



Fundamentals of animal nutrition  
Educational subject description sheet

**Basic information**

<b>Field of study</b> Animal husbandry		<b>Education cycle</b> 2021/22	
<b>Speciality</b> -		<b>Subject code</b> BD000000BZON.I8B.0747.21	
<b>Organizational unit</b> The Faculty of Biology and Animal Science		<b>Lecture languages</b> english	
<b>Study level</b> First-cycle (engineer) programme		<b>Mandatory</b> optional	
<b>Study form</b> Part-time		<b>Block</b> major subjects	
<b>Education profile</b> General academic		<b>Disciplines</b> Animal husbandry and fishery	
		<b>Subject related to scientific research</b> Yes	
		<b>Subject shaping practical skills</b> Nie	
<b>Teacher responsible for the subject</b>	Barbara Król		
<b>Other teachers conducting classes</b>	Barbara Król		
<b>Period</b> Semester 4	<b>Examination</b> exam	<b>Number of ECTS points</b> 4.0	
	<b>Activities and hours</b> lecture: 9 laboratory classes: 18		

## Goals

C1	to familiarize students with the classification of basic nutrients contained in feed materials
C2	to familiarize students with the structure, chemical properties and nutritional role of basic nutrients
C3	transfer of knowledge in the field of chemical composition of feed materials
C4	to familiarize students with the principles and methods for determining the chemical composition of feed

## Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
<b>Knowledge - Student knows and understands:</b>			
W1	molecular structure of plant and animal organisms and basic chemical composition of living organisms	BH_P6S_WG01, BH_P6S_WG02	written exam
W2	structure and properties of nutrients in feed materials	BH_P6S_WG01, BH_P6S_WG02	written exam
<b>Skills - Student can:</b>			
U1	interpret the results of chemical analysis of feed materials and estimate their nutritional value and usefulness in animal nutrition	BH_P6S_UW07	observation of student's work, test, performing tasks
U2	define and characterize, in relation to the structure and function, individual nutrients found in feed materials	BH_P6S_UW07	observation of student's work, test, performing tasks
U3	define the basic nutrients in accordance with the nomenclature Weende and other systems of feed analysis	BH_P6S_UW07	observation of student's work, test, performing tasks
<b>Social competences - Student is ready to:</b>			
K1	to continually expanding knowledge on analytical methods for assessing the nutritional value of feed	BH_P6S_KR03, BH_P6S_KR04	written exam
K2	to recognize social, professional and ethical responsibility for the production of high quality food, animal welfare and the impact of animal production on the environment	BH_P6S_KR03, BH_P6S_KR04	written exam, observation of student's work
K3	to take risks and assessing the effects of activities in the field of widely understood agriculture and the environment	BH_P6S_KO05, BH_P6S_KR04	written exam, observation of student's work

## Balance of ECTS points

Activity form	Activity hours*
lecture	9
laboratory classes	18
exam / credit preparation	40

class preparation	30	
report preparation	15	
consultations	1	
exam participation	2	
<b>Student workload</b>	<b>Hours</b> 115	<b>ECTS</b> 4.0
<b>Workload involving teacher</b>	<b>Hours</b> 30	<b>ECTS</b> 1.0
<b>Practical workload</b>	<b>Hours</b> 33	<b>ECTS</b> 1.1

