

THIRD SEMESTER



THIRD SEMESTER (COMPUTER ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME		Credits	MARKS IN EVALUATION SCHEME										Total Marks of Internal & External
		Hours/Week			INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT							
		Th	Pr		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot			
3.1	Programming in C	3	6	6	25	25	50	100	3	50	3	150	200		
3.2	Operating Systems	3	3	4	25	25	50	100	3	50	3	150	200		
3.3.	*Digital Electronics	3	3	4	25	25	50	100	3	50	3	150	200		
3.4	Multimedia Applications	3	6	6	25	25	50	100	3	50	3	150	200		
3.5	Data Communication	3	-	3	50	-	50	100	3	-	-	100	150		
Soft Skills -I		-	2	-	25	25	-	-	-	-	-	-	25		
Total		15	20	23	150	125	275	500	-	200	-	700	975		

3.1 PROGRAMMING IN C

L T P
3 - 6

RATIONALE

Computers play a vital role in present day life, more so, in the professional life of technician engineers. People working in the field of computer industry, use computers in solving problems more easily and effectively. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various applications of computers. The knowledge of C language will be reinforced by the practical exercises.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Identify the problem and formulate an algorithm for it.
- Identify various control structures and implement them.
- Identify various types of variables.
- Use pointer in an array and structure.
- Use structures and union for handling data.
- Explain the concepts of C programming language
- Explain and implement the language constructs concepts
- Install C software on the system and debug the programme
- Explain and execute member functions of C in the programme
- Describe and implement array concept in C programme
- Describe and execute pointers

DETAILED CONTENTS

1. Algorithm and Programming Development

- 1.1 Steps in development of a program
- 1.2 Flow charts, Algorithm development
- 1.3 Programme Debugging

(04 Periods)

2. Program Structure

- 2.1 I/O statements, assign statements
- 2.2 Constants, variables and data types
- 2.3 Operators and Expressions
- 2.4 Unformatted and Formatted IOS
- 2.5 Data Type Casting

(08 Periods)

3. Control Structures

- 3.1 Introduction
- 3.2 Decision making with IF – statement
- 3.3 IF – Else and Nested IF
- 3.4 While and do-while, for loop
- 3.5 Break. Continue, goto and switch statements

(08 Periods)

4 Pointers

- 4.1. Introduction to pointers
- 4.2 Address operator and pointers
- 4.3 Declaring and initializing pointers,
- 4.4 Single pointer,

(06 Periods)

5. Functions

- 5.1 Introduction to functions
- 5.2 Global and Local Variables
- 5.3 Function Declaration
- 5.4 Standard functions
- 5.5 Parameters and Parameter Passing

(08 Periods)

5.6 Call - by value/reference

ARRAYS AND STRING

(6 PERIODS)

- 6.1. Introduction to Arrays
- 6.2. Array Declaration, Length of array
- 6.3 Single and Multidimensional Array.
- 6.4 Arrays of characters
- 6.5 Introduction of Strings
- 6.6 String declaration and definition
- 6.7 String Related function i.e. strlen, strcpy, strcmp
- 6.8 Passing an array to function
- 6.9 Pointers to an array and strings

7. Structures and Unions (08 Periods)

- 7.1 Declaration of structures
- 7.2 Accessing structure members
- 7.3 Structure Initialization
- 7.4 Pointer to structures,
- 7.5 Unions



LIST OF PRACTICALS

1. Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetic and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation.
5. Programming exercises on formatting input/output using printf and scanf and their return type values.
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while, statement.
10. Programming exercises on for – statement.
11. Simple programs using pointers.
12. Programs on one-dimensional array.
13. Programs on two-dimensional array.
14. (i) Programs for putting two strings together. (ii) Programs for comparing two strings.
15. Simple programs using functions
16. Simple programs using structures.
17. Simple programs using union.

INSTRUCTIONAL STRATEGY

The subject is totally practical based. Students should be given clear idea about the basic concepts of programming. In practical session student should be asked to draw flow chart, write algorithm and then write program for the algorithm and run on computer. It is required that students should maintain records (files with printouts).

