



## Teaching Guide

Identifying Data					2019/20
<b>Subject (*)</b>	Interactive Models of the Operations Research		<b>Code</b>	614493025	
<b>Study programme</b>	Mestrado Universitario en Técnicas Estadísticas (Plan 2019)				
Descriptors					
<b>Cycle</b>	<b>Period</b>	<b>Year</b>	<b>Type</b>	<b>Credits</b>	
Official Master's Degree	1st four-month period	First Second	Optional	5	
<b>Language</b>	Spanish				
<b>Teaching method</b>	Face-to-face				
<b>Prerequisites</b>					
<b>Department</b>	Matemáticas				
<b>Coordinador</b>		<b>E-mail</b>			
<b>Lecturers</b>		<b>E-mail</b>			
<b>Web</b>	eio.usc.es/pub/mte				
<b>General description</b>	The objective of this subject is to study some models devoted to the cooperation in optimization problems where several agents are involved.				

## Study programme competences / results

Code	Study programme competences / results
A4	Coñecer algoritmos de resolución dos problemas e manexar o software axeitado.
A9	Obter os coñecementos precisos para unha análise crítica e rigorosa dos resultados.
A15	Fomentar a sensibilidade cara aos principios do pensamento científico, favorecendo as actitudes asociadas ao desenvolvemento dos métodos matemáticos, como: o cuestionamento das ideas intuitivas, a análise crítica das afirmacións, a capacidade de análise e síntese ou a toma de decisións racionais.
B6	Capacidade para iniciar a investigación e para participar en proxectos de investigación que poden culminar na elaboración dunha tese doutoral.
B8	Capacidade de traballo en equipo e de forma autónoma
B10	Capacidade de identificar e resolver problemas
C1	Ser capaz de identificar un problema da vida real.
C2	Dominar a terminoloxía científica-metodolóxica para comprender e interactuar con outros profesionais.
C3	Habilidade para traballar os aspectos metodolóxicos da investigación en colaboración con outros colegas a través do Campus Virtual co foro.
C4	Habilidade para realizar a análise estatística con ordenador.
C5	Escoller o deseño máis axeitado para responder á pregunta de investigación.
C6	Utilizar as técnicas estatísticas máis axeitadas para analizar os datos dunha investigación.
C7	Planificar, analizar e interpretar os resultados dunha investigación considerando tanto os aspectos teóricos coma os metodolóxicos.
C8	Habilidade de xestión administrativa do proceso dunha investigación.
C9	Comunicación e difusión dos resultados das investigacións.
C10	Lectura con xuízo crítico de artigos científicos dende unha perspectiva metodolóxica.

## Learning outcomes

Learning outcomes	Study programme competences / results



	AC4	BJ6	CJ1
	AC9	BJ8	CJ2
	AC15	BJ10	CJ3
			CJ4
			CJ5
			CJ6
			CJ7
			CJ8
			CJ9
			CJ10

Contents	
Topic	Sub-topic
Cooperation in planning problems	Planning problems Cooperation in planning problems
Cooperation in queueing problems	Queueing problems Cooperation in queueing problems
Cooperation in networks models	Networks models (shortest path problem, vehicle routing problems, minimum cost spanning tree problems, minimum cost arborescences problems, fixed cost tree problems, etc) Cooperation in networks models
Cooperation in inventory models and linear production problems	Inventory models Cooperation in inventory models Linear production problems Cooperation in linear production problems

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Supervised projects	A4 A9 A15 B6 B8 B10 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10	0	27.5	27.5
Mixed objective/subjective test	A4 A9 A15 B6 B8 B10 C1 C2 C5 C7 C8 C9	2	0	2
Guest lecture / keynote speech	A4 A9 A15 B6 B8 B10 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10	35	26.5	61.5
Speaking test	A4 A9 A15 B6 B8 B10 C1 C2 C5 C7 C8 C9 C10	4	0	4
Problem solving	A4 A9 A15 B6 B8 B10 C1 C2 C5 C7 C8 C9 C10	0	20	20
Personalized attention		10	0	10

(\* )The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Supervised projects	Each student will have to defend a project.



Mixed objective/subjective test	The students have the alternative to be evaluated according to an exam.
Guest lecture / keynote speech	The professors make use of the material, which will be previously provided to the students, to explain all the contents of the subject.
Speaking test	The student will defend the project.
Problem solving	The students have to solve a collection of problems related to the contents of the subject.

**Personalized attention**

Methodologies	Description
Problem solving Supervised projects	The student could ask the teacher for the instructions and the bibliography necessary to carry out his/her project.

**Assessment**

Methodologies	Competencies / Results	Description	Qualification
Problem solving	A4 A9 A15 B6 B8 B10 C1 C2 C5 C7 C8 C9 C10	The students should solve the collection of problems assigned by the professors.	50
Speaking test	A4 A9 A15 B6 B8 B10 C1 C2 C5 C7 C8 C9 C10	The student should defend the corresponding project in the speaking test.	50

**Assessment comments**

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**Sources of information**

<b>Basic</b>	<ul style="list-style-type: none"> <li>- Borm, P., Hamers, H. y Hendrickx, R. (2001). Operations Research Games: A Survey. . Springer</li> <li>- Curiel, I. (1997). Cooperative Game Theory and Applications.. Kluwer Academic Publishers</li> <li>- Sánchez-Rodríguez, E. y Vidal-Puga, J. (2014). Juegos coalicionales. Publicacións da Universidade de Vigo</li> </ul>
<b>Complementary</b>	<ul style="list-style-type: none"> <li>- Borm, P. y Peters, H. (2002). Chapters on Game Theory. Kluwer Academic Publishers</li> <li>- Driessen, T. (1998). Cooperative games, solutions and applications. Kluwer Academic Publishers</li> <li>- González-Díaz, J., García-Jurado, I. y Fiestras-Janeiro, G. (2010). An introductory course on mathematical game theory. American Mathematical Society</li> <li>- Hassin, R. y Haviv, M. (2003). To Queue or not to Queue. Kluwer Academic Publishers</li> <li>- Tijs, S. (2003). Introduction to Game Theory. Kluwer Academic Publishers</li> </ul>

**Recommendations**

**Subjects that it is recommended to have taken before**

Linear and Integer Programming/614493005  
Introduction to Game Theory/614493016

**Subjects that are recommended to be taken simultaneously**

Cooperative Games/614493026

**Subjects that continue the syllabus**

<b>Other comments</b>



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