SCHEME OF EXAMINATION & DISTRIBUTION OF MARKS

SEMESTER - I

Paper No.	Title of the Paper (s)	Nature	Internal Assessment	Term end Exam	Total Marks
1.	Digital Electronics and Microprocessor	Theory	20	80	100
2.	Advance Computer Network	Theory	20	80	100
3.	OOPs using JAVA	Theory	20	80	100
4.	Advanced Operating System	Theory	20	80	100
Lab-1	Digital Electronics	Practical	-	-	100
Lab-2	Java Programming	Practical	-	-	100

SEMESTER - II

Paper No.	Title of the Paper (s)	Nature	Internal Assessment	Term end Exam	Total Marks
1.	Analysis and Design of Algorithm	Theory	20	80	100
2.	Relational Database Management System (RDBMS)	Theory	20	80	100
3.	Data Structure using C++	Theory	20	80	100
4.	Software Engineering	Theory	20	80	100
Lab-1	RDBMS	Practical	-	-	100
Lab-2	Data Structure using C++	Practical	-	-	100

SEMESTER - III

Paper No.	Title of the Paper (s)	Nature	Internal Assessment	Term end Exam	Total Marks
1.	Theory of computation and compiler design	Theory	20	80	100
2.	artificial intelligence and expert system	Theory	20	80	100
3.	soft computing techniques	Theory	20	80	100
4.	.net technology	Theory	20	80	100
Lab-1	MAT LAB	Practical	-	-	100
Lab-2	Programming through .NET	Practical	-	-	100

SEMESTER - IV

Paper No.	Title of the Paper (s)	Nature	Internal Assessment	Term end Exam	Total Marks
1.	Advanced Trends And Technology In Computer Science	Theory	20	80	100
2.	ELECTIVE - I Data Mining and Data Warehousing ELECTIVE - II Computer Graphics and Multimedia ELECTIVE - III Embedded System ELECTIVE-IV Network Security & Cryptography	Theory	20	80	100
3.	Major Project		-	-	400

Note: Internal assessment of 20 marks will consist of two parts -

1. Unit Test (10 Marks): Two tests will be conducted and average of these tests will be the marks of Unit Test.
2. Seminar/Assignment (10 Marks): To be conducted by the Department concerned.

SEMESTER-I
PAPER-I
DIGITAL ELECTRONICS AND MICROPROCESSOR

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Evolution of Digital System & Logic Families

Semiconductor Materials, Types of Solids, Imperfections and Impurities in Solids, pn Junction Diodes, BJTs and other junction Devices, FET and MOSFET, Digital Electronic Signals and Switches, Diode and Transistor as a Switch, Logic Families – Significance and Types, Electrical characteristics of logic families, Comparison of Different Logic Families.

UNIT–II
Boolean concepts and Design of Combinational Circuits

Fundamentals of Logic Gates: AND Gate, OR Gate, Inverter, NAND Gate, NOR Gate. Boolean Algebra and Simplification Techniques: Introduction to Boolean Algebra, Simplification Techniques: Sum-of-Products Boolean Expressions, Product-of-Sums Expressions, Karnaugh Maps for Multi-Output Functions, Karnaugh Map Method, Karnaugh Map for Boolean Expressions with a Larger Number of Variables.

UNIT–III
Design of Combinational Circuits

Implementing Combinational Circuits using K-Map: Half-Adder, Full Adder, Half-Subtractor, Full Subtractor, BCD Adder, Design of code converters, comparators and various Circuits: BCD to excess- 3 code and excess-3 to BCD converters, Binary to Gray Code and Gray Code to Binary Code converter, One & Two Bit Comparator, BCD to 7-segment decoder, BCD to 84-2-1 code converter and other code converter, Carry Propagation–Look-Ahead Carry Generator, Multipliers. Design of Multiplexers, Demultiplexers, Decoder and Encoder.

UNIT–IV
Design of Sequential Circuit

Introduction to sequential circuits: Moore and Mealy machines, Introduction to flip-flops like SR, JK, D & T with truth tables, logic diagrams, and timing relationships, Conversion of Flip-Flops, Excitation table, State tables, and realization of state stables, Design of shift registers, Counters: Ripple (Asynchronous) Counter, Synchronous Counter, UP/DOWN Counters, Design of Different Synchronous Counter using K-Map, Design of sequence generators and detectors, Introduction to Programmable Devices, Architecture of PLDs.

UNIT–V

Microprocessors System

Introduction to Microprocessors, Evolution of Microprocessors and family of microprocessor, Architecture of Microprocessor, Microprocessor Instructions, Addressing Modes and needs; Absolute or Memory Direct Addressing Mode, Immediate Addressing Mode, Register Direct Addressing Mode, Register Indirect Addressing Mode, Indexed Addressing Mode, Implicit Addressing Mode and Relative Addressing Mode.

Text Books:

1. Digital Electronics, William H. Gothmann, PHI
2. Introduction to Digital Systems, Palmer and Perlman,Tata Mc Graw-Hill
3. A Systematic Approach to Digital Design, Fletcher, Prentice Hall.
4. Digital Design, M. Mano, PHI
5. Microprocessors; Principal and Application, Gilmore, Tata Mc Graw-Hill
6. Circuit Design and Simulation with VHDL, V. Pedroni, MIT Press

Reference Book:

1. Digital Design , Samuel Lee, Pearson
2. The Intel Microprocessor- Architecture, Programming and Interfacing, Brey, PHI.
3. Introduction to Microprocessor for Engineers and Scientists, Hosh and Sridhar, PHI.

SEMESTER-I
PAPER-II
ADVANCE COMPUTER NETWORK

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Basics of Data Communication

Introduction to Computer Networks, Network Hardware and Software, OSI and TCP/IP Reference Models, Network topology ,Data Communications, Communication System, transmission modes.

UNIT–II
Physical layer and Media

Data and Signal, Transmission Impairment, Digital and Analog Transmission, Transmission media: Guided media, Wireless transmission: Electromagnetic spectrum, Radio and Micro Waves, Infrared, Light wave, Spread Spectrum Systems, Multiplexing, and Switching: Circuit Switched Network, Datagram Network, and Virtual Circuit Network.

