

M.C.A Syllabus

(Academic year 2015-2016 onwards)

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE – 641 018
(An autonomous college affiliated to Bharathiar University)
Reaccredited by NAAC with 'A' Grade
EFFECTIVE FROM THE ACADEMIC YEAR 2015-2016

ELIGIBILITY FOR ADMISSION:

The Eligibility for Candidates admitted to the first year course in Master of Computer Applications (M.C.A) is as per TANCET.

DURATION OF THE COURSE:

The course shall be offered on a full-time basis. The course will consist of five semesters of course work and laboratory work and the sixth semester shall be project work.

REQUIREMENTS FOR EXAMINATION AND ATTENDANCE

A candidate will be permitted to appear for the semester examinations if, he/she secures not less than 75% of attendance in the number of working days during the semester and that the candidates character has been satisfactory. If a candidate fails to secure 75% attendance and conduct has been satisfactory it shall be open to the Principal or any authority delegated such powers to grant exemption to a candidate for valid reasons subject to conditions.

EXAMINATIONS

The final Examinations shall be conducted at the end of each semester for the subjects of study undergone in that semester.

Practical Examinations will be conducted with one internal examiner and one external examiner. The question paper for practical examination will be jointly prepared by internal and external examiners. Record marks will be assigned by internal examiner.

SESSIONAL MARKS

Sessional marks will be awarded to the candidates for both theory and practical. For theory it will be based on two class tests, assignments and seminar. For practical it will be based on continuous lab assessments. During the sixth semester the students have to report the progress of their Project work on scheduled dates, to the department committee based on which marks shall be awarded by the project supervisor.

PASSING REQUIREMENTS

1. Single valuation (External examiner) system is followed for correcting final theory examinations.
2. A candidate shall be declared to have passed the examinations in a subject if he/she secures not less than 50% of the total prescribed marks for the subject in Sessional and final examinations put together, subject to his/her getting a minimum of 50% of the marks in the semester examination.
3. A candidate who successfully completes the course and passes the examinations prescribed in all the subjects of study and practical examinations shall be declared to have been qualified for the degree.
4. If a candidate does not complete the course successfully within a period of 6 years (12 semesters) from the date of his/her joining, he/she will be disqualified from the course.
5. Candidates who have passed 75% with and more aggregate and have cleared all the papers in the first attempt be classified as First class with distinction.

CLASSIFICATION OF SUCCESSFUL CANDIDATES

1. All candidates securing not less than 60% of the aggregate marks including sessionals shall be declared to have passed the Degree in **FIRST CLASS** provided they have passed the examination in every subject including practical, project work and Viva-Voce within three years of joining the course.
2. Other successful candidates shall be declared to have passed the examinations in **SECOND CLASS**.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018
DEPARTMENT OF COMPUTER SCIENCE
M.C.A. Syllabi and Scheme of Examinations for the Students
Admitted from 2015-2016 academic year onwards

Semester	Code	Part	Paper	Title of the Paper	Hrs (wk)	Internal Marks	External Marks	Total Marks	SE - Min.	TPM	Credits
I	15MCA11C	A	I	Computer Organization and Architecture	4	25	75	100	38	50	4
	15MCA12C	A	II	Problem Solving and C Programming	4	25	75	100	38	50	4
	15MCA13C	A	III	Mathematical Foundation for Computer Science	4	25	75	100	38	50	4
	15MCA14C	A	IV	Software Engineering	4	25	75	100	38	50	4
	15MCA15C	A	V	Accounting and Financial Management	4	25	75	100	38	50	4
	15MCA16P	A		Practical 1 : C Programming Lab	3	40	60	100	30	50	3
	15MCA17P	A		Practical 2 : Multimedia Lab	2	40	60	100	30	50	3
					25			700			26
II	15MCA21C	A	VI	Data Structures	4	25	75	100	38	50	4
	15MCA22C	A	VII	Operating Systems	4	25	75	100	38	50	4
	15MCA23C	A	VIII	Database Systems Concepts	4	25	75	100	38	50	4
	15MCA24C	A	IX	Object Oriented Programming and C++	4	25	75	100	38	50	4
	15MCA25C	A	X	Operations Research	4	25	75	100	38	50	4
	15MCA26P	A		Practical 3: Object Oriented Programming Lab	3	40	60	100	30	50	3
	15MCA27P	A		Practical 4: Database Systems Lab	2	40	60	100	30	50	3
					25			700			26
III	15MCA31C	A	XI	Data Communication Networks	4	25	75	100	38	50	4
	15MCA32C	A	XII	Object Oriented Analysis and Design with UML	4	25	75	100	38	50	4
	15MCA33C	A	XIII	Design and Analysis of Algorithms	4	25	75	100	38	50	4
	15MCA34C	A	XIV	Data Mining and Big Data Analytics	4	25	75	100	38	50	4
	15MCA35C	A	XV	Computer Graphics	4	25	75	100	38	50	4

	15MCA36P	A		Practical 5: Data Structures and Algorithms Lab	3	40	60	100	30	50	3
	15MCA37P	A		Practical 6: UML Lab	2	40	60	100	30	50	3
					25			700			26
IV	15MCA41C	A	XVI	Visual Programming	4	25	75	100	38	50	5
	15MCA42C	A	XVII	.NET Programming (C#)	4	25	75	100	38	50	4
	15MCA43C	A	XVIII	Principles of Compiler Design	4	25	75	100	38	50	4
	15MCA44E	B	XIX	Elective 1:	4	25	75	100	38	50	3
	15MCA45E	B	XX	Elective 2:	4	25	75	100	38	50	3
	15MCA46P	A		Practical 7: Visual Programming Lab	3	40	60	100	30	50	3
	15MCA47P	A		Practical 8: C# Programming Lab	2	40	60	100	30	50	3
					25			700			25
V	15MCA51C	A	XXI	Java Programming	4	25	75	100	38	50	5
	15MCA52C	A	XXII	Principles of Marketing and Management	4	25	75	100	38	50	4
	15MCA53C	A	XXIII	Software Project Management	4	25	75	100	38	50	4
	15MCA54E	B	XXIV	Elective 3:	4	25	75	100	38	50	3
	15MCA55E	B	XXV	Elective 4:	4	25	75	100	38	50	3
	15MCA56P	A		Practical 9: Java Programming Lab	3	40	60	100	30	50	3
	15MCA57P	A		Practical 10: Software Project Management Lab	2	40	60	100	30	50	3
					25			700			25
VI	15MCA61	B		Project and Viva Voce		40	160	200	80	100	7
				Total / Credits				3700			135

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018
DEPARTMENT OF COMPUTER SCIENCE**

ELECTIVES FOR FOURTH & FIFTH SEMESTER

ELECTIVE – I

- 1.1. Enterprise Resource Planning
- 1.2. Embedded Systems
- 1.3. Client / Server Technology
- 1.4. Micro Processor and Assembly Language Programming
- 1.5. Windows Programming
- 1.6. Principles of Programming Languages

ELECTIVE – II

- 2.1. E-Commerce
- 2.2. Cryptography and Network Security
- 2.3. Distributed Computing
- 2.4. Management Information System and COBOL Programming
- 2.5. UNIX Architecture and Programming

ELECTIVE – III

- 3.1. TCP/IP
- 3.2. Digital Image Processing
- 3.3. Bio Informatics
- 3.4. Parallel Processing
- 3.5. Intelligent Information Retrieval
- 3.6. Multimedia Systems and its Applications

ELECTIVE – IV

- 4.1. Soft Computing
- 4.2. Wireless Application Protocol (WAP)
- 4.3. Cloud Computing
- 4.4. Open Source Tools
- 4.5. Service Oriented Architecture (SOA)

SEMESTER – I

Paper–I: COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT – I

Number System: Binary, Decimal, Octal, Hexadecimal – Conversion from one to another – complements – Binary codes. Basic Logic Gates – Basic Theorems and Properties of Boolean Algebra – NAND, NOR implementation – Sum of Products – Product of Sums – Karnaugh map – Tabulation Method – Don't Care Conditions.

UNIT – II

Combinational Logic Circuit Design: Multiplexers – Demultiplexers – Decoders – Encoders – Half Adder – Full Adder – Subtractor – Parallel Adders.

Flip-flops: RS, D, JK Flip-flops – Registers – Shift Registers – Ripple counters – Synchronous counters.

UNIT – III

Register Transfer and Micro Operations: Arithmetic circuit – Logic Circuit – Shift Circuit – Arithmetic Logic Shift unit – Stack Organization – Instruction formats – Addressing modes – Data Transfer, Data Transfer, Manipulation and program control instructions.

UNIT – IV

Input – Output organization: Peripheral Devices – Input – Output interface – Asynchronous Data Transfer (Strobe & Handshaking Method) – Modes of Transfer – Priority Interrupt – DMA – IOP.

UNIT – V

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.

TEXT BOOKS

1. M.Morris Mano, “Digital Logic and Computer Design”, PHI, 2001.
2. M.Morris Mano, “Computer system architecture” Third Edition, PHI, 2001.

REFERENCE BOOKS

1. Albert Paul Malvino, Donald P. Leach, “Digital Principles and Applications”, Tata McGraw Hill, 2002.
2. J.P.Hayes, “Computer Architecture and Organization” TataMcGraw Hill, 1998.
3. William Stallings, “Computer Organization & Architecture – Designing for performance”, Pearson Education, Sixth Edition.

SEMESTER – I

Paper–II: PROBLEM SOLVING AND C PROGRAMMING

UNIT – I

Planning the Computer Program – Flow Chart – Types of Logic used in Flowchart – Computer Languages – Hierarchy of Programming Languages – Classifications of Programming Languages – Program development process – Characteristics of a Good Program – Error in Programming.

UNIT – II

An overview of C – Data types and sizes – Declarations – Variables – Constants – Operators – Expressions – Program Control Structures – Loop Control Structures – C Formatted Input / Output – Arrays – Strings

UNIT – III

Function – Function Arguments – Function Prototype – Storage classes – Recursion – Structures – Unions – Bit Manipulations and Enumerations – Self-Referential Structures – Dynamic Memory Allocation.

UNIT – IV

Pointers – Introduction – Pointers and Arrays – Pointers and Strings – Pointers and Structures – Pointers and Data structures.

UNIT – V

Streams and files - command line arguments - C preprocessor - conditional computation directives - defining macros - standard library functions (including system functions) – I/O functions (Console, disk port I/O) – I/O redirection – bit fields - usage of inline assembly

TEXT BOOKS

1. Yeshavant Kanetkar, “Let us C”, 4th Edition, BPB Publications, 2003.
2. D.P.Nagpal, “Computer Fundamentals – Concepts system & Applications”.
3. Yeshavant Kanetkar, “Undocumented DOS through C”, BPB Publications, 2003.

REFERENCE BOOKS

1. Ashok N.Kamthane. “Programming with ANSI and Turbo C”, Pearson Education Asia, 2003.
2. E.Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill.
3. Deitel & Deitel, “C How to Program”, Third Edition, Pearson Education Asia.
4. Robert A. Radcliffe, 'Encyclopedia C' BPB Publications.

SEMESTER – I

Paper–III: MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

UNIT I

Mathematical Logic: Introduction – Connectives, NAND & NOR connectives – Tautology and Contradiction – Truth tables – Equivalence formulae – Normal forms – Principal disjunctive normal forms – Principal conjunctive normal forms.

Theory of Inference for Statement Calculus: Rules of inference – Direct and indirect method of proof.

(Chapter 1 – Sections: 1.1, 1.2, 1.2.1 to 1.2.4, 1.2.6, 1.2.8 to 1.2.11, 1.3, 1.3.1 to 1.3.4, 1.4)

UNIT II

Finite Automata: Deterministic finite automata – Non-deterministic finite automata.

