



INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI

भारतीय प्रौद्योगिकी संस्थान तिरुपति

Yerpedu-Venkatagiri Road, Yerpedu Post, Tirupati District, Andhra Pradesh - 517 619

1.	Title of the course	Engineering Mathematics I
2.	Course number	MA103L
3.	Structure of credits (L-T-P-C)	3-1-0-4
4.	New course/modification to	New
5.	To be offered by	Mathematics and Statistics
6.	Prerequisite	None
7.	Course Objective(s): To discuss the notions of limits, continuity, differentiation and integration of functions of several variables. To review vector differential and integral calculus. To discuss different techniques to solve first-order and second-order differential equations. To develop the power series solutions for differential equations with variable coefficients.	
8.	Course Content: Review of single variable calculus, Functions of several variables: limits, continuity, partial derivatives, tangent plane, directional derivatives, differentiation, the chain rule, maxima and minima, Double and triple integrals: area and volume, change of variables, Curves: parametrization, arc-length and its invariance, curl and divergence, line integrals, conservative vector fields and Green's theorem, surface integrals and Stokes' theorem, Gauss divergence theorem, First-order differential equations: geometrical meaning of a first-order differential equation, variable separable equations, exact equations, integrating factors, linear and Bernoulli equations, orthogonal trajectories, existence and uniqueness of solutions for initial value problems, Second-order differential equations: homogeneous linear equations with constant coefficients, Euler-Cauchy equations, linear independence of solutions and Wronskian, solution of non-homogeneous equations, Power series method, Legendre's equation, Legendre polynomials, Frobenius method, Bessel's equation, Sturm-Liouville problems,	
9.	Textbook(s): 1. Kreyszig E, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons (2010). 2. Thomas G B Jr, Weir M D and Hass J R, Calculus, Pearson Education (2009).	
10.	Reference(s): 1. Piskunov N, Differential and Integral Calculus Vol. 1-2, Mir Publishers (1974). 2. Apostol T M, Calculus Vol. 1 - 2, Wiley (2007).	