UNIT–III
Data Link Layer

Data link layer design issues: Services, Framing, Error detection and correction, Error and flow control, Stop-and-Wait protocol, Sliding Window protocol, HDLC, Channel allocation: Static and Dynamic allocation, Multiple Access Protocols: ALOHA, CSMA, Collision-free and limited-contention protocols, Virtual LAN, LAN and MANs: IEEE Standards for LAN and MAN, High Speed LAN, Bluetooth, Cellular telephony, Broadband wireless technologies, Wireless LAN, Transmission in ISDN, Broad Band ISDN , ATM Networks.

UNIT–IV
Upper Layers

Network Layer: Design Issues in Networks, Routing Algorithms, Congestion Control Algorithms, Internet Protocol (IP), ICMP, IGMP, Delivery, Forwarding and routing, IP Address, Need of Subnetting, and Internetworking, Transport Layer: Services of transport layer , TCP, UDP and SCTP Protocols, Quality of Service, Services of presentation layer, Overview of application layer protocol: Telnet, DNS, SNMP, SMTP, FTP, TFTP, BOOTP, HTTP Protocols, Firewalls.

UNIT–V
Advanced Concept and Network Security

Over View of Cellular Networks, Adhoc Networks, Mobile Adhoc Networks, Wireless Medium Access Control, Properties of a MANET, Sensor Networks, Virtual Private Networks, Mobile Network Layer: Mobile IP. Network Security: Cryptography, Symmetric key and Asymmetric key cryptography, Security services: Confidentiality, Integrity and authentication, Digital signature, IP security.

Text Books:

1. Data Communication and Networking, Behrouz A. Forouzan, Tata McGraw-Hil, Fourth edition, 2006.
2. Computer Networks, Andrew S. Tanenbaum, PHI / Pearson Education Inc.,
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W. Ross, Pearson Education Inc., New Delhi.
4. Data and computer Network Communication, Firewall Media, Shashi Manjal,First Edition, 2007.
5. Network Security and Management, Brijendra Singh, PHI Learning Private limited.
6. Computer Network, Udit Agarwal, Dhanpat Rai and Co., 2013.
7. Cryptography and Network Security By William Stallings, 4th Edition Pearson Publication
8. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education Inc., New Delhi.
9. Network Security and Cryptography, Bernard Menezes, Cengage Learning, 2010.

Reference Books:

1. Data and Computer Communication, William Stallings, Pearson Education.
2. Computer and Communication Networks, Nader F. Mir, Pearson Education, 2007.
3. Data & Computer Communication, Black, PHI.
4. Communication Networks, Walrand, TMH.
5. Internetworking with TCP/IP, Douglas E. Comer, and Prentice Hall India.

SEMESTER-I
PAPER-III
OOPs USING JAVA

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I

An overview of Java

Object-Oriented Programming: Classes and Objects, Variables, Constants, and Data Types, Primitive Data Types, Variable Scope, Wrappers, Conditional Statement if, switch Statement, Inheritance, Method Overriding, Class Methods: Method Arguments, Method Overloading, Constructors, Keyword super, this, final, static, Passing by Value, passing by Reference, Variable Scopes, Life Cycle of a Java Program, JDK and JRE, Java Editions, Polymorphism, Dynamic method dispatch.

UNIT-II

Package, Applet, Swing and JDBC

Packages, Interfaces, and Encapsulation, Abstract Classes, , Graphic User Interface, Event Handling , Java Applets: Writing Applets Using Swing, Error Handling, Java Exceptions, Databases Using JDBC: JDBC Driver Types.

UNIT–III

Network-Socket Programming and JDBC

Introduction to Collections and Introduction to Generics, Java Serialization, Network Programming, Socket Programming, and Processing E-Mails with Java: Protocols and Servers, Creating Mailer, Required Supporting Classes, Writing the Mail Sender, Introduction to Multi-Threading, Swing with J-Table: J-Table and the MVC Paradigm, Remote Method Invocation (RMI), Writing RMI Clients, Finding Remote Objects. Java Enterprise Edition Overview: JCP, JSR, and Other Acronyms, Tiers of Java EE Applications.

UNIT–IV

Servlet, Java Beans and JNDI

What is Servlet?, Deploying a Servlet, Installing Glass Fish Plug-In for Eclipse, creating Servlet with Eclipse, Browser-Servlet Data Flow, HTTP Get and Post Requests, Cookies, Server-Side http Session, Filters, Event Listeners, Asynchronous Servlets. Java Server Pages (JSP): Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, JavaBeans, JSTL. Developing Web Applications with servlet and JSP.

UNIT–V

Enterprise JavaBeans (EJB) and other APIs

Overview of EJB, Types of EJB, Stateless and Stateful Session Beans, Singleton Beans, Deploying EJB, Message-Driven Beans, Timer Service. Introduction to the Java Persistence API: Mapping Objects to Database Tables, JPQL, Overview of Spring MVC, Introduction to Hibernate Framework

Text Books:

1. The Complete Reference – Java, Herbert Schildt, Tata McGraw Hill.
2. Introduction to Programming with JAVA – A Problem Solving Approach , John Dean, Raymond Dean, Tata Mc Graw Hill
3. Java Programming, Joyce Farrell, Cengage Learning.
4. Java Programming: A Practical Approach, C. Xavier, Tata McGraw Hill,
5. Introduction to Java programming: comprehensive version, Y. Daniel Liang, Pearson Education

Reference Books:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt, Dale Skrien, Tata McGraw Hill.
2. Java Programming: From the Ground Up, Ralph Bravaco, Shai Simonson, and Tata McGraw Hill Edition.
3. Java Programming, D.S.Malik, Cengage Learning.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Using JAVA 2, Joseph L weber, PHI
6. JSP Java Server Pages, Barry Burd, IDG Books India(p) Ltd
7. Java2, swing, servlets, JDBC & JAVA Beans Programming Black Book Steven Holzner, Dreamtech press.

SEMESTER-I
PAPER-IV
ADVANCED OPERATING SYSTEM

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Operating System Basics

Processor Registers, Instruction Execution, Interrupts, Interrupts and the Instruction Cycle, Interrupt Processing, Multiple Interrupts, Multiprogramming, The Memory Hierarchy, Cache Memory, I/O Communication Techniques, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, Operating System Objectives and Functions, Types of Operating system.

UNIT–II
Processes and Process Control Strategy

Process States, Process Description, Process scheduling Process Control block, Execution of the Operating System, Security Issues, Processes and Threads, Multithreading, Thread Functionality, Windows Thread and SMP Management, Solaris Thread and SMP Management, Linux Process and Thread Management, Principles of Concurrency, Mutual Exclusion: Hardware Support, Semaphores, Monitors, Message Passing, Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Integrated Deadlock Strategy.

