

1.	Title of the course	Numerical Methods
2.	Course number	MA206L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	Modified with MA203L/NUMERICAL ANALYSIS
5.	To be offered by	Mathematics and Statistics
6.	Prerequisite	None
7.	Course Objective(s): To apply interpolation techniques to compute approximation of an integral. To compute solutions of large linear systems. To find the roots of nonlinear equations and solutions of a few well-known differential equations using approximation techniques.	
8.	Course Content: Introduction: round-off error, truncation error, errors in scientific and engineering computation; Interpolation: Lagrange's interpolation, Newton's forward, backward and divided differences, error of the interpolating polynomial; Numerical solutions of nonlinear equations: bisection method, regula-falsi, secant method, Newton's method, fixed-point iteration, convergence acceleration for fixed point iteration, real roots of polynomials, complex roots of polynomials; Numerical integration: basic methods of numerical integration, Gaussian rules, composite rules, adaptive quadrature; Solutions of a system of linear equations: Gaussian elimination, pivoting strategy, LU-factorization, Cholesky's method, ill-conditioning, norms, Jacobi and Gauss-Seidel methods, partial pivoting; Numerical solutions of differential equations: Taylor series method, Euler method, Runge-Kutta method, predictor-corrector methods for initial value problems, Adams-Moulton method, shooting method and finite difference methods for boundary value problems.	
9.	Textbook(s): 1. Kreyszig E, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons (2010). 2. Kincaid D and Cheney W, Numerical Analysis: Mathematics of Scientific Computing, Brookes/Cole Publishing Company (1999).	
10.	Reference(s): 1. Hildebrand F B , Introduction to Numerical Analysis, 2nd Edition, Tata McGraw-Hill (2003). 2. Conte S D and deBoor C, Elementary Numerical Analysis An Algorithmic Approach, 3rd Edition, McGraw-Hill (1980).	