1.	Field of study	Biotechnology
2.	Academic year of entry	2017/2018 (winter term)
3.	Level of qualifications/degree	second-cycle studies
4.	Degree profile	general academic
5.	Mode of study	full-time

Module: Plant biotechnology

Module code: 2BT_E_12

1. Number of the ECTS credits: 7

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
2BT_E_12_1	Student acquires an advanced knowledge of the modern methods in biotechnology applied in plant breeding and research on structure and function of plant genomes.	2BT_E_W02 2BT_E_W06 2BT_E_W10	5 5 5
2BT_E_12_2	Student defines the goals, applications and environmental risk of the methods used in genetic modification of plant genomes.	2BT_E_U02 2BT_E_W06	5 5
2BT_E_12_3	Student demonstrates the practical ability to apply the modern techniques to induce genetic variation in plants and gets familiar with the molecular analysis of transgenic plants.	2BT_E_U01 2BT_E_U02 2BT_E_W03	5 5 5
2BT_E_12_4	Student applies modern biotechnology tools for understanding the structure and function of plant genomes.	2BT_E_U01 2BT_E_U02	5 5
2BT_E_12_5	Students uses specialized electronic data bases and international services to update the reports on world wide status of genetically modified crops.	2BT_E_K03 2BT_E_K05 2BT_E_U06	5 5 5
2BT_E_12_6	Student is able to plan the basic equipment for plant biotechnology laboratory.	2BT_E_U07	5
2BT_E_12_7	Student describes the experiment outcomes, analyzes the results, makes conclusions and present them in the report or presentation.	2BT_E_U10 2BT_E_W04 2BT_E_W08	5 5 5

2BT_E_12_8	Students follows the rules of safety work with the transgenic material and cares about laboratory equipment.	2BT_E_K02	5

3. Module description	
Description	The module delivers the advanced knowledge on plant biotechnology and prepares students theoretically and practically in terms of the methods used in plant biotechnology. Particular emphasis is placed on learning the key methods of plant biotechnology used in plant breeding, including the production and analysis of genetically modified plants and haploids. The usefulness of genetically modified plants in other industries as well as in the basic research is also presented. During self-made experiments, students learn to handle with the equipment of modern specialized plant biotechnology laboratory. A wide range of laboratory techniques used in biotechnology of the crops as well as and model plants is demonstrated . Student acquires practice in collecting and analysis of empirical data, interpretation of the results and formulation of the hypothesis and conclusions.
Prerequisites	Principles of molecular biology, basis of biotechnology and in vitro cultures of plants on undergraduate level.

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
2BT_E_04_w_1	Final test	The written work to evaluate a knowledge and practical skills acquired during laboratory.	2BT_E_12_4, 2BT_E_12_5
2BT_E_04_w_2	Evaluation of practical skills	Verification of student's compliance with the rules of the work in specialized laboratory including handling with aseptic conditions of work and modern laboratory devises; evaluation of student's ability for conducting experiments; data collection and formulation of the conclusions.	2BT_E_12_3, 2BT_E_12_4, 2BT_E_12_5, 2BT_E_12_6, 2BT_E_12_7, 2BT_E_12_8
2BT_E_04_w_3	Presentation of the report of the laboratory work	Preparation of a report describing the scheme of the experiment, the obtained results and conclusions.	2BT_E_12_4, 2BT_E_12_5, 2BT_E_12_6
2BT_E_04_w_4	Written exam	Getting a credit on the laboratory work and report is obligatory to enter the exam which evaluate the knowledge on problems presented during the lectures.	2BT_E_12_1, 2BT_E_12_2, 2BT_E_12_5

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_E_08_fs_1	lecture	Lectures supported with computer presentations in Power Point to illustrate the problems discussed.	30	Acquisition of knowledge presented in lectures; textbooks and research papers related to the topics discussed.	25	2BT_E_04_w_4
1BT_E_08_fs_2	laboratory classes	Conducting of the experiments following the instructions, the analysis of the results – under teacher supervision. Possibility of consultation: Individual work with the student on the preparation of the report of laboratory work.	60	Preparation for laboratory tasks based on the instructions and recommended literature.	65	2BT_E_04_w_1, 2BT_E_04_w_2, 2BT_E_04_w_3