



Animal nutrition and feed quality
Educational subject description sheet

Basic information

Field of study Veterinary Medicine		Education cycle 2021/22
Speciality -		Subject code WMWMWW-AJS.J8BO.0073.21
Organizational unit The Faculty of Veterinary Medicine		Lecture languages english
Study level Long-cycle programme		Mandatory mandatory
Study form Full-time		Block major subjects (conducted) in foreign languages
Education profile General academic		Disciplines Veterinary medicine
		Subject related to scientific research Yes
		Subject shaping practical skills Nie
Teacher responsible for the subject	Maja Słupczyńska	
Other teachers conducting classes	Maja Słupczyńska	
Period Semester 4	Examination exam	Number of ECTS points 5.0
	Activities and hours lecture: 30 laboratory classes: 45	
	Standard groups A. Basic sciences, B2. Animal production	

Goals

C1	Students will be introduced to the principles of determining the chemical composition of feed, criteria for the division of feed materials, digestion, absorption and utilization of individual nutrients depending on the structure of the digestive system.
C2	Students will learn to balance diets and formulas of complete mixtures depending on the species and direction of use of livestock, as well as systems and techniques of animal feeding.
C3	Students will be familiarized with metabolic disorders caused by dietary errors and methods of their prevention.
C4	Students will also be presented ways of modifying the composition of animal origin products by nutrition and methods of reducing the emission of undigested nutrients to the environment.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	knows to an extensive degree and distinguishes the principles of animal raising and husbandry, taking into account the principles of animal nutrition, principles of maintaining their welfare and principles of production economics;	O.W8	written exam, test, performing tasks
W2	explains and interprets the etiology, pathogenesis and clinical symptoms of diseases occurring in individual animal species, and knows the principles of therapeutic procedure, as well as the methods of diagnostic and therapeutic procedure appropriate for the diseases occurring in animals;	O.W3	written exam, test
Skills - Student can:			
U1	uses his/her professional skills to improve the quality of veterinary care, animal welfare, as well as public health;	A.U19	performing tasks
U2	understands the need of continuing education, in order to ensure continuous professional development	A.U21	active participation
Social competences - Student is ready to:			
K1	exhibits responsibility for his/her decisions made in regard to the people, animals and the natural environment	O.K1	active participation
K2	formulates conclusions from own measurements or observations	O.K5	active participation, performing tasks
K3	deepens his/her knowledge and improves skills	O.K8	written credit, active participation, test, performing tasks
K4	communicates with the co-workers and shares knowledge	O.K9	active participation, performing tasks

Balance of ECTS points

Activity form	Activity hours*
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lecture	30	
laboratory classes	45	
lesson preparation	30	
exam / credit preparation	20	
exam participation	2	
consultations	1	
Student workload	Hours 128	ECTS 5.0
Workload involving teacher	Hours 78	ECTS 3.0
Practical workload	Hours 45	ECTS 1.7

* hour means 45 minutes

Study content

No.	Course content	Activities
1.	<p>1. Feeds and their ingredients. Sampling of various feed materials for analysis (sampling methods, labels, packaging, storage and transport methods). Classification of feed ingredients. Basic and extended analysis of feeds - presentation of analytical methods for the determination of basic nutrients.</p> <p>2. Classification and nutritional importance of carbohydrates. Digestion, absorption and utilization of carbohydrates in monogastric animals and ruminants.</p> <p>3. Classification and nutritional importance of proteins. Digestion, absorption and utilization of proteins in monogastric animals and ruminants. Other nitrogen compounds present in feed materials. Evaluation of the biological value of proteins, the concept of ideal protein and protected protein / amino acids.</p> <p>4. Classification and nutritional importance of lipids. Digestion, absorption and utilization of lipids in monogastric animals and ruminants.</p> <p>5. Classification and importance of minerals. Role, symptoms of deficiency and /or toxicity of individual macro- and micronutrients. Synergism and antagonism between individual mineral components. Bioavailability of minerals from feed materials and commercial mineral additives. Methods for determining animals requirement for minerals.</p> <p>6. Classification and importance of vitamins. Role, symptoms of deficiency and/or toxicity of individual vitamins. Factors affecting the stability/activity of vitamins in feed components and mineral-vitamin mixtures. Absorption of vitamins from the gastrointestinal tract.</p> <p>7. Mechanisms regulating the feed intake in animals (mechanical, physiological). Classification and nomenclature of feed materials. Nutritive value and nutritional importance of roughage.</p> <p>8. Nutritional value and nutritional importance of concentrates. Feed additives - division, purpose of application, applicable legal regulations. Anti-nutritive substances in feed materials -occurrence, impact on the health and productivity of animals, methods of inactivation of the activity of anti-nutritional substances.</p> <p>9. Feed preparation methods and their effect on the digestibility of nutrients. The method of feed preparation depending on the species of animals for which they are intended. Feed preservation methods.</p> <p>10. Physiological fundamentals of dairy cattle nutrition - nutritive value of feeds in dairy cow, feeding systems - nutrition techniques. Metabolic disorders resulting from incorrect feeding of dairy cows.</p> <p>11. Feeding of fattening and breeding cattle. Feedstuffs used in fattening, physiological conditions of the fattening process, feeding systems for fattening.</p> <p>12. Feeding the calves. Basics of physiological feeding of calves, development of the gastrointestinal tract, milk replacers, digestive and metabolic disorders in calves.</p> <p>13. Physiological fundamentals of pigs feeding: sows, piglets and weaners, pigs for fattening. Demand of individual groups for nutrients. Pig feeding systems, swine feeding diseases - causes, symptoms and prevention.</p> <p>14. Physiological fundamentals of poultry nutrition: specification of the keeping and feeding of laying hens (composition of eggs, influence of feeding on laying and nutritional methods of modifying the composition of eggs); feeding of chickens for slaughter - the demand for energy and nutrients, methods for improving the use of feed, the use of feed additives. Diseases of laying hens and broiler chickens caused by nutritional mistakes.</p> <p>15. Hygiene and safety of feed production. Ways of modifying the chemical composition and quality of animal products on the nutritional way - functional foods.</p>	lecture

