**ZARZĄDZENIE NR 120**

**Rektora Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie**

**z dnia 30 października 2023 r.**

**w sprawie opisów efektów uczenia się w tłumaczeniu na język angielski  
dla kierunków studiów prowadzonych na Wydziale Biotechnologii i Hodowli Zwierząt**

Na podstawie art. 23 ustawy z dnia 20 lipca 2018 r. Prawo o szkolnictwie wyższym i nauce (tekst jedn. Dz. U. z 2023 r. poz. 742, z późn. zm.) w związku z § 3 ust. 7 zarządzenia nr 64 Rektora ZUT z dnia 1 października 2019 r. w sprawie zasad sporządzania i wydawania dyplomów ukończenia studiów i suplementów do dyplomu (z późn. zm.) zarządza się, co następuje:

**§ 1.**

1. W celu wydania na wniosek absolwenta odpisu suplementu do dyplomu w tłumaczeniu na język angielski wprowadza się – uchwalone przez Senat – opisy efektów uczenia się w tłumaczeniu na język angielski dla kierunków studiów prowadzonych na Wydziale Biotechnologii i Hodowli Zwierząt.
2. Opis efektów uczenia się w tłumaczeniu na język angielski dla poszczególnych kierunków studiów stanowi integralną cześć odpisu suplementu do dyplomu.

**§ 2.**

Opisy efektów w tłumaczeniu na język angielski w wydawanych odpisach suplementów do dyplomu dla kierunków studiów rozpoczynających się:

1. od roku akademickiego 2019/2020:
2. biotechnologia, studia pierwszego stopnia – stanowi załącznik nr 1,
3. biotechnologia, studia drugiego stopnia – stanowi załącznik nr 2,
4. kynologia studia pierwszego stopnia – stanowi załącznik nr 3,
5. kynologia, studia drugiego stopnia – stanowi załącznik nr 4,
6. zootechnika, studia pierwszego stopnia – stanowi załącznik nr 5,
7. zootechnika, studia drugiego stopnia – stanowi załącznik nr 6;
8. od roku akademickiego 2021/2022 – biotechnologia, studia drugiego stopnia – stanowi załącznik nr 7.

**§ 3.**

W zarządzeniu nr 94 Rektora ZUT z dnia 6 listopada 2019 r. w sprawie opisu efektów uczenia się w tłumaczeniu na język angielski dla poszczególnych kierunków studiów prowadzonych w ZUT (z późn. zm.) uchyla się w § 1 pkt 1 oraz załącznik nr 1 – Kierunki Wydziału Biotechnologii i Hodowli Zwierząt.

**§ 4.**

Zarządzenie wchodzi w życie z dniem podpisania.

W zastępstwie Rektora

prof. dr hab. inż. Jacek Przepiórski

prorektor ds. nauki

Załącznik nr 1  
do zarządzenia nr 120 Rektora ZUT z dnia 30 października 2023 r.

Biotechnologia, studia pierwszego stopnia (na podstawie uchwały nr 58 Senatu ZUT z dnia 26 czerwca 2017 r.)

