

3rd Semester

Data Structure

L T P
4 1 0

Theory :100
End Term Exam : 80
I.A. : 20

RATIONALE

The effectiveness of implementation of any application in computer mainly depends on the that how effectively its information can be stored in the computer. For this purpose various -structures are used. This paper will expose the students to various fundamentals structures arrays, stacks, queues, trees etc. It will also expose the students to some fundamental, I/O manipulation techniques like sorting, searching etc

- 1.0 INTRODUCTION: 04**
 - 1.1 Explain Data, Information, data types
 - 1.2 Define data structure & Explain different operations
 - 1.3 Explain Abstract data types
 - 1.4 Discuss Algorithm & its complexity
 - 1.5 Explain Time, space tradeoff

- 2.0 STRING PROCESSING 03**
 - 2.1 Explain Basic Terminology, Storing Strings
 - 2.2 State Character Data Type,
 - 2.3 Discuss String Operations, Pattern Matching Algorithm

- 3.0 ARRAYS 07**
 - 3.1 Give Introduction about array,
 - 3.2 Discuss Linear arrays, representation of linear array In memory
 - 3.3 Explain traversing linear arrays, inserting & deleting elements
 - 3.4 Discuss multidimensional arrays, representation of two dimensional arrays in memory (row major order & column major order), and pointers
 - 3.5 Explain sparse matrices.

- 4.0 STACKS & QUEUES 08**
 - 4.1 Give fundamental idea about Stacks and queues
 - 4.2 Explain array representation of Stack
 - 4.3 Explain arithmetic expression ,polish notation & Conversion
 - 4.4 Discuss application of stack, recursion
 - 4.5 Discuss queues, circular queue, priority queues.

- 5.0 LINKED LIST 08**
 - 5.1 Give Introduction about linked list
 - 5.2 Explain representation of linked list in memory
 - 5.3 Discuss traversing a linked list, searching,
 - 5.4 Discuss garbage collection.
 - 5.5 Explain Insertion into a linked list, Deletion from a linked list, header linked list
 - 5.6 Discuss double linked list, circular linked lists.

6.0	TREE	08
6.1	Explain Basic terminology of Tree	
6.2	Discuss Binary tree, its representation and traversal, Threaded Binary Tree, binary search tree, searching,	
6.3	Explain insertion & deletion in a binary search trees	
6.4	Describe heap, heap sort	
6.5	Explain general tree.	
7.0	GRAPHS	06
7.1	Explain graph terminology & its representation,	
7.2	Explain Adjacency Matrix, Path Matrix	
7.3	Discuss Warshall's algorithm, shortest paths	
7.4	Discuss linked representation of a graph, operation on Graphs, traversing a graph.	
8.0	SORTING SEARCHING & MERGING	08
8.1	Discuss Algorithms for Bubble sort, Selection sort, Insertion sort, Quick sort, Radix Sort, Merge-sort	
8.2	Merging	
8.3	Linear searching, Binary searching.	
9.0	FILE ORGANIZATION	08
9.1	Discuss Different types of files organization and their access method,	
9.2	Explain Hashing, Hash function, collision resolution, open addressing, Linear Probing & modification, chaining.	

Books

1. Data Structure by S. Lipschutz - (Schaum Series)
2. Introduction to Data Structure in C by :A.N.Kamthane; Pearson Education

COMPUTER SYSTEM ARCHITECTURE

L	T	P	Theory	:100
4	1	0	End Term Exam	: 80
			I.A.	: 20

Topic	Periods
1. Basic structure of computer hardware	05
1.1 Basic Structure of computer hardware	
1.2 Functional Units	
1.3 Computer components	
1.4 Bus Structure	
1.5 Performance measures	
1.6 Memory addressing & Operations	
2. Instructions & instruction sequencing	05
2.1 Fundamentals to instructions	
2.2 Operands	
2.3 Op codes	
2.4 Instruction formats	
2.5 Addressing techniques	
2.6 Addressing Modes	
3. Arithmetic operations	05
3.1 Basic arithmetic operation	
3.2 Floating point representation	
3.3 Floating point arithmetic operation	
4. Processor System	10
4.1 Design of ALU	
4.2 Registers files	
4.3 Data path design	
4.4 Bit slice processor	
4.5 Basic memory operation	
4.6 Complete instruction execution	
4.7 Hard wired control	
4.8 Microprogrammed control	
5. Memory System	10
5.1 Memory characteristics	
5.2 Memory – processor data transfer	
5.3 Semiconductor RAM	
5.4 ROM	
5.5 Interleaved Memory	

5.6 Cache memory	
5.7 Virtual memory	
6. Input – Output System	10
6.1 Input - Output Operation	
6.2 Programmed I/O	
6.3 Interrupt driven I/O	
6.4 DMA	
6.5 I/O Channel architecture	
7. I/O Interface & Bus architecture	10
7.1 Bus interconnection	
7.2 Bus structure	
7.3 Basic parameters of Bus design	
7.4 Peripheral component interconnect Bus	
7.5 SCSI	
7.6 USB	
8. Parallel Processing	05
8.1 Parallel Processing	
8.2 Linear PipeLine	
8.3 Multiprocessor	
8.4 Flynn's Classification	

Books

Fundamentals of Computer Architecture ; By; Parthasarthy , Senthil Kumar; TMH
Computer System Arcitecture: Moris Mano, PHI

Digital Electronics

L T P
4 0 0

Theory :100
End Term Exam : 80
I.A. : 20

RATIONALE

All the modern computer operate on the principles of digital electronics. This subject will introduces the various concepts of digital electronics like, various number system, logic gates, Boolean algebra etc. to the students. By going through this paper, the student will acquaint him self to the various basic digital circuits like flip-flops, multi-vibrators etc., which are the main constituents of the digital computers.

COURSE CONTENT

PERIODS

1. NUMBER SYSTEM	05
1.1 Discuss number system and radix.	
1.2 Describe different number systems.	
1.3 Compute binary addition, subtraction, multiplication and division.	
1.4 Perform binary to decimal conversion and vice versa.	
1.5 Convert binary to octal and vice versa.	
1.6 Perform binary to hexadecimal conversion and vice versa.	
1.7 Solve decimal to octal conversion and vice versa.	
1.8 Convert decimal to hexadecimal conversion and vice versa.	
1.9 Do 1's complement and 2's complement.	
1.10 Study need for 1's and 2's complement.	
1.11 Compute subtraction using 1's and 2's complement.	
1.12 Solve different examples regarding different codes.	
2. BINARY CODES	04
2.1 State and explain binary code.	
2.2 Differentiate between weighted and non-weighted code.	
2.3 Describe BCD code, XS-3 code, Gray code.	
2.4 Perform BCD addition and subtraction.	
2.5 Distinguish between ASCII and EBCDIC code.	
2.6 Convert BCD to XCS-3 code and vice versa.	
2.7 Do the BCD to gray code conversion and vice versa.	
2.8 Describe the XS-3 to Gray code conversion and vice versa.	
2.9 Solve different examples regarding different codes.	
3. LOGIC GATES	04
3.1 State and explain logic gate.	
3.2 Discuss different types of digital logic system.	
3.3 Draw OR, AND, NOT, XOR, XNOR Gates with their truth table.	
3.4 Describe universal logic gate.	
3.5 Discuss NAND and NOR gate with their truth table.	

- 3.6 Convert all the logic gate outputs using universal logic gate.
- 3.7 Draw the pin diagram of different logic gate ICs.

4. BOOLEAN ALGEBRA & COMBINATIONAL LOGIC. 05

- 4.1 Study the theorems & postulates of Boolean algebra.
- 4.2 Differentiate between combinational logic circuit & sequential logic circuit.
- 4.3 Describe the relation of Boolean algebra to switching elements.
- 4.4 Obtain Boolean expression from a truth table.
- 4.5 State & explain K-Map.
- 4.6 Describe a 2-variable, 3-variable & 4-variable K-Map.
- 4.7 Determine the minimal equation.
- 4.8 Compute minimal equations for SOP & POS.
- 4.9 Explain expression graphical representation of Boolean functions.

5. FUNCTIONS OF COMBINATIONAL LOGIC 08

- 5.1 Explain the necessity of combinational circuit.
- 5.2 Design a Half-Adder & Full-Adder circuit.
- 5.3 Describe & design Half-Sub tractor & Full-Sub tractor.
- 5.4 Convert the entire adder & sub tractor circuit using universal logic gates.
- 5.5 Study parallel binary address.
- 5.6 Discuss a magnitude comparator circuit with expression.
- 5.7 Define encoder & decoder.
- 5.8 Describe the decoder circuit for binary to gray, BCD to decimal & BCD to 7-segment.
- 5.9 Discuss the encoder circuit for
 - 5.9.1 Gray to Binary.
 - 5.9.2 BCD to xs-3.
 - 5.9.3 Xs-3 to BCD.
- 5.10 Differentiate between MUX & DEMUX.
- 5.11 Describe 4 to 1 line, 8 to 1 line MUX.
- 5.12 Show the principle of operation of 1 to 16 lines DE-MUX.
- 5.13 Study parity generator/checker circuit.

6. FLIP- FLOPS & MULTIVIBRATORS 08

- 6.1 Classify different types of flip-flops.
- 6.2 Study of a RS FF using NAND & NOR gate.
- 6.3 Draw the waveforms for clock RS FF with its operation.
- 6.4 Explain edge-triggered Multivibrator.
- 6.5 Describe a DFF with its waveform.
- 6.6 Describe a TFF with its waveform.
- 6.7 Describe the working principle of master-slave J-K FF with its waveforms.
- 6.8 Explain the conversion from.
 - 6.8.1 JK FF to SR FF.
 - 6.8.2 JK FF to T FF.
 - 6.8.3 JK FF to D FF.
- 6.9 Study flip-flop application.
- 6.10 Solve different problems regarding flip-flop.

7.	COUNTERS & SHIFT REGISTERS	08
7.1	Define counter & shift register.	
7.2	Differentiate between ripple & synchronous counter.	
7.3	Describe the working of a 4-bit ripple counter.	
7.4	Distinguish between.	
	7.4.1 4-bit synchronous serial counter.	
	7.4.2 4-bit synchronous parallel counter.	
7.5	Study the module N counter.	
7.6	Explain divide by N counter.	
7.7	Design a skipping state counter.	
7.8	Describe & design.	
	7.8.1 Mod-6 counter.	
	7.8.2 Mod-12 counter.	
	7.8.3 Decade counter.	
7.9	Describe the working of a Ring counter.	
7.10	Study Johnson counter.	
7.11	Study counter application.	
7.12	Describe the working of a;	
	7.12.1 4-bit serial-in-serial-out (SISO) shift register.	
	7.12.2 4-bit serial-in-parallel-out (SIPO) shift register.	
	7.12.3 4-bit parallel-in-serial-out (PISO) shift register.	
	7.12.4 4-bit parallel-in-parallel-out (PIPO) shift register.	
7.13	Discuss the shift register applications.	
8.	MEMORIES	06
8.1	State & explain.	
8.2	Explain ROM, PROM, EPROM, & E ² PROM.	
8.3	Differentiate between ROM & RAM.	
8.4	Study different types of RAM.	
8.5	Distinguish between SRAM & DRAM.	
8.6	Study detail structure of memory expression.	
8.7	Describe magnetic bubble memories.	
8.8	Describe the working principle of magnetic disk memories.	
8.9	Explain special memories like CCD & CD-ROM.	
8.10	Discuss memory applications.	
9.	D/A & A/D CONVERTERS	06
9.1	Describe D/A & A/D converter.	
9.2	Draw a weight-register type D/A converter circuit with neat sketch.	
9.3	Discuss a ladder type D/A converter circuit.	
9.4	Compare the features of A/D conversion method.	
9.5	Study of a Dual-slope A/D converter.	
9.6	Describe a Successive approximation A/D converter circuit.	
9.7	Discuss D/A applications.	

10. INTRODUCTION TO DIGITAL LOGIC FAMILIES

06

- 10.1 Discuss logic family.
- 10.1 Explain different types of TTL & CMOS logic gate ICs.
- 10.2 Study different characteristics of logic families ICs.
- 10.3 Study different characteristics of logic families like;
 - 10.3.1 Propagation delay.
 - 10.3.2 Power dissipation.
 - 10.3.3 Operating temp.
 - 10.3.4 Fan-in.
 - 10.3.5 Fan-out.
 - 10.3.6 Voltage level.
 - 10.3.7 Relative cost.
- 10.4 Study the pin-out connection of digital IC chips.

