INSTITUTE OF MATHEMATICS
College of Science
University of the Philippines Diliman

Math 23 Course Syllabus

A. Course Catalogue Description

Course Number	Math 23
Course Title	Elementary Analysis III
Course Description	Functions of several variables; limits and continuity of functions of several variables; partial derivatives and the total differential; directional derivatives; relative and absolute extrema of functions of several variables; double and triple integrals; applications of multiple integrals; vector fields; line and surface integrals
Prerequisite	Math 22/equiv.
Course Credit	4 units
Number of Hours	4 hours/week

B. Course Content

  I. Course Introduction

  II. Differential calculus of functions of several variables

1. Functions of several variables, level curves, and level surfaces
2. Limits and continuity of functions of several variables
3. Partial derivatives
4. Higher-order derivatives, the total differential, and tangent plane approximation
5. The Chain Rule and implicit differentiation
6. Directional derivatives and gradients
7. Tangent planes to level surfaces
8. Relative extrema and the Second Derivative Test
9. Absolute extrema and the method of Lagrange multipliers
10. Parametric surfaces and surfaces of revolution

  III. Multiple Integration

1. Double integrals
2. Double integrals in polar coordinates
3. Applications of double integrals (area, volume, mass, surface area)
4. Triple integrals
5. Triple integrals in cylindrical and spherical coordinates
6. Applications of triple integrals (volume, mass)

  IV. Vector fields, line integrals and surface integrals

1. Vector fields
2. Curl and divergence
3. Line integrals of scalar and vector fields
4. The Fundamental Theorem of Line Integral
5. Path-independent line integrals
6. Green's Theorem
7. Surface integrals of scalar and vector fields
8. Stokes' Theorem and Gauss' Divergence Theorem

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