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R.K.D.F. UNIVERSITY, BHOPAL
MASTER OF COMPUTER APPLICATION
FIRST YEAR
Semester – I

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UNIT-I


UNIT-II

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. Design of simple Arithmetic & Logic Unit & Control Unit, arithmetic and logical operations. Along with register transfer, timing in register transfer. Functional units – Basic operational concepts – Bus structures – Performance and etrics – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instructions – Sets – RISC and CISC – ALU design – Fixed point and Floating point operation.

UNIT-III

Architecture of a simple processor: A simple computer organization and instruction set, instruction formats, addressing modes, instruction cycle, instruction execution in terms of microinstructions, interrupt cycle, concepts of interrupt and simple I/O organization, Synchronous & Asynchronous data transfer, Data Transfer Mode: Program Controlled, Interrupt driven, DMA (Direct Memory Access), implementation of processor using the building blocks.

UNIT-IV

Assembly Language programming: Pin Diagram of 8086, Architecture of 8086, Addressing Mode of 8086, detailed study of 8086/8088 assembly language, instruction set of 8086, loops and Comparisons, conditions and procedures, arithmetic operations in assembly language. Simple Assembly Language program of 8086. Illustrations using typical programs like: table search, subroutines, symbolic and numerical manipulations and I/O.

UNIT-V
Memory organization: Secondary Memory, Primary Memory: Random access memory, Read Only memory, basic cell of static and dynamic RAM, Building large memories using chips, Concept of segmentation & Paging, Associative memory, cache memory organization, virtual memory organization.

TEXT BOOKS:

REFERENCES:
3. David A. Patterson and John L. Hennessy, “Computer Organization and Design:
An overview: Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & 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-II

Fundamentals of C++ Programming: History of C++, Structure of a C++ Program; Data types; Constant Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

UNIT-III

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, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples.

UNIT-IV

Advanced Programming Techniques: Special constructs – Break, continue, exit(), goto & labels; Function returning pointers; Pointer to function, Function as parameter; Structure – basic, declaration, membership operator, pointer to structure, referential operator, self referential structures, structure within structure, array in structure, array of structures; Union – basic, declaration; Enumerated data type; Typedef; command line arguments.

UNIT-V

Abstract data types, Objects and classes, Attributes and Methods, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions, Object lifetime, Static and dynamic objects, global and local objects, Metaclass, Modeling the real world objects.

TEXT BOOKS:
1. Balagurusamy; Object oriented programming with C++; TMH
2. David Parsons Object oriented programming with C++; BPB publication

References:
1. David Parsons; Object oriented programming with C++; BPB publication
2. Object oriented programming in C++ by Robert Lafore: Galgotia
3. Balagurusamy; Object oriented programming with C++; TMH
4. Hubbard; Programming in C++ (Schaum); TMH
5. Mastering C++ by Venugopal, TMH
UNIT-I

Sets, Relations and Functions: Sets, Subsets, Power sets, Complement, Union and Intersection, Demorgan’s law, Cartesian products, Relations, relational matrices, properties of relations, equivalence relation, functions. Injection, Surjection and Bijection mapping, Composition of functions, the characteristic functions and Mathematical induction.

UNIT-II

Proportions & Lattices: 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). Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element, Lattices, sub lattices, Isotonicity, distributive inequality, Lattice homomorphism, lattice isomorphism, complete lattice, complemented lattice distribution lattice.

UNIT-III

Groups and Fields: Group axioms, permutation group, sub group, co-sets, normal subgroup, semi group, Lagrange theorem, fields, minimal polynomials, reducible polynomials, primitive polynomial, polynomial roots, applications.

UNIT-IV

Graphs: Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk, paths, and circuits. Eulerian graphs, tree properties of trees, pendant vertices in tree, center of tree, spanning trees and cut vertices, binary tree, matrix representation of graph, incidence and adjacency matrix and their properties, applications of graphs in computer science.

UNIT-V

Discrete Numeric function and Recurrence relation: Introduction to discrete numeric functions and generating functions introduction to recurrence relations and recursive algorithms, linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions and total solutions.

