

INSTITUTE OF MATHEMATICS
College of Science
University of the Philippines Diliman

Math 133 Course Syllabus

A. Course Catalogue Description

Course Number	Math 133
Course Title	Introduction to Mathematical Modeling
Course Description	Overview of mathematical modeling; discrete models; model fitting; linear programming; linear and nonlinear continuous models; numerical methods; optimization of continuous models
Prerequisite	CS11/equiv. and Math 122/equiv.
Course Credit	3 units
Number of Hours	3 hours/week

B. Course Content

- I. Course Overview and Orientation
- II. Discrete Models
 1. Difference Equations
 2. Discrete Dynamical Systems
 3. Solutions and Stability
 4. Models in Financial and Biological Population Systems
- III. Model Fitting
 1. Fitting Models to Data Graphically
 2. Analytic Methods (Least-Squares Criterion, Minimizing Sum of Absolute Deviations, Chebyshev Approximation Criterion, others)
 3. Model Comparison
- IV. Optimization (Model and Graphical Solutions)
 1. Linear Programming
 2. Nonlinear Programming
- V. Linear Continuous Models
 1. Linear Ordinary Differential Equations
 2. Equilibria, Phase Diagrams and Solution Fields
- VI. Nonlinear Continuous Models
 1. Equilibrium Solutions
 2. Stability and Phase Plane
 3. Ecological/Biological/Financial/Other Models
- VII. Numerical Methods
 1. Euler's Method, Runge-Kutta Method and ODE solvers
 2. Numerical Solutions of Higher-order ODEs

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