

COURSE GUIDE: 2012-13

COURSE DETAILS

Name :	Quantitative Methods		
Code :	62102205	Plan :	Grade in Administration and Business Management
Academic year :	2012/2013	Level :	Undergraduate
Course :	2	Type :	Obligatory
Semester :	2nd		

TIME DISTRIBUTION IN ACCORDANCE WITH REGULATION

ECTS :	6	In-class hours:	45
		Not in-class hours:	105
Total time (in hours):			150

USE OF VIRTUAL PLATFORM:

LECTURER DETAILS

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ACTIVITIES ORGANIZATION

Planned activities for learning and workload distribution per activity (in hours)

I. STUDENT'S ACTIVITIES (In-class / Online)	• Seminars	0,0
	• Teaching group	31,0
	• Work group / small group [Example]	14,0
	<i>Total In-class/Online time :</i>	45,0
II. STUDENT'S AUTONOMOUS ACTIVITIES (not in-class)	•	105,0
	<i>Total not in-class time :</i>	105,0
TOTAL WORKING HOURS		150,0

ELEMENTS OF INTEREST FOR COURSE LEARNING

Justification of contents

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Several mathematical models related with optimization and decision making are introduced. In particular, fundamentals of mathematical programming (both linear and non-linear, with and without constraints), of game theory and of econometric models are studied.

Other courses related

Macroeconomics (2th course of ABM), Operations Management I and II (3th course of ABM), Strategic Management I and II (4th course of ABM).

Minimum knowledge required to deal with the Course

Topics corresponding to a basic Mathematics course of the 1st year of Administration and Business Management.

General education and B1 level in English are required, B2 level is highly recommended.

COMPETENCIES

General competencies

General objectives of the University of Almería

1. Basic professional skills.
2. Oral / written communication in English.
3. Capacity of self-criticism.
4. Capacity of problema solving.

Other general objectives

Application of knowledge

Specific competencies developed

Capacity of application of mathematical methods, in particular, of optimization, operational research and statistics, to the statement and solution of practical problems from economics and management.

LEARNING OJECTIVES/OUTCOMES

1. Acquiring fundamentals of mathematical modeling in real-life situations.
2. Being able to pose and solve optimization problems appearing in economics and business, distinguishing between linear and non-linear models, and applying adequate solution methods.
3. Being able to use basic concepts of the game theory and of the economics modeling, in particular, of the basic regression models.

CONTENTS

Module

Linear Programming. Optimization problem when both the objective function and the restrictions are linear. Their application in Economics and Business. Duality. Simplex method.

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Content	<p>Topic 1: Introduction to Linear Programming. Classical optimization problems when both the objective function and the restrictions are linear.</p> <p>Topic 2: Simplex method.</p> <p>Topic 3: Duality. Dual Simplex algorithm.</p> <p>Topic 4: Transportation problems.</p>
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Learning system and methodology

<i>System</i>	<i>Learning procedures and activities</i>	<i>Observations</i>	<i>Hours In-class/ Online</i>
Teaching group	Lectures		7,0
Work group	Problem solving		3,5

Description of autonomous workload

- Attending the lectures and problem solving sessions.
- Active participation in classes.
- Individual study and problem solving.
- Use and consult the recommended bibliography, as well as making use of office hours.
- Use of the resources available at Aula Virtual.

Module	Non-linear Programming
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Content	<p>Topic 1: Non-constrained optimization. Necessary conditions for extremum.</p> <p>Topic 2: Constrained optimization. Lagrange multipliers and Kuhn-Tucker theorem.</p> <p>Topic 3: Elements of integer and multi-criterial programming.</p>
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Learning system and methodology

<i>System</i>	<i>Learning procedures and activities</i>	<i>Observations</i>	<i>Hours In-class/ Online</i>
Teaching group	Lectures		8,5
Work group	Problem solving		5,5

Description of autonomous workload

- Attending the lectures and problem solving sessions.
- Active participation in classes.
- Individual study and problem solving.
- Use and consult the recommended bibliography, as well as making use of office hours.
- Use of the resources available at Aula Virtual.

