



## Teaching Guide

Identifying Data					2019/20
<b>Subject (*)</b>	Advanced Production Systems		<b>Code</b>	730497235	
<b>Study programme</b>	Mestrado Universitario en Enxeñaría Industrial (plan 2018)				
Descriptors					
<b>Cycle</b>	<b>Period</b>	<b>Year</b>	<b>Type</b>	<b>Credits</b>	
Official Master's Degree	1st four-month period	Second	Optional	3	
<b>Language</b>	Spanish				
<b>Teaching method</b>	Face-to-face				
<b>Prerequisites</b>					
<b>Department</b>	Empresa				
<b>Coordinador</b>	Lamas Rodriguez, Adolfo	<b>E-mail</b>	adolfo.lamasr@udc.es		
<b>Lecturers</b>	Crespo Pereira, Diego Lamas Rodriguez, Adolfo	<b>E-mail</b>	diego.crespo@udc.es adolfo.lamasr@udc.es		
<b>Web</b>	<a href="http://www.gii.udc.es/">http://www.gii.udc.es/</a>				
<b>General description</b>	<p>A simulación é unha técnica Lean para deseñar e mellorar procesos que desempeña un papel fundamental en Industria 4.0. O propósito desta materia é formar en técnicas de simulación de eventos discretos aplicadas ó deseño de sistemas avanzados de produción. En concreto, veránse problemas de deseño e optimización de plantas de fabricación pertencentes a proxectos de I+D+i reais en donde se aplican modelos de eventos discretos. A materia polo tanto axudará a aprender tanto técnicas de simulación como de mellora e optimización de sistemas de fabricación automatizados e robotizados.</p>				

## Study programme competences / results

Code	Study programme competences / results
A2	ETI2 - Knowledge and ability to project, calculate and design integrated manufacturing systems.
A8	ETI8 - Ability to design and project automated production systems and advanced process control.
A9	EG1 - Knowledge and skills to organize and manage companies.
A13	EG5 - Knowledge of management information systems, industrial organization, production systems and logistics and quality management systems.
A14	EG6 - Capacities for work organization and human resources management. Knowledge on prevention of occupational risks.
B2	CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
B3	CB8 - That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
B5	CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
B6	G1 - Have adequate knowledge of the scientific and technological aspects in Industrial Engineering.
B13	G8 - Apply the knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts.
B14	G9 - Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.
B16	G11 - Possess the learning skills that allow to continue studying in a self-directed or autonomous way.
C1	ABET (a) - An ability to apply knowledge of mathematics, science, and engineering.
C3	ABET (c) - An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
C6	ABET (f) - An understanding of professional and ethical responsibility.
C8	ABET (h) - The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
C11	ABET (k) - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Learning outcomes



Learning outcomes	Study programme competences / results		
Coñecementos para o deseño e optimización de sistemas integrados e automatizados de fabricación, organización industrial, sistemas produtivos, control económico e xestión de proxectos.	AJ2 AJ8 AJ9 AJ13 AJ14	BJ2 BJ3 BJ5 BJ6 BJ13 BJ14 BJ16	CJ1 CJ3 CJ6 CJ8 CJ11
Capacidade para a organización do traballo e a xestión de recursos. Coñecementos sobre a xestión de riscos.	AJ2 AJ8 AJ9 AJ13 AJ14	BJ2 BJ3 BJ5 BJ6 BJ13 BJ14 BJ16	CJ1 CJ3 CJ6 CJ8 CJ11

Contents	
Topic	Sub-topic
Fabricación Lean	Flujo pieza a pieza Calidad integrada en el modelo Sistema de producción Pull Producción Nivelada
Fabricación digital	Gemelo Digital de procesos
Industria 4.0	Robotización RV AGVs Gemelo digital
Robotización	Soldadura robotizada Control Dimensional Ensayos no Destructivos

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Supervised projects	A2 A8 A9 A13 A14 B2 B3 B5 B13 B14 B16 B6 C1 C3 C6 C8 C11	5	6	11
Guest lecture / keynote speech	A2 A8 A9 A13 A14 B2 B3 B5 B13 B14 B16 B6 C1 C3 C6 C8 C11	10	34	44
ICT practicals	A2 A8 A9 A13 A14 B2 B3 B5 B13 B14 B16 B6 C1 C3 C6 C8 C11	5	15	20
Personalized attention		0		0

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

Methodologies
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Methodologies	Description
Supervised projects	Resolución de casos prácticos propostos en clase e completados na casa.
Guest lecture / keynote speech	Clases maxistras sobre simulación de sistemas avanzados de produción
ICT practicals	Resolución de casos de simulación guiados polo profesor.

Personalized attention	
Methodologies	Description
Supervised projects Guest lecture / keynote speech ICT practicals	Tutorials for solving doubts and problems found during the course.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Supervised projects	A2 A8 A9 A13 A14 B2 B3 B5 B13 B14 B16 B6 C1 C3 C6 C8 C11	Assessment of the cases solved by the students.	90
ICT practicals	A2 A8 A9 A13 A14 B2 B3 B5 B13 B14 B16 B6 C1 C3 C6 C8 C11	Attendance to the ICT practicals and submission of the solved cases.	10

Assessment comments
<p>O "Alumnado con recoñecemento de dedicación a tempo parcial edispensa académica de exención de asistencia" comunicarán ó inicio do curso a súa situación os profesores da materia, segundo establece a "Norma que regula o réxime de dedicación ao estudo dos estudantes de grao na UDC" (Art. 3.b e 4.5) e as "Normas de avaliación, revisión e reclamación das cualificacións dos estudos de grao e mestrado universitario (Art. 3 e 8b). Para os alumnos que soliciten a dispensa académica a avaliación será igual ao resto xa que os traballos serán completados fóra do horario de clases.</p>

Sources of information	
<b>Basic</b>	<ul style="list-style-type: none"> <li>- Robinson, Stewart (2004). Simulation : The Practice of Model Development and Use. John Wiley &amp; Sons</li> <li>- Flexsim (2019). Tutoriales de Flexsim.</li> <li>- Yuri Merkurjev &amp; otros (2009). Simulation-Based Case Studies. Springer</li> </ul>
<b>Complementary</b>	

Recommendations
<b>Subjects that it is recommended to have taken before</b>
<b>Subjects that are recommended to be taken simultaneously</b>
<b>Subjects that continue the syllabus</b>
Other comments
<p>A sustainable use of resources must be made to prevent the negative impact on the natural environment. For this reason, the delivery of the documentary works carried out in this subject: They will be requested in virtual format and / or computer support. It will be done through Moodle, in digital format without needing to print them. If it is necessary to make them on paper: a) plastics will not be used, b) double-sided impressions will be made, c) recycled paper will be used, d) the printing of drafts will be avoided.</p>



(\*)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.