

## 3<sup>rd</sup> 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

- 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.

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

## Fundamental of Electronics devices

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

### RATIONALE

Electronics being the basic building block for computer hardware, happens to be the foundation for a student of computer science & Engineering. In this subject the student will be expressed to the various analog electronics component concepts, which are the basic units of any modern computer and its peripheral devices.

### COURSE CONTENT

### PERIODS

#### 1. Semiconductor Theory

07

- 1.1 Introduction to semiconductor.
- 1.2 Current carriers in semiconductor
- 1.3 Atomistic picture of Germanium & Silicon
- 1.4 Electric current, free electron density, & mobility in semiconductor
- 1.5 Current due to hole in semiconductor
- 1.6 Pure & impure semiconductor
- 1.7 Doping of minority carriers
- 1.8 Temperature dependency of semiconductor
- 1.9 History of development of semiconductor

#### 2. The PN junction in forward & reversed bios

08

- 3.1 Introduction
- 3.2 PN junction thermal equilibrium
- 3.3 PN junction under forward bios
- 3.4 PN junction under reverse bios
- 3.5 Combined V-I characteristics under forward & reverse bios

#### 3. Photo Diode, phototransistors & PNP structure

10

- 3.1 Introduction
- 3.2 Carrier generation by light in a uniform semiconductor
- 3.3 PN junction photo diode for light detection
- 3.4 Phototransistor concept only
- 3.5 Miscellaneous photo detector structures
- 3.6 MOSFET structure, types & mode of operation

#### 4. AUDIO POWER AMPLIFIERS

08

- 4.1 Differentiate between voltage and power amplifier.
- 4.2 Classify power amplifier.
- 4.3 Explain the working principle of different types of power amplifier (class-A, class-AB, class-B and class-C amplifiers).
- 4.4 Derive collector efficiency of class-A and class-B power amplifiers.
- 4.5 Explain construction and working principle and advantages of push pull amplifiers and complementary symmetry amplifiers.
- 4.6 Discuss heat generations due to power dissipation.
- 4.7 Explain the concept of thermal resistance, thermal capacity, heat sinks,

## 5. FIELD EFFECT TRANSISTORS AND CIRCUIT ANALYSIS

07

- 5.1 State concept of FET.
- 5.2 Differentiate between JFET & BJT.
- 5.3 Classify FET.
- 5.4 Explain construction, working principle and characteristic of JFET.
- 5.5 Explain JFET as an amplifier.
- 5.6 Define parameters of JFET.
- 5.7 Establish relation among JFET parameters.
- 5.8 Explain JFET biasing method and connection.
- 5.9 Derive voltage gain of a JFET amplifier.
- 5.10 Explain construction and working principle of MOSFET.

## 6. FEED BACK AMPLIFIER

06

- 6.1 Define and classify feedback amplifier.
- 6.2 Explain principle of negative feed back with the help of block diagram.
- 6.3 Define gain of an amplifier with feed back.
- 6.4 Discuss the advantages/ effects of negative feed back in amplifier.
- 6.5 Derive input output impedance of negative feed back amplifier.
- 6.6 Explain principle of working, characteristics and use of emitter follower.

## 7. OSCILLATOR

10

- 7.1 Define and classify Oscillator.
- 7.2 State and explain fundamental principle of working of oscillator.
- 7.3 Explain essentials of transistor oscillators.
- 7.4 Explain Barkhausen criteria.
- 7.5 Explain construction, working principle and use of Hartley, Collpits, Phase shift, wein bridge and crystal oscillators .

## 8. TUNED AMPLIFIER

04

- 8.1 Define and classify Tuned amplifier.
- 8.2 Explain advantage of Tuned amplifier.
- 8.3 State limitations of Tuned amplifier for low frequency applications.
- 8.4 Explain working principle of single tuned and double tuned amplifiers.

**Total 60**

## TEXT BOOKS

1. Semiconductor devices by ; M.K.Chuthan & Bhatt; TMH
2. Principle of Electronics by V.K.Meheta

## Digital Electronics

L	T	P	<b>Theory</b>	:100
4	0	0	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-Subtractor & Full-Subtractor.
- 5.4 Convert the entire adder & subtractor circuit using universal logic gates.
- 5.5 Study parallel binary adder.
- 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 DEMUX.
- 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<sup>2</sup> 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.

**Total 60**

## **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.

## Computer Organisation

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

### RATIONALE

Computer Organization 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. OVERVIEW

03

- 1.1 Brief History of Computers
- 1.2 Information
- 1.3 Hardware and Software
- 1.4 Processing
- 1.5 Memory
- 1.6 Input and Output
- 1.7 von Neumann Model

#### 2. REPRESENTATION OF DATA IN BINARY

05

- 2.1 Introduction
- 2.2 Number Systems
- 2.3 Unsigned Integers
- 2.4 Signed Integers
- 2.5 Floating Point Numbers in Decimal
- 2.6 Limits of Representation
- 2.7 Octal and Hexadecimal Representation

#### 3. HARDWARE BUILDING BLOCKS

05

- 3.1 Introduction
- 3.2 Logic Gates
- 3.3 Combinational circuits.
- 3.4 Sequential circuits
- 3.5 Integrated Circuits
- 3.6 Clock signals
- 3.7 Register
- 3.8 Memory & Other elements.

#### 4. PROCESSOR INSTRUCTION SET-I

07

- 4.1 Instruction format
- 4.2 Programmable registers
- 4.3 Program example
- 4.4 Conditional execution
- 4.5 Instruction classes & Instruction Set
- 4.6 Iteration
- 4.7 I/O Instruction
- 4.8 PSW

#### 5. PROCESSOR INSTRUCTION SET-II

05

- 5.1 Addressing modes
- 5.2 Function & function calls

5.3 Table of instruction	
5.4 Arithmetic & Logic instructions	
5.5 Character & String operation	
5.6 Instruction set role	
<b>6. PROCESSOR DESIGN</b>	<b>08</b>
6.1 Introduction	
6.2 Processor Architecture	
6.3 Control Signals and Control Unit	
6.4 Instruction Formats and Codes	
6.5 Arithmetic and Logic Unit (ALU)	
6.6 Data Transfer and Manipulation	
6.7 Program Counter	
6.8 Nested Function Calls and the Stack	
6.9 Cache Memory	
6.10 Pipelined Implementation	
6.11 Design of a RISC Processor	
<b>7. CONTROL UNIT</b>	<b>07</b>
7.1 Introduction	
7.2 Implementing a Typical Instruction	
7.3 Hardwired Control Unit	
7.4 A Limitation of Hardwired Control	
7.5 Basic Concept of Microprogrammed Control	
7.6 Microinstruction Sequencing	
7.7 Microprogrammed Control Unit	
7.8 Microinstruction Formats	
7.9 Comparison of Hardwired and microprogrammed Control Units	
<b>8. MEMORY ORGANISATION</b>	<b>05</b>
8.1 Memory Hierarchy	
8.2 Partitioned Memory	
8.3 Non-contiguous Memory Allocation	
8.4 Principle of Virtual Memory	
8.5 Virtual Memory with Paging	
8.6 Segmented Logical Address Space	
8.7 Associative Memory	
8.8 Cache Memory Organisation	
<b>9. INPUT AND OUTPUT ORGANISATION</b>	<b>08</b>
9.2 Input/Output Devices and Controllers	
9.3 Accessing Devices	
9.4 Device Status and Control	
9.5 Interrupt Mechanism and Handling	
9.7 Modes of Data Transfer	
9.8 Character Devices and Block Devices	
9.9 Direct Memory Access	
9.10 I/O Interfaces	
9.11 I/O Processors	
<b>10. I/O DEVICE &amp; MEMORY</b>	<b>07</b>
10.1 Introduction	
10.2 Keyboard and Mouse	
10.3 Graphics Display	
10.4 Display Technology	
10.5 Software for User Interaction	

- 10.6 Introduction
- 10.7 Magnetic Disks
- 10.8 Optical Disks
- 10.9 Flash Memories
- 10.10 Printers
- 10.111 Clock, Speaker and Microphone

**Books**

1. Computer System Organization ; By : N. Jotwani. TMH
2. Structured computer organization - by A.S. Tanenbaum (PHI)

## 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  $\Gamma(1/2) = \sqrt{\pi}$  (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 properly 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 discontinuity.  
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-Cotes'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 DIFFERENTIAL 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-Kutta method up to 4<sup>th</sup> 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  
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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

## 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**

## DIGITAL ELECTRONICS LAB

L     T     P  
0     0     6

Practical                 : 50  
Sessional                : 25

1. Implement AND, OR, NOT, NOR, NAND, XOR, XNOR gates & verify the truth table.
2. Study Universal properties of NAND AND NOR gates.
3. Implement Boolean function.
4. Implements K - MAP.
5. Implement Half - adder and full – adder using minimum number of logic gates
6. Implement Half - subtractor and full - subtractor using minimum number of logic gates.
7. Study flip-flops
  - i. JK flip flop.
  - ii. D flip flop.
  - iii. SR flip flop.
8. Study 4 - bit a synchronous up/down counter using gates.
9. Study 4 - bit synchronous up/down counter using gates.
10. Study mod 6, mod 10, mod 12, a synchronous counters.
11. Study ring counters.
12. Study shift registers
  - i. SISO
  - ii. SIPO
  - iii. PISO
  - iv. PIPO
  - v. Bi-directional
13. Study 8 - bit D/A & A/D conversion using IC only.
14. Study Multiplexer & De-multiplexer using IC only.
15. Study encoders & decoders.
16. Study display devices – LED/LCD, 7-segment display.

