

## SYLLABUS – A COURSE DESCRIPTION

### I. General information

1. Course name: **Mechanisms, effects of drugs action and drugs interactions in humans**
2. Course code: **01-BTA-HUMDRUGS**
3. Course type (compulsory or optional): **optional**
4. Study programme name: **Biotechnology**
5. Cycle of studies (1st or 2nd cycle of studies or full master's programme): **2nd cycle of studies**
6. Educational profile (general academic profile or practical profile): **general academic profile**
7. Year of studies (if relevant): **I**
8. Type of classes and number of contact hours (e.g. lectures: 15 hours; practical classes: 30 hours):  
**lectures: 15 hours**
9. Number of ECTS credits: **1**
10. Name, surname, academic degree/title of the course lecturer/other teaching staff:  
**dr Agnieszka Knopik-Skrocka, askro@amu.edu.pl**
11. Language of classes: **English**
12. Online learning – yes (partly – online / fully – online) / no: **the module will be run as classes with teacher; most of didactic materials will be available on e-learning AMU platform; in some special cases (e.g. epidemic/pandemic) online classes partly or fully can be lead by teacher (using e.g. MS Teams).**

### II. Detailed information

1. Course aim (aims)
 

The aim of the module is to:

  - introduce to discovering and steps of production of brand-name drugs (original drugs)
  - present the knowledge about similarities and differences between synthetic brand-name drugs and generic drugs
  - introduce to biopharmaceutics ( biological drugs) and biosimilar drugs– production, contribution to pharmaceutical market, immunogenicity
  - develop the knowledge about the mechanisms of drug metabolism and interactions of drugs with other drugs or diet
  - develop the knowledge about compartments and the mechanisms of drugs action in human cells
  - introduce to drug affinity to the cellular targets (enhancement with using biotechnology, nanotechnology)
  - indicate the problem with human cells resistance to drugs (chemoresistance, multidrug resistance proteins)
  - show the newest therapies used in treatment of tumors, cardiovascular, neurodegenerative diseases
  - introduce to immunotherapy of tumors as one of the "hot topics" in biological and medical studies (e.g. immunotherapy with check points inhibitors)
  - develop students awareness of challenges in contemporary medicine and develop curiosity about looking for the newest therapies approved by FDA and EMA and trends in biological and medical studies
2. Pre-requisites in terms of knowledge, skills and social competences (if relevant)
 

General knowledge about human cell's biology
3. Course learning outcomes (EU) in terms of knowledge, skills and social competences and their reference to study programme learning outcomes (EK)

Course learning outcome symbol (EU)	On successful completion of this course, a student will be able to:	Reference to study programme learning outcomes (EK)
EU_01	mention and characterise discovering and production process of brand-name drugs (original drugs )	BT_W01, Bt_W03, Bt_W04, Bt_W08, BT_W09, BT_U03, BT_U05, BT_K02
EU_02	explain similarities, differences between brand-name and generic drugs	Bt_W01, BT_W02, Bt_W04, Bt_W06,

		Bt_W09, BT_U03, BT_U05, Bt_K02
EU_03	characterise biopharmaceutics and biosimilar drugs (with regard to their production, biological features, immunogenicity) and give examples of these drugs	BT_W01, BT_W02, BT_W04, BT_W06, BT_W09, BT_U03, BT_U05, BT_K01, BT_K02
EU_04	recognise the effect of genes to drug metabolism (poor/intermediate/ultrafast metabolisers) and explain interactions between drugs/diet ingredients	BT_W01, BT_W02, BT_W04, BT_W06, BT_W09, BT_U03, BT_U05, BT_K02
EU_05	indicate main targets for drugs in human cells and describe diversity of drugs action mechanisms	BT_W01, BT_W02, BT_W04, BT_W06, BT_W09, BT_U03, BT_U05, BT_K02
EU_06	explain the influence of MDR proteins to multidrug resistance phenomenon and indicate contribution of biotechnology, nanotechnology in enhancement of drug affinity to human cells	BT_W01, BT_W02, BT_W04, BT_W06, BT_W09, BT_U03, BT_U05, BT_K02
EU_07	give examples of the newest therapies used in treatment of tumors, cardiovascular, neurodegenerative diseases, indicate trends in biological and medical studies, but also suggest their new directions	BT_W01, BT_W02, BT_W03, BT_W04, BT_W06, BT_W08, BT_W09, BT_U03, BT_U04, BT_U05, BT_K01, BT_K02
EU_08	develop own awareness of challenges in contemporary medicine and develop own curiosity about trends in biological and medical studies	BT_W01, BT_W04, BT_W06, BT_W09, BT_U03, BT_U04, BT_U05, BT_K02, BT_K04

