors, programming environment, user interfaces.).

UNIT 4-Linker & Loaders : Relocation & linking concepts, design of linkers, self relocating programs, a linker for MS DOS, linking for overlays, loaders : A two pass loader scheme, Relocating loaders, subroutine linkage, Direct linkage loader, Binders overlays.



UNIT 5-Sequential file organisation, random file organisation, index structure, indexed file organisation, alternate key indexed sequential files, multi key organisation, multi key access, multi list file organisation, inverted files & their definition , insertion, deletion, operations with optimum utilization of memory, comparison of various type of file organization

References :

1. D.M. Dhamdhere " System Programming & O.S." Second Ed.
2. J.Donovan"SystemProgramming"THM.
3. Rajaraman V. "Fundamental of Computers" (4nd edition.) Prentice Hall of India, New Delhi 2004
4. SardesD.H."Computer'stoday"McGrawHill1988.
5. S.Jaiswal,"FundamentalofComputer&IT",WileydreamtechIndia.

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102MCA : MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

COURSE OUTCOME: On completion of the course, students are expected

CO1: To understand discrete mathematical preliminaries.

CO2: To learn about Boolean algebra, groups and fields.

CO3: To apply discrete mathematics in formal representation of various computing constructs.

CO4: To explore the importance of analytical problem solving approach in engineering problems.

CO5: To have deep insight into the application of graphs in Computer Science.

UNIT 1-Sets Relations and Functions :Sets, Subsets, Power-Sets, Complement, Union and intersection. Demorgan's law Cardinality, relations: Cartesian Products, relations relational Matrices, properties of relations, equivalence*relation Functions: Injection, Surjection, Bijection Composition of Functions, Permutations. Cardinality, the characteristic functions Recursive definitions, finite induction. Lattices & Boolean Algebra:

UNIT 2-Axiomatic definition of Boolean algebra as algebraic structures with two operations. Proposition & Prepositional functions, Logical connections Truth values and Truth Table the algebra of prepositional functions-the algebra of truth values-Applications (switching circuits, Basic Computer Components).

Groups and Fields:

UNIT 3- Groups: Group axioms-permutation groups; Subgroups, Co-sets, Normal Subgroups, Free semi groups; Modular arithmetic grammars, language.

UNIT 4-Fields : Definition; structure; minimal polynomials; irreducible polynomials; primitive Elements., polynomial roots; Applications (Error Correcting Codes Sequence generation).

UNIT 5-Graphs: Finite graphs; incidence and degree, isomorphism, sub graphs and union of graphs ; Connectedness ; walks paths and circuits Eulerian graphs. Trees properties of trees; pendant vertices in a tree, Center of tree Spanning trees and Cut vertices; Binary tree Matrix representation of a graph, Incidence, Adjacency matrices and their properties. Applications of graphs in Computer Science.

REFERENCES:

1. "Discrete Mathematical Structure with applications to Computer Science "by J.P. Trembley & R.P. Manohar.
2. "Discrete Mathematics " by K.A. Ross and C.R.B. Writh
3. "Discrete Mathematical Structures for Computer Science" by Bernard Kolman & Robert C. Busby



103MCA : PROGRAMMING AND PROBLEM SOLVING USING 'C & C++'

COURSE OUTCOME: Upon successful completion of this course, students will be able

- CO1: To understand the basic concept of C & C++ programming, and its different modules.
CO2: To gain knowledge of decision, loop control structures and other programming constructs.
CO3: To apply acquired knowledge in writing C & C++ - program .
CO4: To study various building blocks and advanced programming techniques.
CO5: To contribute in the development of system software and other applications using "C" and C++ language.

UNIT 1-An Overview : Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithm & flowcharts; Characteristics of a good program - accuracy simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/conventions of coding, documentation, naming variables; Top down design ; Bottom up design.

UNIT 2-Fundamentals of C Programming : History of C; structure of a C program, Data types, Constants & Variables Operators & expressions; Control Constructs - if-else, for, while, do-while; Case statement; Arrays; Formatted and unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

UNIT 3-Modular Programming: functions; Arguments; Return value; Parameter passing -call by value, call by reference; Return statement; Scope visibility and life-time rules for various types of variable, static variable; Calling a function ; Recursion - basics, comparison with iteration, tail recursion, when to avoid recursion examples. Fundamentals of pointers, structures and union.

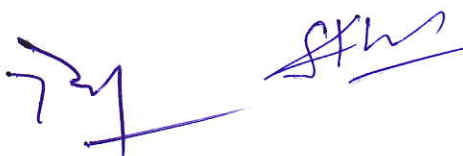
UNIT 4- Basic of C++: Basic Concept of Object Oriented Programming and its advantages/characteristics- Object, Classes, Inheritance, Reusability, Polymorphism & Overloading; A Comparative Study of C & C++, Input & Output in C++, Functions-inline Functions, Friend Function Parameter Passing. introduction to Objects and Classes.

UNIT 5- Constructor, Destructor Function overloading, this pointer, Operator overloading, Inheritance, types of inheritance, Virtual Base Class, Nested Classes, Static Members.

Arrays in C++: arrays as data members, arrays of objects ; Dynamic Memory Allocation Operators: new and delete. Pure Virtual Function.

References :

1. The C Programming Language - B.W. Kernighan & D.M. Ritchie
2. The Sprit of C - Cooper, Mullish
3. Kanetkar Y : Let us C
4. An introduction to C programming – Amit Saxena, Anamaya Publishers, New Delhi
5. " Object Oriented Programming in C++" By Lafore.
6. " Programming with C++" By John Hubbard
7. " The C++ Programming Language" By Stroustrup
8. " C++ Inside Outside" Byeckel



104MCA:COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

COURSE OUTCOME: Upon successful completion of this course, students will be able -

CO1: To learn the basic concept of assembly language and understand difference between computer architecture and computer organization .

CO2: To apply knowledge to trace and debug at the assembly level.

CO3: To understand and extend simple CPU implementations.

CO4: To explore about interrupt/exception handling and make simple performance estimates for assembly code.

CO5: To have skills to design the data path and control unit of a simple CPU.

UNIT 1-Representation of Information: number system, integer and floating point representation, character codes(ASCII,EBCDIC) , error detection and correction codes .

UNIT 2-Basic Building Blocks: Boolean algebra, combinational blocks: gates, multiplexers , decoders etc. Sequential building blocks: flip flops, registers, counters, ALU, Random Access Memory etc.

UNIT 3-Register Transfer Language and micro operations: concept of bus, data movement among registers, a language to represent conditional data transfer, data movement from/to memory, arithmetic and logical operations along with register transfer ,timing in register transfer.

UNIT 4-Architecture of a simple processor : A simple computer organization and instruction set, instruction format, addressing modes, instruction execution, in terms of micro instructions, concept of interrupt and simple I/O organization, implementation of processor using the building blocks.

