1.	**Field of study**	**Biotechnology**
2.	Faculty	Faculty of Natural Sciences
3.	Academic year of entry	2022/2023 (winter term), 2023/2024 (winter term), 2024/2025 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: Basics of microbial biotechnology

Module code: 2BT_55A

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)
2BT_55_1	Student has detailed knowledge and ability to assess the risks associated with microbiological processes of synthesis and degradation of various compounds as well as their application on an industrial scale	2BT_U04_P 2BT_W02_P 2BT_W05_P 2BT_W08_P 2BT_W09_P	5 4 4 4 4
2BT_55_2	Student classifies the xenobiotic. Describes the mechanisms of their microbial transformation in the environment	2BT_U02_P 2BT_W03_P	4 4
2BT_55_3	Student knows and applies the principles of screening for microorganisms with desired properties	2BT_U01_P 2BT_U03_P 2BT_W09_P	5 4 5
2BT_55_4	Student can perform biochemical and morphological characteristics of the microorganisms isolated from the environment	2BT_U01_P 2BT_U03_P	4 3
2BT_55_5	Student induces and identifies the enzymes and metabolites of microbial origin and demonstrates their use in the industry and environmental protection	2BT_U03_P	3
2BT_55_6	Student rates and evaluates methods used in assessing the biodegradability of polymeric waste	2BT_U04_P 2BT_U06_P	5 5
2BT_55_7	Student interprets, thinks analytically and evaluates critically the results of experimental work using current information and past experiences.	2BT_K01_P 2BT_U05_P	5 3

		2BT_U06_P 2BT_W08_P	4 5
2BT_55_8	Students will gain experience in effective communication skills by practicing, listening and speaking clearly. Respect the safety rules when working with microorganisms.	2BT_K02_P 2BT_K04_P	5 5
2BT_55_9	Critically uses sources of information on the environmental impact of plastics, including internet data. Is able to assess the credibility of information based on its sources and use information in the process of self-education	2BT_K01_P	5

3. Module description	
Description	The course delivers the basic knowledge of microbial biotechnology. The course will cover advanced methods associated with microbial synthesis and degradation processes as well as their economics. The emphasis will be placed upon variety of abiotic and biotic mechanisms involved in the conversion of persistent compounds in the environment. Special attention will be paid to synthesis, disposal and biodegradation of plastic materials and microbial screening for enzymes and metabolites synthesising microorganisms of potential use in various industries. During the course the students will perform screening for microorganisms with desired properties and isolate commercially useful metabolites. Moreover, students will examine degradability of natural and synthetic polymeric materials in various environments. The estimation of susceptibility of plastics to filamentous fungi and white rot fungi as well as fungal enzymes involved in the degradation will be tested. Through the analysis, interpretation and discussion of the results students integrate knowledge, skills and competence.
Prerequisites	Basic knowledge of chemistry, biochemistry, microbiology and enzymology

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
2BT_55_w_1	Coursework	according to the Syllabus	2BT_55_1, 2BT_55_2, 2BT_55_3, 2BT_55_4, 2BT_55_5, 2BT_55_6, 2BT_55_7, 2BT_55_8, 2BT_55_9
2BT_55_w_2	Exam	according to the Syllabus	2BT_55_1, 2BT_55_2, 2BT_55_5, 2BT_55_6, 2BT_55_9

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	
2BT_55_fs_1	lecture	Multimedia lecture	10	Memorising and describing the material from the lectures, assessing basic sources of information and how to evaluate and use this information	10	2BT_55_w_2
2BT_55_fs_2	laboratory classes	Cooperative work in the biochemical and microbiological laboratory under the	35	Reading instructions, planning and basic understanding of the scientific method,	45	2BT_55_w_1

		supervision of lecturer, performing experiments according to the instructions given to students, analysis of the results		preparation of report, recognition of the biodegradable plastics market		