#### 4. Learning content with reference to course learning outcomes (EU)

Course learning content	Course learning outcome symbol (EU)
Discovering and production of brand-name drugs (original drugs) – pre-clinical studies, clinical trials, drug patent and its expiration, serendipity in drug discovery, personalised medicine	EU_01
Synthetic brand-name drugs and generic drugs - similarities and differences	EU_02
Biopharmaceutics ( biological drugs) and biosimilar drugs – production, contribution to pharmaceutical market, immunogenicity	EU_03, EU_08
Drug metabolism and interactions of drugs with other drugs or diet ingredients (poor, intermediate, ultrafast metabolizers)	EU_04
Main cellular targets of drugs, diversity of drug action mechanisms and enhancement of drug affinity (monoclonal antibodies, liposomes, molecular Trojan horse strategy)	EU_05, EU_08
Multidrug resistance phenomenon in human cells (chemoresistance, MDR proteins)	EU_06
The newest therapies used in treatment of tumors, cardiovascular, neurodegenerative diseases (FDA/EMA approved)	EU_07, EU_08
Trends in biological and medical studies focused on new potential drugs (combination therapies, micro and circRNA studies)	EU_07, EU_08

#### 5. Reading list

Original scientific articles and reviews available at the lecturer

### III. Additional information

1. Teaching and learning methods and activities to enable students to achieve the intended course learning outcomes (please indicate the appropriate methods and activities with a tick or/and suggest different methods)

Teaching and learning methods and activities	
Lecture with a multimedia presentation	X
Interactive lecture	
Problem – based lecture	
Discussions	X
Text-based work	
Case study work	
Problem-based learning	
Educational simulation/game	
Task – solving learning (eg. calculation, artistic, practical tasks)	
Experiential work	
Laboratory work	
Scientific inquiry method	
Workshop method	
Project work	
Demonstration and observation	
Sound and/or video demonstration	X
Creative methods (eg. brainstorming, SWOT analysis, decision tree method, snowball technique, concept maps)	
Group work	

2. Assessment methods to test if learning outcomes have been achieved (please indicate with a tick the appropriate methods for each LO or/and suggest different methods)

Assessment methods	Course learning outcome symbol							
	EU_1	EU_2	EU_3	EU_4	EU_5	EU_6	EU_7	EU_8
Written exam								
Oral exam								
Open book exam								
Written test	X	X	X	X	X	X	X	X
Oral test								
Multiple choice test								
Project								
Essay								
Report								
Individual presentation								
Practical exam (performance observation)								
Portfolio								
Discussion activity							X	X

3. Student workload and ECTS credits

Activity types	Mean number of hours spent on each activity type
Contact hours with the teacher as specified in the study programme	15
Preparation for classes	
Reading for classes	
Essay / report / presentation / demonstration preparation, etc.	
Project preparation	
Term paper preparation	
Test preparation	15
Total hours	30
Total ECTS credits for the course	1

4. Assessment criteria according to AMU in Poznan grade system

Very good (bdb; 5,0): Student's level of activity is outstanding, final test 88-100%

Good plus (+db; 4,5): Student's level of activity is very good, final test 80-87,5%

Good (db; 4,0): Student's level of activity is good, final test 70-79,5%

Satisfactory plus (+dst; 3,5): Student's level of activity is satisfactory, final test 61-69,5%

Satisfactory (dst; 3,0): Student's level of activity is satisfactory, but including many mistakes, final test 50-60,5%

Unsatisfactory (ndst; 2,0): Student's level of activity is unsatisfactory, final test <50%