

Course Title: Precalculus

Type: Natural Sciences(General Education)

Offering: Undergraduate Degrees (including Associate Degrees)

Prerequisites: Nil

Placement: 1-4 Semesters

Credit Hours: 3 (3 + 0)

Course Objectives: Upon successful completion of this course, students will be able to:

- Exhibit a comprehensive understanding of linear, quadratic, and exponential functions, including their intrinsic properties and graphical representations.
- Analyze and elucidate two dimensional coordinate geometry, elementary trigonometric functions, demonstrating proficiency in their graphical interpretations.
- Achieve proficiency in understanding and applying the concepts of limits, continuity, differentiation, and various methods of integration.

Course Contents:

Functions: Function, Families of functions (Bijective, Floor, Ceiling) , Inverse functions, Graph of functions, Linear functions and models, quadratic functions and models, solving inequalities, quadratic equations in the complex system, Exponential and logarithmic functions.

Trigonometry: Angles and their measure, Trigonometric functions via the unit circle, Right triangle trigonometry, Basic properties and graphs of trigonometric functions, Inverse trigonometric functions, Trigonometric identities. Applications of trigonometry.

Two Dimensional Coordinate Geometry: Cartesian coordinates (Rectangular coordinates), equation of straight line, slope and gradient, parallel and perpendicular lines, angle between lines. Distance formula.

Limits and Continuity: An Introduction to Limits, Properties of Limits, Limits of algebraic functions, Limits of trigonometric functions, Limits at Infinity, Infinite limits and asymptotes, Continuity, Continuity of trigonometric functions.

Differentiation: Definition and notation, Geometrical interpretation of the derivative, Techniques of Differentiation, The Product and Quotient Rules, Derivatives of Trigonometric Functions, Logarithmic Differentiation. Applications of derivative.

Integration: Introduction to Integration, Rules of integration, Integration by substitution, Integration using partial fractions, Integration by parts. Definite integral. Applications of definite integral.

Recommended Books:

1. Anton, H., Bevens, I. and Davis S., *Calculus*, John Wiley & Sons, Inc., 10th Edition, 2012.
2. Beveridge, R. W. *College Algebra and Trigonometry*, Richard W. Beveridge, 2018.
3. Edward, C.H., *Calculus and Analytic Geometry*, Prentice Hall College Div., 3rd edition, 1990.
4. Mendelson, E. and Ayres, F., *Calculus, Schaums outlines series*, McGraw-Hill, 4th edition, 1999.