Course Name: Introduction to Programming and Data Structure

Instructor: Laltu Sardar and Ritankar Mondal

Syllabus:

1. The Evolution of Programming Languages, Compiler, Interpreter, Assembler

2. Imperative languages: Introduction to imperative language; syntax and constructs of a specific language (preferably C)

3. Variables, assignments, Basic input/output, Main program, If-statement, Logical operators, Loops, Output formatting, Parameters, return values, Debugger

4. Arrays, Pointers, Dynamic Memory Allocation, Structures

5. Basic structures: Lists, Strings, Dictionary, Values and references

6. Basics of program design, Programming style, Exceptions

7. Functions and Recursion: Parameter passing, procedure call, call by value, call by reference, recursion, scope of variables.

8. Linked lists: Implementation of linked lists, inserting, deleting, and inverting a linked list, Stacks and Queues.

9. Matrix Algorithms: Matrix addition, multiplication, and inverse calculation. Finding Eigen values and Eigen vectors. Efficient Algorithms for large/sparse matrices.

10. Algorithm for Polynomials: Polynomial addition and multiplication, division.

11. File handling: principles of data storage and manipulation

12. Matrix Algorithms: Finding Eigen values and Eigen vectors of a large Matrix. Polynomial addition and multiplication.

References:

[1] B. W. Kernighan and D. M. Ritchi: The ‘C’ Programming Language, Prentice Hall, Englewood Cliffs, NJ, 1980.

[2] B. Gottfried: Programming in C, Schaum Outline Series, New Delhi, 1996.

[3] D. E. Knuth: The Art of Computer Programming. Vol. 1, 2nd ed. Narosa/Addison-Wesley, New Delhi/London, 1973.