Course guide
820422 - CEMM - Materials Science and Engineering

Last modified: 02/03/2026

Unit in charge: Barcelona East School of Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.

Degree: BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JOSE MARIA MANERO PLANELLA - JORDI LLUMA FUENTES

Others:

Primer quadrimestre:
CASIMIR CASAS QUESADA - Grup: M11, Grup: M12
VICTOR GERARDO GARCIA FERNANDEZ - Grup: T11, Grup: T12, Grup: T15, Grup: T16
JOSE MARIA MANERO PLANELLA - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15, Grup: M16, Grup: M17
MERITXELL MOLMENEU TRIAS - Grup: M15, Grup: M16, Grup: M17
MARTA PEGUEROLES NEYRA - Grup: T11, Grup: T12, Grup: T13, Grup: T14, Grup: T15, Grup: T16, Grup: T17
XAVIER ANDRES ROMERO PEDRET - Grup: M13, Grup: M14, Grup: T13, Grup: T14
JOAN SOLÀ SARACIBAR - Grup: T17

Segon quadrimestre:
CASIMIR CASAS QUESADA - Grup: M11, Grup: M12
VICTOR GERARDO GARCIA FERNANDEZ - Grup: T11, Grup: T12, Grup: T13, Grup: T14, Grup: T16
JORDI LLUMA FUENTES - Grup: T11, Grup: T12, Grup: T13, Grup: T14, Grup: T15, Grup: T16
JOSE MARIA MANERO PLANELLA - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15, Grup: M16
MERITXELL MOLMENEU TRIAS - Grup: M16
XAVIER ANDRES ROMERO PEDRET - Grup: M15
JOAN SOLÀ SARACIBAR - Grup: M13, Grup: M14, Grup: T15

REQUIREMENTS

ELASTICITAT - Prerequisit
MECÀNICA DE FLUIDS - Prerequisit
RESISTÈNCIA DE MATERIALS - Corequisit

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. Understand and apply materials engineering techniques.

Transversal:
1. 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.

TEACHING METHODOLOGY

The course uses about:
-23% Expository lectures (theory), taught in Catalan.
-13% Classroom work aimed (problems or exams), taught in Catalan.
-7% Practical work (labs).
-57% Self (study).

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student should be able to:
· Distinguish and relate the structure of materials with their properties and applications.
· Understand and apply standards of materials tests.

STUDY LOAD

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

Total learning time: 150 h

CONTENTS

(ENG) Microestructura, diagrames de fase i disseny amb materials,

Related competencies :
CEMEC-25. Understand and apply materials engineering techniques.

Full-or-part-time: 45h 40m
Theory classes: 14h
Laboratory classes: 2h
Self study : 29h 40m

(ENG) Metalls.

Related competencies :
CEMEC-25. Understand and apply materials engineering techniques.

Full-or-part-time: 36h 10m
Theory classes: 11h
Laboratory classes: 4h
Self study : 21h 10m

(ENG) Ceràmiques i vidres.

Related competencies :
CEMEC-25. Understand and apply materials engineering techniques.
07 AAT N3. 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.

Full-or-part-time: 23h 50m
Theory classes: 7h
Laboratory classes: 2h
Self study : 14h 50m

(ENG) Polímers i materials compostos.

Related competencies :
CEMEC-25. Understand and apply materials engineering techniques.

Full-or-part-time: 27h 50m
Theory classes: 9h
Laboratory classes: 2h
Self study : 16h 50m

Materials selection and analysis of failures.

Description:
Selection charts with shape.
Examples of selection with shape.
Failure analysis.

Specific objectives:
Select the best material (or family of materials) that covers a set of properties. Having assimilated the basic concepts of analysis of failures in the design.

Related activities:
Practice 5. Determination of quality criteria using non-destructive inspection (ultrasounds and induced currents).
Final test.

Related competencies :
CEMEC-25. Understand and apply materials engineering techniques.

Full-or-part-time: 16h 30m
Theory classes: 6h
Laboratory classes: 2h
Self study : 8h 30m

GRADING SYSTEM

2 partial exams with a weight of 40% the 1st control and 40% the 2nd control.
Practices: 20%

EXAMINATION RULES.

In general you can bring any supporting material for conducting the problem part of the test and nothing for the teoretical part or the reevaluation.
Devices that can be used to communicate are explicitly excluded.

BIBLIOGRAPHY

Basic:
- Ashby, M. F.; Jones, David R. H. Materiales para ingeniería, vol. 2. Barcelona [etc.]: Reverté, 2008-2009. ISBN 9788429172560.
- Mangonon, Pat L. Ciencia de materiales : selección y diseño. México [etc.]: Prentice Hall, 2001. ISBN 9702600278.

Complementary:
- Ashby, M. F.; Jones, David R. H. Materiales para ingeniería, vol. 1 [on line]. Barcelona [etc.]: Reverté, 2008-2009 [Consultation: 24/11/2021]. Available on: http://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=5635457. ISBN 9788429172553.
- Kalpakjian, Serope; Schmid, Steven R. Manufactura, ingeniería y tecnología [on line]. 7ª ed. México [etc.]: Pearson Educación, cop. 2014 [Consultation: 21/04/2020]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=5323. ISBN 9786073227360.