UNIT–III
Memory Management and Scheduling

Memory Partitioning, Paging, Segmentation, swapping, Security Issues. Virtual Memory concept, Algorithms, Locality and Virtual Memory, Operating System Software, UNIX and Solaris Memory Management, Linux Memory Management, Windows Memory Management, Types of Professor Scheduling, Scheduling Algorithms, Traditional UNIX Scheduling, Multiprocessor Scheduling, Real-Time Scheduling, Linux Scheduling, Windows Scheduling, Process and Thread Priorities, Multiprocessor Scheduling.

UNIT–IV
I/O Management and File Management

Disk Scheduling, I/O Devices, Organization of the I/O Function, Operating System Design Issues, I/O Buffering, Disk Scheduling, LINUX I/O, Windows I/O, File Organization and Access, File Directories, File Sharing, Record Blocking, Secondary Storage Management, File System Security, UNIX File Management, LINUX Virtual File System, Windows File System.

UNIT–V

Advance Topics of Operating System

Embedded Operating Systems, eCos, Tiny OS, Computer Security Concepts, Threats, Attacks, and Assets, Intruders, Malicious Software Overview, Viruses, Worm, Authentication, Access Control, Intrusion Detection, Malware Defense, Dealing With Buffer Overflow Attacks, Distributed Process Management, Process Migration, Distributed Global States, Distributed Mutual Exclusion, Distributed Deadlock.

Text Books:

1. Operating System Concepts, Silbersachatz and Galvin, Pearson Education Pub.
2. Operating Systems, Madnick E., Donovan J., Tata McGraw Hill,
3. Operating Systems, A. S. Tannenbaum, PHI

Reference Books:

1. Operating Systems Internals and Design Principle, William Stallings, Prentice Hall Publishers
2. Operating Systems- AConcept-Based Approach, Dhananjay M. Dhamdhere, McGraw-Hill

SEMESTER-I
LAB 1: DIGITAL ELECTRONICS

SEMESTER-I
LAB 2: JAVA PROGRAMMING

LAB Detail

Break-up of marks for External Practical Examination			
S. No.	Argument	Maximum Marks	Minimum Passing Marks
1	Lab Record	20	36
1.	Viva-voce	40	
2.	Program Development and Execution	40	
	Total Marks	100	36

SEMESTER-II
PAPER-I
ANALYSIS AND DESIGN OF ALGORITHM

Note: There will be two parts of the question paper: Section A and Section B. Section-A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Introduction:

Analysis of algorithms, asymptotic notations, Standard notations and common functions, Recurrence solution: Substitution method, iteration method and the master method, algorithm design techniques: basic

UNIT-II

Divide and Conquer

Binary search, Min-Max Problem, merge sort, quick sort, and Matrix Multiplication.

Introduction to NP-Completeness

The class P and NP, Polynomial reduction, NP-Completeness Problem, NP-Hard Problems

UNIT-III

Graph Algorithms

Undirected Graph, Directed Graph, Traversing Graphs, Representation of graphs, Breadth-first search, Depth-first search, strongly connected components, topological sort.

String Matching: Introduction, The naïve string matching algorithm, Rabin-Karp algorithm, String Matching with finite automata.

UNIT-IV

Greedy Method

Knapsack problem, Huffman codes, job sequencing with deadlines, Minimum Spanning trees: Prim's and Kruskal's algorithms, Single Source Shortest path: Dijkstra's algorithm and Bellman Ford algorithms.

UNIT-V

Dynamic Programming

O/1 Knapsack problem, all Pair's shortest paths: Warshal's and Floyd's algorithms, Single source shortest paths, Backtracking, Branch and Bound: Travelling Salesman Problem.

Text Books:

1. Introduction to Algorithms, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd./ Pearson Education.
2. Computer Algorithms: Introduction to Design & Analysis, Basse, Addision Wesley.
3. Fundamental of Computer Algorithm, Horowitz & Sahani, Galgotia.
4. Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson Education.

Reference Books:

1. A practical guide to data Structures and algorithms Using JAVA, Sally Goldman & Kenneth Goldman, CRC Press
2. Data Structures and Algorithms, V. Aho, J. E. Hopcroft, and J. D. Ullman, Pearson Education.
3. Fundamentals of Data structures in C++, E. Horowitz, S.Sahni and Dinesh Mehta, University Press.

SEMESTER-II
PAPER-II
RELATIONAL DATABASE MANAGEMENT SYSTEM

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Fundamentals of Relational DBMS

Data Models, Schemas and Instances, Data Abstraction, Data Independence, Codd's 12 rules, Overview & Architecture of commercial RDBMSs: Oracle, SQL Server, My SQL etc.,

UNIT–II

Entity - Relationship (ER) Model, Relational data model concepts, Database Language: SQL, SQL Programming Techniques: DDL, DML, DCL query statements, Constraints and Triggers, Views and Indexes, SQL in Server Environment. Data dependency, Functional dependencies and Normalization of Relational Databases, First, Second and Third Normal forms, Boyce-Codd Normal form (BCNF),

UNIT–III
Transaction Processing

ACID Properties of Transactions, Concurrency control, Serializability and Recoverability, Transaction support in SQL, Locking Techniques, Time Stamp ordering, Validation Techniques, Granularity of Data Items, Database recovery techniques - Shadow paging, Log Based Recovery. Database Security: Access control, Statistical Database Security, Deadlock: Detection, Avoidance and Recovery.

UNIT–IV
Object Model and Object-Oriented Databases

User defined abstract data types and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Overview of Object-Oriented concepts, Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and storage issues; Transactions and Concurrency control, Example of ODBMS, Query processing and Optimization.

UNIT–V
Parallel and Distributed Databases and Client-Server Architecture

Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases. An overview of Client-Server architecture.

Text Books:

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, Pearson Education Inc., New Delhi.
2. Database-Systems Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw-Hill Education , New Delhi
3. Fundamentals of Database Management Systems, Mark L. Gillenson, Wiley India Pvt. Ltd., New delhi.
4. Introduction To Database Systems, C.J.Date, Longman, Pearson Education

Reference Books:

1. Database Systems: A Complete Book, Hector Garcia-Molina, Jeffret D. Ullman, Jenniffer Widom, Pearson Education Inc., New Delhi.
2. Database Systems: Design, Implementation, and Management, Peter Rob & Carlos Coronel, CENGAGE Learning India Pvt. Ltd., New Delhi.
3. Database Systems Using Oracle, Nilesh Shah, PHI Learning Pvt. Ltd., New Delhi.

