COURSE DESCRIPTION CARD - SYLLABUS

Course name
Designing of biomaterials and implants properties [S2IBio1-IIiP>PWBiI]

Course

Field of study
Biomedical Engineering

Year/Semester
1/2

Area of study (specialization)
Engineering of Implants and Prosthesis

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
30

Number of credit points

4,00

Coordinators

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Lecturers

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 biometerials 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:

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 and exam after completing the lecture series.
Written exam covering practical and theoretical issues. Individual elements of the exam are scored on a point scale, and in order to pass the exam, it is required to collect at least 50% of the total number of points.
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 assessed on a point scale, it is required to collect at least 50% of the total number of points to pass.

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

Course topics

none

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	100	4,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	53	2,00