IC150 Computation for Engineers

Credits : 3-0-0-3

Prerequisite: Consent of the faculty member

Students intended for: B.Tech

Elective or Core: Core Semester: Even/Odd

Course objective: First course in computing is a core course to all engineering disciplines as the use of computers in every engineering discipline requires mastering efficient computing for problem solving. Computers are used for mathematical analysis, data analysis, numerical problem solving, communications, and for many specialized applications. The first course in computing is designed aiming to equip students to solve real world problems using programming, numerical computing and computer as an engineering tool.

Course Content:

- Computers, programming and environment: Computer and its components, common uses of a computer, computer as a machine, what is a program, program testing and verification, problem solving and implementation of algorithms, limitations of computing with computers, compilers, operating system/unix environment, editors, IDE's [3-4 Lectures]
- Programming: Problem solving with programming, Basics of Programming, Primitive types, Expressions, Decision making, Iteration, Function, Recursion, Pointer, Array, Structure & Union, Basic I/O, File handling, Dynamic Memory Allocation. [20-22 Lectures]
- Numerical Computation and number crunching (Scilab/Python and Openoffice/Excel): Scilab fundamentals, programming with Scilab, error handling, finding roots (various methods), matrix operations, Entering and Formatting Data and formulae, Using Built-in Functions, performing logical tests, interpolations [10-12Lectures]
- Reporting of Results: Units, Significant figures, Graphs and tables for data presentation

[1-2 Lecture]

Books and References:

V. Rajaraman: *Computer Programming in C*

R. G. Dromey: *How to Solve It By Computer*

Kernighan and Ritchie: *The C Programming Language*

Kernighan and Pike: *The Unix Programming Environment*

Joseph C. Musto, William E. Howard, Richard R. Williams: Engineering Computations: An Introduction Using MatLAB and Excel, Tata McGraw Hulls