Teaching Guide				
Identifying Data				2016/17
Subject (*)	SIMULACIÓN DE PROCESOS INDUSTRIAIS E OPTIMIZACIÓN		Code	730G04065
Study programme	Grao en enxeñaría en Tecnoloxías Industriais			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Fourth	Optativa	4.5
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Análise Económica e Administración de Empresas			
Coordinador	Garcia del Valle, Alejandro	E-mail	alejandro.garcia.delvalle@udc.es	
Lecturers	Crespo Pereira, Diego Garcia del Valle, Alejandro Lamas Rodriguez, Adolfo	E-mail	diego.crespo@udc.es alejandro.garcia.delvalle@udc.es adolfo.lamasr@udc.es	
Web				
General description	Course dealing with simulation and optimization as useful tools for the characterization and understanding of industrial processes to reduce costs and improve them.			

Study programme competences	
Code	Study programme competences
A1	Capacidade para a resolución dos problemas matemáticos que poidan formularse na enxeñaría. Aptitude para aplicar os coñecementos sobre: álxebra lineal; xeometría; xeometría diferencial; cálculo diferencial e integral; ecuacións diferenciais e en derivadas parciais; métodos numéricos; algorítmica numérica; estatística e optimización.
B2	Que os estudantes saiban aplicar os seus coñecementos ao seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo
B4	Que os estudantes poidan transmitir información, ideas, problemas e solucións a un público tanto especializado como leigo
B5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprenderen estudos posteriores cun alto grao de autonomía
B6	Ser capaz de concibir, deseñar ou poñer en práctica e adoptar un proceso substancial de investigación con rigor científico para resolver calquera problema formulado, así como de comunicar as súas conclusións ?e os coñecementos e razóns últimas que as sustentan? a un público tanto especializados como leigo dun xeito claro e sen ambigüidades
B7	Ser capaz de realizar unha análise crítica, avaliación e síntese de ideas novas e complexas
B8	Deseñar e realizar investigacións en ámbitos novos ou pouco coñecidos, con aplicación de técnicas de investigación (con metodoloxías tanto cuantitativas como cualitativas) en distintos contextos (ámbito público ou privado, con equipos homoxéneos ou multidisciplinares etc.) para identificar problemas e necesidades
C1	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C3	Entender a importancia da cultura emprendedora e coñecer os medios ao alcance das persoas emprendedoras.
C4	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.

Learning outcomes		
Learning outcomes	Study programme competences	
Knowing formulate and solve problems in situations where there is randomness.	A1 B2 B4 B5 B6 B7 B8	

Ability for abstraction. Understand, analyze and characterize industrial processes.	A1	B2 B4 B5	C3
Using simulation software and tools. Solve complex industrial processes.	A1	B2 B4 B5	C1 C4

Contents	
Topic	Sub-topic
1. Simulation	Introduction. Simulation applications.
2. Modelling and Simulation	Systems, modeling and simulation. Simulation types. The modeling process.
3. Discrete Event Simulation	Systems and processes of discrete events. Terminology and architecture of a discrete events model. Application areas.
4. Concepts used in Discrete Event Simulation	Items, properties and values. Queues. Routes. Processing. Merging or splitting entities. Resources and shifts.
5. Advance techniques in simulation	Sensitivity analysis. Optimization. Management of scenarios in simulation.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 B2 B4 B5 C3	6	18	24
Case study	A1 B6 B7 B8 C1	26	37.5	63.5
Supervised projects	A1 B5 B6 B7 C4	1	20	21
Personalized attention		4	0	4
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Lectures explaining the contents of the course
Case study	Interactive resolution of simulation cases
Supervised projects	Work (both individual and group)

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech Supervised projects Case study	Personal attention will be made in tutorial hours.

Assessment			
Methodologies	Competencies	Description	Qualification
Supervised projects	A1 B5 B6 B7 C4	Team work	80
Case study	A1 B6 B7 B8 C1	Troubleshooting interactive simulation. Each student will do an individual work that will be assessed by the teacher.	20

Assessment comments

Two assignments along the course will be made. One individual T1 and another in group T2. Both will be scored from 0 to 10.
The final grade NF will be:
NF = 0.2xT1 + 0.8xT2
The "students with recognition of a part-time academic and exemption of assistance" will communicate at the beginning of the course your situation to the teachers of the subject, as established by the "Standard that regulates the dedication to the study of undergraduates in the UDC "(Art.3.be 4.5) and the" Standards for evaluation, review and claim of the qualifications of undergraduate and master's degree (Art. 3 and 8b).
Students in this situation will be assessed on the date approved by the School Board, by an objective test consisting of solving exercises on the contents of step 3 of the Guide.

Sources of information	
Basic	- Alejandro García del Valle (2013). Apuntes de Simulación. Moodle - David Krahl, Robin Clark (2011). ExtendSIM for Discrete Event System Simulation. Imagine That! - Steward Robinson (2004). Simulation. The Practice of Model Development and Use. John Wiley and Sons - Diego Crespo Pereira, David del Río Vilas, Nadia Rego Monteil, Rosa Ríos Prado (2012). Simulation and Highly Variable Environments: A Case Study in a Natural Roofing Slates Manufacturing Plant, Use Cases of Discrete Event Simulation. Springer
Complementary	

Recommendations
Subjects that it is recommended to have taken before
ORGANIZACIÓN DE EMPRESAS/730G04024 ESTATÍSTICA/730G04008 XESTIÓN EMPRESARIAL/730G04010
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.