Learning outcomes

BIOLOGY – the first cycle of study – general academic profile

For the cycle of courses starting before the academic year 2019/2020

In terms of knowledge, the graduate of the grade I biology programme:

KW_01: Recognises basic processes occurring in living organisms at the molecular, cellular, and organism level
KW_02: Describes the relationships between organisms and the environment
KW_03: Has basic knowledge of the evolutionary variability of the biosphere
KW_04: Identifies the relationships between the main disciplines of biology and other natural science disciplines, which facilitate understanding of the principles of organism function or provide a tool for interpretation and generalisation of acquired knowledge
KW_05: Knows basic notions and terminology used in natural sciences and refers them to the conceptual categories of the philosophy of nature
KW_06: Acknowledges the development of knowledge, particularly in the field of experimental biology, and advancement in research techniques
KW_07: Recognises and understands the possibilities of practical applications of biological knowledge, particularly those of applied biology, in socio-economic life
KW_08: Acknowledges the importance of conservation of biodiversity as a source of biological material for practical applications and a determinant of balance in the biosphere
KW_09: Knows basic laws of physics and physical chemistry and uses them to interpret processes occurring in living systems and their environment
KW_10: Identifies the properties of the main elements as well as the structure and properties of major groups of organic compounds and recognises their relationships with the structure and functioning of living cells
KW_11: Describes processes occurring in living organisms based on experiments, observations, and literature data
KW_12: Characterises relationships in the biosphere based on field measurements and observations as well as recommended literature
KW_13: Acknowledges the importance of mathematical description and statistical interpretation of results in characterisation of processes occurring at different levels of organisation of the living world
KW_14: Knows basic mathematical concepts and calculation methods and their applicability in interpretation of biological processes
KW_15: Knows the basics of probability theory and application thereof in statistical interpretation of phenomena
KW_16: Has basic knowledge of information technologies and possible applications thereof for description and interpretation of biological processes
KW_17: Knows basic laboratory and field research tools and techniques applied in biological sciences
KW_18: Knows the basics of management of occupational health and safety in Poland
KW_19: Identifies hazards associated with work with chemicals and biological material and methods for prevention of risk as well as first-aid principles
KW_20: Knows basic concepts of the law of intellectual property
KW_21: Knows the principles of using patent data
KW_22: Knows basic principles of establishment of private businesses based on the knowledge of biotechnological processes and applied biology

In terms of skills, the graduate of the grade I biology programme:

K_U01: Uses basic laboratory and field research tools and techniques applied in biology sciences
K_U02: Performs simple analyses of biological material, evaluation and diagnoses, and designs simple analytical and preparatory procedures
K_U03: Makes simple field measurements and observations

K_U04: Has an ability to conduct basic laboratory experiments in biophysics, chemistry, biochemistry, and biology
K_U05: Applies mathematic and statistical methods for description of phenomena, analysis of the experiment, and elaboration of results
K_U06: Applies information techniques for description and interpretation of biological processes
K_U07: Formulates correct conclusions from experiments and observations
K_U08: Exhibits understanding of recommended academic textbooks of biology and philosophy
K_U09: Understands selected fragments of specialised scientific texts
K_U10: Reads simple English-language biological texts
K_U11: Has an ability to use various sources of information, including university library resources and academic and scientific internet websites
K_U12: Writes thematic review papers, correctly interpreting indicated scientific papers or textbooks
K_U13: Uses biological terminology in scientific discussion
K_U14: Has an ability to defend presented interpretations of discussed issues using a scientific language
K_U15: Makes written reports of experiments and writes, in English as well, short essays on assigned topics
K_U16: Collects literature data for addressing a research problem of chosen biological specialisation
K_U17: Has an ability to prepare an oral presentation of specific biological issues
K_U18: Prepares short presentations in English presenting biological problems
K_U19: Makes an independent choice of the range of study problems corresponding to scientific interests
K_U20: Has a good command of a foreign language at level B2+ of the European Framework of Reference for Languages

In terms of social competence, the graduate of the grade I biology programme:

K_K01: Is able to assess knowledge and skills acquired at the undergraduate level and recognises the need for continuous improvement of language skills and extending specialist and general knowledge
K_K02: Acknowledges the necessity of upgrading occupational competencies
K_K03: Adopts an active attitude towards acquisition, extension, and updating biological knowledge
K_K04: Chooses specialisation subjects required for future scientific career or other jobs
K_K05: Recognises the importance of humanities, including ethics and philosophy, which provide tools for intellectual development of the scientific attitude
K_K06: Analyses and assesses contemporary issues and ethical conflicts associated with work on biological material
K_K07: Adopts a pro-environmental approach and acts in accordance with the principles of ethics in science
K_K08: Has an ability to work in a team in order to solve problems, fulfil tasks efficiently, and prepares presentations
K_K09: Analyses assigned tasks in terms of correct and efficient implementation thereof by determining the sequence of activities and specifying principles of cooperation in the team
K_K10: Acknowledges responsibility for own safety and safety of the environment during experimental work with apparatus, chemicals, and biological material
K_K11: Acts properly in an emergency and can provide first aid