UNIT 5-Assembly Language Programming: detailed study of 8086/8088 assembly language instruction set, loops and comparisons, condition and procedure, arithmetic operator assembly language, illustrations using typical programs like : table search, subroutines, symbolic and numerical manipulations and I/O. Memory Organization: basic cell of static and dynamic RAM, building large memories using chips, associative memory, cache memory organizations, virtual memory organization.

References :

1. M. Morris Mano, "Computer System and Architecture", (3rd edition) Prentice Hall of India, New Delhi, 1994.
2. Liu and Gibson, "8086/8088 Microprocessor Assembly Language.
3. Bartee, " Digital computer Fundamentals".
4. Malvino, "Digital computer Electronics".



105MCA E1: ORGANIZATIONAL BEHAVIOUR

COURSE OUTCOME: Upon successful completion of this course, students will be able

- CO1:** To learn fundamental concepts related to Organizational Structure, behavior and context.
CO2: To understand the behavior of people in the organization and analyze the complexities associated with management of the group behavior in the organization
CO3: To study Components of organization, nature and variety of organizations.
CO4: To apply acquired knowledge of Principles underlying design of organization
CO5: To have skills to use knowledge of Interpersonal skills and Group Dynamics in an organization .

UNIT 1-Introduction to Organizations and Individuals. What is an organization. Components of organization, nature and variety of organizations (in terms of objectives. Structure etc.) models of analyzing organizational phenomena.

UNIT 2-Organizational and business variables, Organizations in the Indian context, Institutions and structures. Basic roles in an organization, etc . perception attitudes. Motives (achievement, power and affiliation).

UNIT 3-Commitment : Value creativity and other personality factors. Profile of a manager and an entrepreneur.

Interpersonal and Group Processes- Interpersonal trust, understanding the other person from his/her point of view. Interpersonal communication. Listening, feedback, counseling. Transactional analysis. Self-functioning. Team decision-making team conflict resolution. Team problem solving.

UNIT 4-Organizational Structure and Integrating Interpersonal and Group Dynamics-elements of structure. Functions of structure . determinants of structure, disfunctionalities of structures. Structure - technology. Environment- people relationships.

UNIT 5-Principles Underlying design of organization; organizational change. Integrating cases (s).

Case method and lectures should be supplemented with a variety of other methodologies such as feedback on questionnaires and tests, role plays and behaviour simulation exercise.

References :

1. A.J. Robertson. Lvan T. and Cooper . Cary. L. "Work Psychology: Understanding Human Behaviour in the Workplace" Macmillan India Ltd. Delhi. 1996.
2. Dwivedi R.S. "Human Relations and Organisational Behaviour: A Global perspective" Macmillan India Ltd. Delhi. 1995.
3. Amold.J.Robertson.Lavern T.and CooperCary.L."Work Psychology: Understanding Human Behaviour in the Workplace" Macmillan Indian Ltd.Delhi.1996.
4. French & Bell (4thed.). "Organization Development: Behavioral science Interventions for Organization Improvement" Prentice Hall of India Pvt.Ltd.New Delhi 1996.
5. P.Kesho."Organisational Development for Excellence" MacMillan India ,1996
6. Robbins (4th ed.). "Essentials of Organizational Behaviour" Prentice Hall of India
6. Schermerhorn, Hunt and Osbora "Managing Organizaiton Behaviour" John Willey & Sons. USA.1982.
- 7.Weston.Mergers. "Restructuring and Corporate Control" Prentice Hall Of India Pvt.Ltd. New Dellhi.1995.



105 MCA E2: ERP AND BPR ALLIED CONCEPTS

COURSE OUTCOME: Students after studying ERP And BPR Allied Concepts course are expected:

CO1: To understand various ERP & BPR methodologies and their applications.

CO2: To gain knowledge about Business Functions, Processes, Data Requirements , Production & Materials Management Information System.

CO3: To study issues and challenges of applying tools/techniques of Information Technology for BPR.

CO4: To apply acquired knowledge of ERP & BPR methodologies in the industry

CO5: To contribute in the field of ERP and BPR implementation .

UNIT 1-Introduction to ERP :- Evolution of ERP, Growth of ERP Market , advantages of ERP, ERP & Related technologies : BPR ,MIS , DSS,EIS, Data Warehousing & Data Mining , OLAP, Supply Chain Management.

UNIT 2-Business Functions, Processes, & Data Requirements: - Functional Areas of operation: Marketing & sales, Production & Materials Management, Accounting & Finance , Human Resources. Marketing Information System & Sales Order Process: - Sales Quotations & Orders, Order Filling, Accounting & Invoicing, Payment & Returns, Sales & Distribution in ERP: Pre-sales activities, sales order processing, Inventory Sourcing, Delivery, Billing, Payment, CRM (Customer Relationship Management).

UNIT 3-Production & Materials Management Information System: - Materials Requirement Planning (MRP), Manufacturing Resource Planning (MRP-II), Bill of Materials (BOM), JIT & Kanban, CAD/CAM, Product Data Management, Make-to-Order (MTO), Make-to-Stock (MTS), Assemble-to-Order (ATO), Engineer-to-Order (ETO), Configure-to-Order (CTO).

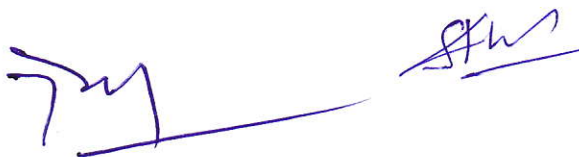
Accounting & Finance: - Accounting & finance activities: creating financial statements, Operational Decision Making Problem: Credit Management, Product Profitability Analysis, ERP & Inventory Cost Accounting Activity, Activity based costing & ERP.

UNIT 4-ERP Implementation Life Cycle: - Pre-evaluation screening, Package evaluation, Project Planning phase, Gap Analysis, Reengineering, Configuration, Implementation team training, Testing, Going live, End user training. Post- implementation, Role of vendors & consultants.

UNIT 5-Business Process Reengineering (BPR) & its Implementation:-BPR, five step methodology to implement BPR, Development process vision & determining process objectives, defining the processes to be reengineered, understanding & measuring the existing processes, identifying the IT levels, designing the prototype & implementing it.

BOOKS :

1. Concepts in Enterprise Resource Planning : Bready, Monk ,Wagner
2. Buisness Process Reengineering : Jayaraman Natarajan & Rangramanujan
3. ERP Concepts & Practice V.K Garg & Venkitakrishan.
4. Enterprise Resource Planning : Alexis Leon



201MCA : OPERATING SYSTEMS

COURSE OUTCOME: On successful completion of this course, Students will be able -

- CO1:** To understand to analyze the structure and basic architectural components involved in OS.
- CO2:** To display competence in recognizing and using operating system features.
- CO3:** To gain knowledge of implementation of different operating systems aspect.
- CO4:** To apply knowledge of different operating system algorithms.
- CO5:** To contribute and make enhancements in the features of operating systems.

