

3.1 OPERATING SYSTEMS

L T P Cr
3 - 4 5

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 hand-on experience and good working knowledge to work in DOS and Windows environments. The aim is to gain proficiency in using various operating systems after undergoing this course.

DETAILED CONTENTS

1. Brief Introduction to System Software (4 hrs)
 - 1.1 Compiler
 - 1.2 Assembler
 - 1.3 Loader
 - 1.4 Operating system
 - 1.5 Linking, loading and executing a program

2. Overview of Operating Systems (6 hrs)
 - 2.1 Definition of Operating Systems
 - 2.2 Types of Operating Systems – Batch processing, time sharing, multiprogramming, multiprocessing and real time systems
 - 2.3 Importance of Operating Systems

3. Brief Introduction to MS-DOS, UNIX and WINDOWS (8 hrs)
 - 3.1 Brief history of DOS, UNIX and WINDOWS
 - 3.2 Main features of DOS and UNIX
 - 3.3 Directory structure of DOS ?
 - 3.4 File structure of DOS
 - 3.5 DOS commands – Internal and external
 - 3.6 UNIX commands – Commonly used file and directory commands, process and device management commands
 - 3.7 Introduction to Windows

4. Process Management Functions (8 hrs)
 - 4.1 Job Scheduler
 - 4.2 Process Scheduler, scheduling algorithms
 - 4.3 Process synchronization

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| 5. | Memory Management Function | (8 hrs) |
| | 5.1 Introduction | |
| | 5.2 Single Process System | |
| | 5.3 Fixed Partition Memory | |
| | 5.4 System Loading | |
| | 5.5 Segmentation | |
| | 5.6 Swapping | |
| | 5.7 Simple Paging System | |
| 6. | I/O Management Functions | (8 hrs) |
| | 6.1 Dedicated Devices | |
| | 6.2 Shared Devices | |
| | 6.3 Virtual Devices | |
| | 6.4 Storage Devices | |
| | 6.5 Buffering | |
| | 6.6 Spooling | |
| 7. | File Management | (6 hrs) |
| | Types of File System | |
| | - Simple file system | |
| | - Basic file system | |
| | - Logical file system | |
| | - Physical file system | |

LIST OF PRACTICALS

1. Demonstration of all the controls provided on Control Panel
2. Practical exercises involving various internal and external DOS commands (10 No.)
3. Practical exercises involving various UNIX/LINUX commands
4. Various editors EDITVI/VIM/SED

INSTRUCTIONAL STRATEGY

As per the above information, it is clear that the subject is both theory and practical oriented. Therefore, the stress must be given on both the theory and practical teaching. In the practical classes, the laboratory must be equipped with all the basic operating system software i.e DOS, UNIX, WINDOWS etc.

While imparting instructions, the teachers are expected to lay more emphasis on concepts and principles of operating systems, its features and practical utility.

RECOMMENDED BOOKS

1. Operating systems by John J Donovan; Tata McGraw Hill, New Delhi
2. System programming by Dham Dhare
3. Unix operating system by Vijay Mukhi
4. Operating system by C. Ritchie
5. MS DOS by Peter Norton, BPB Publications
6. Microsoft Windows Manual
7. First Course in Computers by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
8. WWW.msn.com and linked sites

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	4	10
2.	6	15
3.	8	15
4.	8	15
5.	8	15
6.	8	15
7.	6	15
Total	48	100

1.

3.2 GENERAL ENGINEERING

L T P Cr
4 - 2 5

RATIONALE

A diploma holder has to assist in activities of installation, operation and maintenance etc of different machines and equipment. These activities are not branch specific and instead require him to know basics of civil, electrical and mechanical engineering. The subject of General Engineering has been included to impart basic knowledge of civil, electrical and mechanical engineering to the students.