REFERENCES

UNIT-I

Communication Meaning and process of communication, importance of effective communication, communication situation, barriers to communication. Objectives of communication, types of communication, principles of communication, essentials of effective communication.

UNIT-II

Media of Communication Written, oral, face-to-face, visual, audio-visual, merits and demerits of written and oral communication.

UNIT-III

Communication Skills: Developing communication skills; Listening; Speaking; Reading-Writing (Oral & Written). Body language; Utility of aids in Communication.

UNIT-IV

Spoken Skills Preparing for oral presentation, conducting presentations; Debates; Seminar; Speeches; Lectures; Interviews; Telephonic Conversation; Negotiations; Group Discussions.

UNIT-V

Written Skills: Preparing of bio-data, seminar, paper, bibliography, and official correspondence; Mechanics of writing; Formal & Informal writings, letters; paragraphing, precise, report writing, technical reports, length of written reports, organizing reports, writing technical reports; Creative writing; Common Errors in Language.

REFERENCES:
5. Scot Ober “Contemporary Business Communication”, Wiley India.
UNIT-I

Stack and Queue: 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-II

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-III

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-IV

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-V

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.

REFERENCES
3. Trembl “Introduction to Data Structure with Applications”.
4. Tennenbaum A.M. & others: Data Structures using C & C++; PHI
<table>
<thead>
<tr>
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<td>MCA</td>
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Outline: Exercises to implement various Programming using C++.

Outline: Exercises to implement various data structures and algorithms using C++.

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Outline: Exercises to implement various experiments.
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UNIT I


UNIT II

IMPLEMENTING ADTS AND ENCAPSULATION: Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III


UNIT IV


UNIT V


REFERENCES:
UNIT-I

Introduction: Advantage of DBMS approach, various view of data, data independence, schema and subschema, primary concepts of data models, Database languages, transaction management, Database administrator and users, data dictionary, overall system architecture. ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables.

UNIT-II

Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types of keys, candidate, primary, alternate and foreign keys. Relational Algebra & SQL: The structure, relational algebra with extended operations, modifications 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.

UNIT-III

Functional Dependencies and Normalization: basic definitions, trivial and non trivial dependencies, closure set of dependencies and of attributes, irreducible set of dependencies, introduction to normalization, non loss decomposition, FD diagram, first, second, third Normal forms, dependency preservation, BCNF, multivalued dependencies and fourth normal form, Join dependency and fifth normal form.

UNIT-IV

Database Integrity: general idea. Integrity rules, domain rules, attribute rules, relation rules, Database rules, assertions, triggers, integrity and SQL. Transaction, concurrency and Recovery: basic concepts, ACID properties, Transaction states, 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 and atomicity- log based recovery, deferred Database modification, immediate Database modification, checkpoints. Distributed Database: basic idea, distributed data storage, data replication, data fragmentation horizontal, vertical and mixed fragmentation.

UNIT-V

Emerging Fields in DBMS: object oriented Databases-basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity, data warehousing terminology, definitions, characteristics, data mining and it’s overview, Database on www, multimedia Databases-difference with conventional DBMS, issues, similarity based retrieval, continuous media data, multimedia data formats, video servers. Storage structure and file organizations: overview of physical storage media, magnetic disks performance and optimization, basic idea of RAID, file organization, organization of records in files.
asic concepts of indexing, ordered indices, basic idea of B-tree and B+-tree organization. **Network and hierarchical models:** basic idea, data structure diagrams, DBTG model, implementations, tree structure diagram, implementation techniques, comparison of the three model.

REFERENCES:
UNIT-I

Introduction: Evolution of operating systems (History of evolution of OS with the generations of computers), Types of operating systems, Multitasking, Timesharing, Multithreading, Multiprogramming and, Real time operating systems, Different views of the operating system, System Programmer’s view, User’s view, Operating system concepts and structure, Layered Operating Systems, Monolithic Systems. Processes: The Process concept, The process control block, Systems programmer's view of processes, Operating system services for process management, Scheduling algorithms, First come first serve, Round Robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues, Performance evaluation of scheduling algorithms stated above

