Course guide
240EM133 - 240EM133 - Bioceramics

Last modified: 27/05/2024

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).

Academic year: 2024 **ECTS Credits:** 4.5 **Languages:** 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, atenent a la tranferència 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 INFORMATI0N 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
Self study	72,0	64.00
Hours large group	27,0	24.00
Hours small group	13,5	12.00

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, structura, 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

Nfinal = 0.60 Nef + 0. 10 Nep + 0.10 Npl + 0.2Nsem

Nfinal: nota final
Nef: nota examen final
Nep: nota examen parcial
Npl: nota prácticas de laboratorio
Nsem: nota seminarios

BIBLIOGRAPHY

Basic:

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

RESOURCES

Audiovisual material:

- Nom recurs. Resource