UNIT 1-Introduction :Evolution of operating systems, Types of operating systems, Different views of the operating system, operating system Concepts and structure.

Processes : The Process concept, systems programmer's view of processes, operating system services for process management. Scheduling algorithms. Performance evaluation.

UNIT 2-Memory Management : Memory management without swapping or paging, swapping, virtual memory, page replacement algorithms, modeling paging algorithms, design issues for paging systems, segmentation.

Inter-process Communication and Synchronization : The need for inter-process synchronization, mutual exclusion, semaphores, hardware sport for mutual exclusion, queuing implementation of semaphores, classical problems, in concurrent programming, critical region and conditional critical region, monitors, messages.

Deadlocks : Deadlock Prevention ,deadlock avoidance.

UNIT 3-File Systems :File systems, directories, file system implementation, security protection mechanisms.

Input/output :Principles of I/O Hardware : I/O devices, device controllers, direct memory access.

Principles of I/O Software : Goals, interrupt handlers, device drivers, device independent I/O software.

User space I/O Software.

UNIT 4-Disks : Disk hardware, scheduling algorithms, Error handling, track-at-a-time caching, RAM Disks.

Clocks : Clock hardware, memory mapped terminals, I/O software.

Processes and Processors in Distributed Systems :

Threads, System models, processor allocation, scheduling.

Distributed File Systems : Design, Implementation, trends.

UNIT 5-Performance Measurement, monitoring and evaluation Introduction ,important trends affecting performance issues, why performance monitoring and evaluation are needed, performance measures, evaluation techniques, bottlenecks and saturation, feedback loops.

Case Studies : MS-DOS,MS WINDOWS, LINUX (UNIX) Operating System.

References :

1. Deitel, H.M. " An Introduction to Operating Systems". Addison Wesley Publishing Company 1984.
2. Milenkovic M., "Operating Systems - concepts and Design". McGraw Hill International Edition-Computer Science series 1992.
3. Peterson J.L. Abraham Silberschatz. "Operating System Concepts". Addison Wesley Publishing Company, 1989.
4. Tanenbaum, A.S." Modern Operating Systems", Prentice Hall of India Pvt. Ltd. 1995.



202MCA : DATA BASE MANAGEMENT SYSTEMS

COURSE OUTCOME: Upon successful completion of this course, students will be able -

CO1: To understand to analyze database design methodology.

CO2: To gain knowledge in fundamentals of database management system to analyze the difference between traditional file system and DBMS.

CO3: To apply knowledge of different database languages.

CO4: To study various data models for database and write queries.

CO5: To have knowledge of Distributed database and its applications.

UNIT 1-Introduction : advantages of DBMS approach; various views of data ,data independence, schema & sub-schema ; primary concept of data models ; database Languages; transaction management; database administrator & user ; data dictionary; overall system architecture. ER model: basic concepts ; design issues; mapping constraints; keys; ER diagram; weak & strong entity- set; specialization & generalization, aggregation, inheritance; design of ER schema; reduction of ER schema to tables. Domains, relation & keys: domains; relations; kind of relations; relational databases; various types of keys ; candidate, primary, alternate & foreign keys.

UNIT 2-Relation algebra & SQL: The structure; relational algebra with extended operation; modification of database; idea of relational calculus; basic structure of SQL; set operations; aggregate functions; null values; nested sub queries; derived relations; views; modification of database; join relations; DDL in SQL. Database Integrity : General idea; Integrity rules ; domain rules; Attribute rules; Relation rules; Database rules; assertions; triggers; integrity & SQL.

UNIT 3-Functional dependencies & normalization: basic definitions; Trivial & nontrivial dependences; closure set of dependences & of attributes; Irreducible set of dependences; Introductions to normalization; Nonloss decomposition; FD diagram; First, Second and Third normal forms; Dependency preservation; BCNF; multivalued dependencies and fourth normal form; Join dependencies and fifth normal form.

Transaction, concurrency a Recovery : Basic Concept; ACID Properties; Transaction State; Implementation of Atomicity and Durability; Concurrent executions; Basic Idea of Serializability ; Basic Idea of Concurrency Control; Basic Idea of Deadlock; Failure Classification; Storage Structure- types, Stable storage Implementation, Data Access; Recovery & Atomicity- Log Based Recovery, Deferred Database Modification, Immediate Database Modification, Checkpoints.

UNIT 4-Distributed Databases: Basic Idea; distributed Data Storage; Data Replication; Data Fragmentation- Horizontal, Vertical & Mixed Fragmentation.

Emerging Fields in DBMS: Object Oriented Databases- Basic Idea & the Model, Object Structure, Object Class, Inheritance, Multiple Inheritance, Object Identity; Data Ware Housing- Terminology, Definitions, Characteristics; Data Mining & its Overview; Databases On WWW; Multimedia databases-difference with conventional DBMS, Issues, Similarity based Retrieval, Continues Media Data, Multimedia Data Formats, Video Servers.

UNIT 5-Storage Structure & File Organization : Overview of Physical Storage Media; Magnetic Disk Performance and Optimization; Basic Idea of RAID; File Organization; Organization of Records in Files; Basic Concepts of Indexing; Ordered Indices; Basic Idea of B-Tree & B⁺ Tree Organization.

Network&Hierarchical Model:Basic Idea;DataStructureDiagram;DBTG Model; Implementation; Tree Structure Diagram; Implementation Techniques; Comparison of the Three Models.

References :

1. Date. C. J. "An Introduction to Database Systems" Narosa Publishing House, New Delhi
2. Desai B.C. "An Introduction to Database Concepts" Galgotia Publications New Delhi
3. Elmsari and Navathe. "Fundamentals of Database System" Addison Wesley, New York.
4. ullman J.D. "Principles of Database System" Galgotia Publications, New Delhi.
5. Data Base System Concepts:A.Silberschatz, H.F. Korth, S. Sudarshan(3rdEd.)(McGraw Hill Pub)

203MCA : DATA STRUCTURE USING 'C' LANGUAGE

COURSE OUTCOME: Upon successful completion of this course, students will be able

CO1: To recognize to manage large amounts of data efficiently and gain understanding of linear and non linear data structures .

CO2: To learn use of efficient data structures and design efficient algorithms.

CO3: To apply different kinds of data structures which are suited to different kinds of applications.

CO4: To study various algorithm of linear and non linear data structures.

CO5: To have knowledge of Searching, Hashing & Sorting and use it appropriately.