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Let us C by Yashwant Kanetkar
2. Programming in ANSI C by E Balaguruswami, , Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Problem Solving and Programming in C by RS Salaria, Khanna Book Publishing Co(P) Ltd. New Delhi
4. Programming in C by Reema Thareja; Oxford University Press, New Delhi
5. Programming in C by Gottfried, Schaum Series, , Tata McGraw Hill Education Pvt Ltd , New Delhi
6. Exploring C by Yashwant Kanetkar; BPB Publications, New Delhi
7. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi
8. Elements of C by M.H. Lewin, Khanna Publishers, New Delhi
9. Programming in C by Stephen G Kochan
10. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi
11. Programming in C : A Practical Approach by Ajay Mittal, Pearson Publication
12. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

<http://swayam.gov.in>

SUGGESTED DISTRIBUTION OF MARKS Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	04	08
2	08	16
3	08	16
4	06	12
5	08	20
6	06	12
7	08	16

Total	48	100
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3.2 OPERATING SYSTEMS

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3 – 3

RATIONALE

The course provides the students with an understanding of human computer interface existing in computer system and the basic concepts of operating system and its working. The students will also get hands-on experience and good working knowledge to work in windows and Linux environments. The aim is to gain proficiency in using various operating systems after undergoing this course. While imparting instructions, the teachers are expected to lay more emphasis on concepts and principles of operating systems, its features and practical utility.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Describe various types and services of operating system
- Identify the concept of process, various states in the process and their scheduling.
- Classify different types of schedulers and scheduling algorithms.
- Identify the significance of inter-process communication and synchronization.
- Describe deadlock and the various ways to recover from deadlock
- Identify memory management techniques
- Describe virtual memory and its underlying concepts.
- Describe the features and brief history of Linux
- Use General purpose commands and filters of Linux
- Use of shell scripts in Linux



DETAILED CONTENTS

1. Overview of Operating Systems

(09 Periods)

Definition of Operating Systems, Types of Operating Systems, Operating System Services, User operating system interface, System Calls, Types of System Calls, System Programs, Operating System Structure, Virtual Machine, Benefits of Virtual Machine

2. Process Management (Principles and Brief Concept)

(09 Periods)

Process concept, Process State, Process Control Block, Scheduling Queues, Scheduler, Job Scheduler, Process Scheduler, Context Switch, Operations on Processes, Interprocess Communication, Shared Memory Systems, Message-Passing Systems, CPU Scheduler, Scheduling Criteria, Scheduling Algorithms, Preemptive and Non Preemptive, First come first serve (FCFS), Shortest Job first (SJF), Round Robin (RR), Multiprocessor scheduling, Process Synchronization.

3. Deadlocks (Principles and Brief Concept) (04 periods)

Deadlock, Conditions for Dead lock, Methods for handling deadlocks, Dead Prevention, Deadlock Avoidance, Deadlock detection, Recovery from deadlock.

4. Memory Management Function (Principles and Brief Concept) (09 periods)

Definition – Logical and Physical address Space, Swapping, Memory allocation, Contiguous Memory allocation, Fixed and variable partition, Internal and External fragmentation and Compaction, Paging – Principle of operation, Page allocation, Hardware support for paging, Protection and sharing, Disadvantages of paging, Segmentation, Virtual Memory.

5. I/O Management Functions (Principles and Brief Concept)

(04 periods)

Dedicated Devices, Shared Devices, I/O Devices, Storage Devices, Buffering, Spooling.

6. File Management (Principles and Brief Concept) (04 periods)

Types of File System; Simple file system, Basic file system, Logical file system, Physical file system, Various Methods of Allocating Disk Space

7. Linux Operating System (09 Periods)

History of Linux and Unix, Linux Overview, Structure of Linux, Linux releases, Open Linux, Linux System Requirements, Linux Commands and Filters: mkdir, cd, rmdir, pwd, ls, who, whoami, date, cat, chmod, cp, mv, rm, pg, more, pr, tail, head, cut, paste, nl, grep, wc, sort, kill, write, talk, mseg, wall, merge, mail, news Shell: concepts of command options, input, output, redirection, pipes, redirecting and piping with standard errors, Shell scripts, vi editing commands

LIST OF PRACTICALS

1. Demonstration of all the controls provided in windows control panel.
2. Exercise on Basics of windows.
3. Installation of Linux Operating System
4. Usage of directory management commands of Linux: ls, cd, pwd, mkdir, rmdir
5. Usage of File Management commands of Linux: cat, chmod, cp, mv, rm, pg, more, find
6. Use the general purpose commands of Linux: wc, od, lp, cal, date, who, whoami
7. Using the simple filters: pr, head, tail, cut, paste, nl, sort
8. Communication Commands: news, write, talk, mseg, mail, wall
9. Write a shell program that finds the factorial of a number.
10. Write a shell program that finds whether a given number is prime or not.
11. Write a shell program to find the average of three numbers.
12. Write a shell program that will convert all the text of the file from lowercase to uppercase.