UNIT-II

Memory Management: Memory management without swapping or paging, Concepts of swapping and paging, Page replacement algorithms namely, Least recently used, Optimal page replacement, Most recently used, Clock page replacement, First in First out (This includes discussion of Belady’s anomaly and the category of Stack algorithms), Modeling paging algorithms, Design issues for paging system, Segmentation, Segmented Paging, Paged Segmentation

UNIT-III

Inter-process Communication and Synchronization: The need for inter-process synchronization, Concept of mutual exclusion, binary and counting semaphores, hardware support for mutual exclusion, queuing implementation of semaphores, Classical problems in concurrent programming, Dining Philosopher’s problem, Bounded Buffer Problem, Sleeping Barber Problem, Readers and Writers problem, Critical section, critical region and conditional critical region, Monitors and messages. Deadlocks: Concepts of deadlock detection, deadlock prevention, deadlock avoidance. Banker’s Algorithm.

UNIT-IV


UNIT-V

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.

REFERENCES:
UNIT – I

Pre-requisites: Data structure & Discrete structures, models of computation, algorithm analysis, order architecture, time space complexities average and worst case analysis.

UNIT-II

Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.
Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search).

UNIT-III

Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths.
Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms.

UNIT-IV


UNIT-V

Computational Complexity: Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples. Combinational algorithms, string processing algorithm, Algebraic algorithms, set algorithms.

REFERENCES:
1. Ullman "Analysis and Design of Algorithm" TMH
UNIT I


UNIT II


UNIT III


UNIT IV


UNIT V


REFERENCES:
### Course Outline:

<table>
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Outline: Exercises / case studies that require object-oriented programming in JAVA.

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Outline: Exercises / case studies that require table design, normalization and query building.
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UNIT-I


UNIT-II

**Data Security and Integrity:** Parity Checking Code, Cyclic redundancy checks (CRC), Hemming Code, Protocol Concepts –, Basic flow control, Sliding window protocal-Go-Back-N protocol and selective repeat protocol, Protocol correctness- Finite state machine.

UNIT-III


UNIT-IV


UNIT-V


REFERENCES:
2. Forouzan “Data Communication and Networking 3ed”, TMH
UNIT I

BASIC INTERNET CONCEPTS: Connecting to the Internet – Domain Name System - Exchanging E-mail – Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses – Chatting and Conferencing on the Internet – Online Chatting - Messaging – Usenet Newsgroup , Internet Relay chat (IRC) – Instant Messaging - Voice and Video Conferencing.

UNIT II


UNIT III

Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability,.Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.

UNIT-IV

Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.

UNIT-V


References:
1. Web Technology, Achyut Godbole, Atul Kahate, TMH
4. Satyanarayana, E-Government, PHI
UNIT-I

**General Issues and Overview of AI:** The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP programming: Syntax and numeric functions, Basic list manipulation functions, predicates and conditionals, input output and local variables, iteration and recursion, property lists and arrays.

UNIT-II

**Problem Solving, Search and Control Strategies:** General problem solving, production systems, control strategies forward and backward chaining, exhaustive searches depth first breadth first search. **Heuristic Search Techniques** Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem reduction & AO* algorithm, constraint satisfaction problems.

UNIT-III

**Knowledge Representations:** First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

UNIT-IV

**Natural Language processing:** Parsing techniques, context free grammar, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammers, symantic analysis. Game playing Minimax search procedure, alpha-beta cutoffs, additional refinments. **Planning** Overview an example domain the block word, component of planning systems, goal stack planning, non linear planning.

UNIT-V

**Probabilistic Reasoning and Uncertainty:** Probability theory, bayes theorem and bayesian networks, certainty factor. **Expert Systems** Introduction to expert system and application of expert systems, various expert system shells, vidwan frame work, knowledge acquisition, case studies, MYCIN. **Learning** Rote learning, learning by induction, explanation based learning.

REFERENCES:
UNIT I


UNIT II


UNIT III


UNIT IV


UNIT V


REFERENCES:
UNIT-I


UNIT-II

Attributes of output primitives, line style, color and intensity, Area filling algorithms, Scan line algorithm, boundary fill flood fill algorithm, Antialiasing techniques. Two dimensional transformations; translation, scaling, rotation, reflection sheering, composite transformation, transformation commands, character generation.