UNIT 1-Prerequisite: Array; Structure; Pointers; Pointer to Structures; Functions ; Parameter Passing; Recursion. Stack & Queue: Contiguous Implementation of Stack; Various Operation on Stack; Various Polish Notations-Prefix, Postfix, infix; Conversion From one to Another- Using Stack; Evaluation of Post & Prefix Expressions. Contiguous Implementation of Queue; Linear Queue, Its Drawback; Circular Queue; Various Operation on Queue; Linked Implementation of Stack & Queue- Operations. General List : List & its Contiguous Implementation, its Drawback; Singly Linked List- Operation on it; Doubly Linked List- Operation on it; Circular Linked List; Linked List Using Arrays.

UNIT 2-Trees: Definitions- Height, Depth, Order, Degree, Parent & Children Relationship etc.; Binary Trees- Various Theorem , Complete Binary Tree, Almost Complete Binary Tree; Tree Traversals-Pre, In & Post Order Traversals, Their Recursive And Non Recursive Implementations; Expression Tree-evaluation; Linked representation of Binary Tree- Operations. Threaded Binary Trees, Forest, Conversion of Forest into Tree. Heap-Definition.

UNIT 3-Searching, Hashing & Sorting: Requirement of Search Algorithm; Sequential search, Binary Search, Index Sequential Search, Interpolation Search; Hashing - Basics, Methods, Collisions, Resolution of Collisions, Chaining; Internal Sorting-Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort on linked and Contiguous List. Shell Sort, Heap Sort.

UNIT 4-Graphs: Related Definitions; Graph Representation- Adjacency Matrix, Adjacency List, Adjacency Multi List; Traversal Schemes- Depth First Search, Breadth First Search; Minimum Spanning Tree; Shortest Path Algorithm; Kruskal & Dijkstra Algorithms.

UNIT 5-Miscellaneous Features: Basic Idea of AVL Tree- Definition, Insertion, Deletion Operations; Basic Idea of B Tree- definition, Order, Degree, Insertion & Deletion Operations; B⁺ Tree- Definition, Comparison with B Tree; Basic Idea of String Processing.

References :

1. "Data structure and Program Design In C" Robert L. Kruse.
2. "Introduction to Data Structures" J.P. Trembley & Sorenson"
3. Algorithms + data Structures = Programs" N. writh
4. "Fundamentals of Data Structures "E. Horwitz & S.Sahni
5. "Data Structure Using C & C++" TennenBaum A.M. & Others: PHI



204MCA : PROBABILITY AND COMBINATORICS

COURSE OUTCOME: on successful completion of this course, students will be able -

CO1: To know basic concepts and principles of Probability And Combinatorics.

CO2: To gain knowledge of probability and nature of random variables.

CO3: To study the use of generating function to solve the engineering problems.

CO4: To apply the permutations and combinations to solve various problems.

CO5: To learn about the nature of system using the recurrence relations.

UNIT 1-Probability : Sample space, Events. Axioms. Conditional probability. Bays rule Random variables: Discrete and continuous.

UNIT 2-Distribution and density functions. Marginal and conditional distributions. Stochastic independence.

Expectation : Expectation of a function, Conditional expectation and variance.

UNIT 3-Moment generating function. Cumulate generating functions. Characteristic functions. Distributions: Discrete and continuous distributions.

UNIT 4-Permutations and combinations : Distinct and non-distinct objects. Generating functions for combinations.

UNIT 5-Recurrence relations: Linear and with two indices. Principles of inclusion and exclusion. Formula derangement . Restrictions on relative positions.

References:

1. Liu. C.L. "Introduction to Combinatorial mathematics" McGraw Hill. 1996.
2. Ross. S."A.First Course in Probability" Collier Macmillan New York . 1976.



205MCA E3: Software Engineering

COURSE OUTCOME: on successful completion of this course, students will be able

CO1: To understand basic concepts related to System Analysis & Design.

CO2: To gain knowledge of Software engineering fundamentals.

CO3: To apply software engineering principles and techniques

CO4: To develop, maintain, evaluate large scale software systems and produce efficient, reliable, robust and cost-effective software solutions.

CO5: To have skills of effective member or leader of software engineering teams and manage time, processes and resources effectively.

UNIT 1-Overview of System Analysis & Design : System Definition & Concepts: Characteristics and Type of Systems, System Environment & Boundaries, Real-Time & Distributed Systems, Role & Need of System Analyst, Qualifications and Responsibilities.

System Development Life Cycle: Introduction to Various phases of system development of life cycle, data & fact gathering techniques (interviews, group communication, presentation and site visits), Feasibility Study and its Importance, Type of Feasibility reports, prototyping, cost-benefit analysis.

UNIT -2

Software engineering fundamentals : Definition of software engineering, difference with conventional method of software development, phases of software development life cycle, software project teams, software development process models: waterfall, prototype, spiral.

Software Requirement Analysis : Role of software requirement specification, Characteristics and components of software requirement specification, Specification languages, structure of SRS.

UNIT-3

Software design & testing: Fundamental of design concept; abstraction. modularity; types of module. Coupling and cohesion: content, common, control, stamp, data coupling. Cohesion; coincidental, logical, temporal, procedural, communicational, sequential, functional. Design methodology- Object oriented approach, function approach Vs Object oriented approach, Software metrics; size oriented, function oriented, object oriented metrics.

Verification & validation: types of testing (black box and white box testing),unit testing, integration testing, system testing, acceptance testing.

UNIT-4

Software estimation and reliability: Issue in software cost estimation, standard component, function point method, COCOMO.

Concept of software reliability, software errors, faults. Reliability metrics.

UNIT -5

SCM & Software maintenance : Fundamental of software configuration management & software maintenance, major elements of SCM, types of software maintenance.

CASE Tools & Environment : Concept, Scope of CASE, Classification of CASE Tools, categories of CASE environments.

Books:

1. Software Engineering : A Practitionrs Approach, Pressman Roger, Tata McGraw Hill.
2. An Integrated Approach to software Engineering, Pankaj Jalote, Narosa Pub.
3. Software Engineering : A Practitionrs Approach, Pressman Roger, Tata McGraw Hill.
4. An Integrated Approach to software Engineering, Pankaj Jalote, Narosa Pub.

205MCA E4 – Software Testing.

COURSE OUTCOME: on successful completion of this course, students will be able

CO1: To know basics of software testing and testing terminologies

CO2: To develop skill of Test Case Design and strategies.

CO3: To apply acquired knowledge in testing of software

CO4: To explore different levels Of Testing.

CO5: To contribute in the designing of test cases and gain knowledge of testing tools.

UNIT - I: Introduction: Testing as an Engineering Activity, Testing as a Process, testing axioms, Basic Definitions Software Testing Principles, The Tester's Role in a Software Development Organization, The Defect Repository and Test Design, Developer/Tester Support for Developing a Defect Repository, Defect Prevention Strategies.

