Course Syllabus

I. General Information

Course name in English	In vitro methods in toxicology
Course name in Polish	Metody *in vitro* w toksykologii
Programme	Bioanalytical technologies
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	MSc
Form of studies (full-time, part-time)	Full-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator/person responsible	Dr hab. Anna Sierosławska

Type of class *(use only the types mentioned below)*	Number of teaching hours	Semester	ECTS Points
lecture			28
tutorial			
classes			
laboratory classes			
workshops			
seminar	120	I , II, III, IV	
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory	30	III	
translation classes			
study visit			

Course pre-requisites	Knowledge in topics from biology and biochemistry fields

II. Course Objectives

Getting acquainted with the latest methods of evaluating toxicity with the use of cell cultures.
Preparing and writing the original experimental thesis

III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
W_01	knows the terminology used in the cytotoxicity assessment;	K_W01,
W_02	is able to indicate the basic analytical methods used to assess the potential cytotoxicity of xenobiotics and knows the rules of laboratory work with primary and secondary cell lines and the biological materials according to GLP standards;	K_ W05, K_W07, K_W02

W_03	knows the principles of the protection of intellectual property in biological sciences;	K_W09,
SKILLS		
U_01	is able to design and carry out the experiment under the guidance of the tutor and applies advanced techniques and research tools;	K_U01, K_U07, K_U15, K_U18, K_U19
U_02	is able to independently search for and verify the data on the cytotoxicology and related fields using the current literature and available databases; selects source materials;	K_U02, K_U03, K_U14,
U_03	uses statistical methods to interpret and verified the obtained results;	K_U04, K_U14,
U_04	is able to independently design and present the results of his own and other authors' studies with respect to their copyrights in the form of a multimedia presentation and / or oral presentation;	K_U05, K_U06, K_U10
U_05	discusses and expresses views on topics related to scientific research and is able to indicate their practical use in the economy; understands the need for continuous personal and professional development and is open to modern technologies in *in vitro* toxicology and connected with this the need to follow the scientific literature;	K_U02, K_U03, K_U05, K_U11, K_U14, K_U16, K_U17
SOCIAL COMPETENCES		
K_01	Is aware of the sense of toxicity / safety assessment of the compound of different origin present in the environment;	K_K01, K_K02
K_02	is aware of the ethical issues during planning and carrying out research experiments with the biological material, especially obtaining cells for primary cultures;	K_K04
K_03	applies the principles of Good Laboratory Practice and Occupational Health and Safety in the experimental work;	K_K03, K_K05

IV. **Course Content**

Animal cell cultures as the tool in toxicity assessment – primary and secondary cell cultures, specific cell lines, 3D cultures – culture, storage and experiment design. Assessment of the cytotoxic potential of xenobiotics of different origin. Effects of xenobiotics on the cellular pathways. Pathophysiological effects of xenobiotics on the cells. Methods and techniques used in cytotoxicity assessment. Verification and statistical analyses of the obtained results. Selection the available information related to the selected research topic, including from the electronic sources. Critical analysis of the obtained results.

V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods *(choose from the list)*	Forms of assessment *(choose from the list)*	Documentation type *(choose from the list)*
KNOWLEDGE			
W_01	Conversational lecture, Guided research (seminar paper), Guided practice, Work with text, Laboratory analysis, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
W_02	Conversational lecture, Guided research (seminar paper), Guided practice, Work with text, Laboratory analysis, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
W_03	Conversational lecture, Guided research (seminar paper), Guided practice, Work with text, Laboratory analysis, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis, Examination card,
SKILLS			
U_01	Project-based learning, Laboratory classes, Practical classes, Guided research (seminar paper), Group work, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
U_02	Project-based learning, Laboratory classes, Practical classes, Guided research (seminar paper), Group work, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
U_03	Project-based learning, Laboratory classes, Practical classes, Guided research (seminar paper), Group work, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
U_04	Project-based learning, Laboratory classes, Practical classes, Guided research (seminar paper), Group work, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
U_05	Project-based learning, Laboratory classes, Practical classes, Guided research (seminar paper), Group work, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis
SOCIAL COMPETENCIES			
K_01	Project-based learning, Laboratory classes, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis, Examination card,

K_02	Project-based learning, Laboratory classes, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis, Examination card,
K_03	Project-based learning, Laboratory classes, Discussion	Preparation / implementation of the project, written paper / report	Evaluated written paper, Grade card, Master thesis, Examination card,

VI. Grading criteria, weighting factors.....Student workload

Non passed

- absence of student,
- lack of the experimental study,
- inactivity and no timeliness of preparing the components of the thesis,
- lack of the multimedia presentation,
- lack of the master\'s thesis

Passed

- presence of student,
- performance of the experimental study,
- activity and timeliness of preparing the components of the thesis,
- performance of the multimedia presentation,
- submission of the master\'s thesis within the deadline

Form of activity	Number of hours
Number of contact hours (with the teacher)	**210 (150 + 60 individual consultation)**
Number of hours of individual student work	**490**

VII. Literature

Basic literature
1. scientific literature associated with the seminar subject, 2. reviewed papers from scientific journals. 3. Hodgson E., 2010. A textbook of modern toxicology, John Wiley & Sons
Additional literature
1. Lesley A. Stanley., 2014. Molecular and cellular toxicology an introduction. Wiley Blackwell