SEMESTER-II
PAPER-III
DATA STRUCTURE USING C++

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I
Introduction

Data structure, Data types: primitive, non-primitive data types, ADT, Linear and non linear data structure, Complexity and its Notation, List Structures:

Arrays

One dimensional, Multidimensional arrays, allocation methods, address calculations, sparse arrays.

Linked List

Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these list. (Insertion operation includes – insertion before a given element, insertion after a given element, insertion at given position, insertion in sorted linked list)

UNIT-II
Stack

Definition, Operations PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack, use of stack in recursion, Stacks in C++ Using Templates

Queue

Introduction, and Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations (INSERT, DELETE, TRAVERSE), implementation using array and linked list and applications.

UNIT-III
Tree

Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Binary Search Trees, Implementations, Threaded trees, AVL Trees, Balanced multi way search trees: 2-3 tree, Red Black tree, B tree, B+ tree, their applications.

UNIT-IV
Sorting

Types of sorting, Sequential Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort, complexity analysis of sorting techniques SEARCHING: Linear or sequential search, Binary search, Hashing, collision resolution methods.

UNIT-V

Graph

Definition of Graph, Basic Terminology types of Graph, adjacency and incident (matrix & linked list) representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Shortest path Algorithm, spanning tree, Minimum Spanning tree, Krushkal and prims algorithms.

Text Book:

1. Data Structures using C, A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
2. Data Structures using C by A. K. Sharma, Pearson Education
3. Data Structures and Algorithms, A.V. Aho, J.E. Hopcroft and T.D. Ullman, Addison-Wesley, Low Priced Edition.
4. Fundamentals of Data structures, Ellis Horowitz & Sartaj Sahni, AW Pub.
5. Fundamentals of computer algorithms, Horowitz Sahni and Rajasekaran, Pearson Edu.
6. Data Structures and Program Design in C, Robert Kruse, PHI.

Reference Books:

1. Theory & Problems of Data Structures, Jr. Symour Lipschetz, Schaum's outline by TMH
2. Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
3. Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H
4. Classical Data Structure, D. Samanta, PHI
5. Data Structures, schaum's Outlines, Adapted by G A PAI

SEMESTER-II
PAPER-IV
SOFTWARE ENGINEERING

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I

Fundamentals of Software Engineering and Process models

Software myths, Software engineering- A layered technology, Software Development Life Cycle, Capability Maturity Model Capability Maturity Model CMM, Process models: waterfall model, Incremental process models, Evolutionary process models, Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, software requirements document.

UNIT–II

S/W Requirements and Design Engineering

Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management, System models: Context Models, Behavioral models, Data models, Object models, Design process and Design quality, Design concepts, the design model, software architecture, Fundamental issues in software design: Goodness of design, cohesions, coupling. Function-oriented design: structured analysis and design.

UNIT–III

Testing Strategies and Product metrics

A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging, Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT–IV

Testing Plan and Maintenance

Snooping for information, Coping with complexity through teaming, Testing plan focus areas, Testing for recoverability, Planning for troubles, Preparing for the tests: Software Reuse, Developing good test programs , Data corruption, Tools, Test Execution ,Testing with a virtual computer, Simulation and Prototypes, Managing the Test, Customer's role in testing, Software maintenance issues and techniques. Software reuse. Client-Server software development.

UNIT–V

Software Reengineering and Project Management

Software Reengineering, Evolution of Software Economics, Life Cycle Phases and Process artifacts, Model based software architectures, Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments, Process Planning, Project Control and process instrumentation: Seven core metrics, management indicators, quality indicators, life-cycle expectations

Text Books:

1. Fundamentals of Software Engineering, Rajib Mall, PHI Learning Pvt. Ltd.
2. Software Engineering, Ian Somerville, Pearson Education Inc., New Delhi.
3. Software Engineering: A Practitioner's Approach, Roger S. Pressman, Tata McGraw-Hill
4. Software Project Management, Walker Royce, Pearson Education.

Reference Books:

1. Software Engineering, Shari Lawrence Pfleeger, Joanne M. Atlee, Pearson Education, Inc. New Delhi.
2. Software Engineering, Pankaj Jalote, Wiley India Pvt. Ltd., New Delhi.
3. Software Engineering, Dines Bjørner, Springer India Pvt. Ltd., New Delhi.
4. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
5. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH.
6. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.

SEMESTER-II
LAB 1: RDBMS

SEMESTER-II
LAB 2: DATA STRUCTURE

Break-up of marks for External Practical Examination			
S. No.	Argument	Maximum Marks	Minimum Passing Marks
1	Lab Record	20	36
1.	Viva-voce	40	
2.	Program Development and Execution	40	
	Total Marks	100	36

SEMESTER-III
PAPER-I
THEORY OF COMPUTATION AND COMPILER DESIGN

Note: There will be two parts of the question paper: Section A and Section B will consist 10 short answer type questions/Objective questions of 2 marks each covering entire syllabus while section B will consist two question from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I
AUTOMATA, REGULAR EXPRESSIONS AND LANGUAGES
Principles of mathematical induction, Finite Automata (FA), Deterministic Finite Automata (DFA), Non-deterministic Finite Automata (NFA). Regular Expression, FA and Regular Expressions, Proving languages not to be regular, Closure properties of regular languages, Equivalence and minimization of Automata.

UNIT-II
CONTEXT-FREE GRAMMARS AND LANGUAGES
Context-Free Grammar (CFG), Parse Trees, Ambiguity in grammars and languages Definition of the Pushdown automata, Languages of a Pushdown Automata, Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata.

UNIT-III
PROPERTIES OF CONTEXT-FREE LANGUAGES, UNDECIDABALITY
Normal forms for CFG, Pumping Lemma for CFL, Closure Properties of CFL, Turing Machines, A language that is not Recursively Enumerable (RE), An Un-decidable problem that is RE, Un-decidable problems about Turing Machine, Post's Correspondence Problem.

UNIT- IV
INTRODUCTION TO COMPILING & SYNTAX ANALYSIS
Compilers – Analysis of the source program, Phases of a compiler, Compiler construction tools Lexical analysis , Role of lexical analyzer ,Role of the parser, Writing grammars, Context-free grammars ,Top down parsing, Bottom-up parsing, Shift reduce parsing, Operator precedence parsing, LR parsers , SLR parser.