Note:

1. The students of Civil Engineering, will be studying Part A (Mechanical Engineering) and Part B (Electrical Engineering) only.
2. The students of Electrical engineering, Electronics and Communication Engineering, Instrumentation and Control Engineering, Computer Engineering and Information Technology will be studying Part A (Mechanical Engineering) and Part C (Civil Engineering) only.
3. The students of Mechanical Engineering will be studying Part B (Electrical Engineering) and Part C (Civil Engineering) only.
4. The students of remaining branches of engineering and technology will be studying all the three Parts A (Mechanical Engineering), Part B (Electrical Engineering) and Part C (Civil Engineering), unless specified otherwise
5. A time of 2 hours per week has been allotted to Mechanical Engineering, 2 hours per week to Electrical Engineering and 2 hour per week to Civil Engineering in the lecture hours, for teaching theory and a lump-sum time of 2 hours per week has been allotted for the Practicals.

DETAILED CONTENTS

PART-A

MECHANICAL ENGINEERING

Theory

1. **Transmission of Power** (8 hrs)
 - 1.1 Belt Drives:
Types of belts, belt materials, cross and flat belt drives, advantages of V-belt drive over flat belt drive.
 - 1.2 Gears Drives:
Types of gears (briefly), types of gear trains
2. **Internal combustion Engines** (10 hrs)
 - 2.1 Classification of IC engines

- 2.2 Working principles of two stroke and four stroke engines
- 2.3 Working principles of petrol engine and diesel engines
- 2.4 Gas turbines (working principle only)
- 3. Refrigeration and Air Conditioning System (8 hrs)**
 - 3.1 Different types of refrigeration principles and refrigerants
 - 3.2 Working of domestic refrigerator
 - 3.3 Working of Window type AC system
- 4. Hydraulics: (6 hrs)**
 - 4.1 Classification of pumps (reciprocating and centrifugal)
 - 4.2 Working principles of both reciprocating and centrifugal pumps
 - 4.3 Turbine: Working principles of impulse turbine and reaction turbine

PRACTICAL EXERCISES IN MECHANICAL ENGINEERING

1. Demonstration and study of main parts of 4 stroke petrol and diesel engines by actually dismantling them (The idea is to acquaint the students with the most common troubles occurring in the engines)
2. Demonstration and study of main parts of 2 stroke petrol engine by actually dismantling it. (The idea is to acquaint the students with the most common trouble occurring in the engines)
3. Demonstration and study of gas turbines through models
4. Demonstration and study of different hydraulic pumps
5. Demonstration and study of various drives for transmission of powers i.e. models of belts and gears.
6. Demonstration and study of air conditioning system in a building
7. Demonstration and study of domestic refrigerating system

PART B

ELECTRICAL ENGINEERING

Theory

Electrical:

1. Basic Quantities of Electricity: (4 hrs)
 - 1.1 Definition of voltage, current, power and energy with their units
 - 1.2 Name of the instruments used for measurement of quantities such as voltmeter, ammeter, wattmeter, energy meter.
 - 1.3 Connection of the instruments in electric circuit
2. Application and Advantages of Electricity: (3 hrs)
 - 2.1 Difference between AC and DC
 - 2.2 Various applications of electricity

- 2.4 Advantages of electrical energy over other types of energy
3. Various Types of Power Plants: (3 hrs)
- 3.1 Elementary block diagram of thermal, hydro and nuclear power stations
- 3.2 Brief explanation of the principle of power generation in above power stations
4. Transmission and Distribution System (6 hrs)
- 4.1 Key diagram of 3 phase transmission and distribution system
- 4.2 Brief functions of accessories of transmission line
- 4.3 Distinction between high and low voltage distribution system
- 4.4 Identification of three phase wires, neutral wires and the earth wire on a low voltage distribution system
- 4.5 Identification of the voltage between phases and between one phase and neutral
- 4.6 Distinction between three phase and single phase supply
5. Supply from the Poles to the Distribution Board: (4 hrs)
- 5.1 Arrangement of supply system from pole to the distribution board
- 5.2 Function of service line, energy meter, main switch, distribution board
6. Domestic Installation: (6 hrs)
- 6.1 Distinction between light and fan circuits and single phase power circuit, sub circuits
- 6.2 Various accessories and parts of installation, identification of wiring systems
- 6.3 Common safety measures and earthing
- 6.4 Introduction to BIS code of safety and wiring installation
7. Electric Motors and Pumps: (6 hrs)
- 7.1 Definition and various application of single phase and three phase motors
- 7.3 Conversion of horse power in watts or kilowatts
- 7.4 Type of pumps and their applications
- 7.5 Use of direct online starter and star delta starter

PRACTICAL EXERCISES IN ELECTRICAL ENGINEERING:

1. Use of Megger:
- Objective:** To make the students familiar with different uses of megger
2. Connection of a three phase motor and starter including fuses and reversing of direction of rotation.

