COURSE PROGRAMME

1.	Field of study	Biotechnology
2.	Academic year of entry	2016/2017 (winter term) *The number and date of a Faculty Council's resolution: 18/2015 (19.06.2015 r.)*
3.	Level of qualifications/degree	second-cycle studies
4.	Degree profile	general academic
5.	Mode of study	full-time
6.	ISCED code	0512 (Biochemistry)

Learning outcomes

7.	Description of learning outcomes	Attachment no. 1
8.	Model learning outcomes	

Programme of study

9.	Connection between the field of study and university development strategy, including the university mission	The education within the specialization is convergent with the operational aims, outlined in the strategy of development of the University of Silesia for 2012-2020, especially those referring to the operational aim: innovative education and modern teaching offer. The specialization has a positive assessment of the State Accreditation Committee. The internationalization and mobility in the educational process, realized mainly due to LPP Erasmus program, cover both the scientific and educational trips of Polish students and academic teachers to numerous universities in Europe and increasing mobility in the opposite direction. Incessant increase in the quality of education is achieved, among others, by the development of didactic competences of the academic teachers and internal system of ensuring high-quality education. Valuable contribution to the increase in education quality is also realized by effective support of a standard didactic offer by projects financed by European Social Fund, e.g. projects for commissioned specialties. The offer of educational program of this specialization is constantly modified and updated to follow, to the greatest extent, the expectations of a local and global labor markets. This is possible, mainly, thanks to an activation of the cooperation with the local environment, especially with employers from biotechnological sector . The educational program of this specialization is regularly consulted with the employers. Our high-quality education is supported by a close connections with researches conducted by the scientists of the Faculty of Biology and Environmental Protection. Most of them reach an international level. According to the mission of the University of Silesia, the education process is oriented to the most complete development of each student and its aimed at opening cognitive perspectives to the students who want to enter them as independent, thinking person, taking part in their everyday life.
10.	Number of semesters	4
11.	Degree	magister (Master's Degree)
12.	Area (or areas - for joint or interdisciplinary studies) of education to which the programme is assigned and the leading discipline of art or science for the POL-on system	natural sciences [biotechnology]
13.	Areas, fields and disciplines of art or	• natural sciences

	science to which the learning outcomes of the field of study are related, indicating the **percentage** shares in which the programme of study refer to the various fields of science	• biological sciences - 100% • biotechnology
14.	Specializations	Environmental Biotechnology Plant Biotechnology
15.	Number of ECTS credits required to achieve the qualification equivalent to the level of study	Environmental Biotechnology: 120, Plant Biotechnology: 120
16.	Percentage of the ECTS credits for each of the areas to which the learning outcomes are related to the total number of ECTS credits	Environmental Biotechnology natural sciences - 100% Plant Biotechnology natural sciences - 100%
17.	Percentage of the ECTS credits for optional modules in relation to the total number of ECTS credits	Environmental Biotechnology: 85%, Plant Biotechnology: 85%
18.	Total number of ECTS credits that a student must obtain in the modules taught	Environmental Biotechnology: 120, Plant Biotechnology: 120
19.	Number of ECTS credits that a student must obtain in modules from humanities or social science areas of education (not less than 5 ECTS) - in the case of fields of study assigned to areas other than, respectively, the humanistic or social studies	Environmental Biotechnology: 5, Plant Biotechnology: 5
20.	Modules description (including learning outcomes, number of ECTS credits and assessment methods of the learning outcomes)	Attachment no. 2
21.	Course structure	Attachment no. 3
22.	Graduation requirements for a particular specialization	Environmental Biotechnology Plant Biotechnology
23.	Organization of the process of obtaining a degree	After being recruited, a student chooses a Department to realize the seminars, laboratory classes and the MSc thesis. The head of the Department selects the students on the basis of the interview and the marks obtained by the candidate at the courses related to the

