



Gayatri Vidya Parishad Institute of Higher Learning and Research

(Deemed to be University under Distinct Category)

Kommadi, Madhurawada, Visakhapatnam – 530 048, Andhra Pradesh

CALCULUS AND LINEAR ALGEBRA

LECTURE SCHEDULE

(Common to ALL Branches)

ACADEMIC YEAR: 2026-2027

Pre-requisite Course/Topic Names:	1. Basics of Limits and Continuity 2. Basics of Differential and Integral calculus 3. Elementary Matrix Algebra
Lecture No	Topic
1	Orientation of the course
UNIT-I : SEQUENCES, SERIES AND MEAN VALUE THEOREMS	
2	Introduction: Definition of a Sequence, convergence of a sequence
3	Infinite series, Convergence/ divergence of an Infinite series
4	Convergence of Geometric, Harmonic p-series preliminary test for divergence
	Tutorial -I
5	Comparison Test
6	D'Alembert's Ratio Test
7	Cauchy's nth root test
	Tutorial -II



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8	Rolle's theorem, Lagrange Mean Value theorem
9	Cauchy's Mean value theorem
10	Taylor's theorem; Taylor's series expansion of $f(x)$; Maclaurin's Series expansion of $f(x)$
11	Summarization of Unit
	Tutorial -III (Short assessment)
UNIT-II: PARTIAL DIFFERENTIATION	
12	Introduction to partial differentiation
13	Total derivative & Chain rule
14	Jacobian, Properties
	Tutorial -IV
15	Functional dependence - Jacobian
16	Taylor's series for function of two variables
17	Maxima and Minima of functions of two variables without constraints
	Tutorial -V
18	Lagrange's method of undetermined multipliers
19	Lagrange's method of undetermined multipliers
20	Summarization of Unit
	Tutorial -VI (Short assessment)
UNIT-III: MULTIPLE INTEGRALS	
21	Evaluation of Double integrals
22	Changing the order of Integration/
23	Change of variables in double integrals: Cartesian to Polar
	Tutorial -VII
24-25	Area enclosed by a closed curve
26, 27	Evaluation of Triple integrals
	Tutorial -VIII
28	Change of variables in Triple integrals: Cartesian to Spherical, Cartesian to cylindrical
29	Problems
30	Summarization of Unit



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	Tutorial -IX (Short assessment)
	UNIT-IV: SOLVING SYSTEMS OF LINEAR EQUATIONS
31	Rank of a Matrix – Definition, Rank of a matrix by echelon form
32	Rank of a matrix by normal form
33-34	Consistency of Linear system of Equations: Homogeneous, Non- Homogeneous
	Tutorial -X
35-36	Eigen Values & Eigen Vectors
37	Properties of Eigen values and Eigen Vectors
	Tutorial -XI
38	Summarization of Unit
	Tutorial -XII (Short assessment)
	UNIT V: CAYLEY HAMILTON THEOREM AND QUADRATIC FORMS
39	Cayley-Hamilton theorem
40	Application – Finding Inverse and Power of a matrix
41	Reduction to Diagonal form
	Tutorial -XIII
42-43	Quadratic forms and nature of the quadratic forms
44	Summarization of Unit
	Tutorial -XIV (Short assessment)
45-48	Revision



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Text Books:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 10th edition, John Wiley & Sons, 2011.
2. B. S. Grewal, *Higher Engineering Mathematics*, 45th edition, Khanna Publishers, 2020.

Reference Books:

1. Greenberg M D, *Advanced Engineering Mathematics*, 2nd edition, Pearson Education, Singapore, Indian Print, 2003.
2. Peter V. O'Neil, *Advanced Engineering Mathematics*, 7th edition, Cengage Learning, 2011.