GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING AND DATA STRUCTURES

Course Code: GR15A1011 L:2 T:1 P:0 C:3
I Year II Semester

Prerequisites: Knowledge of mathematics required

Course Objectives
- To review basic computer system concepts
- To express algorithms and draw flowcharts in a language independent manner.
- To introduce the basic concepts of C-programming language such as variables, operators, branching, looping, functions, arrays, pointers, structures and files
- To examine the key aspects of c-library
- To understand the significance of sorting, searching algorithms and basic operations of stacks and queues for real time scenario.

Course Outcomes: At the end of this course students will be
- able to analyze and resolve a given problem
- able to use the programming concepts, c-library and generate code for a given problem
- able to apply sorting and searching algorithm for real time scenario
- able to understand the basic operations of stacks and queues.

Unit-I
Introduction to Computers: Computer Hardware and Software, System Software, Program Development Steps, Algorithms, Flowcharts.
Introduction to C: Structure of C-Program, Keywords, Identifiers, Data Types, Constants, Variables, Operators, Expressions, Precedence and Order of Evaluation, Type Conversions and Type Casting .
Managing I/O: Input-Output Statements,Formatted I/O.

Unit-II
Decision Making Statements: if, if-else, if-else-if, nested if, switch
Iterative Statements: while, do- while, for
Unconditional Statements: break, continue, go to.
Arrays: Introduction, One-dimensional Arrays, Declaring and Initializing Arrays, Multidimensional Arrays.
Strings: Introduction to Strings, String Handling Functions, Array of Strings.

Unit-III

Functions: Introduction, Function Definition, Function Declaration, Function Calls, Return Values and Their Types, Categories of Functions, Nested Functions, Recursion, Storage Classes, Passing Arrays to Functions.
Pointers: Pointers and Addresses, Pointer Expressions and Pointer Arithmetic, Pointers and Functions, Pointers and Arrays, Pointers and Strings, Array of Pointers, Pointer to Pointers.

Unit-IV

Structures: Basics of Structures, Nested Structures, Arrays of Structures, Arrays within Structures, Structures and Functions, Self Referential Structures, Unions.
Files: Introduction, Types of Files, File Access Functions, I/O on Files, Random Access to Files, Error Handling, Command Line Arguments.

Unit-V

Sorting: Bubble sort, Merge sort, Insertion sort, Selection Sort, Quick Sort.
Searching: Linear Search, Binary Search.
Introduction to Data Structures: Stack Operations using Arrays: Push and Pop,
Queue Operations using Arrays: Insert, Delete

Teaching Methodologies: White board and marker, power point presentation

Text Books

1. The C Programming Language, BRIANW. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.
2. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, Oxford University Press.
3. Computer Programming and Data structures by EBalaguruswamy, published by Mc Graw Hill.

Reference Books

1. Data structures using C, A.K. Sharma,Pearson publication
2. Let Us C, Yashwanth Kanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
5. Programming with problem solving, J.A.Jones & K.Harrow, Dreamtech Press.
6. Programming in C, Stephen G.Kochan, III Edition, Pearson Education.
7. Data Structures and Program Designing, C,R.Kruse, C.L.Tondo, B P Leung, Shashi M, Second Edition, Pearson Education.
8. Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.
9. Introduction to Data Structures in C, Ashok N Kamthane , Pearson Publication.