



## 1. General information

**Course:** MANUFACTURING TECHNOLOGY**Type:** CORE COURSE**Degree:** 351 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING (ALM)**Center:** 106 - SCHOOL OF MINING AND INDUSTRIAL ENGINEERING**Year:** 3**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 56325**ECTS credits:** 6**Academic year:** 2020-21**Group(s):** 56**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** ELENA MARIA BEAMUD GONZALEZ - Group(s): 56

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## 2. Pre-Requisites

- Basic knowledge of materials.
- Basic knowledge of production and manufacturing system

## 3. Justification in the curriculum, relation to other subjects and to the profession

The Industrial Engineer is the professional who uses the knowledge of the physical sciences and mathematics and the engineering techniques to develop his professional activity in aspects such as control, instrumentation and automation of processes and equipment, as well as the design, construction, operation and maintenance of industrial products. This training allows you to participate successfully in the different branches that integrate industrial engineering, such as mechanics, electricity, electronics, etc., adapt to the changes in the technologies in these areas and, if necessary, generate them, responding to the needs that are presented in the productive and service branches to achieve the welfare of the society to which it is owed.

Therefore, this subject is responsible for integrating concepts that the student has received in other subjects (calculus, Fundamentals of Computer Science, statistics, Science of materials, etc...) but has not seen a physical utility in a system of Manufacturing. This aspect is very important to be able to form a practical engineer capable of integrating elements that apparently have no relation in a useful system.

In addition this subject facilitates the understanding of the model of organization of the production of a company, that must be employed by the student during his practices in companies and during the development of his project end of degree.

## 4. Degree competences achieved in this course

## Course competences

Code	Description
A01	To understand and have knowledge in an area of study that moves on from the general education attained at secondary level and usually found at a level that, while supported in advanced text books, also includes some aspects that include knowledge found at the cutting edge of the field of study.
A02	To know how to apply knowledge to work or vocation in a professional manner and possess the competences that are usually demonstrated by the formulation and defence of arguments and the resolution of problems in the field of study.
A03	To have the capability to gather and interpret relevant data (normally within the area of study) to make judgements that include a reflection on themes of a social, scientific or ethical nature.
A04	To be able to transmit information, ideas, problems and solutions to a specialized audience.
A07	Knowledge of Information Technology and Communication (ITC).
A08	Appropriate level of oral and written communication.
A12	Knowledge of basic materials and technologies that assist the learning of new methods and theories and enable versatility to adapt to new situations.
A13	Ability to take the initiative to solve problems, take decisions, creativity, critical reasoning and ability to communicate and transmit knowledge, skills and abilities in Mechanical Engineering.
A15	Ability to work to specifications and comply with obligatory rules and regulations.
A17	Ability to apply principles and methods of quality control.
A18	To have organization and planning skills used in businesses and other institutions and organizations.
A19	Ability to work in a multilingual and multidisciplinary environment.
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously

## 5. Objectives or Learning Outcomes

### Course learning outcomes

Description

Knowledge of systems of automatization in manufacturing processes

Knowledge of machine tools, tools and equipment in manufacturing processes

Knowledge of the basics of metrology and the application of measuring techniques in quality control in manufacturing

Know the basic theories and technological aspects applied to the systems and processes of manufacturing

Knowledge of the analytical methods in the processes of manufacturing and the calculation of the principle technological parameters

Generic knowledge of the engineering of manufacturing within a production context

Theoretical and applied knowledge of the quality control techniques in manufacturing

