ES102CS COMPUTER PROGRAMMING AND PROBLEM SOLVING

Credits:3

Instruction: (3L) hrs per week	*Duration of SEE: 3 hours*
CIE: 30 marks	*SEE: 70 marks*

Course Objectives:

- To acquire problem solving skills
- To be able to develop flowcharts
- To understand structured programming concepts
- To be able to write programs in C Language

Course Outcomes:

Students will be

- Able to develop flowcharts and algorithms for real time applications
- Able to understand structured programming concepts
- Able to write, debug C programs using control structures, arrays and structures

UNIT – I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow charts. **Number Systems**: Binary, Octal, Decimal, Hexadecimal

Introduction to C Language: Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements

Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.

UNIT-II

Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, If, If-Else, Switch-Statement and Examples. Loop Control Statements: For, While, Do-While and Examples. Continue, Break and Goto statements

Functions: Function Basics, User-defined Functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing. **Recursion-** Recursive Functions..

Storage Classes: Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.

UNIT – III

Preprocessors: Preprocessor Commands

Arrays: Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection and Bubble Sort.

UNIT - IV

Pointers: Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, Lvalue and Rvalue, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command-line Arguments.

Strings: Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions.

UNIT - V

Structures: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions, Type Definition (typedef), Enumerated Types.

Input and Output: Introduction to Files, Modes of Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

Suggested Reading:

1. B.A. Forouzan and R.F. Gilberg, *A Structured Programming Approach in C* , Cengage Learning, 2007.
2. Kernighan BW and Ritchie DM, *The C Programming Language*, Prentice Hall of India, 2nd Edition, 2006.
3. Rajaraman V, *The Fundamentals of Computer*, Prentice-Hall of India, 4th Edition, 2006.

ES151CS COMPUTER PROGRAMMING LAB

Credits:1

Instruction: (2P) hrs per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*

Course Objectives:

- To understand the fundamentals of programming in C Language
- To learn how to write, compile and debug programs in C
- To acquire logical and programming skills to formulate problems to implement in C language.
- To analyze and choose programming components to solve computing problems in real-world.

Course Outcomes:

Students will be

- Able to write, compile and debug programs in C language
- Able to formulate problems and implement in C language.
- Able to choose control structures and arrays to solve computing problems in real-world.

1. Finding the maximum and minimum of given set of numbers

2. Finding Roots of a Quadratic Equation

3. Sin x and Cos x values using series expansion

4. Conversion of Binary to Decimal, Octal, Hexa and Vice versa

5. Generating a Pascal triangle and Pyramid of numbers

6. Recursion: Factorial, Fibonacci, GCD

7. Matrix addition and multiplication using arrays

8. Bubble Sort, Selection Sort

9. Programs on Linear Search and Binary Search using recursive and non-recursive procedures.

10. Functions for string manipulations

11. Find the No. of characters, words and lines in a given text file

12. File Handling programs.

PC201CS OBJECT ORIENTED PROGRAMMING USING C++

Credits:3

Instruction: (3L+1T) hrs per week *Duration of SEE: 3 hours*
CIE: 30 marks *SEE: 70 marks*

Course Objectives:

- To understand basic concepts of object oriented programming.
- To learn how to define user defined functions and calling functions.
- To acquire knowledge on inheritance and polymorphism and apply for real-time
- applications.
- To learn the usage of pointers for creation of linked list.

Course Outcomes:

Students will be

- Able to understand object oriented programming concepts
- Able to define user defined functions.
- Able to write C++ programs using inheritance and polymorphism.
- Able to develop programs using pointers, templates and exception hanlding.

UNIT - I

Introduction to C++: Programming paradigms, Object Oriented Programming Concepts, Advantages and Applications of OOPs.

Variables and assignments, Data types, expressions, Simple flow control and Control structures.

UNIT - II

Functions: Call by value, call by reference. Parameters using procedural abstraction; Testing and debugging functions. I/O Streams as an introduction to classes and objects.

Introduction to arrays, Arrays in functions, Programming with arrays and multidimensional arrays. Structures, Classes, Abstract data types.

UNIT – III

Strings, Pointers and Dynamic Arrays, Recursion, Constructors, Destructors, Copy Constructors.