TEXT BOOKS

1. Digital Electronics by R.K.Gaur.
2. Digital principle by R.P.Jain.
3. Digital Electronics by Floyad.
4. Switching, they & logic design by V.K.Jain.
5. Principle of Digital Electronics by Morris & Mano.

Management Information System

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Management Information System is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1. Management Information System An Overview	06
1.1 Introduction	
1.2 Management Information System	
1.3 Definition of MIS	
1.4 Framework for MIS Organisation and Management Triangle	
1.5 Information needs and its Economics	
1.6 System Approach	
1.7 Meaning and Objective of MIS	
1.8 Disadvantages of Information System	
1.9 Approaches of MIS Development	
1.10 Constraints in Developing an MIS	
1.11 MIS and Use of Computer	
1.12 Limitations of MIS	
1.13 Computer based Information System	
2. Information System for Decision Making	03
2.1 Introduction	
2.2 Transaction Processing System	
2.3 Management Information System	
2.4 Intelligent Support System	
2.5 Office Automation System	
3. Computer Hardware for Information System	03
3.1 Introduction	
3.2 Basics of Data Representation	
3.3 Types of Computer.	
3.4 Basic Components of Computer Systems	
3.5 Factors to buy a PC	
4. Computer Software for Information System	03
4.1 Introduction	
4.2 Programming Languages	
4.3 Classification of Software	
4.4 Role of Software in Problem Solving	
4.5 Criteria for Investment in Hardware and Software	

5.	Data Communication System	03
5.1	Introduction	
5.2	Telecommunication System	
5.3	Data Communication Hardware	
5.4	Data Communication Software	
5.5	Communication Networks	
5.6	Distributed Systems	
5.7	Topology of Computer Network	
5.8	Protocols and Network Architecture	
5.9	Open System Interconnection (OSI)	
5.10	Network Management	
6.	Database Management technology	03
6.1	Introduction	
6.2	Data vs. Information	
6.3	Data Hierarchy	
6.4	Methods for Organising Data in files	
6.5	Limitations of File-based- systems	
6.6	Database and Database Management System	
6.7	Object Oriented Database Structure	
6.8	Entity Relationship Diagram	
6.9	Fourth Generation Languages (4GLs)	
6.10	Recent Development in Database	
6.11	Principle of Database Management	
6.12	The Database Administrator	
7.	Client- Server Computing	03
7.1	Introduction	
7.2	Definition of Client-Server Computing	
7.3	Components and functions of a Client-Server System	
7.4	Development of Client-Server System	
7.5	Client-Server Security	
7.6	Client-Server Costs Computations	
7.7	Advantages of Client-Server Systems	
7.8	Disadvantages/ Obstacles of a Client-Server System	
8.	Decision Support System	03
8.1	Introduction	
8.2	Definitions	
8.3	Evolution of DSS	
8.4	Objectives of DSS	
8.5	Classifications of DSS	
8.6	Characteristics of DSS	
8.7	Components of DSS	
8.8	Functions of a DSS	
8.9	Development of DSS	
8.10	Group Decision Support system	
8.11	Executive Information System	
8.12	Success Criteria for DSS/ EIS	
8.13	Relationship between MIS and DSS	
8.14	DSS measures of success in organizations	
8.15	Applications of a DSS	
8.16	TPS, MIS, DSS and EIS	

8.17	Future Development in DSS	
9.	Office Information System	03
9.1	Introduction	
9.2	Office Automation	
9.3	Offices and Office Systems	
9.4	Types of Office Automation Systems	
9.5	Integrated Office	
10.	Information System in Business	03
10.1	Introduction	
10.2	Functional Areas of Business	
10.3	Manufacturing Information System	
10.4	Marketing Information Systems	
10.5	Quality Information Systems	
10.6	Financial and Accounting Information Systems	
10.7	Research and Development Information Systems	
10.8	Human Resource Information Systems	
10.9	Geographical Information Systems	
10.10	Cross-Functional systems	
11.	Systems Analysis and Design	03
11.1	Introduction	
11.2	System Development Life Cycle (SDLC)	
11.3	Prototyping	
11.4	Rapid Application Development (RAD)	
11.5	End-User Computing	
11.6	Software Packages outsourcing	
11.7	Comparison of IS Development Methodologies	
11.8	Other Tools for IS Development	
11.9	Computer Aided Software Engineering	
11.10	Challenges in Developing Information Systems	
12.	Strategic Management Information System	03
12.1	Introduction	
12.2	Characteristics of SMIS	
12.3	Strategic Planning for MIS	
12.4	Development of SMIS	
12.5	MIS Strategy Implementation	
12.6	Barriers to Development of SMIS	
13.	Information Resources Management	03
13.1	Introduction	
13.2	Principles of IRM	
13.3	IRM Objectives	
13.4	Functional Components of IRM	
13.5	Organisation of Information Resources Function	
13.6	Application of Scarce IS Resources	
13.7	Management of Information Systems Personnel	
13.8	Management of End-User Computing	
13.9	A Proactive CIO Strategy	

14. Enterprise Resource Planning	03
14.1 Introduction	
14.2 Enterprise Modelling	
14.3 Role of Information Technology in Enterprise Modelling	
14.4 Flow of Information	
14.5 Role of Common/ shared Enterprise Database	
14.6 Selection of ERP	
14.7 Application of POC approach	
14.8 Material requirement planning	
14.9 Manufacturing Resource Planning (MRP II)	
14.10 Business Process Re-Engineering (BPR)	
14.11 ERP Implementation Methodology	
14.12 Principle for ERP Implementation	
14.13 Guideline for ERP Implementation	
14.14 Causes for failure in ERP Implementation	
14.15 Sample list of ERP vendors	
14.16 ERP Software packages (SAP)	
15. Supply Chain Management	03
15.1 Introduction	
15.2 Definitions	
15.3 Concept of SCM	
15.4 SCM Process	
15.5 Stevan's Model of Supply chain integration	
15.6 Goal / Componenets of SCM	
15.7 Performance of Supply chain	
15.8 Comparison between ERP & SCM	
15.9 ERP Implementation: A case of Distortion of Demand	
15.10 Supply chain Solution vs. ERP Vendors	
15.11 Benefits of SCM	
15.12 Disadvantages of SCm	
16. Applications of Information Technology in Business	03
16.1 Introduction	
16.2 E-Commerce (EC)	
16.3 Commerce over the Internet	
16.4 Electronic Cash over the Internet	
16.5 Internet Security	
16.6 Electronic Business (E-Business)	
16.7 Application of E-Commerce in India	
16.8 Successful E-Commerce	
16.9 Mobile Commerce	
16.10 E-Governance	

Books

1. Management Information System; By : Dr. A.K.Gupta (S.Chand & Company Ltd)

Engineering Mathematics – III

L	T	P	Theory	: 100
4	0	0	End Term Exam	: 80
			I.A.	: 20

OBJECTIVE

On completion of study of Engineering Mathematics - III the students will be able to:

1. Apply matrices in Engineering mechanics, electrical circuits & linear programming.
2. Transform Engineering problems to mathematical models with the help of differential equation & familiarise with the methods of solving by analytical method, transform method, operator method & numerical method.
3. Solve algebraic & transcendental equations by iterative methods easily programmable in computers.
4. Analyse data & develop interpolating polynomials through method of difference.

COURSE CONTENT

PERIODS

- | | |
|---|-----------|
| 1. MATRICES | 04 |
| 1.1 Define rank of a matrix. | |
| 1.2 Perform elementary row transformation to determine rank of a matrix. | |
| 1.3 Define Rouche's Theorem for consistency of a system of linear equations in n unknowns. | |
| 1.4 Solve equations in three unknowns testing consistency. | |
| 2. LINEAR DIFFERENTIAL EQUATION | 12 |
| 2.1 Define homogeneous & non homogeneous diff. Equations with constant coefficient with examples. | |
| 2.2 Find general solution of linear equations in terms of C.F & P.I. | |
| 2.3 Derive rules of finding C.F & P.I in terms of operator D. | |
| 2.4 Explain method of variation of parameter to solve equation of the form $y''+py'+qy=f(x)$. | |
| 2.5 Describe methods of solutions of Cauchy's & Legendre's linear equation with variable coefficient. | |
| 2.6 Define partial differential equations(P.D.E.). | |
| 2.7 Form partial differential equations by eliminating arbitrary constants & arbitrary functions. | |
| 2.8 Solve partial differential equations of the form $Pp+Qq=R$. | |
| 2.9 Derive rules of finding C.F and P.I of Homogeneous linear partial differential equation with constant coefficient solve problems in relation to O.D.E. & P.D.E. | |
| 3. LAPLACE TRANSFORM (L.T.) | 12 |
| 3.1 Define Gamma function and $\Gamma(n+1) = n!$ and find $\Gamma(1/2) = \Gamma(1)$ (No problem). | |

- 3.2 Define laplace transform of a function $f(t)$ & inverse laplace transform.
- 3.3 Derive L.T of standard functions and explain existence conditions of L.T.
- 3.4 Explain linearity, shifting and change of scale property of L.T.
- 3.5 Formulate L.T of derivatives, integrals, multiplication by t^n , division by t .
- 3.6 Derive formula of inverse L.T.
- 3.7 State and derive convolution theorem.
- 3.8 Solve linear differential equation with constant coefficients associated with initial conditions using transform method.
- 3.9 Define unit step function and derive second shifting property.
- 3.10 Solve problem from 3.3 to 3.9.

4. FOURIER SERIES (F.S.) 12

- 4.1 Define periodic functions.
- 4.2 State dirichlet's conditions for the Fourier expansion of a function and its convergence.
- 4.3 Express periodic function $f(x)$ satisfying dirichlet's conditions as a Fourier series
- 4.4 State Euler's formulae.
- 4.5 Obtain F.S of continuous functions & functions having points of discontinuously
- 4.6 Obtain F.S of functions having arbitrary period.
- 4.7 Define even and odd functions and obtain their F.S.
- 4.8 Explain half range series.
- 4.9 Solve problems on 4.1 to 4.8.

5. NUMERICAL METHODS 04

- 5.1 Appraise limitation of analytic method of solution of algebraic & transcendental equations.
- 5.2 Derive iterative formula for finding solutions of algebraic & transcendental equations by
 - 5.2.1 Bisection method.
 - 5.2.2 Method of false position.
 - 5.2.3 Newton Raphson method.
- 5.3 Solve problems on 5.2.

6. FINITE DIFFERENCE & INTERPOLATION 12

- 6.1 Explain finite difference & form table for forward & backward difference.
- 6.2 Explain differences of a polynomial and express it in factorial notation.
- 6.3 Define shift operator E and establish relation between E ,
- 6.4 Derive Newton's forward and backward interpolation formula for equal interval.
- 6.5 State lagrange's interpolation formula for unequal intervals.
- 6.6 Derive numerical differentiation using forward and backward difference.
- 6.7 Explain numerical integration and state
 - 6.7.1 Newton-cote's formula.
 - 6.7.2 Trapezoidal rule.
 - 6.7.3 Simpson's 1/3 rule.
- 6.8 Solve problems on 6.1 to 6.7.

7. NUMERICAL SOLUTION OF ORDINARY DIFFENTIAL EQUATIONS 04

- 7.1 State and explain formula for solving ordinary differential equations using
- 7.1.1 Taylor's series method.
 - 7.1.2 Euler's method.
 - 7.1.3 Runge-kutte method up to 4th order.

