CS535 Introduction to Scientific Computing
L-T-P : 2-0-1

Objectives:

This course serves two goals:

1. To make students familiar with the concepts of programming and the get them accustomed with high-level languages like Matlab, Mathematica, etc.

2. To provide an overview of some of the issues and problems that arise in scientific computation, such as (non-)linear systems, numerical and symbolic integration, differential equations and simulation.

Outcome of this course:

After this course the student should be able to understand simple mathematical models and scientific problems (such as finite capacity growth models, plotting a line through data points, etc.) and implement a solution in an adequate scientific programming language (such as matlab, mathematica).

Syllabus:
- Introduction to scientific computing.
- Representing numbers in a computer: scalar data types;
- Variables and constants: guidelines for variable names.
- Assignment statements: mathematical and logical operators;
- Keyboard input and screen output;
- Writing a simple, linear program.
- Conditional statements; arrays and subscripts; loops. File 110; plotting;
- Functions and subroutines.
- Program design; writing well structured programs; debugging techniques.
- Scientific applications of computer programs; Introduction to Matlab
- Solving nonlinear equations;
- Numerical integration;
- Data analysis, plotting and smoothing;
- Simulating simple physical, chemical and/or mathematical systems.
- Simulation: the simple programming approach to difference equations.
- Differential Equations