SHARNBASVA UNIVERSITY, KALABURAGI
ADDITIONAL MATHEMATICS - I
COMMON TO ALL BRANCHES

Course Code	21MATDIP31	CIE Marks	50
Contact Hours/Week	02	SEE Marks	00
Total Hours	25	Exam Hours	00
Semester	III	Credits	00

Course Learning Objectives:

This course will enable students to:
- Acquire basic concepts of complex trigonometry, vector algebra, differential and integral calculus and vector differentiation.
- know the basic concepts of derivatives and representation of different types of polar curves Evaluation of double and triple integrals.
- know the basic concepts of partial differential equations.
- To develop the knowledge of matrices and linear algebra in compressive manner.
- To understand the essential concept of linear algebra.

Course Outcomes(COs):

After completion of course, the student will able to

CO#	Course Outcomes	POs	PSOs
CO1	Learn the representation of complex numbers in Argand diagram and understanding the vector dot product and cross product and use in finding the area, projection, etc. Also understanding the gradient, divergence and curl operators.	1, 2, 3	
CO2	Apply the knowledge of calculus to find the nth derivative and solve the problems related to polar curves and its applications in determining the bendness of a curve.	1, 2, 3	
CO3	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and solve first order linear/nonlinear differential equation analytically using standard methods.	1, 2, 3	
CO4	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.	1, 2, 3	
CO5	Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vectors.	1, 2, 3	

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√	√			
CO2	√	√	√			
CO3	√	√	√			
CO4	√	√	√			
CO5	√	√	√			

Course Articulation Matrix / Course mapping :

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CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2		1				1			1			
CO2	3	2	2		1				1			1			
CO3	3	2	2		1				1			1			
CO4	3	2	2		1				1			1			
CO5	3	2	2		1				1			1			

MODULE-1: COMPLEX TRIGONOMETRY

Complex Numbers: Definition and Properties . Modulus and Amplitude of complex number, Argand's diagram , De-Moivre's theorem (without proof)

Vector Analysis : Scalar and Vectors. Vector addition and subtraction. Multiplication of vectors   (Dot and Cross products) Scalar and vector triple products- simple problems, Vector Differentiation : Gradient, Divergence and Curl.

(RBT Levels: L1, L2 and L3) 5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-2: DIFFERENTIAL CALCULUS

Review of successive differentiation. Formulae of nth derivatives of standard functions- Leibnitz's theorem (without proof).

Polar Curves: Expression for Angle between radius vector and tangent, length of perpendicular from pole to the tangent, angle between two polar curves, Pedal Equation of polar curves and problems. Taylor' and Maclaurin's series expansions.

(RBT Levels: L1, L2 and L3)   **5 Hours**

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-3: PARTIAL DIFFERENTIAL

Definitions of Partial Differentiation, Direct and Indirect partial derivatives, Symmetric functions, Homogeneous function and Euler's theorem on homogeneous function. Total Derivative of composite and implicit function. Jacobians.

(RBT Levels: L1, L2 and L3)   **5 Hours**

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-4: INTEGRAL CALCULUS

Reduction Formulae of $\int_0^{\pi/2} Sin^n x \, dx$, $\int_0^{\pi/2} Cos^n x \, dx$, and Statement of Reduction formulae $\int_0^{\pi/2} sin^m x \, cos^n x \, dx$ and Problems.

Double and Triple integral- simple problems.

(RBT Levels: L1, L2 and L3)   **5 Hours**

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Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-5: LINEAR ALGEBRA

Basic concepts of matrices- Rank of matrix by elementary row transformations- Echelon form. Consistency of system of Linear equations. Solution of system linear equations by Gauss Elimination method, Linear Transformation, Cayley- Hamilton theorem to compute inverse of matrix. Eigen values and Eigen vector, Largest Eigen value and corresponding Eigen vector by Reyleigh's Power method.
(RBT Levels: L1, L2 and L3)
                                                                                    5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

CIE + Assignments: 15+35=50 Marks
There will be a 2 CIE's, the best one among 2 CIE's will be considered and there will be a 35 marks for Assignments

Text Books:
1. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig : Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference books:
1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition,
2. McGraw-Hill Book Co., New York, 1995.
2. James Stewart : "Calculus –Early Transcendentals", Cengage Learning India Private Ltd., 2017.
3. B.V.Ramana : "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta Pal &Subobh C Bhunia:"Engineering Mathematics", Oxford University Press,3rd Reprint,2016.
5. Gupta C.B., Singh S.R. and Mukesh Kumar : "Engineering Mathematics for Semester I & II",
Mc-Graw Hill Education (India) Pvt.Ltd., 2015.

Web links and Video Lectures:
1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.class-central.com/subject/math
3. http://academicearth.org.