GURU NANAK DEV INSTITUTE OF TECHNOLOGY
CURRICULUM FOR DIPLOMA COURSE

IN

Computer Engineering

SECOND YEAR

(TERM III & TERM IV)

FOR

DELHI STATE

GOVT. OF DELHI

GURU NANAK DEV INSTITUTE OF TECHNOLOGY
ROHINI, SECTOR-15, DELHI,

TERM-III

S.NO	SUBJECT	LTP	EVALUATION SCHEME						TOTAL MARKS
			INTERNAL ASSESSMENT		EXTERNAL ASSESSMENT				
			THEORY	PRACTICAL	WRITTEN MARKS	HOURS	PRACTICALS	HOURS	
1	Operating System	313	50	50	100	3	50	-	250
2	Digital Electronics	313	50	50	100	3	50	3	250
3	Data structure in C	313	50	50	100	3	50	3	250
4	Micro Processor	313	50	50	100	3	50	3	250
5	Computer in Workshop-I	- - 6	-	50	-	-	50	-	100
6	Student Centered activities	6							
		12 4 24	200	250	400		250		1100

TERM-IV

S.NO	SUBJECT	LTP	EVALUATION SCHEME						TOTAL MARKS
			INTERNAL ASSESSMENT		EXTERNAL ASSESSMENT				
			THEORY	PRACTICAL	WRITTEN MARKS	HOURS	PRACTICALS	HOURS	
1	Object ori ented pro gra mming	3 1 4	50	50	100	3	50	3	250
2	Computer Organization	3 1 -	50	-	100	3	-	-	150
3	Data Communication	3 1 3	50	50	100	3	50	3	250
4	Data Base Management System	3 1 3	50	50	100	3	50	3	250
5	Peripheral & Interfaces	3 1 3	50	50	100	3	50	3	250
6	Computer workshop-II	- - 4	-	50		-	50	3	100
	Student Centred Activites	3							
		15 5 20	250	250	500		250		1250

Operating System

Rationale

The course Provides the students with an understanding of human computer interface existing in computer system and basic concepts of operating system and its Working. the aim is to gain proficiency in using various operating systems after undergoing this course .

DETAILED CONTENTS

(1). Brief introduction to system software: Compiler, Assembler, Loader Operating System

(2). Overview of Operating System: Operating System as resource manager, operating system services. System calls. operating system, classifications single user, multi-user, batch-processing time-sharing real-time Operating System, multi processing, distributed operating system, network operating system.

(3). Memory Management: Single Contiguous allocation, partitioned allocation, relocatable partitioned allocation. Paged allocation, segmentation.

(4). Processor Management: Processor overview, process states, multi-programming, levels of scheduling, deadlock, necessary conditions for deadlock prevention.

(5). File Management: File supports, access methods, contiguous, linked and indexed allocation, directory systems, single level, two levels, tree structure, graph directory system and file protection.

(6). Device Management: Dedicated, Shared and Virtual devices, sequential access. direct access devices. Interrupt processing, idea of spooling, disk scheduling.

(7). Case Study: Case study of Window operating System

List of Practical

1. Practical exercises involving various Internal External DOS Commands.
2. Exercises on Windows operating system.
3. Exercises on UNIX/Linux operating system-Shell programming/Operating system commands.

Reference Books

1. Operating system concepts-Silberschatz, Galvin
2. Operating system design and implementation-Andrew Tanenbaum and WoodhuII
3. Operating system-Godbalakar
4. Operating system-Dhamdhere

DIGITAL ELECTRONIC

Rationale

The objective of this subject to enable the students to know the basic concepts of digital electronics and gain familiarity with the available IC Chips. This will form a broad base for studying Microprocessor and further subjects.

DETAILED CONTENTS

1. NUMBER SYSTEM AND CODES

=BINARY NUMBERS: - Decimal, binary, octal, hexadecimal number systems, conversion from one number system to another system

=BINARY ARITHMETIC: binary addition, subtraction, multiplication, division, 1's complement and 2's complement of binary numbers, arithmetic operations with signed numbers.

=**BINARY CODES:** - binary coded decimal (BCD) code, excess-3 code error detection code, the grey code or reflected code, alphanumeric code.