UNIT-III

Viewing coordinates, Window, view port, clipping, Window to view port transformation, line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm, 3D clipping: Normalized view volumes, view port clipping, clipping in homogeneous coordinates. Illumination model: Light sources, diffuse reflection specular reflection, reflected light, intensity levels, surface shading; phong shading ground shading, color models like RGB, YIQ, CMY, HSV etc.

UNIT-IV

3-D Viewing: Three-dimensional concepts, 3D display techniques, 3D representation polygon & curved surfaces. Design of curves & surfaces- Bezier’s Method, B-spline methods, 3D transformation transition, scaling, composite transformation rotation about arbitrary axis, projections: Parallel & Perspective, Hidden surface and line removal; back face removal, depth buffer and scan line methods.

UNIT-V

Introduction to multimedia, multimedia components, multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations.

REFERENCES:
### Computer Networks Lab & Web Programming Lab

**Subject Code:** MCA-306

**Outline:** Exercises to implement the various experiment.

**Outline:** Exercises to implement the various Program with C++.

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### Computer Graphics Lab

**Subject Code:** MCA-307

**Outline:** Exercises to learn implementing various graphics algorithms using C++ and Exercises to learn multimedia concepts.
<table>
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# R.K.D.F. UNIVERSITY, BHOPAL

**MASTER OF COMPUTER APPLICATION**

**SECOND YEAR**

**Semester – IV**

<table>
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<tr>
<td>MCA</td>
<td>Advance Java Programming</td>
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## UNIT-I

**Java Database Connectivity:** JDBC Product, Types of Drivers, Two-Tier Client/Server Model, Three-Tier Client/Server Model, Basic Steps of JDBC, Creating and Executing SQL Statement, Set Object, Working with Database Meta Data, Interface.

**Servlets:** Servlet Interaction & Advanced Servlets, Life cycle of Servlet, Java Servlet development Kit, Javax. servlet package. **JavaServer Pages:** JSP, Understanding the Client-Server Model, Understanding Web server software, Configuring the JSP Server.

## UNIT-II

RMI: Designing RMI application, Executing RMI application, **EJB:** Types of Enterprise Java beans, Session Bean & Entity Bean, Features of Session Bean, Life-cycle of Stateful Session Bean, Features of Entity Bean, Life-cycle of Entity Bean, Container-managed Transactions & Bean-managed Transactions, Implementing a container-managed Entity Bean.

## UNIT-III

**XML:** What is XML, XML Syntax Rules, **Structs:** Introduction to the : Apache Struts, MVC Architecture, Struts Architecture, Introduction to the Struts Controller, Introduction to the Struts Action Class, Using Struts ActionFrom Class, Using Struts HTML Tags, Introduction to Struts. **Hibernate:** Introduction to Hibernate 3.0, Hibernate Architecture, First Hibernate Application

## UNIT-IV

**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 flowlayout, Grid layout, Border layout, Card layout. **The Java Event Handling Model:** Java’s event delegation model – Ignoring 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, Eey Event, Mouse Event, Text Event, Window Event.

## UNIT-V

**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 resultset object contents; java.sql Package; The JDBC exception classes; Connecting to Remote database.
Networking & RMI: Java Networking : Networking Basics : Socket, Client server, reserved sockets, proxy servers, Inet address, TCP sockets, UDP sockets.;

REFERENCES:
2. Deitel “Java- How to Program:” Pearson Education, Asia
UNIT- I

UNIT–II

UNIT-III

UNIT- IV

UNIT-V

REFERENCES:
UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V


REFERENCES:
UNIT-I

Introduction to Compiling and one pass compiler: Compilers and translators, phases of compilers, Structure of a compiler, compiler writing tools, bootstrapping, overview of one pass compiler, Error handling.

Finite Automata & Lexical Analysis: Role of lexical analyser, specification of tokens, recognition of tokens, regular expression, finite automata, form regular expression to finite automata, DFA and NFA, implementation of lexical analyser, tools for lexical analyser, only introduction to LEX.

