



## Course guides

# 295767 - 295EM131 - Materials with Applications in Transport and Energy

Last modified: 04/06/2021

**Unit in charge:** Barcelona East School of Engineering

**Teaching unit:** 702 - CEM - Department of Materials Science and Engineering.

**Degree:** ERASMUS MUNDUS MASTER'S DEGREE IN ADVANCED MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Optional subject).  
MASTER'S DEGREE IN MATERIALS SCIENCE AND ADVANCED MATERIALS ENGINEERING (Syllabus 2019). (Optional subject).

**Academic year:** 2021

**ECTS Credits:** 6.0

**Languages:** Spanish

### LECTURER

**Coordinating lecturer:** Antonio Mateo

**Others:** Antonio Mateo, Pablo Guardía i Jessica Calvo

### TEACHING METHODOLOGY

### LEARNING OBJECTIVES OF THE SUBJECT

Transportation is an engineering field where the correct selection of materials is vital for the performance of vehicles. The students should understand the specific requirements of critical components in vehicles, translate them into materials' properties and select among the existing materials the ones able to fulfil the specifications.

Concerning Energy, the three main topics are:

Materials for energy conversion

Materials for energy storage

Materials for fuel production

### STUDY LOAD

Type	Hours	Percentage
Guided activities	6,0	4.00
Hours medium group	28,0	18.67
Self study	102,0	68.00
Hours small group	14,0	9.33

**Total learning time:** 150 h



## CONTENTS

### Automotive materials

**Description:**

Els materials amb aplicacions automobilístiques es divideixen en dos grans blocs:

Materials per la carroceria o BIW (Body in white), principalment acers d'alta resistència i aluminis

Materials pel motor: cada part, tant interna com externa del motor té uns requeriments en servei que porten a la selecció d'un determinat material i procés de fabricació. Es detallaran per Bloc motor, Pistons i anelles de retenció, Vàlvules, Cigonyal i arbre de lleves.

**Full-or-part-time:** 33h

Theory classes: 10h

Laboratory classes: 1h 30m

Guided activities: 1h 30m

Self study : 20h

### Aerospace Materials

**Description:**

content english

**Full-or-part-time:** 33h

Theory classes: 10h

Laboratory classes: 1h 30m

Guided activities: 1h 30m

Self study : 20h

### Train materials

**Description:**

content english

**Full-or-part-time:** 16h 30m

Theory classes: 4h 30m

Practical classes: 2h

Self study : 10h

### Sea transport materials

**Description:**

content english

**Full-or-part-time:** 16h 30m

Theory classes: 4h 30m

Guided activities: 2h

Self study : 10h



#### title english

**Description:**

Materials for energy conversion  
Materials for energy storage  
Materials for fuel production

**Full-or-part-time:** 49h 30m

Theory classes: 15h  
Laboratory classes: 1h 30m  
Guided activities: 3h  
Self study : 30h

## GRADING SYSTEM

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## BIBLIOGRAPHY

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**Basic:**

- Warren, Nigel. Metal corrosion in boats : the prevention of metal corrosion in hulls, engines, rigging and fittings. 3th ed. Nova York: Adlard Coles Nautical, 2006. ISBN 9781574092370.
- Davies, Geoffrey. Materials for automobile bodies [on line]. Amsterdam [etc.]: Elsevier, Butterworth Heinemann, cop. 2003 [Consultation: 06/10/2020]. Available on: <https://www.sciencedirect.com/science/book/9780750656924>. ISBN 9780750656924.
- Yamagata. Nou llibre.
- Benini, Ernesto. Advances in gas turbine technology. Rijeka: InTech, [2014]. ISBN 9789533076119.