0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094431   OPERATING SYSTEMS (OS)

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

DETAILED CONTENTS

1.   Brief Introduction to System Software   (6 Hrs)

     1.1   Compiler
     1.2   Assembler
     1.3   Loader
     1.4   Operating system

2.   Brief Introduction to MS-DOS and WINDOWS   (8 Hrs)

     2.1   Brief history of DOS, and WINDOWS
     2.2   Main features of DOS
     2.3   Directory structure of DOS
     2.4   File structure of DOS
     2.5   Detail concept of DOS commands
     2.6   Introduction to Windows

3.   Overview of Operating Systems   (10 Hrs)

     3.1   Definition of Operating Systems
     3.2   Types of Operating Systems
     3.3   Importance of Operating Systems
     3.4   Storage organization
     3.5   Linking, loading and executing control program

4.   Functions of Operating System   (24 Hrs)

4.1 Process Management Functions (Principles and Brief Concept)
a) Job Scheduler
b) Process Scheduler
c) Process synchronization

4.2 Memory Management Function (Principles and Brief Concept)
a) Introduction
b) Single Process System
c) Fixed Partition Memory
d) System Loading
e) Segmentation
f) Swapping
g) Simple Paging System

4.3 I/O Management Functions (Principles and Brief Concept)
a) Dedicated Devices
b) Shared Devices
c) I/o Devices
d) Storage Devices
e) Buffering
f) Spooling

4.4 File Management
a) Principles and Brief Concept
b) 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 (20 No.)
3. Practical exercises involving Basics of Windows (20 No.)
4. Exercises on windows operating system

RECOMMENDED BOOKS

1. Operating System Concepts by Ekta Walia, Khanna Publishers, New Delhi
2. Operating System by John J Donovan
3. Operating System by Dham Dhare
4. Operating System by C. Ritchie

5. MS DOS by Norton, BPB Publications, New Delhi
6. Microsoft Windows Manual
7. First Course in Computers by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
8. DOS Manual
9. Windows 2000 by BPB Publications, New Delhi.
10. Operating System by Stallings, Tata McGraw Hill Publishers, New Delhi

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094432   DIGITAL ELECTRONICS – I

RATIONALE

The objective of this subject is to enable the students to know the basic concepts of digital electronics and gain familiarity with the available IC chips. The students will learn about number systems, logic gates, various codes, parities, Boolean algebra, mux and demux, flip-flop, counters, shift registers. This will form a broad base for studying digital system design, advanced microprocessors and further studies.

DETAILED CONTENTS

1. Introduction   (01 Hrs)

    a) Define digital and analog signals and systems, difference between analog and digital signals
    b) Need of digitization and applications of digital systems

2. Number System   (10 Hrs)

    a) Decimal binary, octal, hexadecimal number systems
    b) Conversion of number from one number system to another including decimal points
    c) Binary addition, subtraction, multiplication, division, 1's and 2's complement method of subtraction
    d) BCD code numbers and their limitation, addition of BCD codes numbers, conversion of BCD to decimal and vice-versa
    e) Excess-3 code, gray code, binary to gray and gray to binary conversion

f)   Concept of parity, single and double parity, error detection and correction using parity

3.   Logic Gates   (04 Hrs)
a)   Logic gates, positive and negative logic, pulse waveform, definition, symbols, truth tables, pulsed operation of NOT, OR, AND, NAND, NOR, EX-OR, EX-NOR gates
b)   NAND and NOR as universal logic gates

4.   Logic Simplification   (08 Hrs)

a)   Rules and laws of Boolean algebra, logic expression, Demorgan's theorems, their proof
b)   Sum of products form (minterm), Product of sum form (maxterm), simplification of Boolean expressions with the help of Rules and laws of Boolean algebra
c)   Karnaugh mapping techniques upto 4 variables and their applications for simplification of Boolean expression

5.   Arithmetic Circuits   (03 Hrs)

a)   Half adder, full adder circuits and their operating
b)   Parallel binary adder, 2-bit and 4-bit binary full adder, block diagram, working

6.   Multiplexer / Demultiplexer   (04 Hrs)

a)   Basic functions, symbols and logic diagrams of 4-inputs and 3-inputs multiplexers,
b)   Function/utility of 16 and 32 inputs multiplexers
c)   Realization of Boolean expression using multiplexers/ demultiplexers

7.   Decoders, Display Devices and Associated Circuits   (04 Hrs)

a)   Basic Binary decoder, 4-line to 16 line decoder circuit
b)   BCD to decimal decoder, BCD to 7-segment decoder/driver LED/LCD display

