

[GJG103] MANUFACTURING TECHNOLOGY LABORATORY

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING	Subject	?
Semester	2	Course	2
Character	OPTIONAL	Mention / Field of specialisation	
Plan	2020	Modality	Face-to-face
Credits	6	Hours/week	5
		Language	CASTELLANO/EUSKARA
		Total hours	90 class hours + 60 non-class hours = 150 total hours

PROFESSORS

ORTUBAY IBABE, RAFAEL
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REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
MANUFACTURING TECHNOLOGIES	(No previous knowledge required)

SKILLS

VERIFICA SKILLS

SPECIFIC

GJCE30 - Knowledge and application of technologies, tools and production and manufacturing systems

GENERAL

GJCG03 - Addressing and optimising activities of assembly, commissioning, assistance and maintenance of facilities, machinery, and industrial mechatronic systems

CROSS

GJCTR2 - To be able to understand and apply knowledge to problem solving in complex work situations or specialised and professional environments calling for creative and innovative ideas, using self-developed arguments and procedures;

BASIC

G_CB5 - To have developed learning abilities required to embark on subsequent studies with a high level of autonomy.

LEARNING RESULTS

RG201 They coordinate their work with the other members of the team, contribute in their team to the development of the tasks to be carried out and the creation of a good working climate.

LEARNING ACTIVITIES

	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	2 h.	4 h.

EVALUATION SYSTEM

	W
Self-assessment	30%
Co-assessment	35%
Observation (technical capacity, attitude and participation)	35%

MAKE-UP MECHANISMS

(No mechanisms)
Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.

NCH - Non-class hours: 2 h.

TH - Total hours: 4 h.

RG202 They make decisions and assess the possible consequences of the selected alternative.

LEARNING ACTIVITIES

	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	2 h.	4 h.

EVALUATION SYSTEM	<i>W</i>	MAKE-UP MECHANISMS
Observation (technical capacity, attitude and participation)	100%	<i>(No mechanisms)</i>
Comments: Continuous assessment. Retake is not foreseen.		
CH - Class hours: 2 h. NCH - Non-class hours: 2 h. TH - Total hours: 4 h.		

RG204 They define the problem, the development of the solution, as well as the conclusions in an effective way, making a correct use of the language, in writing.

LEARNING ACTIVITIES	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	2 h.	4 h.
EVALUATION SYSTEM	<i>W</i>	MAKE-UP MECHANISMS	
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems Comments: Revision and correction of the written report of the semester project	
CH - Class hours: 2 h. NCH - Non-class hours: 2 h. TH - Total hours: 4 h.			

RG205 They define the problem, the development of the solution, as well as the conclusions in an effective way, making a correct use of the language, orally.

LEARNING ACTIVITIES	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	1 h.	3 h.
EVALUATION SYSTEM	<i>W</i>	MAKE-UP MECHANISMS	
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	100%	<i>(No mechanisms)</i>	
Comments: Continuous assessment. Retake is not foreseen.			
CH - Class hours: 2 h. NCH - Non-class hours: 1 h. TH - Total hours: 3 h.			

RGJ223 They determine manufacturing processes, analyzing and justifying the sequence and variables of the it.

LEARNING ACTIVITIES	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	3 h.	3 h.	6 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	5 h.	3 h.	8 h.

Practical work in workshops and/or laboratories, individually and/or in teams 8 h. 6 h. 14 h.

EVALUATION SYSTEM

W

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

40%

Individual written and/or oral tests or individual coding/programming tests

60%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one

CH - Class hours: 18 h.

NCH - Non-class hours: 12 h.

TH - Total hours: 30 h.

RGJ224 They operate the tools, machines and equipment involved in the manufacturing process, relating their operation to the process conditions and the characteristics of the final product.

LEARNING ACTIVITIES

CH

NCH

TH

Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning

2 h.

3 h.

5 h.

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

5 h.

4 h.

9 h.

Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects

8 h.

4 h.

12 h.

Practical work in workshops and/or laboratories, individually and/or in teams

12 h.

7 h.

19 h.

EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

20%

Individual written and/or oral tests or individual coding/programming tests

80%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one

CH - Class hours: 27 h.

NCH - Non-class hours: 18 h.

TH - Total hours: 45 h.

RGJ225 They prepare numerical control (CNC) machines, selecting the tools and applying the required techniques or procedures.

LEARNING ACTIVITIES

CH

NCH

TH

Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints

2 h.

3 h.

5 h.

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

6 h.

3 h.

9 h.

Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects

8 h.

4 h.

12 h.

Practical work in workshops and/or laboratories, individually and/or in teams

12 h.

7 h.

19 h.

EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

80%

Individual written and/or oral tests or individual coding/programming tests

20%

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one

CH - Class hours: 28 h.

NCH - Non-class hours: 17 h.

TH - Total hours: 45 h.

RGJ226 They control dimensions, geometries and surfaces of products, comparing the measures with the specifications of the product.

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.	1 h.	2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	1 h.	3 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2 h.	1 h.	3 h.
Practical work in workshops and/or laboratories, individually and/or in teams	4 h.	3 h.	7 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS	
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	60%	Individual written and/or oral tests or individual coding/programming tests	
Individual written and/or oral tests or individual coding/programming tests	40%	Comments: If a retake exam is needed, the final mark will be obtained 25% first mark 75% second one	

CH - Class hours: 9 h.
NCH - Non-class hours: 6 h.
TH - Total hours: 15 h.

CONTENTS

SELECTION OF MACHINING MATERIALS

- Commercial forms of the materials.
- Materials and their machining conditions.

MACHINING WITH MANUAL TOOLS

- Filing, drilling, sawing, reaming, threading, riveting, punching...

PREPARATION OF MACHINES, EQUIPMENT, FIXTURES AND TOOLS

- Forming machines and equipment
- Machines and equipment for chip removal manufacturing
- Elements and controls of the machines.
- Regulation of process parameters.

OPERATIONS WITH MACHINE-TOOLS FOR THE REMOVAL OF CHIPS.

- Operation of machine tools.
- Cutting tools.
- Operating techniques for removing chips.

NUMERICAL CONTROL PROGRAMMING

- Part clamping tools.
- Machining strategies.
- CNC-ISO programming.

FORMING OPERATIONS

- Operation of the machines - Tools and utensils - Operational forming techniques

WELDING IN NATURAL ATMOSPHERE AND PROJECTION

- Operation of welding and projection machines.
- Welding and projection techniques.

CONTROL OF DIMENSIONS, GEOMETRIES AND SURFACES OF PRODUCTS.

- Measurement, comparison and verification processes
- Geometric and surface measurement and verification techniques in the manufacturing process

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	CRUZ, T. 2010. Control Numérico y Programación II. Marcombo Formación
Class presentations	KALPAKJIAN, S. SCHMID, S.R. 2009. Manufactura, ingeniería y tecnología. Prentice Hall
Labs	GROOVER, M. 1997. Fundamentos de manufactura moderna: Materiales, procesos y sistemas. Prentice Hall
Lab practical training	HERNÁNDEZ, G. 2016. Manual del soldador. Cesol
Topic related web quires	http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_in_k.pl?grupo=MECATRONICA22&ejecuta=15&_ST