KALASALINGAM UNIVERSITY

(Kalasalingam Academy of Research and Education)
ANAND NAGAR, KRISHNANKOIL – 626 126

DEPARTMENT OF MATHEMATICS
COURSE PLAN

Name of the Staff Members : All faculties of Mathematics Department
Subject with code : Mathematics I (MAT103)
Course : B. Tech.,
Semester / Branch : I / All branches

PRE-REQUISITE:

Basic concepts of matrix theory, differentiation, integration, two and three dimensional analytical geometry and differential equations.

OBJECTIVES:

1. To familiarize the students with the concept and techniques of differentiation and integration and their applications to engineering problems**.**
2. To study the Eigen value problems, Differential equations.
3. To grasp the concepts in analytical geometry.

COURSE LEARNING OUTCOMES AND END USE

1. To find the methods of solving differential equation which are very much useful to the students in their respective branches of Engineering.
2. To use three dimensional geometry and eigen value problems in many engineering problems.

TEXT BOOKS:

T1. Kreyszig, E, Advanced Engineering Mathematics, John Willey and Sons (Asia) Limited, Singapore, 8th Edition, 2001.
T2. Arumugam, S., Thangapandi Issac, A., Somasundaram, A., Engineering Mathematics Volume I, Scitech Publications (India) Pvt Ltd., Chennai, 2nd Edition, Reprint 2009.

REFERENCES:

1. Grewal, B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37th Edition, 5th Reprint 2004.
2. Venkatraman, M.K, Engineering Mathematics first year, The National publishing company, Chennai, 2nd Edition, Reprint.

LESSON PLAN:

S. No.	Topic Name	Text Book	No. of periods	Cum. No. of periods
	UNIT I: MATRICES			
1	Characteristic Equation – Eigen values and eigen vectors of a real matrix – Properties of eigen values and eigen vectors.	T2 (Sec 2.3-2.4)	2	2
2	Cayley – Hamilton Theorem and Problems.	T2 (Sec 2.3-2.4)	2	4

3	Orthogonal transformation of a real symmetric matrix to diagonal form.	T2(Sec 2.5)	2	6
4	Quadratic Form – Reduction of Quadratic Form to Canonical Form by orthogonal transformation – Index, Signature and Nature of Quadratic Forms.	T2(Sec 2.7)	3	9
	UNIT II: APPLICATIONS OF DIFFERENTIAL CALCULUS			
5	Curvature and Radius of curvature: Cartesian and Polar forms.	T2(Sec 4.14)	2	11
6	Center and Circle of curvature.	T2(Sec 4.15)	1	12
7	Evolutes.	T2(Sec 4.15)	3	15
8	Envelopes – Evolute as envelopes of normals.	T2(Sec 4.16)	3	18
	UNIT III: FUNCTIONS OF SEVERAL VARIABLES			
9	Partial derivatives – Total derivatives – Higher order partial derivatives and Problems.	T2(Sec 4.10 & 4.13)	2	20
10	Euler's theorem for homogenous functions – Taylor's expansion.	T2(Sec 4.11 & 5.2	2	22
11	Jacobians.	T2(Sec 4.12)	1	23
12	Maxima and Minima for functions of two variables.	T2(Sec 5.3)	2	25
13	Constrained maxima and minima by Lagrangian multiplier method.	T2(Sec 5.4)	2	27
	UNIT IV : ORDINARY DIFFERENTIAL EQUATIONS (ODE)			
14	Solutions of second and higher order linear ODE with constant coefficients.	T2(Sec 7.9)	3	30
15	Cauchy's and Legendre's linear equations.	T2(Sec 7.10)	2	32
16	Simultaneous first order linear equations with constant coefficients.	T2(Sec 7.11)	2	34
17	Method of Variation of parameters.	T2(Sec 7.12)	2	36
	UNIT V: THREE DIMENSIONAL ANALYTICAL GEOMETRY			
18	Direction cosines and ratios.	T2(Sec 3.1-3.3)	1	37
19	Angle between two lines and equation of a plane.	T2(Sec 3.3-3.4)	2	39
20	Equation of a straight line and coplanar lines, shortest distance between two skew lines.	T2(Sec 3.5-3.6)	3	42
21	Sphere – Tangent plane – Plane section of a sphere – Orthogonal spheres.	T2(Sec 3.7)	3	45

Prepared by

(Staff in charge)

Verified by

(HOD - Maths)