INSTRUCTIONAL STRATEGY

This subject is both theory and practical oriented. Therefore, stress must be given on particulars along with theory. Laboratory must have windows as well as Linux operating system. Concepts of O.S. must be taught practically.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Operating System Concepts by Silberschatz, Galvin; Wiley Publication
2. Operating Systems by Stallings; Tata McGraw Hill.
3. Operating Systems- A Concept Based Approach by DhamDhare; Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Operating Systems by Achyut S Godbole and AtulKahate; Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Unleashed Linux by Tech Media Publishers, New Delhi
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

<http://swayam.gov.in>

SUGGESTED DISTRIBUTION OF MARKS Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	09	15
2.	09	20
3.	04	10
4	09	20
5	04	10
6	04	10
7	09	15
Total	48	100

3.3 DIGITAL ELECTRONICS

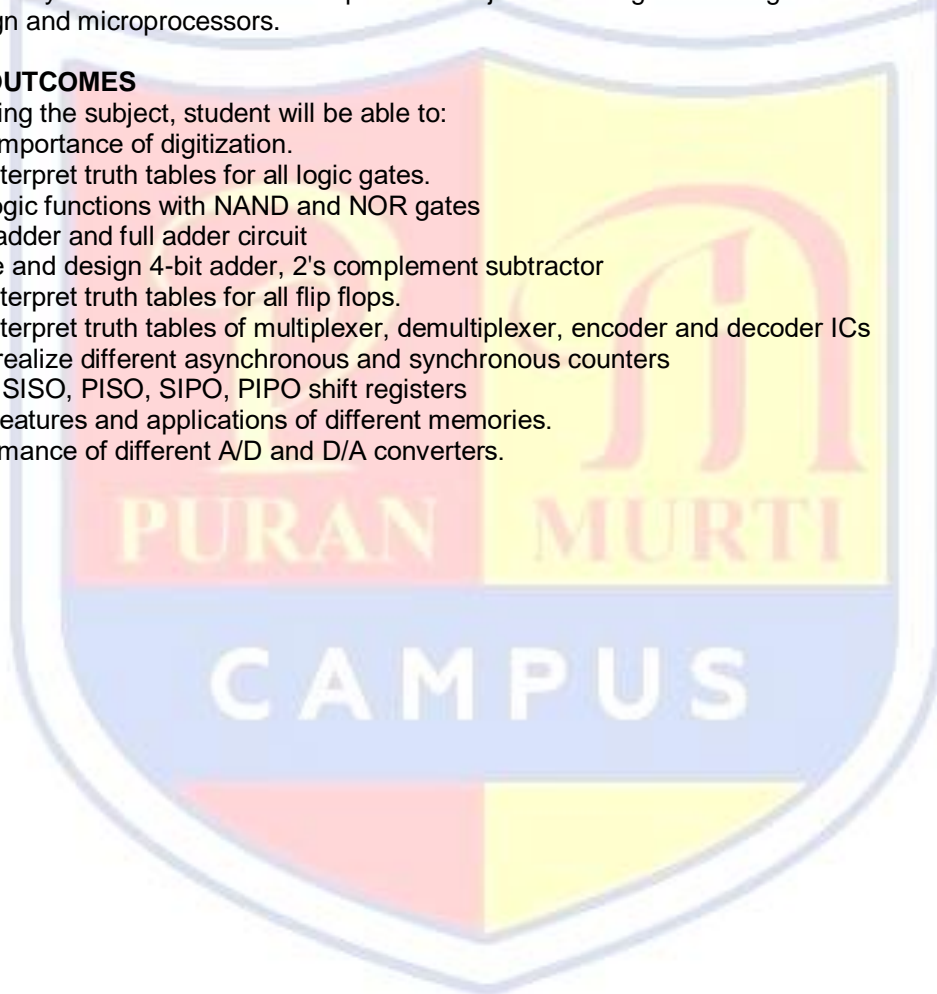
L T P
3 - 3

This course has been designed to make the students know about the fundamental principles of digital electronics and gain familiarity with the available IC chips. This subject aims to give a background in the broad field of digital systems design and microprocessors.

