



## Teaching Guide

Identifying Data					2024/25
<b>Subject (*)</b>	Emerging Manufacturing Technologies Workshop		<b>Code</b>	730556022	
<b>Study programme</b>	Máster Universitario en Informática Industrial e Robótica				
Descriptors					
<b>Cycle</b>	<b>Period</b>	<b>Year</b>	<b>Type</b>	<b>Credits</b>	
Official Master's Degree	2nd four-month period	First	Optional	3	
<b>Language</b>	Spanish				
<b>Teaching method</b>	Face-to-face				
<b>Prerequisites</b>					
<b>Department</b>	Enxeñaría Naval e Industrial				
<b>Coordinador</b>	Ramil Rego, Alberto	<b>E-mail</b>	alberto.ramil@udc.es		
<b>Lecturers</b>	Lopez Diaz, Ana Jesus Ramil Rego, Alberto	<b>E-mail</b>	ana.xesus.lopez@udc.es alberto.ramil@udc.es		
<b>Web</b>					
<b>General description</b>	Introduction to the programming environment of an industrial robotic system: languages, simulation and operation. Features of its configuration and movement. Application to an additive manufacturing system by laser through direct energy deposition (Laser DED)				

## Study programme competences / results

Code	Study programme competences / results
A9	COMP09 - Planificar y coordinar tareas en equipos interdisciplinarios o transdisciplinarios ofreciendo propuestas que contribuyan a la eficacia del trabajo colaborativo.
A26	CON08 - Identificar las estructuras mecánicas básicas y avanzadas con las que se construyen las distintas morfologías robóticas, así como las claves y parámetros de su comportamiento, y los modelos cinemáticos y dinámicos de robots.
A74	OPT-CON15 - Identificar as tecnoloxías emerxentes de fabricación, así como as aplicacións da robótica sobre elas.
A92	OPT-HAB15 - Aplicar as tecnoloxías emerxentes de fabricación.

## Learning outcomes

Learning outcomes	Study programme competences / results
Saber identificar y usar tecnologías emergentes de fabricación	AR74
Saber implementar aplicaciones de la informática industrial a las tecnologías de fabricación	AR9 AR92
Saber implementar aplicaciones de robótica las tecnologías emergentes de fabricación	AR26 AR74 AR92

## Contents

Topic	Sub-topic
Identify and use emerging manufacturing technologies	-Laser material processing -Processing systems - DED Additive manufacturing (by laser directed energy deposition)
Implementation of industrial computing applications and robotics to emerging manufacturing technologies	Programming of industrial robots for manufacturing -Axis positioning systems -Robotic arms

## Planning



Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A26 A74	9	9	18
Laboratory practice	A9 A92	9	18	27
Supervised projects	A9 A92	1	27	28
Personalized attention		2	0	2

(\*)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	Keynote sessions on subject contents
Laboratory practice	Offline / online programming practices using tools and programming environments of a system with an industrial robotic arm used in manufacturing technologies
Supervised projects	Work based on the development and implementation of the suitable programming procedures for a manufacturing process example.

Personalized attention	
Methodologies	Description
Supervised projects Laboratory practice	The activity with the laboratory equipment and the work development will be carried out with the help and supervision of the personnel of the research teams.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Supervised projects	A9 A92	Aspects such as the scope and complexity of the work will be taken into account, as well as its originality.	70
Laboratory practice	A9 A92	Attendance to 80% of the sessions is necessary	30

Assessment comments
<p>Partial-time students will be evaluated in the same terms as those of full-time students.</p> <p>Evaluation criteria in second opportunity will be the same as in first opportunity.</p> <p>There is not academic exemption for class attendance in this subject</p>

Sources of information	
<b>Basic</b>	<ul style="list-style-type: none"> <li>- Olaf Diegel, Axel Nordin, Damien Motte (2019). A Practical guide to design for additive manufacturing / . Singapur, Springer</li> <li>- Gebhardt, Andreas (2016). Additive manufacturing : 3D printing for prototyping and manufacturing. Munich ; Hanser Publishers</li> <li>- Brandt, Milan. (2016). Laser Additive Manufacturing : Materials, Design, Technologies, and Applications.. Kent : Elsevier Science,</li> <li>- Toyserkani, Ehsan. (2005). Laser cladding. Boca Raton : CRC Press</li> <li>- Miranda Colorado, Roger (2016). Cinemática y dinámica de robots manipuladores. [Barcelona] : Marcombo</li> <li>- John J. Craig. (2006). Robótica. México : Prentice Hall,</li> <li>- Ollero Baturone, Aníbal. (2001). Robótica manipuladores y robots móviles.. Barcelona] : Marcombo</li> </ul>
<b>Complementary</b>	

Recommendations
Subjects that it is recommended to have taken before



<b>Subjects that are recommended to be taken simultaneously</b>
<b>Subjects that continue the syllabus</b>
<b>Other comments</b>
<p>&amp;lt;p&amp;gt;1. The delivery of the documentary works for this subject:&amp;nbsp;&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;1.1. Will be requested in virtual format and / or computer support.&amp;nbsp;&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;1.2. Will be done through Moodle, in digital format avoiding the need of printing.&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;1.3. If made on paper:&amp;nbsp;&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;-Do not use plastics.&amp;nbsp;&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;-Double sided printing will be made.&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;-Recycled paper will be used.&amp;nbsp;&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;-The printing of drafts will be avoided.&amp;lt;/p&amp;gt;&amp;lt;p&amp;gt;2. Sustainable use of resources and prevention of harm to the natural environment must be observed.&amp;lt;/p&amp;gt;</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.