UNIT - II: Test Case Design : Test Case Design Strategies, Using Black Box Approach to Test Case Design, Random Testing, Requirements based testing, Boundary Value Analysis, Decision tables, Equivalence Class Partitioning, State-based testing, Cause-effect graphing, Error guessing, Compatibility testing.

UNIT - III: Using White Box Approach to Test design, Test Adequacy Criteria, static testing vs. structural testing, code functional testing, Coverage and Control Flow Graphs, Covering Code Logic, Paths, Their Role in White-box Based Test Design, Evaluating Test Adequacy Criteria.

UNIT - IV: Levels Of Testing : The Need for Levels of Testing, Unit Test, Unit Test Planning, Designing the Unit Tests, The Test Harness, Running the Unit tests and Recording results, Integration tests, Designing Integration Tests, Integration Test Planning, Scenario testing, Defect bash elimination. System Testing, Acceptance testing, Performance testing, Regression Testing, testing OO systems, Testing the documentation.

UNIT V Introduction to automatic testing & tools: Drawback of manual testing, Benefits of automatic testing, demerits of automatic testing, functional testing tools, performance testing tolls. Overview of automatic tool QTP : history, benefits, anatomy, main parts of QTP.

Reference Books:

1. Srinivasan Desikan and Gopaldaswamy Ramesh, "Software Testing – Principles and Practices", Pearson education, 2006.
2. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.
3. Ron Patton, " Software Testing", Second Edition, Sams Publishing, Pearson education, 2007
4. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.
5. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, 1995.
6. Boris Beizer, "Software Testing Techniques" – 2nd Edition, Van Nostrand Reinhold New York, 1990.



301MCA : COMPUTER NETWORKS

COURSE OUTCOME: on successful completion of this course, students will be able

CO1: To learn the basic taxonomy and terminology of computer networking area.

CO2: To enrich various concepts of Protocol Hierarchies, Design Issues, Interfaces and Services including Connection Oriented and Connection less Services.

CO3: To study about OSI Layers, LAN,MAN,WAN , Internet and IEEE Standards.

CO4: To build network topologies and use appropriate network tools .

CO5: To have skills of implementation of Network Security and Socket Programming.

UNIT 1-Introduction : Goals & Applications, Reference Models OSI and TCP/IP, Comparison, Network Hardware: LAN,MAN,WAN and Internet, Wireless networks, Inter Networks, Network Software: Protocol Hierarchies, Design Issues, Interfaces and Services, Connection Oriented And Connection less Services, Service Primitives.

UNIT 2-Physical Layer: Concept of Data Transmission, Transmission Media, Switching techniques, Wireless Transmission, ISDN and ATM.

UNIT 3-Data Link Layer: Framing, Error Control, DLC Protocols: Simplex, Stop-and-Wait, Shielding Window, HDLC.Medium Access Sub Layer: Channel Allocation- Static & Dynamic, Multiple access protocols, IEEE Standards for LAN, FDDI, Fast Ethernet.

UNIT 4-Network Layer: Organization, Virtual Circuits v/s Data gram Services, Routing Algorithms, Congestion Control, Network Layer in Internet.

UNIT 5-Transport Layer: Services & Protocols (TCP and UDP), ATM ALL Protocol, Socket Programming.

Application Layer: Network Security, DNS, SNMP, E-mail, WWW, Network Multimedia Applications.

References :

Computer Networks, A.S. Tannenbaum, 3rd Edition, PHI.

Data networks, Dimitri Bertsekas & Robert Gallager, PHI.

Data Networks: Concepts, Theory & Practices, Black, PHI.

Computer Networks & Distributed Processing, Martin J., PHI.



302 MCA : UNIX & Shell Scripting

COURSE OUTCOME: on successful completion of this course, students will be able

CO1: To learn about structure of UNIX like Kernel , shell and features of UNIX.

CO2: To understand Unix file system command for file manipulation

CO3: To study about advanced features including multi user communication & Scheduling.

CO4: To build programs using Shell programming .

CO5: To have knowledge about Linux structure, Various flavors of Linux and Installation of Linux .

UNIT 1 : Overview UNIX & LINUX

Structure of UNIX , evolution of UNIX ,Kernel and shell , features of UNIX ,UNIX: Installation and booting.

UNIT 2 : File System

Unix file system ,types of Unix files ,Login Directory, Inode-User Identification. file system hierarchy , working directories & pathnames ,pwd. Basic command for file manipulation like :ls, cat , cp, rm, mv, ln ,touch , cd,mkdir,rmdir,file access permission , types of permissions , determining & changing permission , Umask, chown,chgrp,newgroup, changing your password :passwd.

UNIT 3 : Advanced features

Multi user communication &Scheduling:who,write,mesg,wall,mail,at,lp,lpstat,pr,news,motd, Multiple commands on command line , redirecting : standard output to a file , standard input from a file and both , pipelines and filter:herad,tail,paste,sort,uniq,grep,egrep,fgrep,awk,nl, The Process:running a process in the background , process status , terminating a process , delay process. General purpose utilities:more,file,wc,od,cal,banner,cmp,ty,sty,date etc.

System Calls for the System:File Related system calls, process related system call,Mounting and Unmounting File System,Link Unlink.

UNIT 4 : Introduction To Shell Script:

Unix editors:vi,ex.Bourn Shell,C Shell, advance features of shell. Shell variable – system shell variables , local & global variables . Shell meta characters and environment ,if and case statements, for ,while and until loops. Shell Programming.

UNIT 5 : : Introduction to Linux: History and features of Linux, Linux structure, Various flavors of Linux,Installing Linux .

System Administration: Understanding System Administration,startup & shutting down ,Managing user accounts,backing up data,system security.

Reference:

1. UNIX System – Rebecca Thomas (McGraw- Hill)
2. Advanced UNIX – Stephen Prata (BPB Publication)
3. UNIX System –Sumitabha Das
4. Operating System by PHI- Milan koewick



303 MCA-E5 :Cloud Computing

COURSE OUTCOME: After completion of this course student will be able to

CO1: To learn fundamentals of cloud computing.

CO2: To understand cloud architecture, types , services & the basic concepts of security systems.

CO3: To gain deep insight of cryptographic protocols in cloud computing.

CO4: To study virtualized infrastructure security and methods to improve virtualization security.

CO5: To have knowledge of market Based management of Clouds

Unit 1: Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST, Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP, Social networking

Unit 2: Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure

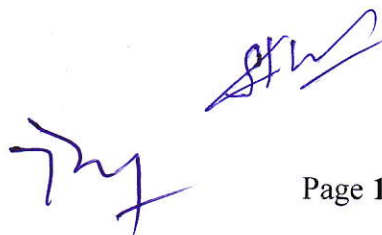
Unit 3: Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits ..