LEARNING OUTCOMES

After undergoing the subject, student will be able to:

- Explain the importance of digitization.
- Verify and interpret truth tables for all logic gates.
- Realize all logic functions with NAND and NOR gates
- Design half adder and full adder circuit
- Demonstrate and design 4-bit adder, 2's complement subtractor
- Verify and interpret truth tables for all flip flops.
- Verify and interpret truth tables of multiplexer, demultiplexer, encoder and decoder ICs
- Design and realize different asynchronous and synchronous counters
- Design 4-bit SISO, PISO, SIPO, PIPO shift registers
- Explain the features and applications of different memories.
- Verify performance of different A/D and D/A converters.



DETAILED CONTENTS

- 1. Overview of Operating Systems (09 Periods)**
Definition of Operating Systems, Types of Operating Systems, Operating System Services, User operating system interface, System Calls, Types of System Calls, System Programs, Operating System Structure, Virtual Machine, Benefits of Virtual Machine
- 2. Process Management (Principles and Brief Concept) (09 Periods)**
Process concept, Process State, Process Control Block, Scheduling Queues, Scheduler, Job Scheduler, Process Scheduler, Context Switch, Operations on Processes, Interprocess Communication, Shared Memory Systems, Message-Passing Systems, CPU Scheduler, Scheduling Criteria, Scheduling Algorithms, Preemptive and Non Preemptive, First come first serve (FCFS), Shortest Job first (SJF), Round Robin (RR), Multiprocessor scheduling, Process Synchronization.
- 3. Deadlocks (Principles and Brief Concept) (04 periods)**
Deadlock, Conditions for Dead lock, Methods for handling deadlocks, Dead Prevention, Deadlock Avoidance, Deadlock detection, Recovery from deadlock.
- 4. Memory Management Function (Principles and Brief Concept) (09 periods)**
Definition – Logical and Physical address Space, Swapping, Memory allocation, Contiguous Memory allocation, Fixed and variable partition, Internal and External fragmentation and Compaction, Paging – Principle of operation, Page allocation, Hardware support for paging, Protection and sharing, Disadvantages of paging, Segmentation, Virtual Memory.
- 5. I/O Management Functions (Principles and Brief Concept) (04 periods)**
Dedicated Devices, Shared Devices, I/O Devices, Storage Devices, Buffering, Spooling.
- 6. File Management (Principles and Brief Concept) (04 periods)**
Types of File System; Simple file system, Basic file system, Logical file system, Physical file system, Various Methods of Allocating Disk Space
- 7. Linux Operating System (09 Periods)**
History of Linux and Unix, Linux Overview, Structure of Linux, Linux releases, Open Linux, Linux System Requirements, Linux Commands and Filters: mkdir, cd, rmdir, pwd, ls, who, whoami, date, cat, chmod, cp, mv, rm, pg, more, pr, tail, head, cut, paste, nl, grep, wc, sort, kill, write, talk, mseg, wall, merge, mail, news Shell: concepts of command options, input, output, redirection, pipes, redirecting and piping with standard errors, Shell scripts, vi editing commands

LIST OF PRACTICALS

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9. Write a shell program that finds the factorial of a number.
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12. Write a shell program that will convert all the text of the file from lowercase to uppercase.

INSTRUCTIONAL STRATEGY

This subject is both theory and practical oriented. Therefore, stress must be given on particulars along with theory. Laboratory must have windows as well as Linux operating system. Concepts of O.S. must be taught practically.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
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3. Operating Systems- A Concept Based Approach by DhamDhare; Tata McGraw Hill Education Pvt Ltd, New Delhi
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1.	09	15
2.	09	20
3.	04	10
4	09	20
5	04	10
6	04	10
7	09	15
Total	48	100

3.3 DIGITAL ELECTRONICS

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Rationale

This course has been designed to make the students know about the fundamental principles of digital electronics and gain familiarity with the available IC chips. This subject aims to give a background in the broad field of digital systems design and microprocessors.

