Faculty of Economics & Political Science

Mathematical Economics 2

Information :

Course Code :	ECO 404	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours
Department :	Department of Economics				

Area Of Study :

This course relates mathematical techniques to economic analysis. It intends to provide a mathematical representation to economic theories. The course covers a variety of topics, for example: Game theory, Nash equilibrium, The Principal Agent Problem with Hidden Information, Bayes theory, Cournot's model and oligopolistic competition. It offers students with applications and case studies in several topics such as: price wars, externalities and public goods.

Course Goals:
• Provide students with the mathematical tools required for economic analysis.
• Teach students how to apply the Lagrange multiplier approach to constrained optimization problems.
• Acquaint students with solving economic problems in a matrix form and inform them with Cramer's rule.
• Economic Applications using game theory.
• Equip Students how to formulate economic problem in mathematical terms.

Description :

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Course outcomes :

a.Knowledge and Understanding: :	
1 -	Define the basics of matrices, and their importance for economists.
2 -	Identify Homogeneous andHomothetic Functions, as well as explaining Concavity and Convexity.
3 -	Differentiate between different models of oligopolistic competition.
b.Intellectual Skills: :	
1 -	Calculate costs, revenues and profits of real case studies using different oligopolistic competition models.
2 -	Appraise national and international company's situations using the concept of game theory and Nash equilibrium.
c.Professional and Practical Skills: :	
1 -	Apply mathematical, statistical and graphical techniques in an appropriate manner.
2 -	Manipulate game theory and the use of Nash Equilibrium concept in solving economics problems.
3 -	Practice the Principal Agent Problem in real situations.

d.General and Transferable Skills: :	
1 -	Use critical thinking methods for solving problems and decisions making.
2 -	Encourage Innovation and knowing how to work towards the results.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introductory lecture and course outline Revision on matrices, differentiation, Integration and different types of functions	9	3	
Game theory	6	2	
Nash equilibrium	6	2	
Midterm Exam		1	
The Principal Agent Problem with Hidden Information	6	2	
Cournot's model and oligopolistic competition	6	2	
Economic Applications and Case studies	6	2	
Final Exam		1	

Teaching And Learning Methodologies :

Data show and computer in lectures
Case studies Applications.
Group discussion and presentations.

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Course Work (Attendance, Participation, Assignments, Quizzes, Research Paper…)	30.00		To assess understanding and to assess theoretical background of the intellectual and practical skills.
Final Exam	40.00	15	To assess knowledge and intellectual skills.
Midterm Exam	30.00	8	To assess professional skills.