UNIT-II

Syntax Analysis & Parsing Techniques: Context free grammars, Phase tree, ambiguity of parse tree, bottom up parsing and top down parsing, shift reduce parsing, operator precedence parsing, elimination of left recursion, recursive descent parsing, predictive parser construction, Transition diagram.

UNIT-III

LR parsers, constructing SLR and canonical LR parsing tables, using ambiguous grammar, Introduction to YACC, LR(1) & LALR Parsers. Syntax Directed Translation: Syntax directed translation scheme, construction of syntax trees, SDT with inherited and synthesized attributes, symbol tables.

UNIT-IV

Intermedicate code generation: Intermedicate languages, prefix notation, three address code, quadruples and triples, translation of assignment statements, boolean expression, procedural calls and iterative statements. Run time Environment: Source language issues, storage organisation and allocation strategies, parameter passing, implementation of block structured languages.

UNIT-V

Error Detection and Recovery: Errors, sources of errors, Lexical & syntactic phase error, semantic errors: panic mode error recovery & phrase level error recovery mechanisms.


REFERENCES:
1. Alfred V. Aho, Ravi Sethi and J.D. Ullman “Compilers- Principles, Techniques and tools” Addison Wesley, A

UNIT - II


UNIT - III


UNIT - IV


UNIT - V


REFERENCES

UNIT-II


UNIT-III

Fundamentals of fuzzy sets and fuzzy logic theory, fuzzy inference principle. Examples of use of fuzzy logic in control of real-world systems.

UNIT-IV


UNIT-V


REFERENCES:
2. Goldberg : Introduction to Genetic Algorithms
UNIT-I

Problem formulation, Problem Definition – Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics – Specialized production systems.

UNIT-II

Problem solving methods – Problem graphs, Matching, Indexing and Heuristic functions – Measure of performance and analysis of search algorithms - Game playing.

UNIT-III

Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic.

UNIT-IV


UNIT-V


Reference Books
### Course | Subject Title | Subject Code
--- | --- | ---
MCA | Microprocessors And Its Application | MCA-408

**UNIT - I**

**THE 8086 PROCESSOR - SOFTWARE ASPECTS**

- Evolution of Microprocessors - 8086 architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Interrupts and interrupt service routines.

**UNIT - II**

**8086 SYSTEM DESIGN**

- 8086 signals description – Basic configurations - System bus timing – System design using 8086 – Minimum mode /Maximum modes 8086 system and timings.

**UNIT - III**

**INTERFACING CONCEPTS**


**UNIT - IV**

**ADVANCED PROCESSORS**


**UNIT - V**

**BUILDING SYSTEMS**


**REFERENCES:**

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V

CASE STUDIES : Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System – JINI.

REFERENCES:

<table>
<thead>
<tr>
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**Outline:** Exercises / case studies that require Advanced programming in JAVA
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<td>Unix &amp; Shell Programming</td>
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<td>MCA-505 (optional)</td>
<td>TCP/IP Design and Implementation</td>
<td>20</td>
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UNIT—I

General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer Reading and writing disk block, Advantage and disadvantage of buffer cache.

UNIT—II

Internal Representation of Files: INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks.
System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES Mounting and unmounting files system, Link Unlink.

UNIT—III

Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process. The SHELL
Interprocess Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems, solution with master and hare process, and solution with semaphores.

UNIT—IV

Introduction to shell scripts: shell Bourne shell, C shell, Unix commands, permissions, editors, filters sed, grep family, shell variables, scripts, meta characters and environment, if and case statements, for while and until loops. Shell programming.

UNIT—V

Awk and perl Programming: Awk pattern scanning and processing language, BEGIN and END patterns, Awk arithmetic and variables, Awk built in variable names and operators, arrays, strings, functions, perl; the chop() function, variable and operators, $_, $ and $$. Lists, arrays, regular expression and substitution, file handling, subroutines, formatted printing.

Linux: History & Features of Linux, Linux structure, various flavours of linux.

REFERENCES:
UNIT - I

INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT : Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT – II


UNIT – III


UNIT – IV


UNIT – V


REFERENCES:
UNIT-I


UNIT-II


UNIT-III


UNIT-IV

File handling, File handling using File Stream, Stream Writer, Stream Reader, Binary Reader, Binary Writer classes, File and Directory Classes.