LEARNING OUTCOMES

After undergoing the subject, student will be able to:

- Explain the importance of digitization.
- Verify and interpret truth tables for all logic gates.
- Realize all logic functions with NAND and NOR gates
- Design half adder and full adder circuit
- Demonstrate and design 4-bit adder, 2's complement subtractor
- Verify and interpret truth tables for all flip flops.
- Verify and interpret truth tables of multiplexer, demultiplexer, encoder and decoder ICs
- Design and realize different asynchronous and synchronous counters
- Design 4-bit SISO, PISO, SIPO, PIPO shift registers
- Explain the features and applications of different memories.



DETAILED CONTENTS**1. Introduction****(02 Periods)**

- a) Distinction between analog and digital signal.
- b) Applications and advantages of digital signals.

2. Number System**(03 Periods)**

- a) Binary, octal and hexadecimal number system: conversion from decimal and hexadecimal to binary and vice-versa.
- b) Binary addition and subtraction including binary points. 1's and 2's complement method of addition/subtraction.

3. Codes and Parity**(03 Periods)**

- a) Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and Gray code.
- b) Concept of parity, single and double parity and error detection

4. Logic Gates and Families**(05 Periods)**

- a) Concept of negative and positive logic
- b) Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates, NAND and NOR as universal gates.
- c) Introduction to TTL and CMOS logic families

5. Logic Simplification**(04 Periods)**

- a) Postulates of Boolean algebra, De Morgan's Theorems. Implementation of Boolean (logic) equation with gates
- b) Karnaugh map (upto 4 variables) and simple application in developing combinational logic circuits

6. Arithmetic circuits**(02 Periods)**

- a) Half adder and Full adder circuit, design and implementation.
- b) 4 bit adder circuit

7. Decoders, Multiplexers, De Multiplexers and Encoder**(04 Periods)**

- a) Four bit decoder circuits for 7 segment display and decoder/driver ICs.
- b) Basic functions and block diagram of MUX and DEMUX with different ICs
- c) Basic functions and block diagram of Encoder

8. Latches and flip flops**(04 Periods)**

- a) Concept and types of latch with their working and applications
b) Operation using waveforms and truth tables of RS, T, D, Master/Slave JK flip flops. c) Difference between a latch and a flip flop

9. Counters**(06 Periods)**

- a) Introduction to Asynchronous and Synchronous counters b) Binary counters
c) Divide by N ripple counters, Decade counter, Ring counter

10. Shift Register**(06 Periods)**

Introduction and basic concepts including shift left and shift right.

- a) Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out. b) Universal shift register

11. A/D and D/A Converters**(06 Periods)**

- Working principle of A/D and D/A converters
- Brief idea about different techniques of A/D conversion and study of :
 - Stair step Ramp A/D converter
 - Dual Slope A/D converter
 - Successive Approximation A/D Converter
- Detail study of :
 - Binary Weighted D/A converter
 - R/2R ladder D/A converter
- Applications of A/D and D/A converter.

12. Semiconductor Memories (03 periods)

Memory organization, classification of semiconductor memories (RAM, ROM, PROM, EPROM, EEPROM), static and dynamic RAM, introduction to 74181 ALU IC



LIST OF PRACTICALS

1. Verification and interpretation of truth tables for AND, OR, NOT NAND, NOR and Exclusive OR (EXOR) and Exclusive NOR(EXNOR) gates
2. Realisation of logic functions with the help of NAND or NOR gates
3. - To design a half adder using XOR and NAND gates and verification of its operation
4. Verification of truth table for positive edge triggered, negative edge triggered, level triggered IC flip-flops (At least one IC each of D latch , D flip-flop, JK flip-flops).
- 5 Verification of truth table for encoder and decoder ICs, Mux and DeMux
6. To design a 4 bit SISO, SIPO, PISO, PIPO shift registers using JK/D flip flops and verification of their operation.
7. To design a 4 bit ring counter and verify its operation.
8. Use of Asynchronous Counter ICs (7490 or 7493)

Note: Above experiments may preferably be done on Bread Boards.

