

Course Name : Diploma in Mechanical, Information Technology and Civil Engineering
Semester : Third
Subject Title : Mathematics III Subject
Code : DTMA2101

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	P	T		Theory		Test	Total		Pract		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	1	3	100	35	25	125	50	-	-	-	-	25	10	150

Objective:

1. To make students well versed in various methods of integration for solving problems.
2. To expose students to techniques of solving differential equations.

No.	Contents	L	M
1	Integration 1.1 Definition of integration. Integration of standard functions. 1.2 Theorems of integration. 1.3 Methods of Integration 1.3.1 Integration by substitution 1.3.2 Integration by partial fractions. 1.3.3 Integration by parts. 1.4 Definite Integration 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems.	19	40
	1.5 Applications of definite integrals 1.5.1 Area under curve. Area bounded by two curves. 1.5.2 Volume of solid of revolution.	06	10
2	Differential Equations: 2.1 Order and degree of the differential equation. 2.2 Formation of differential equations. 2.3 Solution of differential equation of first order, first degree. 2.3.1 Variable separable method.	12	25

	2.3.2 Reducible to variable separable method. 2.3.3 Homogeneous differential equation. 2.3.4 Exact differential equation. 2.3.5 Introduction of integrating factor. 2.3.6 Linear differential equation. 2.3.7 Bernoulli's differential equation.		
	2.4 Solution of Linear differential equations of higher order with constant coefficients. 2.4.1 Complementary function 2.4.2 Particular integral of e^{ax} , $\sin ax$, $\cos ax$, x^n , $v e^{ax}$, xv 2.5 Applications of differential equation.	11	25
		48	100

Text Books :

- 1) Applied Mathematics - B.M.Patel, J.M.Rawal and others - Nirali Prakashan (July-2010)
- 2) Mathematics for Polytechnic students - S. P. Deshpande- Pune Vidyarthi Griha Prakashan (first edition-Aug.2005).

Reference Books :

- 1) Applied Mathematics II - G.V. Kumbhojkar - C. Jamnadas & Co. (second edition – 2010-11)
- 2) Higher Engineering Mathematics – B. S. Grewal – Khanna Publication (1995)

Course Name : Diploma in Information Technology
Semester : Third
Subject Title : Digital Electronics
Subject Code : DTIT2102

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	3	3	100	35	25	125	50	50	20	-	-	25	10	200

COURSE CONTENT

PERIODS

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

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

4. BOOLEAN ALGEBRA & COMBINATIONAL LOGIC. 05

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

5. FUNCTIONS OF COMBINATIONAL LOGIC 08

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

6. FLIP- FLOPS & MULTIVIBRATORS 08

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

7. COUNTERS & SHIFT REGISTERS

08

- 7.1 Define counter & shift register.
- 7.2 Differentiate between ripple & synchronous counter.
- 7.3 Describe the working of a 4-bit ripple counter.
- 7.4 Distinguish between.
 - 7.4.1 4-bit synchronous serial counter.
 - 7.4.2 4-bit synchronous parallel counter.
- 7.5 Study the module N counter.
- 7.6 Explain divide by N counter.
- 7.7 Design a skipping state counter.
- 7.8 Describe & design.
 - 7.8.1 Mod-6 counter.
 - 7.8.2 Mod-12 counter.
 - 7.8.3 Decade counter.
- 7.9 Describe the working of a Ring counter.
- 7.10 Study Johnson counter.
- 7.11 Study counter application.
- 7.12 Describe the working of a;
 - 7.12.1 4-bit serial-in-serial-out (SISO) shift register.
 - 7.12.2 4-bit serial-in-parallel-out (SIPO) shift register.
 - 7.12.3 4-bit parallel-in-serial-out (PISO) shift register.
 - 7.12.4 4-bit parallel-in-parallel-out (PIPO) shift register.
- 7.13 Discuss the shift register applications.

8. MEMORIES

06

- 8.1 State & explain.
- 8.2 Explain ROM, PROM, EPROM, & E^2 PROM.
- 8.3 Differentiate between ROM & RAM.
- 8.4 Study different types of RAM.
- 8.5 Distinguish between SRAM & DRAM.
- 8.6 Study detail structure of memory expression.
- 8.7 Describe magnetic bubble memories.
- 8.8 Describe the working principle of magnetic disk memories.
- 8.9 Explain special memories like CCD & CD-ROM.
- 8.10 Discuss memory applications.