UNIT-V

Databases in VB.NET, Database: Connections, Data adapters, and datasets, Data Reader, Connection to database with server explorer Multiple Table Connection Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source, Data Grid View, Data form wizard, Data validation Connection Objects, Command Objects, Data Adapters, Dataset Class, Working with formula fields, Parameter fields, Group, Special fields, Working with Multiple Tables, SQL in Crystal Report, Report Temples.

REFERENCES:
1. Programming Microsoft Visual Basic.NET – Francesco Balena
2. The Complete Reference -Visual Basic .NET – Jeffrey R. Shapiro
UNIT - I

UNIT - II
INFORMATION RETRIEVAL :

UNIT – III

UNIT - IV

UNIT – V

REFERENCES:
UNIT – I


UNIT – II

MEMORY AND OPERATING SYSTEMS : Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.

UNIT – III

EMBEDDED SOFTWARE : Programming embedded systems in assembly and C Meeting real time constraints Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers.

UNIT – IV

EMBEDDED SYSTEM DEVELOPMENT : Design issues and techniques – Case studies – Completed design of example embedded systems.

UNIT – V

Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupt handling.

REFERENCES:
UNIT-I
Memory, Internal Memory, External Memory, Memory Organization, Associative Memory, Virtual Memory, Cache Memory.

UNIT-II
CPU, Arithmetic and Logic Unit, Instruction Sets, Instruction cycle, Addressing Modes and formats, Instruction Pipeline, Processor organization, Register organization, Control Unit Operation.

UNIT-III
External Devices, I/O modules, Programmed I/O, Interrupt Driven I/O, Direct Memory Access, I/O Channels and processors, Asynchronous Data Transfer.

UNIT-IV
Reduced Instruction Set Computers, Complex Instruction Set Computers, Super Scalars, Vector, Parallel Cluster, Distributed, Embedded and MultiCore Processors.

UNIT-V

Reference Books:
UNIT-I

Introductory concepts – The evolving role of software – Its characteristics, components and applications- A layered technology – the software process – Software process models -Software process and project metrics – Measures, Metrics and Indicators.

UNIT-II


UNIT-III

Testing fundamentals – Test case design – White box testing – Basis path testing – Control structure testing – Black box testing – Strategies: Unit testing integration testing – Validation.

UNIT-IV


Reference Books
Unit-I

Unit - II
Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multitenance using cloud data stores, Data access control for enterprise applications.

Unit - III
Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model.

Unit - IV

Unit - V
Issues in cloud computing, Implementing real time application over cloud platform Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud.

Reference Book:
1. Google Apps by Scott Granneman, Pearson
2. Cloud Security & Privacy by Tim Malhar, S.Kumaraswammy, S.Latif (SPD, O’REILLY)
UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V


REFERENCES:
UNIT – I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V


REFERENCES:

UNIT - I


UNIT - II

INTRODUCTION TO PARALLEL COMPUTERS AND COMPUTATION: Introduction to Parallelism and computing; Parallel machine model; Parallel programming model; HPC/HTC models.

UNIT - III

DESIGNING PARALLEL ALGORITHMS: Methodical design; Partitioning; Communication; Agglomeration; Mapping. Design and development of parallel processing systems. Unix workstation clusters. Master slave programming. Multi-threaded programming. Scheduling. Concurrency.

UNIT - IV


UNIT - V


REFERENCES:
UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V


REFERENCES:
UNIT - I


UNIT - II


UNIT - III


UNIT - IV

TCP IMPLEMENTATION : Data structure and input processing – transmission control blocks – segment format – comparison – finite state machine implementation – Output processing – mutual exclusion – computing the TCP data length.

UNIT - V


REFERENCES:
### Unix Programming Lab & .Net Programming Lab

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**Outline:** Exercises to implement the various Experiment.

**Outline:** Exercises to learn programming in C#, ASP, VB - .NET languages (etc.)

### Software Development Lab

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# R.K.D.F. UNIVERSITY, BHOPAL
## Master of Computer Application (MCA)

### SCHEME
#### Sixth Semester

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