Unit4: Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture .

Unit 5: Market Based Management of Clouds , Federated Clouds/Inter Cloud: Characterization & Definition ,Cloud Federation Stack , Third Party Cloud Services . Case study : Google App Engine, Microsoft Azure , Hadoop , Amazon , Aneka.

References:

1. Buyya, Selvi , Mastering Cloud Computing ,TMH Pub
2. umar Saurabh, Cloud Computing , "Wiley Pub"
3. Krutz , Vnes, Cloud Security , Wiley Pub
4. Velte, Cloud Comput ing A Practical Approach ,TMH Pub
5. Sosinsky, Cloud Computing , Wiley Pub



303 MCA E6: Internet of things

COURSE OUTCOME: After completion of this course student will be able to

CO1: To recognize the technology of IOT and its application areas.

CO2: To learn to analyze and evaluate protocols used in IOT.

CO3: Apply the concepts of IOT to different applications.

CO4: To develop and design applications using IOT.

CO5: To have knowledge of analysis and evaluate the data received through sensors in IOT.

Unit I: Introduction & Concepts: Introduction to Internet of Things, Physical Design of IOT, Logical Design of IOT, IOT Enabling Technologies, IOT Levels.

Unit II Domain Specific IOTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

Unit III M2M & System Management with NETCONF-YANG: M2M, Difference between IOT and M2M, SDN and NFV for IOT, Software defined Networking, Network Function Virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IOT Systems management with NETCONF-YANG.

Unit IV Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages

Unit V: IOT Physical Devices & Endpoints: What is an IOT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, and Programming & IOT Devices.

TEXT BOOKS: Vijay Madiseti, Arshdeep Bahga, "Internet of Things A Hands-On- Approach", 2014, ISBN:978 0996025515

REFERENCE BOOKS: 1. Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013, ISBN: 978-1-118-43062-0 2. Daniel Kellmerein, "The



304MCA:COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

COURSE OUTCOME: After completion of this course student will be able to

CO1: To understand various errors in numerical approximation.

CO2: To display understanding of common numerical methods like Arithmetic, Floating point number, operations, Normalization, and their consequences.

CO3: To study Simultaneous linear equations & Solutions of simultaneous linear equations.

CO4: To apply acquired knowledge of Interpolation, Iterative methods and Regression Analysis

CO5: To learn about Probability Theory.

UNIT 1-Errors in numerical approximation: Sources of errors, machine error, Relative error, Percentage error, round off in different number system, Interpolation : Gauss Backward, Gauss Forward, Lagranges interpolation, Newton divided Difference , Inverse interpolation.

UNIT 2-Iterative methods: Zeros of a single transcendental equation and zeros of polynomial using bisections, false position Newton-Raphson etc. convergence of solutions.

UNIT 3-Simultaneous linear equations: Solutions of simultaneous linear equations gauss elimination method and pivoting, ill-conditioned equations and refinement of solutions, Gauss Sidle iterative methods.

Numerical Differentiation & Integration: Solutions of differential equation, Runge- Kutta methods, predictor- corrector methods.

STATISTICAL ANALYSIS:

UNIT 4-Regression Analysis: Least Square fitting: Polynomial and curve fitting. Linear and nonlinear regression. Correlation- Pearsons coefficient of correlation

UNIT 5-

Probability Theory: Sample Space events; sampling theory, conditional probability Bayes formulas, Additive law of probability, Compound events, Use of Binomial Theorem.

REFERENCES :

- 1."Basic Statistical Computing" by D. Cook A. H. Lee & T.S. Lee
- 2."Statistical Computer Method Basic " by J. D. Lee & T.D. Lee
- 3."Statistical Analysis a Computer Oriented Approach" by A Affi
- 4."Probability & Statistics with reliability queuing & Computer Science Applications" by K. S. Trivedi
- 5."System Simulation" by Geoffrey Gordon
6. "Computer Based numerical Algorithms" by E.V.Krishnamurthy & S.K. Sen
7. "Computer Oriented numerical Methods" by v. Rajaraman
8. " Linear Algebra " by G. Hadlley.

305MCA : JAVA PROGRAMMING

COURSE OUTCOME: upon successful completion of this course, students will be able to

CO1: To gain knowledge about basic Java language syntax and semantics.

CO2: To understand various concepts and constructs of Java language

CO3: To apply concepts of Java to write programs

CO4: To explore fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, Constructor , Methods overloading , Method overriding.

CO5: To contribute in the development of software using Java Programming skills.

UNIT 1-Overview of JAVA Programming :

History of JAVA , features of java , how it is differ from C & C++ , java program structure , java Statements , JVM, command line arguments

Expression & Operator :

Data types , literals , variables , declaring a variable , dynamic initialization . Arrays, Operators - relational , Arithmetic, logical , assignment , increment & decrement , conditional operator , Bitwise operator , special operator, arithmetic expression , evaluation of expression .

Decision making & Branching :

Control Statements--IF , Switch ,Loops , Break , Continue , Return.

UNIT 2-Basic concept of OOPS :

Classes , methods , creating instance & class variable , accessing class member , Constructor , Methods overloading , Method overriding , Static member , final classes , finalizer method, Abstract method & classes , visibility control , Interfaces :Defining interfaces , extending interfaces , implementing interfaces , accessing interfaces ,Variables , Package - system package , using system package , creating package , accessing a package, adding a class to a package , Hiding classes .

UNIT 3-Exception Handling & Multithreaded Programming:

Exception Handling- Fundamental, types, uncaught exception, using try and catch, multiple catch, nested try, throw, throws,finally,**Java thread model**, creating threads, extending thread class, stopping & blocking a thread, Life cycle of thread, thread exception, thread priority, synchronization- implementing and runnable interface, inter thread communication, multithreading.

UNIT 4-Developing web-based program :-

What is an applet, applet architecture, applet life cycle, a simple applet program, AWT-Working with Graphics; line, rectangles, ellipses, circles, arcs, polygons Working with colors; Working with fonts. Stream and Files.

UNIT 5 Advance Java

JDBC: JDBC architecture, JDBC Basics, establishing a connection, JDBC Statements.Designing a User Interface with swing - Benefits Of swing , application framework , adding components to a swing , frame working with swing.

Reference:

1. Programming with java . A preimer by “ E. Balaguruswamy “.
2. “Advence programming in Java by V.K.Jain & Hemlata
3. JAVA 2 platform in 21 DAYS by “Lemay and Cadenhead” by Techmedia pub.
4. The complete reference JAVA 2 by “ Patrick Naughton & Herbert Schidt” .

