

INSTITUTE OF MATHEMATICS  
College of Science  
University of the Philippines Diliman

**Math 30 Course Syllabus**

**A. Course Catalogue Description**

Course Number	Math 30
Course Title	Intermediate Analysis and Applications
Course Description	Integration techniques; multivariate calculus; sequences and series; introduction to matrices; applications to economics, business, life and social sciences
Prerequisite	Math 21/equiv.
Course Credit	3 units
Number of Hours	3 hours/week

**B. Course Content**

- I. Course Introduction
- II. Review on Techniques of Integration
  1. Integration by Substitution
  2. Integration by Parts
  3. Integration by Partial Fractions
- III. Multivariate Differential Calculus
  1. Three-dimensional coordinate system
  2. Functions of more than one variable
  3. Limit and continuity of a function
  4. Partial derivative of a function
  5. Chain Rule for functions of more than one variable
  6. Higher-order derivatives
  7. Extrema and Optimization (including Lagrange multipliers)
- IV. Multivariate Integral Calculus
  1. Double integration
  2. Area, volume and other applications of double integration
  3. Differential equations: integrating factors
  4. Sequences
  5. Series, convergence and divergence
  6. Geometric series, p-series and the Ratio Test
  7. Power series and radius of convergence
  8. Taylor series and binomial series
- V. Matrices
  1. Matrices, operations and special types of matrices
  2. Matrix representation of systems of linear equations
  3. Elementary row operations and reduced echelon forms
  4. Inverse of a matrix (up to 3x3 matrix)
  5. Determinant of a matrix and the Cramer's Rule
  6. Eigenvalues and eigenvectors
  7. Diagonalization of a square matrix

For a more detailed syllabus, send an email request to [ddapr@math.upd.edu.ph](mailto:ddapr@math.upd.edu.ph).