UNIT-V
CODE GENERATION & OPTIMIZATION, RUN TIME ENVIRONMENTS
Issues in the design of code generation, Basic blocks and flow graphs, A simple code generator – DAG representation of basic blocks, Peephole optimization. Principal sources of optimization, Optimization of basic blocks, Introduction to global data flow analysis, Runtime environments.

Text Books:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education,

2007. 2. J. Martin, "Introduction to Languages and the Theory of computation" Third Edition, Tata Mc Graw Hill, 2007
2. Principles of Compiler Design by Aho, D. Ullman, Lam and Ravi Sethi, Pearson Education.
3. Alfred Aho, Ravi Sethi and Ullman, J.D., "Compilers Principles, Techniques and Tools", Pearson Education, 2003.

Reference Books:

1. Theory of Computing by K L P Mishra, S.Chandrashekran Pub.
2. Compiler Design, A.A. Pentambekar, Technical Publications.

SEMESTER-III
PAPER-II
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

Note: There will be two parts of the question paper: Section A and Section B will consist 10 short answer type questions/Objective questions of 2 marks each covering entire syllabus while section B will consist two question from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Fundamentals of Artificial Intelligence

Introduction to AI, Intelligent Agents: Agents and Environments, AI Techniques, Foundations of A.I., History of AI, Areas and state of the art in A.I., Knowledge: Introduction, Knowledge Based system Definition of Knowledge and Knowledge Representation, Examples of Search Problems, Defining the Problem as a State Space Search, Uninformed Search Techniques- DFS, BFS, Best-First Search, A* Algorithm, Problem Reduction, AO*Algorithm, Constrained Satisfaction Problems: Various CSP problems,.

UNIT–II
Symbolic and Structured Representations of Knowledge

Knowledge Representation: Procedural Vs Declarative Knowledge, Representations & Approaches to Knowledge Representation, Frame, Conceptual dependency , Semantic Net ,Scripts etc. Forward Vs Backward Reasoning. Symbolic Logic: Propositional Logic, First Order Predicate Logic: Representing Instance and is-a Relationships, Computable Functions and Predicates, Syntax & Semantics of FOPL.

UNIT–III
A.I. Programming languages

Introduction to LISP ,Basic list manipulation functions, Predicate function ,Logical function ,Input/output and local variables, Lists and Arrays, simple program in LISP , Introduction to PROLOG.

UNIT–IV
Natural Language Processing and Planning

Natural Language Processing: Role of Knowledge in Language Understanding, Approaches Natural Language Understanding, Steps in Natural Language Processing, Syntactic Processing and Augmented Transition Nets, Semantic Analysis, NLP Understanding Systems; Planning: Components of a Planning System, Goal Stack Planning, Hierarchical Planning, Partial Order Planning, Hierarchical Planning, Conditional Planning, Reactive Systems.

UNIT-V
Experts Systems

Overview of an Expert System, Structure of an Expert Systems, Different Types of Expert Systems- Rule Based, Model Based, Non-Production System Architecture, Case Based and Hybrid Expert Systems, Knowledge Acquisition and Validation Techniques, Black Board Architecture, Knowledge Building System Tools.

Text Book:

1. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI Publication.
2. Ravi Bhusan Mishra, Artificial Intelligence, PHI learning privet limited.
3. V.S. Jankiraman, K. Sarukesi and P.Gopalakrishnan, Foundations of Artificial Intelligence and Expert Systems, Macmillan Series in Computer Science.
4. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, Pearson Publication.
5. Principles of Artificial Intelligence, Nils J. Nilsson, Narosa Publication.
6. Artificial Intelligence, Elaine Rich, Kevin Knight, Tata McGraw Hill.

Reference Books:

1. AI-Structures and Strategies for Complex Problem Solving, George Lugar, Pearson Educations.
2. Artificial Intelligence: an Engineering approach, Robert J. Schalkolf, McGraw Hill.
3. Artificial Intelligence, Patrick H. Winston, 3rd edition, Pearson Educations.
4. Decision Support Systems and Intelligent Systems, Efraim Turban Jay E. Aronson, PHI.
5. Artificial Intelligence – A System Approach, M. Tim Jones, Infinity Science Press - Firewall MEDIA.

SEMESTER-III
PAPER-III
SOFT COMPUTING TECHNIQUES

Note: There will be two parts of the question paper: Section A and Section B will consist 10 short answer type questions/Objective questions of 2 marks each covering entire syllabus while section B will consist two question from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Introduction

What is soft computing? Different tools of soft computing and its comparison, area of application.

UNIT-II
Artificial Neural Network

ANN: Architecture, What is a neural network? Structure of biological neurons relevant to ANNs Different types of ANN, Single layer Perception Classifier, XOR problem Supervised and unsupervised learning, EBPA network, Kohenen network, Feed-forward & feedback networks; Learning Process: Memory based learning, Hebbian learning, Competitive, Boltzmann learning, perception learning, delta learning, Widrow- Hoff learning, correction learning, Winner –lake all learning rule, Hopfield networks, Training & Examples, Associative memories etc.

UNIT-III
Fuzzy Logic

Introduction to Classical Sets & Fuzzy Sets, Membership Function, a-cuts, Properties of a-cuts, Decomposition, Theorems, Extension Principle, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations, Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables Fuzzy Relations: Crisp & Fuzzy Relations, Fuzzy Measures, ,Applications of Fuzzy Logic.

UNIT–IV
Genetic Algorithm

What is Optimization? Introduction, Application, GA operators: selection, crossover and mutation, different techniques of selection, crossover and mutation, different types of chromosomes: Binary chromosome, etc., Basic GA and its variations, Application of Genetic algorithm,

UNIT-V
Hybrid soft commuting:

Design of Neuro-Fuzzy model like ANFIS, Neuro-Genetic, Fuzzy-Genetic Neuro-Fuzzy-Genetic model and experiments with MATLAB.

Text Books:

1. Uncertain rule-based fuzzy logic systems: Introduction and new directions by Jerry M.Mendel, Prentic Hall of India.

2. Intelligent hybrid System: Neural Network, Fuzzy Logic and Genetic Algorithm by Da Ruan, Kluwer Academics publishers
3. Neural Network, Fuzzy logic and Genetic Algorithm: Synthesis and application by S. Rajshekhran and G.A. Vijay Laxmi, PHI publication
4. Fuzzy logic with engineering applications by Timothy J Ross, Wiley Publication
5. Neural network by Simon Haykins: Prentice Hall of India
6. Fuzzy Sets, Uncertainty & Information, G.J.Klir & T.A. Folyger, PHI.
7. Fuzzy sets & Fuzzy logic, G.J.Klir & B.Yuan, PHI.

