UNIVERSITÀ DI PAVIA

Anno Accademico 2016/2017

BIOMATERIALS

Enrollment year	2016/2017
Academic year	2016/2017
Regulations	DM270
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	BIOENGINEERING
Curriculum	Bioingegneria delle cellule e dei tessuti
Year of study	1°
Period	2nd semester (01/03/2017 - 09/06/2017)
ECTS	6
Language	

The activity is split

504014 - **BIOMATERIALS - MOD. A**

504016 - **BIOMATERIALS - MOD. B**

UNIVERSITÀ DI PAVIA

Anno Accademico 2016/2017

BIOMATERIALS - MOD. A

Enrollment year	2016/2017
Academic year	2016/2017
Regulations	DM270
Academic discipline	CHIM/02 (PHYSICAL CHEMISTRY)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	BIOENGINEERING
Curriculum	Bioingegneria delle cellule e dei tessuti
Year of study	1°
Period	2nd semester (01/03/2017 - 09/06/2017)
ECTS	3
Lesson hours	24 lesson hours
Language	ITALIAN
Activity type	ORAL TEST
Teacher	MUSTARELLI PIERCARLO (titolare) - 3 ECTS BINI MARCELLA - 3 ECTS
Prerequisites	Basic chemistry notions
Learning outcomes	Module 1 The students should know (i) the biomaterial and biocompatibility definitions; (ii) the solid state concept, the solid materials classification and their main defects; (iii) the main techniques to study and modify the biomaterail surfaces to be able to eventually correct the biocompatibility Module 2 The students must well know the main classes of materials for biomedical applications: polymers (their classification on the basis of mechanical and physico chemical properties, polimerization and the main classes; ceramic and vetro-ceramic materials (traditional and advanced, synthesis and main classes); metals (crystalline structures, metals and alloys, phase diagrams, main classes, corrosion in biologic

	environment)
Course contents	Modulo 1. Biomaterials and biocompatibility definition. Some information on the chemical bond, the definition of solid state and classification of the main classes of solids and their defects. Main techniques for the study of biomaterials surfaces (spectroscopic, thermal and microscopic techniques and contact angle measurements). Techniques for surface modification of biomaterials (silanization, chemical reactions, plasma or laser techniques, self-assembled monolayers or Langmuir-Blodgett films, etc.). Module 2. Polymeric materials, ceramic materials, metal materials, (nano) composites materials.
Teaching methods	Frontal lessons and material provided by the teachers
Reccomended or required readings	1 - Lesson notes and material provided by the teachers 2 - Carlo di Bello, Biomateriali (Introduzione allo studio dei materiali per uso biomedico), Patron Editore
Assessment methods	Oral examination
Further information	Oral examination
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile

UNIVERSITÀ DI PAVIA

Anno Accademico 2016/2017

BIOMATERIALS - MOD. B

Enrollment year	2016/2017
Academic year	2016/2017
Regulations	DM270
Academic discipline	CHIM/02 (PHYSICAL CHEMISTRY)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	BIOENGINEERING
Curriculum	Bioingegneria delle cellule e dei tessuti
Year of study	1°
Period	2nd semester (01/03/2017 - 09/06/2017)
ECTS	3
Lesson hours	24 lesson hours
Language	ITALIAN
Activity type	ORAL TEST
Teacher	MUSTARELLI PIERCARLO (titolare) - 3 ECTS BINI MARCELLA - 3 ECTS
Prerequisites	Basic chemistry notions
Learning outcomes	Module 1 The students should know (i) the biomaterial and biocompatibility definitions; (ii) the solid state concept, the solid materials classification and their main defects; (iii) the main techniques to study and modify the biomaterail surfaces to be able to eventually correct the biocompatibility Module 2 The students must well know the main classes of materials for biomedical applications: polymers (their classification on the basis of mechanical and physico chemical properties, polimerization and the main classes; ceramic and vetro-ceramic materials (traditional and advanced, synthesis and main classes); metals (crystalline structures, metals and alloys, phase diagrams, main classes, corrosion in biologic

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Course contents	Modulo 1. Biomaterials and biocompatibility definition. Some information on the chemical bond, the definition of solid state and classification of the main classes of solids and their defects. Main techniques for the study of biomaterials surfaces (spectroscopic, thermal and microscopic techniques and contact angle measurements). Techniques for surface modification of biomaterials (silanization, chemical reactions, plasma or laser techniques, self-assembled monolayers or Langmuir-Blodgett films, etc.). Module 2. Polymeric materials, ceramic materials, metal materials, (nano) composites materials.
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Further information	Oral examination
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile