

Scheme & Syllabus of
2 year Master of Computer Applications
(MCA)
(Effective from the Session: 2020-21)



Khallikote Unitary University
Berhampur

MCA Eligibility

Duration: 2 years (4 semesters)

Eligibility:

All those candidates who have passed bachelor's degree of minimum three years duration in BCA/B.Sc.(IT)/B.Sc.(CS) or equivalent/B.Voc. with Computer as a major subject and with mathematics at 10+2 level or at graduation level.

or

Bachelor Degree in Computer Science & Engineering or equivalent.

or

Any bachelor's degree of minimum three years duration with mathematics at 10+2 level or at graduation level **and** minimum One Year Diploma in Computer Application/Science/IT or equivalent from any recognized University/Institution

MCA 1ST SEMESTER

Course Code	Course Type	Course Title	Internal	External	Total Marks
CS 11	Core Theory	C programming and Data Structure through C	20	80	100
CS 12	Core Theory	Computer Organization & Architecture	20	80	100
CS 13	Core Theory	Operating system	20	80	100
CS 14	Core Theory	Software Engineering	20	80	100
CS 15	Core Theory	Mathematical Foundation of computer science	20	80	100
CS 11L	Practical	Linux O.S Lab		75	75
CS 12L	Practical	Programming in C & Data Structure Lab.		75	75
	TOTAL		100	550	650

MCA 2nd SEMESTER

Course Code	Course Type	Course Title	Internal	External	Total Marks
CS 21	Core Theory	Database Management System	20	80	100
CS 22	Core Theory	Object Oriented Design and modeling	20	80	100
CS 23	Core Theory	Design and Analysis of Algorithms	20	80	100
CS 24	Core Theory	Data Communication & Networks	20	80	100
CS 25	Core Theory	Core JAVA	20	80	100
CS 21L	Practical	Core Java Lab		75	75
CS 22L	Practical	DBMS Lab (Oracle)		75	75
	Total		100	550	650

MCA 3rd SEMESTER

Course Code	Course Type	Course Title	Internal	External	Total Marks
CS 31	Core Theory	Theory of Computation	20	80	100
CS 32	Core Theory	Data Mining and Data warehousing	20	80	100
CS 33	Core Theory	Advance java	20	80	100
CS 34	Core Theory	MIS	20	80	100
CS 35	Core Theory	Internet of Things(IOT)	20	80	100
CS 31L	Practical	OSP lab (PHP & Python)		75	75
CS 32L	Practical	Web designing lab		75	75
Mini project				100	
TOTAL			100	650	750

4th semester

Course Code	Course Type	Course Title	Internal	External	Total Marks
CS 41	Core Theory	Compiler Design	20	80	100
CS 42	Core Theory	Cryptography & network security(Elective I) Soft Computing(Elective II)	20	80	100
CS 43	Core Theory	Cloud Computing(Elective I) Interactive Computer Graphics(Elective II)	20	80	100
Major Project					250
TOTAL			60	240	550

Semester -I

CS-11- C programming and Data Structure through C

UNIT-I

Introductory Concepts :Overview of programming and programming languages, Types of programming Languages., Introduction to C, Features of C, Structure of C program, C Fundamentals Character Set, Identifiers and Keywords ,Variables and constants , Data types, Type casting.

UNIT-II

Operators and Expressions, Precedence and Associativity , Library Functions, Data Input output statement, Format specifiers, Control Statements, Arrays, String Array, Functions ,Storage classes.

UNIT-III

Pointers, Dynamic memory allocation, Structures and unions, User defined data types (type def), command line arguments, Files ,File handling, Binary Files, Random Access Files.

UNIT IV

Introduction, to data structures. Abstract data type, Stacks and Queues: circular Queue, Priority Queue, Deque, representation and Applications. Linked Lists: Singly linked lists, Linked stacks and queues, Operation on polynomial, Doubly linked list, Circular linked list, Doubly circular linked lists, Dynamic storage Management, Garbage collection and compaction.

UNIT-V

Graphs: Terminologies and representation, Path matrix, graph traversal,- DFS and BFS, shortest path problems, Bi-connected graphs.

Trees: Terminologies and memory representation, Binary trees, Binary search trees, Tree traversing, Operations on binary trees, - Expression manipulations,

Threaded binary trees, Height balancing trees, heaps.Sorting techniques: Bubble sort, selection sort, Insertion sort, Merge sort, Quick sort, Heap sort, searching technique: Linear search and binary search.

Text books: 1.An introduction to data structures with Applications. J. P. Tremblay P.G.Sorenson (Me Graw Hill)

Data Structures using C & C+ + Langsman, Augensteing & Tanenbaum (PHI)

2. Programming in ANSI C by E.Balaguruswamy

3.Data Structure using C by D.Anil Kumar

4.Let us C by Y. B. Kanitkar

5.Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Second Edition, 2008, Universities Press Pvt. Ltd.

CS-12: COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT -I:

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits., Flip Flop, counter, Integrated Circuits, Decoder, Multiplexers, Registers, Shift Registers, Binary counter, Memory unit. Data Representation: Data types, Complements, Fixed and Floating Point Representation, Other binary codes and error Detection codes.

UNIT –II

Register Transfer and Micro operations: Register Transfer language, Register transfer, Bus and Memory Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations and Arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycles, Memory Reference Instructions, Input, Output and Interrupts, Design of Accumulator logic.

UNIT –III

Programming the Basic Computer: Introduction, Machine Language, Assembly Language, The Assembler, Programming Arithmetic and Logic Operations, Subroutines, and input - output, Programming. Micro programmed Control: Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT –IV

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC. Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Computer Arithmetic: Addition and Subtraction, Multiplication algorithms, Division Algorithms, Floating point arithmetic operations, decimal arithmetic unit, and decimal arithmetic operations.

UNIT –V

Input -Output organization: Peripheral Devices, I/O output interface, Asynchronous data transfer, Modes of transfer, Priority Interrupt, DMA, Input output Processor, Serial Communication. Memory Organization: Memory Hierarchy, Main Memory, Cache Memory.

Text Books:

1. “Computer System and Architecture” (3rd edition), Mano M., Prentice Hall of India.
2. “Computer Organization and Architecture” (2nd edition), Stalling W., Prentice Hall of India.
3. “Computer Organization and Design”, Pal Chauduri. P (1994), Prentice Hall of India, New Delhi.
4. “Introduction to Digital Computer Design”(4th edition), New Delhi.

Reference Books:

1. J. P. Hayes “Computer Architecture and Organization" McGraw Hill Education India.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, 5th Edition, Mc Graw-Hill Education India
3. A.S. Tananbaum “Structured Computer Organization” Pearson Education.

