



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design properties of biomaterials and implants

---

### Course

Field of study

Inżynieria biomedyczna

Area of study (specialization)

Inżynieria Implantów i protezowania

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1 / 2

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

---

### Number of hours

Lecture

15

Tutorials

Laboratory classes

Projects/seminars

30

Other (e.g. online)

### Number of credit points

3

---

### Lecturers

Responsible for the course/lecturer:

dr inż. Grzegorz Adamek

Instytut Inżynierii Materiałowej

grzegorz.adamek@put.poznan.pl

Responsible for the course/lecturer:

---

### Prerequisites

Basic knowledge of materials, chemistry and physics of biomaterials. Ability to solve basic problems of science on the basis of existing knowledge, the ability to obtain information from identified sources.

Understanding the need to broaden the competence, willingness to work together as a team.



### Course objective

Provide students with basic knowledge of design properties of biomaterials and implants, to the extent specified by the content of the program relevant to the field of study. Development of students' ability to solve simple problems related to the choice of nanomaterials and analysis of the results of studies based on the gained knowledge.

### Course-related learning outcomes

#### Knowledge

Has knowledge of the methods of examining the physical and mechanical properties of biomaterials and tissues: static, cyclic fatigue and others, methods of examining microstructure: optical, scanning and transmission electron microscopy, X-ray diffraction, methods of examining the surface of biomaterials.

#### Skills

To actively engage in solving the questions, independently develop and expand skills in field of biomaterials design

#### Social competences

Is aware of product design is a system consisting of technical, economical and management problems.

Is aware of other engineering aspects including environmental and responsibility for the decisions.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

In the scope of lectures: on the basis of answers to questions concerning the material assimilated at previous lectures - current activity or a written test after completing the lecture series.

In terms of projects: on the basis of an assessment of the current progress in the implementation of tasks and presentation of the completed project

### Programme content

Possibilities of designing the properties of biomaterials: metals and alloys, ceramics, composites.

Principles of implant design. Methods of producing bionanomaterials. In terms of projects: on the basis of the evaluation of the current progress in the implementation of tasks and the presentation of the completed project

### Teaching methods

Lecture: multimedia presentation, illustrated with examples given on the board.

Projects: preparation and presentation of the project in a group.

### Bibliography

#### Basic

articles from Scopus



M. Jurczyk, J. Jakubowicz, Nanomateriały ceramiczne. Wyd. Pol. Pozn. 2004

M. Jurczyk, J. Jakubowicz, Bionanomateriały, Wyd. Pol. Pozn. 2008

Additional

R. W. Kelsall, Nanotechnologie, PWN 2009

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	1,8
Student's own work (literature studies, preparation for classes, preparation for test, project preparation) <sup>1</sup>	30	1,2

<sup>1</sup> delete or add other activities as appropriate