Objective: Students may be made familiar with the equipment needed to control a three-phase motor
The students must experience that by changing any two phases, the direction of rotation is reversed.

3. Connection of a lamp, ceiling fan, socket outlet, geyser, floor grinder, voltage stabilizer etc.

Objective: Students may be made familiar with the different types of equipment and circuits used in the domestic installations

4. Trouble shooting in a three-phase motor

Note: The teacher may create anyone of the following faults

- (a) Loose connections
- (b) Blown fuse
- (c) Tripped overload protection
- (d) Incorrect direction of rotation
- (e) Single phasing
- (f) Burnt winding to be simulated by a loose connection behind a terminal box.

Objective: The students must be able to detect the most common faults, which may occur in a three-phase motor, using meggar wherever necessary

5. Treatment of electric shock

Note: The teacher may give a demonstration how an electric shock must be treated.

Objective: Students must be trained to treat the persons suffering from an electric shock

6. Demonstration and study of Domestic installation components used in single phase and three phase wiring

7. Demonstration and study of distribution line components

8. Demonstration and study of a distribution Board

Note: Students may be asked to study the distribution board in the institution and note down all accessories.

Objective: Students must be made familiar with the distribution board

9. Connections and taking reading of an energy meter (1ϕ & 3ϕ)

Objective: Students may be asked to connect an energy meter to a load and calibrate reading

10. Demonstration and study of submersible motor pump set and its working

Objective: To tell use of the set in water supply and irrigation works.

PART C

CIVIL ENGINEERING

Theory

1. Construction Materials (10 hrs)
 Basics of various construction materials such as stones, bricks, lime, cement and timber along with their properties, physical/ field testing and uses, elements of brick masonry.
2. Foundations (8 hrs)
 - i) Bearing capacity of soil and its importance
 - ii) Types of various foundations and their salient features, suitability of various foundations for heavy, light and vibrating machines
3. Basic concept of concrete (8 hrs)
 Various ingredients of concrete, different grades of concrete, water cement ratio, workability, physical/ field testing of concrete, mixing of concrete
4. RCC (6 hrs)
 Basics of reinforced cement concrete and its use (elementary knowledge), introduction to various structural elements of a building

PRACTICAL EXERCISES IN CIVIL ENGINEERING

1. Testing of bricks
 - a) Shape and size
 - b) Soundness test
 - c) Water absorption
 - d) Crushing strength
2. Testing of concrete
 - a) Slump test
 - b) Compressive Strength of concrete cube
3. The students should be taken to different construction sites to show them various construction materials, concreting process and construction of RCC structural elements, foundations and other civil works

Note: While imparting instructions, teachers are expected to lay more emphasis on concepts and principles. It will be better if the classes for general engineering are conducted in the laboratories and organized demonstrations for explaining various concepts and principles.

RECOMMENDED BOOKS

Mechanical Engineering

1. General Mechanical Engineering by M. Adithan; TTTI, Chandigarh
2. Basic Civil and Mechanical Engineering by Jayagopal; Vikas Publications, New Delhi
3. IC Engines and Automobile Engineering by Dr.MP Poonia, Standard Publishers, New Delhi
4. Refrigeration and Air Conditioning by RK Rajput; SK Kataria and sons; Ludhiana
5. Theory of Machines by RS Khurmi and JK Gupta; S. Chand and Company Ltd., New Delhi

Electrical Engineering

1. Electrical Technology Part 1: Basic Electrical Engineering by Theraja, BL; S Chand and Company, New Delhi
2. Principles of Electrical Engineering by Gupta BR, S Chand and Company, New Delhi
3. Basic Electrical Engineering by Mehta VK; S Chand and Company, New Delhi
4. Basic Electricity and Measurements by Suryanarayan NV and N Delhi; Tata McGraw Hill, 1987, New Delhi
5. Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and sons, New Delhi
6. Basic Electrical Engineering by PS Dhogal, Tata McGraw Hill, New Delhi
7. Basic Electricity by BR Sharma; Satya Parkashan, New Delhi

