



## Course guides

# 295765 - 295EM125 - New Challenges in Additivation and Degradation of Plastic Materials

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

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**Coordinating lecturer:** Orlando Santana Pérez

**Others:** Maria Lluïsa Maspoch  
Jonathan Cailloux  
Profesores invitados (conferencias).

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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### Specific:

CEMCEAM-01. (ENG) Dissenyar i desenvolupar productes, processos i sistemes, així com l'optimització d'altres ja desenvolupats, atenant a la selecció de materials per aplicacions específiques.

CEMCEAM-02. (ENG) Aplicar métodos innovadores para el diseño, simulación, optimización y control de procesos de producción y transformación de materiales

CEMCEAM-03. (ENG) Realizar estudios de caracterización y evaluación de materiales según sus aplicaciones

CEMCEAM-05. (ENG) Interpretar y aplicar normativas y especificaciones relativas a los materiales y sus aplicaciones

CEMCEAM-06. (ENG) Evaluar el tiempo de vida en servicio, la reutilización, la recuperación y el reciclaje de productos atendiendo a las características de los materiales que lo conforman

### Transversal:

02 SCS. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.

05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.

06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

07 AAT. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.

## TEACHING METHODOLOGY

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## LEARNING OBJECTIVES OF THE SUBJECT

1. Study the main requirements for ecodesign and circular economy in polymeric materials.
2. Know the main families of thermoplastics, both fossil and biobased, their relevant characteristics and challenges related to eco-design and circular economy: structure, special properties and technological aspects.
3. Introduce the main families of elastomers, their most relevant characteristics and challenges related to eco-design and circular economy in this type of materials.
4. Know the main mechanisms of thermo-oxidative degradation, UV.
5. Know the main stabilization additives against degradation-decomposition and the challenges that arise from the eco-design and circular economy.
6. Introduce technological aspects and European initiatives related to the revaluation of polymer material recycled.

## STUDY LOAD

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

**Total learning time:** 150 h

## CONTENTS

### title english

**Description:**

content english

**Full-or-part-time:** 10h 30m

Theory classes: 9h

Laboratory classes: 1h 30m

### title english

**Description:**

content english

**Full-or-part-time:** 3h

Theory classes: 3h

### title english

**Description:**

content english

**Full-or-part-time:** 6h

Theory classes: 3h

Laboratory classes: 3h



#### title english

**Description:**

content english

**Full-or-part-time:** 7h 30m

Theory classes: 6h

Laboratory classes: 1h 30m

#### title english

**Description:**

content english

**Full-or-part-time:** 10h 30m

Theory classes: 10h 30m

## GRADING SYSTEM

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## BIBLIOGRAPHY

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**Basic:**

- Brydson, J. A.. Plastics materials. 7th ed. Oxford: Butterworth-Heinemann, 1999. ISBN 0750641320.

- Gächter, R.; Müller, H.. Plastics additives handbook : stabilizers, processing aids, plasticizers, fillers, reinforcements, colorants for thermoplastics. 3rd ed. Munich, [etc.]: Hanser, 1993. ISBN 3446175717.

**Complementary:**

- Murphy, John. Additives for plastics handbook [on line]. 2nd ed. Kidlington, Oxford: Elsevier Advanced Technology, 2001 [Consultation: 02/03/2020]. Available on: <https://www.sciencedirect.com/science/book/9781856173704>. ISBN 1856173704.