

Course Title	Mathmatics II
Course Code	Eco-222
Pre-Requisite	MATH-109: Mathmatics
Degree Program (BS / MS / PhD)	BS

Course Objectives

1. To prepare students for mapping working knowledge of static and dynamic optimization techniques applied in economics. The course will begin with calculus and constrained optimization
2. Students will develop an understanding of how to formulate a dynamic economic problem in mathematical terms
3. To develop their ability to use relevant mathematical techniques in manipulating the models that embody the theories studied.

Learning Outcomes

1. Exhibit a sound understanding of mathematical techniques Integration, Differential Equations and difference equations
2. Formulate economic problems in mathematical terms
3. Apply the relevant tools for analyzing economic problems.
4. Reason logically and work analytically
5. Select and apply appropriate techniques to solve problem
6. Constrained optimization

Contents

Week	Topic
1	Economic Dynamics and Integral Calculus Review of Differentiation, Dynamics and Integration, Indefinite integrals
2	Definite Integrals, Area Under the Curve, Improper Integrals
3	Economic Applications, Present Value of Cash Flow, Perpetual Value of Cash Flow, Domar Growth Model
4	First Order Differential Equations

	First Order Linear Differential Equations with Constant Coefficient and Constant Term, Dynamics of Market Price, Variable Coefficient and Variable Term
5	Exact Differential Equations, Non-Linear Differential Equations
6	Qualitative / Graphical Approach, Solow Growth Model
7	Discrete Time, Differences and Difference Equations, Solving First Order Difference Equations
8	Dynamic Stability of Equilibrium, The Cobweb Model
9	Mid-term
10	<p>► Market Model With Inventory</p> <p>Nonlinear Difference Equations – The Qualitative Graphic Approach</p>
11	<p>Higher Order Differential Equations</p> <p>Second Order Linear Differential Equations With Constant Coefficient and Constant Term, Complex Numbers and Circular Functions</p>
12	Analysis of Complex Root Case, A Market Model With Price Expectations
13	Differential Equation with Variable Term, Higher Order Linear Differential Equations
14	The Differential Version of optimization conditions, Extreme values of a function of two variables, Quadratic Form- An Excursion
15	Objective Functions with More than two variables, Second Order conditions with respect to concavity and convexity
16	Finding Stationary Values, Lagrange Multiplier
17	Kuhn-Tucker Conditions, Maximum Value and the Envelope Theorem
18	Final Examination

Readings List (including Books, Journals, Papers Articles, & Websites whatever is applicable)

a. Textbook: Alpha C. Chiang & Kevin Wainwright. *Fundamental Methods of Mathematical Economics*, 2014, 4th Edition, McGraw-Hill Book Company.

Reference books:

- Akihito Asano. *An Introduction to Mathematics for Economics*. 2013, Cambridge University Press.
- Robert C. Werde & Murray Spiegel. *Schaum's Outlines; Advanced Calculus*, 2002, 2nd Edition, McGraw Hill Book Company.