

Course guide 340059 - PRFA-M4012 - Manufacturing Processes

Last modified: 03/04/2024

Unit in charge:	Vilanova i la Geltrú School of Engineering			
Teaching unit:	712 - EM - Department of Mechanical Engineering.			
Degree:	BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).			
	BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus			
	2009). (Optional subject).			
	BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).			
Academic year: 2024	ECTS Credits: 6.0 Languages: Catalan			

LECTURER	
Coordinating lecturer:	MAURICI SIVATTE ADROER
Others:	MAURICI SIVATTE ADROER

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. CE26. Applied knowledge of systems and fabrication process, METROLOGIA and quality control.

Transversal:

2. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

4. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

TEACHING METHODOLOGY

The sessions are divided into classes of theory, problems and laboratory practice.

The lectures comprise the statements of the basic theoretical concepts of the topics of the course applied examples and exercises as described.

They will also be proposed Exercises that the students will solve individually.

In laboratory practice classes, which will be obligatory to pass the subject , experimental fellows are developed and is the student, individually or in groups, who must work on the aspects set by the teacher.

LEARNING OBJECTIVES OF THE SUBJECT

When finishing the subject the student has to be able to:

- Describe the main processes of formation used at industrial level.
- Use quality management tools and metrology applied to manufacturing processes.
- Choose the type of manufacturing process of a piece based on the design, material and technological and environmental aspects.
- Use, in a basic way, the machines of the manufacturing processes studied.
- Work in teams effectively, improving communication, distribution of tasks and group cohesion.
- Exhibits effective technical results.



STUDY LOAD

Туре	Hours	Percentage
Hours small group	15,0	10.00
Hours large group	45,0	30.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Metrology and quality in manufacturing processes.

Description:

Measurement. Errors and uncertainty in the measurement Dimensional and geometric tolerances. Settings. Verifiers fixed dimensions. Gauges Surface Finish

Specific objectives:

Calculate adjustments make mounting and control. Decide surface roughness depending on the application. Having quality concepts in all phases of the production process; estimate its difficulty and need, and know the different solutions adopted in the industry and the tools available.

Related activities:

A1 = Learning Assessment. A2 = Lab. A3 = Reporting.

Full-or-part-time: 54h Theory classes: 16h Laboratory classes: 8h Self study : 30h

Machining processes.

Description: Machining by chip removal. Features. Turning Machine. Milling machine

Specific objectives:

Understand the concept of machining machining, advantages, machinery, and basic concepts of calculus. Delve into the operation, operations and characteristics of the Turning Machine. Deepen the operation, operations and characteristics of the Milling Machine.

Related activities: A1 = Learning Assessment. A2 = Lab. A3 = Reporting.

Full-or-part-time: 27h Theory classes: 10h Laboratory classes: 2h Self study : 15h



Computer aided manufacturing.

Description:

Main concepts of computer aided manufacturing. ISO programming.

Specific objectives:

The student must know the concept of numerical control, their vewntajas, machinery, and basic programming concepts.

Related activities: A1 = Learning Assessment. A2 = Lab. A3 = Reporting.

Full-or-part-time: 27h 45m Theory classes: 4h Laboratory classes: 5h Self study : 18h 45m

Conforming processes by plastic deformation.

Description:

Plastic conformation theory Volumetric deformation processes Surface deformation processes

Specific objectives:

Know the different types of hot deformation, cold deformation and cutting processes, their characteristics and the cases in which they are applicable.

Related activities:

A1 = Evaluation of learning. A2 = Laboratory practices.

A3 = Presentation of reports.

Full-or-part-time: 15h

Theory classes: 6h Self study : 9h

Conforming processes by casting and molding.

Description:

Theory of conformation by molding. Molelos. Foundry with sand molds Metal mold molding Other molding technologies

Specific objectives:

Know the most important molding processes and parameters that define them

Related activities: A1 = Learning Assessment. A2 = Lab. A3 = Reporting

Full-or-part-time: 11h 15m Theory classes: 5h Self study : 6h 15m



Powder Metallurgy, welding and additive manufacturing

Description:

Powder Metallurgy Arc welding, TIG, MIG, resistance Hard and soft soldering Additive manufacturing

Specific objectives:

Know the main features and applications of Powder Metallurgy. Knowing the different welding technologies. Knowing the different Additive manufacturing technologies.

