



## Course guide

# 820422 - CEMM - Materials Science and Technology

Last modified: 27/02/2023

**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:** 2022    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

### LECTURER

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**Coordinating lecturer:** JOSE M. MANERO PLANELLA

**Others:**

Primer quadrimestre:

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

Segon quadrimestre:

VICTOR GERARDO GARCIA FERNANDEZ - Grup: T11, Grup: T12, Grup: T13, Grup: T14  
JORDI LLUMA FUENTES - Grup: M11, Grup: M12, Grup: T11, Grup: T12, Grup: T13, Grup: T14  
JOSE MARIA MANERO PLANELLA - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15, Grup: M16  
MERITXELL MOLMENEU TRIAS - Grup: M15  
MIGUEL MORALES COMAS - Grup: M16  
MARTA PEGUEROLES NEYRA - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15, Grup: M16  
XAVIER ANDRES ROMERO PEDRET - Grup: M13, Grup: M14

### REQUIREMENTS

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Per G\* ENG MECÀNICA  
ELASTICITAT - Prerequisit  
MECÀNICA DE FLUIDS - Prerequisit  
RESISTÈNCIA DE MATERIALS - Corequisit  
Per DG MECÀNIC-MATERIALS  
ELASTICITAT - Prerequisit  
MECÀNICA DE FLUIDS - Prerequisit  
RESISTÈNCIA DE MATERIALS - Corequisit  
Per DG ELECT IND AU-MEC  
ELASTICITAT - Prerequisit  
RESISTÈNCIA DE MATERIALS - Corequisit  
Per DG MEC-ELECT IND AU  
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) Metals.

#### 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.

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In general you can bring any supporting material for conducting the problem part of the test and nothing for the theoretical part or the reevaluation.

Devices that can be used to communicate are explicitly excluded.

## BIBLIOGRAPHY

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### 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](http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=5323). ISBN 9786073227360.