INSTRUCTIONAL STRATEGY

The digital systems in microprocessors have significant importance in the area of electronics. Adequate competency needs to be developed by giving sufficient practical knowledge in microprocessors (programming as well as interfacing), A/D, D/A Converters and other topics. Help may be taken in the form of charts, simulation packages to develop clear concepts of the subject. Programming exercises other than the tested in circulation may be given to the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Actual laboratory and practical work, model/prototype making, assembly and disassembly exercises and viva-voce

RECOMMENDED BOOKS

1. Digital Electronics and Applications by Malvino Leach, Tata McGraw Hill Education Pvt Ltd, Delhi
2. Digital Logic Designs by Morris Mano, Prentice Hall of India, New Delhi
3. Digital Electronics by Soumitra Kumar Mandal, Tata McGraw Hill Education Pvt Ltd,
4. Digital Electronics by V K Sangar , Raj Publishers, Jalandhar
5. Digital Electronics by Tokheim, Tata McGraw Hill Education Pvt Ltd,
6. Digital Fundamentals by Thomas Floyds, Universal Book Stall
7. Digital Electronics by RP Jain, Tata McGraw Hill Education Pvt Ltd, New Delhi
8. Digital Electronics by KS Jamwal, Dhanpat Rai and Co., New Delhi
9. Digital Electronics by Yashpal and Sanjeev Kumar; North Publication, Ambala City
10. Digital Electronics by BR Gupta, Dhanpat Rai & Co., New Delhi
11. Digital Systems: Principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi
12. Digital Electronics by Rajaraman V., Prentice Hall of India, New Delhi
13. Fundamentals of Digital Electronics by Naresh Gupta, Jain Brothers, New delhi
14. Fundamentals of Digital Electronics by Naresh Gupta, Jain Brothers, New Delhi

Websites for Reference:

<http://swayam.gov.in>

SUGGESTED DISTRIBUTION OF MARKS Topic No.	Time Allotted (Periods)	Marks Allocation (%)
1.	02	04
2.	03	05
3.	03	05
4.	05	10
5.	04	10
6.	02	05
7.	04	10
8.	04	10
9	06	12
10.	06	12
11.	06	12
12	03	05
Total	48	100

3.4 MULTIMEDIA APPLICATIONS

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RATIONALE

This subject aims to develop a clear understanding of What is multimedia?, and how it can be used for enhancing teaching instruction methodologies, business and personal communications. It will help the students in understanding technical aspects of multimedia content creation, the processes and tools used for designing multimedia systems. This will make the students proficient in designing and developing an multimedia application.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Define and describe multimedia functions.
- Identify and explain the devices, hardware and software system.
- Operate and design in graphics.
- Use photo-shop software for drawing and editing photos.
- Identify the tools to create animations,
- Reduce the size of various file formats i.e. audio, video and text.



DETAILED CONTENTS

1. Introduction to Multimedia Systems

(12 Periods)

Concept of Multimedia, History of Multimedia, Multi media hardware and software-various classes, components, Quality criteria and specifications of different capturing devices, Communication devices, Storage devices, Display devices, Elements of Multimedia and different multimedia file formats, Applications of multimedia – benefits and problems.

2. Content and Project Planning, Designing and development

(12 Periods)

Planning steps and process, Concept of data compression, Text encoding, Audio encoding techniques, Types of images, Capturing images using camera/scanner, coding techniques for Moving Images, Editing , Editing of images audio, text, video and graphics, navigation and user interface designing, Use of various codes like bar code, QR code in multimedia applications.

3. Using Image Processing Tools

(12 Periods)

Photo-shop workshop, image editing tools, specifying and adjusting colors, using gradient tools, selection and move tools, transforming path drawing and editing tools, using channels, layers, filters and actions

4. Multimedia Authoring Tools

(12 Periods)

Types of Authoring programmes – Icon based, Time based, Story boarding/scripting and object oriented working in macromedia flash, exploring interface using selection of PEN tools. Working with drawing and painting tools, applying colour viewing and manipulating time line, animating, processing, guiding layers, importing and editing sound and video clips in flash



LIST OF PRACTICALS

1. Installation of various multimedia software like Photoshop, Flash, Director or any open source software
2. Installing and use of various multimedia devices
 - Scanner
 - Digital camera, web camera
 - Mike and speakers
 - Touch screen
 - Plotter and printers
 - DVD
 - Audio CD and Video CD
3. Reading and writing of different format on CD/DVD
4. Transporting audio and video files
5. Using various features of Flash
6. Using various features of Photo-shop/GIMP
7. Making multimedia presentations combining, Flash, Photo-shop, such as department profile, lesson presentation, games and project presentations.
8. Generation and recognition of bar code & QR code using pre built application/mobile applications.