(All the above experiments are to be conducted giving thorough study of IC's)

## Floating Subjects

### ELECTRONIC INSTRUMENTATION AND MEASUREMENTS

Contact Hrs/ Week:4

Topic	Periods
<b>1.0 Standard Instruments</b>	<b>10</b>
Units, Standards and Basics of Galvanometer, SI mechanical units , Si electrical units, SI temperature scales and other unit systems, Standards for mass length and volume, time and frequency standards, IEEE standards . Errors-- grass errors and systematic errors, absolute errors and relative errors. Accuracy, precision and resolution. Suspension galvanometer,permanent magnet moving coil mechanism	
<b>2.0 Electromechanical indicating instruments</b>	<b>10</b>
DC ammeter, DC voltmeter, Voltmeter sensitivity, calibration of DC instruments, alternating current indicating instruments. Electro-dynamometer in power measurements-watt-hour meter, power factor meter, Instrument transformer	
<b>3.0 Testing and measuring instruments</b>	<b>12</b>
Audio oscillators, pulse generators , function generator , RF signal generator , Sweep frequency generator , analog multimeter. CRO Block diagram, Cathode ray tube, CRT circuits vertical deflection system , delay line , Multiple trace Horizontal deflection system, triggered timebase oscilloscope probes CRO applications, Digital Storage oscilloscope (DSO), DSO applications.	
<b>4.0 Transducers</b>	<b>07</b>
Resistive sensitive elements : Potentiometers, resistance , thermometers, strain gauges . Capacitive sensing elements: Displacement sensor and dielectric sensor, Inductive sensing elements: Variable reluctance and LVDT, displacement sensor, Electromagnetic sensing elements: Velocity sensors, Thermoelectric sensing elements: Thermistor, Laws of Thermocouple types of thermocouple, Installation of thermocouple, Elastic sensing elements : Sensing elements for Force, torque acceleration and pressure, Piezoelectric sensing element :Static and dynamic characteristics, Electrochemical sensing elements : Ion selective electrode, Solid state gas sensor	
<b>5.0 Analog meters</b>	<b>14</b>
FET input voltmeter, opamp voltage follower voltmeter, voltage to current converter, ohmmeter electronic AC voltmeter, strain gauge circuit using Wheatstone bridge, Measurement of L and C, Q meter	
<b>6.0 Digital meters</b>	<b>07</b>
Digital voltmeter , Digital multimeter, Digital frequency meter, Accuracy , reciprocal counting , time measurements, LCR meter	

#### REFERENCE BOOKS:

- 1 Modern Electronic Instrumentation and Measurement Techniques by Albert . D. Helfrick and william . D. Cooper, PHI - 2003
- 2 Principles of measurement systems by john .p.Bentley; Pearson third edition
- 3 Transducer and Instrumentation by D.V.S Murthy, PHI – 2003, PHI -2003
- 4 Electronic Instrumentation and Measurements by David . A. Bell; PHI Secon edition

## VISUAL PROGRAMMING

Contact Hrs/ Week:4

<b>Topic</b>	<b>Periods</b>
<b>1.0 Introduction to Visual Basic</b>	<b>15</b>
Introduction to visual basic- features and applications of VB – designing the user interface – design aspects of VB forms – menus and common dialogue control	
<b>2.0 Forms and graphics</b>	<b>15</b>
VB structure – variables – projects – forms – modules –controls structures – arrays – procedures and functions OLE and Active X – MDI applications and graphics display and printing information	
<b>3.0 Introduction to Visual C + +</b>	<b>10</b>
Visual C + +: An introduction – common tools – understanding the concepts – windows event driven programming – creating visual c + + applications with AppWizard controls	
<b>4.0 Visual c + + in detail</b>	<b>10</b>
Creating menus- adding shortcut keys- submenus – creating a dialog box – connecting methods to dialog box controls – connecting variable to dialog box controls – displaying a dialog box. Creating check and list boxes – creating combo boxes and sliders	
<b>5.0 File handling</b>	<b>10</b>
File handling- application wizard – SDK and MFC programming – multiple documents and multiple views	
VC + + and data base Management – building a data base application using ODBC – building a data base application using DAO	

### TEXT

Visual basic 6.0 from the ground up – Garry Comell – TMH  
Visual C + + from the ground up – John Paul Mueller – TMH

### REFERENCE BOOKS

1. Visual basic 6 in record time – Steve brown - bpb
2. Visual basic 6 complete reference – Noel Jerke – TMH
3. Teach yourself visual C + + - David Holzgang – bpb
4. Visual c + + in record time – Steven Holzver – bpb

# Value Additions

## Web Technology Lab.

### **1 Introduction**

- 1.1 Introduction to Electronic Commerce and the Web
- 1.2 E\_Commerce phases
- 1.3 Technical overview of web content
- 1.4 The Microsoft Distributed Internet application architecture (DNA)
- 1.5 One tier, two tiers, three tiers & N-tier system
- 1.6 Alternatives to Active Server Platform
- 1.7 Security

### **2 COM primer**

- 2.1 Introduction
- 2.2 Understanding COM
- 2.3 Why components
- 2.4 Fundamental Building Blocks
- 2.5 COM V/S Object Orientation
- 2.6 The COM architecture
- 2.7 The COM library
- 2.8 How to develop COM components

### **3 ACTIVE SERVER PAGES**

- 3.1 Coming to grips with Active Server Pages
- 3.2 What is ASP
- 3.3 History of ASP
- 3.4 Using different languages & platforms
- 3.5 Differentiating between DHTML & ASP
- 3.6 Examples of ASP
- 3.7 Conquering ASP+ & ASP.net
- 3.8 Using browsers with ASP
- 3.9 Need for ASP server
- 3.10 Learning the variations in ASP servers

### **4 Writing The First Active Server Page**

- 4.1 Using tag syntax with ASP
- 4.2 Creating the time page statically with ASP
- 4.3 Creating the time page dynamically with ASP
- 4.4 Introduction to date & time functions
- 4.5 Creating loops in ASP
- 4.6 Working with forms
- 4.7 Adding buttons to forms
- 4.8 Handling events in VBScript
- 4.9 Working with more form attributes
- 4.10 Sneaking a peak ahead

### **5 Understanding the ASP object model**

- 5.1 Understanding How static HTML pages are loaded
- 5.2 Understanding How ASPs are loaded
- 5.3 Learning about the roles of CGI & ISAPI
- 5.4 Learning about the ASP Object model
- 5.5 Coming to grips with Client-side Scripting
- 5.6 Coming to grips with Server-side Scripting

### **6 Using the Request Object**

- 6.1 Introduction

- 6.2 Knowing the difference between the Get & Post
  - 6.3 Reading in binary data from the user
  - 6.4 Reading data with the form collection
  - 6.5 Reading data with the QueryString collection
  - 6.6 reading cookies from the user
  - 6.7 Additional collections of the Request Object
- 7 Using the Response Object**
- 7.1 Introduction
  - 7.2 Using the Write method
  - 7.3 Writing binary data
  - 7.4 Working with Buffer
  - 7.5 Redirecting the user's request elsewhere
  - 7.6 Sending cookies to the user
  - 7.7 Setting page expiration
  - 7.8 Checking if the user is still connected
  - 7.9 Setting the ContentType property
  - 7.10 Adding a platform for internet content selection label
  - 7.11 Specifying the character set to use
  - 7.12 Setting a status line
  - 7.13 Sending additional headers in your response
  - 7.14 logging information with the Response Object
- 8 Using the Server Object**
- 8.1 Introduction
  - 8.2 Setting the Timeout for your ASPs
  - 8.3 Using the CreateObject method
  - 8.4 Execute
  - 8.5 GetLastError
  - 8.6 HTML Encode
  - 8.7 MapPath
  - 8.8 Transfer
  - 8.9 URLEncode
  - 8.10 Putting it all together- A server Object example
- 9 Using the Session Object**
- 9.1 Introduction
  - 9.2 Understanding the session id property
  - 9.3 Setting a Timeout for user session
  - 9.4 Making use of the Session\_OnStart event
  - 9.5 Making use of the Session\_OnEnd event
  - 9.6 Using the location identifier
  - 9.7 Using the CodePage property
  - 9.8 Working with the Contents collection
  - 9.9 Removing items from the Content collections
  - 9.10 Working with the StaticObjects collection
  - 9.11 Clearing all the session variables
  - 9.12 Working with web forms
- 10 Using the Application Object**
- 10.1 Introduction
  - 10.2 Using Locking mechanisms with the application Objects
  - 10.3 Working with the Content collection
  - 10.4 Removing items from the Content collections
  - 10.5 Working with arrays in the Content collection
  - 10.6 Working with the StaticObjects collection
  - 10.7 Making use of the Application\_OnStart Event
  - 10.7 Making use of the Application\_OnEnd Event

## ELECTRONIC SYSTEM & DEVICES LAB

### LIST OF EXERCISE

1. Soldering practice, - iron, flux and solder
2. Soldering practice using tag boards
3. Study of CRO and testing of components
4. Study of power amplifiers – (setup) – setup push pull amplifier
5. Set up astable, monostable, multivibrators using 555 IC
6. Set up 3 terminal voltage regulators
7. Setup voltage regulators using 723
8. Setup delay circuits (VCO, PLL) IC 566
9. Study of UPS and stabilizer, spike suppressor
10. PCB Design
  - a) Artwork & layout construction
  - b) Artwork transfer to copper clad
  - c) Etching using (Ferric chloride)
  - d) Drilling
  - e) Component assembly
  - f) Soldering and testing of simple circuits

## 4<sup>th</sup> Semester

### COMPUTER ARCHITECTURE

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

Topic	Periods
<b>1. Basic structure of computer hardware</b>	<b>07</b>
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	
<b>2. Instructions &amp; instruction sequencing</b>	<b>08</b>
2.1 Fundamentals to instructions	
2.2 Operands	
2.3 Op codes	
2.4 Instruction formats	
2.5 Addressing techniques	
2.6 Addressing Modes	
<b>3. Arithmetic operations</b>	<b>05</b>
3.1 Basic arithmetic operation	
3.2 Floating point representation	
3.3 Floating point arithmetic operation	
<b>4. Processor System</b>	<b>10</b>
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	
<b>5. Memory System</b>	<b>10</b>
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	
<b>6. Input – Output System</b>	<b>10</b>
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

**Books**

Fundamentals of Computer Architecture ; By; Parthasarthy , Senthil Kumar; TMH

## OPERATING SYSTEM & SYSTEM PROGRAMMING

L	T	P	<b>Theory</b>	: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**
  - 1.1 State Objectives and Explain functions of operating system.
  - 1.2 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 Damdhare
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  
4     -     -

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

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 1-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, va 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 programme.
- 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. Introduction to microprocessor; P.K.Ghosh,P.R.Sikdar; PHI
3. Microprocessor by B.Ram.
4. Fundamentals of Microprocessor & Application; A.Singh,A.Chabra;S.Chand

## ELECTRONIC SYSTEMS AND DEVICES

Contact Hrs/ Week:4

### Topic

### Periods

#### 1.0 Cathode ray Oscilloscope

08

CRO – CRT principles – electrostatic focusing and deflection – block diagram of CRO – triggered sweep – front panel controls – terminals of CRO – specification of CRO – measurements using CRO – frequency, phase angle, time period – single trace and dual trace CRO with block diagram – dual beam, delayed sweep and digital storage CROs, CRO probes

#### 2.0 Amplifier Circuits

10

Schemes in amplifier coupling – RC coupled, transformer coupled, direct coupled amplifiers, comparison – applications – voltage and power amplifier – class A, Class B, class AB and class C amplifiers – thermal runaway – heat dissipation – heat sink – push pull amplifier.