		research profile of the Department. Interviews take place in the second part of July. Students at Biotechnology realize their diploma theses in one of the following departments: Department of Plant Anatomy and Cytology, Department of Biochemistry, Department of Genetics, Department of Biophysics and Plant Morphogenesis, Department of Histology and Animal Embryology, Department of Animal Physiology and Ecotoxicology and Department of Microbiology. The choice of a supervisor and decision on the MSc thesis subject takes place during the 1st month of the 1st semester. The MSc thesis is of an research character and is related with the chosen specialization. Student has to submit their MSc thesis in the Dean's Office. An academic teacher of at least PhD hab. degree is appointed as the reviewer. A diploma exam is taken in front of an examination board consisted of 3 persons: a supervisor, a reviewer and a head of the board. During the exam at least three questions are posed by the supervisor and the reviewer. The final mark, written in the diploma, is calculated according to the rules defined in the Statute of the Studies in the University of Silesia (enclosure to the announcement of the Rector of the University of Silesia, published on the September 2 2011).
24.	Internships (hours and conditions) in the case of practical programmes and in general university programme - if such requires internship	
25.	Total number of ECTS credits that a student must obtain in internships	Environmental Biotechnology: 0, Plant Biotechnology: 0
26.	Number of ECTS credits - higher than 50% of the total number of credits - that a student must obtain: • in general university programmes within a module connected with research carried out in the area to develop his/her knowledge and research skills; • in practical programmes within a module connected with vocational preparation to allow a student to develop practical and social skills	Environmental Biotechnology: 112, Plant Biotechnology: 112
27.	Minimum staff resources and staff to student ratio	Attachment minimum staff

Additional information

28.	General description of the programme	During the second cycle-studies of biotechnology, completed by the defense of master thesis, students learns, under the supervision of their professors, how to pose and solve problems concerning plant and environmental biotechnology and actively take part in scientific researches. Within the frame of chosen department students realize specialization and MSc laboratories as well as specialization seminar. A 2-year lasting master research project is the first that students conduct, to great extent, by themselves and it is closely related to the research profile of the department. Specialization laboratories which take place in modern, fully equipped departmental laboratories are crucial in this process. Specialization and master seminar provide theoretical support, necessary for a proper realization of the master project. The aim of these seminars is to teach students how to plan scientific experiments as well as to prepare, discuss and present the results of their master thesis. Apart from these, each student acquires advanced knowledge on such disciplines as bioinformatics, bioethics, plant and microbial biotechnology. An important and obligatory element of the education is also the introduction to modern information technologies and statistical methods in natural sciences. Apart from the modules that guarantee

		the basic knowledge, number of facultative modules enable students to individualize the course of their studies according to their personal interests and selected specialization. This offer is complemented by a wide range of modules from beyond the main specialization. Qualifications acquired at this study are the basis for applying for mid-level managerial posts in laboratories and institutions connected with food and pharmaceutical industry, as well as in the area of health care, environmental protection, plant breeding, pest control and in similar branches of science and economy. The second-cycle studies also prepare the graduates to continue their education at the next level of education i.e. PhD studies in the same or similar area.
29.	General description of the specialization	Environmental Biotechnology Environmental biotechnology: within 2 year study numerous obligatory and facultative modules are offered to the students of this specialization, including: Environmental biotechnology, Phytoremediation, Liquid chromatography in environmental biotechnology, Food microbiology and nutritional physiology, Industrial microbiology, Physiology of adaptation to the environment and Histochemical and immuno-histochemical techniques. Profile of a graduate: this specialty meets the needs of our region and local labor market and the program of education is consistent with current assumption of national politics in relation to environmental protection. The graduate is well prepared, both practically and theoretically, to the application of specific biotechnological techniques in recognition and setting of biological processes in various environments. A graduate is ready to take up a job in the institutions applying and introducing modern technologies, based on the utilization of plants and microorganisms and their enzymes. The skills acquired during the studies enable the employment in environmental and diagnostic laboratories as well as in research and developmental institutions. Plant Biotechnology within 2 year study numerous obligatory and facultative modules are offered to the students of this specialization, including: GMO-benefits and threats, Molecular cytogenetics, Plant genomics, DNA markers, Plant organ growth modeling, Physiological basis for pharmaceutical action, Patch-clamp technique in the study of plant cells, Histochemical and immunochistochemical techniques. Profile of a graduate: graduates of this specialization acquire reliable and recent knowledge about the molecular basis of biotechnological processes, supporting the methods of plant breeding for the purposes of modern agriculture and other areas of industry (food industry, manufacturing and pharmaceutical industry). Practical, specialist qualifications of the graduates refer to handling advanced equipment of biotechnological laboratory as well as applying basic and advanced techniques used in plant biotechnology. The graduate of this specialty possess the knowledge and practical skills enabling them to take up a job in the developing sector of modern agriculture.
30.	Learning outcomes coverage matrix	Attachment no. 4

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(pieczęć i podpis Dziekana)