CS-13: OPERATING SYSTEM

UNIT-I

Operating system concepts, evolution of operating systems, multi-programming, multiprocessing, time sharing, real-time & multi-tasking, operating system services, file system management: directory structures, file allocation and access methods, file protection.

UNIT-II

Process management: CPU scheduling & schedulers, CPU scheduling techniques: Pre-emptive and non-preemptive scheduling, FIFO, SJF, Round Robin, Priority Scheduling, Multi-level queues, performance evaluation of scheduling algorithms.

UNIT-III

Memory management: Contiguous and non-contiguous allocation schemes MFT, MVT, swapping, memory fragmentation, Dynamic memory allocation, paging, virtual memory, page replacement algorithms: FIFO, LRU, OPTIMAL, Frame allocation schemes, Segmentation.

UNIT-IV

Disk scheduling: FCFS, SSTF, Scan, C-Scan Look, C-Look sector Queuing. Inter-process Communication, Process synchronization, Mutual exclusion, Semaphore and its implementation monitor.

UNIT-V

Concept of Deadlock, necessary conditions for deadlock, Resource allocation graph, deadlock prevention, deadlock avoidance and recovery techniques.

BOOKS:

1. Operating System Concept- Galvino & Silverschatz (Addison Wesley)
2. Operating System Concepts-J.L. Peterson & A. Silverschatz (Add. Wesley)
3. Modern Operating System – A. S. Tanenbaum (PHI, 1995)
4. Operating Systems – Concept & Design (Milan Milenkovic) (MGH, 1992)
5. An Introduction to Operating Systems- H. M. Deitel (Addison Wesley, 1984)

CS-14 : SOFTWARE ENGINEERING

UNIT-I

Unit-I: Introduction

Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

Unit-II: Software Requirement Specifications (SRS)

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS.

Unit-III: Software Design

Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halstead's Software Science, Function Point (FP) Based Measures, Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO).

Unit-IV: Software Testing

Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

Unit-V: Software Maintenance and Software Project Management

Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

References:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4. Pankaj Jalote, Software Engineering, Wiley.
5. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.
6. Ian Sommerville, Software Engineering, Addison Wesley.
7. Kassem Saleh, "Software Engineering", Cengage Learning.
8. Pfleeger, Software Engineering, Macmillan Publication.

CS-15: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

UNIT I

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT II

Relations: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function, Composition of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

UNIT III

Basics of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorem, the principles of Inclusion – Exclusion.

Graph Theory: Representation of Graphs, DFS, BFS, Spanning Trees, Planar Graphs.

Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

UNIT IV

Recurrence Relations: Generating Functions, Function of Sequences, Calculating Coefficients of generating functions, Recurrence relations, solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, solution of non homogeneous Recurrence Relations.

UNIT V

Network scheduling –PERT and CPM with known activity times, critical path analysis, various types of floats, probability consideration in PERT, Transportation problem, degeneracy in transportation problem , Assignment problem

Sequencing problem- introduction to sequencing problem, flow shop problem, processing and jobs , 2,3 and M machines, general n/m job shop problem .

TEXT BOOKS:

1. Mathematical Foundation of Computer Science – ShahnazBathul, PHI.
2. Logic and Discrete Mathematics, Grass Man and Tremblay, Pearson Education.
3. Elements of Discrete Mathematics- A Computer Oriented Approach, C.L.Liu, D.P. Mohapatra, 3rd edition, TMH.
4. Discrete Mathematics for Computer Scientists & Mathematicians, second edition, J.L.Mott, A. Kandel, T.P. Baker, PHI
5. "Operations Research", Kanti Swarup, Gupta. P. K. and Manmohan, Sultan Chand and Sons.
6. Operation research by S.D. Sharma , Kedarnath Publication.

REFERENCE BOOKS:

1. Discrete Mathematics and its applications, 6th edition, K.H.Rosen, TMH.
2. Discrete Mathematical Structures, Mallik and Sen, Cengage Learning.
3. Discrete Mathematical Structures, Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, PHI/ Pearson Education.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Logic and Discrete Mathematics, Grass Man and Tremblay, Pearson Education.

CS-11L LINUX & SHELL PROGRAMMING LAB:

INTRODUCTION :

What is operating system, functions of O.S., types of O.S, Basic concepts of multi user system, Introduction to Linux, characteristics of Linux, component of linux, SHELL, types of SHELL, File naming, file system, types of users in linux, difference between DOS file system, linux file system.

Simple Directory Commands! pwd, mkdir, cd, rmdir,ls command, various options of ls.

Simple File Commands : cat, cp, rm, mv and other commands, wild card characters, file access permission, chmod command,cmp,comm.,diff,wc,vi editor, types of editor, various commands of vi editor,Pipes and filters : Standard files, redirection, filters (grep, wc, cut, head,sort,unique,,tr,tail commands) environment variables,ps command,kill,running jobs background, communication commands,su command,set command, .profile command.

INTRODUCTION TO SHELL PROGRAMMING :

Creation of shell program, executing the shell script, echo command, creating variables referencing variables, expr command, various control statements in linux, break and continue commands, array handling in linux, floating point operations, programs on shell script.

Text Books:

1. UNIX- Concepts and applications,

By: Sumitabha Das TMH publication

Reference Books:

2. Using UNIX – Special Edition ,PHI publication

3. The UNIX programming Environment,

By: Kernighan and Pike, PHI publication

IT 12L: C PROGRAMMING & DATA STRUCTURE LAB.

(C Language)

Objective : This is the first programming language subject student will learn. This subject will teach them programming logic, use of programming instructions, syntax and program structure. This subject will also create foundation for student to learn other complex programming languages like C++, Java etc.

CS 12 - C Programming

1 An Overview of C

- 1.1 A Brief History of C
- 1.2 C is middle-level Language
- 1.3 C is a Structured Language
- 1.5 The Form of a C Program.
- 1.7 Compilation & Execution of C. Program on Dos & Unix

2 Variables, Data Types, Operator & Expression

- 2.1 Character Set
- 2.2 C Token
- 2.3 Identifier & Keyword
- 2.4 Constant
- 2.5 Data Types in C
- 2.7 Operator & Expression
- 2.8 Precedence & Associability of Operators.

