

Mathematics (2)

Course Title: Mathematics (2)

Course Code: GEN104

Credit Hours: 3

Knowledge Domain: General fundamentals.

Prerequisite(s): Mathematics (1) (GEN103).

Learning Objectives

In addition to those given for Mathematics (1), the student will be able to:

1. Grasp analytic geometry concepts by using visualization.
2. Understand the physical meaning of differential equations by using animation.

Learning Outcomes:

In addition to those given for Mathematics (1), the following could be added:

1. Grasping the geometrical aspects of mathematics through visualization.
2. With the help of animation, some examples of differential equations are used to grasp their physical meaning.
3. Abstract concepts of linear algebra are grasped.

Overview and Syllabus

Plane curves and polar coordinates. Vectors and analytic geometry in space. Vector analysis. Elements of differential equations. Vector spaces and linear algebra. Matrices.

Course Outline

	Topic
1	<u>Module1: Plane Curve and Polar Coordinates</u> Conic sections and quadratic equations. Parametric equations for plane curves. Polar coordinates and polar equations for conic sections. Integration in polar coordinates. Activity Quiz

2	<p><u>Module2: Vectors and Analytic Geometry in Space</u> Vectors in the plane. Cartesian coordinates and vectors in space. Dot products and cross products. Lines and planes in space. Surfaces in space. Cylindrical and spherical coordinates Activity Quiz</p>
3	<p><u>Module3 : Vector analysis</u> Line integrals. Vector fields and flux. Green's theorem in the plane. The divergence theorem. Activity Quiz</p>
4	<p><u>Module4: Differential equation</u> Separable first order equations. Linear first order equations. Second order homogeneous & nonhomogeneous linear equations. Activity Quiz</p>
5	<p><u>Module5: Vector spaces and linear algebra</u> Vector spaces over a field. Linear independence and bases. Subspaces. The algebra of linear transformations. Activity Quiz</p>
6	<p><u>Module6: Matrices</u> Square matrices. Determinants and their properties. Activity Quiz</p>