RKUNIVERSITY

SYLLABUS

Course Title	**Advanced Programming with C and Data Structure**
Course Code	**BCA212**
Course Credit	Theory(Hrs) : 4
	Practical(Hrs) : 4
	Tutorial(Hrs) : 0
	Credits : 6

Course Objectives

The objectives of the course are:

- To develop proficiency in the specification, representation, and implementation of data types and data structures
- To get understanding of applications of data structures
- To build programs that demonstrates effective use of advanced c features
- To develop a base for advanced computer science study

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
	Section – I	
1	**User Defined Function** Basics of built in functions, Introduction of user defined functions, Need for user defined functions, Form of C functions, return values & their types, category of functions, Array as a function argument, Recursion	**06**
2	**Structure and Union** Basics of Structure, Declaration and initialization of structure, Array of Structures, Array within Structure, Structure within Structure, Structure as a function argument, Basics of Union	**06**

3	**Pointer** Definition and Concept, Advantages of using pointer, Pointer arithmetic, Array and Pointers, Dynamic memory allocation functions : malloc( ), calloc( ) , free( ) and relloc( ), Pointer to Structure, Pointer to Pointer, Pointer as a function argument	**08**
4	**Data file handling** Concept of data file and file structure Working with different types of files: Text file and binary files Mode of Operations: Opening and closing of data file - [fopen( ), fclose( )], Write data/record to a data file - [fprintf( ), fwrite( ), fputs( )], Reading from data file - [fscanf( ), fread( ), fgets( )], File handling functions - [feof( ), ferror( ), fseek( ), ftell( ), rewind( )]	**08**
	Section – II	
5	**Basics of Data structure** Primitive and non-primitive, Linear and Non-linear Data structures	**04**
6	**Stack and queue** Basics of Stack, Operations on stack, Application of stack in recursion, Basics of Queue, Operations on simple queue	**10**
7	**Linked list** Basic of Linked List, Overview of different types of linked list: Singly linked list, Doubly linked list and Circular linked list, Operations on Singly linked list and Doubly linked list - Insertion at different positions, Deletion from different positions, Traversal of linked list	**14**

Instructional Method and Pedagogy:

- Lectures will be conducted on the basis of Classroom Response Systems with the use of multimedia projector and black board.
- Assignments based on course contents will be given at the end of each unit/topic and will be evaluated at regular interval.
- Experiments will be based on the practical curriculum and will be evaluated at regular interval.

Course Learning Outcomes:

On the completion of the course, students will be able to:

- **Decide** the appropriate data type and data structure for a given problem
- **Solve** a problem by considering various problem characteristics, such as the data size, the type of operations, etc.
- **Decompose** the solution into modules at the user-defined function level
- **Know the concepts** of various pointers and file management in C language
- **Understand** the use of functions and write functions in C and various advanced concepts
- **Transpose** the physical problem domain into procedural program

Text books:

- Title : Programming in ANSI C, fourth Edition, TMH Publication
  Author(s): E Balagurusamy
- Title : C: The Complete Reference, TMH Publication
  Author(s): Herbert Scheldt
- Title : Data Structure using C, PHI Publication
  Author(s): Tennenbaum Aaron M.

Reference Books:

- Title : Computer fundamentals and Programming in C, Oxford
  Author(s): Pradip dey and Manas Ghosh
- Title : Programming in C, Pearson
  Author(s): Ashok Kamthane
- Title : Fundamentals of Data Structures in C, University Press
  Author(s): Horowitz, Sahni, Anderson-Freed
- Title : Data Structures and Algorithm Analysis in C, Pearson Education
  Author(s): Mark Allen Weiss
- Title : Classis Data Structures, PHI
  Author(s): D. Samanta

Additional Resources

- www.cprogrammingreference.com
- www.cprogramming.com
- http://cslibrary.stanford.edu