Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NMEC510	Computational Lab	0	0	3	1.5

Course Objective
• This course aims to enhance the coding skills using with various numerical methods
Learning Outcomes
On successful completion of this course, students will learn: • To code numerical schemes using MATLAB programming • To numerically integrate a function and solve ODEs and PDEs

Exp. No.	Topics to be Covered	Contact Hour	Learning Outcome
1	To find the roots of a function using Bisection method	6	Students will learn to develop a code on the bisection method and use it to determine the roots of a function
2	To find the roots of a function using Newton-Raphson method	3	Students will learn to develop a code on the Newton-Raphson method and use it to determine the roots of a function
3	To find the roots of a function using False Position or Regular Falsi Method	3	Students will learn to develop a code on the Regular Falsi method and use it to determine the roots of a function
4	To solve simultaneous equations using Gauss-Seidel method	3	Students will learn to write a code to solve simultaneous equations using Gauss-Seidel method
5	To numerically integrate a function using Newton-Cotes integration scheme	3	Students will learn write a code to integrate a function using Newton-Cotes method
6	To numerically determine the extremum of a function using Golden Section optimization method	6	Students will learn develop a code to determine the extremum of a function using Golden Section optimization method
7	To solve a first order differential equation (ODE) numerically using Euler's method	3	Students will learn to write a code to solve the 1st order ODE using Euler's method
8	To numerically solve a partial differential equation (elliptic equation) using finite difference method	6	Students will learn to write a code to solve an elliptic PDE using finite difference method
9	To numerically solve a partial differential equation (parabolic equation) using finite difference method	3	Students will learn to write a code to solve a parabolic PDE using finite difference method

10	Simulation of mechanical systems using Simulink	6	Students will get familiarized with the MATLAB's Simulink tool to solve for the response of a mechanical system.
Total		42	

Text Books:

1. Numerical Methods for Engineers, Steven C. Chapra and Raymond P. Canale, 7th Edition, McGraw Hill Education

Reference Books:

1. Introduction to Numerical and Analytical Methods with MatlabFor Engineers And Scientists, William Bober, 2013.