2. BOOLEAN ALGEBRA

=Digitallogic operation: digital logic, +ve logic, -ve logic, logic operation logic, gates definition and symbols,

=Fundamental of Boolean algebra: Boolean algebra, Boolean function, basic theorem and identities.

=Minimization technique for logic operation sum of product and product of sum rule. karnaugh map technique up to 4 variables.

=Digitallogic family: Direct coupled logic circuits, resistor transistor logic, transistor transistor logic (TTL), omplementary MOS (CMOS), Characteristic and comparison of TTL and CMOS.

3. COMBINATIONAL LOGIC CIRCUIT

=Addersand Sub tractors: basic adders and sub tractors, parallel binary address, ripple carry and look ahead carry address.

=Digitalcomparators: exclusive OR gates as comparator, comparator for 2 bit binary number.

=DecodeEncoder: Multiplexer, Demultiplexer.

4. SEQUENTIAL LOGIC CIRCUITS

Operating characteristics of flip-flop (latch), Set reset flips flop, clocked flipflop, edge triggered flip- flop, T flip-flop, D flip flop, and master slave JK flip flop.

5. COUNTERS

3bit Asynchronous counter, binary ripple counter, synchronous counter, synchronous decode counter and up-down counter.

6. REGISTER AND MEMORIES

=Registers: Flip-flop as register, types of register serial in serial out shift register, serial in parallel out shift register, parallel in parallel out shift register. parallel in serial out shift register.

=Memories: classification of memories, RAM, ROM

7. ANALOG TO DIGITAL & DIGITAL TO ANALOG CONVERTERS.

General principle of A/D & D/A conversion and brief idea of their application Binary register network register and register ladder network method of D/ A conversion

List of Practical

1. Study of Logic Breadboard with verifications of Truth Table for AND, OR, N AND. EX-OR. NOR Gate.
2. Verification of NAND and NOR gate as universal gates.
3. Construction of half adder and full adder circuit using EXOR gate and NAND gate and verification of their operation
4. Verify the operation of MUX using an IC
5. Verify the operation of DEMUX using an IC
6. Verily the operation of BCD to Decimal Decoder using an IC
7. Verify the operation of BCD to Seven-segment decoder using an IC
8. Verify operation SR JK, D, flip flop, Master-slave JK Flip flop using an IC
9. Verify operation lf SISO. PISO, SIPO, and PIPO Shift registers (universal Shift register)
10. Study of Ring counter UP-DOWN counter
11. Construct and verify the operation of an asynchronous binary and decade Counter using JK flip flop
12. Verification of truth tables and study the operation of tri-state buffer IC 74126 or slirnilar IC and construction of 4/8 bit directional bus by Using an IC
13 Testing of digital IC's using IC tester.

REFERNCE BOOKS:

I. Digital Electronics - Bartelt **2.** Digital Logic Design- Morris Mano **3.** Digital Principles and application - Albert Paul Malvino and Leach
4. Digital Electronics practice using IC - R .P.Jain and MMS Anand
5. Digital fundamental- Thomas Floyds**.**

DATA STRICTURES USING C

Rationale

The data structures are the technique of designing the basic algorithm for real life projects .
Understanding of data structure is essential and this facilitates the understanding of the language.

Detailed Concepts

1 **Problem solving concepts:**
    Top down and bottom up design, structured programming & debugging technique, program testing to documentation, consideration for choice of paper
2 **Data type and data structure**
    Concept of data type and data structures, difference between data type and data structures, view of data structure at logical level, implementation level, application level**,** built in data structures and User defined data structures
3. **User defined data structures**
    Difference between user-defined and Built-in data structures. Linear linked list, creation, insertion, deletion, traversal, array, circular link list, creation, insertion, deletion, traversal. doubly linked list: creation, insertion, deletion, traversal and their application.
4 **Stacks:**
    Stack definition and examples representation of stacks as an array, stack operation, pointer implementation of lists**,** comparison of two implementation**,** linked list representation of stacks, application of stacks
5 **Queues**
    Queues definitions and examples, representation of queues using arrays, queues operation, linked list representation of queues, application of queues, dequeue
6 **Non linear data structures:**
    Trees, terminology of trees, concepts and application of binary trees, linked representation of binary trees, tree traversal technique and algorithms using recursion and non recursive methods, creation of binary tree, inserting a node in binary tree and deletion a node from a binary tree and searching in a binary tree