#### 3.0 Voltage regulation & Power Supply

12

Timer IC – 555 – block diagram – astable and monostable multivibrators – 3 terminal voltages regulator IC 78 and 79 series – 723 IC in voltage regulation – principle of VCO, PLL and other time delay circuits – dissipative and non-dissipative power supply – SMPS – block diagram, working comparison of linear power supply and SMPS stabilizer – UPS – specification and rating – surge and spike suppressors – batteries maintenance.

#### 4.0 Introduction to PCB design

15

PCB design – copper clad laminates ingredients – copper surface standards – types of laminates – art work design approach – input drawing on white card board sheet – black typing on transparent base foil art work taping – layout scale – grid system and artwork rules – PCB standard sizes layout approaches and documentation – design tools for analog circuit PCB – design tool for digital circuit PCB – multiplayer boards.

#### 5.0 Processes in PCD design

15

Etching – etchants – different types – operation of shearing – sawing – punching – blanking – milling – routing – drilling – lead preparation – mounting of components – clearing – materials used for cleaning.

### REFERENCE BOOKS

1. Electronic Devices & Circuit Theory – Gayakwad PHI
2. Opamps and Integrated Circuit Technology – Gayakwad PHI
3. Semiconductor approximation – Malvino TMH
4. Instrumentation, Devices and system – Tangan, Sarma
5. Printed Circuit Board – Design and Technology – Walter C Bosshart, TMH



## **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++ ;Kamthane; Pearson
3. Let Us C++ By Y. Kanetkar
4. C++ and OOP Paradigm; D.Jana; PHI

## 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

1.0 Acquaintance with the microprocessor trainer kit, hardware & the user's commands

2.0 Find out the Hex- code for corresponding Instruction

3.0 Write small Assembly language programme for  
Data Transfer  
> Register to Register  
> Register to Memory and Vice-Versa

4.0 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

5.0 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

## Floating Papers

### OPEN SOURCE SOFTWARES

L	T	P	Total Mark	: 100
4	-	-	Theory	: 80
			I.A	: 20
		<b>Topic</b>		<b>Periods</b>

#### **1.0 INTRODUCTION AND LINUX OPERATING SYSTEM 18**

1.1 Introduction : Need of Open Sources – Advantages of Open Sources – Applications – Commercial aspects of Open Source movement - Certification courses issues.

1.2 Open Source Operating Systems: LINUX – Introduction – General Overview – Kernal mode and User mode process.

1.3 Advanced Concepts: Scheduling, Time Accounting – Personalities – Cloning and Backup your Linux System – Linux Signals – Development with Linux.

1.4 Linux Networking: Configuration Files – Red Hat Linux network GUI configuration tools – Assigning an IP address – Subnets – Route – Tunneling – Useful Linux network commands – Enable Forwarding.

#### **2.0 MYSQL 18**

2.1 MySQL: Introduction – What is MySQL? - MySQL Data Types - Primary Keys and Auto Increment Fields – Queries - Download MySQL Database - Facts About MySQL database - Connecting to a MySQL Database - writing your own SQL programs - Closing a Connection.

2.2 PHP MySQL Create Database and Tables: Create a Database - Create a Table - Insert Data Into a Database Table - Insert Data From a Form into a Database. Record Selection Technology: Select Data From a Database Table - Display the Result in an HTML Table - The WHERE clause - The ORDER BY Keyword – Working with Strings – Date and Time – Working with metadata.

2.3 Sorting Query Results: Sort Ascending or Descending - Order by Two Columns - Update Data In a Database - Delete Data In a Database - Using sequences – MySQL and Web. Database ODBC: Create an ODBC Connection - Connecting to an ODBC - Retrieving records - Retrieving Fields from a Record - Closing an ODBC Connection.

#### **3.0 INTRODUCTION TO PHP 16**

3.1 PHP Introduction: A Brief History of PHP - Installing PHP - A Walk Through PHP - Installing and Configuring PHP on Windows.

3.2 Language Basics: Lexical Structure -Data Types -Variables -Expressions and Operators – Constants - Flow-Control Statements -Including Code -Embedding PHP in Web Pages

3.3 Functions: Calling a Function - Defining a Function - Variable Scope - Function Parameters - Return Values -Variable Functions - Anonymous Functions.

3.4 Strings: Quoting String Constants - Printing Strings - Accessing Individual Characters -Cleaning Strings - Encoding and Escaping -Comparing Strings - Manipulating and Searching Strings - Regular Expressions.

3.5 Arrays : Indexed Versus Associative Arrays - Identifying Elements of an Array - Storing Data in Arrays - Multidimensional Arrays - Extracting Multiple Values - Converting Between Arrays and Variables - Traversing Arrays - Sorting - Acting on Entire Arrays - Using Arrays.

#### **4.0 OPEN SOURCE TOOLS AND TECHNOLOGIES 10**

4.1 Web Server: Apache Web Server – Working with Web Server – Configuring and using apache web services.

4.2 Open source software tools: Browsers – Processors – Compilers – Model driven architecture tools.

- 4.3 Eclipse IDE platform: Architecture – History – Simultaneous Releases.
- 4.4 Case Study: E-Governance - Government Policy toward Open Source.

**BOOKS:**

- 1 The Linux Kernel Book; Rem Card, Eric Dumas and Frank Mevel Wiley Publications
- 2 MySQL Bible Steve Suchring John Wiley sons,
- 3 Programming PHP Rasmus Lerdorf and Levin Tatroe O'Reilly Publications

**Mobile Computing**

L	T	P		Total Mark	: 100
4	-	-		Theory	: 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**

<b>1.</b>	<b>Introduction to Wireless networks &amp; Mobile Computing</b>	<b>04</b>
1.1	Networks	
1.2	Wireless Networks	
1.3	Mobile Computing	
1.4	Mobile Computing Characteristics	
1.5	Application of Mobile Computing	
<b>2.</b>	<b>Introduction to Mobile Development Frameworks</b>	<b>04</b>
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	
<b>3.</b>	<b>Wireless Transmission</b>	<b>04</b>
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	
<b>4.</b>	<b>Medium Access Control</b>	<b>04</b>
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	
<b>5.</b>	<b>Wireless LANs</b>	<b>04</b>
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	
<b>6.</b>	<b>Ubiquitous Wireless Communication</b>	<b>04</b>
6.1	Introduction	
6.2	Scenario of Mobile Communication	
6.3	Mobile Communication Generations 1G to 3G	
6.4	3 <sup>rd</sup> Generation Mobile Communication Network	
6.5	Universal Mobile telecommunication System ( <b>UMTS</b> )	
<b>7.</b>	<b>Mobile IP</b>	<b>04</b>
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	
<b>8.</b>	<b>Mobile Transport Layer</b>	<b>04</b>
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	
<b>9.</b>	<b>Mobile Computing</b>	<b>04</b>
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	
<b>10.</b>	<b>Wireless Telecomm Networks</b>	<b>04</b>
10.1	GSM	
10.2	GPRS	
10.3	IS-95	
10.4	CDMA-2000	
10.5	W-CDMA	

10.6	Wireless Sensor Networks	
<b>11.</b>	<b>Messaging Services</b>	<b>04</b>
11.1	Short Message Services (SMS)	
11.2	Multimedia Message Services (MMS)	
11.3	Multimedia transmission over wireless	
<b>12.</b>	<b>Pervasive Computing and Information Access</b>	<b>04</b>
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	
<b>13.</b>	<b>Web Services and Mobile Web</b>	<b>04</b>
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	
<b>14.</b>	<b>Developing Mobile Application with J2ME</b>	<b>04</b>
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	
<b>15.</b>	<b>Smart Phone</b>	<b>04</b>
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.N.Jani, Kamaljit I. Lakhtaria, Dr. Ashish N. Jani & Nita Kanabar (S.Chand & Company Ltd.)
2. Wireless communications & networks ---- William stallings; Pearson pub.
3. Mobile communications ----- Jochen schiller,Pearson pub.
4. Broadband Communications; C.M.Akujaobi,M.N.Sidique; PHI

## JAVA Programming

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

### 1.0 The JAVA revolution

- 1.1 Java applets
- 1.2 Revolutionary programming
- 1.3 Rich object environment
- 1.4 What to expect next ?
- 1.5 The java infrastructure
- 1.6 Overview of Object Oriented concepts

### 2.0 Extending classes

- 2.1 An extended class
- 2.2 What protected really means
- 2.3 Constructors in extended classes
- 2.4 Overriding methods & hiding fields
- 2.5 Marking methods & classes final
- 2.6 The object class
- 2.7 Static classes
- 2.8 Inner classes
- 2.9 Abstract classes & methods
- 2.10 Cloning objects
- 2.11 Extending classes - how & when?
- 2.12 Designing a class to be extended

