1.	**Field of study**	**Biotechnology**
2.	Faculty	Faculty of Natural Sciences
3.	Academic year of entry	2021/2022 (winter term), 2022/2023 (winter term)
4.	Level of qualifications/degree	first-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: In vitro cultures in biotechnology

Module code: 1BT_17A

1. Number of the ECTS credits: 4

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
1BT_17_1	Student is able to plan a basic laboratory equipment to conduct in vitro cultures of plant and animal cells	1BT_W09_P	5
1BT_17_2	Student classifies and describes techniques for plant and animal cell/ tissues cultures, and defines their application in various fields of biotechnology and basic research.	1BT_W09_P	5
1BT_17_3	Student distinguishes between the types of in vitro cultures, classifies fundamental processes occurring in vitro in culture of plant cells/tissues and defines the conditions leading to a specific type of plant morphogenesis.	1BT_W05_P 1BT_W09_P	5 5
1BT_17_4	Students applies the basic techniques of in vitro cultures and defines the conditions for the growth and differentiation of cells under in vitro culture conditions in different plant species.	1BT_U01_P	5
1BT_17_5	Student is able to evaluate different plant cultures in terms of their degree of differentiation, regeneration capacity and somaclonal variations.	1BT_U03_P	5
1BT_17_6	Student describes the effects of the experiment, analyzes the results, draws conclusions and present them in a report.	1BT_U04_P	5
1BT_17_7	The student has a habit of knowledge updating and critical evaluation of the possibility of its practical use.	1BT_U02_P 1BT_U06_P	2 2
1BT_17_8	Student follows the rules of work in a specialized laboratory and takes care of their own and others safety.	1BT_K04_P 1BT_U04_P	5 4

3. Module description

Description	The module delivers the advanced knowledge on cell and tissues cultures of plants and animals; acquaints the student with the principles of working in sterile conditions and the requirements and specifics of the laboratory for in vitro culture of plant and animal tissues. Particular emphasis is placed on

	mastering the various methods of in vitro cells/tissues culture of plants and knowledge of their practical use, including plant breeding. In addition, the biology of animal cell cultures is presented and the possibilities of their use in medical biotechnology are discussed. In experiments carried out independently, the student acquires the ability to work under aseptic conditions to establish, maintain, monitor and analyze plant cultures; collect empirical data and improves the ability to analyze and interpret the results of the observation.
Prerequisites	Knowledge of botany, zoology and physiology on high school level.

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
1BT_17_w_1	Coursework	according to the Syllabus	1BT_17_1, 1BT_17_2, 1BT_17_3, 1BT_17_4, 1BT_17_5, 1BT_17_6, 1BT_17_7, 1BT_17_8

5. Forms of teaching

code	form of teaching			required hours of student's own work		assessment of the learning outcomes of the module
	type	description (including teaching methods)	number of hours	description	number of hours	
1BT_17_fs_1	lecture	Lectures supported with computer presentations in Power Point to illustrate the problems discussed.	15	Acquisition of knowledge presented in lectures; textbooks and research papers related to the topics discussed	20	1BT_17_w_1
1BT_17_fs_2	laboratory classes	Working under the supervision of the lecturer - performing experiments based on the instructions, the analysis of the results. Consultations: Individual work with the student on the preparation of the report of laboratory work.	45	Preparation for laboratory tasks based on the instructions and recommended literature.	20	1BT_17_w_1