No.	Course content	Activities
2.	<p>1. Calculation of the content of individual nutrients in fresh material and in dry matter based on the results of chemical analyzes. Interpretation of the results obtained.</p> <p>2. Feed digestibility coefficients (apparent and true digestibility). Methodology for determination of digestibility: biological methods - in vivo (balance method, the difference technique, in sacco and in situ methods) and chemical methods. Calculation of apparent digestibility coefficients based on numerical data. Interpretation of the results obtained.</p> <p>3. Metabolic balance - calculation of the production effect of feed on the basis of C and N balance. Assessment methods the biological value of feed protein. Calculation of the biological value of feed protein by chemical methods - Osera and Block-Mitchela method.</p> <p>4. Principles of the use of non-protein (synthetic) nitrogen compounds in the feeding of ruminants. Calculation of the amount of the addition of various nitrogen sources from non-protein nitrogen compounds to feeds depending on the extent of the desired coverage of the needs in terms of the general protein. Interpretation of the results obtained.</p> <p>5. Energy values for feed. Metabolism of energy in the body: from gross energy to net energy. Food/energy units used in various feeding systems of monogastric animals (European for poultry, pigs, horses) and energy value according to the NEL system - for ruminants. Calculation based on numerical data in accordance with the relevant mathematical formulas: net lactation energy values - for dairy cows; metabolic energy for pigs and energy digestible for horses.</p> <p>6. Diet formulation for ruminants in the INRA system. Basic concepts: energy system - UFL and UFV, protein system (PDIA, PDIMN, PDIME, PDIN, PDIE), fill unit system, forage fill value, feed intake capacity).</p> <p>7. Formulation of diet for fattening bull (selected breeds) in accordance with the recommendations of the INRA system - work with standards, determination of animal requirement, selection of feed materials, optimization of the feed ration (paper standards + computer program INRAtion).</p> <p>8. Formulation of diet for breeding heifers (selected breeds) in accordance with the recommendations of the INRA system - work with standards, determination of animal requirement, selection of feed materials, optimization of the feed ration (paper standards + computer program INRAtion).</p> <p>9. Balancing a diet for ruminating animals in the DLG system. Basic concepts related to the system: feeding standards for dairy cows, estimation of nutritional value of feeds, rules for determining the need for crude protein available in the small intestine and rules for calculating nCP values in feedingstuffs, energy demand (MJ-NEL). Calculation the diet for a dairy cow ("paper" standards + WinPasz computer program)</p> <p>10. Dietary standards for pigs feeding. Principles of feeding pigs - fattening pigs.</p> <p>11. Calculation of doses and recipes of complete mixtures for fattening pigs in individual phases of fattening ("paper" standards + WinPasz computer program).</p> <p>12. The rules of feeding sows in different phases of the reproductive cycle.</p> <p>13. Calculation of doses and recipes of complete mixtures for sows in individual phases of the cycle ("paper" standards + WinPasz computer program).</p> <p>14. Feeding of poultry. Recommended shares of individual feed components due to the presence of "anti-nutritional" substances.</p> <p>15. Calculation of the recipe for a complete mixture for poultry - broiler chickens and layers (WinPasz computer program).</p>	laboratory classes

Course advanced

Teaching methods:

case analysis, problem-solving method, project-based learning (PBL), presentation / demonstration, teamwork, discussion, lecture, classes

Activities	Examination methods	Percentage in subject assessment
lecture	written exam, active participation	60%
laboratory classes	written credit, active participation, test, performing tasks	40%

Entry requirements

non

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. Nutrient Requirements of Dairy Cattle. Seventh Revised Edition, NRC. 2001.

Optional

1. The Encyclopedia of Farm Animal Nutrition. M.F. Fuller (ed). CABI Publishing. 2004
2. Laboratory procedures in animal nutrition research. M. L. Galyean. Texas Tech University, Lubbock. 1980.

Kierunkowe efekty uczenia się

Kod	Treść
O.K1	Exhibits responsibility for his/her decisions made in regard to the people, animals and the natural environment
O.K5	Formulates conclusions from own measurements or observations
O.K8	Deepens his/her knowledge and improves skills
O.K9	Communicates with the co-workers and shares knowledge
O.W3	Explains and interprets the etiology, pathogenesis and clinical symptoms of diseases occurring in individual animal species, and knows the principles of therapeutic procedure, as well as the methods of diagnostic and therapeutic procedure appropriate for the diseases occurring in animals;
O.W8	Knows to an extensive degree and distinguishes the principles of animal raising and husbandry, taking into account the principles of animal nutrition, principles of maintaining their welfare and principles of production economics;
A.U19	Uses his/her professional skills to improve the quality of veterinary care, animal welfare, as well as public health;
A.U21	Understands the need of continuing education, in order to ensure continuous professional development