Civil Engineering

2. Textbook of Concrete Technology 2nd Edition by Kulkarni, PD Ghosh RK and Phull, YR; New Age International (P) Ltd., Publishers, New Delhi
3. Materials of Construction by Ghose; Tata McGraw Hill Publishing Co., Ltd., New Delhi

4. Civil Engineering Materials by TTTI, Chandigarh; Tata McGraw Hill Publishing Co. Ltd., New Delhi
5. Concrete Technology by Gambhir; Tata McGraw Hill Publishing Co., Ltd., New Delhi
6. Building Construction by J Jha and Sinha; Khanna Publishers, Delhi
7. Building Construction by Vazirani and Chandola; Khanna Publishers, Delhi
8. Civil Engineering Materials by SV Deodhar and Singhai; Khanna Publishers, Delhi
9. Soil Mechanics and foundation Engineering by SK Garg; Khanna Publishers, Delhi

SUGGESTED DISTRIBUTION OF MARKS

Part-A

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	8	25
2	10	31
3	8	25
4	6	19
Total	32	100

Part-B

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	4	12
2	3	9
3	3	9
4	6	18
5	4	16
6	6	18
7	6	18
Total	32	100

Part-C

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	31
2	8	25
3	8	25
4	6	19
Total	32	100

3.3 OBJECT ORIENTED PROGRAMMING USING C++

L	T	P	Cr
3	-	6	6

RATIONALE

Object orientation is a new approach to understand the complexities of the real world. In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. C++ is an object-oriented language, which enables a programmer to write programs, so that the object can be made to work collaboratively to produce the solution to live problems. By undergoing this course, the students will be able to understand the principles of object oriented programming, with programs in C++ and use them to make small application programs.

DETAILED CONTENTS

1. Introduction (2 hrs)
Need for object-oriented programming: characteristics of object-oriented programming
2. C++ Programming Basics (2 hrs)
Basic program construction; Pre-processor directives; variables; manipulators; operators; library functions (2 hrs)
3. Decision-making
Relational operators: loops; decisions; logical operators: other control statements
4. Structures and Functions (6 hrs)
Structures; enumerated data types; functions; passing arguments to functions and returning values from functions; overloading of functions
5. Objects and Classes (6 hrs)
C++ objects as physical objects and data types; constructors and destructors, private vs public, Friend function and Friend classes
6. Arrays (4 hrs)
Arrays fundamentals; arrays of objects; arrays as class member, strings

7. Operator Overloading (6 hrs)
Overloading unary operators; overloading binary operators; data conversion; pitfalls of operator overloading and conversion
8. Inheritance (6 hrs)
Derived class and base class; derived class constructors, overriding member functions; class hierarchies; public and private inheritance; levels of inheritance; multiple inheritance; ambiguity in multiple inheritance, containership; classes within classes.
9. Pointers (6 hrs)
Addresses and pointers; pointers and arrays; pointers and functions; pointers and strings, pointers to objects
10. Files and Streams (8 hrs)
Streams; string I/O; Character I/O, Object I/O, I/O with multiple objects; file pointers, error handling; redirection

LIST OF PRACTICALS

1. Programming exercises on control flow statements in C++
2. Programming exercises on arrays, strings, function and pointers in C++
3. Writing programs to construct classes and deriving objects
4. Writing programs for constructors, destructors, using public and private access specifiers
5. Programming exercises on operator overloading, type conversions and inheritance
6. Programming exercises on functional overloading
7. Writing programs on stream computation and real life operations
8. Implementation of a mini project in C++

INSTRUCTIONAL STRATEGY

Since the entire course is totally practical oriented, it is strongly intended that after discussing the individual concepts in the class, the students shall be asked to write the programmes for the same in the practical class. The theory and practical shall go hand in hand. It is required that the students make a file of the practical exercises which may include the problem definition, algorithms flow charts (wherever required) and the print outs for each listed practical.

