

SYLLABUS – PULS Doctoral School

Name of the course (as specified in the approved program): Functional food	
Name of the course in Polish: Funkcjonalna żywność	
Unit providing the course (Department): Department of Animal Nutrition	
Course leader: Prof. dr hab. Adam Cieślak	
Discipline: Animal science and fisheries	Semester: 7
TYPE OF CLASSES: (course load)	
- Lectures	5
- Practical classes	7
- Self-study	10
Total number of hours:	
22	
OBJECTIVE OF THE COURSE:	
Presentation of the current status of knowledge about the development of functional foods, their mechanism of action in humans, and regulatory framework. Getting acquainted with the practical implementation of the methods of verifying factors influencing functional food The current information about functional food market size, share, trends & forecast	
TEACHING METHODS:	
Multimedia presentations Journal club – selecting data for discussion Analysis of case studies The practical presentation of chromatographic techniques used in food analyses	
EDUCATION OUTCOMES*	
	Reference to education outcomes of the PULS Doctoral School
In the area of knowledge (PhD students know and understand): 1) world scientific literature concerning functional foods and their mechanism of action in humans 2) the latest theories and trends in the area of functional foods research concepts and their scientific interpretation	P8U_W_1 P8U_W_2
In the area of skills (PhD students know how to): 3) apply knowledge in the process of creative formulation of their research problems 4) innovatively solve research tasks using independently gained knowledge concerning state-of-the-art methods and research tools	P8U_U_1 P8U_U_2
In the area of social competencies (PhD students are capable to): 5) independent planning of research and dissemination of the existing body of scientific literature 6) promote appropriate models of teamwork 7) maintain and promote the importance and role of the intellectual community in social life	P8U_K_1 P8U_K_4 P8U_K_5
Methods of evaluation of outcomes achievement:	
Written test (theoretical knowledge): effects no 1, 2, 5 Projects (practical knowledge): effects no 3,4,5,6,7	
TEACHING CONTENT:	
<ul style="list-style-type: none"> • Review of current topics of functional foods and their mechanism of action in humans • Fatty acids and amino acids measurement methods (e.g. gas chromatography, liquid chromatography) • Meat alternatives and substitutes – modern trends, consumer acceptance, advanced production technologies, regulatory framework. • Meat and meat products – how to implement functionality while saving the sensory qualities and technological quality. • Functional food additives and their role in the manufacturing process (pigments, preservatives, antioxidants, 	

* efekty uczenia się stanowią Załącznik nr 1 do Regulaminu Szkoły Doktorskiej Uniwersytetu Przyrodniczego w Poznaniu, który stanowi załącznik do uchwały nr 44/2021 Senatu UPP

acidifiers, thickeners, gelling agents, sweeteners, and flavorings).

The course completion criteria and methods: Written test (lectures) Activity during practical classes <input type="checkbox"/> pass (Z) <input type="checkbox"/> course credit with a grade <input checked="" type="checkbox"/> examination (note)	Percent of a final grade: 50% 50%
<p style="text-align: center;">RECOMMENDED LITERATURE:</p> <ol style="list-style-type: none"> 1. Pang, G., Xie, J., Chen, Q., & Hu, Z. (2012). How functional foods play critical roles in human health. <i>Food Science and human wellness</i>, 1(1), 26-60. 2. Alongi, M., & Anese, M. (2021). Re-thinking functional food development through a holistic approach. <i>Journal of Functional Foods</i>, 81, 104466. 3. Maqsood, S., Adiamo, O., Ahmad, M., & Mudgil, P. (2020). Bioactive compounds from date fruit and seed as potential nutraceutical and functional food ingredients. <i>Food chemistry</i>, 308, 125522. 4. Siciliano, R. A., Reale, A., Mazzeo, M. F., Morandi, S., Silveti, T., & Brasca, M. (2021). Paraprobiotics: A new perspective for functional foods and nutraceuticals. <i>Nutrients</i>, 13(4), 1225. 5. Gao, M., Cieślak, A., Huang, H., Gogulski, M., Petrič, D., Ruska, D., ... & Szumacher-Strabel, M. (2023). Effects of raw and fermented rapeseed cake on ruminal fermentation, methane emission, and milk production in lactating dairy cows. <i>Animal Feed Science and Technology</i>, 300, 115644. 6. Yanza, Y. R., Szumacher-Strabel, M., Lechniak, D., Ślusarczyk, S., Kolodziejcki, P., Patra, A. K., ... & Cieslak, A. (2022). Dietary <i>Coleus amboinicus</i> Lour. decreases ruminal methanogenesis and biohydrogenation, and improves meat quality and fatty acid composition in longissimus thoracis muscle of lambs. <i>Journal of Animal Science and Biotechnology</i>, 13, 1-19. 7. Web sites: https://meatquality.eu/ 8. Macho-González, A., Bastida, S., Garcimartín, A., López-Oliva, M. E., González, P., Benedí, J., González-Muñoz, M. J., & Sánchez- Muniz, F. J. (2021). Functional Meat Products as Oxidative Stress Modulators: A Review. <i>Advances in nutrition</i> (Bethesda, Md.), 12(4), 1514–1539. https://doi.org/10.1093/advances/nmaa182 9. Vallikkadan, M.S., Dhanapal, L., Dutta, S. et al. Meat Alternatives: Evolution, Structuring Techniques, Trends, and Challenges. <i>Food Eng Rev</i> 15, 329–359 (2023). https://doi.org/10.1007/s12393-023-09332-8 	