An Application: Text search – Finite automata with epsilon - Transitions.

(Chapter 2 – Sections: 2.2 to 2.5)

UNIT III

Graph Theory: Graphs – Diagraph – Types of graph – Simple theorems – Definitions of paths – Reachability – Matrix representation – Binary trees – Traversal of binary trees – Expression trees – Infix, postfix, prefix expressions.

(Chapter 5 – Sections: 5.1, 5.1.1 to 5.1.4)

UNIT IV

The Solution of Numerical Algebraic and Transcendental Equations: Bisection method – Iteration method – Newton-Raphson method.

(Chapter 3 – Sections: 3.1, 3.1.1, 3.2, 3.4)

UNIT V

Solution of Simultaneous Linear Algebraic Equations: Direct method: Gauss elimination method – Gauss Jordan method. Indirect method: Gauss Jacobi method – Gauss Seidel method of iteration.

(Chapter 4 – Sections: 4.1, 4.2, 4.2.1, 4.7 to 4.9)

TEXT BOOKS:

1. DISCRETE MATHEMATICAL STRUCTURES WITH APPLICATIONS TO COMPUTER SCIENCE – J.P.TREMBLAY AND R.MANO HAR, Tata McGraw Hill Publishing Company Limited, Tenth Reprint 2000. **(For Units I and III)**
2. INTRODUCTION TO AUTOMATA THEORY, LANGUAGES AND COMPUTATION – JOHN E.HOPCROFT, RAJEEV MOWANI, AND JEFFERY D.ULLMAN, Third Edition, Pearson Education, 2008. **(For Unit II)**

3. NUMERICAL METHODS – DR. P.KANDASAMY, DR. K.THILAGAVATHY AND DR.K.GUNAVATHY, S.Chand and Company Limited, New Delhi, Revised Edition 1999. **(For Unit IV and V)**

REFERENCE BOOK:

DISCRETE MATHEMATICS WITH GRAPH THEORY AND COMBINATORICS – T.
VEERARAJAN, Tata McGraw Hill Publishing Company Limited, New Delhi, Fifth Reprint,
2008.

SEMESTER – I

Paper IV:–SOFTWARE ENGINEERING

UNIT – I

The evolving role of software – Software – Software Crises and Myths. **Software Engineering:** Layered Technology – The software process model – Evaluating Software Process models – Component Based development – The formal methods model – 4GT. **Software Project Planning:** Project Planning objectives – Software Scope – resources – Software Project estimation – Decomposition Techniques – Empirical estimation models.

UNIT – II

Analysis concepts & Principles: Requirement Analysis – Analysis Principles – Software Prototyping – Specification. **Analysis Modeling:** Data Modeling – Functional modeling & information flow – Behavioral modeling.

UNIT – III

Design Concepts & Principles: The design process – Design Principles – Design concepts – Effective modular design. **Architectural Design:** Software Architecture – Data design – Analyzing alternative Architectural design – Mapping requirements into software Architecture – Transform mapping – Transaction mapping.

UNIT – IV

User Interface Design: The Golden Rules – User interface design – Task analyzing and modeling – interface design activities – implementation tools – Design Evaluation. **Component Level Design:** Structured Programming – Comparison of Design notations. **Object-Oriented Design:** Design for object – Oriented systems – the system design process – The object design process.

UNIT – V

Software Testing Techniques: Software Testing Fundamentals – Test case design – White box Testing – Basis path Testing – Control structure testing – Black box Testing. **Software Testing Strategies:** A Strategic Approach to software testing – Strategic issues – Unit Testing – integration testing – Validation testing – System testing.

TEXT BOOKS

1. Roger S Pressman – “Software Engineering a Practitioner’s Approach”, Fifth Edition, McGraw-Hill Higher Education

REFERENCE BOOKS

1. Rajib Mall, “Fundamentals of Software Engineering”, PHI, Second Edition.
2. Sommerville, “Software Engineering”, Pearson Education, Sixth Edition.
3. Richard Fairly, “Software Engineering Concepts”, Tata McGraw Hill, 1997.
4. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, “Fundamentals of Software Engineering”, Second Edition, Pearson Education Asia.

SEMESTER – I

Paper–V: ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT – I

Accounting: Definition, Objectives, Advantages, Accounting Concepts, Accounting Conventions. Methods of Accounting – Single Entry and Double Entry System. Basic Books of Accounts – Journal and Ledger – Preparation of Trial Balance. **Final Accounts:** Trading and Profit and Loss Account and Balance Sheet of Sole Proprietary Concern.

UNIT – II

Financial Management: Meaning – Objectives – Financial Decisions – Functions of a Finance Manager. **Ratio Analysis:** Meaning – Advantages – Limitations – Classification of Ratio: Profitability, Turnover and Solvency Ratios.

UNIT – III

Funds Flow Statement: Concept of Funds – Funds flow Statement – Uses and Limitations – Preparation of Fund Flow Statement – Cash Flow Statement.

Costing: Definition, Nature and Importance, Advantages and Limitations of Cost Accounting – Classifications of Cost – Preparation of Cost Sheet

UNIT – IV

Budget and Budgetary Control: Meaning and Definition, Objectives of Budgetary Control, Advantages and Limitations - Preparation of Different types of Budgets. **Marginal Costing:** Meaning, Advantages – Cost – Volume Profit Analysis – Break Even Analysis – Uses and Assumptions – Applications of Marginal Costing.

UNIT – V

Standard Costing: Meaning – Standard Costing and Budgetary Control – Advantages and Limitations of Standard Costing – Analysis of Variance with References to Material and Labour.

Computerized Accounting System – Coding – Master File – Transaction File – Documents Used for Data Collection – Processing of Different Files and Output Obtained.

TEXT BOOKS

1. R.L.Gupta and Radhaswamy “Financial Accounting”, Sultan Chand & Co.
2. Jain and Narang, “Financial Accounting”, Kalyani Publishers.
3. S.N.Maheswari, “Principles of Management Accounting”, Sultan Chand & Co.
4. Sharma and Gupta, “Financial Management”, Kalyani Publishers.

SEMESTER – I

Practical 1: C PROGRAMMING LAB

1. Programs using Arrays.
2. Programs using Control Structures.
3. Programs using Structure.
4. Programs to Access the Array Element using Pointers.
5. Programs using File.
6. Programs using Functions with Pointers.

SEMESTER – I

Practical 2: MULTIMEDIA LAB

1. Create Sun flower using Photoshop.
2. Animate Plane Flying in the Clouds using Photoshop.
3. Create Plastic Surgery for the Nose using Photoshop.
4. Create See-through text using Photoshop.
5. Create a Web Page using Photoshop.
6. Convert Black and White Photo to Color Photo using Photoshop.
7. To Rotate an Image.
8. To Drop each word of a sentence one by one from the top.
9. To move a car with sound effect.
10. To bounce a ball and move it with sound effect.

SEMESTER – II

Paper–VI: DATA STRUCTURES

UNIT – I

Introduction: Introduction: Algorithmic notation – Programming principles – Creating programs- Analyzing programs. Arrays: One dimensional array, multidimensional array, pointer arrays. Searching: Linear search, Binary Search, Fibonacci search.

UNIT – II

Stacks: Primitive operations, Application of stacks. Queues: Primitive operations - Priority queues - Dequeues – Applications. Linked list: Singly Linked List, Doubly Linked List, Circular Linked List, Linked stacks, Linked queues, Applications of Linked List –Dynamic storage management.

UNIT – III

Trees: Binary tree, Terminology, Representation, Traversal, Types, Applications. Graph: Terminology, Representation, Traversals – Applications - Spanning Trees, shortest path and Transitive closure, Topological sort. Sets: Representation - Operations on sets – Applications.

UNIT – IV

Tables: Symbol tables - Hash tables. Sorting techniques: Internal and External sorting - Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, Radix Sort.

UNIT – IV

Files: queries - Sequential organization – Index techniques. B Trees: B Tree indexing, operations on a B Tree, Lower and upper bounds of a B Tree - B + Tree Indexing – Trie Tree Indexing.

TEXT BOOKS

1. Ellis Horowitz and Sartaj Sahni “Fundamentals of Data Structures”
Galgotia Book Source, Pvt. Ltd., 2004.

REFERENCE BOOKS

1. D. Samanta, “Classic Data Structures”, Prentice-Hall of India, Pvt. Ltd., India 2003.
2. Robert Kruse, C.L. Tondo and Bruce Leung, “Data Structures and Program Design in C”, Prentice-Hall of India, Pvt. Ltd., Second edition, 2007.
3. Jean Paul Tremblay and Paul G. Sorenson, “An Introduction to Data Structures with Applications”, Tata McGraw-Hill, Second edition, 2001.
4. Aaron M Tanenbaum, Moshe J Augenstein and Yedidyah Langsam, "Data Structures using C and C++", Pearson Education, 2004.
5. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, Second edition, 2006

SEMESTER – II

Paper–VII: OPERATING SYSTEMS

UNIT – I

Introduction – What is an OS – Mainframe systems – Desktop systems – Multiprocessor systems – Distributed systems – Clustered systems – Real-Time systems. Operating system structures: Systems components – OS services – System calls – System Programs – Systems structure – Virtual machines - System Design & Implementation – System Generation.

UNIT II

Process Management: Process concept – Process scheduling – Operations on process – Cooperating process – Inter-process communication. CPU scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor Scheduling – Real-Time Scheduling. Deadlocks: Deadlock characterization – Methods for handling Deadlocks – Deadlocks prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlock.

UNIT III

Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual memory: Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing

UNIT IV

I/O Systems: Disk structure – Disk scheduling – Disk management – Swap – Space management. File systems: File concept – Access methods Directory structure – File system structure – File system implementation – Directory implementation – Allocation methods – Free space management.

UNIT V

CASE STUDY: Linux: Design Principles – Kernal modules – Process management, scheduling – Memory management – File systems – Input & Output – Interprocess Communication – Network structure – Security.

TEXT BOOKS

1. Silberschatz, Galvin, Gagne, Operating Systems Concepts, Sixth Edition, John Wiley & Sons, 2004.

REFERENCE BOOKS

1. Tanenburn, “Operating systems: Design & Implementation”, PHI, Second Edition, 1998.
2. Deital, “Operating Systems”, Pearson Education Asia, Second Edition, 2001.
3. D.M.Dhamdhare, “System Programming and Operating Systems”, TMH, 2000.

SEMESTER – II

Paper–VIII: DATABASE SYSTEMS CONCEPTS

Unit I :

Introduction - Database system applications - purpose of database system – View of data – Database Languages – Relational Databases – Database Design – Data Storage and Querying – Transaction Management – Database Architecture – Database Users and Administrators.

Unit II :

Relational Databases – Relational Model – Structure of Relational Databases – Fundamental Relational Algebra Operations – Additional Relational Algebra Operations.

SQL – Background – Data Definition – Basic Structure of SQL Queries – Set Operations – Aggregate Functions – Null values – Nested Subqueries – Views – Modification of the Database.

Unit III :

Database design : Database Design and the E – R Model – Design Phases – Design Alternatives – The Entity Relationship Model – Constraints – Entity Relationship Diagrams – Extended E – R features – Specialization – Generalization – Aggregation – Reduction to Relational Schemas.

Unit IV :

Relational Database Design – Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Keys and Functional Dependencies – Boyce – Codd Normal Form – BCNF and Dependency Preservation – Third Normal Form – Functional Dependency Theory – Lossless Decomposition – Dependency Preservation – BCNF Decomposition Algorithm – 3NF Decomposition – Multivalued Dependencies – Fourth Normal Form – 4NF Decomposition.

