Third Semester Syllabus

Programming principle and algorithm (DCS-301)
Discipline core (DC): Credit 3(3-0-0)

Objective:
Expose the basics of measuring the efficiencies of algorithms and how to identify basic operations within an algorithm. Certain objectives have been set out to ensure that outlines the principles of a good programming style.

COURSE OUTLINE:

Unit 1

Introduction to 'C' Language, Language Fundamentals
History, Structures of 'C' Programming, Function as buildingblocks. Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments.

Unit 2

OperatorsBuild in Operators and function, Types of operators, Precedence and Associativity, Expression, Statement and types of statements , Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files, Preprocessor directives: #include, #define.

Unit 3

Control structures Decision making structures: If, If-else, Nested If-else, Switch; Loop Control structures: While, Dowhile, for, Nested for loop; Other statements: break, continue, goto, exit

Unit 4

Introduction to problem solving, Concept: problem solving, Problem solving techniques, (Trail & Error, Brain Stroming, Divide & Conquer), Steps in problem solving (Define Problem, Analyze Problem, Explore Solution) Algorithms and Flowcharts (Definitions, Symbols), Characteristics of an algorithm Conditionals in pseudo-code, Loops in pseudo code Time complexity: Big-Oh notation, efficiency Simple Examples: Algorithms and flowcharts (Real Life Examples)

Unit 5

Simple Arithmetic Problems Addition / Multiplication of integers, Determining if a number is +ve / -ve / even / odd, Maximum of 2 numbers, 3 numbers, Sum of first n numbers, given n numbers, Integer division, Digit reversing, Table generation for n, ab , Factorial, sine series, cosine series, nCr , Pascal Triangle, Prime number, Factors of a number, Other problems such as Perfect number, GCD numbers etc (Write algorithms and draw flowchart), Swapping,Functions Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes, Recursion.

RECOMMENDED BOOKS

1. Let us C-YashwantKanetkar.
2. Programming in C-Balguruswamy

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (DCS-303)
Basic Engineering and Science (BES) Core: Credit 4(3-0-2)

Objective: The objective of this subject is to impart fundamental knowledge and skills regarding basic electrical and electronics engineering and digital electronics which diploma holders will come across in their professional life. This course will enable the students to understand the basic concepts and principles of d.c. and a.c. fundamentals, and batteries.

COURSE OUTLINE:

1. Overview
Basic concepts of electrical parameters, AC and DC, Use of Electrical Engineering. Ohm's law, Kirchhoff's Law. Concept of voltages & current sources and their conversion.

2. AC fundamentals
Representation of sinusoidal quantity, Equation of sinusoidal wave form, Simple RLC circuits

3. Batteries
Basic idea about primary and secondary cells, Construction, working and applicants of Lead-Acid, Nickel-Cadmium and Silver oxide batteries, Charging methods used for lead-acid battery(accumulator), Care and maintenance of lead-acid battery, Series and parallel connections of batteries, General idea of solar cells, solar panels and their applications, Introduction to maintenance free batteries.

4. Semi Conductor Physics
Conductors, Insulators, Semiconductors, Idea of Energy Level, Energy Band Diagrams of Insulators, Conductors and Semiconductors, Effect of Temperature, Recombination of holes and electrons, n-type semiconductor, p-type semiconductor, Majority and Minority Carriers.

5. Semi Conductor Diode & Transistor
Mechanism of current conduction and characteristics of ordinary diode, zener diode, LED, Principle of operation characteristics and applications of BJT and concept of configurations.

6. Electrical & Electronics Measuring Instruments
Operations methods and applications of induction type energy meter, Analog/ Digital multimeter, CRO

7. Earthing & Discharge
Concept of earthing and grounding, importance of Earthing, Mechanism and procedure of earthing provided in computer centre, checking of earthing, Static Discharge, Methods to reduce discharge, Provision for the safety of computers from high electrical discharge, Magnetic effect.

8. Number System
Distinction between analog and digital signal, Applications and advantages of digital signals **,**Binary, Octal and hexadecimal number system: conversion from decimal and hexadecimal to binary and vice-versa, binary addition, subtraction, multiplication and division including binary points. 1's and 2's complement method of addition/subtraction.