8.   Encoders and Comparators   (04 Hrs)

a)   Encoder, decimal to BCD encoder, decimal to BCD priority /encoder, keyboard encode
b)   Magnitude comparators, symbols and logic diagrams of 2-bit and 4-bit comparators

9. Latches and Flip-Flops (08 Hrs)

   a) Latch, SR-latch, Flip-flop, difference between latch and flip-flop
   b) S-R, D flip-flop their operation using waveform and truth tables, race around condition
   c) JK flip-flop, master slave and their operation using waveform and truth tables

10. Counters (10 Hrs)

   a) Asynchronous counter, 4-bit Asynchronous counter, Asynchronous decade counter
   b) Asynchronous counter, 4-bit Asynchronous binary counter, Asynchronous decade counter
   c) Up/down Asynchronous counter, divide by N counter MOD-3, MOD-5, MOD-7, MOD-12 counters
   d) Ring counter, cascaded counter, counter applications

11. Shift Registers (08 Hrs)

   a) Shift registers functions, serial-in-serial out, serial-in-parallel-out, parallel-in-serial-out, parallel-in-parallel out
   b) Universal shift register, shift register counter and applications of shift registers

LIST OF PRACTICALS

1. Study of logic breadboard with verification of truth table for AND, OR, NOT, NAND, EX-OR, NOR gate
2. Verification of NAND and NOR gate as universal gates
3. Construction of half-adder and full adder circuits using EX-OR and NAND gate and verification of their operation
4. Verify the operation of
   a) multiplexer using an IC
   b) de-multiplexer using an IC

5. a) Verify the operation of BCD to decimal decoder using an IC
   b) Verify the operation of BCD to 7-segment decoder using an IC

6. Verify operation of SR, JK, D-flip-flop master slave JK flip-flop using IC
7. Verify operation of SISO, PISO, SIPO, PIPO shift register. (universal shift register)
8. Study of ring counter, Up/down counter
9. Construct and verify the operation of am asynchronous binary decade counter using JK flip-flop

10. Verification of truth tables and study the operation of tristate buffer IC 74126 or similar IC and construction of 4/8 bit bi-directional bus using an IC
11. Testing of digital ICs using IC tester

RECOMMENDED BOOKS

1. Digital Electronics and Applications by Malvino Laech, Tata McGraw Hill, New Delhi
2. Digital Logical Designs by Morris Mano, Prentice Hall of India, New Delhi
3. Digital Fundamentals by Thomas Floyds, Universal Book Stall
4. Digital Electronics by RP Jain, Tata McGraw hill, New Delhi
5. Digital Electronics by KS Jamwal, Dhanpat Rai & Co., New Delhi
6. Digital Electronics by Rajiv Sapra, Ishan Publications, Ambala
7. Digital Electronics by BR Gupta Dhanpat Rai & Co., New Delhi
8. Digital Systems: Principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi
9. Digital Electronics by Rajaraman V., Prentice Hall of India, New Delhi
10. Digital Electronics by Terry LM Bartlrt
11. Digital Systems by Sanjay K Bose, Wiley Eastern (P) Ltd.

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094433   DATA STRUCTURES USING 'C'

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. Fundamental Notations   (8 Hrs)

    1.1 Problem solving concept, top down and bottom up design, structured programming
    1.2 Concept of data types, variables and constants

1.3   Concept of pointer variables and constants

2.   Arrays   (12 Hrs)

    2.1   Concept of Arrays
    2.2   Single dimensional array
    2.3   Two dimensional array
    2.4   Operations on arrays with Algorithms (searching, traversing, inserting, deleting)

3.   Linked Lists   (12 Hrs)

    3.1   Introduction to linked list and double linked list
    3.2   Representation of linked lists in Memory
    3.3   Traversing a linked list
    3.4   Searching linked list
    3.5   Insertion and deletion into linked list
    3.6   Application of linked lists
    3.7   Doubly linked lists
    3.8   Traversing a doubly linked lists
    3.9   Insertion and deletion into doubly linked lists

4.   Stacks, Queues and Recursion   (12 Hrs)

    4.1   Introduction to stacks
    4.2   Representation of stacks
    4.3   Implementation of stacks
    4.4   Uses of stacks
    4.5   Introduction to queues
    4.6   Implementation of queues (with algorithm)
    4.7   Circular Queues
    4.8   De-queues

