



Faculty of Business Economics

UPCT



Course unit description:

Quantitative and computer tools for
business decision making

Degree/s: Master in Business Administration

1. Subject data

Name	Quantitative and computer tools for business decision making				
Subject area					
Module	Module I: Tools for Business Administration and Management				
Code	212101005				
Degree programme	Master in Business Administration				
Curriculum	2018				
Centre	Faculty of Business Economics				
Type	Compulsory				
Length of subject	Termly	Term	1	Course	1 st .
Language	English				
ECTS	4	Hours / ECTS	25	Total workload (hours)	100

2. Lecturer data

Lecturer in charge	Roberto J. Cañavate Bernal		
Department	Quantitative and Computer Methods		
Knowledge area	Quantitative Methods for Business		
Office location	Faculty of Business Sciences - Third floor, office 325		
Telephone	968 325783	Fax	968 325745
email	r.canavate@upct.es		
URL / WEB	http://metodos.upct.es		
Office hours	Published on 'Aula Virtual' and on bulletin board		
Location	Office 325		

Qualification/Degree	Degree in Mathematics
Academic rank at UPCT	College Lecturer (Profesor Titular de Escuela Universitaria)
Year of admission in UPCT	2000
Number of five-year periods (<i>quinquenios</i>) if applicable	3
Research lines (if applicable)	Continuous Location, Polyhedral Theory, Integer Programming, Spreadsheet Applications to Optimization
Number of six-year periods (<i>sexenios</i>) if applicable	0
Professional experience (if applicable)	Collaboration scholarship in Statistics in C.A.R.M. (1997-1998) Assistant Professor in UMH of Elche (1998-2000)
Other topics of interest	Applications of ICT to learning

Lecturer in charge	José Antonio García Córdoba		
Department	Quantitative and Computer Methods		
Knowledge area	Quantitative Methods for Business		
Office location	Third floor, office 315		
Telephone	968 325492	Fax	968 325745
email	josea.garcia@upct.es		
URL / WEB	http://metodos.upct.es		
Office hours	Published on "Aula Virtual" and on bulletin board		
Location	Office 315		

Qualification/Degree	Mathematics Sciences
Academic rank at UPCT	Professor
Year of admission in UPCT	1999
Number of five-year periods (<i>quinquenios</i>) if applicable	0
Research lines (if applicable)	Health economics
Number of six-year periods (<i>sexenios</i>) if applicable	0
Professional experience (if applicable)	
Other topics of interest	

Lecturer in charge	Juan Francisco Sánchez García		
Department	Quantitative and Computer Methods		
Knowledge area	Quantitative Methods for Business		
Office location	Third floor, office 321		
Telephone	968 325623	Fax	968 325745
email	jf.sanchez@upct.es		
URL / WEB	http://metodos.upct.es/jfsanchez		
Office hours	Published on "Aula Virtual" and on bulletin board		
Location	Office 321		

Qualification/Degree	Degree in Economics and Business
Academic rank at UPCT	Associate Professor (Profesor Contratado Doctor)
Year of admission in UPCT	1996
Number of five-year periods (<i>quinquenios</i>) if applicable	4
Research lines (if applicable)	Computing, programming, simulation, game theory
Number of six-year periods (<i>sexenios</i>) if applicable	0
Professional experience (if applicable)	Tax advisor for 11 years
Other topics of interest	

3. Subject description

3.1. General description

The aim of this course is to provide the student the ability to apply quantitative and computer tools in the analysis of economic and business data and in decision making, to identify patterns of business behaviour using statistical techniques, and to create optimization models using specific software.

3.2. How the subject contributes to a professional career

This course allows learning how to use advanced computer tools for decision making in the business, according to the professional profile of the Master in Business Administration.

3.3. Relationship with other subjects in the programme

This course is related to the elective course “Quantitative analysis of business information” as long as the rest of the compulsory courses.

3.4. Incompatibilities defined in the programme

None.

3.5. Recommendations to do the subject

It is desirable that the student has basic knowledge about spreadsheets and statistical software.