9. Codes and Parity

Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and Gray code, Concept of parity, single and double entry and error detection, Alpha numeric codes : ASCII and EBCDIC

10. Logic Gates and Families
Concept of negative and positive logic, Definition, Symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates, NAND and NOR as universal gates, Logic family classification: Definition of SSI, MSI,LSI, VLSI,TTL and CMOS families.

11. Logic Simplification
Postulates of Boolean algebra, De Morgan's Theorems . Various identities. Formulation of truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equation with gates. Karnaugh map (upto 4variables) and simple applications in developing combinational logic circuits.

12. Arithmetic Circuits
Half adder and Full adder circuit, design and implementation, Half and Full subtractor circuit, design and implementation, 4 bit adder/subtractor, Adder and Subtractor IC

13. Decoders, Multiplexers and De Multiplexers
Four bit decoder circuits for 7 segment display and decoder/driver ICs, Multiplexers and De-Multiplexers, Basic function and block diagram of MUX and DEMUX. Different types and ICs.

14. Latches and flip flops

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

LIST OF PRACTICALS

1. Verification of Ohm's Law
2. Verification of KCL and KVL
3. Test of charging and discharging of lead-acid battery using hydrometer
4. Connection of a three-phase motor and starter with fuses and reversing of direction
5. Connection of analog and digital single phase energy meter
6. Study of a distribution board for domestic and industrial installation
7. Open-circuit and short-circuit test on a single-phase transformer
8. Star-delta starting of induction motors
9. To draw V-I characteristics of pn-junction diode
10. To draw input and output characteristics of a transistor in CB and CE configurations

LIST OF RECOMMENDED BOOKS

1. Digital Electronics: Principles and Integrated Circuits by A.K Maini, Wiley-India Pvt Ltd. Daryaganj, New Delhi

2. Digital Electronics and Applications by Malvino Leach, Tata McGraw Hill Education Pvt Ltd, New Delhi

Computer system Peripherals (DCS-304)
Discipline core (DC): Credit 4(3-0-2)

Objective: A computer engineer should be able to interface and maintain key-board, printer, mouse, monitor etc along with the computer system. The course provides the necessary knowledge and skills regarding working construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the computer system.

COURSE OUTLINE:

1. **Video Display**
   The basic principle of working of video monitors (CRT/TFT/LCD/LED), video display adapters, video modes, Video display EGA/VGA/SVGA/PCI adapters and their architecture
2. **Key Board and Mouse**
   Types and basic principle of working of wired /wireless key board and wired /optical/wireless mouse, scan codes.
3. **Disk Drivers**
4. Features and working of hard disk drive, floppy disk drive, optical and DVD disk drives and CD writer, Pen Drive, Logical structure of disk and its organization and boot record
5. **Peripheral Devices, Ports and Connectors**
6. Working principle of various input devices such as Scanner, Tablets, touch screen, light pen, digitizers and joystick, Serial, Parallel, PS/2, USB, RJ- 45, BNC
7. **Printers**
   Principle and working of deskjet, Inkjet, dot matrix and laser printers and plottrs
8. **Networks Peripherals (Features and Working)**
   Hub, Switches, Gateway, Router, Bridge, Modem, Patch Panel, I/O Box, Patch Cord, Wireless access point, LAN card(wired/wireless access)
9. **Power Supplies (Working Principle)**

SMPS, Constant voltage transformers, Uninterruptible Power Supplies : Classification of UPS, On the basis of their output power, on the basis of their working, ON line UPS, OFF line UPS, Line interactive UPS, Line Interaction UPS or Electronic Generator, Comparison Among Three Types of UPS Systems, and Selection of UPS, Important specifications of UPS.

LIST OF PRACTICALS
1) To identify various components and peripheral devices of computer.
2) Demonstration of different Peripherals of a computer system.
3) To study the operation of SMPS
4) To study the operation of CVT.
5) To study the operation of UPS.
6) To study the Video display Unit
7) To study the Network Connections

LIST OF RECOMMENDED BOOKS
1. B. Govinda Rajalu, IBM PC and Clones. Hardware Trouble Shooting and Maintenance, Tata McGraw Hill 1991
 2. Robert, S Lai: The waite group writing MS DOS Device, Drives, Addison, Wesley Publishing Co. 2nd Ed. 1992.