**Programme of studies:** *biotechnology*

**Level of qualification:** first cycle studies

**Educational profile:** general academic

**Fields of science:** Agricultural sciences, Natural sciences, Engineering and technology

**Discipline of science:** animal science and fisheries (80%), biological sciences (15%), materials engineering (5%)

**Name of qualification (Title conferred): inżynier**

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcomes for programme of studies** |
| **Knowledge** | |
| BT\_1A\_W01 | has general knowledge of mathematics, physics and related sciences adapted to programme of studies “biotechnology” |
| BT\_1A\_W02 | has systematic, based on theory, knowledge of chemistry (organic, inorganic, physical and analytical) and biology and living organisms |
| BT\_1A\_W03 | has elementary knowledge of law, management and economics |
| BT\_1A\_W04 | knows basic principles of safety and hygiene of work and intellectual property protection |
| BT\_1A\_W05 | shows knowledge of a foreign language at B2 level and of basic vocabulary in biotechnology in a foreign language |
| BT\_1A\_W06 | has general knowledge of humanities and its significance in agricultural sciences; knows and understands basic ethical and legal conditions relating to scientific, teaching and development activities |
| BT\_1A\_W07 | has general knowledge of structure of living organisms and knows biochemical, molecular and cellular fundamentals of organisms functioning |
| BT\_1A\_W08 | has systematic knowledge of analysis of molecular, enzymatic and physiological processes of living organisms |
| BT\_1A\_W09 | has established knowledge of structure, function and computer analysis of genes and genomes, methods of inheriting, as well as the influence of genetic factors on forming environment |
| BT\_1A\_W10 | has in-depth knowledge relating to using basic laboratory methods, techniques and engineering tools allowing to complete technical tasks adopted to programme of studies “biotechnology” |
| BT\_1A\_W11 | has basic knowledge of selecting reactors, devices, technological lines and computer programmes used in biotechnology |
| BT\_1A\_W12 | shows general knowledge connected to using biotechnological processes and methods in various branches of science and industry |
| BT\_1A\_W13 | knows research techniques and principles of preparing and writing a scientific study |
| BT\_1A\_W14 | knows and understands the role and significance of natural environment and sustainable use of biodiversity and its threats |
| BT\_1A\_W15 | has general knowledge of the influence of biotechnological factors on functioning and development of animal and plant production |
| BT\_1A\_W16 | has knowledge of diversity, functioning and significance of microorganism for a human and natural environment |
| BT\_1A\_W17 | shows knowledge of morphological, anatomical and cellular structure and has knowledge of diseases and developmental disorders of living organisms |
| BT\_1A\_W18 | has general knowledge of nucleic acids structures modification techniques and using living organisms in biomedical studies |
| BT\_1A\_W19 | has knowledge on influence of pathogenic agents and understands principles of immunological regulation and principles of immunological diagnostics |
| BT\_1A\_W20 | has knowledge of principles of rational nutrition and healthy lifestyle; understands procedures of acquiring and obtaining various food products |
| BT\_1A\_W21 | has basic knowledge of computer science, computer software and biological databases used in biotechnology |
| **Skills** | |
| BT\_1A\_U01 | Uses knowledge of mathematics, statistics and computer science, which he/she applies for description of phenomena occurring in nature |
| BT\_1A\_U02 | Can determine chemical, physical and biochemical phenomena and processes in natural environment and used by human; can estimate risk and prevent possible hazard resulting from occurring processes and phenomena |
| BT\_1A\_U03 | Uses knowledge for characterising and classification of living organisms basing on monographic sources; has practical skills of observing plants in a place of their occurrence; analyses issues relating to beginning and evolution of life on Earth |
| BT\_1A\_U04 | Uses knowledge of microbiology and immunology; has a skill of keeping microorganisms’ culture; has a skill of understanding mechanisms conditioning microorganisms’ virulence, can characterise selected infectious diseases; understands functioning of immunological system; can use appropriate diagnostic techniques |
| BT\_1A\_U05 | Uses basic issues of structure and function of animal and plant organisms’ cells; can indicate research methods for indication and analysis of processes occurring in a cell; can start cells and tissues cultures |
| BT\_1A\_U06 | Identifies and analyses mechanisms determining life functions, ontogenesis, heredity processes, evolutionary mechanisms of organisms and mutagenic agents |
| BT\_1A\_U07 | Can discuss structure, location and function of individual tissues, organs and systems of living organisms; can appropriately interpret physiological processes occurring in plant’s and animal’s organism |
| BT\_1A\_U08 | Selects and uses methods, techniques and devices routinely used in research and diagnostic laboratories; uses them in solving problems concerning food production, animal health protection and natural environment protection |
| BT\_1A\_U09 | Has a skill of using a foreign language at B2 level of the Common European Framework of Reference |
| BT\_1A\_U10 | Uses key notions of biotechnology; knows and assesses significance of biotechnology in various fields of life and in creating and obtaining existing biologically active substances; knows basic issues of pharmacology and pharmacokinetics of drugs; can design biotechnological lines and use various research devices and apparatuses in biotechnology; is aware of hazards resulting from achievements of biotechnology; knows issues connected with biosafety |
| BT\_1A\_U11 | Can use basic sociological and psychological knowledge useful in a biotechnologist’s work; has some knowledge of legal grounds and mechanisms of intellectual property protection; knows and can use fundamentals of economy and management; understands bioethical, social, legal and economic determinants concerning achievements of modern biotechnology |
| BT\_1A\_U13 | Uses IT tools and biological databases in biotechnological research |
| BT\_1A\_U14 | Can present methods of preventing contamination of the environment; knows notation of hazardous substances concentration; knows fundamentals of toxic substances influence on organisms, uses knowledge of biotechnology application in environmental protection |
| BT\_1A\_U16 | Uses principles of rational nutrition and health lifestyle; understands procedures of acquiring and obtaining various food products, including those using microorganisms |
| BT\_1A\_U17 | Plans, organises and executes simple research tasks, individually and in a team, led by a tutor; interprets obtained results and draws conclusions; systematically updates hi/her knowledge and uses it in solving individual problems; has an ability to disseminate acquired knowledge in his/her professional and scientific circle; individually prepares the diploma paper |
| **Social competences** | |
| BT\_1A\_K01 | understands molecular basis of biotechnological processes and is aware of their empirical cognisability basing on mathematical and statistical methods |
| BT\_1A\_K02 | shows understanding of basic principles of ethics, economics and law; acts in accordance with them |
| BT\_1A\_K04 | shows responsibility for safety of own and other people’s work; is aware of influence of biotechnology on creation and state of the natural environment and human health |
| BT\_1A\_K05 | shows openness to general and specific creation and development of own learning activities basing on various sources of scientific information; can think and act in an entrepreneurial way |
| BT\_1A\_K06 | shows positive opinions and attitudes towards people, organisms and environment; has high sensitivity to their needs and problems |
| BT\_1A\_K08 | is aware of biological and technological determinants of basic biotechnological processes |

Załącznik nr 2  
do zarządzenia nr 120 Rektora ZUT z dnia 30 października 2023 r.

