

1.	Title of the course	Numerical Analysis
2.	Course number	MA633L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	Modified with MA604M/NUMERICAL ANALYSIS
5.	To be offered by	Mathematics and Statistics
6.	Prerequisite	CoT
7.	Course Objective(s): To discuss methods of interpolation and different ways to compute approximation of an integral. To show different methods to find the solution of a large linear system. To solve nonlinear equations and a few well-known differential equations using approximation techniques.	
8.	Course Content: Error and algorithm analysis: big-O notation, master theorem, order and rate of convergence, Numerical interpolations: polynomial, Newton's divided difference, Lagrange interpolation, Hermite and spline interpolations, Numerical solutions for nonlinear equations: closed methods, bisection method, regula-falsi method, open methods, fixed point iteration, Newton-Raphson iteration, secant method, acceleration, Numerical linear algebra: direct and iterative methods, eigenvalue, eigenvectors, QR decomposition, singular value decomposition, power method, Numerical integration: Newton-Cotes formula, trapezoidal rule, Simpson rules, Romberg integrations, Gaussian quadrature rule, Numerical differentiation: Taylor series method, Runge-Kutta method, multi-step method, Boundary value problems: shooting method, finite difference method.	
9.	Textbook(s): 1. Kincaid D and Cheney W, Numerical Analysis: Mathematics of Scientific Computing, 3rd Edition, American Mathematical Society (2009). 2. Richard L B and Douglas J F, Numerical Analysis, 9th Edition, Cengage India Pvt. Ltd. (2012).	
10.	Reference(s): 1. Atkinson K E, An Introduction to Numerical Analysis, 2nd Edition, Wiley India Pvt. Ltd. (2008). 2. Trefethen L N and David B III, Numerical Linear Algebra, SIAM (1997). 3. Gene G H and Charles F V L, Matrix Computations, 4th Edition, Hindustan Book Agency (2015). 4. Isreles A, A First Course in the Numerical Analysis of Differential Equations, 2nd Edition, Cambridge University Press (2008).	