401MCA : Artificial Intelligence & Expert Systems

COURSE OUTCOME: upon successful completion of this course, students will be able -

- CO1:** To understand basic concepts of artificial intelligence, early developments in this field, basic knowledge representation, problem solving, and learning methods of artificial intelligence.
- CO2:** To know strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving particular problems.
- CO3:** To study game playing as problem solving, representation of a game as a state space, state space search, heuristic search, blind and informed search.
- CO4:** To develop understanding of natural language processing
- CO5:** To contribute in the development of expert system and make progress in the field of AI , soft computing, fuzzy systems and robotics etc.

UNIT 1- An Overview of AI: Definitions, Foundations of AI: Philosophy, Mathematics, Psychology, Computer Engineering, linguistics, History of AI, Applications of AI.

UNIT 2 -AI Production Systems, Search and Control Strategies:

AI Production systems and control strategies; Exploring alternatives: Finding a path: Depth first search, hill climbing, breadth first search, beam search, best first search; Finding the best Path: The British Museum search, Branch and Bound Search, A* Search, AO* Search; Game Playing: Minmax search, Alpha-beta pruning, Progressive deepning, Heuristic Pruning..

UNIT 3-Knowledge Representations:

First order predicate calculus, Clause form representation of WFFs, resolution principle & unification, inference mechanism, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

UNIT 4-Natural Language Processing:

Overview of linguistics, grammars and languages, Parsing techniques: Chart Parsers, transition nets, augmented transition nets, WASP Parser.

UNIT 5-Expert systems:

Introduction and applications of exert systems, Rule-based System Architecture, Non-production system architecture, Expert system shells, dealing with uncertainty: Bayesian reasoning and fuzzy reasoning. Introduction to Some of the AI Techniques like neural networks, genetic algorithms, machine learning, pattern recognition, Robotics etc.

Books:

1. Introduction to AI and Expert Systems: D.W. Patterson PHI.
2. Artificial Intelligence: P.H. Winston, Addison Wesley.
3. Principles of AI: N.J. Nilsson, Springer-Verlag
4. Artificial Intelligence: A Modern Approach: Stuart Russell and Peter Norvig, Pearson Education

402 MCA-E7 : .Net Technology

COURSE OUTCOME: Students after studying these areas of knowledge are expected:

- CO1:** To learn fundamentals of .NET framework
- CO2:** To enrich knowledge about Windows Forms, Controls and ASP.NET based applications.
- CO3:** To gain proficiency in C# by building stand-alone applications in the .NET framework using C#.
- CO4:** To build data-driven applications using the .NET Framework, C#, and ADO.NET
- CO5:** To have skills to create web-based applications and Reports using .NET technologies

UNIT 1 - Introduction to .NET Framework: Programming Platform .NET Framework, .NET Architecture, CLR, the Just-in-Time Compiler, Garbage collection. .NET Framework class library.

C# - The Basics and Console Applications in C#: Introduction to C#.NET Development Environment, Visual development & event driven Programming -Methods and events. Data type, type conversion. Variables, constants, operators, Decision making, Loops, Class, Object, Methods. Arrays, String manipulation.

UNIT 2 - Overview of OOPs: encapsulation, inheritance, polymorphism, abstraction. Operator overloading. Creating and using Class Library, Creating user-Defined Classes. Understanding Constructors and instance Variables, Handling and Using Interfaces. Preprocessor directives, Exception handling, Understanding Delegates.

Windows Forms and Controls: The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs - ToolTips.

UNIT 3 - Introduction to ASP.Net: Overview of ASP.NET framework, ASP.NET Application Life Cycle, page life cycle phases: Initialization, Instantiation of the controls on the page, Restoration and maintenance of the state. Understanding ASP.NET Controls, Applications Web servers, installation of IIS. Web forms, Web form controls - server controls, client controls, web forms & HTML.

UNIT 4 - Programming in ASP.Net Adding controls to a web form Buttons, Text Box. Labels, Checkbox. Radio Buttons, List Box etc. States of ASP.Net: View State, Control State, Session State, Application State. Creating a multiform web project, running a web Application, Event Handling- Application and Session Events, Page and Control Events. Validation controls: RequiredFieldValidator, RangeValidator, CompareValidator, RegularExpressionValidator, CustomValidator, ValidationSummary.

UNIT 5 - Database connectivity in ASP.Net: Architecture of ADO.NET, Connected and Disconnected Database. Create Connection using ADO.NET Object Model, Connection Class, Command Class, Data Adapter Class, and 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.

References:

1. ASP .NET Unleashed C# programming - Wrox Publication
2. C# Programming Black Book by Matt Talles
3. Introduction to .NET - Unleashed

TEXT & REFERENCE BOOKS :

- VB.NET Programming Black Book by Steven Holzner - Dreamtech publications
- Mastering VB.NET by Evangelos Petroustos - BPB publications
- Introduction to .NET framework - Wrox publication

402 MCA E8—Introduction to Oracle

Course Outcome: Students after studying these areas of knowledge are expected:

CO1: To learn about the fundamental concepts of Oracle and understand database creation , its management and acquire knowledge of Data base Administration .

CO2: To gain deep insight of SQL Plus, Creation, Insertion, Updation, Deletion of tables and other SQL constructs.

CO3: To know skills of Joining Multiple Tables and Granting Permissions in database.

CO4: To build application using concepts of PL/SQL.

CO5: To have knowledge of Oracle Procedures & Functions.

UNIT-1 DIFFERENT DATA BASE MODEL ,RDBMS COMPONENTS – KERNEL, DATA DICTIONARY,CLIENT/SERVER COMPUTING AND ORACLE, OVERVIEW OF ORACLE ARCHITECTURE – ORACLE FILES, SYSTEM AND USER PROCESS, ORACLE MEMORY, ROLE OF DBA, SYSTEM DATA BASE OBJECT, PROTECTING DATA

UNIT 2- SQL Plus, Oracle data types, Creation, Insertion, Updation, Deletion of tables, Modification of structure of tables, Removing, Deleting, Dropping of Tables, Data Constraints, Column level & table Level Constraints.Null, Unique Key, Default key, Foreign key ,Check Integrity constraints. Defining different constraints on the table Defining Integrity Constraints in the ALTER TABLE Command, Select Command, Logical Operator, Range Searching, Pattern Matching,Oracle Function, Grouping data from Tables in SQL, Manipulation Data in SQL

UNIT 3- Joining Multiple Tables (Equi Joins),Joining a Table to itself (self Joins),Subqueries Union, intersect & Minus Clause.Creating view,Renaming the Column of a view,Granting Permissions, - Updation, Selection, Destroying view,Permission on the objects created by the user,GRANT statement,Object Privileges,Referencing a table belonging to another user,Revoking the permission given,Indexes