3 Console I/O

- 3.2 Character input & Output
- 3.3 String Input & Output.
- 3.4 Formatted Input/Output (scanf/printf)

4 Control Statement

- 4.2. Selection Statements
If, Nested if, if-else-if,
The Conditional Expression, switch
- 4.3. Iteration Statements
for loop, while loop, do-while loop
- 4.4 Jump Statements:Goto & label, break & continue, exit() function

5 Pointers

- 5.3. The basics of Pointer
- 5.4. The Pointer operator
- 5.5. Application of Pointer
- 5.6. Pointer Expression
- 5.7 .Declaration of Pointer, Initializing Pointer
- 5.8. Pointer Arithmetic
- 5.10. Pointer to Pointer

6 Array & String

- 6.1 . Single Dimension Arrays
Accessing array elements, Initializing an array
- 6.2 Multidimensional Arrays
Initializing the arrays, Memory Representation
Accessing array elements
- 6.3 . Passing Single Dimension array to Function
- 6.4 . Array & Pointer
- 6.5 . Array of Pointer

6.6 String Manipulation Functions

7 **Function**

7.1. Introduction

7.2. Arguments & local variables

7.3. Returning Function Results by reference & Call by value

7.4. Recursion

8 **Storage Class & Scope**

8.1. Meaning of Terms

8.2. Scope - Block scope & file scope

8.3. Storage Classes

Automatic Storage, Extern Storage, Static Storage, Register Storage

9 **Structure, Union, Enumeration & typedef**

9.1. Structures

Declaration and Initializing Structure, Accessing Structure members, Structure Assignments, Arrays of Structure, Passing Structure to function, Structure Pointer

9.2. Unions

10 **C Preprocessor**

10.1. Introduction

10.2. Preprocessor Directive

11 **File handling**

11.1. Introduction

11.2. Defining & Opening a File

11.3. Closing a File

11.4. Input/Output Operations on Files

11.5. Error Handling During I/O Operation

11.6. Random Access Files

11.7. Command Line Arguments.

11.8. programs on data structure

Text Books and References:

1. C: The Complete Reference: Herbert Schildt
2. Let us C Solutions: Y.P. Kanetkar
3. Spirit Of "C": Moolish Kooper.
4. Programming in C : S. Kochan.
5. C Programming Language: Kernighan & Ritchie.
6. Programming in C: R. Hutchison.
7. Graphics Under C: Y. Kanetkar

Semester - II

CS-21: DATA BASE MANAGEMENT SYSTEMS

UNIT-I

Review of file systems, characteristics of database approach, DB system concepts and architecture, data models, schema & subschema, 3-tier architecture, Physical and logical data independence, data base languages: DDL & DML. Data modeling using E-R approach, Reduction of E-R diagrams to tables.

UNIT-II

Hierarchical data model: Basic concepts, tree-structure diagrams, physical and logical database record concepts, data manipulation, and overview of IMS Access & Storage structures.

Network data model : DBTG data structure diagrams concept of set, owner and member records, set membership, Insertion and retention options, data manipulation overview of DBTG DB system.

Relational model : Structures of relational database, Relational algebra, Key Concepts, Integrity Constraints, Concept Of normalization, types of data dependencies, 1NF, 2NF, 3NF, BCNF, 4NF and 5NF.

UNIT-III

Query processing: basic structure of query, translation of queries Into relational algebra, basic algorithms for executing query operations, use of SQL as a query processing language, simple and nested queries, concept of views, Join relations.

File organization in DBMS: Introduction,File Organization,Sequential File Organization,Indexed Sequential File Organization,Direct File Organization.

UNIT-IV

Concept of data base transaction, transaction states, ACID properties, serializability. Concurrency control in DB Systems: lock based and time-stamp based techniques, two phase commit protocol,Failure and recovery in DB systems, log-based recovery, shadow-paging.

UNIT-V

Distributed databases: concept and Architecture, comparative view of Distributed databases and centralized database, data fragmentation, level of Distributed transparency.

Object oriented databases: object-oriented models, object structure, inheritance, object identity and object containment.

Parallel databases: I/O parallelism, inter query and intra query parallelism, inter operation and intra operation parallelism

BOOKS:

1. Fundamentals of Database Systems - Elmsary and Navathe, Addison Wesley.
2. Principles of Database Systems - .Ullmari J. D., Galgotia Publications.
3. Introduction to Database Systems - Bipin C Desai Narosa Publishing House.
4. An Introduction to Database systems-Date C. J. Addison Wisley.

CS-22 Object Oriented Modelling and Design using UML

Unit-1: Overview of Object Oriented Systems Development: , Concept of Object Oriented Software, Importance of Object Oriented Software, Object Oriented Future, Object Oriented Systems Development Methodology, characteristics of object oriented modeling. Object Basics: An Object Oriented Philosophy, Objects, Object Behavior, Object Oriented Properties, links, Association, Aggregation, Generalization and Specialization.

Unit-2: Object Oriented Systems Development Life Cycle: The Process of Software Development, Developing Good Quality Software, Use Case Driven Approach for Object Oriented Systems Development, Reusability.

Object Oriented Methodologies: Introduction, Types of Object Oriented, Methodologies, Patterns, Unified Approach.

Unit-3: **Object Modeling-** Advance Modeling Concepts- Aggregation, Abstract Class. Multiple Inheritance, Generalization as an Extension, Generalization as a Restriction, Metadata, Constraints, Example of Object Model

Dynamic Modeling- Events, State and State Diagram, Elements of State Diagrams, Examples of State Diagrams, Advance Concepts in Dynamic Modeling, Concurrency, Example of Dynamic model

Functional Modeling- Functional Models, Data Flow Diagrams, Features of a DFD, Design flaws in DFD, Example of Functional model, Relationship between Object, Dynamic, and Functional Models

Unit-4: Unified Modeling Languages (UML): Introduction to Unified Modeling Language (UML), Static and Dynamic Models, UML Diagrams, UML Class Diagrams-Types, Structural Diagrams- Class, Object, Component, Deployment Diagrams, Behavioural Diagrams-Activity, Use Case, State Chart ,Collaboration, Sequence Diagrams, UML Extensibility.

Unit-5: Object Oriented Analysis – Identifying Use-Cases: Complexity in Object Oriented Analysis, Business Process Modeling and Business Object Analysis, Use-Case Driven Object Oriented Analysis, Use-Case Model, Developing Efficient Documentation. Object Analysis: Classification: Object Analysis, Classification Theory, Approaches for Identifying Classes, Class Responsibility Collaboration.

Identifying Relationships, Attributes, and Methods: Introduction, Associations, Inheritance Relationships, A Part of Relationship-Aggregation, Class Responsibility: Identifying Attributes and Methods, Class Responsibility: Defining Attributes, Object Responsibility: Methods and Messages.

TEXT BOOK

1. Grady Booch, "Object Oriented Analysis and Design with Applications", Addison Wesley, 1994.

REFERENCE BOOK :

1. Schach,* Stephen R., "An Introduction to Object Oriented Systems Analysis and Design with HJML and the Unified Process" Tata McGraw Hill, 2003.
2. Object-Oriented Analysis and Design with Applications (3rd Edition)-Grady Booch, Robert A. Maksimchuk, Michael W. Engel, and Bobbi J. Young

CS-23 : DESIGN & ANALYSIS OF ALGORITHM

UNIT I:

Algorithm Analysis – Time Space Tradeoff, Analysis Of Algorithm Efficiency, Asymptotic Notations – Conditional asymptotic notation , Removing condition from the conditional asymptotic notation , Recurrence equations – Solving recurrence equations

UNIT II:

Divide and Conquer Approach: Merge Sort, Quick sort , Strassen's algorithm for Matrix Multiplications. Graph Algorithms: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths.