Unit V :

Database System Architectures – Centralized and Client / Server Architectures – Centralized Systems – Client / Server Systems – Server System Architectures – Parallel Systems – Distributed Systems – Network Systems.

Text Book:

“Database System Concepts “by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Fifth edition, 2006, Mc Graw Hill International Edition.

Reference Books:

1. “An Introduction to Database Systems “ by Bipin c. Desai
2. “ Database Management Systems” by Elmasri and Navathe

SEMESTER – II

Paper–IX: OBJECT ORIENTED PROGRAMMING AND C++

UNIT – I

Principles of Object Oriented Programming: Software Crisis – Software Evolution – Procedure Oriented Programming – Object Oriented Programming Paradigm – Basic concepts and benefits of OOP – Object Oriented Language – Application of OOP – Structure of C++ – Applications of C++ – Tokens, Expressions and Control Structures - Operators in C++ – Manipulators.

UNIT – II

Functions in C++: Function Prototyping – Call by reference – Return by reference – Inline functions – Default, const arguments – Function Overloading – Friend and Virtual Functions.

Classes and Objects: – Member functions – Nesting of member functions – Private member functions – Memory Allocation for Objects – Static Data Members – Static Member functions – Array of Objects – Objects as function arguments – Friendly functions – Returning objects – const member functions – Pointer to members.

UNIT – III

Constructors: Parameterized Constructors – Multiple Constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy and Dynamic Constructors – Destructors.

Operator Overloading: Overloading unary and binary operators – Overloading binary operators using friend functions- Overloading the extraction and the insertion operators.

UNIT – IV

Inheritance: Defining derived classes – Single Inheritance – Making a private member inheritable – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Virtual base classes – Abstract classes – Constructors in derived classes – Member classes – Nesting of classes.

UNIT – V

Streams: String I/O – Character I/O – Object I/O – I/O with multiple objects – File pointers – Disk I/O with member functions. Exception handling – Templates – Redirection – Command line arguments.

TEXT BOOKS

1. Robert Lafore, “Object Oriented Programming in C++”, Third edition, Galgotia, Publications Pvt. Ltd., 2000.
2. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley, 2000.
3. Stanley B. Lippman, Josee Lajoie, C++ Primer, Addison Wesley Longman, 1998.

REFERENCE BOOKS

1. Herbert Schildt, C++: The Complete Reference, McGraw Hill Inc., 1997.
2. Stanley B. Lippman, Inside the C++ Object Model, Addison Wesley, 1996.

SEMESTER II

Paper-X: OPERATIONS RESEARCH

UNIT I

Linear Programming Problem – Formulation of L.P.P – Graphical solutions of L.P.P. – Simplex Method. Charnes Penalty Method (or) Big – M Method – Two Phase Simplex method – Duality in L.P.P – Primal and Dual Problems – Dual simplex method.

(Chapter 2 – Sections: 2.1 to 2.4; Chapter 3 – Sections: 3.1 and 3.2; Chapter 4 – Sections: 4.1 to 4.4; Chapter 5 – Sections: 5.1 to 5.4, 5.9)

UNIT II

The transportation problems – Basic feasible solution by L.C.M – NWC – VAM – Optimum solutions – Unbalanced Transportation problems degeneracy. The Assignment problems – Introduction – Mathematical formulation – Hungarian assignment method. Maximization in assignment problem – Unbalanced assignment problem – Travelling sales man problems.

(Chapter 10 – Sections: 10.1 to 10.13, 10.15; Chapter 11 – Sections: 11.1 to 11.4, 11.7)

UNIT III

Inventory control – Types of inventories – Inventory costs – EOQ Problem with no Shortages – Production problem with no shortages – EOQ with shortages – Production problem with shortages – EOQ with price breaks-ABC analysis.

(Chapter 19 – Sections: 19.1 to 19.12, 19.15)

UNIT IV

Replacement model: Introduction – Replacement of items that deteriorates gradually-value of money does not change with time-value of money changes with time – Replacement of items that fails suddenly.

Individual Replacement – Group replacement. Network scheduling by PERT / CPM – Introduction – Network and basic components – Rules of Network construction – Time calculation in Networks – CPM. PERT – PERT calculations.

(Chapter 18 – Sections: 18.1 to 18.3; Chapter 25 – Sections: 25.1 to 25.8)

UNIT V

Queuing theory: Introduction – Characteristics of Queuing system – Problem from single server: finite and infinite population model – Problems from multi server: finite and infinite Population model.

(Chapter 21 – Sections: 21.1 to 21.9)

TEXT BOOK:

OPERATIONS RESEARCH – KANDI SWARUP, P. K. GUPTA AND MAN MOHAN, s. chand & sons education publications, new delhi, fourteenth revised edition. reprint 2009.

REFERENCE BOOKS:

1. OPERATIONS RESEARCH–AN INTRODUCTION – HAMDY A.TAHA, Seventh Edition, Pearson Education, Reprint 2005.
2. INTRODUCTION TO OPERATIONS RESEARCH – FREDRICK S. HILLIER GERALD J.LIEBERMAN, Seventh Edition, Tata McGraw Hill Publishing Company Limited, Reprint 2001.
3. OPERATIONS RESEARCH THEORY AND APPLICATIONS – J.K.SHARMA Macmillan India Limited, Second Edition, Reprint 2003.
4. PROBLEMS IN OPERATIONS RESEARCH – P.K.GUPTA AND D.S.HIRA, Third Edition, S.Chand and Company Limited, Reprint 2005.

SEMESTER – II

Practical 3: OBJECT ORIENTED PROGRAMMING LAB

1. C++ Program using operator overloading functions.
2. C++ Program using Type Conversion.
3. C++ Program using String manipulation functions.
4. C++ Program using friend functions.
5. C++ Program using inheritance.
6. C++ Program using Polymorphism.
7. C++ Program using files.
8. C++ Program using pointers.
9. C++ Program using templates

SEMESTER – II

Practical 4: DATABASE LAB

Study features of commercial RDBMS packages such as Oracle and Developer 2000. laboratory exercise should include defining scheme of applications, creation of a database, writing SQL queries to retrieve information from database. Use of host language interface with embedded SQL. Use of forms and report writer package. Some sample applications, which may be programmed, are given below.

1. Banking automation for various schemes
2. Online reservation system.
3. Student Database .
4. Student mark processing system (Internal and External marks).
5. Hotel management.
6. Stock maintenance.
7. College admission system. (both, UG and PG)

SEMESTER – III

PAPER XI: DATA COMMUNICATION NETWORKS

UNIT – I

Introduction: Use of computer networks – Network Hardware – Network Software – Reference models – Example of networks.

UNIT – II

The Physical Layer: The Theoretical basis for data communication – Guided transmission Media – Wireless transmission – Communication satellites – The Public switched Telephone network – Cable Television – Mobile telephone system.

UNIT – III

Data Link Layer: Data link layer design issues – Error detection and correction – Elementary data link protocols – Sliding window protocols –Example data link Protocols.

UNIT – IV

Network Layer: Network layer design issues – Routing algorithms – Congestion, Control algorithms – Quality of service – Internetworking – Network layer in the internet.

UNIT – V

Transport Layer: The transport service – Elements of transport protocol – A simple transport protocol – The internet Transport Protocols: UDP – The Internet Transport Protocols: TCP.
Application Layer : DNS- Electronic mail : The World Wide Web- Basics of Network Security.

TEXT BOOKS

1. Andrew S. Tanenbaum, “Computer Networks”, IV Edition, Pearson Education,

REFERENCE BOOKS

1. P. Green – Computer Network Architectures and Protocols, Plenum Press, 1982.
2. Harry Katzan – An Introduction to “Distributed Data Processing”, A Petrocelli Book, New York / Princeton.
3. Tittel – Theory and Problems of Computer Networking, Schaum’s outline series, TMH.
4. Godbole – Data Communication & Networking, TMH.
5. Leon Garcia – Communication Networks: Fundamental Concepts & Key Architecture, TMH.

SEMESTER – III
Paper–XII: OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML

UNIT - I

INTRODUCTION: An overview of object oriented systems development – Object basics – Object oriented systems development life cycle.

UNIT - II

OBJECT ORIENTED METHODOLOGIES: Rumbaugh methodology – Booch methodology – Jacobson methodology – Patterns – Frameworks – Unified approach – Unified modeling language.

UNIT - III OBJECT ORIENTED ANALYSIS: Identifying use cases – Object analysis – Classification – Identifying object relationships – Attributes and methods.

UNIT - IV

UML: INCEPTION Use case Modeling - Relating Use cases – include, extend and generalization. Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class hierarchies- Aggregation and Composition

UNIT - V

UML: ELABORATION System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML and package diagram - UML class diagrams - UML interaction diagrams – UML State diagram and Modeling – UML activity diagrams and Modeling

TEXT BOOKS

1. Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw - Hill, 1999.
2. Craig Larman, “Applying UML and Patterns: An Introduction to Object Oriented Analysis and Design and Iterative Development,” Third Edition, Pearson Education, 2005.

REFERENCES

1. Martin Fowler, “UML Distilled”, 2nd Edition, Prentice Hall of India / Pearson Education, 2002.
2. Mahesh P Matha, “Object Oriented Analysis and Design using UML”, PHI Learning, New Delhi, 2005.
3. James Rumbaugh, Ivar Jacobson and Grady Booch “The Unified Modeling Language Reference Manual”, Addison Wesley, 1999.
4. Micheal Blaha, James Rambaugh, “Object-Oriented Modeling and Design with UML”, Second Edition, Prentice Hall of India Private Limited, 2007.

SEMESTER – III
Paper–XIII: DESIGN AND ANALYSIS OF ALGORITHMS

UNIT- I

Algorithm Specification –Recursive Algorithms – Performance Analysis – Space Complexity – Time Complexity -.Asymptotic Notations – Asymptotic Complexity of SUM and Recursive SUM and ADD Algorithms - Analysis of Sequential Search.

UNIT- II

Elementary Data Structures- Stacks and Queues – Trees – Binary Trees – Binary Search Trees – Iterative and Recursive Search of BST – Graphs – Konigsberg Bridge Problem – Graph Representations - Graph Traversals

UNIT - III

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT - IV

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem .

UNIT - V

Backtracking: General Method – 8 Queens problem – sum of subsets – graph coloring – Hamiltonian problem – knapsack problem.

TEXT BOOK:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithm, Galgotia Publications, 2007.

REFERENCES:

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.

SEMESTER – III
Paper–XIV: DATA MINING AND BIG DATA ANALYTICS

Objectives

- To know the basic concepts of Data Mining and Big Data Analytics.

UNIT – I

Introduction – Data Mining – Relational Databases – Data Warehouses – Transactional databases – Data Mining functionalities – Classification of Data Mining systems – Major Issues in Data Mining.

UNIT – II

Data Preprocessing – Data cleaning – Missing value, noising data and inconsistent data – Data integration and Transformation – Data reduction – Data cube aggregation – Dimensionality reduction and data compression – Data mining primitives.

UNIT – III

Classification and predictions – Issues regarding classification and prediction – Classifications by decision tree induction – Classification by Back propagation – Other classification methods

UNIT – IV

Cluster Analysis – Types of Data in Cluster Analysis – Interval – Scaled variables, Binary variables, Nominal ordinal and ratio-scaled variables – Clustering methods – Partitioning methods – K-means, k-medoids and CLARANS – Hierarchical methods – Agglomerative and Divisive, BIRCH, CURE – Outlier analysis – Data Mining applications.

