Regulation GRBT-20	**Godavari Institute of Engineering & Technology (Autonomous)**		I B.Tech. (1 Semester)			
Course Code XXXXXXX	**MATHEMATICS - I** (ALL BRANCHES)					
Teaching	Total contact hours - 48		L	T	P	C
Prerequisite(s): Types of matrices, Differentiation and Integration.			3	0	0	3

Course Objective:
- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students understand advanced level mathematics to develop the confidence and ability to handle real world problems and their applications.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Transform the knowledge of solving system of linear equations using matrices.
CO2:	Evaluate nature of the Quadratic form.
CO3:	Acquire the knowledge maxima and minima of function of several variables
CO4:	Evaluate multiple integrals and their applications
CO5:	Understand and apply vector derivatives and vector integration theorems.

Syllabus:

Unit I: Matrix Operations and Solving Systems of Linear Equations   10 hrs
Rank of a matrix by echelon form, solving system of linear homogeneous and non-homogeneous equations – Gauss elimination method, Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem.

Unit II: Quadratic forms   8 hrs
Quadratic forms and nature of the Quadratic forms, reduction of Quadratic form to canonical form by diagonalisation and orthogonal transformation.

Unit III: Partial differentiation and Applications   10 hrs
Partial derivatives, total derivatives, chain rule, Homogeneous functions and Euler's theorem, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Unit IV: Multiple Integrals and Applications   10 hrs
Evaluation of double integrals (Cartesian and polar coordinates) and triple integrals, change of variables, change of order of integration, Finding areas and volumes.

UNIT V: Vector Calculus   10 hrs
Scalar and vector point functions, Curl, Gradient and Divergence, directional derivative, Irrotational and Solenoidal vector fields. Line integral, Work done, Area, Surface and volume integrals. Greens, Stokes and Gauss Divergence theorems (without proof).

Text books:
1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:
1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. T.K.V.Iyenger, et.al., Engineering Mathematics, Volume-III, .Chand Publicatiobns, 2018.
4. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2015.

Web Links:
1. https://nptel.ac.in/courses/111105121/
2. https://nptel.ac.in/courses/111105035/

CO-PO Mapping:
(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	-	-	-	1
CO2	3	2	2	2	-	-	-	-	-	-	-	1
CO3	3	2	2	2	-	-	-	-	-	-	-	1
CO4	3	2	2	2	-	-	-	-	-	-	-	1
CO5	3	2	2	2	-	-	-	-	-	-	-	1