UNIT III: Dynamic Programming: Dynamic Programming, Elements of Dynamic Programming, Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems. Greedy Algorithms: Elements of Greedy strategy, An activity selection problem, Huffman Codes, A task scheduling problem, knapsack problem, traveling salesman problem.

UNITIV

Backtracking: General Method, 8 Queens problem ,sum of subsets , graph coloring ,Hamiltonian problem ,Branch and Bound: introduction, knapsack problem, Assignment problem, travelling salesman problem.

UNIT V

String matching: The naïve String Matching algorithm, The Rabin-Karp Algorithm, The Knuth-Morris Pratt algorithm. NP-Complete Problem: Polynomial-time verification, NP-Completeness- class P ,class NP and NP completeness problem, NP Hard completeness problem.

TEXT BOOK :

Introduction to the Design and Analysis of Algorithms, Anany Levitin : Pearson Education, 2003.

REFERENCE BOOKS :

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.
3. Fundamentals of Computer Algorithms, Horowitz and Sahni, Galgotia Publications.
4. Introduction to. Algorithms, Gormen, Leiserson and Rivest : Prentice Hall of India.

CS-24 ; DATA COMMUNICATION AND NETWORKS

UNIT-I:

Introduction to computer Networks:

- What is computer network, Tools and motivation.
- Application of networks.
- point-to-point or switched networks.

Circuit switched networks \ packet switched networks.

Broad Cast Networks, Packet radio networks, Satellite Networks, LAN.

- Network protocols, OSI model.
- Examples of some networks, concept of delays, how to reduce delays.

Data Transmission:

- Transmission Terminology
- Analog & Digital data Transmission
- Transmission impairments.
- Transmission media and its characteristics.

UNIT-II

Data encoding and communication technique PCM, AM, FM and PM.

Asynchronous Transmission, synchronous Transmission, Error detection technique, Parity, CRC & FEC.

Interfacing RS. 232 and X.21 Multiplexing and communication Hardware.

FDM, TDM, STDM, Modems, Multiplexer, Demultiplexer, concentrators, Front end processors.

UNIT-III

MAC and Data Link Layer :

- DLL fundamentals.
 - Retransmission strategies.
 - Contention based MAC protocols
 - Polling based MAC Protocols
- MAC Protocols High speed networks.

UNIT-IV

Network Layer :

- Introduction to layer.functionality
- Routing

- Congestics Control Algorithms
- IP
- Internetworking.

UNIT-V

Transport Layer and application layer services:

- Transport services and mechanism
- Transport control mechanism
- TCP/UDP
- RPC : (Remote Procedure Call)
- Applications: FTP, Telnet, E-mail, WWW, DNS.

BOOKS:

1. Computer Network A system approach, 4th ed.: Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann Publishers.
2. . Data Communications and networks:Forouzan, TMH.

Reference Books:

1. Computer Networks:Andrew Tanenbaum, PHI Publication,
2. Data & Computer Communication: William Stallings, PHI Publication.

CS-25: CORE JAVA

UNIT-I: Paradigm of programming languages, comparison of procedure oriented approaches and object oriented concepts, basic concept of OOPS, introduction to Java, basic features of Java, JVM concepts data types, variables, Java operators, expressions, various types of control statements, Arrays.

Class & Objects : Class fundamentals, creating object's, introducing methods, static methods, constructors, types of constructors, constructor overloading, this keyword, garbage collection, finalize method,

UNIT-II

Inheritance and polymorphism : inheritance basics, access control, multilevel inheritance, -abstract class, polymorphism, final keyword.**Packages and interfaces :** Definition of package, seeing the CLASS PATH, package naming, interface.

UNIT-III

Multithreading, I/O and string handling, introduction to multithreading, main thread, java thread model, thread class & runnable interface, thread properties, synchronization in java, interthread communication, I/O basics, FILE stream classes, byte stream classes *and* character stream classes, Input and output stream hierarchy reading and writing data from and to file, transient and volatile modifiers, stream tokenizer, serialization, print stream, random access files.

UNIT-IV

Exceptions, types of exception, handling of exceptions using try, catch, catching multiple exceptions using finally clause, throwing exception. Applet programming, graphics & user interfaces and exception handling, applet class, applet architecture, handling events, HTML applet tag, passing parameter to applet

UNIT-V Awt: Awt class, Awt controls, layouts and layout manager, event handling by AWT components, menu bars and menus, Swings fundamentals, difference between AWT and Swing based GUI.

RECOMMENDED AND REFERENCE BOOKS :

1. Programming with Java, E. Balaguruswamy.
2. Java Complete Reference, Herbert Schildt.
3. Web Enabled Commercial Application Development using Java 2.0, Ivan Bayross.

REFERENCE BOOKS :

1. Core Java Vol-I Fundamentals, Core Java Vol-II Fundamentals, Gay Cornell.
2. Java In a Nutshell, David Flanagan (O'reilly Publication)

CS-21L- JAVA PROGRAMMING

Session 1:Data types, variables and operators

Exercise 1: Write a program in Java to implement the formula (Area = Height x idth) to fmd the area of a rectangle. Where Height and Width are the rectangle's

.Exercise 2: Write a program in Java to find the result of following expression (Assume a = 10, b = 5)

i) $(a \ll 2) + (b \gg 2)$

ii) $(a) \ll (0 \gg 0)$

iii) $(a + b * 10) / 10$

iv) a & b

Exercise : Write a program in Java to find the average of marks you obtained in your 10+2 class.

Exercise: Write a program in Java that calculate sum,average and mean deviation of n number

Exercise: Write a program in Java that will print square and cubes of odd numbers from 0 to 50. the o/p should be

Original number	square	cube
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Session 2: Statements and array

Exercise 1: Write a program in Java to find A*B where A is a matrix of 3x3 and B is a matrix of 3x4, Take the values in matrixes A and B from the user.

Exercise 2: Write a program in Java to compute the sum of the digits of a given X integer, Remember, your integer should not be less than the five digits, (e.g., if input is 23451 then sum of the digits of 23451 will be 15)

Session 3: Class and Objects

Exercise 1: Write a program in Java with class Rectangle with the data fields width, length, area and colour. The length, width and area are of double type and colour is of string type. The methods are set_length(), set_width(), set_colour(), and find_area(). Create two object of Rectangle and compare their area and colour. If area and color both are the same for the objects then display "Matching Rectangles", otherwise display "Non matching Rectangle".