### 3.0 Interfaces & Packages

- 3.1 An example interface
- 3.2 Single inheritance versus multiple inheritance
- 3.3 Extending interfaces
- 3.4 Implementing interfaces
- 3.5 Using an implementation
- 3.6 When to use interfaces ?
- 3.7 Package naming
- 3.8 Package access
- 3.9 Package content

### 4.0 Exceptions

- 4.1 Creating exception types
- 4.2 Try, catch & finally
- 4.3 Throws
- 4.4 When to use exceptions
- 4.5 Java run time exceptions

### 5.0 Strings

- 5.1 Basic string operations
- 5.2 String comparisons
- 5.3 Utility functions
- 5.4 Making related strings
- 5.5 String conversions
- 5.6 Strings as char arrays
- 5.7 Strings & byte arrays
- 5.8 String buffer class

### 6.0 The I/O package

- 6.1 Streams

- 6.2 Input stream
- 6.3 Output stream
- 6.4 Input stream reader
- 6.5 Output stream reader
- 6.6 Standard stream types
- 6.7 Filter streams
- 6.8 Print stream
- 6.9 Buffered streams
- 6.10 Byte array streams
- 6.11 String buffering input stream
- 6.12 File streams & field scriptor
- 6.13 Piped streams
- 6.14 Sequence input stream
- 6.15 Line number input stream
- 6.16 Push back input stream
- 6.17 Stream tokenizer
- 6.18 Data streams
- 6.19 Random access file
- 6.20 The file class
- 6.21 File name filter
- 6.22 The I/O exception classes

## **7.0 Threads**

- 7.1 Creating threads
- 7.2 Synchronization
- 7.3 Wait & notify
- 7.4 Details of wait & notify
- 7.5 Thread scheduling
- 7.6 Deadlocks
- 7.7 Suspending threads
- 7.8 Interrupting threads
- 7.9 Ending thread execution
- 7.10 Ending application execution
- 7.11 Using runnable
- 7.12 Volatile
- 7.13 Thread security & thread group
- 7.14 Debugging threads

## **8.0 Standard utilities**

- 8.1 Bitset, enumeration , implementing an enumeration interface
- 8.2 Vector , stack
- 8.3 Dictionary , Hash table
- 8.4 Properties
- 8.5 Observer/Observable
- 8.6 Date , Random
- 8.7 String tokenizer

## **9.0 Networking**

- 9.1 Internet address
- 9.2 Datagrams
- 9.3 Sockets "for clients"
- 9.4 Sockets "for servers"
- 9.5 URL
- 9.6 URL connections

## **10.0 Applets**

- 10.1 Applet basics
- 10.2 The applet class
- 10.3 Applet architecture

- 10.4 HTML applet tag
- 10.5 Syntax for the <APPLET> tag
- 10.6 Passing parameters to applets
- 10.7 Understanding get code base() & get document base ()
- 10.8 Applet context & show document()
- 10.9 Printf debugging
- 10.10 Order of applet initialization
- 10.11 Repainting
- 10.12 Graphics
  - 10.12.1 Sizing graphics
  - 10.12.2 Simple graphic methods
- 10.13 Color
- 10.14 Color methods
- 10.15 Fonts
- 10.16 Multiline text
- 10.17 Handling alignment events, mouse events, keyboard events

## **11.0 Abstract window toolkit**

- 11.1 Introduction
- 11.2 Components
  - 11.2.1 Container
  - 11.2.2 Panel
  - 11.2.3 Canvas
  - 11.2.4 Label
  - 11.2.5 Button
  - 11.2.6 Checkbox
  - 11.2.7 Checkbox group
  - 11.2.8 Choice
  - 11.2.9 List
  - 11.2.10 Scroll bar
  - 11.2.11 Text field
  - 11.2.12 Text area
- 11.3 Layout
- 11.4 Menu components
- 11.5 Event

## **12.0 Imaging**

- 12.1 Simple image loader
- 12.2 Image observer
- 12.3 Graphical feedback
- 12.4 Media tracker
- 12.5 Image producer
- 12.6 Image filter & Image filter source
- 12.7 Download & animation

## **Books**

Programming with JAVA - A primer; E. Balaguruswamy  
Java - how to program; Deital & Deital  
Programming in Java; S.Khadana; S.Chand

## Value Additions

### **ASP.NET LAB**

#### **Graded exercises**

- 1 Opening & running an ASP.NET web application.
- 2 Creating an ASP.NET web application
- 3 Understanding programming basics
- 4 ASP.NET infrastructure.
- 5 ASP.NET web forms.
- 6 Managing & displaying data for ASP.NET application
- 7 Use of server controls
- 8 Creating a user control in ASP.NET
- 9 Creating a composite control in ASP.NET
- 10 Building ASP.NET web services
- 11 Building mobile web application
- 12 Managing state in ASP.NET application
- 13 Caching in ASP.NET application
- 14 Tracing ,debugging & handling exceptions in ASP.NET application

### **Computer Aided Engineering Drawing**

Sl. No. Topics hrs allotted

1	Introduction to Computer Aided Sketching	12
2	Projection of Points	6
3	Projection of Lines	9
4	Projection of Planes	12
5	Projection of solids	15
6	Sections of Solids	12
7	Development of surfaces	12
8	Conversion of orthographic views to Isometric projection	12
	Tests	6
	Total	96

#### Subject Contents

1	Introduction to Computer Aided Sketching	12
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Computer screen, layout of the software, standard toolbar/menus, and description of most commonly used toolbars, navigational tools, co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawingsize and scale. Commands and creation of lines, co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity, Dimensioning, line conventions, material conventions and lettering.

2	Projection of Points	6
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Four quadrants ,principal planes ,profile planes, Projection of points in all the four quadrants, Projection of points- front view,top view and side views

3	Projection of lines	9
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Projection of line when parallel to both the planes, Projection of line parallel to one plane and perpendicular to other plane, Projection of line inclined to one plane and parallel to other plane (Side views for above cases) , Projection of line inclined to the both the planes

4 Projection of planes 12

Meaning of the planes like square, rectangular, pentagonal, hexagonal, and circular  
Drawing the three views of the planes in different position using first angle projection method  
Solving the problems using change of position method only

5 Projection of solids 15

Projection of cube, triangular prism, square prism, rectangular prism, pentagonal prism, hexagonal prism, pyramids like square, rectangular, pentagonal and hexagonal, Cone and cylinder in different positions using first angle projection method

6 Section of Solids 12

Sectional views of cube ,prisms and pyramids like square ,pentagonal , hexagonal.  
Cone and cylinders resting with base on HP with axis parallel or perpendicular to HP only

## **5<sup>th</sup> 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

<b>5. Two Dimensional Viewing</b>	<b>04</b>
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.	
<b>6. Three Dimensional Object Representations</b>	<b>10</b>
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.	
<b>7. Three Dimensional Geometric &amp; Modeling Transformations</b>	<b>04</b>
7.1 Translation	
7.2 Rotation	
7.3 Scaling	
7.4 Reflection	
7.5 Shear	
7.6 Composite transformation	
7.7 Modeling & Coordinate transformation.	
<b>8. Three Dimensional Viewing</b>	<b>06</b>
8.1 Viewing pipeline	
8.2 Viewing coordinates	
8.3 Parallel projection	
8.4 Perspective projection	
8.5 Concept of 3D clipping.	
<b>9. Illumination Model &amp; Surface Rendering Methods</b>	<b>04</b>
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,	
<b>10. Introduction to Digital Audio</b>	<b>04</b>
10.1 Basics of Acoustics, Psychoacoustics	
10.2 Musical sound and noise, elementary sound system	
10.3 Microphones, Amplifiers, digital audio formats	
<b>11. Introduction to Digital Image</b>	<b>06</b>
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 Systems; Buford; Pearson
3. Multimedia: Sound and Video by Jose Lozano, PHI
4. Multimedia Systems, Tech. & Communications; S.Pandey, M.Pandey; Katson

## 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 cost
- 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 Explain briefly organization structure
- 2.11 Explain briefly team structure
- 2.12 Discuss 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
- 3.1 Briefly explain the steps in requirement dictation for software- initiating the process facilitated application specific techniques and quality function deployment
- 4.2 List the principles of analysis

- 4.3 Briefly explain software prototyping
- 4.4 State the prototyping approach
- 4.5 State the prototyping tools and methods
- 4.6 State the S/W requirement specification principle
- 4.7 Define SRS document
- 4.8 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
- 5.5 Compare the various types of interface
- 5.6 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
3. Software Engineering; Firewall

## 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.

<b>1.0</b>	<b>BASIC of Data Communication</b>	<b>06</b>
1.1	Introduction to Data Transfer	
1.2	Asynchronous & Synchronous Transmission	
<b>2.0</b>	<b>Reliable Data Transmission</b>	<b>06</b>
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	
<b>3.0</b>	<b>Connections and Interfacing</b>	<b>06</b>
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	
<b>4.0</b>	<b>Multiplexing</b>	<b>06</b>
4.1	Concept of Multiplexing	
<b>5.0</b>	<b>Network Applications</b>	<b>06</b>
5.1	Introduction, Network users, Central Servers	
5.2	LAN Environment, Device Sharing, Print servers	
5.3	Directory Services, Network benefits, Network Disadvantages	
<b>6.0</b>	<b>Network Structures</b>	<b>06</b>
6.1	Topologies	
6.2	Structured Wiring System, Media Twisted Pair, Coaxial cable, Fiber Optics	
<b>7.0</b>	<b>Standards</b>	<b>06</b>
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,	
<b>8.0</b>	<b>LAN Signaling and Access</b>	<b>06</b>
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),
2. Computer networks; Tanenbum; Pearson
3. Data communication & network; Forouzen; TMH

## 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 J\_ process large volume of data. This paper teaches the methodology of storing & processing da for commercial application. It also deals in the security & other aspects of DBMS.