Biotechnologia, studia drugiego stopnia (na podstawie uchwały nr 23 Senatu ZUT z dnia 23 kwietnia 2018 r)

**Programme of studies:** *biotechnology*

**Level of qualification:** second cycle studies

**Educational profile:** general academic

**Fields of science:** Agricultural sciences, Natural sciences, Engineering and technology

**Discipline of science:** animal science and fisheries (60%), nutrition and food technology (10%), agriculture and horticulture (10%) biological sciences (5%), materials engineering (10%), chemical engineering (5%)

**Name of qualification (Title conferred): magister inżynier**

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcomes for programme of studies** |
| **Knowledge** | |
| BT\_2A\_W01 | has extended knowledge of biology, chemistry, mathematics, physics and related sciences adapted to programme of studies “biotechnology” |
| BT\_2A\_W02 | has in-depth knowledge of economic, legal and humanistic aspects in biotechnology |
| BT\_2A\_W03 | knows the principles of management, including quality management |
| BT\_2A\_W04 | knows detailed principles of work safety in a laboratory and protection of industrial ownership in biotechnology |
| BT\_2A\_W05 | knowns and understands ethical, legal and economic standards in a profession of a biotechnologist; knows ethical determinants of work with biological material |
| BT\_2A\_W06 | has a detailed and systematic knowledge of using molecular, enzymatic and physiological processes of living organisms in biotechnology |
| BT\_2A\_W07 | shows in-depth knowledge on the structure, function and computer analysis of genes and genomes, methods of heredity as well as the influence of genetic factors on creating environment |
| BT\_2A\_W08 | has knowledge of advanced laboratory methods, techniques and engineering tools allowing to conduct technical tasks adapted to programme of studies “biotechnology” |
| BT\_2A\_W09 | has extended knowledge of engineering processes, technological devices and lines used in biotechnology |
| BT\_2A\_W10 | shows in-depth and systematic knowledge connected with using biotechnological processes and methods in various branches of science and industry |
| BT\_2A\_W11 | knows research techniques and principles of preparing and writing a scientific paper |
| BT\_2A\_W12 | shows advanced knowledge concerning the influence of human activity on natural environment and its biodiversity |
| BT\_2A\_W13 | has extended general knowledge of the influence of biotechnological factors on human health and on functioning and development of animal and plant production |
| BT\_2A\_W14 | has enriched knowledge of genetic modifications and their significance for human and natural environment |
| BT\_2A\_W15 | shows in-depth knowledge of modern breeding significant for development of rural areas |
| BT\_2A\_W17 | knows advanced bioinformatics techniques and can use them in biotechnology |
| **Skills** | |
| BT\_2A\_U01 | uses in-depth theoretical knowledge to analyse processes and phenomena influencing the improvement of life quality and health of animals and people |
| BT\_2A\_U02 | can plan and analyse biotechnological research using tools of bioinformatics |
| BT\_2A\_U03 | knows a foreign language at level B2+, communicates in everyday and professional situations, can write a report and simple essay on a known topic; has a skill of preparing oral presentations within the scope of biotechnological vocabulary |
| BT\_2A\_U04 | analyses factors influencing food production, quality and safety; analyses factors influencing natural environment; estimates outcomes of creating, using and releasing GMO to the environment; determines the influence and significance of biotechnology w in protection of natural environment and biodiversity |
| BT\_2A\_U05 | can individually or in a group design and conduct an experimental process, including measurements that can be used in biotechnology; interprets obtained results and draws conclusions; conducts a discussion based on individually acquired knowledge using a specialist language |
| BT\_2A\_U06 | makes thorough analysis of molecular grounds for evolution as well as factors influencing functioning of genome and transcriptome; analyses factors influencing variations in an organism |
| BT\_2A\_U07 | analyses main metabolic pathways and mechanisms of their regulation basing on the knowledge on structure and biological functions of proteins, hormones and vitamins; can acquire and use enzymes |
| BT\_2A\_U08 | Selects and uses advanced research techniques and tools used in biotechnology |
| BT\_2A\_U09 | uses learnt methods in research; draws up literature in accordance with research profile; analyses scientific news and other source materials in the context of own research project; can prepare a project of own scientific research and independently prepare scientific paper |
| BT\_2A\_U10 | observes basic principles of good laboratory practice (GLP); can determine hazards of biotechnologist’s work, can react in dangerous situations applying rules of work safety and hygiene |
| **Social competences** | |
| BT\_2A\_K01 | shows need of constant expanding general and specialised knowledge, is aware of advisability of expanding learnt knowledge both in professional activities and personal development |
| BT\_2A\_K02 | shows understanding of biotechnological processes used in various areas of human activities; interprets and describes those processes using scientific attitude |
| BT\_2A\_K03 | is aware of influence of biotechnology on shaping and state of natural environment and human health |
| BT\_2A\_K04 | is aware of existence of ethical and social standards connected with conducted research and professional activities; understands advisability of acting according to set ethical and legal principles |
| BT\_2A\_K05 | shows discipline in individual work; willingly participates in group work; can creatively plan and conduct own and team activities |
| BT\_2A\_K06 | shows responsibility for made decisions and their outcomes; presents argumentative and critical attitude |
| BT\_2A\_K07 | understands advisability of stimulating individual cognitive activities and improving professional competences; shows independence in acquiring scientific information from various sources |
| BT\_2A\_K08 | is aware of joint responsibility for safety of own and other people’s work; can think and act in an entrepreneurial way |

Załącznik nr 3  
do zarządzenia nr 120 Rektora ZUT z dnia 30 października 2023 r.

Kynologia, studia pierwszego stopnia (na podstawie uchwały nr 2 Senatu ZUT z dnia 25 stycznia 2016 r.)

