

<b>Course Title</b>	<b>Engineering Mathematics II</b>
<b>Course Code</b>	MA203
<b>Course Credit</b>	Lectures : 3
	Practical : 0
	Tutorial : 1
	Total :4

**Course Objective**

After Successful completion of the above course, students will be able to:

CLO 1: **Solve** technical and computational problems using linear algebra.

CLO 2: **Develop** the understanding of theory and computational skills necessary for the concepts of calculus.

CLO 3: **Analyze** the feasibility of the solution and justify methods used.

CLO 4: Perform line, surface and volume integral and discuss their applications.

**Detailed Syllabus**

Sr. No.	Contents	Hours Allotted
<b>SECTION 1</b>		
1.	<b>VECTORS</b> Scalar and vector product, Applications of vector product – circulation, workdone.	4
2.	<b>MATRICES</b> 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- Hamiton theorem, Hermitian matrix and Skew- Hemitian matrix, Unitary matrix.	8
3.	<b>LAPLACE TRANSFORMS</b> Definition of Laplace transforms, Laplace transforms of elementary functions, Inverse Laplace transforms, First shifting theorem.	8
4	<b>LINEAR TRANSFORMATION</b> 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 the Linear transformation, Canonical form or sum of squares form using the	8

	orthogonal transformation, Index and Signature of the quadratic form.	
	<b>SECTION 2</b>	
5.	<b>MULTIPLE INTEGERATION</b> 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.	8
6.	<b>VECTOR DIFFERENTIAL CALCULUS</b> Vector differentiation, Scalar and vector fields, Gradient, Divergence and curl of a vector field, Directional derivative, Irrotational, Solenoidal.	8
7.	<b>VECTOR INTEGRAL CALCULUS</b> Line Integral, Green's theorem. Surface integral, Divergence theorem, Volume integral, Stoke's theorem.	8
8.	<b>Gamma and Beta Functions</b> Gamma functions and its properties, Beta functions and its properties, Relation between Gamma and Beta function.	4

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