Exercise 2: Create a class Account with two overloaded constructors. The first constructor is used for initializing, the name of account holder, the account number and the initial amount in the account. The second constructor is used for initializing the name of the account holder, the account number, the addresses, the type of account and the current balance. The Account class is having methods Deposit(), Withdraw(), and Get_Balance(), Make the necessary assumption for data members and return types of the methods. Create objects of Account class and use them.

Session 4:

Inheritance and polymorphism

Exercise 1: Write a Java program to show that private member of a super class cannot be accessed from derived classes.

Exercise 2: Write a program in Java to create a Player class. Inherit the classes Cricket_Player, Football_Player and Hockey_Player from Player class.

Exercise 3: Write a class Worker and derive classes Daily Worker and Salaried Worker from it. Every worker has a name and a salary rate. Write method comPay(hit hours) to compute the week pay of every worker. A Daily Worker is paid on the basis of the number of days s/he works. The Salaried Worker gets paid the wage for 40 hours a week no matter what the actual hours are. Test this program to calculate the pay of workers. You are expected to use the concept of polymorphism to write this program.

Exercise 4: Write a Java program based on method overloading and method overriding.

Session 5: Package and Interface

Exercise 1: Write a program to make a package Balance in which has Account class with Display_Balanc method in it. Import Balance package in another program to access Display__Balance method of Account class.

Exercise 2: Create an Interface having two methods division and modules. Create a class, which overrides these methods.

Exercise 3: Write a program in Java which implements interface Student which has two methods Display_Grade and Atrendance for PG_Students and UG_Students (PG_Students and UG_Students arc two different classes for Post Graduate and Under Graduate students respectively).

Session 6: Exception Handling

Exercise I: Write a program in Java to display tnc names and roll numbers of students. Initialize respective array variables for 10 students. Handle ArrayIndcxOutOfBoundsException, so that any such problem doesn't cause illegal termination of program.

Exercise 2: Write a Java program to enable the user to handle any chance of divide by zero exception.

Exercise 3: Create an exception class, which throws an exception if operand is non-numeric in calculating modules. (Use command line arguments)

Session 7: Multithreading

Exercise 1: Write a Java program to create five threads with different priorities. Send ""two threads of the highest priority to sleep state. Check the aliveness of the threads and mark which thread is long lasting,

Exereise 2: Write a program to launch 3 threads. each thread increments a counter 'variable. Run the program with synchronization,

Exm:ise 3: Write a program for generating 2 threads, one for printing even numbers and the other for printing odd numbers.

Session 8: Reading, Writing and String handling in Java

Exercise 1: Write a program in Java to create a String object. Initialize this object with your name. Find the length of your name using the appropriate String method. Find the character 'a' is in your name or not; if yes find the number of times 'a' appears in your name. Print locations of occurrences of 'a'. Try the same for different String objects.

2: Write a program in Java for String handling which performs the following:

- i) Checks the capacity of StringBuffer objects.
- ii) Reverses the contents of a string given on console and converts the resultant string in upper case,
- iii) Reads a string from console and appends it to the resultant string of it

Exercise 3: Write a program in Java to read a statement from console, convert it into "-"upper case and again print on console,

Exercise 4: Write a program in Java, which takes the name of a file from user, read contents of the file and display it on the console.

Exercise 5: Write a Java program to copy a file into another file.

Session 9; Applets and it's applications

Exercise 1: Write a Java Applet program which reads your name and address in different text fields and when a button named find is pressed the sum of the length of characters in name and address is displayed in another text field. Use appropriate colors, layout to make your applet look good.

Exercise 2: Create an applet which displays a rectangle/string with specified colour & coordinate passed as parameter from the HTML file.

CS-22L: DBMS LAB. (ORACLE)

INTRODUCTION TO MANAGING DATA:

Database concept, DBMS, characteristics of DBMS, RDBMS, characteristics of RDBMS, E. FT Codd's Rule.

INTRODUCTION TO ORACLE.

Characteristics Of Oracle :Various tools of oracle, Data types, creating a table, create a table from another table, copy the structure, inserting data into tables, updating the contents of a table, delete operators, many facts of the select command.modifying the structure of the table, dropping the table and truncate the table:

Data Constraints : Column level, table level constraint, null value concept, primary key constraint, unique key constraint, check constraint, foreign key constraint.

Arithmetic operators used in oracle, logical operators, relational operator,, pattern matching,

oracle functions, grouping data from tables,, joining the table, types of joining, sub queries, types of sub query, correlated queries, sub queries, set operations: union, Intersect, minus clause.

View, creating a view, advantage, limitation, dropping a view, sequence, alter sequence, drop sequence.

Data control language : Grant revoke.

Transaction control language : Commit, save point and rollback.

INTRODUCTION TO PL/SOL :

Introduction, advantages of PL/SQL,Architecture, PL/SQL syntax, understanding the PL/SQL block structure, PL/SQL data types, Attributes:%type, %rowtype, control statements.

Cursors : Definition, types of cursor, explicit cursor, explicit cursor management-, explicit cursor, cursor mgt, cursor for loop, cursor for update.

Exception handling, stored procedure, declare of a procedure, types of parameter, dropping a procedure.

Function : Definition, declaration, how to execute a oracle function. . ' ^

Database Triggers : Introduction, Definition, difference between trigger and-procedure, types of triggers, syntax for creating triggers, dropping a trigger.

Recommended Books:

1. Understanding ORACLE Perry J & Later J
2. SQL & PL/SQL programming Scott Urman
3. SQL & PL/SQL programming Language Ivan Byrass

Semester – 3

CS-31 THEORY OF COMPUTATION

UNIT-I

Finite Automata & Regular Expressions: finite state systems. Non-Deterministic Finite Automata. Finite Automata with ϵ -Moves, Regular Expressions, Two-way finite automata, Finite Automata with output.

UNIT-II :

Properties of Regular Sets : The Pumping Lemma for Regular Sets, Closure Properties of Regular sets, Decision Algorithms for Regular Sets, The MYHILL-NERODE Theorem and minimization of Finite Automata.

UNIT-III :

Context Free Grammars : Context Free Grammars, Derivation Trees : Simplification of context free grammars. Chomsky Normal Form : Greibach Normal Form.

UNIT-IV :

Pushdown Automata, Properties of Context Free Languages : The Pumping Lemma for CFL's. Closure Properties of CFL's, Decision Algorithms for CFL's.

UNIT-V :

Turing Machines : The Turing Machine Model, Computable -Languages and functions. Techniques of Turing Machine Construction, Undecidability : Properties of Recursive and Recursively Enumerable Languages :

Universal Turing Machines (without any reference to undecidable problems), The Chomsky Hierarchy : Regular grammars, Unrestricted grammars, Context sensitive languages.

