

# Faculty of Economics and Political Science

Mathematical Economics 2						
Information :	<u>-</u>					
Course Code	e: ECO 404	Level	:	Undergraduate	Course Hours :	3.00- Hours
Department :	Department of Econor	nics				
Area Of Stud	<u>y :</u>					
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: <i>"Á</i> Provide students with the mathematical tools required for economic analysis. <i>"Á</i> Teach students how to apply the Lagrange multiplier approach to constrained optimization problems. <i>"Á</i> Acquaint students with solving economic problems in a matrix form and inform them with Cramer's rule. <i>"Á</i> Economic Applications using game theory. <i>"Á</i> Equip Students how to formulate economic problem in mathematical terms.						
Description :	1					
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Course outer	omos :					
Course outcomes :						
1 -	Differentiate between diffe	rent models	of c	ligopolistic competition	า	
2 -	Identify Homogeneous and Homothetic Functions, as well as explaining Concavity and Convexity					
3 -	Define the basics of matrices, and their importance for economists.					
b.Intellectual Skills: :						
1 -	Appraise national and international company's situations using the concept of game theory and Nash equilibrium.					
2 -	Calculate costs, revenues	and profits o	of re	al case studies using o	different oligopolistic	competition models.
c.Professional and Practical Skills: :						
1 -	Practice the Principal Age	nt Problem ir	n rea	al situations.		
2 -	Manipulate game theory a	nd the use o	f Na	ash Equilibrium concep	ot in solving economic	cs problems.
3 -	Apply mathematical, statistical and graphical techniques in an appropriate manner.					



### d.General and Transferable Skills: :

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

### Course Topic And Contents :

Торіс	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 Paperõ D	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.