Related activities:

A1 = Learning Assessment. A2 = Lab. A3 = Reporting

Full-or-part-time: 10h Theory classes: 4h

Self study : 6h

(ENG) Proves d'avaluació individual

Description: Each student will make two single assessment tests.

Full-or-part-time: 5h Guided activities: 5h

ACTIVITIES

A1. LEARNING ASSESSMENT

Description:

Training for the acquisition of knowledge and individual study activities.

Specific objectives:

Assess the level of knowledge and competencies of the subject. Resolution in writing or an oral test, i justified individual issues.

Material:

Statement of the test.

Delivery:

Resolution in writing or oral, justified, and individual test theoric questions and problems.

Full-or-part-time: 5h Theory classes: 5h



A2. PRACTICE

Description:

Development of a laboratory experimental work, scheduled and guided by Professor embodiment. It is a compulsory activity.

Specific objectives:

Recognize and apply some of the concepts studied in the theory activities. Explain and describe the practical phenomena observed in the laboratory.

Material:

Reports preparatory process of the realization of the lab.

Delivery:

For each session of laboratory practice, a document of the work done will be delivered according to the conditions specified in each particular case.

Full-or-part-time: 11h

Theory classes: 11h

A3. QUESTIONNAIRES

Description:

Exercises will be proposed that students will solve in class individually.

Specific objectives: Reinforce the lessons learned in class.

Full-or-part-time: 1h

Theory classes: 1h

GRADING SYSTEM

The training activities for the acquisition of knowledge and individual study of the student will be evaluated by means of two written tests:

First Partial Examination (35%)

Second Partial Examination (40%)

Training activities related to the exercises solved in class by students: 5%

The training activities related to the practical work will be evaluated according to the following parameters: personal attitude, individual work developed, individual or team reports on the activities carried out: 20% Only the written tests, corresponding to 75% of the final mark, will be Reassessable.

EXAMINATION RULES.

The conditions for completion of each test shall be specified in each case, in good time.



BIBLIOGRAPHY

Basic:

- Lasheras Esteban, José Mª. Tecnología mecánica y metrotecnia. San Sebastián: Editorial Donostiarra, 1984. ISBN 8470630873.

- Coca Rebollero, Pedro; Rosique Jiménez, Juan. Tecnología mecánica y metrotecnia. Madrid: Pirámide, 1996. ISBN 8436816633.

- DeGarmo, Ernest Paul; Temple Black, J.; Kohser, Ronald A. Materiales y procesos de fabricación. Vol. 1 [on line]. 2a ed. Barcelona [etc.]: Reverté, 1988 [Consultation: 15/02/2024]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=2919 7568. ISBN 8429148221.

- Kalpakjian, Serope; Schmid, Steven R. Manufactura, ingeniería y tecnología, Vol. 1, Ingeniería y tecnología de materiales [on line]. 7 a ed. Ciutat de Mèxic: Pearson, 2014 [Consultation: 19/02/2024]. Available on: <u>https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB BooksVis?cod primaria=1000187&codigo libro=5323</u>. ISBN 9786073227353.

- Groover, Mikell P. Fundamentos de manufactura moderna : materiales, procesos y sistemas [on line]. 3a ed. México [etc.]: Prentice-Hall Hispanoamericana, 2007 [Consultation: 13/02/2024]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=4585 363. ISBN 9789701062401.

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Complementary:

- Vivancos Calvet, Joan. Máquinas herramientas con Control Numérico : fabricación asistida por Computador (C.A.M.), fabricación flexible, fabricación integrada por Computador (C.I.M.). Barcelona: ETSEIB. Centre Publicacions d'Abast, 1994.

- Vivancos Calvet, Joan. Tecnologías de fabricación : procesos de fusión y moldeo y de deformación. Barcelona: ETSEIB.CPDA, 1998. ISBN 8484982815, 8484982823.

- Reina Gómez, Manuel. Soldadura de los aceros : aplicaciones. 5a ed. Madrid: Weld-Work, 2012. ISBN 9788461605781.