TEXT BOOK :

Introduction to Automata Theory & Languages and Computation, John E. Hopcroft & Jeffrey D Ullman, Narosa Publishing House.

REFERENCE BOOKS :

1. Computer Theory, Cohen.
2. Theory of Computation, KLP Mishra & N. Chandrasekharan, PHI.
3. Automata Theory P.K Srimani

CS-32 DATA MINING AND WARE HOUSING

UNIT - I

What is Data Mining ? Data Mining - On what kind of Data ? Data Mining Functionalities. Major issues of Data Mining.

What is a Data Warehouse ? A Multidimensional Data Model. Data -Warehouse Architecture. Data Warehouse implementation. Data cube technology. Data warehousing to Data mining.

UNIT - II: Data Processing :

Data Cleaning Data integration and transformation, Data reduction, Discretization and concept Hierarchy generation.

Data Mining primitives, languages, and System architectures.

Data Mining Primitives, A Data Mining Query Language, Designing GUI based on a Data Mining Query Language, Architecture of Data Mining Systems.

UNIT - III :Characterization and Comparison :

What is Concept Description ? Data generalization and summarization- Based Characterization/Analytical Characterization, Mining class comparisons, Mining Descriptive Statistical Measure in Large Databases.

Mining Association Rules in Large Databases:

Association Rule Mining, Mining Single Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from transaction databases, Mining Multidimensional association rules from

Relational Databases and Data warehouses from association mining to correlation analysis, constraint based association mining.

UNIT - IV: Classification and Predictions :

Concept of classification and prediction, classification by decision tree induction, Bayesian classification, classification by back propagation, classification based on analyst from association rule mining/other classification methods (K-Nearest Neighbour classifiers, case based reasoning, Genetic algorithm, Rough set approach, Fuzzy set approaches), Prediction, classifier accuracy.

Cluster Analysis

What is cluster analysis ? Types of data in cluster analysis, categorization of major clustering methods, Hierarchical methods, Density based methods, Grid based methods, Model based methods, Outer analysis.

UNIT - V: Mining Complex Types of Data :

Multidimensional analysis and descriptive mining of complex, data objects, Mining spatial Databases, Mining Multimedia databases, Mining Time-Series and sequence data, Mining text Databases, Mining the WWW.

Application and Trends in Data Mining:

ata Mining Applications, Data Mining System products and Researuls prototypes, Social impacts of Data Mining, Trends in Data Mining.

BOOKS:

1. Data Mining : Concepts and Techniques, J. Han and M. Kamber, Morgon Kaufmann Publishers, Elrevis India (2001).
2. Principles of Data Mining : D. Hand, H. Mannia &P. Symth, MIT Press, 2001,
3. Recent Literatures from ACM SIGMOD, VLDB, IEEE Trans, Knowledge and Data Engg, Knowledge Discovering, ACM SIGKOD, IEE ICDM, SIAM, Data Mining, ICML

CS-33: JAVA PROGRAMMING (ADVANCE)

UNIT-I

JDBC:-

JDBC Drivers, Statements & types, record sets & various operators,

Reflection API&JAR File Format:-

Using Reflection finding methods, Obtaining Information about constructors, fieldsOf a class, Invoking Method by name, JAR Utility.

Java Beans:-

What is Java Beans, component architecture designing, different features and properties of java beans.

UNIT-II

XML:-

Electronic data transaction by XML- Introduction, DTD, Comparison between HTML & XML, difference between SGML & XML, CSS & XSL, DSO, DOM, XML Schema. Using XML as backend process with java program.

UNIT-III

Servlet (Server side Component):-

Server-side component using servlet- introduction, Background, life-cycle of servlet, Web-server for Servlet Development, architecture, simple servlet programming using javax.servlet API, Handling HTTP Request & Response Reading Servlet Parameter, Database access through Servlet.Cookies & Session Tracking.

UNIT-IV

JSP (Server side Scripting):-

Server-side scripting of JSP- Introduction, Background, Life cycle of JSP, architecture, JSP programming using predefined tags (expression, Scriplet, Declaration, Directive), use of standard action

tags, communication between HTML & JSP, Database access using JSP, create user defined tag and calling in JSP, communication between JSP & XML using DOM parser.

UNIT-V

JSP Struts (An Architecture):

Introduction, life cycle process, MVC architecture, advantage and disadvantages, configuration of struts application in web server, implementation of Action class, ActionFormBean class, use of Struts-Config.xml and exception handling.

RECOMMENDED BOOKS :

1. Java servlet programming (O' Reilly)
2. Java JSP Programming (O' Reilly)
3. Sams Teach Yourself XML in 21 days.

CS-34: MANAGEMENT INFORMATION SYSTEM & E-Commerce

UNIT-I : Fundamentals of information systems concepts :

Need for information, systems - what managerial and users need to know, system concepts-business as a system - information processing concepts - information systems concept, recognizing information systems.

Information systems for operations management and strategic advantage :

An overview of information systems - information systems for business operations - information systems for management decision-making, competitive strategy concepts - strategic roles for information systems -strategic information systems and the managerial end-user.

UNIT-II : The systems development, analysis, design and implementation:

The scientific method - the systems approach -understanding a problem and opportunity - developing a solution - implementing a solution - systems development process prototyping - end user development - managing end-user development - managing end-user computing -principles for managing PCs-off-self software - outsourcing - comparison of different methodologies - challenges in developing information systems - IS development in a global environment.

UNIT-III : Transaction processing information reporting and executive information system :

Introduction - the data entry process - batch processing - real-time processing - file and database processing - document and report generation. Attributes of information quality - information presentation alteration information reporting systems - executive information systems.

Management decision making and decision support system:

information and decision making - information and management: Information reporting vs decision support system - decision support system - models for decision support - software for decision support - using decision support system , developing decision support systems.

UNIT-IV :

Business Information Systems :

Marketing Information System - Manufacturing Information System - Human Resource Information system - Accounting Information System - Financial Information System.

UNIT V

Electronic Commerce

Traditional commerce and E-commerce – Role of Internet in E-commerce , Value Chains – Strategic Business And Industry Value Chains – Role of E-commerce. E-commerce software, security threats to e-commerce, protecting e-commerce systems. Payment systems for e-commerce.

Mobile Commerce

Introduction – Infrastructure of M-Commerce – Types Of Mobile Commerce Services – Mobile Marketing & Advertisement, Applications of M-Commerce

BOOKS :

1. Management Information System, James A 'o' Brien, Galgotia Publications.
- 1 Management Information System, Uma G. Gupta, Galgotia Publications.
- 2 . E.Brian Mennecke, J.Troy Strader, “Mobile Commerce: Technology, Theory and Applications”, Idea Group Inc., IRM press, 2003.
- 3 2. Ravi Kalakota, B.Andrew Whinston, “Frontiers of Electronic Commerce”, Pearson Education, 2003.