Reference Books:

1. Artificial neural networks, B.Vegnanarayana Prentice Halll of India P Ltd.
2. Neural networks in Computer intelligence, Li Min Fu, TMH.
3. Neural networks, James A Freeman & David M S kapura, Pearson education.

SEMESTER-III
PAPER-IV
.NET TECHNOLOGY

Note: There will be two parts of the question paper: Section A and Section B will consist 10 short answer type questions/Objective questions of 2 marks each covering entire syllabus while section B will consist two question from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I

.Net Framework and C#.NET

Introduction to .NET Technology, .NET Framework, Components of .NET CLR and Class Library Importance of MSIL, CTS etc., Class Libraries, Introduction to Visual Studio.NET, IDE, Menu Bar, Toolbox, Output Windows, VD&EDP, Inside a C# Program, Data Types, Statements, Arrays, Using Strings, Objects, Classes and Structs, Properties, Inheritance, Indexers, Delegates, Events, Namespaces, Generics, Collections and Data Structures, Exception Handling, Threading, Using Streams and Files, Reflection, Assemblies, versioning, Windows Forms, Controls.

UNIT–II

Programming with VB.NET

The structure of VB.NET and Control structures, VB.NET Variables, VB.NET Operators, Control Statements, Working with forms, GUI with windows forms, Working with Menu, Loops, Validation, Sub Procedures and Functions, Multiple Forms, Form Controls, File Handling, Exception Handling, Working with Databases, Advanced Database Programming using ADO.net, Classes, Generics, Collections, Inheritance.

UNIT–III

ASP.NET: Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NET Validation Controls, Using the Simple Validations, Using the Complex Validates Accessing Data using ADO.NET, Using the Complex Validates Accessing Data using ADO.NET, Configuration Overview. Themes and Master Pages: Creating a Consistent Web Site, ASP.NET 2.0 Themes - Master Pages, Displaying Data with the Grid View Control Introducing the Grid View Control, Filter Data in the Grid View Control, Allow Users to Select from a Drop Down List in the Grid, Add a Hyperlink to the Grid, Deleting a Row and Handling Errors.

UNIT-IV

Database Handling with .NET Technology

How to consume a web service from an ASP.NET page, Web services accessing database, SQL Connect, SQL Command, Data Access with LINQ to SQL : Automatic Properties, Creating LINQ to SQL Entities, Performing standard database commands with LINQ to SQL, Performing Validation; Navigation Controls: Understanding Site Maps, Site Map Path Control, Formatting the Site Map Path Control, Menu Control, Tree View Control; Login Control S, Authenticated Users, Change Password Control, Templates with Password Recovery Control, Caching Application Pages and Data.

UNIT–V

Advanced Applications in .NET Framework

XML Web Services: Setting Web Method Attribute, Setting Web Services Attribute, Invoking an XML Web Service with HTTP-Get, HTTP-Post & SOAP, XML Web Services Behavior, AJAX(Asynchronous JavaScript and XML): Server Side & Client Side Ajax, Ajax Toolkit, Setting up and implementing Ajax, SQL Server Administration: Setup Database server of a website, Converting data between MDF to DBO,DBO to XLS or in any other format, Backup and Restore of data, FTP Management, Sending Emails, Designing email panel, How to send an email to various users, Sending auto emails.

Text Books:

1. Professional Visual Studio 2013, Bruce Johnson, Wrox Publication
2. Beginning ASP.NET 4.5.1: in C# and VB, Imar Spaanjaars, Wrox Publication
3. Professional C# 5.0 and .NET 4.5.1, Christian Nagel, Jay Glynn, Morgan Skinner, Wrox Publication
4. Pro ASP.NET 3.5 in C# 2008, Matthew MacDonald and Mario Szpuszta, Wrox Publication
5. Pro ASP.NET MVC 3 Framework, Adam Freeman; Steven Sanderson, Apress
6. Professional ASP.NET MVC 3, Jon Galloway; Phil Haack; Brad Wilson; K. Scott Allen, Wrox
7. The Complete reference, ASP.NET, M M Donald, TMH

Reference Books:

1. Pro ASP.NET 4 in C# 2010, Matthew MacDonald; Adam Freeman; Mario Szpuszta, Apress
2. Microsoft® ASP.NET 4 Step by Step, George Shepherd, Microsoft Press
3. Programming Microsoft® ASP.NET 4, Dino Esposito, Microsoft Press

SEMESTER-III
LAB-1
MAT LAB

LAB-2
PROGRAMMING THROUGH .NET

The break-up of marks for Practical will be as under :			
Sr. No.	**Argument**	**Maximum Marks**	**Minimum Passing Marks**
1.	Lab Record	20	
2.	Viva-voce	40	
3.	Program Development and Execution	40	
	Total Marks	100	36

SEMESTER-IV
PAPER-I
ADVANCED TRENDS AND TECHNOLOGY IN COMPUTER SCIENCE

Note: There will be two parts of the question paper: Section A and Section B will consist 10 short answer type questions/Objective questions of 2 marks each covering entire syllabus while section B will consist two question from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT–I
Big Data Analytics
Big Data Analytics Applications, Product Selection, Design and Engineering, Location-Based Services, Online Advertising, Architecture Components: Massively Parallel Processing (MPP) Platforms, Unstructured Data Analytics and Reporting: Search and Count, Context-Sensitive and Domain-Specific Searches, Categories and Ontology, Qualitative Comparisons, Data Privacy Protection, Real-Time Adaptive Analytics and Decision Engines, Implementation of Big Data.

UNIT–II
Cloud Computing
Cloud Computing Overview, Applications, Intranets and the Cloud, Cloud Computing Services, Business Applications and Examples, Deleting Your Datacenter, Benefits & Limitations of Cloud Computing, Accessing the Cloud - Platforms, Web Applications, Web APIs, Web Browsers. Cloud Storage - Overview, Cloud Storage Providers, Standards - Application, Client, Infrastructure, Service,

UNIT–III
Grid Computing
Grid Architecture and Service modeling, Grid resource management, Grid Application trends, Characterization of Grids, Organizations and their Roles, Grid Computing Road Maps, Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems. Grid Middleware: List of globally available Middle wares.

