CP-I: Computing Techniques

(Presentation, Publication and Graphing Techniques)

B. Tech. / B. Sc. 1st Semester
Contact hours: 45

Units Contents of the Subject

1. Presentation Techniques
   - Power Point Presentation
   - Data Presentation
   - Graphics and curves presentation
   - Multi Media Presentation
   - Creation of flash videos

2. Documentation and Publication Techniques
   - Introduction to Word Processor(s)
   - Excel Sheet Preparations
   - Graphics in the Excel
   - LaTeX file Preparation
   - Working on Adobe Premier Pro / Maya / Coral Draw

3. Graphing Techniques
   - Data Curve plotting: Using Excel, Origin and Gnu Plot
   - Functional Plotting: Using Gnu Plot, Origin
   - Introduction to Mathematica / MatLab explorations
   - Functional Plots using Mathematica / MatLab
   - Animation graphics using Mathematica / MatLab
B. Tech. and B. Sc. 2nd Semester
Contact Hours: 45

Units Contents of the Subject

Introduction
Stored Program Architecture of Computers, Evolution of Processors (In terms of word length & Speed only), Storage Device- Primary Memory and Secondary Storage, Working Principle of Primary Storage devices- RAM, ROM, PROM, EPROM, EEPROM, Random, Direct, Sequential access methods.

Number System
Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r’s and (r-1)’s complement. Representation of Integer in sign-magnitude, signed 1’s and 2’s complement. Floating point representation. Concept of bias and normalization. Representation of alphabets.

Binary Codes: Binary arithmetic, Addition and subtraction of Integers and floating point numbers. Multiplication of Integers. Gray code, BCD 8421 and 2421, Excess-3 and Excess-3 gray codes. (Not

Programming in C
- Structure of C Program, Concept of Preprocessor, Macro Substitution, Intermediate code, Object Code, Executable Code. Compilation Process,
- Basic Data types, Importance of braces ({ }) in C Program, enumerated data type, Identifiers, Scope of Variable, Storage Class, Constants, Expressions in C, Type Casting, Control Statements, printf( ), scanf ( ), reading single character. Command Line Arguments.
- Arrays in C, Pointers, Using pointers to represent arrays, Dynamic Memory allocation, Structures, using typedef, Arrays of Structures & pointers.
- Functions in C, Passing Parameters (By value & Reference), using returned data, Passing arrays, structures, array of structures, pointer to structures etc., passing characters and strings, The void pointer.
CP- III: Programming with C++ and JAVA

B. Tech. (All Branches except Comp. Science) / B. Sc. 3rd Semester
Contact Hours: 45

Programming in C++

- **C++ Overview**
  - C++ Characteristics
  - Object-Oriented Terminology
  - Polymorphism
  - Object-Oriented Paradigm
  - Abstract Data Types
  - I/O Services
  - Standard Template Library
  - Standards Compliance

- **Functions and Variables**
  - Functions: Declaration and Definition
  - Variables: Definition, Declaration, and Scope
  - Variables: Dynamic Creation and Derived Data
  - Arrays and Strings in C++
  - Qualifiers

- **Classes in C++**
  - Defining Classes in C++
  - Classes and Encapsulation
  - Member Functions
  - Instantiating and Using Classes
  - Using Constructors
  - Multiple Constructors and Initialization Lists
  - Using Destructors to Destroy Instances

- **Operator Overloading**
  - Operator Overloading
  - Working with Overloaded Operator Methods

- **Initialization and Assignment**
  - Initialization vs. Assignment
  - The Copy Constructor
  - Assigning Values
  - Specialized Constructors and Methods
  - Constant and Static Class Members

- **Inheritance**
  - Overview of Inheritance
  - Defining Base and Derived Classes
  - Constructor and Destructor Calls

- **Input and Output in C++ Programs**
  - Standard Streams
Manipulators
Unformatted Input and Output

Introduction to JAVA Tools


PROGRAM ELEMENTS: Primitive data types, variables, assignment, arithmetic, short circuit logical operators, Arithmetic operators, bit wise operators, relational operators, Boolean logic operators, the assignment operators, operator precedence, Decision and control statements, arrays.

CONTROL STATEMENTS: Java’s Selection Statements, if statement, switch statement, Iteration Statements, while, do-while, for, for-each, Nested Loops, Jump Statements, Using break, Using continue, return.

OBJECTS AND CLASSES: Objects, constructors, returning and passing objects as parameter, Nested and inner classes, Single and Multilevel Inheritance, Extended classes, Access Control, usage of super, Overloading and overriding methods, Abstract classes, Using final with inheritance.

PACKAGE AND INTERFACES: Defining package, concept of CLASSPATH, access modifiers, importing package, Defining and implementing interfaces.

Suggested Books

1. Let Us C: Bala Guruswami, TATA McGraw Hill.
2. Programming with C, C++: Yashwant Kanitkar
Introduction to Networking Technology: Computer network, uses of computer networks, network hardware, network protocol, Reference models: The OSI reference model, the TCP/IP Reference model, a comparison of the OSI and TCP/IP reference models
The physical layer: Guided transmission media: Magnetic media, twisted pair, coaxial cable, fiber optics. Wireless transmission: the electromagnetic spectrum, radio transmission, microwave transmission, infrared and milli-meter waves, light wave transmission
The transport layer: The transport service, The internet transport protocols: TCP, UDP
Application layer: protocol and service provided by application layer, transport protocols. The world wide web, HTTP, FTP, SMTP, DNS.
Transport layer: transport layer service and principles,

  List: Numbered list, Non-Numbered lists, Definition lists
  Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed),
  Managing images in html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images.
Frames
Tables in HTML documents: Tags used in table definition, Tags used for border thickness,
Tags used for cell spacing, Tags used for table size, Dividing table with lines, Dividing lines with cells, Cell types: Titles cells, Data cells
Hypertext and Link in HTML Documents
URL/FTP/HTTP
Types of links: Internal Links, External Link, Link Tags, Links with images and buttons, Links that send email messages Special effects in HTML documents.

Web Designing with PHP

Orientation and First Steps: PHP’s Place in the Web World, Basic Rules of PHP Programs,

Working with Text and Numbers: Text, Numbers, Variables, Making Decisions and Repeating: Understanding true and false, Making Decisions, Building Complicated Decisions,

Repeating, Arrays: Array Basics, Looping Through Arrays, Modifying Arrays, Sorting Arrays, Using Multidimensional Arrays,

Functions: Declaring and Calling Functions, Passing Arguments to Functions, Returning Values from Functions, Understanding Variable Scope, Making Web Forms: Useful Server Variables, Accessing Form Parameters, Form Processing with Functions, Validating Data, Displaying Default Values, Putting It All Together,

Classes and Objects: Introduction, The Basics of class, Constructors and Destructors

Storing Information with Databases: Organizing Data in a Database, Connecting to a Database Program, Creating a Table, Putting Data into the Database, Inserting Form Data Safely, Generating Unique IDs, A Complete Data Insertion Form, Retrieving Data from the Database, Changing the Format of Retrieved Rows, Retrieving Form Data Safely, A Complete Data Retrieval Form, MySQL Without PEAR DB.