

SYLLABUS

Name of the course (as specified in the approved curriculum) Module 2 – Animal Nutrition and Feed Management		Number of ECTS credits 10	
Name of the course in Polish Żywnienie Zwierząt i Paszoznawstwo			
Unit providing the course Department of Animal Nutrition			
Course co-ordinator prof. UPP dr hab. Bartosz Kierończyk			
Field of study Animal Production Management	Level II – master studies	Profile Academic-general	Semester 1
TYPE OF CLASSES AND COURSE LOAD (Classes with teacher and student's own work)			
Mode of studies: full-time		Mode of studies: part-time	
- lectures	30	- lectures	-
- classes	50	- classes	-
- field classes	45	- field classes	-
- labs	10	- labs	-
- consultations	10	- consultations	-
- student's own work	100	- student's own work	-
- others	5	- others	-
Total number of hours:		250	Total number of hours:
OBJECTIVE OF THE COURSE			
The aim of the course is to provide students with the knowledge of the effects of dietary factors on the structure and function of the gastrointestinal tract; to familiarize them with the chemical composition and hygiene quality of commonly used feed materials; and to develop practical skills in evaluating the nutritional value of feed ingredients and formulating diets and feed rations for various livestock species using computer software, in accordance with current technological practices in the feed industry and applicable Polish/EU feed legislation.			
TEACHING METHODS			
Lectures: Delivered in the form of multimedia-supported presentations.			
Classes: Conducted using multimedia presentation, laboratory and computer-based exercises, guided discussions, student presentations of case studies, team-oriented tasks, and written assignments.			
Field classes: Conducted in animal feed manufacturing facilities and livestock farms			
Remote learning: Classes may be conducted using tools and platforms that support remote instruction, distance learning, and the assessment of learning outcomes.			
Course learning outcomes			The reference to the study field learning outcomes
Knowledge	<p>O1: The student has advanced knowledge of the use of feed mill technologies, research methodologies applied in feed materials analyses, and methods for sampling and chemical evaluation of feedstuffs. Deeply understands the principles of energy and protein evaluation, the occurrence of antinutritional factors, and the legal regulations governing feed materials, feed additives, feed quality and hygiene.</p> <p>O2: The student has advanced knowledge of the anatomy and physiology of non-ruminants and ruminants, including rumen physiology, gastrointestinal microbiology, and nitrogen metabolism in the rumen.</p> <p>O3: The student has advanced knowledge of multi-dimensional nutrition of poultry (broilers, laying hens, and turkeys), pigs (selected production groups), and cattle, including their effects on physiology, metabolic disorders prevention, animal welfare, and the use of modern nutritional technologies.</p> <p>O4: The student understands the impact of anti-nutritional factors on the welfare of non-ruminants and product quality (meat, eggs), the influence of nutrition on the risk of metabolic disorders and unfavourable changes in rumen microbiota, and the use of feed additives to improve nutrient utilization and prevent disease.</p>		<p>AP2A_W06 AP2A_W08 AP2A_W10 AP2A_W11 AP2A_W13</p>