RECOMMENDED BOOKS

1. Mastering C++ by KR Venugopal and Rajkumar, T Ravishankar; Tata McGraw Hill Publishing Co. Ltd., New Delhi
2. Object Oriented Programming in C++ by E. Balaguruswamy, TMH Publishing Co. Ltd., New Delhi
3. Object Oriented Programming with C++ by D Parasons; BPB Publications, New Delhi
4. C++ Primer by SB Lippman and J Lajoie; Addison Wesley (Singapore) Pvt. Ltd., New Delhi
5. Object Oriented Data Structuring using C++ by KS Easwarakumar; Vikas Publishing House Pvt. Ltd., New Delhi
6. C++ by Robert Lafore, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi
7. Object Oriented Programming and C++ by R Rajaram; New Age International (P) Ltd., Publishers, New Delhi
9. Programming in C and C++ by SS Khandare; S Chand and Company Ltd. New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	2	5
2.	2	5
3.	2	5
4.	6	15
5.	6	10
6.	4	10
7.	6	10
8.	6	15
9.	6	10
10.	8	15
Total	48	100

3.4 MICROPROCESSORS

L T P Cr
3 - 2 4

RATIONALE

The study of microprocessors in terms of architecture, software and interfacing techniques leads to the understanding of working of CPU in a microcomputer. The development in microprocessors of 32 bit architecture brings them face-to-face with mainframe finding employment in R&D, assembly, repair and maintenance of hardware of microprocessors and computers.

Microprocessors find application in process control industry. They also form a part of the electronic switching system between source and destination in long distance telecommunications. Thus the microprocessor is an area of specialization. Students of electronics and related engineering branches often use microprocessors to introduce programmable control in their projects, in industrial training.

DETAILED CONTENTS

1. Memories (4 Hrs)

Basic RAM cell, N x M bit RAM. Expansion of word length and capacity, static and dynamic RAM, basic idea of ROM, PROM, EPROM, EEPROM
2. A/D and D/A Converters (2 hrs)

General principle of A/D and D/A conversion and brief idea of their applications. Binary resistor network and resistance ladder network methods of D/A conversion. Dual slope and successive approximation types of ADCs.
3. Decoders, Display Devices and Associated Circuits (4 hrs)
 - 3.1 LED, LCD, seven segment display, basic operation of various commonly used display types
 - 3.2 Four bit decoder circuits for 7 segment display and decoder/driver ICs
4. Evolution of Microprocessor (2 hrs)
 - 4.1 Typical organization of a microcomputer system and functions of its various blocks
 - 4.2 Microprocessor, its evolution, function and impact on modern society
5. Architecture of a Microprocessor (With reference to 8085 microprocessor) (6 hrs)
 - 5.1 Concept of Bus, bus organization of 8085
 - 5.2 Functional block diagram of 8085 and function of each block
 - 5.3 Pin details of 8085 and related signals
 - 5.4 Demultiplexing of address/data bus of read/write control signals
 - 5.5 Steps to execute a stored programme

6. Memories and I/O interfacing (4 hrs)
- 6.1 Memory organization, Concept of memory mapping, partitioning of total memory space. Address decoding, concept of I/O mapped I/O and memory mapped I/O. Interfacing of memory mapped I/O devices.
- 6.2 Concept of stack and its function
7. Programming (with respect to 8085 microprocessor) (10 hrs)
- 7.1 Brief idea of machine and assembly languages, Machines and Mnemonic codes.
- 7.2 Instruction format and Addressing mode. Identification of instructions as to which addressing mode they belong.
- 7.3 Concept of Instruction set. Explanation of the instructions of the following groups of instruction set
- 7.4 Data transfer groups, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group.
- 7.5 Programming exercises in assembly language. (Examples can be taken from the list of experiments).
8. Instruction Timing and Cycles (4 hrs)
- 8.1 Instruction cycle, machine cycle and T-states
- 8.2 Fetch and execute cycle.
9. Interrupts (4 hrs)
- Concept of interrupt, maskable and non-maskable, edge triggered and level triggered interrupts, software interrupt, restart interrupts and its use. Various hardware interrupts of 8085. Servicing interrupts, extending interrupt system.
10. Data transfer techniques (4 hrs)
- Concept of programmed I/O operations, sync data transfer (hand shaking), interrupt driven data transfer, DMA, serial output data, serial input data.
11. Interfacing peripherals with 8085 and their application (4 hrs)

LIST OF PRACTICALS

1. Write a assembly level program w.r.t. 8085 microprocessor
2. Addition of two 8 bit numbers
3. To obtain 2's complement of 8 bit number.
4. To subtract a 8 bit number from another 8 bit number using 2's complement.

