OPERATING SYSTEMS

L T P
5 - 2

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   (2 hrs)

    Compiler, Assembler, Loader, Operating system, Linking, Loading and Executing
    a Program

2. Overview of Operating Systems   (4 hrs)

    Definition of Operating Systems, Functions of Operating System, Types of Operating Systems – Batch Processing, Time Sharing, Multiprogramming, Multiprocessing and Real Time Systems, Distributed Systems, Importance of Operating System

3. Brief Introduction to MS-DOS, UNIX and WINDOWS   (14 hrs)

    Brief history of DOS, UNIX and WINDOWS
    Main features of DOS and UNIX
    Directory structure of DOS
    File structure of DOS
    DOS commands – Internal and external
    Unix commands – Commonly used file and directory commands
    Comparison of DOS, Windows and Unix

4. Process Management Functions   (8 hrs)

    Job Scheduler, Scheduling Criteria, Process Scheduler, Scheduling algorithms,
    Process synchronization, Critical section

5. Dead Locks   (12 hrs)

    Introduction and necessary conditions of dead lock, Dead lock avoidance, Dead
    lock detection, Dead lock Recovery

6.   Memory Management Function   (16 hrs)

Introduction, Logical and Physical address space, Virtual memory, Swapping, Single contiguous memory management, Fixed partition, Contiguous allocation, Paging, Segmentation, Demand paging, Page replacement algorithms, Thrashing

7.   I/O Management Functions   (12 hrs)

- Dedicated Devices
- Shared Devices
- Virtual Devices
- Storage Devices
- Buffering
- Spooling

8.   File Management   (12 hrs)

File concept, Access Methods, Directory Structure, Protection, File system structure, allocation methods, Directory implementation

LIST OF PRACTICALS

1.   Demonstration of all the controls provided on Control Panel, and exercises using Windows
2.   Practical exercises involving various internal and external DOS commands (10 Nos.)
3.   Practical exercises involving various UNIX/LINUX commands

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, LINUX, 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.   Operating System Concept by Ekta Walia, Khanna Publishers, New Delhi

3.   System programming by Dhamdhare

4.   Unix operating system by Vijay Mukhi

5. Operating system by C. Ritchie

6. MS DOS by Peter Norton, BPB Publications

7. Microsoft Windows Manual

8. First Course in Computers by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

9. www.msn.com and linked sites

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	2	10
2.	4	15
3.	14	20
4.	8	10
5.	12	10
6.	16	15
7.	2	10
8.	2	10
Total	**80**	**100**

DATA STRUCTURES USING C

L T P
4 - 4

RATIONALE

Data structures are the techniques of designing the basic algorithms for real-life projects. Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of 'C' language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

DETAILED CONTENTS

1.   Introduction   (6 hrs)

    1.1   Problem solving concept, Top Down and Bottom up design, Structured
           programming
    1.2   Concept of data types, Variables and Constants

2.   Linked Lists   (15 hrs)

    2.1   Introduction to Linked list and Doubly linked list
    2.2   Representation of linked lists in Memory
    2.3   Traversing a linked list
    2.4   Searching linked list
    2.5   Insertion and deletion into linked list
    2.6   Application of linked lists

3.   Stacks, Queues and Recursion   (15 hrs)

    3.1   Introduction to stacks
    3.2   Representation of stacks
    3.3   Implementation of stacks
    3.4   Uses of stacks
    3.5   Introduction to queues
    3.6   Implementation of queues (with algorithm)
    3.7   Dequeues

4.   Trees   (8 hrs)

    4.1   Concept of Trees
    4.2   Concept of Representation of Binary Tree
    4.3   Traversing Binary Trees (Pre order, Post order and In order)
    4.4   Searching, Inserting and Deleting Binary Search Trees
    4.5   Characteristics and significance of AVL trees

5.   Sorting and Searching   (10 hrs)

      5.1   Introduction
      5.2   Search algorithm (Linear and Binary)
      5.3   Concept of sorting
      5.4   Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge, Sort, Heap Sort)

6.   Graph   (6 hrs)

      6.1   Introduction to graphs
      6.2   Breadth first search
      6.3   Depth first search

7.   Table   (4 hrs)

      7.1   Searching Sequential table
      7.2   Hash tables
      7.3   Symbol tables

LIST OF PRACTICALS

1) Transformation from Infix to Postfix, Infix to Prefix

2) Programs on implementation of Stacks

3) Programs on implementation of Queues such as initialization, insertion, deletion

4) Program on operation of Lists

5) Programs on construction of binary trees, insertion, deletion and searching in binary trees

6) Programs for Pre order, In order, Post order traversal of trees

7) Programs on sorting techniques (all sorting techniques mentioned in theory)

INSTRUCTIONAL STRATEGY

This subject clears all the fundamentals of programming techniques. Teachers should stress on explaining all the techniques and algorithm in detail in theory sessions. The students should be asked to convert their ideas about a problem into and algorithms in theory class and then write programs for the algorithms. Finally all the programmes should be run on computers. This will help the students to have clear concepts of programming.