**Programme of study:** *cynology*

**Educational cycle:** first cycle studies

**Educational profile:** practical

**Educational areas:** within the scope of agricultural sciences, forestry and veterinary

**Name of qualification/title obtained:** inżynier

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcome for the programme** |
| **Knowledge** | |
| Kn\_1P\_W01 | Has general knowledge of application nature and knows the terminology and concepts, the theories and laws within the scope of biology, chemistry, mathematics and Information Technology |
| Kn\_1P\_W02 | Has, depending on the subjects studied, elementary humanistic, social and legal knowledge enabling understanding of social and economic phenomena and processes |
| Kn\_1P\_W03 | Has basic knowledge within the scope of systematics and taxonomy of Prokaryotes and Eukaryotes within the scope of factographic description and phylogenetic reconstruction as well as their structure, development, multiplication, occurrence and biological as well as economic significance |
| Kn\_1P\_W04 | Knows fundamental mechanisms of inheriting traits in animals, including foundations of population genetics |
| Kn\_1P\_W05 | Knows the construction and usage of basic measurement equipment, machines and devices as well as technical facilities used as a part of the programme of study |
| Kn\_1P\_W06 | Knows the methods of breeding, assessment of the breeding and use value of animals and the methods of selection and the types of animal crossbreeding |
| Kn\_1P\_W07 | Has basic knowledge within the scope of biology, microbiology, immunology and related sciences adjusted to the programme of study |
| Kn\_1P\_W08 | Has knowledge within the scope of structure and functioning of living organisms on various levels of complexity |
| Kn\_1P\_W09 | Demonstrates the knowledge of basic diagnostic methods as well as techniques and tools enabling the use and shaping of living organisms in order to improve the quality of life of animals, including in particular dogs |
| Kn\_1P\_W10 | Has knowledge on the subject of molecular processes occurring on the level of a genome, transcriptome, proteome and metabolome as well as their influence on shaping of the phenotype |
| Kn\_1P\_W11 | Knows basic techniques used in the analysis of quality and nutritional value of feeds and the scope of their use as well as the occupational safety rules for laboratories |
| Kn\_1P\_W12 | Knows the principles and techniques of feeding animals as well as the methods of producing feeds |
| Kn\_1P\_W13 | Characterises breeds of dogs, knows the directions and the manners of using them |
| Kn\_1P\_W14 | Enumerates the chemical composition, the active and anti-nutritional substances contained in raw materials for producing feeds |
| Kn\_1P\_W15 | Has basic knowledge within the scope of economics, labour law, protection of intellectual property and patent law |
| Kn\_1P\_W16 | Has knowledge of a foreign language on B2 level and basic vocabulary in a foreign language within the scope of the field of study. |
| Kn\_1P\_W17 | Has general knowledge of social sciences and humanities within the scope of the programme of study |
| Kn\_1P\_W18 | Knows basic principles of economics and marketing, explains the functioning of individual entrepreneurship within the scope of the programme of study |
| Kn\_1P\_W19 | Knows basic provisions and regulations of dog shows, demonstrations, contests, competitions and test work in cynology |
| Kn\_1P\_W20 | Has basic knowledge within the scope of psychology, sociology and animal aetiology, including in particular canids |
| Kn\_1P\_W21 | Has knowledge on the subject of selected dog diseases, their aetiology, symptoms and methods of prevention |
| Kn\_1P\_W22 | Has basic knowledge within the scope of shaping the zootechnical environment and its influence on animal welfare |
| Kn\_1P\_W23 | Has knowledge of technical engineering tasks adjusted to the programme of study |
| Kn\_1P\_W24 | Has basic knowledge within the scope of biology of game species as well as knows the principles of managing the populations of wild animals |
| **Skills** | |
| Kn\_1P\_U01 | Is able to analyse information within the scope of structure and functioning of nucleic acids and can use them later in breeding practice; has the ability to assess the main metabolic pathways and the mechanisms of their regulation |
| Kn\_1P\_U02 | Based on commonly used methods of laboratory and molecular diagnostics, is able to conduct basic analytic procedures, including also with the use of basic bioinformatic tools; interprets the results of conducted experiments |
| Kn\_1P\_U03 | Has basic ability of evaluating the phenomena influencing the condition of the natural environment and the natural resources. Is able to apply basic biological laws, including genetic ones, and to forecast the positive and negative results of their action in various animals, including domesticated ones |
| Kn\_1P\_U04 | Uses, in a skilful manner, computer tools, Internet sources of information and statistical methods for solving practical problems characteristic for the programme of study |
| Kn\_1P\_U05 | Assesses the nutritional needs of dogs and other domesticated animals; balances the total and metabolic energy and evaluates individual nutrients of diet components, determines the body weight, performs scoring of a dog's condition, is able to produce feeds and estimates their quality and nutritional value |
| Kn\_1P\_U06 | Is able to perform basic analyses of raw materials for production of feeds and use elementary equipment in an analytic laboratory in compliance with the safety rules |
| Kn\_1P\_U07 | Has the ability to assess and determine the character, temperament and temper of a dog; is able to select the methods and tools of training work in the aspect of individual and group work; has the ability to use verbal and non-verbal commands depending on the type of use as well as the ability to maintain training documentation |
| Kn\_1P\_U08 | Is able to interpret the behaviour and emotional states of animals during observation and work with them |
| Kn\_1P\_U09 | Has the ability to undertake activities with the use of suitable methods, techniques and tools, solving problems concerning engineering tasks compliant with the programme of study |
| Kn\_1P\_U10 | Is able to use basic monitoring methods and principles as well as manage the animal breeding processes, including in particular dogs |
| Kn\_1P\_U11 | Is able to recognise the symptoms of most frequently occurring diseases of domesticated animals using suitable diagnostic methods for this purpose; depending on the age and physiological condition of an animal, is able to use proper health prophylaxis programmes |
| Kn\_1P\_U12 | Is able to prepare the zoohygenic environment for the needs of domestic animals taking into consideration the animal rights and welfare |
| Kn\_1P\_U13 | Has the ability to act in conditions threatening the life and health of an animal |
| Kn\_1P\_U14 | Is able to perform daily and periodic care of dogs, including in particular their fur; has basic skills of preparing dogs for shows and demonstrations using suitable techniques and tools |
| Kn\_1P\_U15 | Has a practical ability to use legal and ethical norms as well as economic principles within the scope of breeding, rearing and using of dogs; has practical ability to work with cynologic documentation, including mainly breeding and use |
| Kn\_1P\_U16 | Has the ability to use a foreign language in a verbal and written form on B2 level of the Common European Framework of Reference for Languages |
| Kn\_1P\_U17 | Applies the principles of proper nutrition and healthy lifestyle |
| Kn\_1P\_U18 | Demonstrates the ability to organise the breeding and rearing of various types of domesticated animals and managing of the populations of wild animals |
| **Social competences** | |
| Kn\_1P\_K01 | Has awareness of the roles and significance of domestic animals in human life |
| Kn\_1P\_K02 | Demonstrates readiness for a factual and substantive discussion enabling reaching of a common position |
| Kn\_1P\_K03 | Has the awareness of the level of his/her knowledge and skills as well as understands the need of life-long professional and personal education |
| Kn\_1P\_K04 | Is able to work alone and in a team as well as demonstrates creativity and entrepreneurship in organisation of the performance of the assigned tasks |
| Kn\_1P\_K05 | Is aware of the role of psychophysical fitness for proper performance of jobs related to cynology |
| Kn\_1P\_K06 | Is convinced about the necessity to comply with the principles of professional ethics while working with animals; is careful while formulating opinions on the subject of social and ideological issues referring to theory and practice of breeding, rearing and using of dogs Demonstrates a positive attitude towards people, living organisms and environment as well as sensitivity to their needs and problems |
| Kn\_1P\_K07 | Appreciates the significance of cynology and related disciplines for proper development of local and regional communities |

