

1.	Title of the course	Applied Numerical Methods
2.	Course number	ME506L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME5029/5
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	<p>Course Objective(s): This course deals with how functions, derivatives, integrals, matrices and differential equations are evaluated as strings of numbers in the computer. It studies the speed of convergence of Taylor, Fourier, and other series expansions and their utility. Applications of these techniques in solving model engineering problems are included. Finally, it expects the students to write a computer program for several of the numerical techniques covered in the course.</p>	
10.	<p>Course Content: Concepts of Algorithms and Programming; Introduction to Mathematical Modelling, Taylor and Fourier series expansion, Interpolation, splines, extrapolation, Regression and curve fitting, Solution of simultaneous linear algebraic systems; Nonlinear algebraic equations, Eigenvalues and eigenvectors, Solution of simultaneous non-linear algebraic systems, Numerical integration, Simpson's rule, Gaussian quadrature. Solution of ODE: R. K. Methods; Initial and Boundary values problems, Systems of ODE's; convergence and error studies, Linear PDEs by finite differences.</p>	
11.	<p>Textbook(s): 1. Steven C Chapra and Raymond P Canale, <i>Numerical Methods for Engineers</i>, 7th Edition, McGraw-Hill (2014).</p>	
12.	<p>Reference(s): 1. Sastry S S, <i>Introduction to Numerical Analysis</i>, Prentice Hall of India (2012). 2. Santhosh K Gupta, <i>Numerical Methods for Engineers</i>, New Age International (2012).</p>	