



## IDENTIFYING DATA

### Means, Machines and Tools for Manufacturing

Subject	Means, Machines and Tools for Manufacturing			
Code	V04M141V01333			
Study programme	(*)Máster Universitario en Enxeñaría Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	4.5	Optional	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Pérez García, José Antonio			
Lecturers	Pérez García, José Antonio			
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Web				
General description				

## Competencies

Code	
A1	Knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context.
A3	That students are able to integrate knowledge and handle complexity and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
A5	Students must possess the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.
C1	CET1. Project, calculate and design products, processes, facilities and plants.
C3	CET3. Conduct research, development and innovation in products, processes and methods.
C5	CET5. Technically and economically manage projects, installations, plants, companies and technology centers.
C8	CET8. Being able to integrate knowledge and handle complexity and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
C10	CET10. Possess learning skills that will allow further study of a self-directed or autonomous mode.
C11	CET11. Knowledge, understanding and ability to apply the necessary legislation in the exercise of the profession of Industrial Engineer.
C13	CTI2. Knowledge and ability to design, calculate and design integrated manufacturing systems.
D5	ABET-e. An ability to identify, formulate, and solve engineering problems.

## Learning outcomes

Expected results from this subject	Training and Learning Results
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A1  
A3  
A5  
C1  
C3  
C5  
C8  
C10  
C11  
C13  
D5**Contents**

Topic	
Unit 1.- Industrialization of products	Unit 1.1.- Selection of Manufacturing Processes Unit 1.2.- Manufacture of Prototypes
Unit 2.- Die casting	Unit 2.1.- Die Casting Machines Unit 2.2.- Die casting Molds
Unit 3.- 5 axis CNC milling	Unit 3.1.- 5 axis machining centers Unit 3.2.- Clamping tools and reference systems
Unit 4.- Sheet metal forming	Unit 4.1.- Sheet metal forming machines Unit 4.2.- Dies for sheet metal forming
Unit 5 - Fabrication with Composites	Unit 5.1.- Manufacturing Technologies of components in composite materials Unit 5.2.- Molds for manufacturing with composites
Unit 6.- Injection of Polymers	Unit 6.1.- Plastic Injection Machines Unit 6.2.- Plastic Injection Molds
Unit 7.- Project for the Design and Manufacture of Injection Molds	Unit 6.1.- Analysis of the piece and optimization of the design Unit 6.2.- Calculations Unit 6.3.- Design of the mold Unit 6.4.- Simulation of the process Unit 6.5.- Manufacture of the mold

**Planning**

	Class hours	Hours outside the classroom	Total hours
Lecturing	6	8	14
Project based learning	31	62	93
Project	2	4	6

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

**Methodologies**

	Description
Lecturing	(*)12 Clases Teóricas, dunha hora de duración, a realizarse na aula da EEI asignada pola dirección do Centro. Nelas procederase á exposición básica de contidos e á resolución de exercicios, problemas e casos.
Project based learning	(*)Tanto las clases teóricas como las prácticas estarán integradas bajo un enfoque común de Aprendizaje Basado en Proyectos por lo que, todas ellas, irán encaminadas a la resolución de casos reales de diseño y fabricación de utillajes de mecanizado, moldeo, deformación plástica, fabricación aditiva y fabricación con composites.

**Personalized assistance**

Methodologies	Description
Lecturing	
Project based learning	
Tests	Description
Project	

**Assessment**

	Description	Qualification	Training and Learning Results
Lecturing	Continuous Assessment	10	

Project based learningContinuous Assessment		40	A1 A3 A5	C1 C3 C5 C8 C10 C13	D5
Project	Component Design and Manufacture Project: Final Report and Prototype	50	A1 A3 A5	C1 C3 C5 C8 C10 C11 C13	D5

### Other comments on the Evaluation

#### First opportunity

The subject is evaluated based on two parameters:

- Continuous Assessment (50% of the Final Mark)
- Final Report of the Subject Project and prototype manufacturing (50% of the Final Mark)

Other considerations:

- The Final Qualification will be obtained by adding (with a weight of 50%) that obtained in the previous two sections.
- For those students to whom the Directorate of the EEI has granted the waiver of the Continuous Assessment, the Final Project Report of the subject acquires a value of 100% of the Final Note of the Subject
- The characteristics of both the Continuous Assessment and the Subject Project will be communicated to the students during the presentation of the Subject

#### Second opportunity

The same criteria will be applied as those defined for the First Chance

#### FINAL CONSIDERATIONS:

In case of discrepancy between what is described in the versions in Galego, Castellano or English of this Teaching Guide, what is established in this version in Spanish will always prevail.

### Sources of information

#### Basic Bibliography

John G. Nee, **Fundamentals of Tool Design**, 6ª, SME, 2010

Camarero de la Torre, Julián, **Matrices, Moldes y Utillajes**, 1ª, CIE Dossat 2000, 2003

J.T. Black, Ronald A. Kohser, **Degarmo's materials and processes in manufacturing**, 12, Wiley, 2017

#### Complementary Bibliography

Dangel, R., **Injection Molds for Beginners**, 1ª, HANSER PUBLICATIONS, 2020

Campbell, John, **Complete Casting Handbook: Metal Casting Processes, Metallurgy, Techniques and Design**, 2ª, Elsevier, 2015

Tickoo, Sham, **CATIA V5-6R2014 for designers**, 12ª, Schererville, IN : Cadcim Technologies, 2015

Shoemaker, J., **Moldflow Design Guide A Resource for Plastics Engineers**, 1ª, Hanser, 2006

### Recommendations

### Contingency plan

#### Description

If UVigo decides that the subject must be taught online, then the following changes will be made in relation to the methodology described in this document:

-Software:

- The CAD / CAME tool to use would be Fusion360, instead of Catia v5

- Project of the subject

- It would not include the manufacture of tools in the Mechanical Workshop of the IPF Area in the Foundry Building of the Campus Headquarters