Załącznik nr 4  
do zarządzenia nr 120 Rektora ZUT z dnia30 października 2023 r.

Kynologia, studia drugiego stopnia (na podstawie uchwały nr 53 Senatu ZUT z dnia 24 września 2018 r)

**Programme of studies:** *cynology*

**Level of qualification:** second cycle studies

**Educational profile:** general academic

**Fields of science:** Agricultural sciences

**Discipline of science:** animal science and fisheries (100%)

**Name of qualification (Title conferred): magister inżynier**

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcomes for programme of studies** |
| **Knowledge** | |
| Kn\_2A\_W01 | Has in-depth knowledge on economic, legal, ethical and humanistic aspects in cynology |
| Kn\_2A\_W02 | Knows principles of safe work in laboratory and with animals |
| Kn\_2A\_W03 | Has in-depth knowledge on ecology of Canidae and has extended understanding of the need of preservation of natural environment and sustained use of biodiversity |
| Kn\_2A\_W04 | Has extended knowledge on operational systems, computer software and databases useful in a cynologist’s work |
| Kn\_2A\_W05 | Has in-depth knowledge on chemical composition, active, antinutritive and harmful substances contained in raw materials used in canine nutrition |
| Kn\_2A\_W06 | Has in-depth knowledge on principles and techniques of canine nutrition and methods of feed production |
| Kn\_2A\_W07 | Has extended knowledge on biochemistry and a dog’s body structure and functioning; understands morphological and functional interconnections of tissues and organs |
| Kn\_2A\_W08 | Has in-depth knowledge on various aspects of reproduction in Canidae and accompanying animals |
| Kn\_2A\_W09 | Knows research techniques and principles of preparing and writing a scientific paper |
| Kn\_2A\_W10 | Has extended knowledge on microbiology, immunology and related sciences and knows mechanisms of body defensive reactions to various substances and pathogens |
| **Skills** | |
| Kn\_2A\_U01 | Uses a foreign language at level B2+, communicates in everyday and professional situations, can draw up selected issues in cynology |
| Kn\_2A\_U02 | Uses specialised IT tools, the Internet sources of information and statistical methods for solving problems connected with a cynologist’s work |
| Kn\_2A\_U03 | Independently plans and conducts experiments/measurements using appropriate research techniques and tools; interprets obtained results and draws conclusions |
| Kn\_2A\_U04 | Independently analyses factors influencing food production and quality and dogs’ and other animals’ health |
| Kn\_2A\_U05 | Independently analyses factors influencing the state of natural environment |
| **Social competences** | |
| Kn\_2A\_K01 | Is aware of legal and ethical problems at individual stages of experimenting on animals and working with animals |
| Kn\_2A\_K02 | Understands the need for life-long learning in general and specialised knowledge in order to develop professional achievements |
| Kn\_2A\_K03 | Understands the significance of knowledge in solving cognitive and practical problems |
| Kn\_2A\_K04 | Is ready to meet social obligations and act for social environment |

Załącznik nr 5  
do zarządzenia nr 120 Rektora ZUT z dnia 30 października 2023 r.

Zootechnika, studia pierwszego stopnia ( na podstawie uchwały nr 59 Senatu ZUT z dnia 26 czerwca 2019 r.)

