



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Tissue and genetic engineering

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### 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

compulsory

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### Number of hours

Lecture

15

Tutorials

Laboratory classes

Projects/seminars

15

Other (e.g. online)

### Number of credit points

2

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### Lecturers

Responsible for the course/lecturer:

dr Piotr Ruskowski, PhD, PharmD

email: pruskowski@gmail.com

Responsible for the course/lecturer:

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### Prerequisites

General knowledge of human biology, anatomy and physiology. Basic knowledge in cell biology and physiology. The ability to think logically and planning. Understanding the need to acquire knowledge and continuing education



### 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 tissue and genetic engineering in biomedical engineering
3. Student has the ability to use biomaterial and tissue testing methods in biomedical engineering
4. Student is able to propose improvements to existing technical solutions in medicine.

#### 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

Projects: Credit based on an oral or written answer regarding the content of each exercise

### Programme content

Lecture:

1. Tissue and cell cultures in medicine and laboratory
2. Methodology of cell cultures (passages, cell banks, laboratory regulations)
3. Growth factors and cell culture mediums in laboratory
4. Products of tissue engineering



5. Tools in tissue engineering
6. Genetic engineering and practical aspects
7. Gene therapy - general aspects
8. Monoclonal antibodies as potent drugs and biomedical markers
9. Biocompatibility and biosimilarity. Methodology and ISO regulations
10. Tissue engineering in the industry.

Project:

1. General cell culture methods and equipment
2. Methods of cell analysis (confluency tests)
3. Detection of biosimilarity (methodology and regulations)
4. Cytotoxicity tests
5. Optical methods used in tissue engineering.

**Teaching methods**

Lecture: multimedia presentation.

Project: practical aspects of tissue engineering. Recent reviews and publications.

**Bibliography**

Basic

1. Hodowla komórek i tkanek S. Stokłosa wyd. 1 PWN 2008
2. Tissue Engineering Bernhard O. Palsson, Sangeeta N. Bhatia , Aug 9, 2003

Additional

A laboratory course in tissue engineering Melissa Curtis Micou, Dawn Kilkenny, August 2012, CRC Press

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	32	1,2
Student's own work (literature studies, preparation for exam, project preparation) <sup>1</sup>	18	0,8

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