



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Polymer and composites construction materials

### Course

Field of study

Biomedical Engineering

Area of study (specialization)

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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

elective

### Number of hours

Lecture

15

Tutorials

Laboratory classes

15

Projects/seminars

Other (e.g. online)

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr inż. Monika KNITTER

Responsible for the course/lecturer:

### Prerequisites

The student starting this course should have basic knowledge on construction of materials.

### Course objective

Acquainting with polymers and their composites as construction 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:

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	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	30	1,0

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