Inheritance: The notation of inheritance, derived classes, overriding, Virtual Base Class

UNIT-IV

Static Polymorphism: Function and Operator overloading, Friend function, Runtime Polymorphism, Virtual functions, and Exception Handling.

Function Templates, and Class Templates.

UNIT – V

Pointers and Linked Lists: Nodes and linked lists, Implementation of stacks and queues using arrays and linked lists, Operation on linked lists- inserting a node, deleting a node, searching for a node.

Suggested Reading:

1. Walter Savitch, *Problem Solving with C++,* Pearson Education Publishing, 6th Edition, 2009.
2. SB Lippman, J Lajoie, *C++ Primer*, AW Publishing Company, 3rd Edition, 2007.
3. Paul Dietel, Harvey Dietel, *C: How to Program*, PHI, 6th Edition, 2010.
4. Bjarne Stroustrup, *The C++ Programming Language*, Pearson Education, 4th Edition, 2013

PC 251 CS **C++ PROGRAMMING LAB**

Credits:1

Instruction: (2P) hrs per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*

Course Objectives:

- Able to write, compile and debug programs in C++
- Able to formulate problems and implement in C++.
- Able to apply knowledge to solve computing problems in real-world.

Course Outcomes:

Students will be

- Able to write, compile and debug programs in C++
- Able to formulate problems and implement in C++.
- Able to apply knowledge to solve computing problems in real-world.

1. Implementation of complex numbers using classes.

2. Implementation of matrix class.

3. Programs using constructors, destructors and copy constructors.

4. Implementation of various sorting techniques.

5. Programs on various types of inheritance.

6. Programs on function overloading, operator overloading, and exception handling

7. Programs on virtual functions, dynamic polymorphism.

8. Programs on function templates and class templates.

9. Implementation of stack using arrays and linked list.

10. Implementation of queue using arrays and linked list.

ES251CS COMPUTER SKILLS LAB

Credits:1

Instruction: (2P) hrs per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*

Course Objectives:

- To learn assembling and disassembling of PC Hardware
- To understand the installation of Operating systems
- To be able to acquire skills in Productivity tools

Course Outcomes:

Students will be

- Able to assemble and disassemble the hardware components of computer.
- Able to install the Operating systems.
- Able to learn the documentation and report writing in Productivity tools

I: PC Hardware

1. Identify the peripherals of a computer. (Processor, Memory chips, Mother board, Disk drives, and Controller card such as AGP board, Network cards, Sound card, as well as Parallel and Serial ports etc.,)

2. Disassembling and Assembling PC in working condition. Load the Operating Systems with partitions for Windows and Linux, configure for Network.

II: Productivity Tools:

1. **Documentation Using MS-Word**: Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, and Bookmarks.

2. **Presentation using MS-PowerPoint**: Creating presentation slides and Enhancing Slides with features like Organizational charts, Excel Charts, Word Art, Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object.

3. **MS Excel:** Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions- like sum, average, standard deviation, and charts.

4. **Internet and HTML:**
   a) Telnet/Secure Shell (Remote login to university computers)
   b) Electronic Mail (Communicating with email software)
   c) File Transfer Protocols (transferring files between networked computers)
   d) World Wide Web (Interface, Navigation, Search Tools)
   e) Publishing Web Pages (Using HTML editors to create personal web sites)
   f) **C**reate the web-page (With title, text, frames, hyperlinks to some sites, pictures, lists, tables, fonts and colors) without using any web authoring tools.

5. **Documentation Using LATEX:** Introduction to Linux Commands, Introduction to LateX, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar tool, Page Formatting, Single/Multi column, Pictures/Objects, Drawing, Hyperlinks, Header/Footer, and Tables.

Suggestion Reading:

1. Peter Norton, *Introduction to Computers* , McGraw Hill Publishers, 6th Edition, 2010
2. Leslie Lamport**,** *Latex: A Document Preparation System,* Pearson Education India, 2nd Edition,1994.
3. Stefan Kottwitz, *LaTeX Beginner's Guide***,** Shroff/Packt Publishers, 1st Edition, 2012.

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