Learning outcomes

BIOLOGY – the second cycle of study – general academic profile

For the cycle of courses starting before the academic year 2019/2020

In terms of knowledge, the graduate of the grade II biology programme:

K_W01: Describes and explains, within the selected speciality, complex processes occurring in the living world at various organisational levels
K_W02: Demonstrates vast knowledge, acquired as part of specialisation, of the interactions and relationships occurring at different levels of the biosphere
K_W03: Identifies current problems of the chosen biological specialisation
K_W04: Knows the basics of methodology of natural sciences
K_W05: Acknowledges the importance of inference from experiments and observation and applies it as a principle of description and interpretation of natural phenomena and processes
K_W06: Knows the principles of formulation of investigation assumptions and design of biological experiments or observations
K_W07: Has profound knowledge of physics, chemistry, and mathematics sufficient to understand the theoretical basis of applied techniques, select appropriate research methodology, and adequate interpretation of results
K_W08: Recognises the principles of designing research and selection of investigation methods and techniques applied in biology sciences
K_W09: Knows the basic rules of selection of bioinformatic algorithms for designed analyses
K_W10: Has an ability to use resources provided by biological databases and literature
K_W11: Knows methods of descriptive statistics and the principles of using thereof as research tools in life sciences
K_W12: Knows the sources of information concerning the procedure of application for funding of research projects in the field of experimental and applied biology
K_W13: Knows the principles of safe and ergonomic laboratory work
K_W14: Has knowledge of potential hazards in experimental work as well as emergency procedures
K_W15: Knows and understands basic concepts of intellectual property protection and management thereof
K_W16: Knows the principles of using patent data in biology and biotechnology
K_W17: Knows general principles of establishment of private businesses based on the knowledge and practice of applied biology

In terms of skills, the graduate of the grade II biology programme:

K_U01: Has an ability to apply advanced laboratory and field techniques used in the selected biological specialisation
K_U02: Uses Polish-language textbooks and scientific publications in order to compile information about assigned topics
K_U03: Reads with understanding specialist English-language scientific texts from biological sciences and is able to cite the sources
K_U04: Uses university library-internet resources selectively
K_U05: Finds information on internet websites and performs critical analysis
K_U06: Formulates critical opinions and engages in discussion of biology issues
K_U07: Individually designs and fulfils assigned research tasks under supervision
K_U08: Designs projects and stages of implementation of research tasks and fulfils them guided by a research supervisor
K_U09: Applies statistical methods for analysis of observation and experiment results
K_U10: Uses information technology and specialised software for analysis of data and modelling biological processes
K_U11: Carries out experiments or observations, interprets results, and formulates correct conclusions

K_U12: Has an ability to formulate reasoned judgments on the basis of knowledge provided by academic textbooks, scientific papers, internet websites, and curriculum classes
K_U13: Prepares short presentations of research results
K_U14: Uses audio-visual aids in presentations
K_U05: Has an ability to write an experimental or theoretical paper in the scope of the chosen biology specialisation based on own study results
K_U16: Writes abstracts of own experimental work in English
K_U17: Has an ability to prepare and make an oral presentation in Polish and English addressing detailed topics related to the studied biological specialisation
K_U18: Independently chooses the range of specialisation issues required for a future job and/or a scientific career
K_U19: Has a good command of a foreign language at level B2+ of the European Framework of Reference for Languages

In terms of social competence, the graduate of the grade II biology programme:

K_K01: Has an ability of adequate assessment of qualifications acquired during the grade II study and recognises the need for continued upgrading of competence determining biologist's professionalism
K_K02: Acknowledges the necessity of systematic updating of biological knowledge, particularly in dynamically developing disciplines
K_K03: Adopts an active attitude towards acquisition, extension, and updating biological knowledge, particularly in the scope of practical application
K_K04: Appreciates the importance of humanities, including ethics and philosophy, which provide tools for intellectual development of the scientific attitude
K_K05: Analyses and assesses ethical problems related to non-critical implementation of the achievements of applied biology
K_K06: Adequately assesses the importance of individual elements of a research task and identifies the priorities in implementation thereof
K_K07: Has an ability to define his interest in the studied course and develop it in view of future occupation
K_K08: Has an ability to work in a team in order to solve problems and efficient implementation of designed tasks
K_K09: Acknowledges the benefits of teamwork based on ethical principles governing cooperation between researchers
K_K10: Controls the quality of investigations and their results in view of their reliability and suitability for scientific publication
K_K11: Knows and applies the principles of scientific ethics and respects the intellectual property law
K_K12: Acknowledges responsibility for own safety and safety of the environment during experimental work with chemicals, biological material, and specialised equipment
K_K13: Designs his work environment in accordance with the principles of occupational health and safety and ergonomics