3.6. Special provisions

As set forth in article 6 of the *Reglamento de las Pruebas de Evaluación de los Títulos Oficiales de Grado de la UPCT* the corresponding vice-rector may establish special adaptations in methodology and the development of lessons for students who suffer from a disability or some limitation, in order to enable them continued studies.

The student who, because of their circumstances, may require special measures of this kind should inform the teacher at the beginning of the semester.

Likewise, foreign students who may have difficulty with the language should notify the teacher.

4. Competences and learning outcomes

4.1. Basic curricular competences related to the subject

CB10 - To possess the learning skills that will enable them to continue studying in a way that will be largely self-directed or autonomous.

4.2. General curricular competences related to the subject

1. To apply the knowledge acquired and their problem-solving skills to new environments, within broader (or multidisciplinary) contexts related to business, public administration and the free exercise of the profession.
4. To acquire skills through the teaching-learning process that will enable them to continue training and learning in their specialty, autonomously and through the contacts established with teachers and professionals of the Master.

4.3. Specific curricular competences related to the subject

25. To understand and implement the tools necessary to carry out an autonomous process in business management activities, public administration and the free exercise of the profession.

4.4. Transversal curricular competences related to the subject

CT3 - Learn autonomously

4.5. Subject learning outcomes

1. Be able to apply quantitative and computer tools to the analysis of economic and business data and to decision making.
2. Be able to create models for analysis, planning and business simulation with spreadsheets.
3. Be able to identify business behaviour patterns using statistical techniques.
4. Be able to apply optimization techniques in business.
5. Be able to create and present reports by using quantitative and computer tools.

5. Contents

5.1. Curricular contents related to the subject

Computer, statistical and operations research tools to create models for data analysis and decision making in business. Creating and programming real model with spreadsheets based on quantitative techniques, to analyse economic business data, planning and simulation, as a support for decision making in economics, industry and businesses. Principal components and cluster analysis applied to economic and business data. Techniques and models for planning, optimization and decision making in businesses by using specific software.

5.2. Theory syllabus (teaching modules and units)

PARTE PRIMERA: HERRAMIENTAS INFORMÁTICAS

1. Herramientas avanzadas de la hoja de cálculo
2. Modelos de análisis y diagnóstico de empresas
3. Modelos de planificación y simulación

PARTE SEGUNDA: HERRAMIENTAS ESTADÍSTICAS

4. Análisis descriptivo y de regresión
5. Análisis de componentes principales
6. Análisis clúster

PARTE TERCERA: HERRAMIENTAS DE INVESTIGACIÓN OPERATIVA

7. Aplicaciones de la investigación operativa en la gestión de operaciones
8. Toma de decisiones multicriterio

5.3. Practice syllabus (name and description of every practical)

All the exercises and models corresponding to the different topics will be created in the computers classroom.

Risk prevention

Promoting the continuous improvement of working and study conditions of the entire university community is one of the basic principles and goals of the Universidad Politécnica de Cartagena.

Such commitment to prevention and the responsibilities arising from it concern all realms of the university: governing bodies, management team, teaching and research staff, administrative and service staff and students.

The UPCT Service of Occupational Hazards (*Servicio de Prevención de Riesgos Laborales de la UPCT*) has published a "Risk Prevention Manual for new students" (*Manual de acogida al estudiante en materia de prevención de riesgos*), which may be downloaded from the e-learning platform ("Aula Virtual"), with instructions and recommendations on how to act properly, from the point of view of prevention (safety, ergonomics, etc.), when developing any type of activity at the University. You will also find recommendations on how to proceed in an emergency or if an incident occurs.

Particularly when carrying out training practices in laboratories, workshops or field work, you must follow all your teacher's instructions, because he/she is the person responsible for your safety and health during practice performance. Feel free to ask any questions you may have and do not put your safety or that of your classmates at risk.

