

COURSE: MANUFACTURING TECHNOLOGIES

SUBJECT: Materials in Industry

MODULE: Optional Module

PROGRAM: Master's degree in Materials Science and Engineering

PAGE 1 OF 4

GENERAL CHARACTERISTICS*

Type: Basic formation, Compulsory, Optional

Master Thesis, External practices

Duration: Semester

Semester / s: 2

Number of ECTS credits: 4

Languages: Spanish, Catalan, English

DESCRIPTION

BRIEF DESCRIPTION AND JUSTIFICATION

The course on Manufacturing Technologies aims to bring students the basic knowledge related to manufacturing processes, its typology, its general and specific characteristics, as well as the technical-economic criteria that govern manufacturing and contemporary industrial production. Within its contents, it brings together both the conventional manufacturing processes and the most modern manufacturing strategies, and the demands that must be met in the manufactured products.

In its development, the course uses the knowledge acquired in other subjects, such as: materials resistance, theory of machines, science and technology of materials, computer-aided design and manufacturing, to integrate them and apply them in manufacturing engineering.

Its contents include industrial metrology, chip forming machining, manufacturing by plastic deformation, additive manufacturing, the application of numerical control to production, among other related topics that complement the knowledge.

COMPETENCES

- E21 - Have useful complementary knowledge, including theoretical and practical aspects, for the practice of Science and Materials Engineering.
- E22 – Ability to recognize disciplines related or somehow related to the practice of Material Science and Engineering that will be useful for the development of their professional practice.
- CG2 - The ability to perform a responsible practice of the profession.
- CB6 - To have and understand the required knowledge that provides the basis or opportunity to be innovative in the development and/or application of ideas, often in a research context.
- CB7 - To apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study

* These features should not be modified without the approval of the bodies responsible for academic higher-level structures (field, module and / or system).

COURSE: MANUFACTURING TECHNOLOGIES

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PAGE 2 OF 4

- CB8 - To integrate knowledge and deal with the complexity of formulating judgments based on information, which, being incomplete or limited, includes reflections on social and ethical responsibilities related to the application of their knowledge and judgments.
- CB9 - To communicate conclusions and the reasons that sustain them, to specialized and non-specialized audiences in a clear and unambiguous way

PREREQUISITES*

The corresponding to access master studies

CONTENTS

1. Introduction to manufacturing technologies.
2. Metrology and quality
3. Chip forming machining
4. Numerical control
5. Manufacture by casting.
6. Manufacture by plastic conformation.
7. Welds
8. Additive manufacturing
9. Special machining processes.

METHODOLOGY

LEARNING ACTIVITIES *

Learning Activities	ECTS credits	Competences
Lectures	1.15	E21, E22, CB6, CB7
Seminars	0.07	E21, E22, CB7, CB8, CB9
Case and Problem-Solving Sessions	0.15	E21, E22, CB6, CB7
Personal study	2,33	E21, E22, CB6, CB7, CB8
Presentations	0.15	E21, E22, CG2
Assessment Tasks (Exams, Continuous Assessment...)	0.15	E21, E22, CG2, CB9
TOTAL	4	

TEACHING METHODOLOGY

The teaching methodology used in the course is based on lectures and case and problem-solving sessions. Seminars are also scheduled to solve doubts.

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COURSE: MANUFACTURING TECHNOLOGIES

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PAGE 3 OF 4

The lectures and problem solving classes are linked to dynamic-explanatory classes (content presentation), dynamic-demonstrative classes (the teacher solves a problem) and dynamic-active classes (the student solves the problem).

The student is provided with the complete course documentation with theory and case documents for personal study. In addition, complementary exercises to the course bibliography are recommended.

ASSESSMENT

ASSESSMENT METHODS *

Assessment methods	Weight	Competences
Final exam	40%	E21, E22, CB6, CB7
Reports and Presentations	15%	E21, E22, CG2, CB8, CB9
Follow-up activities	40%	E21, E22, CB6, CB7
Participation	5%	CG2

LEARNING OUTCOMES

- The student must know the current manufacturing technologies, their foundations and new trends. (E21)
- The student must know experimental techniques and designs suitable for the study, design, analysis, optimization of manufacturing processes. (E21)
- The student must know the multidisciplinary nature of manufacturing technologies and their close relationship with Materials Science and Engineering, logistics, quality management and other aspects. (E21, CG2)
- The student must be able to evaluate the impact of manufacturing technologies in their economic, social and environmental context. (E22, CG2)

QUALIFICATION

The evaluation of the course will consider all aspects listed in the evaluation table with its corresponding weight. The main weight of the grade lies in the final examination (40%). In addition, the results of the 2 scheduled follow-up activities (20% + 20%), the participation activities carried out in class 5%, and the evaluable works that will be carried out individually 15% are included in the final grade.

To pass the subject you must have a minimum grade of four in the final exam.

ASSESSMENT OF THE COMPETENCES (Define calculation expressions for each competency based assessment activities related.)

The grade of the final exam, reports and presentations and follow-up activities will be used as an indicator for the evaluation of E21 and E22 competences.

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The grades of participation, reports and presentations and follow-up activities will be used as an indicator for the assessment of competence CG2.

The grade of the final exam and follow up activities will be used as an indicator for the assessment of CB6, CB7 competences.

The grade of the reports and presentations will be used as an indicator for the assessment of CB8, CB9 competences.

BIBLIOGRAPHY (Recommended and accessible to students.)

1. Schey, J. A. "Procesos de Manufactura" 3ª. Ed. Mc Graw Hill. 2002
2. Groover, M. P. "Fundamentos de manufactura moderna". Ed.: Prentice Hall. 1997
3. Boothroyd, G. "Fundamentals of machining and machine tools". 2ª edición. Ed.: Marcel Dekker. 1989
4. Gerling, H. "Alrededor de las máquinas herramientas". 3ª edición. Ed.Reverté. 2000
5. Lasheras, J. M. "Tecnología Mecánica y Metrotécnia". Ed. Donostiarra. 1997
6. Peláez Vara, J. "Máquinas herramientas auxiliares" Colección La máquina herramienta. Centro E.N.CEDEL. 1993
7. Molera Solá, P. "Electromecanizado: Electroerosión y mecanizado electroquímico". Barcelona. Ed.: Marcombo. 1989
8. Shigley, J. E. "Diseño en Ingeniería Mecánica". Ed.: McGraw-Hill. 2002
9. Norton, R. "Diseño de Máquinas" Prentice Hall, México.1999

DOCUMENT HISTORY

PREVIOUS CHANGES

March 24, 2015, Dr. Giovanni Gómez Gras

July 20, 2014, Dr. Guillermo Reyes

CURRENT REVISION

March 16, 2019, Dr. Giovanni Gómez Gras