UNIT-V

The Big Deal about Big Data: What is Big Data-Why Is Big data important- Big Data. Applying Big Data to Business problems: A sampling of use cases-Big Data use cases-IT for IT – Customer state. Analytics for Big Data at Rest: The Big Data platform for high performance deep analytics- Appliance simplicity – Hardware Acceleration-Balance, massively parallel architecture- Modular design.

TEXT BOOKS

1. Jinweihan, Micheline Kambler, "Data Mining: Concepts and Techniques", Morgan Kaufman Publishers, New Delhi. (For Unit I, II, III and IV).
2. Paul C Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, David Corrigan, James Giles, "Harness the Power of Big Data", The McGraw-Hill Publications, 2013, First Edition. (For Unit V).

REFERENCE BOOKS

1. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1998.
2. Sam Anohory, Dennis Murrey, "Dataware housing in the real world", Pearson, 2004.

SEMESTER – III
Paper– XV: COMPUTER GRAPHICS

UNIT – I

A Survey of Computers Graphics – Overview of Graphics Systems – Output Primitives: Points and Lines, DDA, Bresenham’s Algorithm, Properties of Circles & Ellipse, Pixel Addressing.

UNIT – II

Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representations, Composite Transformations – Line Clipping – Two Dimensional Viewing – Graphical User Interfaces and Interactive Import Methods.

UNIT – III

Three Dimensional Concepts – **Three Dimensional Object Representations:** Polygon Surfaces – Curved Lines and Surfaces – Quadric Surfaces – Super Quadrics Blobby objects – Spline Representations – Cubic Spline Interpolation.

UNIT – IV

Three Dimensional Geometric And Modeling Transformations – Three Dimensional Viewing, Viewing Pipeline, Viewing Co-Ordinates, Projections Clipping.

UNIT – V

Visible – Surface Detection Methods: Classification of Visible – Surface Detection Algorithms, Back face Detection, Depth –Buffer Method, A-Buffer Method, Scanline Method, BSP-Tree Method. Illumination Models and Surface – Rendering Methods: Basic Illumination Models – Polygon Rendering Methods – Color Models and Color Applications – Computer Animation

TEXT BOOKS

1. Donald Hearn, M.Pauline Baker, “Computer Graphics C Version” Second Edition, Pearson Education.

REFERENCE BOOKS

1. Zhigangxiang, Roy Phastock, “Computer Graphics”, 2nd Edition, TMCH.

SEMESTER – III

Practical 5: Data Structures and Algorithms Lab

1. Array Creation and Operations.
2. Stack and Queue Operations.
3. Recursion, Infix to Postfix Conversion.
4. Polynomial Addition using Singly Linked List.
5. Doubly Linked List Operations.
6. Graph – Shortest Path
7. Searching – Linear, Binary
8. Sorting –Quick, Merge.

SEMESTER – III

Practical 6: UML Lab

1. Activity diagram for order processing
2. State diagram for ATM use.
3. State diagram for CPU execution
4. Collaboration diagram for database browser
5. Deployment diagram for TCP/IP layout
6. Class diagram for electronic shopping cart
7. Use case diagram for credit card processing
8. Package diagram for web server connection
9. Sequence diagram for database brochures
10. Interaction diagram for grocery shopping

SEMESTER – IV

Paper–XVI: VISUAL PROGRAMMING

UNIT – I

Overview of Integrated Development Environment – Declaring constants, Variables – Scope – Data types – Arrays, Dynamic arrays – Subroutines – Functions – String functions – If, Select Case statements – Looping – MDI forms – Input, Message boxes – Menus.

UNIT – II

Custom Controls: Textbox, Rich text box, Command button, Check box, Option button, List box, Combo box, Scroll bars, Picture box, Image box, Timer, Label, Frame, Shape, Line, Slider, Grid Controls, Progress bar, status bar, Tool bar, Tree View, Classes and objects.

UNIT – III

Creating ActiveX controls – Databases using DAO, RDO, ADO – Working with database objects in code – OLE.

UNIT – IV

MFC Fundamentals: MFC class hierarchy – Member functions – Creating frame windows – Processing messages – Message box – Menus – Dialog box – Check box – Static controls – Radio button – Scroll bars.

UNIT – V

Working with Icons, Cursors, Bitmaps – Working with graphics – Document view architecture.

TEXT BOOKS

1. 'Visual Basic 6 Programming Black Book', Steven Holzner – The CORIOLIS Group USA 2000.
 - UNIT – I : Chapters 2, 3, 4, 5
 - UNIT – II : Chapters 6 –16, 27
 - UNIT – III: Chapters 20, 24 – 26
2. 'MFC programming from the ground up', Herbert Schilt, Tata McGraw Hill, 2nd Ed., 2000.
 - UNIT – IV: Chapters 2, 3, 4, 5, 6
 - UNIT – V : Chapters 7, 9, 17

REFERENCE BOOKS

1. 'Visual Basic 6 from the ground up', Gary Cornell, Tata McGraw Hill, 1997.
2. 'MFC C++ Classes', Shirley Wodtke , 2000.

SEMESTER – IV

Paper–XVII: .NET PROGRAMMING (C#)

UNIT – I

INTRODUCTION TO .NET: Common Language Runtime, .NET frame work, Microsoft Intermediate Languages, JIters, Unmanaged code.

INTRODUCTION TO C#: Evolution of C#, Characteristics of C#, How does C# differ from C++ and Java, Data types, Variables and Literals, Boxing and unboxing, Operators and Expressions, Type conversions, Mathematical functions, Decision making and branching, Decision making and looping.

UNIT – II

OBJECT ORIENTED PROGRAMMING IN C#: Methods, Classes and objects, access specifier, Inheritance, abstract class, sealed classes, interfaces, delegates, namespaces, exceptions.

UNIT – III

ADVANCED FEATURES OF C#: Serializing objects, deserialization, XML based serialization, Multi threading, Reflection Attributes, Properties and Indexers.

UNIT – IV

WINDOW BASED PROGRAMMING: Win Forms, Textbox, Buttons, Message Box, List Box, Handling events.

UNIT –V

ADO.NET: ADO.Net Object Model - Connecting with database, retrieving results, updating data in database, Deletion.

ASP.NET USING C#: Web Application Project, Web Forms, Controls.

TEXT BOOKS

1. E. Balagurusamy, “Programming in C#” A Primer Second Edition.
2. Ian Griffiths, Matthew Adams and Jesse Liberty, “Programming C# 4.0” O’Reilly Sixth Edition.

REFERENCE BOOKS

1. Stanley B.Lippman, “C# Primer A Practical Approach”, Pearson Education, 2002.
2. Tom archer, “Inside C#”, Microsoft Press, 2001.
- 3.”Microsoft C# Language Specification”, Microsoft Press, 2001.

SEMESTER – IV

Paper – XVIII: PRINCIPLES OF COMPILER DESIGN

UNIT – I

Introduction – Structure of a Compiler – Compiler writing Tools – Basic constructs of High level Programming languages: Data structures, Parameter transmission. Lexical analysis – Role of lexical analyser – Finite automata – Regular expressions to Finite automata – NFA to DFA – Minimising the number of states of a Deterministic Finite Automata – Implementation of a Lexical Analyser.

UNIT – II

Parsing techniques – Context free grammars – Derivations and Parse trees – Ambiguity – Capabilities of Context free grammars – Top down and Bottom up parsing – Handles – Shift Reduce parsing – Operator precedence parsing – Recursive descent parsing – Predictive parsing.

UNIT – III

Automatic parsing techniques – LR parsers – Canonical collection of LR(0) items – Construction of SLR parsing table – LR(1) sets of items Construction – Construction of canonical LR Parsing Tables.

UNIT – IV

Syntax Direction Translation – Semantic actions – Implementation of Syntax Directed Translators – Intermediate Code: Postfix notation, Quadruples, Triples, Indirect triples – Methods of translation of Assignment statements, Boolean expressions and Control statements.

UNIT – V

Symbol tables and Code generation: Representing information in a Symbol Table – Data Structures for Symbol table – Introduction to Code Optimization: Basic blocks – DAG representation – Error detection and recovery – Introduction to Code Generation.

TEXT BOOKS

1. Aho A. V. R, Ullman J. D., Compilers, Principles, Techniques and Tools, Addison Wesley, 2001

REFERENCE BOOKS

1. Dhamdhare D. M., Compilers construction Principles and Practice, Macmillan India Ltd.

SEMESTER – IV

Practical 7: VISUAL PROGRAMMING LAB

1. Program for a various font application
2. Program for a notepad application
3. Program for employee details using DAO
4. Program for supplier details using DAO
5. Program for hospital management using DAO
6. Program for newspaper vendor using ADO
7. Program for library transaction using RDO
8. Program for inventory control using RDO

SEMESTER – IV

Practical 8: C# PROGRAMMING LAB

1. Generate Fibonacci series
2. Find the area of square, triangle, and rectangle.
3. Calculate nCr and nPr values.
4. Find the area and circumference of circle
5. Convert dollar to rupee, rupee to dollar.
6. Student details using inheritance.
7. Sales bill preparation using interface.
8. Display clock time using delegates and events.
9. Arithmetic operations
10. Passing values from one form to another form.
11. Calculator.
12. Insert record using data grid view.
13. Create user login form.
14. Cutoff mark calculation.

SEMESTER – V

Paper–XXI: JAVA PROGRAMMING

Unit I

The Genesis of Java – The Java class Libraries – Data types, Variables – Operators – Arrays.
Control Statements: Selection statements – Iteration statements – Jump statements. Introducing classes: Class Fundamentals – Declaring objects –Methods.

Unit II:

Constructors – this keyword –Garbage collection. Overloading Methods – Access controls – Nested and Inner classes.Inheritance: Inheritance basics –using Super- Method overriding –Dynamic method Dispatch –Abstract classes- using final with inheritance. Packages and Interfaces : Packages - Access protection – Importing Packages – Interfaces.

Unit III:

Exception Handling : Exception Handling Fundamentals – Java’s Built in Exceptions – creating own Exception subclasses. Multithreaded Programming :-The Java Thread Model –Creating a Thread – Synchronization – InterThread communication.

Unit IV:

I/O Basics –Reading console Input –Writing Console Output –Reading and writing Files – Exploring java.io.Applet Fundamentals –Applet Basics – Introducing the AWT.

Unit V:

Software Development using Java: Java Beans introduction -- Servlets : Life cycle – A simple servlet – servlet API – Handling HTTP Request and Responses – Session tracking.
Networking Basics – Remote Method Invocation (RMI) –Accessing Database with JDBC.

Text Book:

1. Naughton schildt , “**The Complete Reference JAVA 2**” , Third Edition , Tata McGrah Hill.
2. Deitel and Deitel , “**Java How to Program**” , Third Edition ,Pearson Education Asia.

References Books

1. Keyur shab , “**Java 2 Programming**”, Tata McGraw-Hill pub. Company Ltd.
2. C.Xavier, “**Programming with Java 2**”, SciTech Publications (India) Pvt. Ltd.
3. Cays S. Horstmann , Gary Cornell, “**Core Java2 Volume I – Fundamentals**”, Person Edition, 2001.
4. Cays S. Horstmann , Gary Cornell, “**Core Java2 Volume II – Fundamentals**”, Person Edition, 2003.

SEMESTER – V
Paper–XXII: PRINCIPLES OF MARKETING AND MANAGEMENT

UNIT – I

Management and Administration – Functions – Scientific Management.

Management Process Planning: Steps in Planning Process, Types of plans.

Objectives: Characteristics and Hierarchy of objectives – Management by Objectives (MBO).

UNIT – II

Organization : Types- Departmentalization -Bases of Departmentalization – Span of control. Staffing recruitment and Selection – Training and Development.