### 1.0 BASIC CONCPETS OF DBMS

- 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

- 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

- 3.1 Explain Relational algebra
- 3.2 Explain Different operators select, project, join , simple Examples

### 4.0 NORMALIZATION IN RELATIONAL SYSTEM

- 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

- 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

- 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

- 7.1 Explain Basic concepts,
- 7.2 Concepts of locks, Live Lock, Dead Lock,
- 7.3 Serializability(only fundamentals)

## **8.0 SECURITY AND INTEGRITY**

- 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,

## Management Information System

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

### 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

<b>1. Management Information System An Overview</b>	<b>06</b>
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	
<b>2. Information System for Decision Making</b>	<b>03</b>
2.1 Introduction	
2.2 Transaction Processing System	
2.3 Management Information System	
2.4 Intelligent Support System	
2.5 Office Automation System	
<b>3. Computer Hardware for Information System</b>	<b>03</b>
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	

<b>4.</b>	<b>Computer Software for Information System</b>	<b>03</b>
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	
<b>5.</b>	<b>Data Communication System</b>	<b>03</b>
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	
<b>6.</b>	<b>Database Management technology</b>	<b>03</b>
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	
<b>7.</b>	<b>Client- Server Computing</b>	<b>03</b>
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	

<b>8.</b>	<b>Decision Support System</b>	<b>03</b>
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	
<b>9.</b>	<b>Office Information System</b>	<b>03</b>
9.1	Introduction	
9.2	Office Automation	
9.3	Offices and Office Systems	
9.4	Types of Office Automation Systems	
9.5	Integrated Office	
<b>10.</b>	<b>Information System in Business</b>	<b>03</b>
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	
<b>11.</b>	<b>Systems Analysis and Design</b>	<b>03</b>
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	
<b>12.</b>	<b>Strategic Management Information System</b>	<b>03</b>
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	
<b>13.</b>	<b>Information Resources Management</b>	<b>03</b>
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	
<b>14.</b>	<b>Enterprise Resource Planning</b>	<b>03</b>
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)
2. Management Information Systems; W.S Jawadekar; TMH
3. Management Information Systems; Gordon B davis & Margethe H Olson; TMH,
4. Management Information Systems; Sadagopan; PHI.
5. ERP Concepts & Practices; V.K.Garg,N.K.Venkatkrishnan; PHI

## 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

**Floating Papers**  
**Microcontrollers & Applications**

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

**1.0 INTRODUCTION TO MICROCONTROLLERS 05**

Block diagram of microcomputer, microprocessor & microcontroller, Microcontroller types: embedded, external memory, Harvard, Princeton, RISC & CISC architectures. Microcontroller memory types, Evolution of microcontrollers 4bit, 8bit, 16bit & 32bit.

**2.0 Architecture of MCS 8051 10**

Introduction to INTEL microcontroller family, Pin diagram of 8051 with functions, Introduction to MCS 51 family. Block diagram of 8051, with details of GPR, PC, data pointer, flags, PSW, SP, SFR, I/O ports, counter/timer, serial I/O, data memory, program memory, register banks & stack.

**3.0 Introduction to advanced microcontrollers 05**

Features of MCS-96 family, features of MCS-251 family

**4 Introduction to PIC controllers 05**

Introduction to 16F74, architectural details & block diagram: CPU, registers, data memory, program memory

**5.0 Program development tools 05**

Definitions of instructions, program, software, Machine instruction format, addressing modes, types, tools: assembler, linker, loader, compiler, flowchart, algorithm, Assembly instruction format, 8051 data types and directives.

**6.0 Instruction set of 8051 10**

Classification: Data transfer, Arithmetic, Logical, Boolean & Branch groups, Details (syntax, mnemonics, size, cycles) of each instruction with example, simple programs on above

**7.0 Hardware features of 8051 & programming 15**

I/O port, single bit instruction, I/O port bit addressability, I/O port programming, bit, addressable RAM, single bit operation with carry, reading & writing IO pins, Timer/Counter-programming in 8051, timer registers, TMOD & TCON, Gate, MOD1, MOD2 & counter programming,

Interrupts: interrupts vs polling, ISR, 8051 interrupts, enabling & disabling interrupts, interrupt registers, IE & IP, Programming timer interrupts, external hardware interrupts, low level & edge triggered interrupts, interrupt priority, Serial I/O communication, baudrate; SBUF & SCON registers, programming 8051 to transmit & receive data serially, importance of TI & RI flags, Interfacing External memory, memory mapped I/O.

**8.0 Applications of 8051 05**

PPI 8255, block diagram, pin details, details of mode 0 operation. Digital I/O device interface to control: a switch, an LED, a relay, a buzzer & an opto-coupler, Applications of 8051 to interface the following modules: ADC, DAC, Seven segment, display, LCD & LED, Hexkey pad, traffic controller.

**Books:**

1. The 8051 Microcontroller and Embedded Systems ; M.A. Mazidi & J.G. Mazidi.
2. The 8051 Microcontroller(Architecture, Programming & Applications); Kenneth J. Ayala.
3. Customizing 8051 microcontroller By Mike Predko.
4. Advanced Microprocessors & Microcontrollers By S.K. Venkatram.

## CNC MACHINES

L T P  
4 - -

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

Topic	Periods
<b>1..0 INTRODUCTION TO CNC MACHINES</b>	<b>04</b>
1.1 Introduction	
1.2 History of NC/CNC machines	
1.3 Types of CNC machines	
1.4 CNC machining centres developments	
<b>2.0 STRUCTURE OF CNC MACHINES</b>	<b>16</b>
2.1 Design factors to be considered	
2.2 Static, dynamic and thermal load	
2.3 Guideways in CNC machines	
2.4 Frictional guideways, V, flat and dove-tail, cylindrical and antifriction LM guideways	
2.5 Hydrostatic and Aerostatic guideways	
2.6 Feed drives of CNC machines	
2.7 Servomotors and stepper motors	
2.8 Components of mechanical transmission systems	
2.9 Recirculating ball screws	
2.10 Gear box, timing belts and flexible couplings	
2.11 Spindle bearings- hydrostatic and hydrodynamic and antifriction bearings	
2.12 Measuring systems - Direct and Indirect measuring	
2.13 Rotary encoder and Linear scale	
2.14 Controls, software and user interface	
2.15 Gauging	
2.16 Tool monitoring systems - direct and indirect monitoring	
<b>3. ASSEMBLY TECHNIQUES</b>	<b>05</b>
3.1 Types of linear guides - requirements of guiding system, LM guides assembly precautions	
3.2 Tychoways - assembly precautions, factors affecting performance	
3.3 Ball screw and nut - basic requirements, assembly techniques and precautions	
3.4 Noise and vibration - causes and effects in bearings	
3.5 Shop tools and equipments for assembly	
<b>4.0 DRIVES AND CONTROLS</b>	<b>08</b>
4.1 Introduction	
4.2 Spindle drives - requirements - types	
4.3 Feed drives - requirements - types	
4.4 Advantages of AC Servo drives over DC servo system	
4.5 DC servomotor	
4.6 Servo principle	
4.7 Drive amplifier	
4.8 SCR DC drive	
4.9 Braking methods in Servo drives	
<b>5.0 CNC SYSTEMS</b>	<b>07</b>
5.1 Introduction to CNC system	
5.2 Basic configuration of CNC system	
5.3 CPU, Servo-control, operator control panel, machine control panel other peripheral devices	
5.4 Interfacing, monitoring, diagnostics	
5.5 Machine data	
5.6 Compensation for machine accuracies	

5.7 Direct numerical control (DNC)

## **6.0 CNC PART PROGRAMMING**

**14**

- 6.1 Introduction to part programming
- 6.2 Co-ordinate system and types of Dimensioning
- 6.3 Axis and motion nomenclature
- 6.4 Structure of a part program with block example
- 6.5 Word addressed format
- 6.6 Preparatory and miscellaneous functions
- 6.7 G02 and G03 circular interpolation
- 6.8 Tool compensation
- 6.9 Subroutines (macros)
- 6.10 Canned cycle
- 6.11 Mirror image
- 6.12 Parametric programming (user macros) and R-parameters
- 6.13 G-33; Thread cutting cycle

## **7.0 TESTING OF MACHINE TOOLS**

**06**

- 7.1 Introduction
- 7.2 Verification of technical specifications
- 7.3 Verification of functional aspects
- 7.4 Verification during idle running
- 7.5 Verification of machine tool accuracy and work piece accuracy
- 7.6 Metal removal capability test
- 7.7 Other tests
- 7.8 Safety aspects

### **REFERENCE BOOKS:**

1. **Mechatronics** by TMH
2. **CAD/CAM** by P.N.RAO
3. **CNC Machines** by P.RADHAKRISHNA

## MULTIMEDIA AND ANIMATION TECHNIQUES

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

### Topic

### Periods

#### 1.0 Multimedia Elements Multimedia Application

- 1.1 I/P, O/P devices,
- 1.2 Evaluation of Multimedia systems
- 1.3 Storage media

#### 2.0 Architecture & Issues For Distributed Multimedia System.

- 2.1 Multimedia System Architecture.
- 2.2 Distributed Multimedia.
- 2.3 Synchronization, Orchestration & QOS Architecture
- 2.4 Framework for Multimedia System.

#### 3.0 Compression/Decompression & File Formats

- 3.1 Need
- 3.2 Types
- 3.3 Evaluating & Visibility
- 3.4 Video Compression Technique
- 3.5 Introduction to Standardization of Algorithm
- 3.6 File Formats
- 3.7 History of RIF, TIFF
- 3.8 Introduction to RIFF, AVI
- 3.9 JPEG-objectives, Architecture, JPEG-DCT encoding, Quantization.
- 3.10 JPEG-stastical coding, predictive lossless coding, JPEG performance
- 3.11 MPEG-objectives, Architecture, BIT stream syntax performance
- 3.12 MPEG2 & MPEG4

#### 4.0 Multimedia Authoring and User Interface

- 4.1 Multi Media Authoring System and its type
- 4.2 Hypermedia Application Design consideration
- 4.3 User Interface Design
- 4.4 Information Access
- 4.5 Object Display / Playback Issues

#### 5.0 Distributed Multimedia Systems

- 5.1 Components of Distributed Multimedia Systems
- 5.2 Distributed Client Server Operation
- 5.3 Multimedia Object Server
- 5.4 Multi Server Network topologies
- 5.5. Distributed Multimedia Databases

#### 6.0 Multimedia Tool

- 6.1 Introduction to Multimedia tool – Flash
- 6.2 Creating & Modifying elements
- 6.3 Line tool, fill/attributes, different shapes, text tools & pen tool
- 6.4 Selecting lines fill with arrow tool, selecting shapes, using lasso tool performing basic editing tools, selecting & deselecting elements, modifying created objects.

