INSTITUTE OF MATHEMATICS
College of Science
University of the Philippines Diliman

Math 21 Course Syllabus

A. Course Catalogue Description

Course Number	Math 21
Course Title	Elementary Analysis I
Course Description	Limits and continuity; derivatives of algebraic and transcendental functions (exponential, logarithmic, trigonometric, hyperbolic, and their inverses); applications of derivatives; antiderivatives and definite integrals; Fundamental Theorem of Calculus; applications of the definite integral
Prerequisite	High School Basic Calculus or Math 20/equiv.
Course Credit	4 units
Number of Hours	4 hours/week

B. Course Content

I. Course Introduction

II. Limits and Continuity

1. Limits and limit theorem (ϵ-δ definition optional)
2. One-sided limits
3. Infinite limits and limits at infinity
4. Continuity of a function and the Intermediate Value Theorem
5. The Squeeze Theorem and limits and continuity of trigonometric functions
6. Review of inverse functions, exponential and logarithmic functions, hyperbolic and inverse hyperbolic functions
7. Continuity of inverse trigonometric, exponential, logarithmic, hyperbolic and inverse hyperbolic functions

III. Derivatives and Differentiation

1. Derivative of a function
2. Differentiation of algebraic and transcendental functions
3. The chain rule, implicit differentiation, and higher-order derivatives
4. Indeterminate forms and L'Hôpital's rule
5. Monotonicity and the First Derivative Test
6. Concavity and the Second Derivative Test
7. Sketching graphs of function using derivatives
8. The Mean Value Theorem

IV. Other Applications of Differentiation

1. Rectilinear motion
2. Related Rates
3. Local linear approximation and differential
4. Absolute Extrema, Extreme Value Theorem and optimizations

V. Antiderivatives, Indefinite Integrals and Applications

1. Antiderivatives and formulas of antidifferentiation
2. Integration by Substitution
3. The definite integral
4. Mean Value Theorem for Integration
5. Fundamental Theorem of Calculus
6. Area of a Plane Region
7. Volumes by slicing, disks/washers and cylindrical shells
8. Arc Length of a plane curve

For a more detailed syllabus, send an email request to ddapr@math.upd.edu.ph.