SILVER OAK UNIVERSITY

Engineering and Technology (B.Tech.)

All Departments

Subject Name: Mathematics-2

Semester: II

Prerequisite: Algebra, Trigonometry, Geometry, Calculus and Fourier series

Objective: To compute integrals, line integrals, solution techniques of higher order ordinary differential equations, Transform calculus, Fourier integral representation.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Evaluation Scheme				Total Marks
L	T	P	C	Internal		External		
				Th	Pr	Th	Pr	
3	2	0	5	40	--	60	--	100

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	Multivariable Calculus (Integration): Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds;	10	25%
2	Vector Integral Calculus: Line Integrals, Vector fields and applications as Work, Circulation and Flux, Path independence, Theorems of Green, Gauss and Stokes (without proofs).	4	10%
3	First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.	6	15%
4	Ordinary differential equations of higher orders: Second order linear differential equations with constant coefficients, Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation;	10	25%

	Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.		
5	Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace Transform method.	8	20%
	Fourier Integral, Fourier Cosine Integral and Fourier Sine Integral	2	5%
		40	100%

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	To compute the areas and volumes using multiple integral techniques	1
CO-2	To apply mathematical tools needed in evaluating vector calculus and their usage like Work, Circulation and Flux.	2
CO-3	To apply effective mathematical tools for the solutions of first order ordinary differential equations.	3
CO-4	To apply effective mathematical methods for the solutions of higher order ordinary differential equations.	4
CO-5	To apply the laplace transform as tools which are used to solve differential equations and fourier integral representation.	5

Teaching & Learning Methodology: -

(i) Focus on tricks of the trade and intuitive idea of Concept, use the main theorems as tools, no compromise on rigour, illustrative exercises under each topic, view point of applications

(ii) Tutorial and Teacher guided Problem solving based pedagogy

(iii) Topic based seminars, internet based assignments, teacher guided self-learning activities

List of Experiments/Tutorials: Unit wise/Topic wise Tutorials/Teacher Guided Problem Solving Sets are to be given for Practice and better understanding of Concepts and applications

Major Equipment: Nil

Books Recommended:-

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley and Sons.
2. James Stewart, Calculus: Early Transcendentals with Course Mate, 7e, Cengage, 2012.

List of Open Source Software/learning website: Scilab, MIT Opencourseware.