TEXT BOOKS

1. Higher Engineering Mathematics by Dr. B.S.Grewal.

REFERENCE

1. Numerical Methods by Goel & Mittal
2. A Text Book of Matrix Algebra by S. Biswas
3. Numerical Methods for Engineering by S. K. Gupta
4. Partial Differential Equation by P. Prasad & R. Rabindran
5. Theory of Matrices by Vatssa

DATA STRUCTURE LAB USING C

L T P
0 0 6

Practical : 50
Sessional : 50

1. Implementation of 1D & 2D Array
2. Implementation of Stack
3. Implementation of insertion & deletion in Stack
4. Implementation of insertion & deletion in Queue
5. Implementation of insertion & deletion in Linked list
6. Implementation of Insertion sort
7. Implementation of Selection sort
8. Implementation of Bubble sort
9. Implementation of Quick sort
10. Implementation of Heap sort
11. Implementation of Radix sort
12. Implementation of Binary tree traversal
13. Implementation of Linear search
14. Implementation of Binary search

ADVANCE C LAB

L T P
0 0 6

Practical : 50
Sessional : 25

1. Writing Program using Array
2. Writing Program using Strings
3. Writing Program using Functions
4. Writing Program using Structure
5. Writing Program using Unions
6. Writing Program using Pointers
7. Writing Program using file handling using C

MIS Lab

L T P
0 0 6

Practical : 50
Sessional : 25

Introduction to FOXPRO

Introduction, Special features of FoxPro, Starting FoxPro, Terminologies used in FoxPro File/Table-Record-Fields, Conventions used for naming fiends, Data types

Understanding Databases

Introduction, Opening a Table/Database, Adding records in a table, Close a file

Retrieving and Editing the Data

Introduction, List, Display, Record pointer, Moving the record pointer - Goto -Skip, Modifying data-Edit-Browse

Managing Databases

Introduction, Sorting, Indexing, Searching for record within the database -Locate-Find-Seek

Working with Reports

Introduction, Creating a report format, Generating a report, Previewing the Report- Grouping of data-Subtotals-Grand total

Getting Started with Programming

Introduction, Commands for writing programs - Say - Get-Read - Valid - Range, Picture, Input Accept - Cancel, Branching concepts - If-endif - Do case Otherwise

Programming Structures

Introduction, Looping commands - Do while - For-End for

Small project in FOXPRO

4th Semester

Communication Engineering

L T P
4 0 0

Theory :100
End Term Exam : 80
I.A. : 20

RATIONALE

Communication Engineering is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1. Analog Communication	10
1.1 Concepts of Modulation.	
1.2 Amplitude Modulation, Expression for Amplitude Modulation Signal Power relation in AM wave.	
1.3 Modulation and balance modulation	
1.4 SSB Signal	
1.5 Principle of AM Radio transmitting using block diagram.	
2. Frequency Modulation Systems	10
2.1 Frequency Modulation.	
2.2 Expression for frequency –modulation signal.	
2.3 Frequency Spectrum of FM signal.	
2.4 Phase Modulation.	
2.5 Comparison between AM and FM Modulation.	
2.6 Methods of FM generation.	
2.7 Different methods of FM demodulation.	
3. Pulse Analog Modulation System	10
3.1 Concept of pulse modulation systems.	
3.2 Noisy communication channel	
3.3 Sampling theorem (statements & explanations only)	
3.4 PAM	
3.5 Concept of PTM, PDM	
3.6 Quantization of signal & quantization error.	
4. Digital Communications	10
4.1 Concepts of Digital Communication.	
4.2 Advantages of Digital communication system.	
4.3 Noise and its characterization	

- 4.4 Channel Capacity.
- 4.5 Digital modulation techniques
- 4.6 Binary ASK,FSK & PSK
- 4.7 Binary modulation techniques
- 4.8 Quadrature modulation techniques
- 4.9 QASK, QPSK
- 4.10 Principles of coherent & non-coherent detection
- 4.11 Matched filters
- 4.12 Probability of error & SNR requirements
- 4.13 PCM generation & demodulation
- 4.14 Concepts of Delta modulation
- 4.15 DPCM

- 5. Line Communication 10**
- 5.1 Electro-Mechanical & electronic telephone instruments
- 5.2 Numbering system & dialing
- 5.3 Concept of two-way four-wire conversion(hybrid)
- 5.4 Echoes & Tracking
- 5.5 Electronics & Electromechanical exchange
- 5.6 Time MUX
- 5.7 Space MUX
- 5.8 Analog & digital multiplexing
- 5.9 Principle and features of Telegraphy
- 5.10 Telephony over power line
- 5.11 PBX / PABX/ EPBX
- 5.12 DTMF

- 6. Transmission Lines 10**
- 6.1 Transmission lines- various types.
- 6.2 Equation for primary & secondary constant of X-mission line.
- 6.3 Skin effects
- 6.4 Losses in transmission line
- 6.5 Incident & reflected wave – elementary concepts reflection, co-efficient & standing wave, impedance matching.
- 6.6 Concepts of single and double stub matching for distortion transmission lines

Books

1. Electronic Communication by G.Kennedy (TMH)

OPERATING SYSTEM & SYSTEM PROGRAMMING

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

As Operating System is the resource manager of the Computer System, so students should be exposed towards learning the role of Operating System in controlling & coordinating all the Hardware and Software resources available with a digital computer. System programming deals with Assembler, Compiler, loader etc. which are the system software tools for the students to learn in the field of programming.

A. OPERATING SYSTEM

- 1. INTRODUCTION** **03**
 - 1.2 State Objectives and Explain functions of operating system.
 - 1.3 Discuss Evolution of Operating system and explain structure of operating system.

- 2. PROCESS MANAGEMENT** **08**
 - 2.1 Define process and Explain Process concept, process control, interacting processes, inter process messages.
 - 2.2 Explain implementation issues of Process.
 - 2.3 Discuss process scheduling, job scheduling.
 - 2.4 Explain process synchronization, semaphore.
 - 2.5 State principle of concurrency, types of scheduling .
 - 2.6 Explain deadlock.
 - 2.7 Discuss prevention, recovery, detection of deadlock.

- 3. MEMORY MANAGEMENT** **08**
 - 3.1 Explain Resident monitor, multiple partition, swapping.
 - 3.2 Explain segmentation, virtual memory using paging, virtual memory using segmentation, contiguous memory allocation, non contiguous memory allocation.

- 4. DEVICE MANAGEMENT** **05**
 - 4.1 Discuss the techniques for Device Management - Dedicated, shared and virtual.
 - 4.2 Explain device allocation considerations I/O traffic control & I/O Schedule, I/O Device handlers.
 - 4.3 Define SPOOLING.

- 5. DEAD LOCKS** **08**
 - 5.1 Explain concept of deadlock.
 - 5.2 Define Resources.

5.3 Discuss Dead Lock Detection, Recovery & Prevention, Explain Bankers Algorithm & Safety Algorithm

6. FILE MANAGEMENT

07

File organization, Directory & file structure, sharing of files, file access methods, file systems, reliability, allocation of disk space, file protection, secondary storage management.

B. SYSTEM PROGRAMMING

21

- 1.1 Explain Concept of system programming and show difference from Application program.
- 1.2 Explain Assembler, functions carried out by an assembler.
- 1.3 Discuss Compiler: functions of compiler.
- 1.4 Discuss Compiler, Compare compiler and interpreter.
- 1.5 Explain seven phases of compiler
- 1.6 Discuss Loader: functions of loader, different types of loader, compiler and go loader, Direct linking loader absolute loader, relocatable loader.

TEXT BOOKS

1. System Programming By Damdhere
2. Operating System By Donovan – TMH

REFERENCE BOOKS

1. Operating System By Silverschz & Galvin, Addison Wesley
2. System Programming By: J. J. Donovan - TMH
3. Modern Operating System By Tanenbaum, PHI

Microprocessor & Application

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Microprocessor is the nervous system of any digital computer and is the major component in the field of Computer Engineering. This subject enhances the Hardware knowledge of the students in the area of different microprocessor's pin configuration, their specification, internal architecture, I/o interfacing through PPI Intel 8255,8259 etc and overall knowledge in the field of Assembly Language programming. Moreover the students will be exposed towards the real time application of the microprocessor in the area of Traffic Light, stepper motors, D/A & A/D interfacing etc.

1.0	Introduction to Microprocessor	06
1.1	Discuss microprocessor.	
1.2	Distinguish between microprocessor & microcomputer.	
1.3	Discuss generation of microprocessor.	
1.4	Study generation of microprocessor.	
1.5	Explain concept of SAP-I & SAP-II.	
2.	BASIC ARCHITECTURE OF 8- BIT MICROPROCESSOR	10
2.1	Discuss Architecture.	
2.2	State & Explain BUS.	
2.3	Study general Bus structure.	
2.4	Describe address bus, data bus, control bus.	
2.5	Describe pin structure of 8085 microprocessor.	
2.6	Describe internal Architecture of 8085 microprocessor.	
2.7	Describe three state registers- three state switches.	
2.8	Study the data transfer using tristate registers.	
2.9	Discuss Arithmetic logic unit.	
2.10	Explain program counter.	
2.11	State & explain stack pointer, stack & stack top.	
2.12	State & explain registers.	
2.13	Distinguish between SPR & GPR.	
2.14	Describe flag register.	
3.	INSTRUCTION SET	10
3.1	Discuss instructions.	
3.2	Explain need for addressing data.	
3.3	Differentiate between I-address, 2-address & 3-address instructions with examples	
3.4	Study different instructions of 8085 microprocessor with examples.	
3.5	Define addressing modes.	
3.6	Study various addressing modes of 8085 microprocessor.	

4.	BRANCH & SUB-ROUTINE INSTRUCTIONS	10
4.1	State & explain branch & sub- routine.	
4.2	Study different branching instructions.	
4.3	Classify stack, vs machine control group instructions.	
4.4	Study the basic assembler directives.	
5.	ASSEMBLY LANGUAGE PROGRAMMING	10
5.1	Discuss the concept of ALP.	
5.2	Give examples of an execution of a simple program.	
5.3	Discuss assembler, distinguish between directives & labels.	
5.4	Define structured programming.	
5.5	Study programming examples like conditional loops.	
5.6	State & explain sub-routine.	
5.7	Give programming examples of sub-routines.	
5.8	Design stack manipulation & table look-up.	
6.	TIMING DIAGRAMS	06
6.1	Discuss the concept of timing diagram.	
6.2	Differentiate between instruction cycle, machine cycle & T -state.	
6.3	Draw op-code phase machine cycle (4 & 6 T -state) timing diagram.	
6.4	Draw timing diagram for memory read, memory write, I/O read & I/O write machine cycles.	
6.5	Draw for bus idle, hold & halt states.	
6.6	Draw a neat sketch for the timing diagram for 8085 instruction (mov, Dcv, MYI, LDA).	
7.	INTERFACING I/O PROGRAMMING	08
7.1	Discuss interfacing.	
7.2	Draw the Pin diagram of 8255 a PPI chip.	
7.3	Describe each Pin function.	
7.4	Define Port.	
7.5	Study universal timer chip.	
7.6	Explain programming with I/O chips 8255.	
7.7	Explain programming with I/O chips 8259.	

BOOKS

1. Microprocessor by Gaonkar.
2. Microprocessor by B.P.Singh.
3. Microprocessor by B.Ram.
4. Microprocessor base system design by Ghosal.

Data Mining & Data Ware Housing

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Data Mining & Data ware Housing is the upcoming features in the fields of Information Technology which is based on coverage of large databases and making queries, optimization of queries , statistical analysis of query results and deriving future trends.

1. Introduction to Data Mining	10
1.1 Data, Information & knowledge.	
1.2 Data mining	
1.3 Data Warehousing	
1.4 What Data Mining does	
1.5 Data Mining working principles	
1.6 Five major elements	
1.7 Data Mining tools	
2. Data Clustering	10
2.1 Introduction	
2.2 Similarity and Distance Measures	
2.3 Outliers	
2.4 Hierarchical Algorithms	
2.5 Partitional Algorithms	
2.6 Clustering Large Databases	
2.7 Clustering with Categorical Attributes	
3. Artificial Neural Network	10
3.1 Artificial Neuron	
3.2 Artificial Neural Network	
3.3 Structure of ANN	
3.4 Perception	
3.5 Underfitting & Overfitting of ANN	
4. Association Rules	10
4.1 Introduction	
4.2 How Association Rules work	

4.3	Unique Data Analysis Requirements	
4.4	Computational Procedures and Terminology	
4.5	Node Organization	
4.6	Item Coding	
4.7	Recursive Counting	
5.	Data Ware Housing Concepts & Mechanisms	10
5.1	Introduction	
5.2	Need for Developing Data Warehouse	
5.3	What is a Data Warehouse?	
5.4	Why Separate Data Warehouse?	
5.5	Data Warehouse Systems	
5.6	Data Warehouse Components	
5.7	The Importance of Managing Metadata (Integration)	
5.8	Administration and Management Tools	
5.9	Data Mart	
5.10	The Difference between OLTP and Data Warehousing	
5.11	Decision Support and OLAP	
5.12	Data Processing Models	
5.13	Using Data Warehousing in Strategic Decision Making	
6.	Building a Data Warehouse	10
6.1	Introduction	
6.2	Planning a Data Warehouse	
6.3	Creating and Maintaining a Warehouse	
6.4	Physical Structure of Data Warehouse	
6.5	Conceptual Modeling of Data Warehouse	
6.6	Multidimensional Data Model	
6.7	OLAP Servers	
6.8	Implementing a Warehouse	

Text Book : Data Mining, Data Warehousing and OLAP by Gajendra Sharma,
Katson Books.