7 Searching and sorting

Searching techniques-Sequential search and binary search. sorting techniques: insertion sort, selection sort, bubble sort, quick sort merge sort, heap sort and their efficiency consideration

List of practical

1. Problems on arrays for insertion deletion and searching
2. Problems on operation of linear linked list
3. Problems on construction operations of circular linked list
4. Problems on operation fo doubly linked list
5. Problems on implementation of stack an array as well as pointers
6. Problems on implementation of queues as an array
7. Problems on dequeqs
8. Problems on trees such as of binary trees, insertion, deletion and searching in binary trees
9. Problems on tree traversal algorithm preorder, in order and post order
10. Problems on to Count the leaves and to find the height of tree.
11 Problems on linear and binary search. **12.** Problems on technique suction
 sort, bubble sort, quick sort, merge sort

Reference Books

1. Date and Lily - Data structures **2.** Schaum series - Data structures **3.**Tanenbaum, Augesistein - Data structures using C.

Microprocessor

Rationale

The study of :Microprocessor in terms of Architecture, software and interfacing techniques leads to the understanding of working of CPU in a micro computer. The development in microprocessor of 32 bit architecture brings them face to face with main frame finding employment in R& D, assembly, repair and maintenance of hardware of microprocessor and computer

Detailed contents

1. Microprocessor Architecture .

Intel 8085-Architecture blocks diagram functions of ALU, timing and control unit, registers, data, address and control buses Pin configuration and function of various pins, flags. Instruction cycle-Fetch and execute operation. M/C cycle and state Timing Diagram- opcode fetch cycle, memory read and write operation. Memory organization, memory map and address, Basic concepts of memory interfacing, Address decoding and memory address

2. Microprocessor Instruction.

Instruction set, Instruction, classification, Instruction word size, Addressing modes Detailed instruction-Data transfer Instruction, Arithmetic instructions, Logic instructions, Branch instructions, Machine control instructions

3. Programming concepts

Programming techniques-Looping, counting, indexing Use of counters and time delays Use of stock and subroutines

4. Interfacing and data transfer scheme

Memory mapped I/O and I/O mapped I/O Synchronous and asynchronous data transfer, microprocessor controlled data transfer and peripheral controlled data transfer

5. Interrupts

Interrupts process, Mask able in non mask able interrupt, interrupt priority, RIM and SIM instructions

6. Supporting chips: 8251, 8253, 8254,8255,8257,8259.

List of Practical

(1)   Familiarization with micro processor kit location of 8085~8279,8263,kyeboard,display field, EPROM programmer, expansions lot TTY and serial lines. Performing: exercise on
microprocessor kit. (**2).** Addition of two 8 bit numbers
(3). Subtraction of 8 bit numbers
(4). Decimal addition of two 8 bit numbers

(5). Addition of two 16 bit numbers

(6). Find the largest number out of three given numbers

(7). Find the larger of two numbers

(8). To arrange the data array in ascending and descending order**.**

(9). Block transfer of data byte

(10). Counter design with time delay

(11). BCD addition ad other exercises given by the lab in charge

(12). BCD Subtractions.

Reference Books

1. Fundamental of microprocessor and microcomputer-B Ram **2.** microprocessor architecture, programming and application with 8085-Ramesh S. Gaonkar

COMPUTER WORKSHOP-1

RATIONALE

The course aims at making the student familiar with various parts of computers and how to assemble them, 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.

DETAILED CONTENTS

1. Electronic CAD
Familiarization with electronic CAD software such as electronic workbench for design of simple analog and digital circuits using simulation provided by electronic CAD software. Use of existing libraries adding components to the libraries.

2. AUTOCAD:
Familiarization with latest AUTOCAD software. Basic AUTOCAD commands, drawing and editing commands, editing and dimensioning 2 D examples.

