

Subject Code: 2SC1040301	Subject Title: Linear Algebra and Calculus
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Course Objective:

This course is designed to enable students to acquire the understanding and practice the applications of Calculus and Vector spaces.

Teaching scheme (hours) per week		credit		Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
3	--	3	--	70	30	--	--	100

Subject Contents			
Unit No.	Topic	Total Hours	Weight (%)
1	Vector Space: Vector spaces, Subspaces, Span of a set, Linear dependence and Independence, Dimension and basis.	12	25
2	Linear Transformations: Definitions and examples, Range and kernel of a linear map, Rank and nullity, Inverse of a linear transformation, The space $L(U,V)$, Composition of linear maps, Operator equations.	12	25
3	Bilinear and Quadratic Forms: Bilinear Forms, Space of Bilinear Forms, Bilinear Forms and Matrices, Symmetric and Skew-Symmetric Bilinear Forms, Quadratic Forms.	12	25
4	Application of Partial Derivatives: Euler's Theorem on homogenous function, Extrema of a function of several variables, Application of Lagrange multipliers to find the absolute extreme for a function, Taylor and Maclaurin's expansion for function of two variables (With Proof). Tangent plane and normal to surfaces.	12	25

Course Outcome:

- After successfully completion of the course, the student will be able to ...
- Understand the concept of Bilinear and Quadratic forms.
- Understand the application of partial derivatives and apply it to various types of problems .
- Know about vector space, dimension and basis.
- Understand the concept of linear transformations.

List of References:

- 1) Differential Calculus, by Shantinakaran.
- 2) Vector Analysis, by Murry R. Spiegel.
- 3) An Introduction to linear algebra, by V. Krishnamurthy, JL Arora, East West Press Pvt Ltd, New Delhi.

- 4) Advanced Calculus, by DV Widder, Prentice Hall, New Delhi
- 5) Advanced Calculus, by R C Buck, MacMillan.
- 6) Linear Algebra, Ramchandra Rao, P. Bhimasankar, Tata Mc Graw Hill.
- 7) Linear Algebra, S K Berberion, Oxford University Press.
- 8) Linear Algebra, Sharma and Vashishtha, Krishna Prakashan, Meerut.
- 9) Linear Algebra, Gupta KP, Pragati Prakshan, Meerut.
- 10) Theory and Problems of Linear Algebra, Dr. R.D.Sharma, Dr. Ritu Jain, I.K.International
Publication House Pvt. Ltd. ,New Delhi.