**Programme of studies:***animal husbandry*

**Level of qualification:** first cycle studies

**Educational profile:** general academic

**Fields of science:** Agricultural sciences

**Discipline of science:** animal science and fisheries (100%)

**Name of qualification (Title conferred): inżynier**

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcomes for programme of studies** |
| **Knowledge** | |
| ZO\_1A\_W01 | shows general knowledge of biology, chemistry, mathematics and physics as well as related sciences adapted to programme of studies “animal husbandry” |
| ZO\_1A\_W02 | show basic knowledge of economics, labour law, intellectual property protection and patent law |
| ZO\_1A\_W03 | shows command of a foreign language at level B2 and knowledge of basic vocabulary of animal sciences |
| ZO\_1A\_W04 | has basic knowledge of growth and development of livestock |
| ZO\_1A\_W05 | has general knowledge of structure and functioning of living organisms at a level of a cell, tissue, single organism and population with consideration of various levels of biosphere organisation |
| ZO\_1A\_W06 | has knowledge of organisation and conducting technical engineering tasks adapted to programme of studies “animal husbandry” |
| ZO\_1A\_W07 | has knowledge of shaping natural environment, its role and significance, threats and methods of protection and sustainable use |
| ZO\_1A\_W08 | has basic knowledge of rural area functioning, characterises factors influencing their development |
| ZO\_1A\_W09 | has general knowledge of basic problems connected with animal sciences |
| ZO\_1A\_W10 | knows methods, techniques and technologies of raising, breeding and using animals and has knowledge of processing and commodity assessment of agricultural products |
| ZO\_1A\_W11 | shows general knowledge of social sciences and humanities and has some knowledge of animal related aspect of those sciences |
| ZO\_1A\_W12 | has basic knowledge of using animals and selection, matching and assessment of use and breeding value |
| ZO\_1A\_W13 | has knowledge of animal feeding and fodder standardisation taking into consideration species, age, physiological condition and direction of use, and has some knowledge in basic issues of human nutrition |
| ZO\_1A\_W14 | has knowledge of shaping zoohygienic environment and its influence on productivity and wellness of animals |
| ZO\_1A\_W15 | knows fundamentals of veterinary prevention and dietetics |
| ZO\_1A\_W16 | defines basic principles of economics and marketing in animal production, explains functioning of individual entrepreneurship in agricultural activities |
| **Skills** | |
| ZO\_1A\_U01 | Shows skill of finding, understanding, analysis and creative use of needed information from various sources and in various forms in the field of animal husbandry |
| ZO\_1A\_U02 | Can use basic principles of humanism and ethics in connection with historical development of animal sciences |
| ZO\_1A\_U03 | Shows a skill of precise, concise and appropriate processing of materials |
| ZO\_1A\_U04 | Shows readiness for argumentative and substantive discussion enabling reaching consensus with various subjects |
| ZO\_1A\_U05 | Uses basic information technologies in acquiring and processing information. Can operate appropriate computer programmes and use them in production technology, management, raising and improving animals. Can draw up organisational and technological guidelines of animal production and organise groups of producers in order to improve production efficiency |
| ZO\_1A\_U06 | Can use a modern foreign language. Uses vocabulary concerning animal and plant production at level B2 of the Common European Framework of Reference of the Council of Europe |
| ZO\_1A\_U07 | Completes simple research tasks concerning widely understood animal sciences under supervision of a tutor and draws correct conclusions |
| ZO\_1A\_U08 | Understands interrelations between structure and function at a level of cells, tissues, single organisms and population |
| ZO\_1A\_U09 | Can use routine optimisation techniques influencing plant and animal production, food quality, animal and human health |
| ZO\_1A\_U10 | Can use appropriate methods and tools for solving problems in food production, animal and human health. Can present fundamentals of functional and convenience food; understands principles of proper nutrition of animals and humans, uses principles of proper nutrition and healthy lifestyle |
| ZO\_1A\_U11 | Can solve technical engineering tasks in the field of animal husbandry |
| ZO\_1A\_U12 | Assessment of weaknesses and strengths of standard activities solving occurring professional problems for gaining experience and improvement of engineering skills |
| ZO\_1A\_U13 | Shows a skill of presenting own position and opinions and of communicating with various subjects in verbal, written and graphic form |
| ZO\_1A\_U14 | Assesses wellness of animals and takes action in order to optimise it |
| ZO\_1A\_U15 | Shows a skill of managing herds of various species of domesticated and wild animals |
| ZO\_1A\_U16 | Can determine demand of animals for nutrients, can assess quality of fodder, properly balance food doses and supervise preparation of fodder |
| ZO\_1A\_U17 | Shows a skill of proper use of animals and uses basic principles of breeding them |
| ZO\_1A\_U18 | Can apply basic genetic laws and predict outcomes of their application in various animal populations |
| ZO\_1A\_U19 | Can manage breeding use of animals |
| ZO\_1A\_U20 | Uses principles of economics and marketing for animal production optimisation |
| ZO\_1A\_U21 | Can assess state of environment and natural resources as well as threats resulting from raising and breeding of animals |
| **Social competences** | |
| ZO\_1A\_K01 | is able to work both individually and in team and to manage teams in appointing and controlling tasks carried out as part of planned routine work |
| ZO\_1A\_K02 | acts according to basic principles of ethics in using animals and food production |
| ZO\_1A\_K03 | presents pro-ecological attitude and attitude of responsibility for surrounding animate world at different levels of its organisation resulting from the awareness of risk relating to the use of various production resources |
| ZO\_1A\_K04 | can think and act in an entrepreneurial way |
| ZO\_1A\_K05 | is aware of the need of functioning leaders setting the directions of actions in social and professional environment |
| ZO\_1A\_K06 | can acquire information from literature, databases and other sources within the programme of studies |
| ZO\_1A\_K07 | shows positive opinions and attitudes towards people, organisms and environment and shows high sensitivity to their needs and problems |

Załącznik nr 6  
do zarządzenia nr 120 Rektora ZUT z dnia 30 października 2023 r.