RECOMMENDED BOOKS

1) Data structures – Schaum's Outline Series – McGraw Hill

2) Expert data structures with C by R.B. Patel – Khanna Publishers, New Delhi.

3) Data Structure by Tanenbaum, Prentice Hall of India, New Delhi

4) Data structure by Howartiz- Sahni Galgotia Publication

5) DS using 'C' by Yashwant Kanetkar BPB Publication

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	6	8
2.	15	25
3.	15	25
4.	8	16
5.	10	16
6.	6	5
7.	4	5
Total	**64**	**100**

COMPUTER SYSTEM ORGANIZATION AND ARCHITECTURE

L T P
5 - -

RATIONALE

The subject provides the students with the knowledge of architecture and organization of personal computers. Micro programmed control and hardwired control are explained with algorithms for different arithmetic operations

DETAILED CONTENTS

1. Introduction   (14 hrs)

   1.1 Latches and flip- flop- difference between latch and flip- flop. SR, D, T & JK flip- flop, their operation and truth tables, race condition. Master slave flip- flop, Toggle condition
   1.2 Counters- Asynchronous (Up/ down), Synchronous (Up/ Down), Ring counter and counter application
   1.3 Shift registers- Shift register functions, different types of shift registers and application of shift registers

2. Register Transfer and Micro Operations   (10 hrs)

   Register transfer language, bus and memory transfer, arithmetic logic micro operations. Basic computer organization and design, instructions and instructions codes, computer instruction. Timing and control, instruction cycles, memory reference instruction, input and output and interrupts, complete computer description

3. Programming the basic Computer   (10 hrs)

   Machine language, assembly language, assembler, program loops, programming arithmetic, and logic operations, sub routines, input- output programming

4. Micro Programmed Control   (8 hrs)

   Control memory, address sequencing, micro programs example

5. Central Processing Unit   (16 hrs)

   General register organization, instruction formats, stacks organizations, addressing modes, data transfer and manipulation, programmed control, reduced instructions set computers, pipeline and vector processing, parallel processing, pipelining, arithmetic pipelines, RISC pipelines, Vector processing, array processors.

6.   Computer Arithmetic   Algorithm   (14 hrs)

Addition   and   Subtraction algorithm, multiplication algorithms, division algorithms, floating   point arithmetic operations

7.   Input- Output Organization   (8 hrs)

Peripheral devices, Input Output interface, asynchronous data transfer, modes of transfer, priority interrupt, Direct Memory Access (DMA), Input Output processor

RECOMMENDED BOOKS

1.   Computer Architecture by Rafiquzzaman, M; Prentice Hall of India, New Delhi

2.   Fairhead- 80386/80486, BPB Publication, New Delhi

3.   Hardware and Software of Personal Computers by Bose, SK; Willey Eastern Ltd., New Delhi

4.   Structured Computer Organization by Tanenbaum, Andrew S; Prentice Hall of India, New Delhi

5.   Upgrading and preparing PCs by Scott Muller, Techmedia Publications

6.   Computer Organization and Architecture by Linda Labur, Narosa Publishing House Pvt, Ltd., Darya Ganj, New Delhi

7.   Computer system architecture, Morris mano Prentice Hall of India, New Delhi

8.   Digital Electronics by RP Jain, TMH

9.   Digital Logic design by Morris, PHI

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	14	15
2.	10	15
3.	10	10
4.	8	10
5.	16	20
6.	14	15
7.	8	15
Total	**80**	**100**

DATA COMMUNICATION
(Common with Information Technology)

L T P
4 - -

RATIONALE

The course provides the student with:

 i)   Principles of modulation, types of modulation and principles of digital data transmission

ii)   Communication methods and equipment used in data transmission

iii)   Errors in data communication and how to deal with them

DETAILED CONTENTS

1.   Modulation   (12 hrs)

 ➢ Need for modulation in communication systems. Concepts of AM, FM, PM, PAM, FSK (Frequency Shift Keying), PSK (Phase Shift Key) and PCM (Pulse Code Modulation) (No mathematical treatment)

 ➢ Concepts of bandwidth, noise and channel capacity of different communication system such as radio, microwave, different types of electrical communication lines, optical fiber systems and issues like line characteristics and impedance matching

2.   Transmission of Digital Data and Modems   (20 hrs)

 ➢ Transmission of binary data, concepts of simplex, half duplex and full duplex modes, two and four line systems

 ➢ Bit level data transfer, rate of data transfer

 ➢ Byte level data communication, synchronous communication, data transfer efficiency

 ➢ Asynchronous communication, start-stop bits, data transfer efficiency, relative advantages and disadvantages with synchronous communication

 ➢ Frame level communication, data packets, address encoding and decoding of data packets, data encryption and decryption

 ➢ Serial and parallel data communications, comparison in terms of speed of data transfer

 ➢ Modems: Transmission rate, modem standards, traditional modems, 56 K modems

3.   Error Detection   (16 hrs)

   ➢ Sources of errors in data communication. Effect of errors, data error rate and its dependency on data transfer rates. 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 checks. Encoding redundant bits and recovery of data