9. D/A & A/D CONVERTERS

06

- 9.1 Describe D/A & A/D converter.
- 9.2 Draw a weight-register type D/A converter circuit with neat sketch.
- 9.3 Discuss a ladder type D/A converter circuit.
- 9.4 Compare the features of A/D conversion method.
- 9.5 Study of a Dual-slope A/D converter.
- 9.6 Describe a Successive approximation A/D converter circuit.
- 9.7 Discuss D/A applications.

10. INTRODUCTION TO DIGITAL LOGIC FAMILIES

06

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

TEXT BOOKS

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

Course Name : Diploma in Information Technology
Semester : Third
Subject Title : Computer System Architecture
Subject Code : DTIT2103

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	3	3	100	35	25	125	50	50	20	-	-	25	10	200

Topic	Periods
1. Basic structure of computer hardware 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	05
2. Instructions & instruction sequencing 2.1 Fundamentals to instructions 2.2 Operands 2.3 Op codes 2.4 Instruction formats 2.5 Addressing techniques 2.6 Addressing Modes	05
3. Arithmetic operations 3.1 Basic arithmetic operation 3.2 Floating point representation 3.3 Floating point arithmetic operation	05
4. Processor System 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	10

4.8 Microprogrammed control

5. Memory System **10**

- 5.1 Memory characteristics
- 5.2 Memory – processor data transfer
- 5.3 Semiconductor RAM
- 5.4 ROM
- 5.5 Interleaved Memory
- 5.6 Cache memory
- 5.7 Virtual memory

6. Input – Output System **10**

- 6.1 Input - Output Operation
- 6.2 Programmed I/O
- 6.3 Interrupt driven I/O
- 6.4 DMA
- 6.5 I/O Channel architecture

7. I/O Interface & Bus architecture **10**

- 7.1 Bus interconnection
- 7.2 Bus structure
- 7.3 Basic parameters of Bus design
- 7.4 Peripheral component interconnect Bus
- 7.5 SCSI
- 7.6 USB

8. Parallel Processing **05**

- 8.1 Parallel Processing
- 8.2 Linear PipeLine
- 8.3 Multiprocessor
- 8.4 Flynn's Classification

Books

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

Course Name : Diploma in Information Technology
Semester : Third
Subject Title : Management Information System- 1
Subject Code : DTIT2103

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
4	-	3	3	100	35	25	125	50	50	20	-	-	25	10	200

COURSE CONTENT

PERIODS

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

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

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

- 14.4 Flow of Information
- 14.5 Role of Common/ shared Enterprise Database
- 14.6 Selection of ERP
- 14.7 Application of POC approach
- 14.8 Material requirement planning
- 14.9 Manufacturing Resource Planning (MRP II)
- 14.10 Business Process Re-Engineering (BPR)
- 14.11 ERP Implementation Methodology
- 14.12 Principle for ERP Implementation
- 14.13 Guideline for ERP Implementation
- 14.14 Causes for failure in ERP Implementation
- 14.15 Sample list of ERP vendors
- 14.16 ERP Software packages (SAP)

15. Supply Chain Management

03

- 15.1 Introduction
- 15.2 Definitions
- 15.3 Concept of SCM
- 15.4 SCM Process
- 15.5 Stevan's Model of Supply chain integration
- 15.6 Goal / Componenets of SCM
- 15.7 Performance of Supply chain
- 15.8 Comparison between ERP & SCM
- 15.9 ERP Implementation: A case of Distorition 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)

MIS Lab

Introduction to FOXPRO

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

Course Name : Diploma in Information Technology
Semester : Third
Subject Title : Data Structure
Subject Code : DTIT2104

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	3	3	100	35	25	125	50	50	20	-	-	25	10	200

1.0 INTRODUCTION: 04

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

2.0 STRING PROCESSING 03

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

3.0 ARRAYS 07

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

4.0 STACKS & QUEUES 08

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

5.0 LINKED LIST 08

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

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

Books

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

DATA STRUCTURE LAB USING C

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