5.   Trees   (18 Hrs)

    5.1   Concept of Trees
    5.2   Concept of representation of Binary Tree
    5.3   Traversing Binary Trees (Pre order, Post order and In oder)
    5.4   Searching, inserting and deleting binary search Trees

6.   Sorting and Searching   (20 Hrs)

    6.1   Introduction
    6.2   Search algorithm (Linear and Binary)
    6.3   Concept of sorting

6.4 Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Section Sort, Merge

6.5 Sort, Radix Sort, Heap Sort, Radix Exchange Sort)

LIST OF PRACTICALS

Write programs in C to implement
1. The selection (exchange) sort techniques
2. The bubble sort technique
3. The quick sort technique
4. The merge sort technique
5. The binary search procedures to search an element in a given Ist
6. The linear search procedures to search an element in a given Ist
7. The addition of two matrices using functions
8. The multiplication of two matrices using pointers
9. Push and pop operation in stack using pointers
10. Insertion and Deletion of elements in queue using pointers'
11. Insertion and Deletion of elements in circular queue using pointers
12. Insertion and Deletion of elements in linked list
13. Insertion and Deletion of elements in doubly linked list
14. Conversion from in-fix to post-fix notation
15. The factorial of a given number using recursion

RECOMMENDED BOOKS

1) Expert data structure with C by R.B. Patel – Khanna Publishers, New Delhi
2) Data structures – Schaum's Outline Series – McGaw Hill
3) Data structures – O.G. kakde and U.A. Deshpande
4) Data structures by Kruse
5) Data structures by Sanjiv Sofat, Khanna Publishers, New Delhi
6) Data structures by Horwitz and Sartaj Sahni
7) Data structures by Tanenbaum, Prentice Hall of India, New Delhi

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094434 DTP FUNDAMENTALS

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RATIONALE

This course will enable the students to familiarize with the features and use of application packages such as Page Maker. Corel Draw or any equivalent latest packages. They will develop skills in handling the software.

Note: Since this is a practical oriented subject, there will be in theory paper. Relevant theory/ instruction may be given in practical class/session

DETAILED CONTENTS

1. Introduction   (01 hrs)

    Overview of Desk Top Publishing (DTP)

2. Page Maker   (06 hrs)

    Document needs, creating a document, editing and formatting a document, saving and printing a document, inserting text and graphics inserting columns fonts and styles, integrating images and graphics from a drawing package in the document, making transparencies, elements, frame, option, arrange text image control, expert tracking, indent/tabs, styles, type styles, layout, tool bar (page setting).

3. Coral Draw   (06 hrs)

    3.1 Introduction, exploring Corel Draw screen, using dialog boxes, using roll ups, create/open file, save file, import/export, print file

         Use of ribbon bar, use of toolbox, select object shaping objects using zoom tool, filing objects, outline objects, use of line tool

         Setting up new drawing, setting multi-page document, undo/redo mistakes, repeat, cut, copy, paste, delete, duplicate, clone

         Insert object, paste special, copy attributes from select all drawing objects, selecting objects

         Page setup, insert/delete page, use of layers roll up grid and scale set up, guideline set up

    3.2 Formatting objects

         Arranging objects: align, order, group, ungroup
         Arranging objects: combine, break, apart, weld, intersection, trim, separate

Mode edit: to line, to curve, stretch, rotate, align, convert to curves

Creating special effects: Transform roll up, clear transformation, add perspective, envelop roll up

Creating special effects: blend roll-up, extrude roll up, counter roll up, power line, power-clip clear effects

Working with text: Character, paragraph text, frame, setting of tabs, indents, bullets, spacing in paragraph text

LIST OF PRACTICALS

1. Using window explorer and other window elements
2. Creating and opening a document in page maker
3. Formatting and editing a document
4. Saving and printing a given document
5. Insertion of text and graphics in a given document from external source
6. Using columns utility, to give the document column look
7. Using various fonts and styles to make a document more beautiful
8. Use of page maker to make transparencies
9. Saving and printing a file that has been created
10. Formatting a given file by using undo/redo, repeat cut, copy, paste, delete, duplicate and clone utilities
11. Inserting objects in the drawing, aligning, ordering, grouping and ungrouping of those objects
12. Use of combine, break apart, weld, intersection, trim and separate tools in a given drawing
13. Use of mode edit tools i.e. to curve, to stretch, and rotate
14. Creating special effects i.e. transform roll-up, envelop roll up, add perspective, extrude roll up, contour roll up, power line, power clip, clear effects
15. To insert character and paragraph text in a drawing and frame setting of tabs, indents, bullets and spacing in paragraph text
16. Filling of text to a given path, aligning it to base line, straighten text, and edit text
17. Using tools such as spell, and thesaurus
18. Using find and replace text utility and type assist
19. Adding various symbols to a drawing and creating different path

RECOMMENDED BOOKS

1. Desk Top Publishing From A to Z by Bill Grout and Osborne; McGraw Hill
2. DTP for PC user by Houghton; Galgotia Publishing House Pvt., Ltd., Daryaganj, New Delhi.