5.4. Theory syllabus in English (teaching modules and units)

MODULE I: COMPUTER TOOLS

1. Spreadsheets advanced tools
2. Business analysis models
3. Planning and simulation models

MODULE II: STATISTICS TOOLS

4. Descriptive and regression analysis
5. Principal component analysis
6. Cluster analysis

MODULE III: OPERATIONS RESEARCH TOOLS

7. Applications of operations research to operations management
8. Multi-criteria decision analysis

5.5. Detailed description of learning goals for every teaching module

Module 1: Creation of spreadsheet models for analysis, planning and business simulation.

Module 2: Identify business behaviour patterns using statistics techniques.

Module 3: Apply operations research techniques in decision-making in certain economic and business situations

6. Teaching method

6.1. Teaching method			
Teaching activity	Teaching techniques	Student workload	Hours
Theory classes	Expository class using the method of the lesson and the case method. Resolution of questions raised by the students.	<u>In-class</u> : Taking notes. Asking questions.	8
		<u>Self-study</u> : Study of the subject	
Practical classes and problems	Practical class in computers classroom, where a problem is proposed giving time for its resolution. Resolution of questions raised by the students.	<u>In-class</u> : Active participation. Problem solving. Asking questions	32
		<u>Self-study</u> : Practice using the software by solving practical cases	
Student self-work	Development of a project.	<u>In-class</u> :	
		<u>Self-study</u> : Creation of the project.	52
Evaluation	Exposition of the project.	<u>In-class</u> : Attendance at formal review	4
		<u>Self-study</u> :	
Tutorials	Answering any questions about theory, and solving problems.	<u>In-class</u> : Asking of questions during the tutorial hours	4
		<u>Self-study</u> :	
		<u>In-class</u> :	
		<u>Self-study</u> :	
		<u>In-class</u> :	
		<u>Self-study</u> :	
		<u>In-class</u> :	
		<u>Self-study</u> :	
		<u>In-class</u> :	
		<u>Self-study</u> :	
			100

7. Assessment method

7.1 Assessment method

Assessment activity	Type		Assessment methods and criteria	Percentage (%)	Assessed learning outcomes (4.5)
	Summative	Formative			
Participation and involvement in the teaching-learning process	X		Individual exercises in classroom and tutorials.	Between 5% and 15%	1, 2, 3, 4, 5
Evaluation of projects and reports	X		Submission of practical exercises or projects and reports.	Between 85% and 95%	1, 2, 3, 4, 5

As set forth in article 5.4 of the *Reglamento de las pruebas de evaluación de los títulos oficiales de grado y de máster con atribuciones profesionales (UPCT)*, students in the special circumstances listed in the article 5.4 are entitled to a comprehensive assessment test, upon justified request which must be granted by the Department. This does not exempt them from carrying out compulsory tasks included in the teacher's guide of the subject (official syllabus).

7.2. Control and monitoring methods (optional)

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8. Bibliography and resources

8.1. Basic bibliography

- HILLIER, F.S. and LIEBERMAN, G.J. (2001): “Introduction to Operations Research”, McGraw-Hill.
- MACDONALD, Matthew (2013): “Excel 2013: The Missing Manual”, O’Reilly Media, USA.
- TAYLOR III, B. W. (2013): “Introduction to Management Science. Pearson Education”.
- WAYNE L., Winston (2004): “Operations Research: Applications and Algorithms”, Thomson.
- WINSTON, WAYNE L. (2011): “Microsoft Excel 2010: Data Analysis and Business Modelling”, Microsoft Press, USA.

8.2. Supplementary bibliography

- BERNAL GARCÍA, J.J.; SÁNCHEZ GARCÍA, J.F.; MARTÍNEZ MARÍA DOLORES, S.M. (2008): “20 herramientas para la toma de decisiones”, Especial Directivos, Madrid.
- ESTRATEGIA FINANCIERA (Revista), Editorial CISS - Especial Directivos, Madrid.

8.3. On-line resources and others

- <http://aulavirtual.upct.es>
- <http://office.microsoft.com/en-us/excel/>
- <http://office.microsoft.com/en-us/training/microsoft-excel-training-curriculum-guide-FX102828216.aspx>