

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Calculus
2.	Course Number	MA1101
3.	Status of the Course	Core
4.	Structure of Credits	3-1-0-4
5.	Offered To	UG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Mathematics
8.	To take effect from	July 2018
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: To introduce the notions of limits, continuity, differentiation and integration of real-valued functions of single variable and multi-variable and the integration of vector-valued functions on curves and surfaces. To learn the polynomial approximation of n-times differentiable functions and consequently to understand the behaviour of the functions.	
12.	Course Content: Functions of single variable: Sequences in real numbers, limits and continuity of real valued functions on intervals, extreme values of functions on $[a, b]$, Intermediate value property and differentiation, Taylor's formula, convergence of series, root test, ratio test, Cauchy condensation test, Leibniz's test, power series, radius of convergence, Taylor series, Riemann integration, Riemann Integrable functions, Improper integrals, comparison test, Absolute convergence. Functions of several variables: Continuity, partial derivatives, differentiability, directional derivatives and gradient, tangent plane and normal line, extreme values, Lagrange Multipliers, double and triple integrals, volume and area, change of variables, surface area, surface integrals, line integrals, Green's theorem, vector fields, divergence and curl of a vector field, Stoke's theorem, Divergence theorem.	
13.	Text book(s): 1. G.B. Thomas Jr. and M.D. Weir and J.R. Hass, <i>Calculus</i> , Pearson Education, (2009).	
14.	Reference(s): 1. N. Piskunov, <i>Differential and Integral Calculus Vol. 1-2</i> , Mir Publishers, (1974). 2. Tom M. Apostol, <i>Calculus Vol. 1 - 2</i> , Wiley, (2007).	