Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
BS21	Engineering Mathematics-II	4	1	--	4	1	--	5
		Examination Scheme						
		ISE		MSE	ESE			
		10		30	100 (60% Weightage)			

Course Objectives: To develop mathematical skills for solving engineering problems.

Pre-requisite Course Codes		HSC level Mathematics
After successful completion of the course, student will be able to		
Course Outcomes	**CO1**	To solve differential equations of first order
	CO2	To solve differential equations of higher order using operators
	CO3	To apply techniques of solving Differential Equations of first order to electrical engineering problems
	CO4	To apply techniques of Numerical Integration, Beta & Gamma and Differentiation under integral sign to evaluate integrals
	CO5	To evaluate integrals in various co-ordinate system
	CO6	To calculate Area, Mass of Lamina and volume of regions

Module No	Module name	Unit No.	Topics	Ref	Hrs.
1	**Linear Differential Equations (First order)**	1.1	Exact differential Equations, Equations reducible to exact form by using integrating factors.	1,2,3, 6,7	03
		1.2	Linear differential equations (Review), equation reducible to linear form, Bernoulli's equation.		03
		1.3	Simple application of differential equation of first order and first degree to electrical engineering problem		02
		1.4	Numerical solution of ordinary differential equations of first order and first degree using (a)Taylor's series method (b)Euler's method (c) Modified Euler method (d) Runga-Kutta fourth order formula.	1,2,3, 6	04
2	**Linear Differential Equations**	2.1	Linear Differential Equation with constant coefficient- complementary function, particular integrals of differential equation of the type	1,2,3, 6,7	08

	(Higher order)		f(D)y = X where X is e^{ax},sin(ax+b), cos (ax+b), $e^{ax}V$, xV.		
		2.2	Cauchy's homogeneous linear differential equation and Legendre's differential equation, Method of variation of parameters.		03
3	**Integration (One variable)**	3.1	Beta and Gamma functions and its properties.	1,2,3, 6	05
		3.2	Differentiation under integral sign with constant limits of integration.		02
4	**Multiple Integrals & Applications**	4.1	Tracing of curves and standard solids.	1,2,3, 5,6	02
		4.2	Double integration-definition, Evaluation of Double Integrals.		03
		4.3	Change the order of integration, Evaluation of double integrals by changing the order of integration and changing to polar form.		05
		4.4	Triple integration definition and evaluation (Cartesian, cylindrical and spherical polar coordinates).		04
		4.5	Application of double integrals to compute Area, Mass and Volume. Application of triple integral to compute volume.		04
5	**Numerical Methods**	5.1	Numerical Integration by Trapezoidal, Simpson's 1/3rd and 3/8th rule and its applications to study motion of a moving body.	1,2,3, 4,6,8	04
				Total	52

NOTE: ISE component will be evaluated through assignments conducted in the tutorial sessions.

References:

[1] Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley
[2] H.K.Dass," Advanced Engineering Mathematics", 28th edition,S.Chand, 2010
[3] Grewal B.S., "Higher Engineering Mathematics", 38th edition, Khanna Publication
[4] S.C. Chapra and R.P. Canale, "Numerical Methods for Engineers with Programming and
[5] Software Applications", McGrawHill, Newyork 1998
[6] Thomas & Finney, "Calculus & Analytic Geometry", 9th edition, Addison Wesley.
[7] Jain and Iyengar, "Advanced Engineering Mathematics", 4th edition, Narosa Publishing House, Pvt Ltd, 2014
[8] Dennis G. Zill, "A First Course in Differential Equations with Modelling Applications, Cengage Learning
[9] S.S. Sastry, "Introductory Methods of Numerical Analysis", 4th edition, Prentice-Hall of India Pvt. Ltd.