5. Count the number of bits in high state in accumulator.
6. Check even parity and odd parity of a binary number.
7. Addition of two sixteen bit numbers.
8. Subtraction of a sixteen bit number from an other sixteen bit number.
9. Multiplication of two 8-bit numbers by repetitive addition.
10. Divide two 8-bit numbers by repetitive subtraction.
11. To find:
 - a) Smallest number of three numbers.
 - b) Largest number of three numbers.
12. To sort an array of unsigned binary numbers in descending/ascending order.
13. Generate timing delay through software.
14. Display devices and their Decoder/Drivers Familiarization and use of difficult types of single LED's common anode and common cathode 7 segment LED display, use of 7447, 7448 (for equivalent) decoder/drivers ICs for 7 segment display.
15. Verification of truth table for encoders, decoders, multiplexers, demultiplexers ICs.
16. To Construct and test 4/8 bit D/A converter using ICs.
17. To Construct and test 4/8 bit A/D convert using ICs.
18. Interfacing exercises on 8255 like LED display etc.

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.

RECOMMENDED BOOKS

1. Digital Electronics and Applications by Malvino Leach; Publishers McGraw Hills, New Delhi
2. Digital Logic and Computer Design by Mano, M Morris; Prentice Hall of India, New Delhi
3. Digital Integrated Electronics by Herbert Taub and Donalds Sachilling; Prentice Hall of India Ltd., New Delhi
4. Digital Electronics by Rajaraman; Prentice Hall of India Ltd., New Delhi
5. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Gaonker, Willey Eastern Ltd. New Delhi
6. Microprocessor and Applications by B Ram
7. Microprocessor and Microcontrollers by Dr BP Singh, Galgotia Publications, New Delhi
8. Introduction to Microprocessors by Mathur, Tata McGraw Hill, New Delhi
9. Microprocessor and Microcomputers by Refiquzzaman, Prentice Hall of India Ltd., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	4	5
2.	2	5
3.	4	10
4.	2	5
5.	6	10
6.	4	10
7.	10	15
8.	4	10
9.	4	10
10.	4	10
11	4	10
Total	48	100

3.5 DATA COMMUNICATION

L T P Cr

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RATIONALE

Data Communication course is intended to provide practical exposure and awareness of existing and upcoming communication Technologies. The course is designed in conjunction with the course “Computer Networks” which provides concepts of networks.

DETAILED CONTENTS

1. Basic Concepts of Data Communication (8 hrs)
 - Basic Transmission Signaling-Concepts
 - Electrical and Voice Signals: Analog and digital signals, discrete and continuous signals, periodic and aperiodic signals, time and frequency domains, composite signals, Data Transmission, signal frequency spectrum
 - Basic Definitions: attenuation, delay loss, noise, bandwidth, baud rate, data rate, channel capacity
 - Nyquist's formula, Shannon's formula, signal to noise ratio, decibel/ratio conversion,
 - Filters
 - Errors in Data Communication
 - Repeaters and Amplifiers

2. Signal Transmission Basics – 1 (12 hrs)
 - Modulation and Demodulation: Basic Concepts
 - Analog Modulation (AM):
 - Analog Modulation for analog Signal: Amplitude Modulation, Version of AM, Frequency Modulation (FM), Phase Modulation (PM)
 - Analog Modulation for Digital Signal; Pulse amplitude Modulation (PAM) Pulse duration Modulation (PDM), Pulse Position Modulation (PPM), Pulse frequency Modulation (PFM) , Digital Analog Modulation (DAM) ; Amplitude Shift Keying (ASK) , Frequency Shift Keying (FSK) , Phase shift Keying (PSK) , Differential PSK
 - Digital Modulation (DM) : pulse Modulation, Coded Modulation; Pulse Coded Modulation, Differential Pulse code Modulation, Delta Modulation, Adaptive delta Modulation, Higher data rate digital Modulation