Learning outcomes

BIOTECHNOLOGY – the first cycle of study – general academic profile

For the cycle of courses starting before the academic year 2019/2020

In terms of knowledge, the graduate of the grade I biotechnology programme:

K_W01: Defines basic natural and biotechnological processes and phenomena
K_W02: Demonstrates relationships between the living environment of organisms and their products
K_W03: Has basic knowledge of research techniques applied in biotechnology for analysis of the life processes of various organisms and their metabolites
K_W04: Knows the language and terminology of life sciences used for description of biotechnological processes
K_W05: Applies statistical methods as tools for analysis of biotechnological observation and experiments
K_W06: Lists and describes organisms applicable in production of compounds with biotechnological methods
K_W07: Defines natural processes and recognises their relationships with related sciences
K_W08: Recognises the life mechanisms of organisms useful for large-scale production of bioactive compounds
K_W09: Has knowledge of problems associated with derivation of products with biotechnological methods
K_W10: Identifies potential products that can be derived using specific groups of organisms
K_W11: Describes selected biotechnological processes with the basic terminology
K_W12: Has knowledge of the technology of biotechnological processes
K_W13: Has knowledge of basics of mathematics, physics, and chemistry sufficient to describe and interpret natural phenomena
K_W14: Recognises the relationships between achievements of biotechnology and related sciences and the possibilities of application thereof in human economy
K_W15: Has knowledge of occupational health and safety regulations in laboratory work and principles of ergonomics
K_W16: Has knowledge of general principles of intellectual property protection
K_W17: Recognises basic formalities necessary in running a business based on biotechnological knowledge

In terms of skills, the graduate of the grade I biotechnology programme:

K_U01: Uses basic biotechnological terminology and knowledge
K_U02: searches and uses relevant information resources in Polish and English
K_U03: Applies information technologies in order to acquire and process information
K_U04: Applies basic methods and specialist research equipment for observation and experiments focused on basic biotechnological processes
K_U05: Interprets experiment results and formulates conclusions based on the observations
K_U06: Is capable of reading and understanding scientific literature in Polish and English and applies the skill in debate
K_U07: Applies biotechnological knowledge indispensable for understanding and identification of functioning of processes that can be employed in derivation of intended products
K_U08: Identifies the relationships between function of organisms and their products and large-scale application thereof
K_U09: Performs (statistical) calculations in the field of sciences included in biotechnology in the broad sense
K_U10: Applies acquired biotechnological knowledge for solving and discussing problems related to improvement of biotechnological processes
K_U11: Analyses, presents, and substantiates the importance of the achievements of biotechnological disciplines for economy

K_U12: Demonstrates the capability of critical elaboration and presentation of research problems of biotechnological sciences
K_U13: Applies biotechnological knowledge in practice and disseminates it with co-workers
K_U14: Documents and presents results of own investigations
K_U15: Cooperates in a team and exhibits an ability to discuss
K_U16: Efficiently performs laboratory and field observations and investigations assigned by the research supervisor
K_U17: Communicates effectively in Polish and a modern foreign language in the field of biotechnology and related sciences
K_U18: Has an ability to analyse and present literature data of the basics of biotechnology and related sciences in Polish and a modern foreign language
K_U19: Applies basic measurements and computational and analytical techniques (e.g. mathematics, physics, chemistry)
K_U20: Isolates and identifies microorganisms with biotechnologically important properties
K_U21: Conducts basic experiments and observations and is able to analyse their results
K_U22: Verifies independently investigation results against literature data
K_U23: Analyses and verifies the benefits and risks to the human natural environment associated with the practical application of biotechnology
K_U24: Demonstrates an ability to formulate logical and clear views in writing and in speech
K_U25: Has a good command of a foreign language at level B2+ of the European Framework of Reference for Languages

In terms of social competence, the graduate of the grade I biotechnology programme:

K_K01: Recognises the necessity of development of the biotechnological industry
K_K02: Demonstrates responsibility for his own and co-workers' safety
K_K03: Upholds principles of ethics
K_K04: Recognises the need for development of competence determining a professional approach to the work of a biotechnologist
K_K05: Recognises the necessity of compliance with health and safety regulations during biotechnological observation and investigations
K_K06: Acknowledges new concepts related to scaling up of biotechnological processes and evaluates their profitability
K_K07: Demonstrates awareness of practical application of biotechnology and profitability
K_K08: Acknowledges the need for a rational use of technology associated with living organisms
K_K09: Demonstrates readiness to undertake action limiting adverse changes in organisms induced by biotechnological processes
K_K10: Acknowledges his own responsibility for modifications of organisms caused by adjustment thereof for application in biotechnological processes
K_K11: Upholds the principles of sustainable development
K_K12: Thinks critically in judgement of new information and while presenting own theses or proposals