UNIT–IV
Cluster Computing
Role of Clusters, Definition and Taxonomy Of Parallel Computing, Hardware System Structure, Node Software, Cluster Planning, Architecture , Node Hardware and Node Software, Design Decisions, Network Hardware: Internet technologies, Ethernet, System Access Models, Assigning Names, Node Software, Cluster Workload Management Activities, Queuing, scheduling and monitoring, Virtualization technologies.

UNIT–V
Pervasive Computing
Introduction: Pervasive Computing, Evolution of Pervasive Computing, Pervasive Computing Principles, Pervasive Computing Characteristics, Pervasive

Information Technology, And Pervasive Architecture: Background, Scalability and Availability, Pervasive Web Application Architecture, Implementation Issues, Pervasive Devices: Device Categories, Device Characteristics, and Software Components in the Device, Information Access Devices, Smart Identification and Embedded Controls, Pervasive Applications.

Text Books:

1. Big Data Analytics: Disruptive Technologies for Changing the Game, Dr. Arvind Sathi, IBM Corp.
2. Mining of Massive Datasets, Anand Rajarama, Jure Leskovec, and Jeffrey D. Ullman. E-book, 2013.
3. Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenp Mc Graw Hill.
4. Grid Computing, Joshy Joseph and Craig Fellenstein, Pearson Education 2004.
5. The Grid Core Technologies, Maozhen Li, Mark Baker, John Wiley and Sons, 2005.
6. Beowulf Cluster Computing with Linux, William Gropp, Ewing Lusk, Thomas Sterling, MIT Press,
7. Pervasive Computing: The Mobile World, Uwe Hansmann, Lothar Merk.
8. Pervasive Computing: Technology And Architecture Of Mobile Internet Applications, Jochen Burkhardt , Horst Henn , Stefan Hepper , Klaus Rindtorff , Thomas Schaeck
9. Distributed and Cloud Computing, K. Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.

Reference Books:

1. Big Data Imperatives, Soumendra Mohanty, Madhu Jagadeesh, H. Srivatsa, Apress, e-book of 2012.
2.. Grid Computing: Making the Global Infrastructure a reality, Fran Berman, Geoffrey Fox, Anthony J.G. Hey, John Wiley and sons.
3. In Search of Clusters: The ongoing battle in Lowly Parallel Computing, Gregory F. P Fister, Prentice Hall Publishing Company.

SEMESTER - IV
PAPER - II
ELECTIVE - I
DATA MINING AND DATA WAREHOUSING

Unit – I

Introduction to Data Mining and Data Warehouse

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining. Data Preprocessing: Data Cleaning, Data Integration and Transformation, Data Reduction.

Unit –II

OLAP (Online Analytical Processing)

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

Unit –III

Associations and Classification

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining, Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods.

Unit –IV

Cluster Analysis and Sequence

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis. Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multi-relational Data Mining.

Unit –V

Application Areas

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web, Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

Text Books:

1. Data Mining–Concepts & Techniques, J. Han & M. Kamber, Morgan Kaufmann Pub.
2. Introduction to Data Mining, P. N. Tan, M. Steinbach & Vipin Kumar, Pearson education.
3. Data Mining Techniques – Arun K Pujari, 2nd edition, Universities Press.
4. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn.

Reference Books:

1. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.
2. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
3. Data Mining: Introductory and Advanced Topics, Margaret H.Dunham, Pearson Education 2004.
4. Principles of Data Mining, David Hand, Heikki Manila, Padhraic Symth, PHI 2004.
5. Building the Data Warehouse, W.H.Inmon, Wiley, 2003.
6. Data Warehousing, Data Mining & OLAP, Alex Bezon, Stephen Smith, McGraw-Hill.

SEMESTER - IV
PAPER - II
ELECTIVE - II
COMPUTER GRAPHICS AND MULTIMEDIA

Unit-I

An Introduction Graphics System

Computer Graphics Fundamentals, Application of Computer Graphics, Video Display Devices, Raster & Random Scan Systems, Input Devices, Graphics Software, Interactive devices, Output Primitives, Line Drawing & Circle Generating Algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm.

Unit-II

2D Transformations

2-D Viewing and Clipping: Viewing Transformations, Point Clipping & Line Clipping Algorithms, Polygon Clipping algorithms, 2D Geometric Transformations: Basic transformations (Translation, Rotation, Scaling), Matrix Representation & Homogeneous Coordinates, Composite transformations, Reflection and Shear.

Unit-III

3D transformations

3D Viewing Transformation, Projections: Parallel Projection (Orthographic & Oblique Projections, Isometric Projections), Perspective Projections, 3D Geometric Transformations: Translation, Rotation, Scaling, Matrix Representation, 3D Object Representations: Polygon Surface and Polygon table, Bezier curves and surfaces.

Unit-IV

Multimedia and Photoshop s/w

Fundamentals of Multimedia, Adobe Photoshop CS4: Menus and panels, Exploring the Toolbox, Working with Images: Working with Multiple Images, Rulers, Guides & Grids, Image Size Command, Adjusting Canvas Size & Canvas Rotation, Creating, Selecting, Linking & Deleting Layers, Painting with Selections, Red Eye Tool, Clone Stamp Tool, Color creation, Quick Mask Options, Creating Straight & Curved Paths, Creating Special Effects.

Unit-V

CorelDraw X4

CorelDraw X4 Command Bars & Tools, Drawing Area-Objects-Lines, Working with Text & Artistic Media Tool, Fills & Modifying Outlines, Drop Shadows, Importing and Editing OCR Text, Templates, Drawing and Editing Curves and Lines, Three-point Tools, Clipart, Special Characters and Creating Symbols, Working with Layers & Creating a Master Layer, Brush Tools and Adding Objects, Interactive Tools, Power Clip Feature and the Envelope Tool.

Text Books:

1. Procedural Elements for Computer Graphics, D.F. Rogers, Tata McGraw Hill
2. Fundamentals of Interactive Computer Graphics, J.D. Foley and A.D. Van, Addison-Wesley.
3. How to Do Everything Adobe Photoshop CS4, Chad Perkins, Tata McGraw Hill
4. Corel Draw X4: The Official Guide, (Paperback), Gary David Bouton, Tata McGraw Hill

Reference Books:

1. Photoshop CS4 Quicksteps, Carole Matthews & Gary David Bouton, Tata McGraw Hill
2. Corel DRAW X4 , Deborah Miller, Pearson Education
3. Corel draw X5 In Simple Steps, Hindi Ed., ISBN : 9789350042885, Kogent, Wiley Publications
4. Mathematical Elements for Computer Graphics,, Rogers and Adam, Tata McGraw Hill.
5. Theory & Problem of Computer Graphics, Plastock, Schaum Series.
6. Computer Graphics, Tosijasu, L.K., Springer-verleg
7. Principles of Interactive Computer Graphics, Newman, Tata McGraw Hill.