REFERENCES :

1. Management Information Systems, Charles Parker and Thomas Case, McGraw Hill International.
2. Management Information Systems, W.S. Jawadekar, Tata McGraw Hill.
3. Management Information Systems, V.K. Banerjee and R.K. Sachedeva, Vikas Publishing House.
4. Computers Today, S.K. Basandhra, Galgotia Publications.
5. Managing with Information System, J.K. Enter.
6. Management Information Systems, G.R. Davis and M.H. Olson, McGraw Hill International.
7. Information Systems for Modern Management", Mud rick, Ross and Clagett, PHI.

CS-35 INTERNET OF THINGS

UNIT I:

IoT & Web Technology

The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics

UNIT II:

M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT III:

IoT Architecture -State of the Art – Introduction, State of the art, Architecture

Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT **Reference Architecture-** Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT IV:

IoT Applications for Value Creations

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth

UNIT V:

Internet of Things Privacy, Security and Governance

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security.

Reference Books:

1. Vijay Madiseti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1 st Edition, VPT, 2014
2. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1 st Edition, Apress Publications, 2013
3. Cuno Pfister, Getting Started with the Internet of Things, O’Reilly Media, 2011, ISBN: 978-1-4493- 9357-1

CS-31L OPEN SOURCE PROGRAMMING

UNIT-I:

Introduction to Open Source Programming and PHP

Introduction to Apache, MySQL, PHP and open source – how AMP works – Installing Apache, MySQL and PHP on Windows – Using HTML in PHP – variables, operations, constants, control structure, arrays, functions, classes, handling files, form handling, form validation, linking forms together.

UNIT-II:

Database Programming

Overview of MySQL – using PHP with MySQL – MySQL database programming – connecting – table creation – record insertion – updation – multiple database handling – Querying the database – using tables to display data, PHP – manipulation and creating images with PHP.

UNIT-III:

Mails, Session & Cookies

E-mailing with PHP – sending an e-mail – multipart message – sorting images – getting confirmation – user logins, profiles and personalization. Session tracking using PHP ,Cookies.

UNIT-IV:

PYTHON

Introduction to python, data types, numbers, variables and simple input output ,control statements, string, tuples, lists ,dictionary, set, frozen set, functions, lambda function, filter, map, reduce functions, files & directories, exception handling

UNIT-V:

Classes, __init__ method,self, Inheritance, Multiple Inheritance, Constructors in Inheritance, Importing module,Iterators and generators,decoratorsDatabases and SQL ,Use the Create, Read, Update, and Delete operations to manage databases,

TEXT BOOKS :

PHP Professional Projects, Ashish Wilfred Metta Gupta and Karticj Bhatnagar-Prentice Hall and India Pvt. Ltd., New Delhi, 2002.

REFERENCE BOOKS :

1. Beginning PHP, Apache, Mysql Web Development Micheal K. Class, Rommel Sc^urarnec, Wiley Dream Tech Publishing Incf, New Delhi 2004.
2. Core PHP Programming, Leon Alkinson and Zeev Suraski, Pearson Education, Delhi, 3rd Ed., 2004.
3. Teach Yourself Perl, Clinton Pierce, Techmedia, New Delhi, 2004.
4. Tom Christiansen and Nathan Torkington, Perl Cookbook, Shroff Pub., 1009.
5. Python Programming for the Absolute Beginner by Michael Dawson Premier Press

CS-32L WEB TECHNOLOGY LAB

UNIT – I

HTML- Basic HML, The document body, Text, Hyperlinks, Adding More Formatting, Lists, Using Color and Images, Images, Tables, Frames, Forms-Toward Interactivity. Cascading Style sheets – Introduction, Inline Styles, Embedded Style Sheets, Linking external sheets, Backgrounds, text flow and box model.

UNIT – II

JavaScript- Introduction, simple programming, Obtaining User Input with prompt Dialogs, Operators (arithmetic, Decision making, assignment, logical, increment and decrement) Control Structures - if... else selection statement, while, do... while repetitions statement, for statement, switch statement, break and continue statements, reserved keywords Functions – program modules in JavaScript, programmer defined functions, function definition, Random-number generator, scope rules, global functions, recursion, JavaScript: Arrays.

UNIT – III

JavaScript: Objects – Math Object, String Object, Date Object, Boolean & Number Object, document and window Objects. Event Model – onclick, onload, onerror, onmouseover, onmouseout, on focus, onblur, onsubmit, onreset, more DHTML events.

UNIT-IV

Javascript: JS Debugging, JS Classes, JS Typeof, JS Type Conversion JS RegExp, JS Forms, Validations in JS form, JS Modules

UNIT – V

Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, MathML, Other Markup Languages, Extensible Style sheet Language and XSL Transformations, Document Object Model (DOM).

TEXT BOOKS

1. Internet & World Wide Web- H. M. Deitel, P.J. Deitel, A. B. Goldberg-Third Edition
2. Web Programming –Chris Bates – Third edition.(Wiley)

REFERENCE BOOKS

1. Programming World Wide Web by RW Sebesta (Pearson)
2. An Introduction to Web Design+Programming by Wang & Katia (Pearson)
3. HTML & XML An Introduction NIIT (PHI)
4. HTML for the WWW with XHTML & CSS by Elizabeth Castro (Pearson)
5. Fundamentals of the Internet and the World Wide Web by Raymond Green Law and Ellen Hepp (TMH)
6. Internet and Web Technologies by Raj Kamal (TMH)
7. Internet and Web Basics by Ned Snell, Bob Temple, TM Clark (Pearson)
8. <http://nptel.iitm.ac.in/video.php?subjectId=106105084>

MINI PROJECT (100 MARKS)

Semester – 4

CS-41 COMPILER DESIGN

UNIT-I: Introduction to Compilers :

Compilers and translators, structure of a compiler, compiler writing tools, programming Languages, High level programming languages, definitions of programming languages, Lexical and syntactic structure of a language, finite automata and Lexical analysis, Role of lexical analyzer, regular expressions, finite automata, minimizing the number of syntactic specification of programming languages.

UNIT-II

Context free grammars, derivations and parse trees, capabilities of context free grammars - Basic parsing techniques : Shift reduce parsing - Operator precedence parsing - Top Down parsing - Predictive parsers-Automatic construction of efficient parsers.

UNIT-III

LR Parsers - constructing SLR - canonical LR and LALR parsing tables - using ambiguous grammars -automatic parser generator - implementation of LR parsing tables. **Syntax Directed Translation** :Schemes -implementation - intermediate code - postfix notation - parse tree and syntax trees - three address code -quadruples and triples - translation of assignment statements - boolean expression - postfix translations -translation with a top down parser.