## Value Addition

### ASP.NET LAB

#### Graded exercises

- 1 Opening & running an ASP.NET web application.
- 2 Creating an ASP.NET web application
- 3 Understanding programming basics
- 4 ASP.NET infrastructure.
- 5 ASP.NET web forms.
- 6 Managing & displaying data for ASP.NET application
- 7 Use of server controls
- 8 Creating a user control in ASP.NET
- 9 Creating a composite control in ASP.NET
- 10 Building ASP.NET web services
- 11 Building mobile web application
- 12 Managing state in ASP.NET application
- 13 Caching in ASP.NET application
- 14 Tracing ,debugging & handling exceptions in ASP.NET application

### CNC MACHINES LABORATORY

#### INTRODUCTION:

The following basic concepts in programming must be taught before the students start programming:

- Co-ordinate system
- Dimensioning system
- Preparatory functions (G-codes)
- Miscellaneous function (M-code)
- Control system & their standards [ISO & EIA]
- Programming methodology
- Work piece/job zero, tool zero, reference zero, and tool magazine

#### Preparatory and Miscellaneous functions to be used in CNC milling and turning programs

##### G Codes:

<b>G00</b>	Rapid positioning
<b>G01</b>	Linear Interpolation
<b>G02</b>	Circular Interpolation (Clockwise)
<b>G03</b>	Circular Interpolation (anti clockwise)
<b>G04</b>	Dwell
<b>G17</b>	X-Y Plane
<b>G18</b>	X-Z Plane
<b>G19</b>	Y-Z plane
<b>G20</b>	Inch programming
<b>G21</b>	Metric programming
<b>G33</b>	Thread cutting
<b>G40</b>	Cutter diameter compensation cancel
<b>G41</b>	Cutter diameter compensation left
<b>G42</b>	Cutter diameter compensation right
<b>G70</b>	Inch

<b>G71</b>	Metric
<b>G80</b>	Canned cycle cancel
<b>G81</b>	Drill cycle
<b>G82</b>	Drill cycle with Dwell
<b>G83</b>	Deep hole drilling cycle
<b>G84</b>	Tapping cycle
<b>G85-89</b>	Boring cycle
<b>G90</b>	Absolute positioning
<b>G91</b>	Incremental Positioning

## **M**

### **Codes:**

<b>M00</b>	Programme Stop
<b>M01</b>	Optional Stop
<b>M02</b>	End of Programme
<b>M03</b>	Spindle on
<b>M04</b>	Spindle on clock wise
<b>M05</b>	Spindle off
<b>M06</b>	Tool Change
<b>M07</b>	Coolant ON (Flood)
<b>M08</b>	Coolant ON
<b>M09</b>	Coolant OFF
<b>M17</b>	Unassigned (subroutine cancel)
<b>M21</b>	Mirror image
<b>M22</b>	Cancel mirror image
<b>M30</b>	Programme end & rewind

- Any CNC simulation programming software can be used for writing and executing the programs
- At the end of the semester, preparation of atleast two models in CNC milling machine (machining centre) and turning machine (turning centre) should be demonstrated to the student

### **BOOKS:**

1. Mechatronics by HMT
2. CAD/CAM by P.N.RAO
3. CNC Machines by P.RADHAKRISHNA
4. User Manuals from:
  - a. HMT Ltd
  - b. Fanuc GE
  - c. Siemens

## 6<sup>th</sup> 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

<b>1. E-Commerce in India</b>	<b>08</b>
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	
<b>2. Electronic Commerce Basics</b>	<b>05</b>
2.1 The commerce in e-commerce (Evolution)	
2.2 Internet commerce	
2.3 Models of Electronic Commerce	
2.4 Managing Internet Marketing	
<b>3. Marketing Channels</b>	<b>05</b>
3.1 Introduction	
3.2 The Channel for the net	
3.3 Internet branding.	
3.4 A different pitch for online advertising	
<b>4. CRM &amp; Retailing</b>	<b>05</b>
4.1 Introduction	
4.2 Steps to make an online purchase	
4.3 Retailing in Internet Marketing	
<b>5. E-Commerce is indispensable</b>	<b>05</b>
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	
<b>6. Transaction in Electronic Commerce</b>	<b>07</b>
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	
<b>7.</b>	<b>The Future</b>	<b>05</b>
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	
<b>8.</b>	<b>Legal aspects in Electronic Commerce</b>	<b>05</b>
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	
<b>9.</b>	<b>The dotcom world</b>	<b>05</b>
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	
<b>10.</b>	<b>Venture Capital</b>	<b>05</b>
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	
<b>11.</b>	<b>Case Studies</b>	<b>05</b>
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  
4     -     -

Total Mark     : 100  
Theory            : 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 paper deals with *TCP/IP* which is the backbone of Internet. Web pages are used to project the profile of 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

## Computer System Management, Planning & Maintenance

L     T     P  
4     -     -

Total Mark     : 100  
Theory            : 80

### RATIONALE

This is a subject which will prepare the student to face the industrial environment, in a theoretical manner. It will expose the student to the various computer center management techniques, as well as computer selection procedures. It will acquaint the students to various types of site preparations. In this paper, the student will learn about the various components inside the computer system and their maintenance procedures. Here the student will also learn the various computer trouble shooting methodologies.

### 1.0 INTRODUCTION

08

- 1.1 Describe Need of Management in Computer Centres
- 1.2 Describe Types of Job carried out in computers in an organisation
- 1.3 Discuss Duties & responsibilities of personnel involved
- 1.4 Discuss Hierarchy of position of different levels
- 1.5 Explain need for training of staff.
- 1.6 Idea about various computer makes and installations in India
- 1.7 Name few major vendors in computer hardware and software.

### 2.0 SELECTION OF COMPUTER SYSTEM

05

- 2.1 Discuss Factors affecting selection and evaluation of Computers.
- 2.2 Discuss Different types of Industries and their computer requirements.
- 2.3 Give Selection and evaluation of appropriate configuration for different levels of industries.

### 3.0 SITE PREPARATION & INSTALLATION

12

- 3.1 Plan for computer room layout based on size
- 3.2 Discuss regarding different layout factors & their effect like false Flooring, False roofing, Air conditioning, dust Proofing
- 3.3 Explain the Need of power conditioning equipments like, CVT, UPS, Isolation circuits, with their principle of functioning.
- 3.4 Give Interpretation of the installation and wiring diagram
- 3.5 Describe the steps for actual installation as per the manufacturer's Specified procedures.

### 4.0 COMPONENTS INSIDE THE COMPUTERS (PC) & THEIR INTERCONNECTION

20

- 4.1 Introduction
- 4.2 Explain Hardware - BIOS interaction
- 4.3 Give Interconnection between subsystems of PC
- 4.4 Inside the system unit
  - > Study of mother board and its components
  - > Study of functioning of SMPS
  - > Study of functions of FDD system interface
  - > Study of functioning of HDD system interface
  - > Different standards of expansion units ISA, EISA, VESA, PCI.
- 4.5 Discuss the Post sequence
- 4.6 Describe Keyboard interface
- 4.7 Study the steps for Assembling of a computer
- 4.8 Software settings of computer after installation (CMOS- setup)

### 5.0 BASIC MAINTENANCE OF COMPUTER AND TROUBLE SHOOTING PROCEDURES.

15

5.1 Discuss Basic maintenance concepts )

>Preventive

>Corrective and

>On-line maintenance

5.2 Discuss type & nature of fault

5.3 Diagnostic Program and tools

5.4 Give Firmware (POST) concepts

5.5 Discuss Fault elimination process

5.6 Discuss Systematic way of trouble shooting versus adhoc Trouble shooting.

> Symptoms observation

> Symptom analysis

> Fault diagnosis

> Fault rejection

Books :

1. Computer Management & Planning - by Utpal Baneljee (TMH)

2. PC Hardware, B.Singh; Firewall

3. PC Architecture & Peripherals Part I & II; Firewall

## Advanced Microprocessor & peripherals

L	T	P	<b>Theory</b>	: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 focuses on the latest developments in the field of microprocessor. It gives the Hardware knowledge to 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 for advanced microprocessors. Moreover the students will be exposed towards the real time advanced application of the microprocessor in different areas.

### 1. THE PROCESSORS: 8086/8088 – ARCHITECTURE, PIN DIAGRAMS AND TIMING DIAGRAM

- 1.1 Register Organisation of 8086.
- 1.2 Architecture.
- 1.3 Signal Description of 8086.
- 1.4 Physical Memory Organisation.
- 1.5 General Bus Operation.
- 1.6 I/O Addressing Capability.
- 1.7 Special Processor Activities.
- 1.8 Minimum Mode 8086 System & Timing.
- 1.9 Maximum Mode 8086 System & Timing.
- 1.10 The Processor 8086.

### 2. 8086/8088 INSTRUCTION SET AND ASSEMBLER DIRECTIVES

- 2.1 Machine Language Instruction Formats.
- 2.2 Addressing Mode of 8086.
- 2.3 Instruction Set of 8086/8088.
- 2.4 Assembler Directives and Operators.

### 3. THE ART OF ASSEMBLY LANGUAGE PROGRAMMING WITH 8086/8088

- 3.1 A Few Machine Level Programs.
- 3.2 Machine Coding of the Programs.
- 3.3 Programming with an Assembler.
- 3.4 Assembly Language Example Programs.