Object Oriented Methodology

L T P
4 - -

Total Mark : 100
Theory : 80
I.A : 20

RATIONALE

Now-a-days object oriented Methodology is adopted almost for every computer based programs due to the reusability of the objects. This subject exposes the learner to the various typical object oriented concepts like, classes, objects, inheritance, Operator Overloading etc. It also makes the reader to realize the advantages of object oriented Programming Methodology over the conventional procedural programming methodology.

1.0	PRINCIPLES OF OBJECT ORIENTED PROGRAMMING	05
1.1	Discuss Procedure Oriented paradigm	
1.2	Discuss Object oriented paradigm	
1.3	Explain Object oriented Design & Analysis	
2.0	DATA TYPES & I/O OPERATIONS	08
2.1	State Basic data types	
2.2	Discuss User defined data types & derived data types	
2.3	Explain Dynamic initialization of variables	
2.4	Explain Operators & expressions	
2.5	Explain Formatted & unformatted I/O	
3.0	CLASSES	08
3.1	Specify a class	
3.2	Define member functions	
3.3	Discuss Static Data Member	
3.4	Discuss Arrays within a class	
3.5	Explain Pointers to members	
4.0	CONSTRUCTOR AND DESTRUCTOR	07
4.1	Explain the purpose	
4.2	Discuss Constructors with parameters	
4.3	Explain Multiple constructors in a class	
4.4	Explain Dynamic initialization of objects	
4.5	Discuss Destructors	
5.0	OPERATOR OVERLOADING	07
5.1	Give Definition	
5.2	Explain Unary operator overloading	
5.3	Explain Binary operator overloading	
5.4	Explain String manipulation using operator	
5.5	Show Type conversions	

6.0	INHERITANCE OF CLASSES	10
6.1	Discuss Derived classes	
6.2	Explain Single inheritance	
6.3	Explain Multilevel and Multiple inheritance	
6.4	Explain Hierarchical inheritance	
6.5	Explain Virtual Base Classes	
7.0	POLYMORPHISM	04
7.1	Give fundamental idea on Polymorphism	
7.1	Explain Pointer to objects & derived classes	
7.2	Explain Virtual Functions	
8.0	FILE HANDLING	07
8.1	Discuss Streams and stream classes	
8.2	Discuss Classes for file stream operation	
8.3	Explain Opening and closing files	
8.4	Explain how to handle Error	
8.5	Discuss Command line arguments	
9.0	TEMPLATES AND EXCEPTION HANDLING	04
9.1	Explain Class templates & Function Templates	
9.2	Discuss Template Arguments	
9.3	Discuss Exception Handling	

Books :

1. Object Oriented Programming With C++ By: E. Balaguruswami, TMH
2. Object Oriented Programming With C++ By: David Parsons
3. Let Us C++ By Y. Kanetkar

Operating System Lab

L T P
0 0 6

Practical : 50
Sessional : 50

1. OVERVIEW OF UNIX

UNIX as an Operating system, Kernel, shell and User, UNIX File System, Files and Directories, Access Permission, File system hierarchy.

2. BASIC UNIX COMMANDS

Listing of files and directories, Copying, Deleting Renaming and comparing files, Creation, Navigation and Removing directories, Access permission of files and directories, Editors in UNIX, Status of users, terminals, Date and time, Displaying blown-up message, paging & Printing of files, background jobs.

3. ADVANCED FEATURES OF UNIX

I-nodes, Tees, Pipes and Filters, Cutting, Pasting and sorting of files, searching for a pattern in a string.

4. PROGRAMMING WITH THE SHELL

System variables and shell variables, interactive Shell scripts, Shell termination, conditional statements, looping statements, Special parameters in shell computation and string handling

Microprocessor & Application Lab

L T P
0 0 6

Practical : 50
Sessional : 25

1. Acquaintance with the microprocessor trainer kit, hardware & the user's commands
2. Find out the Hex- code for corresponding Instruction
3. Write small Assembly language programme for Data Transfer
 - > Register to Register
 - > Register to Memory and Vice-Versa
4. Write small Assembly language programme for Arithmetic Operation - 8 bit addition and subtraction multi byte addition and subtraction , BCD addition and subtraction, Multiplication using repeated addition, multiplication using shift-add process
5. Write small Assembly language programme for Input/Output: Programming 8255 with the basic VO modes, interface 7-segment Display using 8255 as a port.

Object Oriented Programming Lab

L T P
0 0 6

Practical : 50
Sessional : 25

Programs On :

1. Objects and classes
2. Declaring and creating objects Constructors
3. Modifiers
4. Passing objects to methods
5. Instance variables and class variables Instance method & class method
6. Scope of variables interface and packages
7. Introductory Problems on Class Inheritance Super classes and sub class
Calling super class constructors
8. Calling super class methods
9. Object class
10. Number class
11. Processing date and time
12. Class Templates and Exceptional handling

5th Semester

Computer Graphics & Multimedia

L T P
4 1 -

Total Mark : 100
Theory : 80
I.A : 20

RATIONALE

Graphics and Multimedia-now a day probably the most talked about technology in the field of computer. This technology is nowadays largely adopted by most computer based applications to bridge the gap between a human user & the computer. By this , multiple media are implemented and used in computer based application to enhance their understanding ability before a common man. This multiple media include, text, sound, video, graphics animation etc. This paper will expose the students to the various concepts of these media and their implementation in computer based application. This will also expose the students to various multimedia implementation techniques like data compression, & various multimedia standards.

Course Content

Periods

1. Applications of Computer Graphics & Multimedia	02
1.1 Computer graphics in CAD	
1.2 Presentation Graphics	
1.3 Computer Art	
1.4 Entertainment	
1.5 Education & Training	
1.6 Visualization	
1.7 Image Processing	
1.8 Graphic User Interface	
1.9 Multimedia Concepts.	
2. Overview of Graphics System	06
2.1 Graphics System	
2.2 Raster Scan Display	
2.3 Random Scan Display	
2.4 Graphics Input Devices	
2.5 Graphics Software.	
3. Graphics Output primitive	07
3.1 Points & Lines	
3.2 DDA Line Drawing Algorithm	
3.3 Bresenham's Line drawing Algorithm	
3.4 Mid Point Circle algorithm	
3.5 Filled Area Primitives	
3.6 Boundary fill algorithm, Flood fill algorithm	
4. Two Dimensional Geometric Transformations	03

4.1	Translation	
4.2	Rotation	
4.3	Scaling	
4.4	Reflection	
4.5	Shear	
4.6	Matrix representation and Homogenous coordinate system	
4.7	Composite transformation	
5.	Two Dimensional Viewing	04
5.1	Viewing pipeline	
5.2	Viewing coordinate reference frame	
5.3	Window to view port coordinate transformation	
5.4	Line clipping concept	
5.5	Polygon clipping concept.	
6.	Three Dimensional Object Representations	10
6.1	Polygon surface	
6.2	Polygon table	
6.3	Plane equation	
6.4	Polygon mesh	
6.5	Quadric surfaces	
6.6	Sphere, Ellipsoid	
6.7	Spline representation	
6.8	Bezier curves & Surfaces	
6.9	B-Spline curves & surfaces.	
7.	Three Dimensional Geometric & Modeling Transformations	04
7.1	Translation	
7.2	Rotation	
7.3	Scaling	
7.4	Reflection	
7.5	Shear	
7.6	Composite transformation	
7.7	Modeling & Coordinate transformation.	
8.	Three Dimensional Viewing	06
8.1	Viewing pipeline	
8.2	Viewing coordinates	
8.3	Parallel projection	
8.4	Perspective projection	
8.5	Concept of 3D clipping.	
9.	Illumination Model & Surface Rendering Methods	04
9.1	Different light sources used in 3D modeling	
9.2	Basic Illumination model	

9.3	Ambient light	
9.4	Diffuse reflection	
9.5	Specular reflection,	
10.	Introduction to Digital Audio	04
10.1	Basics of Acoustics, Psychoacoustics	
10.2	Musical sound and noise, elementary sound system	
10.3	Microphones, Amplifiers, digital audio formats	
11.	Introduction to Digital Image	06
11.1	Vector and raster Graphics	
11.2	Digital representation of image, colour, 16 bit, 24 bit colour depth	
11.3	Colour Characteristics-Hue, saturation, Luminance	
11.4	Colour Palette	
11.5	Image formats-JPEG, BMP, TIFF, GIFF	
11.6	Image evaluation	
11.7	Layers	
11.8	Filters	
11.9	Image manipulation-scaling, cropping, rotation	
12.	Introduction to Video	04
12.1	Video in Multimedia	
12.2	Basics of Motion-Video	
12.3	Sources of Motion-Video	
12.4	Video formats, lines, frames, fields	
12.5	TV Broadcast standards-PAL, NTSC, SECAM	

Text Book :

1. Computer Graphics ; Donald Hearn , M.Pauline Baker ; PHI
2. Multimedia: Sound and Video by Jose Lozano, PHI
3. Multimedia Graphics by Leony Fernandez-Elias and John Villamil-Casanova, PHI

Software Engineering

L T P
4 - -

Total Mark : 100
Theory : 80
I.A : 20

RATIONALE

Software Engineering technology is now a days largely adopted by most computer based applications to bridge the gap between a human user & the computer. By this multiple media are implemented and used in computer based application to enhance their understanding ability before a common man. This will expose the students to various project building and testing techniques which they will encounter during there professional life as a software engineer or manager.