\* hour means 45 minutes

### Study content

No.	Course content	Activities
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1.	<p>The importance of animal nutrition, comparison the chemical composition of plants and animals.</p> <p>Feed and their ingredients. Rules applicable to the sampling of various feed materials for analysis.</p> <p>Classification of feed nutrients. Basic and extended feed analysis - presentation of analytical methods for the determination of basic nutrients.</p> <p>Water - role and physiological significance. Water requirements for animals.</p> <p>Quality requirements for drinking water and their effect on the animal body.</p> <p>Classification and nutritional importance of proteins. Structure, physiological functions, nutritional importance. Methods for determining proteins.</p> <p>Amino acids - criteria for division, physiological functions, animal demand for amino acids.</p> <p>Classification and nutritional importance of structural carbohydrates.</p> <p>Construction, properties and importance in livestock nutrition. Methods for the determination of structural carbohydrates in accordance with the basic analysis of feeds and according to van Soest. The concept of dietary fiber.</p> <p>Classification and nutritional significance of store carbohydrates. Structure, properties and importance in livestock nutrition. Determination methods according to the Weende analysis.</p> <p>Classification and nutritional role of fats. Structure, properties and importance in animal nutrition. Chemical methods for the determination of fats and fatty acids in feed materials.</p> <p>Classification and role of minerals. Macronutrients - role, symptoms of deficiency and / or toxicity. Synergism and antagonism between individual macroelements. Bioavailability of macroelements from feed materials and commercial mineral additives. Chemical methods for the determination of basic macroelements in feed materials.</p> <p>Classification and importance of minerals. Microelements - role, symptoms of deficiency and / or toxicity. Synergism and antagonism between individual microelements. Bioavailability of micronutrients from feed materials and commercial mineral additives. Chemical methods for the determination of basic microelements in feed materials.</p> <p>Classification and importance of vitamins. Factors affecting the stability of vitamins in feed components and vitamin and mineral mixtures. Role, symptoms of deficiency and / or toxicity of water-soluble vitamins. Chemical methods for the determination of water-soluble vitamins.</p> <p>Classification and importance of vitamins. Role, symptoms of deficiency and / or toxicity of fat-soluble vitamins. Chemical methods for the determination of fat-soluble vitamins.</p> <p>Mechanisms regulating animal feed intake (mechanical, physiological).</p> <p>Classification and nomenclature of feed materials.</p>	lecture
2.	<p>Work safety rules in the laboratory. Determination of dry matter and crude ash in plant feed materials.</p> <p>Determination of crude fiber content in plant feed materials.</p> <p>Preparation of samples for determination of crude protein content. Continuation of the crude fiber determination procedure.</p> <p>Mineralization of feed samples for protein determination. Continuation of crude fiber determination.</p> <p>Distillation and titration of mineralized feed material samples and calculation of crude protein content. Calculation of crude fiber content.</p> <p>Determination of crude fat content by the Soxhlet method in plant feed materials.</p> <p>Fat solubility in various solvents, chemical indicators for assessing the quality of fats (LK, LOO, LI).</p> <p>Calculation of the content of nitrogen-free extractives (NFE), conversion of the content of determined nutrients into fresh, dried and anhydrous material.</p> <p>Determination of silage quality I: content of volatile fatty acids in silage.</p> <p>Determination of silage quality II: determination of ammonium nitrogen in silage.</p> <p>Determination of the sum of volatile fatty acids and ammonia nitrogen in the rumen fluid.</p> <p>Determination of the content of selected macroelements in plant feed materials.</p> <p>Determination of the content of selected microelements in plant feed materials.</p> <p>Determination of amino acid content in plant feed materials.</p> <p>Calculation and interpretation of chemical analysis results, preparation of the report.</p>	laboratory classes

## Course advanced

### Teaching methods:

teamwork, lecture, classes

Activities	Examination methods	Percentage in subject assessment
lecture	written exam	60%
laboratory classes	observation of student's work, test, performing tasks	40%

### Entry requirements

A student before taking a course in the subject of "Fundamentals of animal nutrition" should have a fundamental knowledge in the area of organic chemistry (especially in the field of analytical chemistry) and be able to use simple laboratory equipment.

### Literature

#### Obligatory

1. Animal Nutrition. Mc Donald P., Edwards R.A., Greenhalgh J.F., Morgan C.A.: (Ed), Longman Scientific and Technical, New York, 1955, 2002, 2010.
2. Rational Livestock Nutrition in Rural Areas. Red. Król B., Słupczyńska M. Wyd. UPWr, Wrocław, 2016.

#### Optional

1. Animal Nutrition Science. By: Gordon Dryden, Dryden Animal Science. CABI org.
2. Basic Animal Nutrition and Feeding, 5th Edition Wiley.

## Kierunkowe efekty uczenia się

Kod	Treść
BH_P6S_KO05	The graduate is ready to think and act in an entrepreneurial manner, taking into account dynamic changes in legal, economic and social conditions of animal production
BH_P6S_KR03	The graduate is ready to accept the responsibility associated with the exercise of the profession of zootechnics related to the need to ensure the safety and protection of animals and the breeding environment as well as the correct identification and settlement of dilemmas related to animal breeding, being aware of the responsibility for the effects of the improper use of animals being the subject of breeding, husbandry or use
BH_P6S_KR04	The graduate is ready to recognize the importance of social, professional and ethical responsibility for the production of high-quality food, especially animal origin one, animal welfare and the impact of animal production on the state of the environment
BH_P6S_UW07	The graduate is able to evaluate feed materials, as well as formulate and balance diets and concentrated mixtures for farm animals
BH_P6S_WG01	The graduate knows and understands at an advanced level the issues of the construction and functioning of living organisms at various levels of complexity, especially about the anatomy and physiology of farm animals
BH_P6S_WG02	The graduate knows and understands issues in the field of chemistry, biochemistry, statistics, physics, biophysics and genetics