



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

In vitro study of biomaterials and therapeutic agents

### Course

Field of study

Biomedical engineering

Area of study (specialization)

Engineering of implants and prosthesis

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

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr n. farm. Piotr Ruszkowski

Responsible for the course/lecturer:

e-mail: pruskowski@gmail.com

### Prerequisites

General knowledge of tissue engineering, cell culture methods and biomaterials.

### Course objective

Obtaining of the knowledge in the area of cell and tissue culture methodology and its practical indications in medicine and science



### Course-related learning outcomes

#### Knowledge

1. The student has knowledge of the basics of tissue engineering and knows all types of cells and growth factors used as biomaterials
2. The student has knowledge of the methods and tools used in tissue and genetic engineering
3. The student knows the basic methods, techniques, tools and materials used to solve complex engineering tasks in the field of biomedical engineering, in particular virtual design methods and technologies

#### Skills

1. The student is able to communicate using various techniques in the professional environment and other environments (also in other foreign languages) in the field of biomedical engineering
2. Student is able to use cell cultures and genetic engineering in biomedical engineering
3. Student has the ability to use biomaterial and cell culture methodology to test their activity and cytotoxicity

#### Social competences

1. Student is able to work in group
2. The student is aware of the basic importance of tissue and genetic engineering and is able to transfer this knowledge.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: Test covering all the knowledge of the subject, carried out at the end of the semester

### Programme content

#### Lectures:

1. Cell and tissue cultures used in medical applications
2. Methodology of cell culture. Cell banking requirements.
3. Growth factors and mediums used in cell culture laboratory
4. Biomaterials and drug groups used in cell culture procedures. Laboratory reagents.
5. In vitro and in vivo tests required for medical product registration process.

#### Projects:

1. Biocompatibility testing in vitro and in vivo
2. Cytotoxicity testing in vitro



3. Clinical trials of drugs and biomaterials
4. Laboratory methods in vivo. Models in pharmacology.
5. Legal and ethical aspects of biocompatibility testing

### Teaching methods

1. Lectures: multimedial presentation
2. Projects: practical aspects of tissue engineering. Recent reviews and publications

### Bibliography

Basic

1. „Hodowla komórek i tkanek” S. Stokłosa wyd. 1 PWN 2008.
2. Norma ISO 10993

Additional

1. „Advanced drug delivery” Ashim Mitra Chi H. Lee, Kun Cheng, Wiley, 2013

### 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 tests, project preparation) <sup>1</sup>	30	1,2

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