Course Content

Periods

- | | | |
|------------|---|-----------|
| 1.0 | Introduction to software engineering | 06 |
| 1.1 | Explain the relevance of software engineering | |
| 1.2 | State the software characteristics and applications | |
| 1.3 | Explain the emergence of software engineering. | |
| 1.4 | Briefly explain early computer programming high level language programming control flow based design data flow oriented design data structure oriented design object and component bases design | |
| 1.5 | State the software life cycle models | |
| 1.6 | Explain classical water fall and iterative water fall models | |
| 1.7 | Explain prototyping | |
| 1.8 | Explain evolutionary model | |
| 1.9 | Explain spiral model | |
| 2.0 | Understanding project management | 06 |
| 2.1 | State the project management concepts people, product, process and project | |
| 2.2 | Briefly explain the term project management | |
| 2.3 | Explain the project size estimation metrics line of control (LDC) and function point metric (FP) | |
| 2.4 | Distinguish between the project estimation techniques empirical estimation techniques, heuristic techniques, analytical estimation techniques | |
| 2.5 | Briefly explain the three COCOMO models, Basic, Intermediate and complete | |
| 2.6 | State the effect of schedule change on lost | |
| 2.7 | State the Jensen model for stating level estimation | |
| 2.8 | State the tools for scheduling | |
| 2.9 | Explain briefly the use of work breakdown structure, activity networks, Gantt chart and PERT in scheduling | |
| 2.10 | xplain briefly organization structure | |
| 2.11 | xplain briefly team structure | |
| 2.12 | iscuss the Importance of risk identification risk assessment and risk containment with | |

reference to risk management

- 3.0 Understanding the need of requirement Analysis 06**
- 3.1 Explain the need for requirement analysis
- 3.2 Briefly explain the steps in requirement dictation for software- initiating the process facilitated application specific techniques and quality function deployment
- 3.2 List the principles of analysis
- 3.3 Briefly explain software prototyping
- 3.4 State the prototyping approach
- 3.5 State the prototyping tools and methods
- 3.6 State the S/W requirement specification principle
- 3.7 Define SRS document
- 3.8 Briefly explain the characteristics and organization of SRS document

- 4.0 Understanding the principles and methods of S/W design 06**
- 4.1 State the importance of S/W design
- 4.2 State the design principles and concepts
- 4.3 Define cohesion and coupling
- 4.4 State the classification of cohesiveness
- 4.5 State the classification of coupling
- 4.6 Compare the S/W design approaches
- 4.7 Briefly explain structured analysis methodology
- 4.8 State the use of DF diagrams
- 4.9 List the symbols used in DFD
- 4.10 Explain the construction of DFD
- 4.11 State the limitations of DFD
- 4.12 State the uses of structure of chart and structured design
- 4.13 State the principles of transformation of DFD to structure chart
- 4.14 Define the transform analysis and transaction analysis
- 4.15 Review of object oriented concepts
- 4.16 Compare the object oriented and function oriented design

- 5.0 Understanding the principles of user interface design 06**
- 5.1 Briefly explain the rules for UID
- 5.2 Briefly explain the interface design models
- 5.3 State the UID Process and models
- 5.4 Briefly explain the interface design activities defining interface objects, actions and the design issues
 - a. Compare the various types of interface
 - b. Briefly explain the main aspects of Graphical UI, Text based interface

6.0	Understanding the principles of S/W coding	06
6.1	Define coding standards and guidelines	
6.2	Briefly explain code walk through	
6.3	Briefly explain code inspections and software documentation	
6.4	Distinguish between unit testing integration testing and system testing	
6.5	Explain unit testing	
6.6	Methods of black box testing	
6.7	State the equivalence class partitioning and boundary value analysis	
6.8	State the methodologies for white box testing	
6.9	Briefly explain the different white box methodologies statement coverage branch coverage, condition coverage, path coverage, data flow based testing and mutation testing	
6.10	Debugging approaches	
6.11	Debugging guidelines	
6.12	State the need for integration testing	
6.13	Compare phased and incremental integration testing	
6.14	Explain the system testing alphas beta and acceptance testing	
6.15	State the need for stress testing and error seeding	
6.16	State the general issues associated with testing	
7.0	Understanding the importance of s/w reliability	06
7.1	Briefly explain the importance of S/W reliability	
7.2	Distinguish between the different reliability metrics	
7.3	State the reliability growth modeling	
7.4	Explain the characteristics of quality software	
7.5	Explain the evolution of s/w quality management system	
7.6	Explain the Importance, requirement and procedure to gain ISO 9000 certification for software industry	
7.7	State the SEI capability maturity model	
7.8	Compare between ISO 9000 certification	
8.0	Understanding the computer aided software engineering	06
8.1	Briefly explain CASE benefits of CASE	
8.2	Briefly explain the building blocks for CASE	
8.3	CASE support in S/w life cycle	
8.4	List the different CASE tools	
9.0	Advanced topics in software engineering	12
9.1	Briefly explain the component based software engineering (CBSE)	
9.2	Describe the structure of client server (C/S) systems	
9.3	Explain the design of web-based applications.	
9.4	Briefly explain the architectural design, navigation design interface design	
9.5	State the principles and importance of business process re engineering	

- 9.6 Explain software re engineering, software maintenance and S/W re engineering process model
- 9.7 Define reverse engineering
- 9.8 State the importance of reverse engineering to understand processing data and user interfacing
- 9.9 Define forward engineering
- 9.10 State the use of forward engineering in client server architecture, object Oriented architecture and user interface

BOOKS

1. Fundamentals of software engineering - Rajib Mall. Prentice hall of India
2. Software engineering a practitioners approach - Roger S. Pressman., M.C Grawhill international

Computer Network & Data Communication

L	T	P	Total Mark	: 100
4	-	-	Theory	: 80
			I.A	: 20

RATIONALE

Computer Network & Data Communication is the prime area of Application Development. Business applications need to store & process large volume of data. This paper teaches the methodology of storing & processing data for commercial application. It also deals in the security & other aspects of DBMS.

1.0	BASIC of Data Communication	06
1.1	Introduction to Data Transfer	
1.2	Asynchronous & Synchronous Transmission	
2.0	Reliable Data Transmission	06
2.1	Data Transfer rate, channel capacity	
2.2	Packet Switching	
2.3	Datagrams and virtual circuits	
2.5	Different methods of Error Detection, Error Recovery or Error Correction, Flow Control	
3.0	Connections and Interfacing	06
3.1	Introduction to Serial and parallel connections	
3.2	Half Duplex, Full Duplex, Parallel connection	
3.3	IEEE P1394, RJ-45, Modular Connection Modem	
4.0	Multiplexing	06
4.1	Concept of Multiplexing	
5.0	Network Applications	06
5.1	Introduction, Network users, Central Servers	
5.2	LAN Environment, Device Sharing, Print servers	
5.3	Directory Services, Network benefits, Network Disadvantages	
6.0	Network Structures	06
6.1	Topologies	
6.2	Structured Wiring System, Media Twisted Pair, Coaxial cable, Fiber Optics	
7.0	Standards	06
7.1	Introduction to OSI reference Model, seven layer model, Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer	
7.2	Advantage of Layering & Existing Standards,	

8.0	LAN Signaling and Access	06
8.1	Signaling Base band,	
8.2	Manchester encoding & differential Manchester Encoding	
8.3	Modulation techniques: Phase Modulation	
8.4	4bit / 5bit Encoding (4b/5b), 5bit / 6bit encoding (5b/6b)	
8.5	Broadband and carrier band.	
8.6	Access: Carrier sense Multiple Access (CSMA), P-persistent CSMA, CSMA/CD (Collision Detection), CSMA /CA (Collision Avoidance)	
8.7	Token passing, Token Ring, Token Bus, Slotted Ring, Demand Priority, Fast Switching.	
9.0	Popular LAN Standards	04
9.1	Different LAN standards: IEEE 802.3, 10base5, 10base2, 10baseT, Switched Ethernet, IEEE802.4, IEEE 802.5, Token Structure, IEEE 802.6, IEEE 802.1, Physical Layout, Data Encoding and Transmission, FDDI, ATM	
10.0	Interconnection	04
10.1	Use of Repeaters, Bridges, Router, Gateways, Public Network, X.25, Frame Relay	
11.0	Iteroperability	04
	TCP/IP protocol suite	

BOOKS:

1. Data Communication & Computer Networks by W.Stallings (PHI),

Database Management System

L T P
4 - -

Total Mark : 100
Theory : 80
I.A : 20

RATIONALE

Database is the prime area of Application Development. Business applications need to store & process large volume of data. This paper teaches the methodology of storing & processing data for commercial application. It also deals in the security & other aspects of DBMS.

- 1.0 BASIC CONCEPTS OF DBMS** **08**
- 1.1 Discuss the Purpose of database Systems
- 1.2 Explain Data abstraction
- 1.3 Explain Database users
- 1.4 Explain Data definition language
- 1.5 Explain Data Dictionary

- 2.0 DATA MODELS** **08**
- 2.1 Explain Data independence
- 2.2 Describe Entity relationship models
- 2.3 Describe Entity sets and Relationship sets
- 2.4 Explain Attributes
- 2.5 Explain Mapping constraints
- 2.6 Draw E-R Diagram
- 2.7 Describe Relational model
- 2.8 Describe Hierarchical model
- 2.9 Describe Network model

- 3.0 RELATIONAL DATABASE** **08**
- 3.1 Explain Relational algebra
- 3.2 Explain Different operators select, project, join , simple Examples

- 4.0 NORMALIZATION IN RELATIONAL SYSTEM** **08**
- 4.1 Explain Functional Dependencies
- 4.2 Explain Lossless join
- 4.3 Discuss Importance of normalization
- 4.4 Discuss & Compare First second and third normal forms
- 4.5 Explain BCNF

- 5.0 STRUCTURED QUERY LANGUAGE** **08**
- 5.1 Give Elementary idea of Query language
- 5.2 Discuss Queries in SQL
- 5.3 Write simple queries to create, update, insert in SQL

6.0	TRANSACTION PROCESSING CONCEPTS	08
6.1	Give idea about transaction processing	
6.2	Explain Transaction & system concept	
6.3	Explain Desirable properties of transaction	
6.4	Discuss Schedules and recoverability	
7.0	CONCURRENCY CONTROL CONCEPTS	06
7.1	Explain Basic concepts,	
7.2	Concepts of locks, Live Lock, Dead Lock,	
7.3	Serializability(only fundamentals)	
8.0	SECURITY AND INTEGRITY	06
8.1	Describe Authorization and views	
8.2	Explain Security constraints	
8.3	Explain Integrity Constraints	
8.4	Discuss Encryption	

BOOKS:

1. An Introduction to Database Systems By:- C.J. Date
2. DATABASE System Concepts A. Silberschatz, H.F. Korth,

Mobile Computing

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Mobile Computing is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1.	Introduction to Wireless networks & Mobile Computing	04
1.1	Networks	
1.2	Wireless Networks	
1.3	Mobile Computing	
1.4	Mobile Computing Characteristics	
1.5	Application of Mobile Computing	
2.	Introduction to Mobile Development Frameworks	04
2.1	C/S architecture	
2.2	n-tier architecture	
2.3	n-tier architecture and www	
2.4	Peer-to Peer architecture	
2.5	Mobile agent architecture	
3.	Wireless Transmission	04
3.1	Introduction	
3.2	Signals	
3.3	Period, Frequency and Bandwidth.	
3.4	Antennas	
3.5	Signal Propagation	
3.6	Multiplexing	
3.7	Modulation	
3.8	Spread Spectrum	
3.9	Cellular System	
4.	Medium Access Control	04
4.1	Introduction	
4.2	Hidden/ Exposed Terminals	
4.3	The basic Access Method	
4.4	Near / Far Terminals	
4.5	SDMA, FDMA, TDMA, CDMA	

5.	Wireless LANs	04
5.1	Wireless LAN and communication	
5.2	Infrared	
5.3	Radio Frequency	
5.4	IR Advantages and Disadvantages	
5.5	RF Advantages and Disadvantages	
5.6	Wireless Network Architecture Logical	
5.7	Types of WLAN	
5.8	IEEE 802.11	
5.9	MAC layer	
5.10	Security	
5.11	Synchronization	
5.12	Power Management	
5.13	Roaming	
5.14	Bluetooth Overview	
6.	Ubiquitous Wireless Communication	04
6.1	Introduction	
6.2	Scenario of Mobile Communication	
6.3	Mobile Communication Generations 1G to 3G	
6.4	3 rd Generation Mobile Communication Network	
6.5	Universal Mobile telecommunication System (UMTS)	
7.	Mobile IP	04
7.1	Overview	
7.2	Working with mobile IP	
7.3	Mobile IP Entities	
7.4	Mobility Agents	
7.5	Components of Mobile IP	
7.6	Mobile IPv6 Features	
7.7	Mobile IPv6 Address Types	
7.8	Mobile IPv6 Address Scope	
7.9	Mobile IP Operation	
8.	Mobile Transport Layer	04
8.1	Traditional TCP and implications on mobility	
8.2	Indirect TCP	
8.3	Snooping TCP	
8.4	Mobile TCP	
8.5	Selective Retransmission	
8.6	Transaction oriented TCP	
9.	Mobile Computing	04
9.1	WWW architecture for Mobile computing	
9.2	Need of WAP	
9.3	Benefits of WAP	
9.4	Examples of WAP	
9.5	WAP- Architecture	
9.6	WAP protocols	
9.7	WML	

9.8	WAP Push architecture	
9.9	Push-Pull based data acquisition	
9.10	I-mode	
9.11	WAP 2.x	
10.	Wireless Telecomm Networks	04
10.1	GSM	
10.2	GPRS	
10.3	IS-95	
10.4	CDMA-2000	
10.5	W-CDMA	
10.6	Wireless Sensor Networks	
11.	Messaging Services	04
11.1	Short Message Services (SMS)	
11.2	Multimedia Message Services (MMS)	
11.3	Multimedia transmission over wireless	
12.	Pervasive Computing and Information Access	04
12.1	Introduction	
12.2	Pervasive Computing History	
12.3	Pervasive Computing Technology	
12.4	Pervasive Computing Characteristics	
12.5	Application Framework	
12.6	Issues	
13.	Web Services and Mobile Web	04
13.1	Introduction to web services	
13.2	Simple Object Access Protocol (SOAP)	
13.3	Universal Description, Discovery and Integration(UDDI)	
13.4	Web Services Description Language (WSDL)	
13.5	Enhanced Data Rate for GSM Evolution (EDGE)	
13.6	WiFi	
13.7	WiMax	
13.8	Introduction to Mobile Web	
13.9	Mobile Web Browser	
14.	Developing Mobile Application with J2ME	04
14.1	Introduction	
14.2	Introduction to J2ME	
14.3	Installing the J2ME Development Kit	
14.4	Understanding the Process of MIDlets creation without toolkit	
15.	Smart Phone	04
15.1	Introduction	
15.2	How they are built	
15.3	What they do	
15.4	History Smart Phone	
15.5	Smart phone Hardware	
15.6	Smart phone Operating System	

- 15.7 Brew
- 15.8 Smart Phone Application
- 15.9 Word Processing Application with Smart Phones
- 15.10 E-Book Reading
- 15.11 Smart phone Accessories
- 15.12 Stereo Headphones

Books

1. Mobile Computing ; By : Dr. N.NJani, Kamaljit I. Lakhtaria, Dr. Ashish N. Jani & Nita Kanabar (S.Chand & Company Ltd.)

