Dr. A.P.J. ABDUL KALAM UNIVERSITY, INDORE

Course: B.Sc **Semester: I** **Session: 2022-23**
Subject: Mathematics (Martix, Geometry & Vector Algebra)
Subject Code: ELMT103T

2	**Course Title**	Matrices, Geometry and Vector Algebra	
3	**Course Type**	[illegible] Elective	
4	**Pre-requisite (if any)**	This course can be opted as an elective by the students of all subjects who do not have Mathematical Background at 12th level.	
5	**Course Learning Outcomes (CLO)**	Students will be able to use the Matrices, Determinants, Geometry and Vector approach in different areas of business and science like budgeting, sales projection, cost estimation, analysing the results of an experiment etc.	
6	**Credit Value**	Theory: 4	
7	**Total Marks**	Max. Marks: 25 + 75	Min. Passing Marks: 33

Part B - Content of the Course

Total No. of [illegible]r
Total Lectures: 60 hours

Unit	Topics	No. of Lectures
I	1.1 Determinants 1.2 Basic Properties of Determinants 1.3 Minor determinant 1.4 Co-factors 1.5 Applications of determinants in finding the area of a triangle	15
II	2.1 Matrices 2.1.1 Concept of Matrices 2.1.2 Notation, order and equality of Matrices 2.1.3 Types of Matrices 2.1.4 Transpose of a Matrix 2.2 Operations on Matrices 2.2.1 Addition and multiplication 2.2.2 Multiplication with a scalar 2.2.3 Simple properties of addition, multiplication and scalar multiplication 2.3 Adjoint and inverse of a square Matrix	15
III	3.1 Two dimensional coordinate geometry 3.1.1 Shifting of origin 3.1.2 Slope of a line 3.1.3 Angle between two lines 3.2 Various forms of equations of a line in two dimension 3.2.1 Parallel to axes 3.2.2 Point slope form 3.2.3 Slope-intercept form	15

	3.2.4 Two-point form 3.2.5 Intercept form and normal form 3.2.6 General equation of a line 3.3 Distance of a point from a line in two dimension 3.4 Three dimensional coordinate geometry 3.4.1 Coordinate axes and coordinate planes 3.4.2 Coordinates of a point 3.4.3 Distance between two points and section formula	
IV	4.1 Vectors and scalars 4.2 Magnitude and direction of a vector 4.3 Direction cosines and direction ratios of a vector 4.4 Types of vectors and position vector of a point 4.5 Negative of a vector and components of a vector 4.6 Operations on Vectors 4.6.1 Addition of vectors 4.6.2 Multiplication of a vector by a scalar 4.7 Position vector of a point dividing a line segment in a given ratio 4.8 Properties and application of 4.8.1 Scalar (dot) product of vectors 4.8.2 Vector (cross) product of vectors	15

Keywords:
Determinants, Matrices, Two and three dimensional coordinate geometry, Vector analysis.

Part C - Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. P K Mittal and Shanti Narayan: Vector Algebra, S. Chand Publishing, 2005.
2. Nita H. Shah, Foram A. Thakkar: Matrix and Determinant Fundamentals and Applications, CRC Press, 2020.
3. G. Prasad: Coordinate Geometry of Two and Three Dimensions, Axis Publications, 2010.
4. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. Hari Kishan: A Textbook of Matrices, Atlantic Publishers & Dist, 2008
2. Hari Kishan: Vector Algebra and Calculus, Atlantic Publishers & Dist, 2007
3. K. C. Mathew, S. Veeraraghavan: A Textbook of Co-ordinate Geometry of Two and Three Dimensions, Chand Publication, 1972.
4. Shanti Narayan and P K Mittal: A Textbook of Matrices, S. Chand Publishing, 1953.

Suggested Digital Platforms Web links:

https://freevideolectures.com/university/iit-roorkee/
https://www.highereducation.mp.gov.in/?page=xhzIQmpZwkyIQo2b%2Fy5G7w%3D%3D
https://epathshala.ncert.org.in/