UNIT – III

Directing: Principles of direction.

Elements of direction: Motivation, Leadership and Communication.

Controlling: Controlling process – Traditional and Modern Controlling Techniques (Budgetary Control, CPM / PERT).

UNIT – IV

Marketing: Marketing concepts – Modern marketing – Marketing and Selling – Market Segmentation and New Product Development – Product Life Cycle.

UNIT – V

Pricing and methods and policies – Channels of Distribution-functions- - Sales Promotion program and Techniques –Managing the Sales force – Personal selling – Marketing research: Procedure and Methods.

TEXT BOOKS

1. Koontz and O’ Donald, “Essentials of Management”, McGraw Hill.
2. Philip Kotler, “Marketing Management”, Prentice Hall of India.

REFERENCE BOOK

1. Peter F. Drucker, “The Frontiers of Management”.

SEMESTER – V
PAPER XXIII: SOFTWARE PROJECT MANAGEMENT

UNIT- I

INTRODUCTION: Software Projects various other types of projects - Problems with software projects - an overview of project planning - Project evaluation - Project Analysis and technical planning - Project estimates - Preparation of Estimates - COCOMO model - Function Point Analysis - Putnam Model - Non-development overheads.

UNIT- II

ACTIVITY PLANNING: Project schedules - Sequencing and scheduling projects - Network planning models - Shortening project duration - Identifying critical activities.

UNIT- III

RISK MANAGEMENT: Resource allocation - Monitoring and Control - Managing people and organizing teams - Planning for small projects - Handling large projects - Divide and Conquer - Software Project survival.

UNIT- IV

SOFTWARE CONFIGURATION MANAGEMENT: Basic functions, responsibilities, standards, configuration Management, Prototyping - Models of prototyping.

UNIT - V

SOFTWARE QUALITY ASSURANCE: Quality and the quality system - standards and procedures - Technical activities - components - Continuous Improvement - Software Tasks - Management responsibility - Quality System - Contract Review - Document Control - Product identification and trace ability.

Case study using Project management tools.

TEXT BOOKS

1. Mike Cotterell and Bob Hughes, "Software Project Management - Inclination", Tata McGraw Hill, New Delhi, 2008.
2. Robert K Wysocki, Robert Beck Jr and David B Crane, "Effective Project Management", John Wiley & Sons New York, 2011.

REFERENCES

1. Steve McConnell, "Software Project Survival Guide", Microsoft Press, California, 2009.
2. Gerald M Weinberg, "Quality Software Management:Systems Thinking“, Dorset House, New York, 2011.
3. Gerald M. Weinberg," Quality Software Management:First Order Measurement”, Dorset House, New York, 2007.
4. Pressman R S, "Software Engineering - A Practitioner's Approach", Tata McGraw Hill, New Delhi, 2010.
5. Darrel Ince, "An Introduction to S/W Quality Assurance and its Implementation", Tata McGraw Hill, New Delhi, 2006.

SEMESTER – V

Practical 9: JAVA PROGRAMMING LAB

1. Create a employee package to maintain the information about the employee. Use constructors to initialize the employee number and use overloading method to set the basic pay of the employee. By using this package create a java program.
2. Program to implement polymorphism, inheritance and inner classes.
3. Create a frame with user specific size and position it at user specific position (use command line argument). Then different shapes with different colours (use menus).
4. Java program to handle different mouse events.
5. Create an applet for a calculator application.
6. Java program to maintain the student information in text file.
7. Animate images at different intervals by using multi threading concepts.
8. Java program by using JDBC concepts to access a database.
9. Java program to implement RMI.
10. Java bean program to view an image.
11. Program using Java script.

ELECTIVES FOR FOURTH & FIFTH SEMESTER

ELECTIVE- I

1.1 ENTERPRISE RESOURCE PLANNING

UNIT – I

Introduction to ERP – Evolution – what is ERP – Reasons for the growth of the ERP market – The advantages of ERP – Why do many ERP implementation Fail- Why are ERP Packaging being used now ERP – A Curtain Raiser: Accommodating Variety – Integrated Management Information – Seamless Integration – Supply Chain Management – Resource Management – Integrated Data model – Scope – Technology. Business Engineering and ERP: An overview – what is B.E? – Significance of B.E – Principles of B.E – BRP, PER & IT – Business Engineering with IT – ERP and Management Concerns

UNIT – II

Business Modeling for ERP: An overview – Building the Business model. ERP – A Manufacturing perspective: Introduction – ERP – MRP – BOM – closed loop MRP – MRP II – DRP – JIT and Kanban – CAD/CAM – PDM – Data Management benefits of PDM – MTO and MTS – ATO – ETO – CTO.

UNIT – III

ERP modules: Introduction – Finance – Plant Maintenance – Quality Management – Materials Management. Benefits of ERP: Introduction – Reduction of Lead time – On-time shipment – Reduction in cycle time – Improved Resource Utilization – Better customer satisfaction – Improved supplier performances – Increases flexibility – Reduced flexibility – reduced quality costs – Improved information accuracy & decision making capability.

UNIT – IV

ERP Implementation Lifecycle: Introduction – Pre-evaluation screening – package evaluation – project planning phase – GAP analysis – Reengineering – configuration – Implementation Team Training – Testing – Going Live – End-user Training – Post implementation. ERP Implementation: An over view – Role of Consultants, Vendors & Users – customization – Precautions – ERP implementation customization – Precautions – ERP implementation methodology – Guidelines for ERP implementation ERP and the Competitive Advantage: An overview – ERP and the competitive strategy.

UNIT – V

The ERP Domain: An overview – MFG / PRO – IFS / Avalon – Industrial and Financial systems – Baan IV – SAP – SAP R/3 applications – Example of an Indian ERP package – The arrival of ERP III. Marketing of ERP : An overview – Marketing Dynamics & Competitive strategy. Future direction in ERP: Introduction – New Markets – New channels – Faster Implementation methodologies – Business

models & BAPIs – Convergence on Windows NT – application Platforms – New Business segments – More features – Web enabling- Market snapshot

TEXT BOOKS

1. Vinod Kumar Garg, N.K.Venkitakrishnan “Enterprise Resource Planning Concepts & Practice”, PHI, Second Edition, 2003.
2. Alex Leon, “Enterprise Resource Planning”, TMCH, 2003.

ELECTIVE – I

1.2 EMBEDDED SYSTEMS

UNIT – I

Introduction to Embedded Systems: Embedded System – Processor in the system – Other hardware units – software embedded into a system – Exemplary Embedded systems – On chip and in VLSI Circuit. Processor and Memory selection for an Embedded systems.

UNIT – II

Devices and Buses for Device Networks: I/O devices – Timer and counting Devices. Device Drivers and Interrupts Servicing Mechanism: Device drivers – Parallel Port device drivers in a system – Serial Port device in a system – Device drivers for internal programmable timing devices – Interrupt servicing mechanism – context and the periods for context-switching, deadline and interrupt latency

UNIT – III

Program modeling concepts in single & Multiprocessor systems software – Development Process: Modeling Processes for Software analysis before software Implementation – Programming models for event controlled or response time constrained real time programs – Modeling for microprocessor systems. Software Engineering Practices in the Embedded Software Development Process: Software algorithm complexity – Software Development process life cycle and its models – Software analysis – Software design – Software implementation – Software Testing, Validating and Debugging – Real time programming issues during the software development process – Software project management – Software maintenance – UML.

UNIT – IV

Inter – process communication & Synchronization of processes, Tasks and threads: Multiple processes in an application – Problem of sharing data by multiple tasks and routines – Inter Process communication.

Real Time Operating System: Real time and Embedded systems operating systems – Interrupt routines in RTOS environment – RTOS Task scheduling models, Interrupt latency and Response times of the Tasks as performance Metrics – performance Metric in scheduling models for periodic, sporadic and Aperiodic Tasks – IEEE standard POSIX 1003.1b functions for Standardization of RTOS and Inter-task communication functions – List of Basic actions in a preemptive scheduler and Expected times taken at a processor – Filters – point strategy for synchronization between the processes, ISRs, OS functions and tasks and for Resource management – Embedded Linux Internals.

UNIT – V

Hardware – Software co-design in an embedded System: Embedded System Project Management – Embedded system design and co-design issues in system development processes – Design cycle in the development phase for an Embedded system – Uses of Target system, or its Emulator and In-circuit Emulator – Use of software tools for development of an embedded system – Use of scopes and logic analysis for system hardware tests – Issues in Embedded system design. Case Study: An Embedded System for an Adaptive cruise control system in a car, embedded system for a smart card.

TEXT BOOKS

1. Raj Kamal, “Embedded Systems – Architecture, programming and design”, Tata Mcgraw – Hill, 2003.

REFERENCE BOOKS

1. David E. Simon, “An Embedded Software primer” Pearson Education Asia, 2003.

ELECTIVE – I

1.3 CLIENT/ SERVER TECHNOLOGY

UNIT – I

Client / Server Computing: Main frame – Centric Client / Server Computing – Down sizing and Client / Server Computing. **Advantages of Client / Server Computing:** The Advantages of Client / Server Computing – Technology Revolution – Connectivity – User Productivity – Ways to Improve Performance – How to Reduce Network Traffic – Vendor Independence – Faster Delivery of System.

UNIT – II

Components of Client / Server Applications: The Client – The Role of the Client – Client Services – Request for services. **Components of Client / Server Applications:** The Server – The Role of the server – Server Functionality in Detail – The Network operating system – What are the available Platforms? – The Server Operating System.

UNIT – III

Components of Client / Server Applications Connectivity: Open Systems Interconnect – Communications interface Technology – Interprocess Communication – Wide Area Network Technologies. **Client / Server Systems Development-Software:** Factors Driving Demand for Application Software Development – Rising Technology Staff Costs – Need to Improve Technology Professional's Productivity – Need for Platform Migration and Reengineering of Existing Systems – Need for a Common Interface Across Platforms – Increase in Applications Development by Users.

UNIT – IV

Client / Server System Development - Hardware: Hardware / Network Acquisition – PC-Level processing units – Macintosh – Notebooks – Pen – Unix Workstation – X-Terminals – Server hardware – Data storage – Mirrored disk – Network Interface Cards (NICs) – Ethernet – FDDI – CDDI – Power production Devices – Uninterruptible Power Supply [UPS] – Surge protectors. **Client / Server system development - Service and Support:** System Administration – Availability – Reliability – Serviceability – Software Distribution – Performance – Network Management – Help Desk – Remote Systems Management – Security – LAN and Network Management Issues – Licensing.

UNIT – V

Client / Server System Development – Training: Training Advantages of GUI Application – System Administrator Training – Programmer's Resistance to new Technologies – Database Administrator Training – End users training – Training Delivery Technology. **The Future of Client / Server Computing:** What's in store for Networking – Everyone's a peer! – What's in store for Software Development – Everything's an object! – Enabling Technologies – Transformational Systems – The Challenge of the 1990's.

TEXT BOOKS

1."Client / Server computing", Patrick Smith, Steve Guengerich, Second Edition, Prentice-Hall of India (P) Ltd., 2002.

REFERENCE BOOKS

1. Robert Orfali, Dan Harkey and Jerri Edwards, "Essential Client / Server Survival Guide", John Wiley & Sons Inc., 1996.
2. Joe Salami, "Client / Server Databases".
3. Patrick Smith et.al., "Client / Server Computing".
4. Larry I. Vaughn, "Client / Server System Design and Implementation".

ELECTIVE – I

1.4 MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

UNIT – I

Introduction to Microprocessor Architecture and Applications: Evolution of microprocessor 8-bit, 16-bit and 32-bit. Register model of Intel 8088, BIU and EU. Instruction format and addressing modes.