INSTRUCTIONAL STRATEGY

As the subject is practice oriented, more stress should be given to students to do the work practically. The features of software packages Photo-shop, Flash are to be demonstrated in class using LCD projector.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Principles of Multimedia by Parikh, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Multimedia Technologies by Banerji, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Multimedia An Introduction by Villam Casanova and Molina; Prentice Hall of India, New Delhi
4. Multimedia Bible by Win Rosch
5. Multimedia Making it work by Vaughan, Tay
6. Photo-shop for Windows Bible by Deke Maclelland IDG Books India Pvt. Ltd., New Delhi
7. Multimedia Technology and Application by Hillman, Galgotia Publications, New Delhi
8. Flash 5 Bible by Rein Hardit, IDG Books India Pvt. Ltd.
9. Flash 5 in easy steps by Vandome IDG Books India Pvt. Ltd.
10. Fundamentals of Multimedia by Li and Drew, Pearson Publications.
11. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

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1	12	22
2	12	28
3	12	24

4	12	26
Total	48	100

3.5 DATA COMMUNICATION

L T P
3 - -

RATIONALE

Data Communication Course is intended to provide practical exposure and awareness of existing and upcoming Communication technologies

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Identify various network
- Differentiate Analog and Digital system
- Identify various types of transmission media
- Identify slow/fast transmission media
- Identify incorrect data from various sources

DETAILED CONTENTS

1. Introduction

Data Communication- Components, Data representation, Data flow
Networks- Distributed processing, Network criteria , Physical structures
Network Category- LAN, WAN, MAN

(07 periods)

2. Data and Signals

Analog and Digital data, Analog and digital signals, Periodic and Non Periodic signals, periodic analog signals
Digital Signals- Bit rate, Bit length, Digital signal as a composite analog signal, transmission of digital signals
Transmission Impairment- Attenuation, Distortion and noise
Performance- bandwidth, throughput, latency, jitter

(10 periods)

3. Digital and Analog Transmission

Analog transmission- Digital to Analog Conversion- ASK, PSK, FSK
Analog to Analog Conversion- AM, PM, FM(No mathematical treatment) Digital transmission- Digital to digital conversion- coding and schemes Analog to digital conversion- PCM and Delta Modulation (DM) Transmission modes- Serial and parallel transmission

(10 periods)

4. Multiplexing – FDM, WDM, TDM

(07 periods)

5. Transmission media

Guided media-Twisted pair cable, Co-axial cable, fibre optics cable
Unguided Media- radio wave, Microwave, Infrared

(07 periods)

6. Error Detection and Correction

Types of Errors, redundancy, detection v/s correction, Forward error correction v/s retransmission. Error detection through Parity bit, block parity to detect double errors and correct single errors. General principles of error detection and correction using cyclic redundancy check

(07 periods)

INSTRUCTIONAL STRATEGY

Explanation of basic concept of data communication and all entities involved need to be elaborated precisely by the teacher with the emerging technologies. The topics should be clarified diagrammatically as well as with help of multimedia presentations.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce

RECOMMENDED BOOKS

1. Data Communication and Networking by Forouzan; Tata McGraw Hill
2. Computer Networking by Tanenbaum; Prentice Hall of India, New Delhi
3. Data and Computer Communication by William Stalling
4. Data Communication by PS Gupta
5. Computer Communication and Networking by John Freer
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

<http://swayam.gov.in>

SUGGESTED DISTRIBUTION OF MARKS Topic No.	Time Allotted (in Periods)	Marks Allotted (%)
1.	07	15
2.	10	20
3.	10	20
4.	07	15
5.	07	15
6.	07	15
Total	48	100

SOFT SKILLS – I

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RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:

- Identify components of effective verbal communication
- Prepare a report
- Learn the techniques of enhancing memory
- Set goals for overall personality development
- Understand the concept of quality and its implementation in an organisation.

DETAILED CONTENTS

- Soft Skills - Concept and Importance
 - Communication Skills- Improving verbal communication
 - Report Writing
 - Method to enhance memory and concentration
 - Component of overall personality- Dressing sense/etiquettes/body language etc.
- In addition, the students must participate in the following activities to be organized in the institute.
- Sports
 - NCC/NSS
 - Camp – Blood donation
 - Cultural Event

Note: Extension Lectures by experts may be organized. There will be no examination for this subject.

