SCS 1301 – Data Structures and Programming Design in C

Credits – 4 (3L + 1P)

Course Description

This course provides a comprehensive understanding of fundamental data structures and principles of program design using the C programming language. The course equips students with the knowledge and skills to develop efficient and scalable software solutions by implementing primary data structures and algorithms and applying such data structures to solve real-world computing problems.

Indicative Content

- C Programming Language
    - Evolution of the C Language
    - Basic Structure and Syntax
    - Operators and Expressions
    - Control Flow
    - Functions
    - Pointers and Memory management
    - Structures and Unions
    - Preprocessor Directives and Macros
    - Input and Output
- Data Structures
    - Arrays and Strings
    - Linked Lists
    - Stacks
    - Queues
- Algorithms
    - Analysis of Non-Recursive Algorithms
    - Recursion
    - Sorting Algorithm
    - String Matching Algorithms

Recommended Textbooks

1. Kernighan, B.W. and Ritchie, D.M., 1988. *The C Programming Language*
2. Deitel, H.M. and Deitel, H. C: how to program. Prentice-Hall, Upper Saddle
3. Cormen, T.H., Leiserson, C.E., Rivest, R.L. and Stein, C., 2022. Introduction to algorithms. MIT press.
4. Allen, W.M., 1996, *Data Structures and Algorithm Analysis in C*
5. Karumanchi, N., 2017, *Data Structures and Algorithms Made Easy*

Software Tools

- GCC and Vim/Emacs or any other plain text editor