



### BIOCOMPATIBLE MATERIALS

<b>Enrollment year</b>	2020/2021
<b>Academic year</b>	2020/2021
<b>Regulations</b>	DM270
<b>Academic discipline</b>	CHIM/02 (PHYSICAL CHEMISTRY)
<b>Department</b>	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
<b>Course</b>	ADVANCED BIOTECHNOLOGY
<b>Curriculum</b>	PERCORSO COMUNE
<b>Year of study</b>	1°
<b>Period</b>	2nd semester (01/03/2021 - 14/06/2021)
<b>ECTS</b>	6
<b>Lesson hours</b>	48 lesson hours
<b>Language</b>	Italian
<b>Activity type</b>	ORAL TEST
<b>Teacher</b>	BINI MARCELLA (titolare) - 6 ECTS
<b>Prerequisites</b>	To better understand the program course basic inorganic chemistry notions are sufficient
<b>Learning outcomes</b>	At the end of course, the student must know the definition of biomaterial and biocompatibility and should be able to choose more suitable technique for the study and modification of the surface of biomaterials to modify the biocompatibility of cases submitted during the examination. In addition, he will have to know and be able to distinguish the different classes of materials and use an appropriate language to discuss the different materials properties
<b>Course contents</b>	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.).

The classes of materials. Polymeric materials (definition, characteristics, mechanical and chemical-physical properties and main classes used in medicine), Ceramic materials (definition, synthesis and chemical-physical characteristics, bio-inert, bioactive, bioresorbable ceramics), Metallic materials (definition, properties, steels and stainless steels, Co-Cr-Ni alloys, Ti and its alloys, Nitinol), Composite (nano) materials

#### Teaching methods

The course is based on frontal lessons without tutoring. A minimum of frequency is not required.

#### 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

The assessment of skills is represented by the oral exam. For the part devoted to techniques for the study of the surfaces is given the opportunity to the students to choose one of them to discuss during the examination.

#### Further information

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#### Sustainable development goals - Agenda 2030

[\\$lbl\\_legenda\\_sviluppo\\_sostenibile](#)