UNIT – II

Introduction to Personal Computers: IBM, Apple, others – Applications – Study of IBM PC family, BIOS and MSDOS – System Configuration – Evolution of PC, PC/XT, PC/AT – 286,386,486, Pentium and Pentium Systems.

UNIT – III

Macro Assembler: Study of various instructions and directives – Writing programs using – Arithmetic, Branching & Looping instructions, Logical & Shift instructions, Procedures and functions.

UNIT – IV

Input & Output Instructions – File Handling and programming I/O using DOS interrupts and with IN & OUT instructions.

UNIT – V

Two Pass Assembly, Macros and Conditional Assembly – Floating Point Arithmetic.

TEXT BOOKS

1. Mohammed Rafiquazamman, “Advanced Microprocessors”.
2. Detmer, “Assembly Language Programming”.

REFERENCE BOOKS

1. Peter Abel, “IBM PC Assembly Language Programming”.
2. Peter Norton, “Programming IBM PC”.

ELECTIVE – I

1.5 WINDOWS PROGRAMMING

UNIT – I

INTRODUCTION: Differences between DOS and WINDOWS Programs – Traditional Architecture and Windows Architecture – Types, Names – Hungarian Notation – Event-Driven Programming – WinMain() function – The Message Loop, The WinProc() Function.

USER INTERFACE: Windows Messages – WM_CREATE, WM_PAINT, WM_SIZE, WM_MOVE, WM_CLOSE Messages – Concepts of Device Context – GDI objects – Begin Paint(), End Paint(), and Text Out Functions.

UNIT – II

TEXT INPUT: Messages to the EDIT CONTROL Window, Transferring Text between the Edit Window, Transferring Text between the Edit Window and Memory. Character Keystrokes, Non-character keystrokes.

SCROLL BARS: Vertical Scrolling and Horizontal Scrolling – WM_SCROLL Message.

UNIT – III

WINDOWS MEMORY MANAGEMENT: Default Data Segment – Local Allocation, Global Allocation.

RESOURCE SCRIPT FILES: Creation of a Menu Resource – Creation of a BITMAP Resource.

UNIT – IV

MENUS: Menu separator, Menu Items on the Menu Bar, Handling on Exit Menu Item Float Menus – Menu Accelerators – Accelerator Table – Control Key and Virtual Key Combinations.

DISK FILES: Functions for Creation, Write and Close – Functions for Open, Read and Seek.

COMMON DIALOGS: File Common Dialog: The Open Common Dialog – Programming the open Common Dialog – The Save Dialog – Font Common Dialog – Print option Common Dialog.

UNIT – V

DIALOG BOXES: Resource Work Shop: Creation of a Dialog Resource – Controls – Push Buttons – Static Text – Edit Controls – Radio Buttons – Group Boxes – Check boxes – List Boxes – Control Boxes – Scroll Bars.

GRAPHICS IN WINDOWS: PENS, BRUSHES and FONTS.

PROCESSES AND THREADS: Creating Process and Threads.

TEXT BOOKS

1. Robert Lafore, "Windows Programming Made Easy", Galgotia Publications., 1997.

REFERENCE BOOKS

1. Charles Petzold, "Programming Windows", Microsoft Press, 1998.
2. Micheal J.Young, "Windows Programming with Microsoft C++", Tech Publication, 1993.

ELECTIVE – I

1.6 PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT – I

Language Design Issues: The Structure and operation of computer – virtual computers and binding times – language paradigms. **Language Translation Issues:** Programming language syntax – stages in translation – formal translation models.

UNIT – II

Data Types: Properties of Types and Objects – Elementary data types – structured data types. **Abstraction:** Abstract data types – encapsulation by subprograms – type definitions – storage management.

UNIT – III

Sequence Control: Implicit and explicit sequence control – sequencing with arithmetic and non-arithmetic expressions – sequence control between statements. **Subprograms Control:** Subprograms sequence control – attributes of data control – shared data concepts.

UNIT – IV

Inheritance: Inheritance – Polymorphism. **Advances in language design:** Variations on subprogram control – language constructs for parallel processing – language semantics – software architecture.

UNIT – V

Logic Programming: Formal logical systems – PROLOG. **Functional Programming:** Features of functional languages - LISP – Implementing functional languages.

TEXT BOOKS

1. Terrance W. Pratt, Marvin V. Zelkowitz, “Programming Languages, Design and Implementation”.
2. D. Appleby, J.J Vandekopple, “Programming languages – Paradigms and Practice”, McGraw Hill, International Edition (2nd Edition), 1997.
3. A.B. Tucker, “Programming Languages”, McGraw HILL.

ELECTIVE – II

2.1 E-COMMERCE

UNIT – I

Electronic Commerce framework – Electronic Commerce of Media convergence- The Anatomy of E-commerce applications – Electronic Commerce Applications – Electronic Commerce Organization Applications – Market Forces Influencing the I-way – Components of the I-way – Network Access Equipment – the Last Mile: Local roads and access Ramps – Global Information Distribution Networks – Public policy Issues shaping the I-way

UNIT – II

Architectural framework for electronic commerce – World Wide Web (WWW) as the architecture – Web background: Hypertext publishing – Technology behind the web – security and the web – Consumer-oriented applications – Mercantile models from the consumer’s perspective – Mercantile models from the Merchant’s Perspective

UNIT – III

Types of Electronic payment systems – Digital Token-Based Electronic Payment Systems – Smart cards and Electronic Payment Systems – Credit Card based Electronic Payment systems – Risk and Electronic Payment Systems – Designing electronic payment systems – Electronic data interchange – EOI Applications in Business – EDI: Legal, Security, and Privacy issues – EDI and Electronic Commerce.

UNIT – IV

Internal Information systems – Macroforces and Internal Commerce – Work Flow Automation and Coordination Customization and Internal commerce – Supply chain commerce systems – making a business case for a document Library – Types of digital documents – Issues behind Document Infrastructure – corporate Data warehouses.

UNIT – V

The New Age of Information-Based Marketing – Advertising on the Internet – charting the Online Marketing process – Market Research – Search and Resource Discovery Paradigms – Information search and Retrieval – Electronic commerce Catalogs or Directories – Information Filtering – Consumer – Data Interface Emerging Tools.

TEXT BOOKS

1. Ravi Kalakota, Andrew B. Whinston, “ Frontiers of Electronic Commerce”, Pearson Education Asia, 2003.

REFERENCE BOOKS

1. Jeffery F. Rayport, Bernard J. Jaworski, “E- Commerce”, TMCH, 2002.

ELECTIVE – II

2.2 CRYPTOGRAPHY AND NETWORK SECURITY

UNIT – I

Introduction, Attacks, services and Mechanisms – security attacks – security services – A model for internetwork security – Internet standards and RFCs. Classical Encryption Techniques: symmetric cipher Model – Substitution Techniques – Transportation Techniques – Rotor Mechanisms – Steganography.

UNIT – II

Block ciphers and the data encryption standard simplified DES – Block Cipher Principles – The Data encryption standard – The Strength of DES – Differentials and linear Cryptanalysis – Block cipher design principles – Block cipher modes of operations. Public Key Cryptography and RSA: Principles of Public – Key Cryptosystems – The RSA Algorithm.

UNIT III

Key management: Other Public-key Cryptosystems: Key Management – Diffie-Hellman key exchange – Elliptic curve Arithmetic – Elliptic curve Cryptography Message Authentication & Hash functions: Authentication Requirements – Authentication functions – Message Authentication codes – Hash functions – Security of Hash functions & MACS. Digital Signatures – Authentication Protocols – Digital Signature Standard

UNIT IV

Authentication applications: Kerberos – X 509 Authentication service. Electronic Mail security : Pretty good Privacy – S/ MIME 455. IP Security: IP Security overview – IP Security Architecture – Authentication Header – Encapsulation security Payload.

UNIT V

Web Security: Web Security Considerations – Secure Sockets Layer and Transport Layer security – Secure Electronic Transactions. System Security: Intruders – Intrusion detection – Password Management. Firewalls: Firewall Design Principles – Trusted Systems

TEXT BOOKS

1. William Stallings, “Cryptography and Network security – Principles and practices”, Pearson Education, Third Edition, 2003.
2. William Stallings, “Network Security Essential – Applications and Standards”, Pearson Education, 2003.

REFERENCE BOOKS

1. Atul kahate, “Cryptography and Network Security”, TMCH, 2003.
2. Charlie Kanfman, Radio Perlman, Mike Speciner, “Network Security”, Second Edition, Pearson Education Asia.

ELECTIVE – II

2.3 DISTRIBUTED COMPUTING

UNIT – I

Distributed Systems: Fully Distributed Processing Systems – Networks and Interconnection structures – Designing a Distributed processing system.

UNIT – II

Distributed Systems: Pros and Cons of Distributed processing – Distributed Databases – The challenge of Distributed data – Loading factors – Managing the Distributed Resources – Division of responsibilities.

UNIT – III

Design Considerations: Communications Line Loading – Line loading Calculations – Partitioning and Allocation – Data Flow Systems – Dimension Analysis – Network Database Design considerations – Ration analysis – Database Decision Trees – Synchronization of Network Databases.

UNIT – IV

Client-Server Network Model: Concept – File Server – Printer Server – An e-mail Server.

UNIT – V

Distributed Databases: An overview – Distributed databases – Principles of Distributed databases – Levels of Transparency – Distributed Database design – The R* project Technique problems of Heterogeneous Distributed databases.

TEXT BOOKS

1. John A. Sharp, “An Introduction to Distributed and Parallel Processing”, Blackwell Scientific publications, 1987 (FOR UNIT – I & UNIT – III).
2. Uyles D. Black, “Data communications & Distributed Networks”, (UNIT – II).
3. Joel M. Crichlow, “Introduction to Distributed & Parallel Computing”, (UNIT – IV).
4. Stefans Ceri, Ginseppe Pelagatti, “Distributed Databases Principles and Systems”, McGraw Hill Book Co., New York, 1985, (UNIT – V).

ELECTIVE – II

2.4. MANAGEMENT INFORMATION SYSTEMS AND COBOL PROGRAMMING

UNIT – I

Management Information System: Definition – MIS as an evolving concept – Subsystems of MIS – Operating elements of an Information System – MIS support for Decision Making – MIS structure based on Management activity and Organizational function – Logical data concepts and definitions – Physical storage devices – File Organization – Database Organizations.

UNIT – II

COBOL: Format of COBOL programs – Program structure – Character set – COBOL Reserved and Keywords – Data names and Identifiers, Literals, Figurative Constants – IDENTIFICATION DIVISION – ENVIRONMENT DIVISION – Input Output section – DATA DIVISION – File Section – Working-Storage Section – Picture Clauses – both Edited and Non-Edited – Structure of a PROCEDURE DIVISION.

UNIT – III

Arithmetic verbs – MOVE verb - Data movement, Sequence control, Input-Output and Conditional verbs – REDEFINE clause – RENAME clause – CORRESPONDING options – IF statement – PERFORM statements – Table handling – OCCURS clause – Multi dimensional tables – PERFORM verb and Table handling – Indexed tables and Indexed names – SET verb – SEARCH verb – Sorting a Table.

UNIT – IV

Sequential files – File characteristics – File control entries – Fixed length records – Variable length records – Statements for Sequential files – Examples of Sequential File processing – SORT and MERGE verbs – Random files – Keys and their importance – Invalid key clause – Example programs using Random files.