Graphics & Multimedia Lab

L T P
0 0 6

Practical : 50
Sessional : 50

- 1.0 Implementing DDA, Bresenham Line generation algorithm.
- 2.0 Implementing mid point circle generation algorithm.
- 3.0 Implementing area fill algorithm.
- 4.0 Working with Sound Forge
- 5.0 Working with Photoshop
- 6.0 Working with Adobe Premier
- 7.0 Working with Authoring tool (Authorware professional / Toolbook Instructor)
- 8.0 Working with Flash

Data Base Management System Lab

L T P
0 0 6

Practical : 50
Sessional : 25

1. INTORODUCTION IN ORACLE

Organization of Data, Accessing Data , Core Package, DBMS Tools

2. WORKING WITH SQL

SQL Operators , Rules of SQL, Creating Table, inserting into Table, Altering , Updating Table, Query using SELECT Clause, Use of HAVING, GROUP BY, ANY, ALL, SOME etc.

3. VIEWS, INDEX, SYNONYMS

Creating VIEW, using , Updating, Altering View, Creating and Dropping Index, Synonyms for Table and View

4. USING PL/SQL BLOCKS IN SQL

The PL/SQL execution environment, the PL /SQL syntax, Data type, understanding the PL/SQL block structure, Error handling in PL/SQL

4. WORKING WITH SQL *REPORT WRITER

Getting started, Selecting dump report, control break report

Visual Basic Lab.

L T P
0 0 6

Practical : 50
Sessional : 25

1. Introduction

- 1.1 Start & Exit Visual Basic, Elementary idea on Objects
- 1.2 Visual basic Interface
- 1.3 Debug Windows
- 1.4 Print Command
- 1.5 Visual Basic Arithmetic Operator

2. Variables And Functions

- 2.1 Variable Names
- 2.2 Variable Type
- 2.3 Range of Variable values
- 2.4 Functions

3. Build Project & Customize Form

- 3.1 About Project
- 3.2 Form
- 3.3 Form events.

4. Visual Basic Control

- 4.1 Custom Control
- 4.2 Control in Form

5. Function & Procedures

- 5.1 About functions & Procedures
- 5.2 Form, Standards & Class Modules
- 5.3 Sub Procedures
- 5.4 Do-event function
- 5.5 Control Arrays

6. Accessing a Database

- 6.1 About Database
- 6.2 Using Data Manager
- 6.3 Creating a Database
- 6.4 Creating a new table
- 6.5 Attaching a table
- 6.6 Changing Design of existing Table
- 6.7 Creating Indexes
- 6.8 Working with Data

7. Create Form with Data Control

- 7.1 Data aware Control
- 7.2 Create a Form using Data Control
- 7.3 Manipulating Data
- 7.4 Create Menu Bar
- 7.5 Display Menu Item Code

- 8. Object Linking and Embedding**
- 8.1 About OLE
- 8.2 Terms in OLE
- 8.3 OLE Automation
- 8.4 OLE Control pop menus
- 8.5 Create OLE object at design time
- 8.6 Create part of an OLE object
- 8.7 testing Embedding/ linking

- 9. Visual Software Development**
- 9.1 RAD Tools
- 9.2 Visual Components
- 9.3 Basic Interface
- 9.4 Creating and Linking Object through Basic Programming
- 9.5 Activity

- 10. Advanced Features of Visual Basic**
- 10.1 Visual Basic Controls
- 10.2 Simple Animation using Active X
- 10.3 Drag & Drop
- 10.4 Linking to Database

- 11. Active X and Windows API**
- 11.1 Creating Active X DLL
- 11.2 Using Windows API in VB

6th Semester

e- Business

L T P
4 1 -

Total Mark : 100
Theory : 80
I.A : 20

RATIONALE

e- commerce is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1. E-Commerce in India	08
1.1 History of the Internet	
1.2 The path into the future	
1.3 Internet initiation in India	
1.4 The stages in Information technology	
1.5 The Internet paradigm for business	
1.6 What is driving internet growth	
1.7 The Holy Grail of Corporate Nirvana	
1.8 The customer challenge	
1.9 The current Electronic scenario in India	
1.10 Future Tense	
2. Electronic Commerce Basics	05
2.1 The commerce in e-commerce (Evolution)	
2.2 Internet commerce	
2.3 Models of Electronic Commerce	
2.4 Managing Internet Marketing	
3. Marketing Channels	05
3.1 Introduction	
3.2 The Channel for the net	
3.3 Internet branding.	
3.4 A different pitch for online advertising	
4. CRM & Retailing	05
4.1 Introduction	
4.2 Steps to make an online purchase	
4.3 Retailing in Internet Marketing	
5. E-Commerce is indispensable	05
5.1 The supply chain	
5.2 Electronic commerce and global business process	
5.3 The E-Commerce Eras	

5.4	Market pricing	
5.5	What should your e-commerce site have?	
5.6	A minimum e-commerce site in five easy steps	
6.	Transaction in Electronic Commerce	07
6.1	How would you make an e-commerce deal safe	
6.2	Online Money ecash	
6.3	The steps to the Anatomy of a Transaction	
6.4	The latest in e-commerce security	
6.5	The actors in an electronic commerce transaction	
6.6	More business through electronic commerce	
6.7	Application emerging on the Internet	
7.	The Future	05
7.1	Business-to-Business Commerce Opportunity	
7.2	Internet commerce Today and Tomorrow	
7.3	The beginning: The internet as a retail store	
7.4	The Future	
8.	Legal aspects in Electronic Commerce	05
8.1	Legal Issues	
8.2	Facilitating e-commerce through legislation	
8.3	Does Internet commerce beats tax laws	
8.4	New laws for e-commerce success in India	
8.5	The legal future for e-commerce and e-tailing	
9.	The dotcom world	05
9.1	Launching an e-commerce site	
9.2	A method in the dotcom pricing madness	
9.3	Going public: The IPO issue	
9.4	Dotcom funding	
10.	Venture Capital	05
10.1	What is venture capital?	
10.2	Getting venture funding	
10.3	Structuring a deal	
10.4	Stocks and shares	
10.5	Indian Venture capital	
10.6	Investment conditions and restrictions for a venture capitalist	
10.7	The Global Scenario	
10.8	Venture capital Issues	
10.9	Other financing options	
11.	Case Studies	05
11.1	EXPOPOINT.COM – An Indian Portal	
11.2	e-Gurucool.com – An Indian Portal	

Books

1. e-commerce ; By : Bhushan Dewan (S.Chand & Company Ltd.)

Internet and Web Technology

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Internet is the buzz word in today's society. It is a vast pool of information. Without the knowledge of Internet we are in total darkness. This papers deals with *TCP/IP* which is the backbone of Internet. Web pages are used to project the profile on an organization, product or person etc. This paper also deals with the design aspects of Web Page.

1.0 Internet Fundamentals 10

- 1.1 Describe Motivation for internet working
- 1.2 Narrate History & scope of internet
- 1.3 Explain Internet protocol and standardization
- 1.4 Discuss Role of ISP & Factors for choosing an ISP
- 1.5 State Internet service providers in India
- 1.6 Explain Types of connectivity such as Dial Up, leased, VSA T etc.
- 1.7 Discuss Internet server & client modules on various operating systems

2.0 TCP / IP 15

- 2.1 Explain TCP / IP internet layering model
- 2.2 Discuss Reliable stream transport service (TCP) , Need for stream delivery
- 2.3 Properties of reliable delivery service
- 2.4 Providing reliability
- 2.5 Idea behind slide windows
- 2.6 Ports connections and end points , Segment, stream, sequence number
- 2.7 TCP segment format
- 2.8 TCP header
- 2.9 TCP checksum
- 2.10 Acknowledgement
- 2.11 Time out and retransmission
- 2.12 Response to congestion
- 2.13 Establishment of a TCP connection
- 2.14 Source and destination address
- 2.15 Protocol number
- 2.16 Checksum
- 2.17 Closing TCP connection
- 2.18 TCP connection reset.
- 2.20 Explain Connection less data gram delivery (Internet protocol)
- 2.21 Concept of unreliable delivery
- 2.22 Connection less delivery system
- 2.23 Purpose of internet protocol
- 2.24 IP header
- 2.25 Source and destination address
- 2.26 Protocol number

- 2.27 Checksum
- 2.28 Routing in an internet
- 2.29 Direct and indirect delivery
- 2.30 Table driver IP routing
- 2.31 Default roots
- 2.32 Post specific roots
- 2.33 Rooting with IP address
- 2.34 Obtaining a subnet mask
- 2.35 Benefits of TCP/ IP
- 2.36 Explain Subnet Address Extension
- 2.37 Introduction to subnet address extension Minimizing network numbers
- 2.38 Transparent routers
- 2.39 Subnet addressing
- 2.40 Flexibility in subnet address assignment Implementation of subnet with mask
- 2.41 Subnet mask representation
- 2.42 Routing in the presence of subnet
- 2.43 Introduction to UDP
- 2.44 Identifying the ultimate destination 1.5.3 Format of UDP message
- 2.45 Discuss Internet addressing
- 2.46 Explain IP address / domain name address: why both
- 2.47 Explain Mapping of domain name to address
- 2.48 Explain Domain name resolution.
- 2.49 Explain Efficient translation
- 2.50 State Abbreviation of domain name
- 2.51 Discuss Obtaining authority for a sub domain

3.0 Internet Applications & Services 10

- 3.1 Explain E-Mail networks
- 3.2 Discuss E-Mail protocols
- 3.3 Explain Format of an e-mail message
- 3.4 Explain E-mail routing
- 3.5 Explain E-mail clients, POP3,IMAP
- 3.6 Discuss Public domain software
- 3.7 Discuss Types of FTP servers
- 3.8 Discuss FTP clients
- 3.9 Explain Telnet protocol
- 3.10 Explain Server domain Discuss
- 3.11 Telnet clients Discuss Terminal emulation
- 3.12 Explain IRC network & servers
- 3.12 Explain Channels
- 3.13 Explain World Wide Web
- 3.14 Discuss Browser

4.0 HTML & Interactive Tools 15

- 4.1 Discuss Document overview Explain Header elements

- 4.2 Discuss Section headings
- 4.3 Explain Block oriented elements Discuss Lists
- 4.4 Discuss Inline elements
- 4.5 Discuss Visual markup
- 4.6 Explain Hypertext links
- 4.7 Explain Uniform Resource Locator Discuss Imagers
- 4.8 Discuss Tables
- 4.9 Discuss Special characters
- 4.10 Explain CGI (Common Gateway Interface) Explain Active X
- 4.11 Discuss VB Script
- 4.12 Discuss Java Script
- 4.13 XML application
- 4.14 XML rules
- 4.15 Displaying XML documents
- 4.16 Parts of XML document
- 4.17 Concepts of DTD
- 4.18 Entity definition & classification Concepts of templates & its use
Filtering & sorting

5.0 Search Engines 05

- 5.1 Give Technology overview
- 5.2 Discuss Popular search engines
- 5.3 Explain Registration of web site in a search engines

6.0 e- Commerce 05

- 6.1 Electronic commerce Environment & Opportunities
- 6.1.1 Background
- 6.1.2 Electronic commerce environment
- 6.1.3 Electronics market place technologies 6.1.4 Modes of electronic commerce

Text Books:

1. Internet working with TCP/IP Vol-I: Principles, Protocols & architecture
By Douglas E. Comer - PHI
2. HTML: The definitive guide - By Chuck Musciano & Kennedy

Reference Books:

1. Dynamic HTML : The definitive reference By Danny Good Goodman
2. Dynamic HTML in Action By Schurman & Pardi- PHO/Microsoft Press.
3. Internet working with TCP/IP Vol-II: Design, implementation & internals
By Douglas E. Comer -& David L. Stevens - PHI

Network Security & Cryptography

L T P
4 - -

Total Mark : 100
Theory : 80

RATIONALE

Now a day almost all It related jobs use the internet as the backbone service. Therefore it is highly essential for an IT professional to have a fare idea on the security aspect of internet service. This paper aims to provide the student with the various security threats in internet and discuss the different techniques to implement this. One of such technique is implementation of cryptography in the confidential data to be floated in the internet.

