

## **ELI- 604: Programming in C and Data Structures**

**48 Periods**

### **UNIT I**

Introduction-Algorithm / pseudo code, flowchart, program development steps, structure of C program, identifiers, basic data types and sizes, Constants, variables, Operators, expressions, Input-output statements, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels. Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example C programs. 18 Periods

### **UNIT II**

Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two dimensional and multi-dimensional arrays, applications of arrays. pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, C program examples. 11 Periods

### **UNIT III**

Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, bitfields, C program examples. Input and output - concept of a file, streams, standard I/o, Formatted I/O, file I/O operations, error handling, C program examples. Searching - Linear and binary search methods, sorting - Bubble sort, selection sort, Insertion sort. 11 Periods

### **UNIT IV**

Introduction to data structures- singly linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Trees- Binary trees, terminology, representation, traversals, graphs- terminology, representation, graph traversals (dfs & bfs). 8 Periods

### **UNIT I**

Chapter 1,2,3,4,5,6 - Behrouz A. Forouzan and Richard F. Gilberg, Computer science - A structured programming approach using C, Third edition, Cengage Learning

Chapter 1,2,3,4,5,6,7,8,14 - Byron S. Gottfried, Programming with C, 2nd Edition, McGraw-Hill Publishing

Chapter 1,2,3,4,5,6,9,14 - E Balagurusamy, Programming in ANSI C, 4th Edition, Tata McGraw-Hill Publishing

### **UNIT II**

Chapter 8,9,10,11 - Behrouz A. Forouzan and Richard F. Gilberg, Computer science - A structured programming approach using C, Third edition, Cengage Learning

Chapter 9,10,14 - Byron S. Gottfried, Programming with C, 2nd Edition, McGraw-Hill Publishing

Chapter 7,8,11,12,13 - E Balagurusamy, Programming in ANSI C, 4th Edition, Tata McGraw-Hill Publishing

### **UNIT III**

Chapter 7,12,13,14 - Behrouz A. Forouzan and Richard F. Gilberg, Computer science - A structured programming approach using C, Third edition, Cengage Learning

Chapter 11,12,13 - Byron S. Gottfried, Programming with C, 2nd Edition, McGraw-Hill Publishing

Chapter 10,12 - E Balagurusamy, Programming in ANSI C, 4th Edition, Tata McGraw-Hill Publishing

### **UNIT IV**

Chapter 15 - Behrouz A. Forouzan and Richard F. Gilberg, Computer science - A structured programming approach using C, Third edition, Cengage Learning

Chapter 13 - E Balagurusamy, Programming in ANSI C, 4th Edition, Tata McGraw-Hill Publishing

### **Essential Books:**

1. Behrouz A. Forouzan and Richard F. Gilberg, Computer science - A structured programming approach using C, Third edition, Cengage Learning.
2. Byron S. Gottfried, Programming with C, 2nd Edition, McGraw-Hill Publishing
3. E Balagurusamy, Programming in ANSI C, 4th Edition, Tata McGraw-Hill Publishing

### **Suggested Books:**

1. P. Padmanabham, C & Data structures, B.S. Publications.
2. B.W. Kernighan, Dennis M.Ritchie, The C Programming Language, Pearson Education
3. J.A. Jones & K. Harrow, C Programming with problem solving, Dreamtech Press
4. Stephen G. Kochan, Programming in C, III Edition, Pearson Education.
5. R. Kruse, C.L. Tondo, BP Leung, Shashi M, Data Structures and Program Design in C, Second Edition, Pearson Education.