3 Loading and Familiarisation of operating system : Linux, Windows NT, Windows 2000, Windows XP

4 Familiarisation of Page Maker & Corel Draw

Reference Book : (i) Mastering Autocad 2000 - George
Omoar (ii) Corel Draw - william D. Harrel

Object Oriented Programming

Rationale

object orientation is a new approach to understand the complexities of the real world. This course offers the model programming language C++ that shall helped the students to Implement the various concepts of object orientation practically.

Detailed contents

1. Introduction
=Problems with procedure oriented Programming technique =Concepts of OOPs =Characterstics of Oops =Advantages and application of OOPs

2. C++ Programming Basics
=BasicDatatypes =TypeCompatibility =Operatorsin C++ =Scoperesolution operator =ControlStructure

3. Function C++
=FunctionPrototyping =Callbyreference =Inlinefunction =Functionoverloading =LibraryFunction

4. Class and Objects
=Comparison of Class and C - Structure =Creatingobjects =Arrayswithin Class =Arraysofobject =Objectsas Function Arguments

5. Constructor and Destructor
=Constructor and its characteristics =Parameterized Constructor =MultipleConstructor in a class =CopyConstructor =overloaded constructor =Destructor and its characteristics.

6. Operator Constructor
=Overloading of unary =Operatorof binary operator =Manipulation of Strings using operator =Typeconversion-basic type to class & class to basic type.

7. Inheritance
=TypeofInheritance =Needofinheritance=Application of inheritance

8. Managing Console I/O operation
=Unformatted I/O operation =Formatted I/0 operation: fill, precision ,width =I/Ostreams

9, File Operation
=Opening& Closing a file =Programming with files

10, Virtual & friend function
=Pointersto objects =Thispointers =Pointerto derived classes =Virtualfunctions =Purevirtual functions =Conceptof late & early binding

LIST OF PRACTICAL

(1).   Write a program using control structure
(2).   Write a program using constructor and destructor.
(3).   Using objects as function arguments perform the addition of time hours, minutes, and second's format.
(4). Perform addition of two complex numbers using class.
(5). Define a class to represent bank account include the following members Data Member : Name of the depositor, account Number, type of account, and balance amount in the account, Member functions: To assign initial value, to deposit an amount, to withdraw an amount after checking the balance, to display name and balances. Write a main program to test the program
(6). Modify the program for handling 10 customers using array of objects.
(7)   Create a class FLOAT that contains one float data member overload all the four arithmetic operators so that operate on the object of the FLO AT
(8). Define a class string. Use overloaded **==** operator to compare two strings
(9). Write a program using friend function
(10). Write a program using virtual function
(11). Additional Exercise based on various topics.

Reference books:
1. Object oriented programming with c++   -   E.Balaguruswamy.
2. Object oriented programming in turbo c++ -   -   Robert Lafore.

COMPUTER ORGANISATION

Rationale
This Subject provides the students with the knowledge of details organisation of currently available personnel in order to understand their functioning and maintenance.

Detailed Contends

1.   Basic Concept/Introductions
Registors, stacks, ALU, Control Unit, Instruction types. Instruction types, Instruction formats, instructions sets and Addressing modes RISC processor and CISC processor

2.   Basic Mathematical Operation
concept of fixed and float number ,and their representation, fixed point , Addtition, Subtraction and Multiplication. floating point addition and Subtraction

3. Control Unit

Concept of Hard wired and Micro Instruction based Control Units. Principals of instruction decoding and implementation. Horizontal and vertical classes of micro instructions, Identifying **m**icro-instrucitons, minimising micro-instruciton size, parallelism in micro-instructions, Encoding control instruction. Timing cycles and Clock generation.

4. Memory Organisation

Main Memory, Memory Hierarchy, memory references, address mapping, relocation mechanism, concept, of memory, paging and segmentation, associative memory, memory, Principals of virtual memory paging, segmentation, associative memory**,** cache memory.

5. Input-output Organisation

memory mapped and I/O mapped input-out put. Modes of Data transfer **-** polled, Interrupt and DMA Multiple I/O - Daisy Chaining, Polling and Parallel Priority Control.

6. Parallel Processing

Classification (SISD, SIMD, MISD and MIMD), Principles of pipeline processing.

