

FACULTY OF CHEMISTRY

**SUBJECT CARD****Name of subject in Polish** Biomateriały i Urządzenia Biomedyczne**Name of subject in English** Biomaterials and Biomedical Devices**Main field of study (if applicable):** Chemical Nano-Engineering**Specialization (if applicable):** .....**Profile:** academic**Level and form of studies:** 2nd level, , full-time**Kind of subject:** obligatory**Subject code** .....**Group of courses** NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15		15		
Number of hours of total student workload (CNPS)	60		30		
Form of crediting	Examination / crediting with grade*		Examination / crediting with grade*		
For group of courses mark (X) final course					
Number of ECTS points	2		1		
including number of ECTS points for practical classes (P)			1		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,4		0,7		

\*delete as not necessary

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

Basic knowledge of chemical engineering

**SUBJECT OBJECTIVES**

C1 - Getting acquainted with the types of drug carriers and the basic mechanisms of drug release.  
 C2 - Familiarization with the structure and principle of operation of nanosensors used in medicine.  
 C3 - Getting acquainted with the method of producing drug carriers and the method of determining the release rate of drugs.

**SUBJECT EDUCATIONAL EFFECTS**

In terms of knowledge:

The person who successfully completed the course:

PEU\_W01 - the student will be able to classify the structural aspects of biomaterials.

PEU\_W02 - the student will be able to name and describe the elements of designing biomaterials for the human body.

In terms of skills:

The person who successfully completed the course:

PEU\_U01 - The student will be able to determine the biological properties of materials.

PEU\_U01 - The student will be able to build a simple blood glucose meter

In terms of social competences:

The person who successfully completed the course:

PEU\_K01 - Can work in a group of several people, both in conducting experiments and computer processing of the results

### PROGRAMME CONTENT

Lecture		Number of hours
Lec 1	Introduction to the course. The idea of drug dosing in long-term local therapy. (Bio)biocompatible polymers. Diffusive transport of drugs from homo- and heterogenous drug carriers. Description of the release rate controlled by diffusion and dissolution Hydrogels applied externally and internally. Enzymatic release of drugs. Bioluminescent sensors Biosensors based on DNA. Credits in writing.	15
	Total hours	15

Laboratory		Number of hours
Lab1	Biological Performance of Materials	7
Lab 2	Micro/Nanofluidics for Bioengineering & Lab-on-a-Chip – construction of glucometer	8
	Total hours	15

### TEACHING TOOLS USED

N1. Lecture with multimedia presentation  
N2. Laboratory  
N3. Description of experimental results using computer graphics programs  
N4. Consultations

### EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

<b>Evaluation</b> (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
P(lecture)	PEU_W01 - PEU_W02	Final test (max. 10 points)
P2 (laboratory)	PEU_U01 – PEU_U02 PEK_K01	Attendance at the classroom (4.5 points) Reports (5.5 points)

<b>PRIMARY AND SECONDARY LITERATURE</b>	
<b><u>PRIMARY LITERATURE:</u></b> Biomedical Engineering - W.M. Saltzman  Applied Biophysics for drug discovery - D.Huddler, E.R.Zartler  Advanced Biomaterials and Biodevices - A.Tivari, A.N.Nordin  <b><u>SECONDARY LITERATURE:</u></b> Biosensors Nanotechnology - A.Tivari, A.P.F.Turner	
<b>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</b>	
Prof. dr hab. inż. Anna Trusek, anna.trusek@pwr.edu.pl	