Skills	<p>O5: The student is able to prepare written assignments and/or oral presentations on selected topics related to animal nutrition and feed management, using scientific databases, and can critically search, analyse, interpret, and communicate this knowledge in oral, written, and graphical forms.</p> <p>O6: The student is able to work individually or in teams using scientific literature to interpret selected issues in animal nutrition and to apply nutritional recommendations for animals. The student can discuss their topics with specialists from various fields in English, at the B2+ level according to the Common European Framework of Reference for Languages, using appropriate animal science terminology.</p> <p>O7: The student is able to use specialized software to formulate diets and feed ratios, and assess the nutritional value of feeds. The student can evaluate feed quality, perform practical evaluations of total mixed rations (TMR) using the Penn State Separator during field classes on farms.</p> <p>O8: The student is able to discuss and calculate nutrient digestibility coefficients, apply different feeding methods, and assess their impact on production performance.</p> <p>O9: The student can coordinate the work of animal caretakers, organize appropriate feeding for various animal species, and oversee the production of high-quality feed in compliance with Feed Law.</p>	<p>AP2A_U01 AP2A_U02 AP2A_U04 AP2A_U05 AP2A_U15</p>
Social competences	<p>O10: engage in lifelong learning, continuously update knowledge and skills, and support or inspire the learning of others; demonstrate creativity and initiative; act in an entrepreneurial and innovative manner.</p> <p>O11: assume ethical and social responsibility for the outcomes of activities in animal nutrition, with particular focus on the welfare of domestic animals.</p> <p>O12: take ethical and social responsibility to produce safe, high-quality feed, and actively pursue creative and entrepreneurial approaches in this area.</p>	<p>AP2A_K01 AP2A_K03 AP2A_K05</p>
<p>Methods for verifying learning outcomes Tests, presentations, reports, and written assignments</p>		<p>Symbols of course learning outcomes O1 – O12</p>
<p>TEACHING CONTENTS</p> <p>Lectures: Technological processes in the feed industry and their impact on the quality and nutritional value of mixtures; feed law; Biotechnology in the feed industry; machinery and equipment in the feed industry; principles of organization of production in feed mills; livestock feeding systems; analytical techniques (quality of feed fat, the content of anti-nutritional factors, the analysis of the suitability of green fodder for silage, silage analysis); the legal basis for feed hygiene and nutrition of animals; testing rules for active medicated feed their homogeneity and the principles of their manufacture; chemical, fungal, veterinary, microbiological hazards in feed, BSE problem; GMO in animal nutrition; the impact of technological processes on the hygienic quality of feed; characteristics of the gastrointestinal tract environment with microbial systematics, and biodiversity of endogenous microbiota.</p> <p>Classes: Optimizing of the composition of diets and feed ratios for various animal species using computer software; characterization of major groups of raw materials and chemical analyses of its nutritive value; quality and hygiene control of feed; calculating the nutritional value of feed mixture accordance with established feeding recommendations; design of technical lines in feed mills; overview of the gastrointestinal tract of non-ruminant and ruminant species in the scope of anatomy and microbiota populations.</p> <p>Field classes: Evaluation of dietary cow nutrition and management. Activities include, among others, on-farm analysis of rations, feed and faecal sieving to verify ration structure and fibre effectiveness, as well as assessment of animal-based indicators (locomotion/mobility, rumen fill, and welfare). Students also perform organoleptic evaluation of silages in relation to their nutritive value and gain insight into milk production technologies and practical dairy nutrition consultancy in commercial farms and feed companies.</p>		
<p>Forms and criteria of completing the course Classes Exam</p>		<p>Percentage of a final grade 40% 60%</p>

LITERATURE LIST

Core literature

1. The INRA-CIRAD-AFZ feed tables – available online (<https://www.feedtables.com>)
2. AVIAGEN Ross 308 Nutrient Specifications 2022 – available online (https://aviagen.com/assets/Tech_Center/Ross_Broiler/Ross-PlantProteinBasedBroilerNutritionSpecifications2022-EN.pdf)
3. Nutrient Requirements of Swine: Eleventh Revised Edition – available online <https://img1.wsimg.com/blobby/go/cef62d35-7a84-4a76-a0b6-562062e3ac2e/downloads/NRC%20Cerdos%202012.pdf?ver=1634143928997>
4. CVB Feed Table 2018 Chemical composition and nutritional values of feedstuffs – available online https://appec-h.com/wp-content/uploads/2024/08/CVB-Feed-Table-2018_Chemical-composition-and-nutritional-values-of-feedstuffs.pdf
5. Jamse B. Russell, Ithaca, NY (2002). Rumen Microbiology and Its Role in Ruminant Nutrition <https://zt.al/wp-content/uploads/2023/06/Rumen-microbiology-and-its-role-in-ruminant-nutrition-James-B-Russell-Z-Library.pdf>
6. Animal Sciences Auburn University – Animal Nutrition Handbook – available online <https://agriculture.auburn.edu/wp-content/uploads/2021/12/Animal-Nutrition-Handbook-2014-3rd-Rev-Chiba.pdf>

Additional sources

Review articles and source materials recommended by the teachers related to the Module 2 topics.