

[MHL203] PROCESS AND MATERIALS ENGINEERING

GENERAL INFORMATION

Studies	UNIVERSITY MASTER IN INDUSTRIAL ENGINEERING		Subject	?
Semester	1	Course	2	Mention / Field of specialisation ???
Character	OPTIONAL		Language	CASTELLANO
Plan	2022	Modality	Face-to-face	Total hours 34 class hours + 41 non-class hours = 75 total hours
Credits	3	Hours/week	1.89	

2030 AGENDA GOALS



PROFESSORS

TATO VEGA, GUILSON
HURTADO HURTADO, JOSE IGNACIO
LLAVORI OSA, IÑIGO

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
FINITE ELEMENT METHOD	(No previous knowledge required)
MATERIALS ENGINEERING	
????	
????	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MHMP02 - To project, calculate and design integrated manufacturing systems taking into account the performance of polymeric, metallic, composite and biomaterial materials and be able to establish the relationship between properties-microstructure-processing		x		0,48
MHMP03 - To design and carry out machine tests, determining the test plan for the chemical, physical, mechanical and microstructural characterization of materials and carrying them out in accordance with standard norms		x		0,56
MHMP04 - To design and carry out machine tests predicting the chemical, physical and mechanical behavior of a material in service		x		0,56
MHRA22 - To demonstrate knowledge and capabilities to carry out verification and control of facilities, processes and products		x		0,6
MHRA28 - To communicate your conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way		x		0,08
MHRA30 - To work with people, involving and directing them in a dynamic aimed at a common objective that includes reflection on their ethical and social responsibility, with a global vision of the work to be carried out and the characteristics that it requires (quality, deadlines,...), assuming responsibility for the decisions made		x		0,08
MHR125 - Having and understanding knowledge providing a basis or opportunity to be original in developing and/or applying ideas, often in a research context.		x		0,32
MHR126 - To apply the knowledge acquired and your problem-solving skills in new, little-known or changing environments within broader (or multidisciplinary) contexts related to your area of study		x		0,08
MHR129 - To possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous		x		0,24
Total:				3

KC: Knowledge or Content / SK: Skills / AB: Abilities

ENAE LEARNING RESULTS

ENAE LEARNING RESULTS	ECTS
ENA124 - Knowledge and comprehension: Deep knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree.	0,37
ENA126 - Knowledge and comprehension: Critical knowledge of the broad multidisciplinary context of engineering and the interrelations existing between the knowledge of the different fields.	0,37
ENA127 - Analysis in engineering: Ability to analyse new and complex engineering products, processes and systems within a broader multidisciplinary context; select and apply the most appropriate analysis, calculation and experimental methods already established, as well as innovative methods; and critically interpret the results of such analyses.	0,23
ENA130 - Analysis in engineering: Ability to identify, formulate and solve engineering problems in emerging areas of their speciality.	0,52
ENA134 - Research and innovation: Ability to carry out bibliographic searches and consult and use databases and other information sources with discretion, in order to carry out simulations with the aim of conducting research on complex topics of their speciality.	0,37
ENA137 - Research and innovation: Ability to investigate the application of the most advanced technologies in their speciality.	0,37
ENA139 - Practical application of engineering: Practical skills, such as the use of computer tools to solve complex problems,	0,37

carry out complex engineering projects, and design and guide complex investigations.

ENA140 - Practical application of engineering: Complete knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations.

0,37

Total: 3

SECONDARY LEARNING RESULTS

RMH173 [I] *Justifica el comportamiento del material en las condiciones de servicio del producto.*

LEARNING ACTIVITIES

	CH	NCH	TH
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	4 h.	4 h.	8 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Computer simulation exercises, individually and/or in teams	4 h.	6 h.	10 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	8 h.	8 h.	16 h.
Carrying out exercises and solving problems individually and/or in teams	4 h.	10 h.	14 h.

EVALUATION SYSTEM

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

W

100%

MAKE-UP MECHANISMS

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

CH - Class hours: 22 h.

NCH - Non-class hours: 28 h.

TH - Total hours: 50 h.

RMH174 [I] *Conoce en profundidad los tipos y propiedades de las aleaciones metálicas avanzadas.*

LEARNING ACTIVITIES

	CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	2 h.	5 h.	7 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	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	5 h.	6 h.	11 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	3 h.	2 h.	5 h.

EVALUATION SYSTEM

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

W

100%

MAKE-UP MECHANISMS

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

CH - Class hours: 12 h.

NCH - Non-class hours: 13 h.

TH - Total hours: 25 h.

CONTENTS

1. Advanced metallic alloys
2. Corrosion
3. Tribology

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Technical articles
Subject notes
Moodle Platform
Programmes
Lab practical training

Bibliography

William D. Callister, Jr. “Introducción a la ciencia e ingeniería de los materiales”. Tomo II. Ed. Reverté S.A.; Barcelona; 1996.

S. Suresh. Fatigue of materials. 2nd edition. Cambridge University Press. 1998. ISBN 0-521-57847-7.

D. Landolt. "Corrosion and Surface chemistry of metals". 1st edition. EPFL Press. Lausanne, 2007.

Brechtl, J., & Liaw, P. K. (Eds.). (2021). High-entropy materials: Theory, experiments, and applications. Cham, Switzerland: Springer.

N. E. Dowling. Mechanical Behaviour of Materials. Engineering Methods for Deformation, Fracture and Fatigue. 2nd edition. Printice Hall. 1999.

G. E. Dieter. Mechanical Metallurgy. SI Metric Edition. Mc Graw-Hill Book Company, London. 1988.

William D. Callister, Jr. Introducción a la ciencia e ingeniería de los materiales. Tomo II. Ed. Reverté S.A.; Barcelona; 1996.