4.   Communication Methods and Standards   (16 hrs)

   ➢ One-to-one connection, multidrop lines. Methods of implementation, channel capacities

   ➢ Types of multiplexing- TDM (Time Division Modulation), FDM (Frequency Division Modulation), WDM (Wave Length Division Modulation)

   ➢ Direct mode of communication, need for handshake mode of communication, handshake modes

INSTRUCTIONAL STRATEGY

As the subject provides only theoretical concepts, the teacher must explain with reference to practical situations

RECOMMENDED BOOKS

1.   Data Communication and Networking 2nd edition by Forouzan; Tata Mc Graw

        Hill Publishing Co, New Delhi

2.   Data and Computer Communications by William Stallings, Prentice Hall of India,

        New Delhi

3.   Data Communication by Schwaber, William; Mc Graw Hills.

4.   Digital, Analog and Data Communications by Willium, Sinnema and Tom Mc

        Graw Hills

5.   Data Communication by Tenanbaum, Prentice Hall of India, New Delhi

6.   Data Communication by Fred Halsall Addison Wesley (Singapore) Pvt. Ltd., New

        Delhi

7.   Data Communication by Keshav, Addison Wesley (Singapore) Pvt. Ltd., New

        Delhi

8.   Understanding Data Communication, 4th Ed, Gilbert Held, Prentice Hall of India,

        New Delhi

9.   Data Communication By Schweber

10.   Data Communication and Network – By Forauzan.

11.   Data Communication and Network – By Black

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	12	25
2.	20	35
3.	16	25
4.	16	15
Total	**64**	**100**

COMPUTER WORKSHOP

L T P
- - 6

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

1) Familiarization with various components and parts of personal computers, mother board details, hard disk drive, floppy disk drive. CD Rom drive, DVD, keyboard, display devices, various chips (memory chips and CPU); serial and parallel ports, USB port

2) Installation of various operating systems, UNIX, LINUX, Windows NT, Windows 98, 2000 and XP. Familiarization of their features with practical demonstrations. Changing settings.

3) Installation of different softwares and device drivers

4) 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.

5) Hard disk access modes: LBA, ATA, Normal, FAT, NTFS, Partitioning hard disk and loading multiple operating systems.

6) Installation of printers, scanners

7) Installation of modem and starting a new internal connection in a stand alone Computer

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) Complete Guide to Window NT and Workstation by Peter Norton. Tech Media Publications

PC SOFTWARE

L T P
2 - 4

RATIONALE

The objective of the course us to make students efficient in performing, managing document related work using MS Office

DETAILED CONTENTS

1. Windows operating system   (6 hrs)

    Features, Basics, Windows Explorer, My Computer, Customizing Windows using clipboard, Note Pad, Word Pad, Control Panel, Taskbar settings, Network neighbourhood and multimedia, Inserting symbol and other special characters using Paint

2. MS Word   (8 hrs)

    Features, Applications, Fundamentals of MS Word: Menus, Toolbars, Ruler, Scroll Bars, Status Bar; Creating, Saving, Importing and Exporting files; Indents, Lists, Tabs, Styles, Working with frames, Columns, Pictures, Charts/ Graphs, Forms, Tools, Equations and macros, Mail Merge

3. Excel   (8 hrs)
    Features, applications, Worksheet Overview, Rows, Columns, Cell Menus; Creating Worksheets; opening and saving Worksheets; formatting, Printing, Graph/ Charts, Establishing worksheet links, Macros, Database, Tables; Using files with other program using Excel function and formula

4. MS Power Point   (8 hrs)

    Features, Applications, Views, Formatting slide presentation, Slide Show, Animation and Printing Presentation, Multimedia feature

5. Outlook Express   (2 hrs)

    Features, Application, Exploring menus, Send and receive E-mail with attachment, sending mail to a group

LIST OF PRACTICALS

1. Exploring settings using windows control panel

2. Creating, editing and importing/ exporting pictures of different file formts to and from windows paint

3.	Creating, editing and formatting documents using MS Word

4.	Creating and manipulating tables using MS Word

5.	Importing and Exporting text and graphics from other application

6.	Using Mail Merge using MS Word

7.	Creating and manipulating worksheets using MS Excel

8.	Analysing data using MS Excel functions and formulas

9.	Visualizing data using MS Excel charts and Graphs

10.	Creating, attractive presentations including about the department, about your institute and course material using MS Power Point

INSTRUCTIONAL STRATEGY

This course is more of practical importance hence care should be taken to use as many features as possible of the tools discussed in theory more effectively and efficiently

RECOMMENDED BOOKS

1.	R.K. Teral: PC Software made simple, Tata Mc Graw Hill

2.	Crawford and Russel: Getting Ready for Windows 95, BPB Publication

3.	Russel A. Stultz: Learn Excel for Windows in a day, BPB Publication

4.	Mansfield: Mastering Word 6.0 for Windows, BPB Publications.

5.	Peter Dyson: Understanding PC Tools, Sybex/ Tech. Asian Ed., Tech. Pub

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	6	15
2.	8	30
3.	8	25
4.	8	25
5.	2	5
Total	**32**	**100**