SEMESTER - IV
PAPER - II
ELECTIVE - III
EMBEDDED SYSTEM

UNIT–I

Introduction to Embedded Systems

Embedded System Design Process, Formalisms for System Design, Processor technology, IC technology, Design technology, General-Purpose Processor: Introduction, Basic Architecture, Operation, Super-Scalar & VLIW Architecture, Application Specific Instruction Set Processors, Microcontrollers, Digital Signal Processors, Selecting a Microprocessor, Memory: Introduction, Memory write ability, Storage performance, Tradeoff s, Common memory types Memory hierarchy and cache.

UNIT–II

AVR 8515 microcontroller

Architecture and Programming in assembly and C, Interfacing Analog and digital blocks: Analog-to-Digital Converters (ADCs), Digital-to-Analog, Converters (DACs). Microprocessor interfacing: I/O addressing, Port and Bus based, I/O, Memory mapped I/O, Standard I/O interrupts, Direct memory access, Advanced communication principles parallel, serial and wireless, Serial protocols I2C, Parallel protocols PCI bus, Wireless protocol IrDA, blue tooth.

UNIT–III

The 8051 Micro controller & Embedded System Programming

8051 Micro controller Architecture, Input / Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input /Output, Interrupts. Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Interrupts. Applications: Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication.

UNIT–IV

Embedded System Software

Design tradeoffs due to thermal considerations and Effects of EMI/ES etc., Software aspect of embedded systems: Challenges and issues in embedded software development, Co-design, Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Embedded software development environments. Real time operating systems, Kernel architecture: Hardware, Task/process control subsystem, Device drivers, File subsystem, system calls embedded operating systems.

UNIT–V

Development for embedded systems

Embedded system development process, Determine the requirements, Design the system architecture, Choose the operating system, Choose the processor, Choose the development platform, Choose the programming language, Coding issues, Code optimization, Efficient input/output, Testing and debugging, Verify the software on the host system, Verify the software on the embedded system.

Text Books:

1. The 8051 Microcontroller Architecture, Programming & Applications, Kenneth J. Ayala, Penram International.
2. An Embedded Software Primer, David E. Simon, Pearson Education, 2005.
3. Embedded Systems: Architecture, Programming and Design, Raj Kamal, Tata McGraw-Hill Education, 2008

SEMESTER-IV
PAPER-II
ELECTIVE-IV
NETWORK SECURITY & CRYPTOGRAPHY

UNIT–I

Security in Network

Model for Security: Threats in Networks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failure, Information Leakage; Elementary Cryptography: Terminology and Background, Cryptography and network security. Concepts of Encryption and Decryption. Cryptanalysis, Substation Cipher. Transpositions Good and Secure Encryption Algorithm. Trust worthy Encryption systems Data encryption standards (DES) and Advanced Encryption Standards (AES) Comparison of DES and AES.

UNIT–II

Classical Encryption Technique

Symmetric and Asymmetric Encryption Systems, Stream and Block Ciphers, Contemporary Symmetric Ciphers, Confidentiality using Symmetric Encryption; Public Key Encryption and HASH Functions: Public Key Cryptography and RSA, Message Authentication and Hash Function, Hash Algorithms, Digital Signatures and Authentication Protocols.

UNIT–III

Firewalls

Basic Concepts (for understanding the firewalls rules): TCP Segment format IP Datagram format. Introduction: Kinds of Firewalls, Packet Filters. Packet Filtering. Dynamic Packet Filters. Application-Level Filtering. Circuit-Level Gateways, Firewall Configurations, Demilitarized Zone (DMZ) Networks, Distributed Firewalls, Limitation of Firewalls. Filtering Services: Reasonable Services to Filter (Filter Rules to be applied): DNS, Web, FTP, NTP. DNS (Domain Name Server): DNS overview, Protocol overview, Hierarchal Structure, Root Servers, Practical Experience. DNS Security: Unpatched Servers, Mis-configured Servers

UNIT–IV

Web Security

Overview of Web Server Security. Goal of Server Attack. Web site defacement. Data corruption. Data heft. Types of Attacks. Web Server Protection. FTP (File Transfer Protocol) SMTP (Simple Mail Transfer Protocol). NTP (Network Time Protocol), Intrusion detection systems: Types of IDSs. Goal for Intrusion Detection systems, IDS Strength and Limitation. Electronic Mail Security: Security for E-mail. Designs, Example of Secure E- mail Systems, Pretty Good Privacy (PGP), MIME overview. S/MIME functionality; Wireless Application Protocol Security (WAP.)

UNIT–V

Cryptography

Introduction to Cryptograph, Overview on Modern Cryptography, Number Theory, Probability and Information Theory, Classical Cryptosystems, Symmetrical Ciphers (DES, AES), Hash Functions and MACs (Message Authentication Codes), Digital Signatures Modern Trends in Asymmetric Key Cryptography Elliptic curve based cryptography, Elliptic curve based cryptography.

Text Books:

1. Network Security Essentials (Applications and Standards), William Stallings Pearson Education.
2. Hack Proofing your network, Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, Wiley Dreamtech
3. B. A. Forouzan, "Cryptography & Network Security", Tata Mc Graw Hill.
4. Cryptography and Network Security: Principles and practices, William Stallings-III Edition, TMH.
5. The complete Reference Network Security, Bragg, Rhodes-Ousley, Pearson.

Reference Books:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
2. Network Security - Private Communication in a Public World, Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson

SEMESTER - IV
MAJOR PROJECT

Note:

1. It is compulsory, that students would have group of maximum of two students and project should be done under Government Sectors/ Public Sector / Pvt. LTD. S/W Company.
2. The students should not make any project under local or private institutions.
3. The students should make project themselves and project will not be copy of other project.

Steps for Live Project

1. Getting customer's requirements
2. Preparing designs, database and business logics
3. Developing software application project
4. Testing and implementing the project
5. Troubleshooting the project application after implementation

The break-up of marks for fourth semester's Major Project will be as under:

Sr. No.	Argument	Maximum Passing Marks	Minimum Passing Marks
1.	Project Record	100	
2.	Viva-voce	100	
3.	Program Development and Execution	200	
Total Marks		400	144