### 4. SPECIAL ARCHITECTURAL FEATURES AND RELATED PROGRAMMING

- 4.1 Introduction to Stack.
- 4.2 Stack structure of 8086/88.
- 4.3 Interrupts and Interrupt Service Routines.
- 4.4 Interrupt Cycle of 8086/8088.
- 4.5 Non Maskable Interrupt .
- 4.6 Maskable Interrupt.
- 4.7 Interrupt Programming.
- 4.8 Passing Parameters to Procedures.
- 4.9 Handling Programs of size more than 64K.
- 4.10 MACROS.
- 4.11 Timing and Delays.

### 5. BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086/88

- 5.1 Semiconductor Memory Interfacing.

- 5.2 Dynamic RAM Interfacing.
- 5.3 Interfacing I/O Ports.
- 5.4 PIO 8255 [Programmable input-Output Port].
- 5.5 Modes of Operations of 8255.
- 5.6 Interfacing Analog to Digital Data Converters.
- 5.7 Interfacing Digital to Analog Converters.
- 5.8 Stepper Motor Interfacing.
- 5.9 Control of High Power Device using 8255.

## **6. SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING**

- 6.1 Programmable Interval Timer 8253.
- 6.2 Programmable Interrupt Controller 8259A.
- 6.3 The Keyboard / Display Controller 8279.
- 6.4 Programmable Communication Interface 8251 USART.

## **7. 80286-80287 A MICROPROCESSOR WITH MEMORY MANAGEMENT AND PROTECTION**

- 7.1 Salient Features of 80286.
- 7.2 Internal Architecture of 80286.
- 7.3 Signal Description of 80286.
- 7.4 Real addressing Mode.
- 7.5 Protected Virtual Address Mode (PVAM).
- 7.6 Privilege.
- 7.7 Protection.
- 7.8 Special Operation.
- 7.9 80286 Bus Interface.
- 7.10 Basic Bus Operation.
- 7.11 Fetch Cycle of 80286.
- 7.12 80286 Minimum System Configuration.
- 7.13 Interfacing Memory and I/O Device with 80286.
- 7.14 Priority of Bus Use by 80286.
- 7.15 Bus Hold and HLDA Sequence.
- 7.16 Interrupt Acknowledge Sequence.
- 7.17 Instruction Set Features.
- 7.18 80287 Math Coprocessor.

## **8. 80386 - 80387 AND 80486 THE 32-BIT PROCESSOR**

- 8.1 Salient Features of 80386DX.
- 8.2 Architecture and Signal Description of 80386.
- 8.3 Register Organisation of 80386.
- 8.4 Addressing Mode.
- 8.5 Data Types of 80386.
- 8.6 Real Address Mode of 80386.
- 8.7 Protected Mode of 80386.
- 8.8 Segmentation.
- 8.9 Paging.
- 8.10 Virtual 8086 Mode.
- 8.11 Enhanced Instruction Set of 80386.
- 8.12 The Coprocessor 80387.
- 8.13 The CPU with a Numeric Coprocessor – 80486DX.

## **9. RECENT ADVANCE IN MICROPROCESSOR ARCHITECTURE – A JOURNEY FROM PENTIUM ONWARDS**

- 9.1 Salient Features of 80586 (Pentium).
- 9.2 A Few Relevant Concepts of Computer Architecture.
- 9.3 System Architecture.
- 9.4 Branch Prediction.
- 9.5 Enhanced Instruction Set of Pentium.
- 9.6 What is MMX.
- 9.7 Intel MMX Architecture.
- 9.8 MMX Data Types.
- 9.9 Wraparound and Saturation Arithmetic.
- 9.10 MMX Instruction Set.
- 9.11 Salient Points About Multimedia Application Programming.
- 9.12 Journey to Pentium-Pro and Pentium-II.
- 9.13 Pentium III (P-III) - The CPU of the next Millennium.

## **10. PENTIUM 4 – PROCESSOR OF THE NEW MILLENNIUM**

- 10.1 Genesis of Birth of Pentium 4.
- 10.2 Salient Features of Pentium 4.
- 10.3 Net-burst Micro-architecture of Pentium 4.
- 10.4 Instruction Translation Look-aside Buffer (ITLB) and Branch Prediction.
- 10.5 Why Out of Order Execution.
- 10.6 Rapid Execution Module.
- 10.7 Memory Subsystem.
- 10.8 Hyper-threading Technology.
- 10.9 Hyper-threading in Pentium.
- 10.10 Extended Instruction Set in Advanced Pentium Processors.
- 10.11 Instruction Set Summary.
- 10.12 Need for Formal Verification.

## **11. AN INTRODUCTION TO MICROCONTROLLERS 8051 AND 80196**

- 11.1 Intel's Family of 8-bit Microcontrollers.
- 11.2 Architecture of 8051.
- 11.3 Signal Description of 8051.
- 11.4 Register Set of 8051.
- 11.5 Important Operational Features of 8051.
- 11.6 Memory and I/O Addressing by 8051.
- 11.7 Interrupts of 8051.
- 11.8 Instruction Set of 8051.
- 11.9 Design of a Microcontroller 8051 Based Length Measurement system for Continuously Rolling Cloth or Paper.
- 11.10 Intel's 16-bit Microcontroller Family MCS-96.

### **Text Book**

- 1. Advanced Microprocessor and Peripherals ; By: A.K.Ray, K.M.Bhurchandi (TMH)
- 2. Advanced Microprocessor and Peripherals ; By: B.Ray (TMH)

## Algorithm Analysis & Design (Elective)

L     T     P  
4     -     -

Total Mark     : 100  
Theory            : 80

### RATIONALE

Devising the Algorithm is no doubt a different task. But the performance of Algorithm in respect of time and space complexity is still critical to many applications. This paper gives emphasis on the analysis of the algorithm and discusses various approaches and techniques adopted for the purpose.

### 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

### 2.0 Divide & conquer method

- 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
- 2.1 Greedy Method
- i) General Method
  - ii) Case study of Keysnap problem
  - iii) Optimal merge pattern
  - iii) Minimum spanning trees
  - iv) Single source shortest path

### 3.0 The general method

- 3.1 Multistage graphs
- 3.2 Optional binary search trees
- 3.3 Reliability design
- 3.4 Flowshop scheduling

- 1.1 The 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

### Books

Design & Analysis of Algorithm; N.Updhyya; Katson

## Network Security & Cryptography (Elective)

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.

- |           |  |           |
|-----------|--|-----------|
| <b>1.</b> | <b>Possible attacks on computers</b>                       | <b>05</b> |
|           | 1.1 The need for security                                  |           |
|           | 1.2 Security approach                                      |           |
|           | 1.3 Principles of security                                 |           |
|           | 1.4 Types of attacks                                       |           |
| <b>2.</b> | <b>Cryptography concepts</b>                               | <b>10</b> |
|           | 2.1 Plain text & Cipher Text                               |           |
|           | 2.2 Substitution techniques                                |           |
|           | 2.3 Transposition techniques                               |           |
|           | 2.4 Encryption & Decryption                                |           |
|           | 2.5 Symmetric & Asymmetric key cryptography                |           |
| <b>3.</b> | <b>Symmetric &amp; Asymmetric key algorithms</b>           | <b>15</b> |
|           | 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                                      |           |
| <b>4.</b> | <b>Digital certificate &amp; Public key infrastructure</b> | <b>10</b> |
|           | 4.1 Digital certificates                                   |           |
|           | 4.2 Private key management                                 |           |
|           | 4.3 PKIX Model   |           |
|           | 4.4 Public key cryptography standards                      |           |
| <b>5.</b> | <b>Internet security protocols</b>                         | <b>10</b> |
|           | 5.1 Basic concept  |           |
|           | 5.2 Secure socket layer                                    |           |
|           | 5.3 Transport layer security                               |           |
|           | 5.4 Secure Hyper text transfer protocol(SHHTTP)            |           |
|           | 5.5 Time stamping protocol (TSP)                           |           |
|           | 5.6 Secure electronic transaction (SET)                    |           |
| <b>6.</b> | <b>User authentication</b>                                 | <b>05</b> |
|           | 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 :**

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

## Data Mining & Data Ware Housing

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

### RATIONALE

Data Mining & Data ware Housing 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.

<b>1. Introduction to Data Mining</b>	<b>10</b>
1.1 Data, Information & knowledge.	
1.2 Motivation behind Data mining & knowledge discovery?	
1.3 Data mining Functionalities.	
1.4 Elements of Data Mining	
1.5 Data Mining system categorization	
1.6 Issues in Data Mining	
1.7 Data Mining tools	
<b>2. Data Processing</b>	<b>05</b>
2.1 Introduction	
2.2 Data Clearing	
2.3 2.3 Data Integration & transformation	
<b>3. Data Reduction</b>	<b>10</b>
3.1 Data cube Aggregation	
3.2 Attribute Subset Selection	
3.3 Dimensionality Reduction	
3.4 Numerocity Reduction	
3.5 Data discretization and concept Hierarchy generation	
<b>4. Data Mining Statistics</b>	<b>10</b>
4.1 What is Statistics?	
4.2 Data, Counting & Probability	
4.3 Measuring the central Tendency	
4.4 Measuring the dispersion of Data	
4.5 Range, Quartiles, Outliers & Box plots	
4.6 Variance & Standard deviation	
<b>5. Association Rules</b>	<b>05</b>
5.1 Mining Different Kinds of Knowledge From Databases	
5.2 Mining Association Rules	
<b>6. Data Ware Housing Concepts &amp; Mechanisms</b>	<b>10</b>
6.1 Introduction	
6.2 Need for Developing Data Warehouse	
6.3 What is a Data Warehouse?	
6.4 Why Separate Data Warehouse?	
6.5 Data Warehouse Systems	
6.6 Data Warehouse Components	
6.7 The Importance of Managing Metadata (Integration)	
6.8 Administration and Management Tools	
6.9 Data Mart	
6.10 The Difference between OLTP and Data Warehousing	
6.11 Decision Support and OLAP	
6.12 Data Processing Models	

**7. Building a Data Warehouse**

**10**

- 7.1 Introduction
- 7.2 Planning a Data Warehouse
- 7.3 Creating and Maintaining a Warehouse
- 7.4 Physical Structure of Data Warehouse
- 7.5 Conceptual Modeling of Data Warehouse
- 7.6 Multidimensional Data Model
- 7.7 OLAP Servers
- 7.8 Implementing a Warehouse
- 7.9 Database System Vs. Data Warehouse

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

## Software Testing (Elective)

L    T    P  
4    0    0

**Theory** :100  
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

<b>1. Introduction to S/w Testing</b>	<b>08</b>
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	
<b>2. S/W verification and Validation</b>	<b>06</b>
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	
<b>3. Functional Testing Techniques</b>	<b>10</b>
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	
<b>4. Structural Testing Techniques</b>	<b>10</b>
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	
<b>5.</b>	<b>Gray Box Testing</b>	<b>06</b>
5.1	Introduction	
5.2	What is Gray Box Testing	
5.3	Definitions of Gray Box Testing	
5.4	Comparison of WB, BB, GB	
<b>6.</b>	<b>Reducing Number of Test Cases</b>	<b>06</b>
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	
<b>7.</b>	<b>Levels of Testing</b>	<b>06</b>
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	
<b>8.</b>	<b>Automated Testing</b>	<b>08</b>
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**

1. 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.

