Learning outcomes of the programme:

1.	**Field of study**	**Biotechnology**
2.	Academic year of entry	2018/2019 (winter term)
3.	Level of qualifications/degree	second-cycle studies
4.	Degree profile	general academic

Code of the learning outcome of the programme	**Learning outcomes** The graduate:	Codes of the learning outcomes of the areas of education to which the learning outcome of the programme is related
	KNOWLEDGE	
2BT_W01	recognize advanced tools of mathematics, statistics and computer science applied in biotechnology	P2A_W01, P2A_W03
2BT_W02	describe and understand the significance of biotechnology in agriculture, environmental protection and medicine	P2A_W04, P2A_W11
2BT_W03	plan experiments, demonstrate the knowledge of modern techniques of data collecting and research tools applied in analyses of biological material	P2A_W04, P2A_W07
2BT_W04	assess and analyze the significance of an experiment, testing of hypotheses, statistical concluding, and methodology used in biotechnology	P2A_W02
2BT_W05	notice and analyze relationships in nature, using knowledge of the ecological aspects of biotechnology	P2A_W04
2BT_W06	define and explain the issues concerning selected areas of plant and microorganism biotechnology	P2A_W04, P2A_W05
2BT_W07	possess a deeper knowledge of selected fields of biotechnology, and related areas of the natural sciences	P2A_W04, P2A_W05
2BT_W08	plan and conduct experiments. as well as analyze the results and present them for discussion, evaluation or publication	P2A_W07
2BT_W09	present and assess the rules of implementation of production processes from the organism to industrial level	P2A_W11
2BT_W10	specify and describe laboratory and industrial procedures applied in biotechnology	P2A_W07
2BT_W11	specify sources of funds for research and economic development, and define the rules for developing a scientific project	P2A_W08, P2A_W11
2BT_W12	know the English vocabulary for natural science	P2A_W05
2BT_W13	define and explain the issues connected with the occupational safety and health and ergonomics, follow the procedures of intellectual property and copyright protection.	P2A_W09, P2A_W10
2BT_W14	classify, collect and analyse data, using various scientific and bioinformatics tools, prepare complex analytical operations using available computer tools.	P2A_W03, P2A_W06
2BT_W15	apply wider knowledge from other fields of biological and natural science in deepening their biotechnological knowledge	P2A_W03, P2A_W04
2BT_W16	indicate and interpret interdisciplinary aspects of contemporary biotechnology and natural science	P2A_W03, P2A_W04
2BT_W17	Posiada pogłębioną wiedzę na temat wybranych metod naukowych oraz zna zagadnienia charakterystyczne dla dyscypliny nauki niezwiązanej z kierunkiem studiów	
	SKILLS	
2BT_U01	select and apply advanced and appropriate research techniques used in plant and microorganism biotechnology	P2A_U01
2BT_U02	apply advanced biotechnological techniques aimed at directed modification of microorganisms and cells of higher organisms	P2A_U01
2BT_U03	conduct processes of biotransformation, isolation and purification of bio-products, as well as their analyses and diagnostics	P2A_U01
2BT_U04	assess the environmental threats connected with applied technology, and propose effective countermeasures to the threats	P2A_U01
2BT_U05	use scientific literature and apply specific vocabulary enabling verbal communication in biotechnology and related sciences	P2A_U02, P2A_U10, P2A_U12
2BT_U06	apply acquired knowledge in critical analysis and selection of information, especially in the use of electronic sources	P2A_U02, P2A_U03
2BT_U07	plan and realize research tasks, or prepares experiments, with the supervisor’s help	P2A_U04
2BT_U08	apply mathematical and statistical methods to describe phenomena and to analyze data	P2A_U05

2BT_U09	apply advanced expert knowledge to collect empirical data, and to analyze and present them appropriately	P2A_U01, P2A_U06
2BT_U10	create appropriate documentation of scientific research according to specialist methodology	P2A_U01, P2A_U04, P2A_U06
2BT_U11	competently present research problems, and comment on scientific reports with available means of verbal communication	P2A_U07, P2A_U08, P2A_U10
2BT_U12	prepare and present a short scientific report based on the research, according to appropriate methodology	P2A_U02, P2A_U07, P2A_U09
2BT_U13	discuss and express opinions about selected bio-ethical issues, and present arguments	P2A_U07
2BT_U14	work in team, and act as a leader in small teams	P2A_U06, P2A_U08
2BT_U15	plan independently their own professional and scientific career, lead their own autonomous learning in order to, among other aspects, improve their professional competencies	P2A_U11
2BT_U16	act appropriately in life or health emergency situations	P2A_U01, P2A_U06
2BT_U17	use advanced knowledge in other areas of biological and natural sciences related to biotechnology	P2A_U02
2BT_U18	notice and discuss the relationships between biotechnology and other areas of biological and natural science	P2A_U02, P2A_U07
2BT_U19	Posiada pogłębioną umiejętność stawiania i analizowania problemów na podstawie pozyskanych treści z zakresu dyscypliny nauki niezwiązanej z kierunkiem studiów	
SOCIAL COMPETENCES		
2BT_K01	appreciate the significance of mathematical and statistical tools for the description of natural phenomena and processes	P2A_K01, P2A_K04
2BT_K02	be responsible for the research assigned to them, as well as for his/her own work and that of others	P2A_K06
2BT_K03	be in the habit of using available sources of information, and apply the rules of critical thinking during problem solving	P2A_K01, P2A_K05, P2A_K07
2BT_K04	display enterprise, be a team leader and display awareness of his/her professional role	P2A_K02, P2A_K08
2BT_K05	systematically update and refresh the knowledge of biotechnology and evaluate its practical applications	P2A_K05, P2A_K07
2BT_K06	responsibly assess the risks related to research techniques, and follow the rules for safe working	P2A_K06
2BT_K07	introduce and develop the rules of professional ethics	P2A_K02, P2A_K03, P2A_K06
2BT_K08	demonstrate initiative and autonomy in their actions	P2A_K02, P2A_K03, P2A_K06
2BT_K09	evaluate objectively his/her own contribution, as well as the contribution of other persons, in common activity	P2A_K02, P2A_K03
2BT_K10	understand the necessity to popularize, for society, the information of new achievements in biotechnology and present it in an understandable way	P2A_K01
2BT_K11	demonstrate a wider interest in biological and natural sciences and be aware of the necessity to update knowledge	P2A_K01, P2A_K05, P2A_K07
2BT_K12	Rozumie potrzebę interdyscyplinarnego podejścia do rozwiązywanych problemów, integrowania wiedzy z różnych dyscyplin oraz praktykowania samokształcenia służącego pogłębianiu zdobytej wiedzy	