- | | | |
|-----|--|-----------|
| 1. | Possible attacks on computers | 05 |
| 1.1 | The need for security | |
| 1.2 | Security approach | |
| 1.3 | Principles of security | |
| 1.4 | Types of attacks | |
| 2. | Cryptography concepts | 10 |
| 2.1 | Plain text & Cipher Text | |
| 2.2 | Substitution techniques | |
| 2.3 | Transposition techniques | |
| 2.4 | Encryption & Decryption | |
| 2.5 | Symmetric & Asymmetric key cryptography | |
| 3. | Symmetric & Asymmetric key algorithms | 15 |
| 3.1 | Symmetric key algorithm types | |
| 3.2 | Overview of Symmetric key cryptography | |
| 3.3 | Data encryption standards | |
| 3.4 | Over view of Asymmetric key cryptography | |
| 3.5 | The RSA algorithm | |
| 3.6 | Symmetric & Asymmetric key cryptography | |
| 3.7 | Digital signature | |
| 4. | Digital certificate & Public key infrastructure | 10 |
| 4.1 | Digital certificates | |
| 4.2 | Private key management | |
| 4.3 | PKIX Model | |
| 4.4 | Public key cryptography standards | |
| 5. | Internet security protocols | 10 |
| 5.1 | Basic concept | |
| 5.2 | Secure socket layer | |
| 5.3 | Transport layer security | |

5.4	Secure Hyper text transfer protocol(SHTTP)	
5.5	Time stamping protocol (TSP)	
5.6	Secure electronic transaction (SET)	
6.	User authentication	05
6.1	Authentication basics	
6.2	Password	
6.3	Authentication Tokens	
6.4	Certificate based authentication	
6.5	Biometric authentication	
7.	Network Security & VPN	05
7.1	Brief introduction of TCP/IP	
7.2	Firewall	
7.3	IP Security	
7.4	Virtual Private Network (VPN)	

Books :

Cryptography & Network security ; By: A.Kahate : TMH

Software Project Management

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Software project Management is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1. Introduction to Software Project Management	05
1.1 Introduction	
1.2 Why is software project management important	
1.3 What is a Project	
1.4 Software project versus other types of project	
1.5 Contract Management and technical project management	
1.6 Activities covered by software project management	
1.7 Plans, methods and methodologies	
1.8 Some ways of categorizing software project	
1.9 What is management	
1.10 Problems with software projects	
1.11 Setting objects	
1.12 Stakeholders	
1.13 The business case	
1.14 Requirement Specification	
1.15 Management Control	
1.16 Conclusion	
1.17 Further Exercise	
2. Step wise an overview of Project Planning	05
2.1 Introduction to step wise project planning	
2.2 Step 0: Select Project	
2.3 Step 1: Identify project scope and objectives	
2.4 Step 2: Identify project infrastructure	
2.5 Step 3: Analyse project characteristics	
2.6 Step 4: Identify Project products and activities	
2.7 Step 5: Estimate effort for each activity	
2.8 Step 6: Identify activity risks	
2.9 Step 7: Allocate resources	
2.10 Step 8: Review/ publicize plan	
2.11 Step 9 and 10 : Execute plan/ lower levels of planning	
2.12 Conclusion	
2.13 Further exercises.	

3.	Programme Management and Project evaluation	05
3.1	Introduction	
3.2	Programme management	
3.3	Managing the allocation of resources within programme.	
3.4	Strategic programme management	
3.5	Creating a programme	
3.6	Aids to Programme management	
3.7	Benefits management	
3.8	Evaluation of Individual Project	
3.9	Technical assessment	
3.10	Cost-benefit analysis	
3.11	Cash flow forecasting	
3.12	Cost-benefit evaluation techniques	
3.13	Risk evaluation	
3.14	conclusion	
3.15	Further exercises.	
4.	Selection of an appropriate project approach	05
4.1	Introduction	
4.2	Choosing Technologies	
4.3	Technical Plan contents list	
4.4	Choice of Process Models	
4.5	Structure versus speed of delivery	
4.6	The waterfall model	
4.7	The V-process model	
4.8	The spiral model	
4.9	Software Prototyping	
4.10	Other ways of categorizing prototypes	
4.11	Incremental delivery	
4.12	Dynamic Systems Development Method	
4.13	Extreme programming	
4.14	Managing Iterative processes	
4.15	Selecting the most appropriate model	
4.16	Conclusion	
4.17	Further Exercises	
5.	Software effort estimation	05
5.1	Introduction	
5.2	Where are estimate done	
5.3	Problems with over-and under-estimates	
5.4	The basis for software estimating	
5.5	Software effort estimation techniques	
5.6	Expert judgment	
5.7	Estimating by analogy	
5.8	Albrecht function point analysis	
5.9	Function point Mark-II	
5.10	COSMIC full function points	
5.11	A procedural code-oriented approach	
5.12	COCOMO: a parametric model	

5.13	Conclusion	
6.	Activity planning	05
6.1	Introduction	
6.2	The objective of activity planning	
6.3	When to plan	
6.4	Project Schedules	
6.5	Projects and activities	
6.6	Sequencing and scheduling activities	
6.7	Network planning models	
6.8	Formulating a network model	
6.9	Adding the time dimension	
6.10	The forward pass	
6.11	The backward pass	
6.12	Identifying the critical path	
6.13	Activity float	
6.14	Shortening the project duration	
6.15	Identifying critical activities	
6.16	Activity-on-arrow network	
6.17	Conclusion	
6.18	Further Exercises	
7.	Control Unit	05
7.1	Introduction	
7.2	Risk	
7.3	Categories of Risk	
7.4	A frame work for dealing with risk	
7.5	Risk Identification	
7.6	Risk Assessment	
7.7	Risk Planning	
7.8	Risk Management	
7.9	Evaluating risks to the schedule	
7.10	Applying the PERT technique	
7.11	Monte Carlo simulation	
7.12	Critical chain concept	
7.13	Conclusion	
7.14	Further Exercises	
8.	Resource Allocation	05
8.1	Introduction	
8.2	The name of resources	
8.3	Identifying resource requirements	
8.4	Scheduling resources	
8.5	Creating critical path	
8.6	Counting the cost	
8.7	Being Specific	
8.8	Publishing the resource schedule	
8.9	Cost schedules	
8.10	The scheduling sequence	
8.11	Conclusion	
8.12	Further Exercises	

9.	Monitoring and control	05
9.1	Introduction	
9.2	Creating the frame work	
9.3	Collecting the Data	
9.4	Visualizing progress	
9.5	Cost Monitoring	
9.6	Earned value analysis	
9.7	Prioritizing monitoring	
9.8	Getting the project back to target	
9.9	Change Control	
9.10	Conclusion	
9.11	Further Exercises	
10.	Managing contracts	05
10.1	Introduction	
10.2	The ISO 12207 approach to the acquisition and supply of software	
10.3	The supply process	
10.4	Types of contract	
10.5	Stages in contract placement	
10.6	Typical terms of a contract	
10.7	Contract management	
10.8	Acceptance	
10.9	Conclusion	
10.10	Further Exercises	
11.	Managing people and organizing teams	05
11.1	Introduction	
11.2	Understanding behaviour	
11.3	Organizational behaviour a background	
11.4	Selecting the right person for the job	
11.5	Instruction in the best method	
11.6	Motivation	
11.7	The Oldham-Hackman job characteristics model	
11.8	Working in groups	
11.9	Becoming a team	
11.10	Decision making	
11.11	Leadership	
11.12	Organizational structures	
11.13	Dispersed and virtual team	
11.14	The influence of culture	
11.15	Stress	
11.16	Health and safety	
11.17	Conclusion	
11.18	Further Exercises	
12.	Software Quality	03
12.1	Introduction	
12.2	The place of software quality in project planning	
12.3	The importance of software quality	

- 12.4 Defining software quality
- 12.5 ISO 9126
- 12.6 Practical Software quality measures
- 12.7 Product versus process quality management
- 12.8 External standards
- 12.9 Techniques to help enhance software quality
- 12.10 Quality plans
- 12.11 Conclusion
- 12.12 Further Exercises

13. Small Projects

02

- 13.1 Introduction
- 13.2 Some problems with student projects
- 13.3 Content of a project plan
- 13.4 Conclusion

Books

1. Software Project Management ; By : Bob Hughes and Mike Cotterell (TMH)

Algorithm Analysis & Design (Elective)

L T P
4 0 0

Theory :100
End Term Exam : 80
I.A. : 20

RATIONALE

Algorithm Analysis & Design is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT PERIODS

1.0 INTRODUCTION	05
1.1 Algorithm Concept	
1.2 Algorithm Analysis Overview	
1.3 Review of basic data structure & concepts	
1.4 Big-oh Notation	
2.1 Divide & conquer method	10
i) General method	
ii) Case study of binary search	
iii) Case study of merge sort	
iv) Case study of quick sort	
v) Case study of selection	
2.2 Greedy Method	10
i) General Method	
ii) Case study of Keysnap problem iii)Optimal merge pattern	
iv) Minimum spanning trees	
v) Single source shortest path	
3.1 The general method	
3.2 Multistage graphs	
3.3 Optional binary search trees	
3.4 Reliability design	
3.5 Flowshop scheduling	
1.1 T he general method	
1.2 Case study of 8-queen problem 1.3 Sum of subject	
1.4 Hamiltonian cycles	
5.1 The general method	
5.2 Evaluation & Interpolation	
5.3 Modular arithmetic	

ENTERPRISE RESOURCE PLANNING (ELECTIVE)

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Enterprise Resource Planning is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1. Introduction to Enterprise Resource Planning	05
1.1 Overview of ERP, MRP, MRPII and Evolution of ERP	
1.2 Integrated Management Systems	
1.3 Reasons for the growth of ERP	
1.4 Business Modeling, Integrated Data Model, Foundations of IS in Business	
1.5 Obstacles of applying IT, ERP Market. BOM	
1.6 What is the Connection between ERP and MRP ?	
2. Basic concepts of ERP	05
2.1 Why is ERP Important to a company ?	
2.2 How does ERP create value?	
2.3 How has ERP changed the IS function?	
2.4 How does ERP enable inter organisation collaboration?	
2.5 How does ERP create value?	
3.0 Risks and Benefits of ERP	10
3.1 Justifying ERP Investments,	
3.2 Quantifiable benefits from an ERP system ,	
3.3 The Intangible Benefits of ERP,	
3.4 other factors for justifying ERP investments.	
3.5 Risks of ERP, Risk factors of ERP implementation.	
3.6 Crucial factors that decides the success or failure of an ERP system.	
3.7 People issues, Process Risks , Technological Risks,	
3.8 Implementation issues, Operation and maintenance issues,	
3.9 Managing Risk on ERP Projects.,	
3.9. A Benefits of ERP	
4.0 ERP and related Technologies	10
4.1 Business Process Re-engineering (BPR)– BPR Process, Clean Slate Re-engineering,	
4.2 Technology Enabled Re-engineering	
4.3 Myths regarding BPR	
4.4 Business Intelligence Systems-Data Mining, Data Warehousing	

4.5	On-Line Analytical Processing (OLAP)	
4.6	Supply Chain Management	
5.0	ERP - functional Modules	10
5.1	Finance, Accounting Systems	
5.2	Manufacturing and Production System	
5.3	Sales and Distribution Systems,	
5.4	Human Resource Systems	
5.5	Plant Maintenance System	
5.6	Materials Management System	
5.7	Quality Management System	
5.8	ERP System Options and Selection	
5.9	ERP proposal Evaluation.	
6.0	ERP Implantation and Life Cycle	10
6.1	ERP Implementation and Maintenance	
6.2	Implementation Strategy Options and their objectives	
6.3	Features of Successful ERP Implementation	
6.4	Different phases of ERP implantation	
6.5	Strategies to Attain Success	
6.6	User Training, Maintaining ERP & IS	
6.7	Why do many ERP packages fail ?	
7.0	ERP Package Selection	05
	ERP Evaluation and selection. ,	
	ERP Packages :Make or Buy?	
8.0	ERP Implementation and Process	05
8.1	Transition strategies	
8.2	Big bang strategy, phased and parallel implementation	
8.3	Choosing a strategy	
8.4	ERP implementation process	
8.5	ERP implementation plan	
8.6	ERP implementation – The hidden costs.	
8.7	ERP training and education, Data migration, In-house implementation – Pros and cons	
8.8	Organisation of the Implementing Team , People involved in the ERP implementation.	