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Module	Elements of the Game Theory		
Content	Topic 1: Games of two participants. Pure and mixed strategies. Games with and without cooperation. Topic 2: Matrix games and linear programming. Topic 3: Other concepts and paradoxes of the Game Theory.		
Learning system and methodology			
<i>System</i>	<i>Learning procedures and activities</i>	<i>Observations</i>	<i>Hours In-class/ Online</i>
Teaching group	Lectures		7,0
Work group	Problem solving		3,0
Description of autonomous workload			
<ul style="list-style-type: none"> • Attending the lectures and problem solving sessions. • Active participation in classes. • Individual study and problem solving. • Use and consult the recommended bibliography, as well as making use of office hours. • Use of the resources available at Aula Virtual. 			
Module	Mathematical models applied to Economics and Business		
Content	Topic 1: Modelling in Economics. Topic 2: Basic regression models. Specification and estimation. Topic 3: Basic regression model. Contrast of significance and prediction.		
Learning system and methodology			
<i>System</i>	<i>Learning procedures and activities</i>	<i>Observations</i>	<i>Hours In-class/ Online</i>
Teaching group	Lectures		8,5
Work group	Problem solving		4,0
Description of autonomous workload			
<ul style="list-style-type: none"> • Attending the lectures and problem solving sessions. • Active participation in classes. • Individual study and problem solving. • Use and consult the recommended bibliography, as well as making use of office hours. • Use of the resources available at Aula Virtual. • Search for real application data in the economics and management environment. • Basics of the SPSS software. Data introduction and representation. • Test solving for self-assessment. • Problem solving. • Independent study on regression models and other topics. 			

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EVALUATION SYSTEM

Assessment criteria

Written exams and tests, works handed in class, as well as participation in classes will be taken into account. Modules 1-2 and 3-4 will be assessed independently over a maximum of 10 points, being a necessary condition scoring at least 5 points in each assessment. The final marks are computed as a simple average of both assessments.

Marking system

	<i>Activity</i>	<i>(Number of hours)</i>	<i>Percentage</i>
I. STUDENT 'S ACTIVITIES (In- class/Online)	• Teaching group	31	30 %
	• Work group/ small group [example]	14	30 %
II. STUDENT'S AUTONOMOUS ACTIVITIES (Autonomous work)	• Individual work [example]	105	40 %

Assessment instruments

- Test, quizzes, exercises, problem sets.
- Final exams (written or oral).

Monitoring mechanisms

- Registration and access to "Aula Virtual"
- Completion of in-class quizzes and problem solving sessions
- Solution of additional problems and their defense during office hours

BIBLIOGRAPHY

Recommended bibliography

- Aplicaciones de Álgebra Lineal (*Grossman, S.I.*) – Complementary bibliography
- Econometría (*Gujarati, D.N. y Porter, D.*) - Basic bibliography
- Econometría: modelos y pronósticos (*Pindyck, R.S., Rubinfeld, D.L.*) - Complementary bibliography
- Econometric Models, Techniques and Applications (*Intriligator, M.D, Bodkin, R.G. y Hsiao, C.*) - Complementary bibliography
- Fundamentos de optimización matemática para la economía y la empresa con Derive y Mathematica en un entorno Windows (*González, A., Calderón, S., Galache, T., Ordóñez, J.M. y Torrico, A.*) - Complementary bibliography
- Introducción a la investigación de operaciones (*Hillier, F.L. y Lieberman, G.L.*) - Basic bibliography
- Linear and nonlinear programming (*Luenberger, D.E.*) - Bibliografía básica Linear programming and economic analysis (*Dorfman, R., Samuelson, P.A., Solow, R.M.*) - Basic bibliography

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- Linear programming and network flows (*Bazaraa, M.S. Jarvis, J.J., Sherali, H.D.*) - Complementary bibliography
- Matemáticas II. Economía y Empresa. Teoría. (*Rodríguez, J., Prieto, E., Hernández, V. y Gómez, P.*) - Complementary bibliography
- Modelos Económicos (*Pulido, A. y Pérez, J.*) - Complementary bibliography
- Programación lineal y no lineal (*Luenberger, D.E.*) - Basic bibliography
- Programación matemática (*Balbás de la Corte, Alejandro*) - Basic bibliography
- Teoría de juegos con aplicaciones a la economía (*Friedman, James W.*) - Basic bibliography


Bibliography existing in the library of the University of Almeria

<http://almirez.ual.es/search/x?SEARCH=70534211>

WEB ADRESSES

<http://home.ubalt.edu/ntsbarsh/opre640a/partVIII.htm>
Deterministic Modeling: Linear Optimization with Applications
<http://home.ubalt.edu/ntsbarsh/Business-stat/opre/PartIII.htm>
Integer Optimization and the Network Models
<http://home.ubalt.edu/ntsbarsh/Business-stat/opre/partIV.htm>
The Classical Simplex Method
<http://home.ubalt.edu/ntsbarsh/Business-stat/opre/partVI.htm>
Introduction to Game Theory: Wining Business in A Competitive Environment
<http://home.ubalt.edu/ntsbarsh/Business-stat/opre/nonlinear.htm>
From Linear to Nonlinear Optimization with Business Applications
<http://www.ine.es>
Instituto Nacional de Estadística
<http://www.mineco.es>
Ministerio de Economía
<http://www.europa.eu.int>
EUROSTAT
<http://www.bde.es>
Banco de España
<http://www.funcas.es>
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