

Mathematics (1)

Course Title: Mathematics (1)

Course Code: GEN103

Credit Hours: 3

Knowledge Domain: General Fundamentals

Prerequisite(s): None

Learning Objectives

Upon completion of this course, the student will be able to:

1. Indicate the precise and systematic nature of mathematics as its basic underpinnings.
2. Show the power of abstraction in Mathematics.
3. Understand some mathematical applications by illustrating motivational material for each module, Whenever possible.
4. Use mathematical software packages as a powerful tutoring tool.

Learning Outcomes

1. Mastering the basic features of Mathematics (precision, abstraction and systematic thinking).
2. Proper use of mathematical software packages either for helping to solve problems or as a powerful means for visualization.

Overview and Syllabus

Revision of basic concepts. Limits and continuity. Derivatives and their applications. Integration. Applications of definite integrals. Techniques of integration. Infinite series.

Course Outline

	Topic
1	<u>Module 1: Calculus</u> Topic 1: Functions and their graphs. Topic 2: Circles and parabolas. Topic 3: Trigonometric functions.
2	<u>Module 2: Limits and Continuity</u> Topic 1: The Meaning of Limits

	<p>Topic 2: Limits from the Right and the Left. Topic 3: Methods of Evaluating Limits. Topic 4: The Notion of Continuity. Topic 5: Special Limits. Quiz</p>
3	<p><u>Module 3: Derivatives and their Applications</u> Topic 1: Slopes, tangent lines and derivatives. Topic 2: Types of stationary points. Topic 3: Product rule for differentiation Quiz</p>
4	<p><u>Module 4: Integration</u> Topic 1: Calculus and area. Topic 2: Formula for finite sums. Topic 3: Definite integrals. Topic 4: Fundamental theorem of integral calculus. Topic 5: Indefinite integrals. Quiz</p>
5	<p><u>Module 5: Applications of Definite Integrals</u> Topic 1: Area between curves. Topic 2: Volume of solids of revolution. Topic 3: Length of curves and fractals Quiz</p>
6	<p><u>Module 6: Techniques of Integration</u> Topic 1: Integration by parts. Topic 2: Trigonometric integrals. Topic 3: Trigonometric Substitutions. Topic 4: Rational functions and partial fractions. Topic 5: Miscellaneous Substitutions. Topic 6: Using integral tables. Quiz</p>
7	<p><u>Module 7: Infinite Series</u> Topic 1: Limits of sequences of numbers. Topic 2: Convergence and divergence of infinite series. Topic 3: Tests of convergence. Power series. Topic 4: Taylor and Maclaurin series. Quiz</p>