

## Course guide

### 240EM133 - 240EM133 - Bioceramics

Last modified: 02/06/2022

<b>Unit in charge:</b>	Barcelona East School of Engineering
<b>Teaching unit:</b>	702 - CEM - Department of Materials Science and Engineering.
<b>Degree:</b>	ERASMUS MUNDUS MASTER'S DEGREE IN ADVANCED MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Optional subject). MASTER'S DEGREE IN MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Optional subject).
<b>Academic year:</b> 2022	<b>ECTS Credits:</b> 4.5 <b>Languages:</b> English

#### LECTURER

**Coordinating lecturer:** MARIA PAU GINEBRA MOLINS

**Others:**

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

##### Specific:

CEMCEM-11. (ENG) Gestionar la investigació. Desenvolupament e Innovació Tecnològica, atenant a la transferència de tecnologia i els drets de propietat i de patents

CEMCEM-04. (ENG) Realitzar estudis de caracterització, avaluació i certificació de materials segons les seves aplicacions

##### Transversal:

06 URI N3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

#### TEACHING METHODOLOGY

- Participative lectures
- Invited lectures
- Lab practices
- Online questionnaires
- Cooperative learning: group work

#### LEARNING OBJECTIVES OF THE SUBJECT

The goal of the course is to provide the scientific bases for the knowledge on ceramic materials used in medical applications. The different types of ceramic biomaterials are presented. Their structure, physical-chemical and mechanical properties, together with their interactions with the biological systems are analyzed.

#### STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	24.00
Hours small group	13,5	12.00
Self study	72,0	64.00

**Total learning time:** 112.5 h



## CONTENTS

### Introduction.

**Description:**

Ceramics as biomaterials. Historical perspective and current state.

**Full-or-part-time:** 4h 30m

Theory classes: 1h 30m

Self study : 3h

### Biominerals and mineralised tissues

**Description:**

Biological ceramics. Structure and properties of mineralised tissues. Bone, dentin and dental enamel

**Full-or-part-time:** 22h 30m

Theory classes: 7h 30m

Self study : 15h

### Biostable ceramics

**Description:**

Ceramic oxides: alumina and zircona. Structure, properties and applications in the biomedical field

**Full-or-part-time:** 20h

Theory classes: 6h

Guided activities: 2h

Self study : 12h

### Bioactive ceramics

**Description:**

Calcium phosphate-based ceramics. Bioactive glasses and glass ceramics. Processing, structure, properties and applications.

**Full-or-part-time:** 38h

Theory classes: 10h

Laboratory classes: 8h

Self study : 20h

### Aplicaciones de las biocerámicas

**Description:**

content english

**Full-or-part-time:** 27h 30m

Theory classes: 7h 30m

Guided activities: 20h



## GRADING SYSTEM

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$$N_{\text{final}} = 0.60 N_{\text{ef}} + 0.10 N_{\text{ep}} + 0.10 N_{\text{pl}} + 0.2 N_{\text{sem}}$$

N<sub>final</sub>: nota final

N<sub>ef</sub>: nota examen final

N<sub>ep</sub>: nota examen parcial

N<sub>pl</sub>: nota pràcticas de laboratorio

N<sub>sem</sub>: nota seminarios

## BIBLIOGRAPHY

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### Basic:

- Kokubo, Tadashi. Bioceramics and their clinical applications. Cambridge: Woodhead Publishing in Materials, 2008. ISBN 9781845692049.

## RESOURCES

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### Audiovisual material:

- Nom recurs. Resource