

Department of Mathematics
Visvesvaraya National Institute of Technology, Nagpur
Lecture Schedule: Mathematics II (MAL 102)

S.No.	Topic	No. classes required
	Calculus of Functions of Several Variables	
1.	Limit and continuity of function of two or more variables.	1
2.	Differentiability of functions of several variables, partial derivatives and their geometrical interpretation. Tangent plane and normal line.	2
3.	Euler's theorem on homogeneous functions	1
4.	Total differentiation, chain rules	2
5.	Jacobian	2
6.	Taylor's formula	1
7.	maxima and minima of function of two variables, Lagrange's method of undetermined multipliers	3
	Multiple Integrals:	
8.	Double integral: Definition and evaluation	2
9.	Change of order of integration in double integrals	1
10.	Change of variables in double integrals	2
11.	Triple integral: Definition and evaluation	1
12.	Change of variables in Triple integrals	2
13.	Applications to area, volumes, Mass, Centre of gravity.	4
	Vector Calculus:	
14.	Scalar function, Vector function and some examples	1
15.	Limit, Continuity and differentiability of vector function and properties.	1
16.	Gradient and applications	2
17.	Divergence and Curl of a vector field with some problems and properties.	2
18.	Solenoidal vector field, irrotational vector field	1
19.	Line integrals.	2
20.	Surface integrals	1
21.	Volume integrals	1
22.	Green's theorem	1
23.	Stoke's theorem	2
24.	Gauss Divergence theorem and some problems on it.	2
	Ordinary Differential Equations:	
25.	Order, degree definitions and formulation of Ordinary differential equations.	1
26.	Types of solutions: General Solution, Particular Solution and Singular Solution with examples. Solution of first order ODE with variable separable form.	1
27.	Solving higher order ODEs by reducing them to lower order ones. Homogeneous DE and its solution. Non-Homogeneous first order ODE.	1
28.	First order linear and Bernoulli's ODE	1
29.	Exact differential equations and Integrating factors	2
30.	Orthogonal Trajectories: Cartesian and polar forms	2
31.	Existence theorem of solutions of I.V.P's. Problems on it. Uniqueness theorem with problems. Picard's theorem with some problems.	2
32.	Higher Order Linear Differential Equations with constant coefficients.	2
33.	Method of variation of parameters to find the particular integral with some problems.	2
34.	Cauchy-Euler differential equation and its solution. Legendre's differential equation and its solution.	1
35.	System of linear ordinary differential equations.	1