Zootechnika, studia drugiego stopnia (na podstawie uchwały nr 24 Senatu ZUT z dnia 23 kwietnia 2018 r.)

**Programme of studies:** *animal husbandry*

**Level of qualification:** second cycle studies

**Educational profile:** general academic

**Fields of science:** Agricultural sciences

**Discipline of science:** animal science and fisheries (100%)

**Name of qualification (Title conferred): magister inżynier**

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcomes for programme of studies** |
| **Knowledge** | |
| ZO\_2A\_W01 | in an in-depth degree knows kinds of experiments and methods, techniques of research as well as knows basic theories in natural sciences that can be applied in animal husbandry |
| ZO\_2A\_W02 | has in-depth economic, legal, ethical and humanistic knowledge relating to animal husbandry sciences |
| ZO\_2A\_W03 | has in-depth knowledge of influence of animal husbandry environment on health and productivity of animals and has an extended knowledge on animal husbandry prevention as an important element of animal production |
| ZO\_2A\_W04 | has advanced knowledge on the structure, development, growth and functioning of living organisms at various levels of biosphere organisation |
| ZO\_2A\_W05 | has in-depth knowledge on fodder and food assessment and their medicinal and promoting health value |
| ZO\_2A\_W06 | has advanced knowledge of breeding work organisation and planning, including the use of IT tools, and also knowledge of food products quality assessment and management of animal products turnover |
| ZO\_2A\_W07 | has extended knowledge of rural areas functioning, possibilities and factors of their development |
| ZO\_2A\_W08 | has in-depth knowledge of natural environment and its role, significance and methods of protection in sustainable use |
| ZO\_2A\_W09 | has in-depth knowledge of principles of rational nutrition, diseases and raising livestock, pet animals, laboratory animals and management of wild animal populations as well as their use for improvement of human life quality |
| ZO\_2A\_W10 | has in-depth knowledge of taking and organising action in animal husbandry maintaining basic principles of safety and ergonomics od work and shaping individual entrepreneurship |
| ZO\_2A\_W11 | has in-depth knowledge on reproductive processes, most common disorders and biotechniques used in animal reproduction |
| **Skills** | |
| ZO\_2A\_U01 | Shows in-depth skill of finding, understanding, analysis and creative use of needed information from various sources and in different forms in animal husbandry |
| ZO\_2A\_U02 | Has in-depth skills in animal production organisation, turnover of animal products, technologies used in processing animal raw materials and possibility of using therapeutic properties of animals and animal products |
| ZO\_2A\_U03 | Shows ability of analytical, critical and appropriate preparation of materials and formulating independent conclusions |
| ZO\_2A\_U04 | Can conduct a matter-of-fact and factual discussion with various subjects leading to reaching mutual solution of a problem |
| ZO\_2A\_U05 | Can use a foreign language at level B2+ of the Common European Framework of Reference, can communicate in everyday and work-related situations, uses professional vocabulary concerning animal husbandry |
| ZO\_2A\_U06 | Conducts research tasks under the supervision of a tutor concerning widely understood animal sciences and draws appropriate conclusions and prepares written papers in the field of animal husbandry |
| ZO\_2A\_U07 | Analyses and interprets interrelations between structure and function at a level of cells, tissues, single organisms and populations |
| ZO\_2A\_U08 | Makes independent multifaceted analysis of problems in order to optimise phenomena influencing plant and animal production, food quality, animal and human health |
| ZO\_2A\_U09 | Can assess and predict outcomes of proecological influence of animals on environment surrounding them |
| ZO\_2A\_U10 | Can select and use advanced research techniques and tools necessary in scientific work in the discipline of animal husbandry |
| ZO\_2A\_U11 | Shows skills of organising breeding and keeping of various domesticated animal species and managing of populations of wild animals |
| ZO\_2A\_U12 | Can assess and determine usefulness of various nutrients and nutrition additives in human and animal nutrition in order to optimise it |
| ZO\_2A\_U13 | Chooses appropriate methods of bioengineering in animal breeding and assesses results of their application |
| ZO\_2A\_U14 | Can choose, draw up and use appropriate methodology of activities in order to optimise breeding processes in animals |
| ZO\_2A\_U15 | Can various activities in rural areas with possibility of using IT technologies as well as marketing and economic tools |
| **Social competences** | |
| ZO\_2A\_K01 | Works independently and in team, can take a leading role |
| ZO\_2A\_K02 | Shows awareness of the need of gaining additional knowledge and self-improvement in animal husbandry |
| ZO\_2A\_K03 | Shows understanding of the role of joint activities in animal breeders associations and institutions of agricultural counselling |
| ZO\_2A\_K04 | Shows critical attitude towards information available in public space concerning animal husbandry sciences and is ready to solve various problems within his profession |
| ZO\_2A\_K05 | Is able to initiate and organise social activities for the public interest and to think and act in an entrepreneurial manner |
| ZO\_2A\_K06 | Is determined to responsibly play the role of a animal husbandry adapting it current social needs and to contribute with his attitude to elevate the significance of the profession, in particular by observing the principles of professional ethics |
| ZO\_2A\_K07 | Acts according to principles of ethics in animal research |
| ZO\_2A\_K08 | Can consciously assess environmental factors that are hazards for humans and animals |
| ZO\_2A\_K09 | Shows high sensitivity to needs of humans and animals and surrounding environment |

Załącznik nr 7  
do zarządzenia nr 120 Rektora ZUT z dnia 30 października 2023 r.