## 6. Units / Contents

**Unit 1: TECHNOLOGICAL ASPECTS OF THE MANUFACTURING SYSTEMS**

**Unit 2: CONFORMATION BY REMOVE MATERIAL**

**Unit 3: CONFORMATION BY PLASTIC DEFORMATION**

**Unit 4: CONFORMATION BY MOLDING**

**Unit 5: CONFORMATION BY JOINT OF PARTS**

**Unit 6: DIMENSIONAL METROLOGY**

**Unit 7: QUALITY CONTROL IN MANUFACTURING**

## 7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	A01 A02 A08 A15 A17 A18 CB01 CB02 CB03 CB04 CB05 D08	0.8	20	N	-	MASTER LESSONS
Problem solving and/or case studies [ON-SITE]	Cooperative / Collaborative Learning	A02 A03 A08 A13 A15 A17 A18 CB01 CB02 CB03 CB04 CB05 D08	0.6	15	N	-	EXERCISES AND PRACTICAL PROBLEMS
Laboratory practice or sessions [ON-SITE]	Work with simulators	A02 A03 A07 A08 A13 A18 D08	0.6	15	Y	Y	WORK IN GROUPS, EXERCISES AND PRACTICAL SIMULATION WITH SOFTWARE
Group tutoring sessions [ON-SITE]	Problem solving and exercises	A02 A03 A12 A13 A15 A17 A18 D08	0.2	5	N	-	TUTORING
Final test [ON-SITE]	Assessment tests	A01 A02 A03 A04 A07 A08 A12 A13 A15 A17 A18 A19 D08	0.2	5	Y	Y	TEORICAL AND PRACTICAL TESTS
Study and Exam Preparation [OFF-SITE]	Self-study	A02 A03 A12 A15 A17 A18 D08	3.6	90	N	-	STUDY AND PREPARE TESTS
<b>Total:</b>			<b>6</b>	<b>150</b>			
<b>Total credits of in-class work: 2.4</b>			<b>Total class time hours: 60</b>				
<b>Total credits of out of class work: 3.6</b>			<b>Total hours of out of class work: 90</b>				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

## 8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Practicum and practical activities reports assessment	30.00%	30.00%	Final work with contents related to the subject
Final test	70.00%	70.00%	Final test with questions related to the lessons
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

### Evaluation criteria for the final exam:

#### Continuous assessment:

The practices will be valued the utilization and the report of the same one. This activity should be exceeded at least, with a 5 over 10

Laboratory and computer practice sessions will be conducted in small groups. The students will perform different experimental measures in the laboratory or a series of calculations with a computer program.

It will be valued both the work in the laboratory or computer classroom as the report of the practice carried out, having both obligatory and recoverable character.

If the above requirements are not met, students, in order to overcome the subject, must do an examination of practices together with the final examination of the subject, whose value on the final qualification will be, in percentage, the same one that could be obtained with the realization of the practices.

#### Non-continuous evaluation:

Evaluation criteria not defined

### Specifications for the resit/retake exam:

Students who have not performed the present activities (practices and problems), nor have elaborated the technical work, must undergo a single final

examination with all the contents of the subject (practical and theoretical) seen throughout the course.

The minimum mark in each of the parts shall be equal to or bigger than 5. The subject will be exceeded by obtaining an assessment equal to or bigger than 5.

**Specifications for the second resit / retake exam:**

Same as for the extraordinary call

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1
Final test [PRESENCIAL][Assessment tests]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Unit 1 (de 7): TECHNOLOGICAL ASPECTS OF THE MANUFACTURING SYSTEMS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	8
Unit 2 (de 7): CONFORMATION BY REMOVE MATERIAL	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	1
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Unit 3 (de 7): CONFORMATION BY PLASTIC DEFORMATION	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Unit 4 (de 7): CONFORMATION BY MOLDING	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	2
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Unit 5 (de 7): CONFORMATION BY JOINT OF PARTS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	11
Unit 6 (de 7): DIMENSIONAL METROLOGY	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	2
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	2
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	15
Unit 7 (de 7): QUALITY CONTROL IN MANUFACTURING	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	3
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	6
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	20
Global activity	
Activities	hours
Laboratory practice or sessions [PRESENCIAL][Work with simulators]	15
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	5
Final test [PRESENCIAL][Assessment tests]	5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Problem solving and/or case studies [PRESENCIAL][Cooperative / Collaborative Learning]	15
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description

D. Rodriguez Salgado	Soldadura	BELLISCO	9789688808467	
	Conformacion plastica de		9788495279620	2002
J. Del Rio	materiales metalicos (en frio y en caliente): forja, laminacion, estirado etampacion, extrusion, embuticion	: CIE Inversiones Editoriales Dossat	8496437094	2005
Kalpakjian, S.	Manufacturing engineering and technology	Ed. Addison-Wesley	978-0133128741	2008
L. Sevilla and M. J. Martín	Metrología Dimensional	Ed. Servicio de Publicaciones de la Universidad de Málaga	9788497470810	1990
M. P. Groover	Fundamentos de manufactura moderna	McGraw-Hill /Interamericana de Mexico	9789701062401	2007
M. P. Groover	Fundamentos de manufactura moderna: materiales, procesos y sistemas	Prentice Hall Hispanoamericana		1997