UNIT – V

Relative and Indexed Sequential files – Character handling – INSPECT verb – STRING and UNSTRING verbs – Declaratives – COBOL Subroutines – Structure of a subroutine – Calling Subroutine – Examples using Subroutines – Generalization of Reports.

TEXT BOOKS

1. Gordon B. Davis, Margrethe H. Olson, Management Information Systems, Second Edition, Tata McGraw Hill, 2001
2. M. K. Roy, D. Ghose Dastidar, COBOL Programming, Second Edition, Tata McGraw Hill, 1998.

ELECTIVE – II

2.5 UNIX ARCHITECTURE AND PROGRAMMING

UNIT I INTRODUCTION TO UNIX : File System – Essential Commands - General Purpose Utilities - Bourne Shell - SimpleFilters - Advanced filters - Process - Communication and Scheduling - Programming with Shell – File System Architecture.

UNIT II FILE SYSTEM STRUCTURE: Kernel architecture - Kernel data structure - Buffer Cache - Structure of Buffer pool - Scenarios for buffer retrieval - Reading and Writing disk blocks - Advantages and Disadvantages of buffer cache

UNIT III Inode - Structure of regular file - Conversion of a pathname to an inode - Inode assignment to a new file - allocation of disk blocks.

PROCESS SYSTEM : Process states and transitions - Context of a process - Saving the context of a process - Manipulating Process address space –

UNIT IV Process creation and termination – Signals – Awaiting Process Termination - System Boot and INIT process - Process Scheduling – Functions of a Clock Interrupt Handler.

UNIT V MEMORY MANAGEMENT: Swapping - allocation of swap space – Swapping Processes Out – Swapping Processes in - Demand Paging - Data structures of demand paging - Page stealer Process - Page faults.

TEXT BOOK

1. Sumithabha Das, "Unix System V.4 - Concepts and Applications", Tata McGraw Hill, New Delhi, 2008 .
2. Maurice J Bach, "Design of the UNIX Operating System", Prentice Hall, New Delhi, 2007.

REFERENCES

1. Sumitabha Das, “Your Unix the Ultimate Guide “, Tata McGraw Hill, New Delhi, 2012.
2. Richard F Gilberg, Behrouz A Forouzan, ”Unix and Shell Programming - A Text Book (Digitized)”, Thomson Brooks/Cole, California, 2009.
3. Stephen G Kochan, "Exploring The Unix", Tech Publications, Singapore, 1998.
4. Uresh Vahalia, "UNIX Internals: The New Frontiers", Pearson Education, New Delhi, 2008.
5. Keith Haviland, Dina Gray, “Unix System Programming (Digitized)”, Addison Wesley, Boston, 2007.

ELECTIVE – III

3.1 TCP / IP

UNIT – I

A Brief History: Arpanet – (TCP/IP) – Milnet – Csnnet – Nsfnet – Ansnnet – Protocols and Standards – Standards Organisations – TCP/IP Protocol Suite – Addressing – Connection Devices. Introduction – Classful addressing – Subnetting – Supernetting – Classless addressing.

UNIT – II

ARP & RARP – ARP over ATM – Proxy ARP. ARP Package – RARP – Internet Protocol (IP) – Datagram – Fragmentation – options – Checksum: IP Package. Internet Control Messang Protocol (ICMP) – Types of Message – Message format – error Reporting – Query – Checksum – ICMP Package.

UNIT – III

Group Management – IGMP Message: IGMP operation – Process to Process Communication – UDP Operation – TCP services – Flow control – Multicast Routing: Multicast routing protocols. Bootp & DHCP – Booth – UDP Ports – using TFTP – Dynamic host Configuration Protocols (DHCP) – Domain Name system (DNS) – Name Space – Domain Name Space – distribution of Name space – DNS in the Internet – Resolution – DNS Message – Types of records.

UNIT – IV

File Transfer Protocol (FTP): Connections – Communication Command Processing – file Transfer – User interface – Anonymous FTP. Simple Mail Transfer Protocol (SMTP): User Agent (UA) – Addresses – delayed Delivery – Aliases – Mail transfer agent (MTA) – Commands and Responses – Mail Transfer Phases – Multipurpose Internet Mail Extensions (MIME) – Mail Delivery – Mail Access Protocols.

UNIT – V

Simple Network Management Protocols: (SNMP) – Concept – Management Components – SMI – MIB – SNMP – Messages – UDP Ports – Security. IP over ATM: ATM Wans – Carrying Datagram in cells – Routing the cells – Atmarp – Logical IP Subnet (LIS). Mobile IP: Addressing – Agents – Three Pahses – Agent Discovery – Registration – Data Transfer – Inefficiency in Mobile IP – Virtual Private Networks (VPN).

TEXT BOOKS

1. Behrouz A. Forouzan, “TCP/IP Protocol Suite”, Second edition, Tata Mcgraw – Hill Publishing Company

REFERENCE BOOKS

1. W. Richard Stevens, “TCP/IP Illustrated Volume1, The Protocols”, Pearson Education.
2. Comer, “Internetworking with TCP / IP, Vol. 1: Principles, Protocols & Architecture, “Fourth Edition, Pearson Education.

ELECTIVE – III

3.2 DIGITAL IMAGE PROCESSING

UNIT – I

Introduction: What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. Digital Image Fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – Some Basic relationship between Pixels – Linear & Nonlinear operations.

UNIT – II

Image Enhancement in the spatial domain: Background – some basic Gray level Transformations – Histogram Processing – Enhancement using Arithmetic / Logic operations – Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.

UNIT – III

Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.

UNIT – IV

Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.

UNIT – V

Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary deduction – Thresholding – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation.

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, Second Edition, Pearson Education.

REFERENCE BOOKS

1. B. Chanda, D. Dutta Majumder, “Digital Image Processing and Analysis”, PHI, 2003.
2. Nick Efford, “Digital Image Processing a practical introducing using Java”, Pearson Education, 2004.

ELECTIVE – III

3.3 BIO INFORMATICS

UNIT – I

Introduction – Importance of Bioinformatics – Biological Sequence / Structure – Deficit – Genome Projects – Status – Sequence analysis – Homology and analogy. EMBNET – NCBI – Virtual Tourism. Primary Sequence Databases. Biological data base – Primary Sequence Database – Composite Protein Sequence Database – Secondary database – Composite protein – Pattern database – structure and classification of database.

UNIT – II

Genome Information Resources. DNA Sequences data base – Specialised genomic Resources. DNA Sequence analysis. Why analyse DNA? – Gene structure – Features of DNA sequence analysis – Issues in the interpretation and EST search – Approach of Gene hunting – Cell CDNA libraries and ESTs – Approaches to EST analysis – Effect of EST data on DNA data base examples of EST analysis.

UNIT – III

Data Base Searchers and Pair Wise Alignment. Data base searching – Alphabets and Complexity – Comparing Two Sequences – Sub-Sequence – Identity and Similarity – Dot plots – Simple alignment – Gaps – Scoring Matrices – Dynamic Programming – BLAST and its relative – FASTA and related algorithms – Alignment scores and statistical significance of database sequences. Global and local Alignments: Algorithms – Similarities – Semi global alignment.

UNIT – IV

Multiple Sequence Alignment. Goal – Definition – Consensus – Complex – Methods – Database of multiple Alignment – searching database with multiple alignment. Methods of Photo Genetics. Distance Based Methods – Based Methods – Comparison.

UNIT – V

RNA Structure. Amino Acids – Polypeptide Composition Algorithm – Modeling protein folding prediction – RNA Sequence Structure. Proteomics: Classification – Techniques – Inheritors – Drying Design – Structures – X-Ray Crystal – NMR – Empirical Methods and prediction techniques.

TEXT BOOKS

1. T.K. Attwood, D.J. Parry-Smith, “Introduction to Bioinformatics”, Pearson Education Asia, 2003.
2. Dan E. Krane, Michale L. Raymer, “Fundamental Concepts of Bioinformatics”, Pearson Education Asia, 2003.

ELECTIVE – III

3.4 PARALLEL PROCESSING

UNIT – I

Introduction to Parallel Processing – Trends towards parallel processing – Parallelism in uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Parallel Processing Applications.

UNIT – II

Solving Problems in parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter-task Dependency. Structure of Parallel Computers: A Generalized structures of a parallel computers – Vector Computers – Array Processors.

UNIT – III

Principles of Pipelining and Vector Processing: Pipelining: An overlapped parallelism – Instruction and Arithmetic pipelines – Principles of Designing pipelined processors.

UNIT – IV

Structures and Algorithms for Array Processors: SI MD Array Processors – SIMD Interconnection Networks. Multiprocessor Architecture and programming Functional structures – interconnection Networks.

UNIT – V

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.

TEXT BOOKS

1. Kai Hwang, Faye A. Briggs, “Computer Architecture and Parallel Processing” Tata Mc Graw – Hill Book Company, 1985.
2. V. Rajaraman, C. Siva Ram Murthy, “Parallel Computers Architectures and Programming”, PHI, 2003.

REFERENCE BOOKS

1. Kai Hwang – “Advanced Computer Architecture –Parallelism, Scalability, Programmability” Tata Mcgraw Hill 1993.
2. Bary Wilkinson, Michael Allen – “Parallel Programming” – Pearson Education, 2002.
3. Michael J. Quinn, “Parallel Computing Theory and Practice”, TMCH, Second Edition.

ELECTIVE – III

3.5 INTELLIGENT INFORMATION RETRIEVAL

UNIT - I

Introduction: Overview of IR Systems - Historical Perspectives - Goals of IR - The impact of the web on IR - The role of artificial intelligence (AI) in IR

Retrieval Models : Similarity measures and ranking – Boolean matching – Vector Space models - ranked retrieval – text similarity measure – TF- IDF (term frequency – Inverse document frequency) weighting- Cosine similarity - Basic tokenizing - stop-word Removal and Stemming-indexing; Inverted indices-Efficient processing with sparse vectors - Probability models –Relevance feed back

UNIT - II

Query Processing: Basic query processing- query operations --query expansion; query languages- data structure and file organization of IR - Automatic indexing and indexing models.

EVALUATION: Experimental Evaluation of IR: Recall, Precision and F- measure- R-Precision- MAP-NDCG; Evaluation of benchmark text collections

UNIT - III

Text Representation: Statistical characteristics of text -Word Statistics; Zipf's law; Porter Stemmer; morphology; index term selection; using thesauri. Meta data and markup languages (SGML, HTML, XML)

Information filtering Techniques: information filtering - Collaborative filtering and content-based filtering- Applications of information filtering- Recommender systems.

UNIT – IV

Text Categorization and Clustering: Categorization algorithms – Rocchio: Naïve Bayes; decision trees – nearest neighbor – LSI -Clustering algorithms: Agglomerative clustering – k-means – expectation maximization (EM)-Dimension reduction-LSI.

UNIT - V

Web Search : IR systems on WWW – Search engines; spidering; meta crawlers; directed spidering – link analysis (hubs and authorities, Google page rank) - Shopping agents - Heterogeneous information resources - intelligent information resources- intelligent web agents- Web mining and applications

Information Extraction and Integration: Extracting data from text; XML ; Semantic web – collecting and integrating specialized information on the web;

TEXT BOOKS

1. Christopher D Manning, Prabhakar Raghavan and Hinrich Schütze, “Introduction to Information Retrieval”, Cambridge University Press, Cambridge, 2008.
2. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, “Modern Information Retrieval”, Pearson Education, New Delhi, 2004.