Object oriented concept with C++ (DCS-302)
Discipline core (DC): Credit 4(3-0-2)

Objective:
1. To gain knowledge of objects, Class, Data Abstraction, Encapsulation, Inheritance, Polymorphism and Dynamic Binding.
2. To know about constructing programs using Bottom-up design approach.
COURSE OUTLINE:
Introduction: What is object oriented programming? Why do weneed object oriented. Programming characteristics of object-oriented languages. C and C++.Output using cout. Directives. Input with cin. Type bool. The setw manipulator. Type conversions.
Unit 2
Object and Classes:Making sense of core object concepts (Encapsulation, Abstraction, Polymorphism, Classes, Messages Association, Interfaces) Implementation of class in C++, C++ Objects as physical object, C++ object as data types constructor. Object as function arguments. The default copy constructor, returning object from function. Structures and classes. Classes objects and memory static class data. Const and classes
Unit 3
Arrays and string arrays fundamentals: Arrays as class Member Data :Arrays of object, string, The standard C++ String class
Unit 4
Operator overloading: Overloading unary operations. Overloading binary operators, data conversion, pitfalls of operators overloading and conversion keywords. Explicit and Mutable.
Unit 5
Inheritance: Concept of inheritance. Derived class and based class. Derived class constructors, member function, inheritance in the English distance class, class hierarchies, inheritance and graphics

shapes, public and private inheritance, aggregation: Classes within classes, inheritance and program development.
Unit 6
Virtual Function: Virtual Function, friend function, Static function, Assignment and copy initialization, this pointer, dynamic type information.

Practicals

RECOMMENDED BOOKS
1. Herbert Schildt, "C++ the Complete Reference ", III edition, TMH 1999
2. Balagurusamy, Entrepreneurial "Object Oriented programming with C++", TMH
3. Barkakatin "objects oriented programming in C++" PHI 1995

DIGITAL LOGIC (DCS-306)
Discipline core (DC): Credit 4(3-0-2)

Objective: To understand the basics of logic gates and digital design. To comprehend knowledge of operational/combinational/sequential circuits (Adder, Counter, and Memory etc.) in digital design.

COURSE OUTLINE:
UNIT 1
OVERVIEW OF BOOLEAN ALGEBRA AND LOGIC GATES
Number Systems and Codes, Binary Arithmetic, Boolean Algebra, Minimisation of Switching Function, DE Morgan's Theorem, Karnaugh's Map Method (limited up to 4-variables), QuineMcCluskey's Method, Cases with Don't care conditions and multiple output switching functions.
UNIT 2
COMBINATIONAL CIRCUITS
NAND/NOR gates, Realisation of switching functions, Half/full adders, Half/full substractors, Series and parallel additions, BCD adders, Look ahead carry generators ,Decoders and encoders, BCD to 7 segment decoders, Multiplexers and Demultiplexers, Parity bit generator and detector , Error detection.

UNIT 3
SEQUENTIAL CIRCUITS
Introduction to registers and Counters: Flip-Flops and their conversion, Excitation Tables, synchronous and asynchronous counters and designing of sequential circuits: code converter and counters. Mode-k and divide by K counters, counter applications.
UNIT 4
MEMORIES
Introduction to various semiconductor memories and designing of ROM and PLA.
UNIT 5
LOGIC FAMILY
Characteristics of digital ICs, CMOS Logic Family, Implementation of logic using CMOS

Reference Books :
1. Computer organization and architecture: Hamacher "McGraw Hill
2. MillmanTaub , " Pulse , Digital and Switching Waveforms " TMH

3. Floyd : "Digital fundamentals", UBS.
4. A. AnandKumar , " Fundamental of digital Electronics", 2nd Edition

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OPERATING SYSTEMS (DCS-305)
Discipline core (DC): Credit 4(3-0-2)

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Objective: 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.

COURSE OUTLINE:
1: Brief Introduction to System Software
Compiler, Assembler, Loader, Operating system, Linking, Loading and Executing a Program
2. Overview of Operating Systems
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. Process Management Functions
Job Scheduler, Scheduling Criteria, Process Scheduler, Scheduling algorithms, Process synchronization, Critical section
4.Dead Locks
Introduction and necessary conditions of dead lock, Dead lock avoidance, Dead lock detection, Dead lock Recovery
5. Memory Management Function
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
6. I/O Management Functions
Dedicated Devices, Shared Devices, Virtual Devices, Storage Devices, Buffering, Spooling
7. File Management
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 usingWindows
2. Practical exercises involving various internal and external DOS commands
3. Practical exercises involving various UNIX/LINUX commands

LIST OF 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