Reference Books

1. Moris Mano-Computer System Architecture **2.** Morris Mano-Digital Logic and control Design.

3. Raffikuzman-Modern Computer

4. J.P. Hayes-computers Architecture and Organisation.

Data Communication

Rationale

Data communication course is intended to provide practical exposure and awareness of existing and up coming communication technologies.

Detailed Concepts

1. Modulation

Need for modulation ,various type of modulation (Analog + digital) their basic concept comparison of different type of modulation with regard to noise immunity and bandwidth requirement. Basic idea of radio, microwave, satellite, optical fiber, mobile communication system

2. Transmission lines

Different type of transmission lines communication their characteristics (such that bandwidth, characteristics impedance and frequency response) different kind of distortions (for both analog and digital signals) produce by transmission line and line conditioners Concept of matching. Various kinds of noises and their effect on communication S.N.R and channel capacity.

3. Principle of data communication

Transmission of binary data on telephone lines simplex half duplex and duplex mode of transmission two and four line system. Modems and data transfer rate. Basic Block diagram of FSK, PSK, DPSK, QPSK, and QAM modem. Principle of Synchronous, Asynchrohous parallel and serial communication. Multiplexing and demultiplexing (TDM & FDM)

4 Data security and error detection

Signal formats, encryption, Basic principles of error detection on correction single parity and block parity CRC, communication using frame and packets.

5. Communication standards

Direct and handshake mode data communication, Physical aspect of different interface standards (RS-232 line drivers. IEEE--488 centronics interface)

6. Communication Equipment

Introduction to data communication, test procedure and test equipments (Line monitor, loop back method and its implementation, BERT, Protocol analyser cable tester(TDR), OTDR.

List of Practical

1 To obtain all amplitude modulated wave and measure its modulation index. 2
To demodulate an AM signal and compare with it with original signal.
3 To obtain F.M. wave and find maximum deviation.
4 To detect F.M. signal and compare it with the original Signal.
5 To obtain a P.C.M. signal and observe the effect Of
quantization. 6 To obtain a multiplexed signal of two given signals
7 Study of a given modem and its working.
8 Study of T.D.R. method of detecting fault.
9 Study of F.S.K signal.
10 Study of RS-232 port and observe different signals at Its various
pins. 11 Study of fax machine.
12 Study of LAN.

Reference Books

1. Data and computer communication -- William Stalling
2. Data communication - William Schweber
3. Computer networking Tennam Baum
4. Electronic communication system-Kennedy

DATABASE MANAGEMENT SYSTEM

Rationale

This course will acquaint the student with knowledge of fundamentals concept of data and it's application indifferent areas, storage manipulation and retrieval of data using query languages.

DETAILED CONTENTS

I. INTRODUCTION

* View of data   *Data model - ER model, relational model   *Database language- DDL, DML *Database user and administrator *Database system Vs File system *Database system application

2. DATABASE SYSTEM CONCEPT AND ARCHITECTURE *Schemes, instances and database State
*DBMS architecture
*Data independence-logical and physical data independence

3. ENTITY RELATIONSHIP MODEL

*Entity and attributes
*Entity types and entity sets
*Weak entity types
*Key- primary key, candidate key and Super
key *Relationship among entities
*ER diagram

4. RELATION MODEL

*Domains, attributes, tuples and relations
*Domain constraints
*Key constraints and constraints on null
*Entity integrity, referential integrity and foreign key
*Relational algebra- SELECT, PROJECT, JOIN

5. RELATION DATABASE DESIGN *First normal form
*Functional dependency
*Decomposition
*BCNF
*Third normal Form
*Forth normal form

6. EMERGING DATABASE TECHNOLOGIES

*Database warehouse
*Database mining
*Multimedia Database
*Distributed data base concept
*Data Base Security & authorization concept

PRACTICAL

1. Overview, features and functionality, application development in ORACLE
2. Exercise on creating tables
3. Exercise on insertion of data into tables
4. Exercise on deletion of data using different conditions
5. Exercise on SELECT statement
6. Exercise on PROJECT statement
7. Exercise on JOIN statement
8. Exercise on UPDATE statement

REFERENCE BOOKS

1. An introduction to Database systems C.J.Date
2. Database System concept- Silberschatz, Korth Sudarshan
3. Fundamentals of database systems- Elmasri, Navathe

PERIPHERALS AND INTERFACES

Rationale

A Computer Engineer should be able to interface and maintained Keyboard, Printer, mouse, monitor etc. With the computer system**.** The course provide necessary knowledge and skills regarding working construction and interfacing aspects of peripherals.