REFERENCES

1. Grossman D A, Frieder O, “Information Retrieval: Algorithms and Heuristics”, Springer, New York, 2004.
2. Van Rijsbergen C J, ” Information Retrieval”, Butterworths, London, 1979.
3. Croft B, Metzler D and Strohman T, Information Retrieval in Practice, Pearson Education, New Delhi, 2009.
4. Gerald J Kowalski, and Mark T MayBury, “Information Storage and Retrieval systems:Theory and Implementation”, Springer, New York, 2009.
5. Francesco Ricci, Lior Rokach, Bracha Shapira and Paul B Kantor, “Recommender Systems – Handbook”, Springer, New York, 2010.

ELECTIVE – III

3.6 MULTIMEDIA SYSTEMS AND ITS APPLICATIONS

UNIT I

Fundamentals: Introduction to Multimedia, Elements/Building blocks of Multimedia System, Categories of Multimedia, Features of Multimedia, Applications of Multimedia System, Convergence of Multimedia System, Stages of Multimedia Application Development, Example for multimedia systems.

UNIT II

Text: Introduction, About fonts and faces, Text in multimedia, Computers and Text, Font editing and design tools, Hypermedia and Hypertext.

Audio: Introduction, Power of Sound, Multimedia System Sounds, Digital Audio, Editing Digital Recordings, Making MIDI Audio, Audio File Formats, Red Book Standard, Software used for Audio

UNIT III

Images: Introduction, Digital image, Making still images, Bitmap, Vector drawing, 3D drawing and rendering, Color, Color models, Image file formats, Capturing and editing images, Image processing, Image Compression.

UNIT IV

Animation and Video: Introduction, Principles of Animation, Animation Techniques, Animation File formats, Video, Broadcast video Standard, Analog video, digital video, video recording and formats, Shooting and editing video.

UNIT V

Tools: Basic software tools, Multimedia authoring tools, Tools for the WWW, Internet, FLASH: Introduction, Creating Animation in Flash, working with the Timeline and Frame Based Animation- Working with the Timeline and Tween Based Animation- Understanding Layers- Action script.

TEXT BOOKS

1. Multimedia Making it work, By Tay Vaughan
2. Multimedia in Practice – Technology and applications” By Jeffcoat

REFERENCE BOOKS

1. Multimedia: Concepts and Practice, By Stephen McGloughlin
2. Multimedia Computing, Communication and application, By Steinmetz and Klara Nahrstedt.

ELECTIVE – IV

4.1 SOFT COMPUTING

UNIT – I

ARTIFICIAL INTELLIGENCE(AI): Characteristics of AI problem – state space representation – AI search strategies: Brute force, depth first, breadth first, best first, hill climbing and A* algorithms.

UNIT – II

KNOWLEDGE REPRESENTATION: Logic – Propositional calculus – Predicate calculus – rules of inference – resolution – unification algorithm – semantic networks – frames – script.

SOFT COMPUTING AND CONVENTIONAL AI: Constituents – characteristics – hybrid models.

UNIT – III

FUZZY SET THEORY: Fuzzy sets – basic definitions – membership functions – fuzzy rules and reasoning – fuzzy relations – fuzzy if-then rules – fuzzy reasoning.

UNIT – IV

NEURAL NETWORKS: Basic concepts – network properties – learning in simple neurons – single layer perceptrons – multilayer perceptrons – supervised and unsupervised learning – Backpropagation network, Kohonen's self organizing network, Hopfield network.

UNIT – V

GENETIC ALGORITHMS: Survival of the fittest – fitness computations – cross over – mutation – reproduction – rank method – rank space method.

TEXT BOOKS

1. Patrick Henry Winston, "Artificial Intelligence", Pearson Education, 2000.

REFERENCE BOOKS

1. Laurene Fausett, "Fundamentals of Neural Networks", Prentice Hall, 1994.
2. Ross Timothy J., "Fuzzy Logic with Engineering Applications", Tata McGraw Hill, 1997.
3. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, 2002.
4. Patterson Dan W., "Artificial Neural Networks", Prentice Hall, 1996.
5. Jang J. S. R., Sun C. T. and Mizutani E., "Neuro- fuzzy and Soft Computing", Prentice Hall, 1997.

ELECTIVE – IV

4.2 WIRELESS APPLICATION PROTOCOL (WAP)

UNIT – I

The Rise of Mobile Data: Market Convergence Enabling Convergence – Key Services for the Mobile Internet. **Overview of the Wireless Application Protocol:** The Origins of WAP – Overview of the WAP Architecture – Components of the WAP Standard – Network Infrastructure Services Supporting WAP Clients – WAP Architecture Design Principles – Relationship to Other Standards.

UNIT – II

The Wireless Markup Language: Overview – The WML Document Model – WML Authoring – URLs Identify Content – Markup Basics – WML – Basics – Basic Content – Events, Tashes and Bindings.

UNIT – III

Variables – Other Content you can Include – Controls – Miscellaneous Markup – Sending Information – Application Security – **Other Data:** The Meta Element – Document Type Declarations – Errors and Browser Limitations – Content Generation – WML Version Negotiation.

UNIT – IV

User Interface Design: Making Wireless Applications, **Easy to Use:** Web Site Design: Computer Terminals Vs Mobile Terminals – Designing a Usable WAP Site – Structured Usability Methods – User Interface Design Guidelines – Design Guidelines for Selected WML Elements.

UNIT – V

Wireless Telephony Applications: Overview of the WTA Architecture – WTA Client Framework – WTA Server & Security – Design Considerations – Application Creation Toolbox – Future WTA Enhancements. **The Mobile Internet Future:** Better Content, Easier Access – Beyond Browsing – Beyond Cellular – Mobile Data Unleashed.

TEXT BOOKS

1. Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Daniel Mauney, Jari Alvinen, David Bevis, Jim Chan, Stefan Hild, “The Wireless Application Protocol”, Pearson Education, 2003.

ELECTIVE – IV

4.3 CLOUD COMPUTING

UNIT - I

Introduction To Parallel And Distributed Computing: Introduction, Architecture and Distributed computing models and technologies SOA, **Web Services**

Grid, Cluster And Utility Computing: Introduction, Architecture, Pros & Cons, Real time applications.

UNIT - II

Introduction To Cloud Computing: Definition, History, Comparison of Cloud Computing with Grid, Cluster and Utility Computing, Deployment models – Private, Public, Hybrid and Community - Pros and Cons of Cloud Computing. SaaS, PaaS, IaaS etc.

UNIT - III

Virtualization: Types of Virtualization, Tools for Virtualization, Architecture of VMM, Virtualization for Cloud. **Advanced Web Technologies:** AJAX and Mashup – Programming examples using applications.

UNIT - IV

Map Reduce Paradigms: Introduction, GFS Architecture, HDFS Architecture, Hbase, Google big Table, Amazon's (key value) pair storage and Microsoft's Azure infrastructure, Map reduce programming examples

UNIT - V

Cloud Computing Framework: Amazon EC3, S3 storage revises, Aneka frame work, IBM blue Cloud. **Applications:** Distributed search engine and distributed data mining in the cloud.

TEXT BOOKS

1. Anthony T Velte, Toby J Velte and Robert Elsenpeter, "Cloud Computing : A Practical Approach", Tata McGraw Hill, New Delhi, 2010
2. Liu M L, "Distributed Computing Principles and Applications", Pearson Education, New Delhi, 2009.

ELECTIVE – IV

4.4 OPEN SOURCE TOOLS

UNIT – I

Introduction to Linux – What every Linux users knows- The shell-The X windows system –Files and Directories.

UNIT – II

Viewing Text – Editing Text – Grammar and Reference – Analyzing text – Formatting Text.

UNIT – III

LINUX: Network Programming-Introduction to TCP/IP: Introduction –The Transport Layer TCP and UDP. Elementary sockets: Sockets Introduction, Elementary TCP sockets – I/O multiplexing – Socket options

UNIT – IV

PHP Programming Basics PHP - Introduction, PHP Basics: - Syntax- Variables- Controls and functions- passing information between pages -Strings. Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays

UNIT – V

Perl Programming Perl - Introduction, Perl Basics: - Syntax, Variables, Strings, Numbers, Operators, Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length, and Sub string. Hashes, Arguments, Logic, Looping, Files, Pattern Matching, Environment Variables, Using cgi- lib for Forms.

File Management PERL: - File Handling, Reading From Files, Appending Files, Writing to Files, File Checking, Reading Directories.

Databases PERL: - DBI Module, DBI Connect, DBI Query, MySQL Module, MySQL Connect, MySQL SelectDB, MySQL Query.

REFERENCE BOOKS

1. Linux ookBook 2nd Edition Michael Stutz , SPD Pvt.ltd 2004 edition.
2. Linux Ina Nutshell – A desktop Quick Reference – O’Reilly 5th Edition, Ellen sivever, Aarom weber,Stephen Figgins, Robers Love and Arnold Robbins
3. Unix Network programming –The Sockets networking API volume I –Third Edition- W.Richard stevens, Bill Fenner,, Andrew M Rudoff
4. PHP 5 and MySQL Bibble Wiley Dream tech India Pvt.ltd 2006 Edition.
5. Perl CookBook –Tom Christinasen & Nathan Torkington , O’Relli ,SPD Pvt ltd,2006 Edition

ELECTIVE – IV

4.5 SERVICE ORIENTED ARCHITECTURE (SOA)

UNIT- I INTRODUCTION TO SERVICE ORIENTED ARCHITECTURE: Service Oriented Architectures – Business value of SOA - Characteristics of SOA - SOA Architecture – Service based collaboration through Federation – Component Definition - Component Granularity – Component Based Software Engineering – Enterprise Service bus – SOA Enterprise Service Model.

UNIT- II QUALITY OF SERVICE: Web services orchestration – Workflow and Business Process Management – Business Process Execution Language – ACID Transactions - Web services Transactions – SOA Management – Systems Management – Alerting – Provisioning – Leasing – Lifecycle management – Management Architecture.

UNIT- III FUNDAMENTAL PIECES OF SOFTWARE ORIENTED ARCHITECTURE: Universal Description Discovery and Integration – Programming UDDI – UDDI Data Model – UDDI SOAP APIs – Inquiry APIs – Publisher APIs – Web Service Definition Language – Defining Message data types –

UNIT- IV Defining Operations on Messages – Importing WSDL documents – Extensions for binding to SOAP – Simple Object Access Protocol – SOAP Specification – SOAP Message processing – SOAP use of Namespaces – SOAP Multipart MIME attachments.

UNIT-V WEB SERVICES STANDARDS: Web Services Security – WS Trust – WS Privacy – WS SecureConversation – WS Federation - Web Services Coordination – Web Services Policy – Web Services Reliable Messaging – Web Services Attachments.

TEXT BOOKS

1. Thomas Erl, “Service Oriented Architecture (SOA): Concepts, Technology and Design”, Prentice Hall, New Delhi, 2008.
2. James McGovern, Oliver Sims, Ashish Jain and Mark Little, “Enterprise Service Oriented Architectures: Concepts, Challenges Recommendations”. Springer, New York, 2006.

MODEL QUESTION PAPER

Question Paper Pattern (External 75 marks)

- Section-A** **20 marks** (10 Short answer Type Questions of 2 mark each; No choice)
(10 X 2 = 20)
- Section-B** **25 marks** (5 Questions either or type of 5 marks each)
(5 X 5 = 25)
- Section-C** **30 marks** (Three Questions out of 5 Questions, 10 marks each)
(3 X 10 = 30)

Question Paper Pattern (Internal 50 marks)

- Section-A** **10 marks** (5 Short answer Type Questions of 2 mark each; No choice)
(5 X 2 = 10)
- Section-B** **20 marks** (4 Questions either or type of 5 marks each)
(4 X 5 = 20)
- Section-C** **20 marks** (Two Questions out of 3 Questions, 10 marks each)
(2 X 10 = 20)