

#### Department:

Economics and Finance

Course Name:	Mathematical Economics	Course No.:	ECON 613
Prerequisite:	N/A	Credit Hours:	3

#### **Brief Description:**

The aim of the course is to improve the students' skills related to use of mathematical models and applications in economic theory to provide the students with basic mathematical tools and fundamental mathematical skills essential to understanding modern economic theory and practice, including calculus and linear matrix algebra, differentiation, economic dynamics, integrals and optimization to study theories of consumer and producer behavior, applications of optimization in consumer theory and theory of the firm, determination of prices in markets, general equilibrium, input-output model, linear and non-linear models.

#### Course Objectives:

After completion of this course the student will be able to:

- Explain the basic tools of applied mathematics
- Identify the basic mathematical tools of linear algebra,
- Applying these tools in the fields of economics and business.
- Analyze their logical thinking
- Construct the inter-industry Input-Output Model
- Compare the simple and constraint optimization
- Interpret the Economic dynamic

#### Course Topics:

- Sequilibrium Analysis in Economics
- Comparative Statics and Derivatives
- Differentials
- **Optimization**
- Solution State Sta
- **Optimization** with Equality Constraint
- Linear Models and Matrix Algebra
- Solution Economic Dynamics and Integral Algebra





#### Text Book:

Chiang, A.C. and Wainwright, K., "Fundamental Methods of Mathematical Economics," 5<sup>th</sup> Ed. New York, USA: McGraw-Hill, Inc., 2005.

### **Additional References:**

1. Anthony, M., "Mathematics for Economics and Finance," Cambridge, UK: Cambridge University Press, 1996. 2. Glass, J. C., "An Introduction to Mathematical Methods in Economics," New York, USA: McGraw-Hill, Inc., 1980.

#### **Online Resources:**

- https://en.wikipedia.org/wiki/Mathematical\_economics
- www.economist.com/topics/mathematics
- https://www.intelligenteconomist.com > News
- www.studyingeconomics.ac.uk/tips-for-working-efficiently/maths-help

Measurement & Assessment Tools:						
Objectives			Obj 1.1 &1.2	Obj 2.2	Obj 3.1	
Assessment tools	Grade	Week (Time period)	1	2	3	
Midterm test	25	9 <sup>th</sup>	*			
Class work	10	12 <sup>th</sup>			*	
Assignments	15	15 <sup>th</sup>		×		
Final exam	50	As Dated	*			
Total	100					
Extra credit						
Not Required						

Tentative Course Outline:				
Week	Hours	Topics	Readings	
1	3	Syllabus and introduction to mathematical economics and economic models		
2	3	Equilibrium Analysis in Economics		
3	3	Comparative Statics and Derivatives		
4	3	Rules of Differentiation and Their Use in Comparative Static		
5	3	Comparative Static Analysis of General-Function Models		
6	3	Optimization Problems		
7	3	Exponential and Logarithmic Functions		
8	3	The Case of More than One Choice Variables		
9	3	Mid Term		
10	3	Optimization with Equality Constraint		
11	3	Further Topics in Optimization		
12	3	Linear Models and Matrix Algebra		
13	3	Linear Models and Matrix Algebra		
14	3	Economic Dynamics and Integral Algebra		
15	3	Economic Dynamics and Integral Algebra		
16	3	Revision		





## Approved by Dept. Chair:

# Date of Approval:

Extra Information: (Updated every semester and filled by course instructor)				
Course Instructor: Office No: Extension: Email: Office Hours:	Dr			