1. Display Devices

Basic principals and working of monitor, video display adapters - CGA, VGA, SVGA, overview of Raster scan and vector scan, concept of resolution and bandwidth of monitor, Basic concept of PAL and NTSC standard

2. Printers.

Typical printers - impact, non-impact specification, Construction & working principals of DMP, Inkjet Printers, Laser printers.

3. Disk Drives

Construction and working of Hard Disk
Types of actuators-voice coil and stepper motor
Disk preparation - low level formatting, partitioning, high level formatting.
Data encoding techniques - MFM, RLL.
Types of interface - SCSI, IDE, EIDE.
Sector interleaving.

4. Input Device:- Working principle of keyboard, Mouse, Scanner, Digitizer, Touch Screen, Light Pen.

5. Optical storage Media - construction and working principals of CD-ROM, DVD**.**

6. Other Devices - Concept of tape drive, Pen Drive, Zip Drive.

List of Practical

1. To identify various components and peripherals devices of computer
2. Exercise on assembly a PC with peripherals and testing the same.
3. Study the construction assembly, disassembly, working in and testing of the following devices *Monitors (Monochrome, Colour, MultiSync).
   *Keyboards
   *FDD
   *HDD
   *Dot Matrix Printers
   *Optical Devices
   *Inkjet Printers, Laser Printers
   *Mouse and scanners

Reference Books

1. Douglas Hall-Microprocessor and interfacing & programming
2. Govindaraju-IBM PC and clones
3. Bray-Microprocessor, interfacing and programming
4. Krisna, J-Understanding Hardisk Management
5. Win Rosch Bible-Hardware Bible

COMPUTER WORKSHOP-II

Visual basic is programming language which enables a programmer to write programs application packages to produce live problems. After under going on the students will be able to understand the principles of Active-x object and write programs in visual Basic.

DETAILED CONTENTS

1. Introduction to Visual Basic

Features and applications of VB - concept of integrated development environment (IDE) - project application like standard exe.

2. VB Structure

Variable declaration types user defined data types - scope and life of a variable - arrays - constructors - control flow statements - procedures and functions.

3. Designing the User Interface

Design aspects of VB forms - Elements of user interface - properties of controls - text box, label, command button, check box, list box, picture: image shape timer - designing forms and displaying messages using above controls - control arrays.

4. Menus and Common Dialogue Control

Creating menus at design using menu window - control menus and runtime - create shortest keys for pop up menus common dialogue control.

5. Display date, time, string type conversion and Printing Information

Data reports and environments - display tabular data in report form fundamentals of printing - printing with print form method.

6. Data Base Programming

Connecting with database using DAO, RDO ,ADO, ODBC Familiarization with PL/SQL cursors and Triggers

7. Active X : Working with inbuilt Active X, Windows control, creating own Active X through Active X Control. Active X EXE, difference between EXE and DLL.

List of Practicals

1. Exercise on opening projects like standard Exe, Active-X EXE and Active control
2. Exercise on all the menus of opening window of VB
3. Exercise on all basic controls
4. Exercises on UPDATE statement
5. Exercises on Queries and Nested queries
6. Exercises on indexes views and sequences
7. Exercises on data functions, group and scalar functions
8. Exercises on JOINS, Grant and remove privileges
9. Exercises on creation of PL/SQL block
10. Exercises on cursor management in PL/SQL
11. Write a database trigger after update, delete
12. Built a small application using the above illustration

REFERENCE BOOKS

1. Microsoft Visual Basic - John W. Penfold
2. Developing project using Microsoft Visual Basic 5.0/6.0-Dcbbie Tesch. Roya. Boggs
3. SQL, PL/SQL -Ivan Bayross, BPB Publications, New Delhi.