UNIT 4- PL/SQL, SQL & PL/SQL DIFFERENCES, BLOCK STRUCTURE, VARIABLES, CONSTANTS, DATATYPE, ASSIGNING DATABASE VALUES TO VARIABLES, SELECT ... INTO, CURSORS, USING FLOW CONTROL AND LOOP STATEMENT, GOTO STATEMENT, ERROR HANDLING, BUILT-IN EXCEPTIONS, USER DEFINED EXCEPTIONS, THE RAISE-APPLICATION-ERROR PROCEDURE, ORACLE TRANSACTION, LOCKS, IMPLICIT AND EXPLICIT LOCKING. 21

UNIT 5- Procedures & Functions - Concept, creation, execution, advantages, syntax, deletion,Triggers - Concept, use, how to apply database triggers, type of triggers, syntax, deleting,Import, Export,Oracle backup and recovery

Reference :

1. Ivan Bayross, "SQL, PL/SQL", BPB Publications"
2. Liebschuty, "The Oracle Cook Book", BPB Publication
3. Michael Abbey, Michael J.Corey, "Oracle a Beginners guide". TMH Publication
4. Oracle Unleashed (Chapter 1,2,3,4,5 and 9)

402 MCA E9 –Data warehousing and data mining

COURSE OUTCOME: After completion of this course student will be able

CO1: To understand the functionality of the various data mining and data warehousing concepts.

CO2: To find out the strengths and limitations of various data mining and data warehousing models.

CO3: To apply and gain knowledge of analyzing techniques and methodologies used in data mining

CO4: To develop analysis skills using different approaches of data ware housing and data mining technologies.

CO5: To have knowledge about Testing the Data Warehouse and security.

UNIT 1- Introduction to Data Mining :Data Mining , features, business context, technical context, approaches to data mining. Types of Data Mining : Direct & Undirected, Virturous Cycle.

UNIT 2- Data Mining Process & Technique : Data Mining Techniques: automatic, cluster detaction, Decision trees, Neural Networks, Data Mining Methadologies: Conventional System Development :waterfall process,Rapid Prototyping.

UNIT 3-Introduction to Datawarehouse : Data warehousing concepts, Goals & objectives, Issues involved in Data Warehousing, The three C's of Data Warehousing : Commitment,Completeness & Connectivity, OLAP,Types of Data Warehous.

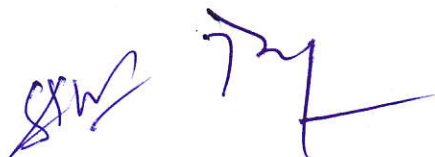
Contracting a Data Warehouse System:

UNIT 4- Stages of the project : Planning stage : Justifying the datawarehouse, obtaining user buy-in, overcoming Resistance to the Data Warehouse, Developing a project plan; Data Warehouse Design approaches. Architectural stage : Process architecture, Introduction, Load manager, Query manager, Detailed Information, Summary Information, Metadata, Data Marting.

UNIT 5- Testing the Data Warehouse: Introduction ,developing the test plan, testing backup recovery, testing the operational environment, testing the database, testing the application, Logistics of the text, Security : Requirements, performance, impact of security, security impact on design.

References:

1. "Data Warehousing" by Amitesh Sinha.
2. "Data Warehousin in the real world " by Sam Anahory & Dennis Murray.
3. " Decision Support System & Data Warehouse Systems " by Efrem G. Mallach.



403MCA : Computer Graphics & Multimedia

COURSE OUTCOME: upon successful completion of this course, students will be able

CO1: To learn basic concepts of computer graphics and multimedia and to understand contemporary graphics hardware and software.

CO2: To display skills of input, output mechanism, do scan-conversion and display objects on screen, fill regions and draw curves.

CO3: To apply acquired knowledge to transform objects in 2d and 3d, clip object in 2d using different mechanisms

CO4: To study detection of visible surfaces using algorithms .

CO5: To have working knowledge of multimedia.

UNIT 1- Introduction:Computer graphics, definition, classification & applications, development of hardware & Software for computer graphics, Refresh Cathode ray tubes, Random and raster scan devices, DVST, plasma panel display, LED and LCD monitors, laser devices, printers, plotters, display processors, raster and random scan system.

Output primitives: DDA along with, Bresenhan's line drawing algorithm, antialiasion, circle generation: Midpoint algorithms, ellipse, other curves, character generation, area filling scan line algorithm, boundary fill flood fill algorithm, attributes of output primitives line attributes, area fill attributes, character attributes.

UNIT 2-Two-dimensional Transformations and Clipping: Translation scaling rotation reflection sheer, matrix representation and homogeneous coordinates composite transformation commands. Viewing coordinates window, view port, window to view transformation line clipping Cohan Sutherland algorithm polygon clipping: Sutherland-hodgeman algorithm.

UNIT 3-Three-dimensional concepts: Three dimensional viewing, three dimensional object presentation : polygons, cured line & surfaces quadrate (sphere, ellipsoid), surfaces, design of curves & surfaces, bezier's methods, Bspling methods; three dimensional transformation: Translation, scaling composite transformation, rotation, about arbitrary axis, projection: parallel, perspective.

UNIT 4-Visible surface detection: Classification of visible-surface, detection algorithms, back face detection, depth buffer methods, A- buffer method, scan line method, depth sorting method. **Illumination and shading:** Light sources, diffuse reflection, specular reflection, reflected light, texture, shadows, light intensity intensity levels. Surface shading, constant intensity, gouraud shading, phong shading.

UNIT 5-Introduction To Multimedia: Review of Multimedia, Multimedia Applications, Multimedia systems architecture, Multimedia Hradware, Multimedia Software, Representation and operations on various multimedia data types: text, images, graphics, video and audio, Introduction to multimedia authoring.

Books:

1. D.Heam and M.P. Baker Computer Graphics (2nd ed), PHI.
2. S. Harrington – Computer Graphics – a Programming approach (2nd ed) McGrawhill.
3. Multimedia Systems Design: Prabhat K. Andleigh and Kiran Thakrar, PHI.
4. Roger S. David Procedural Elements for Computer, McGraw Hill.
5. Roger S. David Mathematical Elements for Computer Graphic, Mc Graw Hill.
6. Foley & Vandan : Computer Graphics : Principles & Practice in "C" Addision Wesly.

404MCA: System Development Project

COURSE OUTCOME: Students after completing System Development Project are expected:

- CO1:** To learn in real life project development environments involving deadlines and teamwork.
- CO2:** To having hands on experience of real life system development life cycle.
- CO3:** To apply the technologies learnt during the course in real life projects
- CO4:** To explore and use upcoming technologies in project development not covered during the course
- CO5:** To contribute in the development of software and applications for the welfare of society.

System Development Project (Here student is required to undertake a **three** months system development project in the Industry/Institute or in a software/computer Organization and submit a detailed project report as per prescribed format latest on the date announced by the department and then evaluated by the examiner.

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