3. Signal Transmission Basics – 2 (14 hrs)
 - Modem (Modulator/DEModulator) and Modem standard; Standard Modem Interface, Modem/ Telephone Line interface, Modem Characterization, PC communication protocol, Modem Line configuration, Operation; modes of operation, types of Modems, Turnaround time of

Modem,

- Multiplexers: Advantages of Multiplexer, Frequency division Multiplexer (FDM) : Guard Band Carrier, ,FDM Standard, Time division Multiplexing,
 - Concentrators, difference between multiplexer and Concentrators, inverse multiplexing
 - Switching Techniques: Circuit switching, Message switching, packet switching, comparison between switching techniques
 - Communication Control Interfaces; Universal asynchronous receiver and Transmitter, Transmission Mechanism in UART , receiving Mechanism in UART , error correction In UART, Timing Signaling in UART
4. Modes of Communication Channel (14 hrs)
- Communication Channel: Channel Modes of operation, Channel configuration, channel configuration for the RS-232 interface, synchronization in transmission, channel access techniques
 - Information Coding: "ASCII EBCDIC,
 - Error Detection and Correction Coding, : Block coding; Geometric coding, Cyclic Coding, Convolution coding,
 - Error Control Techniques and Standard Protocols: Error detection and Correction
 - Error detection Technique, forward Error correcting Techniques, -- communication link control procedures

RECOMMENDED BOOKS

1. Data and Computer Communications, 6th Ed, by W. Stalling, Prentice Hall, 2000
2. Data and Computer Communications: Networking and Internetworking by Gurdeep S Hura, Mukesh Singhal, CRC Press, 2001
3. Computer Networks, A Systems Approach, 2nd Ed, by L. Peterson & B. Davie, Morgan Kaufmann Publishers, 1999
4. Data Communication by PS Gupta
5. Introduction to Data Communication – A Practical Approach by Larry Hughes, Narosa Publication House Pvt. Ltd.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	8	15
2.	12	25
3.	14	30
4.	14	30
Total	48	100

3.6 COMPUTER WORKSHOP

L T P Cr
- - 6 3

RATIONALE

The course aims at making the students familiar with various parts of computers and different types of peripherals. In addition, the course will provide the students with necessary knowledge and skills in computer software installation and maintenance and make him diagnose software faults.

DETAILED CONTENTS

Part-A

- 1) Familiarization with various components and parts of personal computers, mother board details, hard disk and hard disk drive, floppy disk drive. CD Rom drive, DVD, keyboard, display devices, various chips (memory chips and CPU); serial and parallel ports, assembly of complete PC making it operational, fault finding, changing ROM set up and facilities in ROM set up.

Fault diagnosis, repair and maintenance of inkjet, Dot matrix and Laser printers.

Use and maintenance of Moderns.

- 2) Disassembling of PCs : Power supply, switch mode power supply, trouble shooting of SMPS, Disassembling of PC and Trouble shooting the general faults
- 3) Assembling of Computer

Part-B

- 4) Loading of various operating systems, UNIX, LINUX, Windows NT, Windows 98, 2000 and XP. Familiarization of their features with practical demonstrations. Changing settings.
- 5) Virus detection, prevention and cure. Use of PC tools. Learning various types of virus such as boot sector virus, file virus, partition table viruses and their cure.
- 6) Hard disk access modes: LBA, ATA, Normal, FAT, NTFS, Partitioning hard disk and loading multiple operating systems.

INSTRUCTIONAL STRATEGY

As the subject is practical oriented, sufficient exercises on assembling and disassembling of computer system should be given. Exercises in repair and fault finding of peripheral devices like printers, display devices, disk drive should be given to the student. Field visits too the places where assembly of computers is taking place will be helpful to the

students. Visits to the manufacturing units of CVT and UPS will also be helpful to the students.

RECOMMENDED BOOKS

- 1) PC Upgrade of Maintenance Guide 8th Edition by Mark Minasi, BPB Publication
- 2) Hardware Bible by Winn Rosch, Techmedia Publications
- 3) IBM PC and Clones by Govind Rajaluu. Tata McGraw Hill
- 4) Monitor and Fault Diagnosis Vol. 1 and II. M. Lotia, DPB Publications
- 5) Understanding Unix Tech Media Publications
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