Learning outcomes

BIOTECHNOLOGY – the second cycle of study – general academic profile

For the cycle of courses starting before the academic year 2019/2020

In terms of knowledge, the graduate of the grade II biotechnology programme:

K_W01: Characterises in detail and explains the mechanism of selected biotechnological processes and their products
K_W02: Recognises the relationships and dependencies between selected technological processes and proposes possible improved application thereof
K_W03: Acknowledges the principles of the use of organisms in production of bioformulations and in industrial biosynthesis
K_W04: Describes the application and use of new biotechnological models in industrial production
K_W05: Has knowledge of biotechnology and related sciences as well as acquisition of funding for development and design of biotechnological processes
K_W06: Lists mechanisms associated with a broad range of biotechnological processes
K_W07: Describes the possibility of application of new sources of organisms for derivation of designed bioproducts
K_W08: Recognises phenomena related to adaptation of organisms in order to increase their efficiency in production of biologically active compounds
K_W09: Characterises biotechnological achievements that contribute to development of e.g. medicine, various industries, and waste disposal technologies
K_W10: Recognises and understands the operation of data analysis tools
K_W11: Has knowledge of legal regulations, patent laws, and sources of funding of research projects
K_W12: Has profound knowledge of the safety rules in biotechnological work, use of equipment and ergonomics, and principles of creation and development of new jobs in the biotechnology industry
K_W13: Has profound knowledge necessary in running an individual business based on biotechnological knowledge

In terms of skills, the graduate of the grade II biotechnology programme:

K_U01: Applies advanced biotechnological techniques
K_U02: Makes use of Polish and foreign sources of biotechnological knowledge
K_U03: Effectively performs critical analyses of investigation results and literature data
K_U04: Designs and implements assigned research tasks independently
K_U05: Applies mathematical and statistical methods for assessment of results and calculations indispensable for development of parameters of biotechnological processes
K_U06: Formulates conclusions based on investigation results
K_U07: Evaluates risks related to the use of modified organisms and biotechnological processes
K_U08: Uses professional biotechnological vocabulary both in Polish and a foreign language for description and explanation of biotechnological problems
K_U09: Applies specialist knowledge and informatics tools in order to solve theoretical and practical problems
K_U10: Uses biotechnological techniques and specialised scientific equipment
K_U11: Applies knowledge of specialised apparatus in practical design and carrying out biotechnological processes under tutor's supervision
K_U12: Selects and employs methods, techniques, and procedures for designing and carrying out biotechnological processes
K_U13: Designs and applies methods for genetic modification and selection of organisms, biotransformation of organic compounds, and isolation and purification of bioactive compounds
K_U14: Designs the experimental set-up, controls experimental processes, and optimises biotechnological processes
K_U15: Evaluates and effectively prevents threats associated with applied technology

K_U16: Engages in interdisciplinary tasks and implements them in collaboration with other work teams
K_U17: Documents and interprets investigation results
K_U18: Based on own research and literature data, has an ability to write and make oral presentations or brief scientific reports in Polish and another modern language (e.g. English)
K_U19: Plans academic development and professional career
K_U20: Evaluates and formulates opinions and proposals of solutions to selected biotechnological processes
K_U21: Formulates opinions and reasoned judgments on the basis of data from a variety of sources
K_U22: Has a good command of a foreign language at level B2+ of the European Framework of Reference for Languages

In terms of social competence, the graduate of the grade II biotechnology programme:

K_K01: Adopts an active and creative attitude in implementation of new solutions in biotechnology and recognises the need for systematic upgrading of skills and extending knowledge
K_K02: Is able to assess objectively own work contribution and the contribution of team members in solving defined tasks
K_K03: Adopts an active attitude in the cognitive process, design of new biotechnological processes, and analysis of cost efficiency
K_K04: Is responsible for biological material and assigned tasks
K_K05: Identifies hazards associated with irresponsible modifications of organisms aimed at adjustment thereof to the requirements of biotechnological processes
K_K06: Implements professional ethics consistently and complies with health and safety regulations
K_K07: Is creative and adopts an active attitude in independent design and partial implementation of biotechnological processes
K_K08: Acknowledges new trends in biotechnology, biology, and technology
K_K09: Cares for personal development and is capable of team work
K_K10: Is responsible for the quality of products derived in biotechnological processes