

Course Title	Engineering Mathematics- II	
Course Code	MA203	
Course Credit	Lectures	: 3
	Practical	: 0
	Tutorial	: 1
	Total	: 4
Course Learning Outcomes:		
<p>After Successful completion of the above course, students will be able to:</p> <ul style="list-style-type: none"> • Solve technical and computational problems using linear algebra. • Develop the understanding of theory and computational skills necessary for the Concepts of calculus. • Analyze the feasibility of the solution and justify methods used. • Perform line, surface and volume integral and discuss their applications. 		
Detailed Syllabus		
Sr. No.	Contents	Hours Allotted
SECTION 1		
1.	VECTORS Scalar and vector product, Applications of vector product – circulation, work done.	2
2.	MATRICES Types of matrices, Algebra of matrices, Elementary transformations, Determination of rank a matrix by various methods, Inverse of matrix by elementary transformations, Consistency of a system of Linear simultaneous equations, Eigenvalue and Eigenvector of matrix, Cayley- Hamilton theorem, Hermitian matrix and Skew- Hemitian matrix, Unitary matrix.	8
3.	LAPLACE TRANSFORMS Definition of Laplace transforms, Laplace transforms of elementary functions, Inverse Laplace transforms, First shifting theorem.	6
4	LINEAR TRANSFORMATION Matrix Transformation, Linearity in picture, onto and one-to-one transformation, Inverse transformation, Diagonalization of a Matrices, Linear transformation of quadratic form, Canonical form or sum of squares form using	5

	the Linear transformation, Canonical form or sum of squares form using the orthogonal transformation, Index and Signature of the quadratic form.	
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	TOTAL	21
	SECTION 2	
5.	MULTIPLE INTEGRATION Evaluation of double integrals under various region in cartesian and polar coordinates, Change of variable from cartesian to polar co-ordinate and any other co-ordinates, Evaluation of triple integrals, Applications of multiple integrals-Volume of mass by double and triple integrals, Analytical solid geometry, Cartesian coordinates in space, Centre of gravity, Moment of inertia etc.	6
6.	VECTOR DIFFERENTIAL CALCULUS Vector differentiation, Scalar and vector fields, Gradient, Divergence and curl of a vector field, Directional derivative, Irrotational, Solenoidal.	6
7.	VECTOR INTEGRAL CALCULUS Line Integral, Green's theorem. Surface integral, Divergence theorem, Volume integral, Stoke's theorem.	6
8.	Gamma and Beta Functions Gamma functions and its properties, Beta functions and its properties, Relation between Gamma and Beta function.	3
	TOTAL	21

Instructional Method and Pedagogy:

- Main Instructional method will be conducted by usage of Black-board and Chalk-duster.
- Application based learning
- Assignments based on course content will be given to students at the end of each topic/unit and will be evaluated at regular interval.
- Surprise tests/quizzes will be conducted.
- The course includes tutorials, where students have opportunity to practice the examples for the concept being taught in lectures.

Reference Books:

1. Dr. R. C. Shah , “Vector Calculus & Linear Algebra”, Books India Publications.-5th edition.
2. Dr. K. R. Kachot , “Vector Calculus & Linear Algebra”, Mahajan Publishing House.-
3. B. S. Grewal , “Higher Engineering Mathematics”, Khanna Publishers Co. Ltd., New Delhi – 39th edition.
4. Thomos George, B. weir Maurice, D. Hass Joel Giordano Frank, Prajapati Jyotindra , “Calculus”, Pearson Education, Delhi – 1st edition.
5. H. Anton , “Elementary Linear Algebra with applications”, wiley India publications, New Delhi – 8th edition.
6. Gilbert Strang, “Linear Algebra and its applications”, Thomson Brooks/Cole(2006).