UNIT-IV

Symbol tables, contents data structures, representing scope information, run-time storage administration, implementation and storage allocation of simple stack allocation schemes and block structured languages, error detection and recovery, lexical phase errors, syntactic phase errors, semantic errors.

UNIT-V

Introduction to code optimization, principle sources of optimization, loop optimization, DAG representation of basic blocks, global data flow analysis, code generation, problems in code generation, register allocation and assignment, code generation from DAG's, Peephole optimization.

TEXTBOOK:

1. Principles of Compiler Design, Narosa 25th reprint, Alfred Aho, Jeffrey D. Ullman.

REFERENCE:

- 1.Ravi Sethi "Compiler Design-Principles Techniques and Tools",16th reprint,Pearson Education

CS-42 CRYPTOGRAPHY AND NETWORK SECURITY(ELECTIVE -I)

UNIT- I: Introduction :

OSI Security Architecture - Classical Encryption techniques - Cipher Principles - Data Encryption Standard

- Block Cipher Design Principles and Modes of Operation
- Evaluation criteria for AES - AES Cipher - Triple DES - Placement of Encryption Function
- Traffic Confidentiality.

UNIT-II :Public key Cryptography:

Key Management – Diffie – Hellman key Exchange- Elliptic Curve Architecture and Cryptography- Introduction to Number Theory- Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

UNIT-III: Authentication and Hash Function:

Authentication requirements – Authentication functions – message Authentication Codes – Hash Functions- Security of Hash Functions and MACs- MDS message Digest algorithm-secure Hash Algorithm- RIPEMD- HMAC Digital Signatures- Authentication Protocols- Digital Signature Standard.

UNIT-IV: Network Security:

Authentication Applications: Kerberos- X.509. Authentication Service- Electronic Mail Security – POP- S/MIME- IP Security- Web Security.

UNIT-V : System Level Security:

Intrusion Detection- password management. Viruses and related threats- virus counter measures- Firewall Design Principles- Trusted Systems.

TEXT BOOK:

1. Cryptography and Network Security- Principles and Practices, William Stallings, Prentice Hall of India Third Edition, 2003.

REFERENCES:

1. Cryptography and Network Security, Atul Kahale, Tata McGraw-Hill, 2003.
2. Applied Cryptography, Bruce Schneier, John Wiley & Sons Inc., 2001.
3. Security in Computing, Charles B. Pfleeger, Shari Lawrence Pfleeger, Third Edition Pearson Edition, 2003.

CS-42Soft Computing (Elective-I I)

UNIT-I

Neural Networks-1(Introduction & Architecture)

Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

UNIT-II

Neural Networks-II (Back propagation networks)

Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting back propagation training, applications

UNIT-III

Fuzzy Logic-I (Introduction)

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion

UNIT-IV

Fuzzy Logic –II (Fuzzy Membership, Rules)

Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and

Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT-V

Genetic Algorithm(GA)

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications

TEXT BOOKS:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, “Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications” Prentice Hall of India.

2.Siman Haykin,”Neural Netowrks”Prentice Hall of India

4. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India.

5. Kumar Satish, “Neural Networks” Tata Mc Graw Hill

CS-43 CLOUD COMPUTING(ELECTIVE –I)

UNIT – I

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

Cloud Models: Cloud Characteristics - Measured Service - Cloud Models - Security in a Public Cloud Public versus Private Clouds - Cloud Infrastructure Self Service.

UNIT – II

Cloud as a Service: Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy Cloud Design and Implementation using SOA - Conceptual Cloud Model - Cloud Service Defined

Cloud Solutions: Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloud sourcing.

UNIT – III

Cloud Offerings: Information Storage, Retrieval, Archive and Protection - Cloud Analytics Testing under Cloud - Information Security - Virtual Desktop Infrastructure - Storage Cloud.

Cloud Management: Resiliency – Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering.

UNIT – IV

Cloud Virtualization Technology: Virtualization Defined - Virtualization Benefits - Server Virtualization - Virtualization for x86 Architecture - Hypervisor Management Software - Logical Partitioning (LPAR) - VIO Server - Virtual Infrastructure Requirements.

Cloud Virtualization: Storage virtualization - Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Virtualized Data Center.

UNIT – V

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

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

Text Book: Cloud Computing – Insight into New Era Infrastructure, Dr. Kumar Saurabh, Wiley India.

Reference Books:

1. Cloud Computing, Roger Jennings, Wiley India
2. Cloud Computing Explained, John Rhoton, Recursive Press
3. Cloud Computing Bible, Barry Sosinsky, Wiley
4. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Wiley
5. Cloud Computing for Dummies, Judith Hurwiz, Wiley Publishing.

CS43:INTERACTIVECOMPUTERGRAPHICS(ELECTIVE-II)

UNIT-I

Computer graphics applications, graphics systems :video display devices, faster scan systems, graphics Monitors and workstations, input devices, hard copy devices, graphical user interface and interactive input methods : user dialogue, input of graphical data, interactive picture-construction techniques.

UNIT-II

Output primitives: Points and lines, line drawing, algorithms, frame, buffer, circle generation and ellipse generation algorithms, pixel addressing and object geometry, filled area primitives, character generation, initialising.

UNIT-III

Two dimensional geometric transformations:

basic transformations (translation, rotation, scalling), matrix representations and homogenous coordinates, composite transformations (translation, rotation, scalling, reflection, shear) transformation between coordinates 3.2 systems.

Two-dimensionalviewing:viewing pipeline, viewing coordinates reference frame, window to view port coordinate transformation, point 2.3, clipping 2.5, line dipping polygon clipping.

UNIT-IV

Three dimensional geometric: and modelling transformation:Translation, rotation, scalling,

reflection, shear. Three-dimensional viewing: viewing coordinates, projection, projection transformation, clipping.

UNIT-V

Visible-surface detection methods-: back face detection, depth buffer, a-buffer, scan LINE, depth-sorting, BSP-tree, area subdivision method.

Illumination models and surface rendering method :light sources, illumination models, displaying light intensities, halftone patterns and dithering techniques, polygon rendering methods.

BOOKS.:

1. Hearn, D. & Baker, M.P., Computer Graphics, 2/ed. (PHI)

REFERENCE BOOKS:

1. Foley, J.D, Van Dam, A.V. Feinor, S.K. Hughes, 3.F. Computer Graphics: Principles & Practice, 2/ ed, (Addfson-Wesley).
2. Rogers, D.F., Mathematical Elements of Computer Graphics (Me Graw-Hill)
3. Newman, W. & Sprent, R.F., Principles of Interactive Computer Graphics.

Major Project