Text Book

Enterprises Resource Planning, Alex Leon, Tata McGraw-Hill

Parallel Computing (Elective)

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Parallel Computing is the basic foundation paper for any hardcore computer engineer. In this subject students will be exposed to the theoretical aspects of different functional units of a digital computer and fundamental idea how different units of a computer system work together to achieve a common goal.

COURSE CONTENT

PERIODS

1. Parallel Computer Models	08
1.1 Introduction to Parallel Computing	
1.2 Need for Parallel Computing	
1.3 Constraints of Conventional Architecture	
1.4 Computer Generations	
1.5 The State of Computing	
1.6 Evolution of Parallel Processors	
1.7 Parallelism in uniprocessor system	
1.8 Multiprocessors and Multicomputers	
1.9 Multivector and SIMD Computers	
1.10 Parallel Architectural Classifications	
1.11 Instruction Level Parallelism and Thread Level Parallelism	
1.12 Performance of Parallel Processors- Metrics and Measures	
1.13 Distributed Processing	
1.14 Principles of Scalable Performance	
1.15 Speed up Performance Laws	
1.16 Case study of Intel Itanium Processor	
2. Program and Network Properties	06
2.1 Introduction	
2.2 Condition of Parallelism- Bernstein's Conditions	
2.3 Types of Dependencies	
2.4 Hardware and Software Parallelism	
2.5 Program Partitioning and scheduling	
2.6 Program Flow Mechanism	
2.7 Control Flow, Data Flow, Reduction Computers- Tabular Form	
2.8 Comparison of Control Flow, Data Flow and Demand driven Computers	
3. System Interconnect Architectures	06
3.1 Introduction	
3.2 Network Properties	
3.3 Routing.	
3.4 Static versus Dynamic Interconnection Network	
3.5 Network Topologies for Multiprocessor	
3.6 Interprocessor Communication Network	
3.7 Structure of Parallel Computers	
3.8 Comparison of Parallel Computer Architectures	
4. Types of Processors	06
4.1 Introduction	
4.2 Advanced Processor Technology	
4.3 Instruction-Set Architecture	

4.4	CISC Scalar Processors	
4.5	RISC Scalar Processors	
4.6	Comparison of CISC and RISC Tabular form	
4.7	Superscalar Processors	
4.8	VLIW Architectures	
4.9	Comparison of Superscalar and VLIW- tabular form	
4.10	Vector and Symbolic Processor	
4.11	Case Study on Pentium Processor (CISC)	
4.12	Case Study on SPARC (RISC)	
5.	Memory Technology	06
5.1	Introduction	
5.2	Hierarchical Memory Technology	
5.3	Inclusion	
5.4	Coherence	
5.5	Locality of reference	
5.6	Memory Capacity Planning	
5.7	Virtual Memory Technology	
5.8	Page Replacement Algorithms	
6.	Backplane Bus System	06
6.1	Introduction	
6.2	Backplane Bus Specification	
6.3	Arbitration Schemes	
6.4	Interrupt	
6.5	Cache Addressing Models	
6.6	Cache Performance Issue	
6.7	Interleaved Memory Organisations	
7.	Pipelining	06
7.1	Introduction	
7.2	Pipeline- Principle and Implementation	
7.3	Non-Linear Pipeline Processor	
7.4	Classification of Pipeline Processor	
8.	Vector Processing	08
8.1	Introduction	
8.2	Comparison of Vector and Array Processors	
8.3	Basic Vector Architecture and its classification	
8.4	Vector Processing related terminology	
8.5	Vector Instruction Types	
8.6	Vector Performance Modeling	
8.7	Vectorization	
8.8	Design of a Vectorizing Compiler	
8.9	Optimization of Vector Functions	
8.10	Case Study : The Cray Family and Cray-1	
9.	Synchronous parallel Processing(SIMD)	08
9.1	Introduction	
9.2	SIMD Architecture	
9.3	Masking and Data- Routing Mechanism	
9.4	Inter-PE Communication	
9.5	SIMD (Array Processors)- Inter-Connection networks	
9.6	SIMD Parallel Algorithm	

Books

1. Advanced Computer Architecture; By : Er. Rajiv Chopra (S.Chand & Company)

Software Testing (Elective)

L	T	P	Theory	:100
4	0	0	End Term Exam	: 80
			I.A.	: 20

RATIONALE

Software Testing has emerged as a special branch of software engineering which focuses on different techniques used for testing a software. Success of software lies on this step which is very critical in nature. This paper mostly deals with the different testing strategies and methods.

COURSE CONTENT

PERIODS

1. Introduction to S/w Testing	08
1.1 Introduction	
1.2 Testing Process	
1.3 What is s/w Testing	
1.4 Purpose of testing	
1.5 who should test	
1.6 what to test	
1.7 selection of good test case	
1.8 Measurement of progress	
1.9 Incremental testing approach	
1.10 Basic terminology	
1.11 Testing Life cycle	
1.12 when to stop testing	
1.13 Principle of testing	
1.14 Limitation of testing	
1.15 Availability of testing tool, techniques, metrics	
2. S/W verification and Validation	06
2.1 Introduction	
2.2 Verification and Validation	
2.3 QA and QC	
2.4 V&V Limitations	
2.5 Categorising V&V techniques	
2.6 Role of V&V in SDLC	
2.7 Proof of correctness, Simulation & Prototyping	
2.8 Requirement Tracing, s/w v&v planning	
2.9 s/w testing review	
3.0 Independent v&v contractor	
3.1 positive & negative effect of v&v on projects	
3.2 Standard for s/w test documentation	
3. Functional Testing Techniques	10
3.1 Introduction	
3.2 BVA	
3.3 Equivalence class testing.	
3.4 Decision Table based testing	
3.5 Cause effect graphing technique	
3.6 Comparison of techniques	
4. Structural Testing Techniques	10
4.1 Introduction	
4.2 static vs. dynamic testing	

4.3	Dynamic WB testing techniques	
4.4	Mutation Testing vs. error seeding	
4.5	Comparison of BB and WB testing techniques	
4.6	Comparison of WB testing techniques	
4.7	Advantages	
5.	Gray Box Testing	06
5.1	Introduction	
5.2	What is Gray Box Testing	
5.3	Definitions of Gray Box Testing	
5.4	Comparison of WB, BB, GB	
6.	Reducing Number of Test Cases	06
6.1	Prioritization Guidelines	
6.2	Priority Category Schemes	
6.3	Risk Analysis	
6.4	Regression Testing	
6.5	Prioritization of test cases for regression Testing	
6.6	Regression Testing Techniques	
7.	Levels of Testing	06
7.1	Introduction	
7.2	Unit, Integration, System, acceptance testing	
7.3	Integration Testing, classification, decomposition	
7.4	Call graph, path based integration	
7.5	system Testing	
8.	Automated Testing	08
8.1	Automated testing	
8.2	Considerations during testing	
8.3	Types of Testing Tools- static vs Dynamic	
8.4	problems with manual Testing	
8.5	Benefits of Automated Testing	
8.7	Disadvantages of Automated testing	
8.8	Skill needed for using automated tools	
8.9	Test Automation	
8.10	Debugging	
8.11	criteria for for selection of test tools	
8.12	steps for tool selection	

Books

2. Software Testing; By : Er. Rajiv Chopra (S.K Kataria &sons)

Project Work & Seminar

L T P
0 0 6

Practical : 50
Sessional : 50

1. The students should be divided into a group of 4 or 5 students. Each faculty should guide one group & he should act as project guide. The students should select the projects of advanced topic of their own choice (Hardware / Software) in consultation with project guide.
2. The sessional records should be maintained and evaluated by a team of faculty members and the final marks awarded by the team.
3. In the end examination, students will be evaluated by External Examiner from outside and Internal Examiner.

Java Lab

L T P
0 0 6

Practical : 50
Sessional : 25

1. **Data type**

- 1.1 Arrays
- 1.2 Abstract or Derived Data Type

2. **Variables Operators And Control Statement**

- 2.1 Variable
- 2.2 Control Statements
- 2.3 Conditional Statements
- 2.4 Looping Statements
- 2.5 Branching Statements
- 2.6 The Arithmetic Operators
- 2.7 Unary Operators
- 2.8 Conditional Operators
- 2.9 Type wise Operators
- 2.10 Bitwise Operator

3. **Basics of Object Oriented Programming**

- 3.1 Basics of OOp
- 3.2 Object
- 3.3 Package
- 3.4 Constructor
- 3.5 Information hiding
- 3.6 Polymorphism
- 3.7 Inheritance
- 3.8 Function Overriding
- 3.9 Super Keyword
- 3.10 Multilevel Inheritance
- 3.11 Dynamic Method Dispatch
- 3.12 Interface
- 3.13 Final Class
- 3.14 Abstract Class
- 3.15 Nested Class

Web Development Lab

L T P
0 0 6

Practical : 50
Sessional : 25

Networking

1. Installation of network components under NT or 95/981 LINUX
2. Installation of TCP/IP
3. Installation of Intranet
4. Configuration of one web server
5. Deployment of HTML files in Intranet servers

HTML

1. Creation of simple HTML pages, using the following tags.
<Hn> </Hn>
<P> </P>

<A HREF>

2. Creation of tables and lists using HTML
3. Creation of simple forms incorporating GUI components (command button, text box, radio button, check box, combo box) in HTML pages
4. Practical on different Internet services (WWW, Mail, FTP, Chat)
5. Simple application using conditional statements
6. Develop application using loop constraints
7. Creation of classes, interfaces and packages
8. Simple application using threads and runnable interface
9. Simple application using thread synchronization methodology
10. Creating application to create user defined exception
11. Simple application to handle inbuilt exceptions
12. Write application to incorporate simple I/O classes
13. Creating application for text file handling
14. Creating application for random file handling
15. Writing applet and embedding it into HTML file
16. Create applet to display different graphical shapes (line, circle, ellipse, arcs, rectangle) and incorporate colour in those shapes
17. Create applet to incorporate GUI components (command button, text box, text area, list box, combo box, check box, frame, check box group)
18. Create applet-using layout manager
19. Write applet to incorporate events
20. Create multi threaded applet3

XML

1. Creation of XML file
2. Viewing XML file using Cascading Style Sheet Viewing XML file using Extended Style Sheet (XSL)
3. Display single record
4. Display all records
5. Sorting & filtering of records
6. Displaying records in the table
7. XML data binding in HTML
8. Displaying single record
9. Navigating between records using buttons Embedding XML data in HTML table Displaying the records in table in different page
10. XML file with attribute