Biotechnologia, studia drugiego stopnia (na podstawie uchwały nr 107 Senatu ZUT z dnia 31 maja 2021 r)

**Programme of studies:** *Biotechnology*

**Level of qualification:** second cycle studies

**Educational profile:** general academic

**Fields of science:** Agricultural sciences, Natural sciences, Engineering and technology

**Discipline of science:** animal science and fisheries (60%), nutrition and food technology (10%), agriculture and horticulture (10%) biological sciences (5%), materials engineering (10%), chemical engineering (5%)

**Name of qualification (Title conferred): magister inżynier**

**Description of the planned educational effects**

|  |  |
| --- | --- |
| **Code** | **Learning outcomes for programme of studies** |
| **Knowledge** | |
| BT\_2A\_W01 | has extended knowledge of biology, chemistry, mathematics, physics, and related sciences adjusted to biotechnology |
| BT\_2A\_W02 | has in-depth knowledge of economics, quality management, law, and other aspects useful for a biotechnologist |
| BT\_2A\_W03 | knows ethical, legal, economic standards, and other circumstances that are significant in biotechnology |
| BT\_2A\_W04 | has detailed and organised knowledge of using molecular, enzymatic, and physiological processes of living organisms in biotechnology |
| BT\_2A\_W05 | shows in-depth knowledge of structure, function, and computer analysis of genes and genomes, as well as the influence of genetic factors on environment development |
| BT\_2A\_W06 | has knowledge of advanced laboratory methods, engineering techniques and tools allowing to perform tasks adjusted to study of biotechnology |
| BT\_2A\_W07 | has extended knowledge of engineering processes, devices and technological lines used in biotechnology |
| BT\_2A\_W08 | shows in-depth and organised knowledge of using biotechnological processes and methods in various branches of science and industry |
| BT\_2A\_W09 | knows research techniques and principles of preparing and writing a scientific paper |
| BT\_2A\_W10 | shows advanced knowledge of the influence of human activities on natural environment and its biodiversity |
| BT\_2A\_W11 | has extended knowledge of the influence of biotechnology on human health and functioning, and on animal and plant production development |
| BT\_2A\_W12 | has enriched knowledge of genetic modifications and their significance for humans and natural environment |
| BT\_2A\_W13 | shows in-depth knowledge of modern breeding with significance in urban areas development |
| BT\_2A\_W14 | knows advanced bioinformatics techniques and possibilities of their use in biotechnology |
| **Skills** | |
| BT\_2A\_U01 | uses in-depth theoretical knowledge to analyse processes and phenomena affecting the improvement of life and health of animals and humans |
| BT\_2A\_U02 | can plan and analyse biotechnological research using bioinformatics tools |
| BT\_2A\_U03 | knows a foreign language at B2+ level, communicates in everyday and professional situations, can write a report and an essay on a familiar topic; has a skill of preparing oral presentations containing biotechnological vocabulary |
| BT\_2A\_U04 | analyses factors influencing food production, quality, and safety; analyses factors influencing natural environment; determines the influence and significance of biotechnology in natural environment and biodiversity protection |
| BT\_2A\_U05 | can execute an experimental process individually or in a team, including making measurements that can be used in biotechnology; interprets obtained results and draws conclusions; conducts a discussion basing on individually acquired knowledge using specialist language |
| BT\_2A\_U06 | makes thorough molecular analysis of basics of evolution, and also factors affecting functioning of genome and transcriptome; analyses factors affecting organism variability |
| BT\_2A\_U07 | analyses main metabolic pathways and mechanism of their adjustment basing on knowledge of structure and function of proteins, hormones, and vitamins; can obtain and use enzymes |
| BT\_2A\_U08 | selects and uses advanced research techniques and tools applied in biotechnology |
| BT\_2A\_U09 | uses learned methods in research; prepares literature in accordance with research profile; analyses scientific reports in the context of own research project; can prepare project of own scientific research and individually prepare a scientific paper |
| BT\_2A\_U10 | observes basic principles of good laboratory practice; can determine threats in biotechnologist’s work, can react in dangerous situations using principles of industrial safety |
| **Social competences** | |
| BT\_2A\_K01 | shows the need of constant improvement of general and specialised knowledge; is aware of advisability of improving the acquired knowledge both in professional activities and in personal development |
| BT\_2A\_K02 | shows understanding of biotechnological processes used in various fields of human activities; interprets and describes the processes using scientific approach |
| BT\_2A\_K03 | is aware of the influence of biotechnology on the development and state of natural environment, and on human health |
| BT\_2A\_K04 | is aware of existing ethical and social standards concerning conducted research and professional activities; understands the advisability of acting according to the established ethical and legal principles |
| BT\_2A\_K05 | shows discipline in individual work; willingly participates in group work; can creatively plan and execute own and team activities |
| BT\_2A\_K06 | shows responsibility for decisions and their effects; presents a matter of fact and critical attitude |
| BT\_2A\_K07 | understands advisability of stimulating individual cognitive activities and improving professional competence; shows independence in acquiring scientific information from different sources |
| BT\_2A\_K08 | is aware of joint responsibility for his/her and other people’s work safety; can think and act in an entrepreneurial manner |