I B. Tech – II Semester
(17MA201) MATHEMATICS-III
(Common to all branches)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

Pre-Requisites: None

Course Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- Understand the most basic numerical methods to solve simultaneous linear equations.

Syllabus:

UNIT-I: Linear systems of equations:
Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination - Gauss Jordon-Gauss Jacobi and Gauss Seidal methods Applications: Finding the current in electrical circuits.

UNIT-II: Eigen values - Eigen vectors and Quadratic forms:
Eigen values - Eigen vectors– Properties – Cayley-Hamilton theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative and semi definite - Index – Signature.

UNIT-III: Multiple integrals:
Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration. Applications: Finding Areas and Volumes.

UNIT-IV: Laplace transforms:
Laplace transforms of standard functions-Shifting theorems - Transforms of derivatives and integrals Unit step function –Dirac's delta function- Inverse Laplace transforms–Convolution theorem (with out proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT-V: Vector Differentiation:
Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities.
Applications: Equation of continuity, potential surfaces

UNIT-VI: Vector Integration:
Line integral – Work done – Potential function – Area- Surface and volume integrals. Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems. Applications: Work done, Force.

Course Outcomes

COs	Course Out Comes	BTL
CO1	Solve the linear system of equations analytically	3
CO2	Compute the Eigen values and eigen vectors of a square matrix.	3
CO3	Extend the concept of integration of two and three dimensions and support it through applications in engineering	3
CO4	Applying the Laplace Transform technique and use it to solve various engineering problems	3
CO5	Generalize calculus to vector functions and find the Gradient, Divergence and Curl.	3
CO6	Able to solve Line integral, Surface and Volume Integrals.	3

CO – PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2	1	1	-	-	-	-	-	-	-	-	1
2	3	2	1	-	-	-	-	-	-	-	-	1
3	3	2	1	-	-	-	-	-	-	-	-	1
4	2	1	1	-	-	-	-	-	-	-	-	1
5	1	1	1	-	-	-	-	-	-	-	-	1
6	1	1	1	-	-	-	-	-	-	-	-	1

CO –PSO Mapping

CO	PSO1	PSO2	PSO3
1	1	-	-
2	1	-	-
3	1	-	-
4	1	-	-
5	1	-	-
6	1	-	-

Text Books:

1. **B.S.Grewal,** Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **T.K.V.Iyengar, B.Krishna Gandhi, S.Ranganathan, M.V.S.S.N.Prasad**, Engineering Mathematics (Volume-III), S Chand Publications

Reference Books:

1. **Greenberg,** Advanced Engineering Mathematics, 2nd edition, Pearson edn
2. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India
3. **Peter O'Neil,** Advanced Engineering Mathematics,7th edition, Cengage Learning.
4. **D.W. Jordan and T.Smith,** Mathematical Techniques, Oxford University Press.
5. **Srimanta Pal, Subodh C.Bhunia**, Engineering Mathematics, Oxford University Press.
6. **Dass H.K., Rajnish Verma. Er.,** Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.