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094435   DATA COMMUNICATION

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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.   Methodology   (12 hrs)

   Need for a modulation in communication systems. Concept of AM,FM, PM, PAM, FSK, PSK and PCM (no mathematical treatment)

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

2.   Data Communication Principles   (12 hrs)

   Transmission of binary data, concept of simplex, half duplex and full duplex modes, two and four line systems.

   Byte level data communication, synchronous communication data transfer efficiency

   Synchronous communication, start-stop bits, data transfer efficiency, relative advantage and disadvantage with synchronous communication

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

   Serial and parallel data communication, comparison in of speed of data transfer

   Asynchronous transmission, synchronous transmission

3. Error Detecting   (10 hrs)

    Source of error in data communications, effects of error, data error rate
    and its dependency on data transfer rates. Error detecting through
    parity bit, block parity to detect double error and correct single error

    Characteristics of white noise and digital noise

4. Communicating Method and Standards   (03 hrs)

    One to one connections multi drop lines, method of implementation
    channel capacity

    Multiplexed lines, time division multiplexing and demultiplexing

5. Concept of Synchronization   (06 hrs)

    Synchronization method, direct mode of communication, need for
    handshake mode of communication, handshake modes.

RECOMMENDED BOOKS

1. Introduction to Data Communications-A Practical Approach by Carry
    Hanghes, Narosa Publishing House Pvt.Ltd. DaryaGanj NewDelhi11000
2. Data and Computer Communication by William Stalling
3. Computer Communication and Networking by John Fre
4. Computer Networking by Tennan Baum
5. Data Communication by PS Gupta

0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING
SEMESTER -I
094436   COMPUTER WORKSHOP

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RATIONALE

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

DETAILED CONTENTS
Part – A

1. Familiarization with various components and parts of personal computers, motherboard detail, 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.

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

    Use Modems.

2. Assembly and Dissembling of PCs : Power supply, linear power supply and switch mode power supply, trouble shooting of SMPS.

Part-B

3. Loading of various operating system, LINUX, windows NT, Windows 95 and 98. Familiarization of their features with practical demonstration. Changing settings on Windows 2000, XP, millennium

4. Loading other software like MS-Office, Visual Basic, Page Maker, corel Draw, AutoCAD etc.

5. Virus detection, prevention and cure. Use of PC tools. Learning various types of virus such as polymorph virus, stealth viruses; boot sector virus, file virus, partition table viruses.

    Structure of floppy disk and hard disk, writing to boot sector and reading from it.

INSTRUCTIONAL STRATEGY

As the subject is practice oriented, sufficient exercises on assembling and dissembling 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 student. Field visits to the places where assembly of computers is taking place will be helpful to the student. Wits to the manufacturing units of CVT or UPS will also be helpful the students.

RECOMMENDED BOOKS

1) PC Upgrade and Maintenance Guide 8th Edition by Mark Masi, BPB Publication

2)   Hardware Bible by Winn Ross, Techmedia Publications

3)   IBM PC and Clones by Govinda Rajalu. Tata McGraw Hill, Publishers, New Delhi

4)   Electronic Instrumentation and Measurement Technique; by WD Cooper and Adhelfrics. Prentice Hall of India

5)   Common Computer Circuits and Faults Vol. 1 by M. Lotia, BPB Publications

6)   Monitor and Fault Diagnosis Vol.1 and II. M. Lotia, DPB Publications

7)   Unix System Administration by Unleashed. Tech. Media Publications

8)   Understanding Unix Tech Media Publications

9)   Linux Unleashed Tech Media Publications

10)   Unix Configuration and Installation DBP Publications

11)   Novel Network Novel's Guide to Network 4.01 Networks

12)   Teach Yourself Unix BPB Publications

13)   Study Guide Windows NT Server and Workstation 4 Tech Media Publications

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

15)   Complete Guide to Windows 98 by Peter Norton. Tech. Media Publications

16)   Training Guide Windows 98 by MCSE, Tech Media Publications