


**KAPITAŁ LUDZKI**  
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez  
 Unię Europejską w ramach  
 Europejskiego Funduszu  
 Społecznego

**UNIA EUROPEJSKA**  
 EUROPEJSKI  
 FUNDUSZ SPOŁECZNY


<b>Course title</b>		<b>ECTS code</b>	
Drug design		13.3.1217	
<b>Name of unit administrating study</b>			
null			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	drugiego stopnia
Wydział Chemii	Biznes chemiczny	<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
Wydział Chemii	Chemia	<b>type</b>	drugiego stopnia
		<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
Wydział Chemii	Ochrona środowiska	<b>specialization</b>	wszystkie
		<b>type</b>	drugiego stopnia
		<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
<b>Teaching staff</b>			
dr hab. Elżbieta Jankowska, profesor uczelni; dr Julia Witkowska			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		2 classes - 15 h tutorial classes - 15 h student's own work - 20 h TOTAL: 50 h - 2 ECTS	
Lecture			
<b>The realization of activities</b>			
classroom instruction			
<b>Number of hours</b>			
Lecture: 15 hours			
<b>The academic cycle</b>			
2024/2025 winter semester			
<b>Type of course</b>		<b>Language of instruction</b>	
an elective course		English	
<b>Teaching methods</b>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
Lecture with multimedia presentation of basic issues in the drug discovery process		<b>Final evaluation</b>	
		Graded credit	
		<b>Assessment methods</b>	
		Exam with closed (test) and open questions	
		<b>The basic criteria for evaluation</b>	
		Achievement of at least 51 % of the total number of points from the written exam	
<b>Method of verifying required learning outcomes</b>			
<b>Required courses and introductory requirements</b>			
<b>A. Formal requirements</b>			
lack			
<b>B. Prerequisites</b>			
lack			
<b>Aims of education</b>			
The aim of the lecture is to familiarize students with the challenges faced by scientists and pharmaceutical companies involved in drug discovery. The skills and tools that chemists can use to support the drug design process will also be indicated.			
<b>Course contents</b>			

the drug discovery process (identification and validation of targets, structure-based drug design, lead identification and optimization, preclinical and clinical trials, drug approval and marketing)

basic pharmacokinetic properties of drugs (Lipinski rule of five)

drug absorption, distribution, metabolism, and excretion (ADME)

drug potency, stability and toxicity

antibacterial, antiviral and anti-cancer drugs

nature as a drug source

the art of transforming peptides into drugs, bioisosterism in a drug design process

proteins and antibodies as biological drugs

prodrugs in contemporary drug design

economic aspects in drug discovery

### Bibliography of literature

Literature required to pass the course

monographic materials provided by the teacher

scientific papers indicated by the teacher

Extracurricular readings

Valko K., Physicochemical and biomimetic properties in drug discovery, Wiley 2014

Textbook of drug design and discovery, Stromgaard K., Krosggaard-Larsen P., Madsen U. (Eds.), CRC Press 2016

Ng R., Drugs: from discovery to approval, Wiley-Blackwell 2015

Trabocchi A., Guarna A., Peptidomimetics in organic and medicinal chemistry, Wiley 2014

Bioisosters in medicinal chemistry, Brown N. (Ed.), Wiley-VCH 2012

### The learning outcomes (for the field of study and specialization)

Chemistry:

K\_W05: has extended knowledge in the field of the specialization studied

K\_W11: demonstrates in-depth knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field

K\_U04: applies acquired knowledge of chemistry and related scientific disciplines

K\_U10: reads with understanding scientific and popular science chemical texts in English

K\_K05: understands the need for independent search of information in scientific literature and popular science magazines

Chemical Business:

K\_BChII\_W05: knows and understands the main directions of the development of chemistry combined with economics as two interpenetrating scientific disciplines

K\_BChII\_U01: based on the acquired knowledge is able to propose a solution to problems in chemistry, taking into account the economic aspect, using advanced measurement and analytical techniques

K\_BChII\_K03: is willing to critically assess the level of his/her own knowledge in the light of the achievements of the studied scientific discipline

Environmental Protection:

K\_OŚII\_W01: describes in an in-depth manner complex phenomena and processes occurring in nature, including those related to the spread of anthropogenic pollution

K\_OŚII\_U06: defines her/his interests and develops them within the chosen specialization and themes of her/his master's thesis while implementing the process of self-education and planning own future career

K\_OŚII\_K10: has a need for continuous professional development

### Knowledge

Students:

describe the main stages of drug design

indicate the most important problems encountered at each stage of drug discovery

describe target and lead identification processes

list and characterize the properties modified in the lead optimization process

describe the advantages and disadvantages of low-molecular, peptide and protein drugs, including their impact on environment pollution

characterize the differences in antibacterial, antiviral and anti-cancer drug design

list the components of costs generated in the drug search process

describe the achievements and challenges of contemporary drug design

### Skills

Students:

describes with understanding methods for determining and modifying the properties of potential drugs

propose alternative solutions to economic problems encountered at each stage of drug discovery

### Social competence

Students understand the importance of self-learning and rising their competences

## Contact

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