COURSE DESCRIPTION CARD - SYLLABUS

Course name
Polymer and composite biomaterials [S2IBio1E>BPiK]

Course

Field of study
Biomedical Engineering

Year/Semester
1/2

Area of study (specialization)
Bionics and Virtual Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

Lecturers

Prerequisites

The student starting this course should have basic knowledge of polymeric materials used in medical applications.

Course objective

Acquainting with polymers and their composites as materials for medical applications.

Course-related learning outcomes

Knowledge:
The student has in-depth knowledge on physics and chemistry needed in biomedical engineering. The student knows the rules of measuring of selected physical and mechanical properties of biomaterials.
The student has fundamental knowledge on the life-cycle of medical product.

Skills:
The student knows how to retrieve information from literature, databases and other sources (also in English) in the area of biomedical engineering;
The student knows how to identify and formulate simple engineering tasks of a practical character, typical for biomedical engineering, especially selecting of materials for particular biomedical applications.

Social competences:
The student is aware of the necessity for continuous learning and knows how to inspire and organize the process of learning of other people.
The student knows how to prioritize tasks either defined by him/herself or by others.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Knowledge acquired during the lecture is verified by the colloquium carried out during the last lecture. The test consists of 10 differently scored questions. Counting threshold: 50%. Final issues will be sent to students by email
Laboratory: credit based on the assessment of the current progress in the implementation of laboratory tasks and reports

Programme content

Lecture: Polymer materials with self-reinforcing properties (monopolymer materials and their properties). Composites with reduced density and increased strength, modified with biocompatible fillers for applications as materials for the construction of medical devices. Materials with a cellular structure used in the technologies of auxiliary rehabilitation devices. Methods of forming of non-standard polymeric biomaterials. Problems with recycling of structural polymeric materials after their use.
Laboratory: An influence of usage conditions on properties of biomaterials used for surgical threads and dental fillings. Assessment of an influence of the filler type (carbon, glass) on mechanical properties of thermoplastic composites used in medicine. Technology of drains" production in medicine.

Teaching methods

1. Lecture: multimedia presentation, illustrated with films
2.Laboratory: conducting experiments, solving problems, discussion.

Bibliography

Basic
Leda H., „Materiały inżynierskie w zastosowaniach biomedycznych”, Wydawnictwo Politechniki Poznańskiej, 2012.
Nałęcz M., „Biomateriały” Akademicka Oficyna wydawnicza EXIT, 2000
Mazurkiewicz A., „Wprowadzenie do biomateriałów”, Wydawnictwa Uczelniane Uniwersytetu Technologiczno-Przyrodniczego, 2014.
Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
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)	28	1,00