### **Computer Maintenance & Networking Lab**

L     T     P  
0     0     6

Practical               : 50  
Sessional               : 25

#### 1.     STUDY OF COMPUTER COMPONENTS

- 1.1    Study of motherboard
- 1.2    Study of HDD and interface
- 1.3    Study of FDD and interfaces
- 1.4    Study of expansion slab and signals
- 1.5    Study of SMPS functioning

#### 2.     ASSEMBLING A COMPUTER PC

- 2.1    Connecting hardware components.
- 2.2    Setting up the CMOS
- 2.3    Loading operating system (windows 98/2k)
- 2.4    Loading different available application softwares

#### 3.     SYSTEM MAINTENANCE & TROUBLE SHOOTING

- 3.1    Different methods of preventive maintenance
- 3.2    Software level (CMOS or OS) troubleshooting
- 3.3    Card level trouble shooting
- 3.4    Elementary troubleshooting of SMPS faults
- 3.5    Elementary troubleshooting of monitor faults
- 3.6    Elementary trouble shooting of printer faults.

### **Networking Lab**

#### 4.     HARDWARE INSTALLATION:

- 4.1 Define the procedure of Installation of LAN Pre- installation
- 4.2 Cable Installation
- 4.3 Network Equipment (Hub, Switch etc) Installation
- 4.4 Post-installation

5. SOFTWARE INSTALLATION:

- 5.1 Installation & Administration of Window NT/2000 server
- 5.2 Server & workstation installation
- 5.3 Interconnection, domain network
- 5.4 Network Management
- 5.5 Network Printer management & Application Management

6. UNIX INSTALLATION

- 6.1 Installation & Administration of Unix software
- 6.2 Installation of Linux/ Sco Unix Open server on server & Accessing the server through Telnet

**Web Development Lab**

L	T	P		
0	0	6	Practical	: 50
			Sessional	: 25

Networking

- 1. Installation of network components under NT or 95/98/1 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>
<Br>
<A HREF> </A>
<Img>
<FONT>
```

- 2. Creation of tables and lists using HTML
- 3. Creation of simple fOlms 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

## Floating Papers **.NET PROGRAMMING**

RATIONALE: :

.NET Framework is changing the way developers write applications. .NET Framework provides a number of components to create many types of applications including those for consoles, Windows, mobile units and the web. Using .NET framework the data can be made available anytime, anywhere and on any device.

This subject introduces the basics of .NET Framework. Writing applications on VB.Net is covered in this course. Concepts of developing web applications using ASP.NET are discussed. This course helps to use ADO.NET to write the applications to connect with the back end database. The subject also enables the users to know the concepts of XML and the XML web services.

### **1.0 INTRODUCTION TO .NET FRAMEWORK**

**10 Hours**

- 1.1 Introduction to .NET framework: Managed Code and the CLR - Intermediate Language, Metadata and JIT Compilation - Automatic Memory Management.
- 1.2 Language Concepts and the CLR: Visual Studio .NET - Using the .NET Framework.
- 1.3 The Framework Class Library - .NET objects - ASP .NET - .NET web services – Windows Forms

### **2.0 INTRODUCTION TO VISUALBASIC.NET**

**10 Hours**

- 2.1 Elements : Variables and constants – data types – declaration. Operators – types – precedence. Expressions. Program flow – Decision statements – if .. then, if..then..else, select..case– Loop statements – while..end while, do..loop, for..next, for..each..next.
- 2.2 Types: Value data types – Structures, Enumerations. Reference data types- Single-dimensional – Multi-dimensional arrays – jagged arrays – dynamic arrays
- 2.3 Windows programming – creating windows Forms – windows controls – Button, Check box, Combo box, Label, List box, Radio Button, Text box. Events – Click, close, Deactivate, Load, Mousemove, Mousedown, MouseUp.
- 2.4 Menus and Dialog Boxes – Creating menus – menu items – context menu - Using dialog boxes – showDialog() method.

### **3.0 APPLICATION DEVELOPMENT USING ADO .NET**

**10 Hours**

- 3.1 Features of ADO.NET. Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset.
- 3.2 Accessing Data with ADO.NET: Connecting to Data Source, Accessing Data with Data set and Data Reader - Create an ADO.NET application - Using Stored Procedures.

### **4.0 INTRODUCING ASP.NET**

**10 Hours**

- 4.1 ASP.NET Features: Change the Home Directory in IIS - Add a Virtual Directory in IIS- Set a Default Document for IIS - Change Log File Properties for IIS - Stop, Start, or Pause a Web Site.
- 4.2 Creating Web Controls: Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding web controls to a Page.
- 4.3 Creating Web Forms: Server Controls - Types of Server Controls - Adding ASP.NET Code to a Page.

### **5.0 XML WEB SERVICES**

**10 Hours**

- 5.1 Overview of XML : XML Serialization in the .NET Framework -SOAP Fundamentals-Using SOAP with the .NET Framework.
- 5.2 Introduction to web services: Web Services protocol and standards – WSDL Documents - Overview of UDDI - Calling a Web Service from a Browser - Calling a Web Service by Using a Proxy - Creating a simple web service - Creating and Calling a Web Service by Using Visual Studio .NET.

### **BOOKS**

- 1. Introduction to Visual basic.NET NIIT Prentice Hall of India,2005
- 2. Introducing Microsoft .NET David S. Platt Microsoft Press”, Saarc Edition, 2001
- 3. Introduction to Microsoft® ASP.NET Work Book Microsoft Microsoft Press

## Value Additions

### .NET LAB

Contact Hrs/Week:06

Contact Hrs/Sem: 96

#### Exercises

- 1 Opening & running an ASP.NET web application.
- 2 Creating an ASP.NET web application
- 3 Understanding programming basics
- 4 ASP.NET infrastructure.
- 5 ASP.NET web forms.
- 6 Managing & displaying data for ASP.NET application
- 7 Use of server controls
- 8 Creating a user control in ASP.NET
- 9 Creating a composite control in ASP.NET
- 10 Building ASP.NET web services
- 11 Building mobile web application
- 12 Managing state in ASP.NET application
- 13 Caching in ASP.NET application
- 14 Tracing ,debugging & handling exceptions in ASP.NET application

### **OPEN SOURCE SOFTWARES LABORATORY**

#### LAB EXERCISES

1. Install Linux Server in Linux Environment
  2. Set up a Local Area Network in Linux Environment
  3. Connect Internet in Linux Environment
  4. Setting up a Print Server in Linux Environment
  5. Setting up a Web server in Linux Environment
  6. Generate a PHP script will display the multiples of the numbers 1 to 5 upto 5 times. The output should column format
  7. Display the week date of the current date of the machine serving PHP pages  
Generate a list of possibility for two digit numbers consisting of numbers 0 to 5 using nested for loop
  8. Generate a PHP script that will display the grade on the basis of marks as follows :  
Distinction – 80 and above  
First Class – From 60 to below 80  
Second Class – From 45 to below 60  
Pass Class – From 35 to below 45  
Fail – Below 35
- Test the above program using the following set of values stored in an array : 67, 82, 23, 37, 57, and 97
8. Create a function to calculate 33% tax on the given salary Rs. 65,500.

Generate Fibonacci series for the numbers 1 to 70.

9. Create a form to capture book details.

The HTML form should perform the following:

Capture the data such as the Book name, Author name, Publisher name, Category and the Synopsis

Clears the form fields when reset button is clicked

Submit the captured data when submit button is clicked

10. Create a PHP code, which will retrieve the data captured by the HTML form, display the name of the form and also display the message Data Entered Successfully on the HTML form page after performing the following validations:

That the book name form field is not left blank

That the author name form field is not left blank

That the publisher name form field is not left blank

That the synopsis form field is not left blank

11. Develop a form to capture Personnel Information

The HTML based form should perform the following:

Captures data such as name, date of birth, address, city, state and Email

Clear the form fields when the Clear button is clicked

Submit captured information, when Save button is clicked

12. Create a PHP file that will validate data captured by the form. This program uses regular expressions to validate and format data.

13. Create a table that will store valid book information. The structure of the MySQL table will be as follows.

(i) Table Definition

(ii) Column Definition (iii) Table Description

14. Create a Book Master form, which will allow

(i) Inserting records in BookMaster

(ii) Updating records that already exists in the BookMaster.

(iii) Viewing records available in BookMaster.

(iv) Deleting Records from BookMaster.

15. Using MySql , Create a table "Customer" with the following fields.

i) Id

ii) Company Name

iii) Last Name

iv) First Name

v) Address

vi) City

vii) State

viii) Pin Code

Perform the following Operations

i) Change the pin code of any customer

ii) Insert a new record into the table

iii) Update the field's First name and Last Name into name.

iv) Find the customer who does not have a last name

16. Install a Apache Web server

17. Setting up and configuring PHP to work under Apache web server

18. Testing the PHP/Apache web server setup