



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of drug carriers

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### 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

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### Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

### Number of credit points

3

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### Lecturers

Responsible for the course/lecturer:

dr n. farm. Piotr Ruzkowski

e-mail: 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. Materials and biomaterials used in tissue engineering.

### Course objective

Obtaining of the knowledge in the area of different types of drug carriers and nano-carriers.



### Course-related learning outcomes

#### Knowledge

1. The student has knowledge of the basics of pharmacokinetics and pharmacodynamics of therapeutic agents used in pharmacotherapy
2. The student has knowledge of the methods and tools used in drug design process. Student knows about basic processes of drug delivery throughout the human body

#### 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 and drug therapy
2. Student is able to use the knowledge to combine tissue engineering and drug carriers design
3. Student has the ability to use biomaterial and tissue testing methods in drug carrier design

#### Social competences

1. Student is able to work in group
2. The student is aware of the basic importance of drug delivery designing and is able to transfer this knowledge to industry and academia

### 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 elective course

### Programme content

Lectures:

1. Drug definitions, drug administration routes, pharmacological effect
2. Pharmacokinetics of therapeutic agents. Drug penetration through biological membranes
3. Drug distribution process
4. Controlled drug delivery systems
5. Polymers as drug carriers part 1
6. Polymers as drug carriers part 2

Projects:

1. Lipid carriers
2. Metal carriers



3. Nanoparticles as drug carriers
4. Biological carriers and vectors
5. Biodistribution and imaging in drug delivery process

### Teaching methods

1. Lecture: Power Point presentation with multimedia examples
2. Projects: Practical aspects of drug carriers design. Workshops

### Bibliography

Basic

„Drugs – from discovery to approval”, Rick Nag, Wiley-Blackwell, 2nd ed. 2008.

Additional

„Drug delivery-engineering principles for drug therapy”, W.M. Saltzman, Oxford University Press, 2001

### 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