załącznik nr 2 do uchwały Rady Szkoły Doktorskiej UPP nr 1/P/2023

SYLLABUS – PULS Doctoral School

Name of the course (as specified in the approved program): **Renewable energy sources in the animal production sector**	
Name of the course in Polish: **Odnawialne źródła energii w sektorze produkcji zwierzęcej**	
Unit providing the course (Department): **Department of Biosystems Engineering**	
Course leader: **Prof. Jacek Dach**	
Discipline: **Animal science and fisheries**	Semester: **8**

TYPE OF CLASSES:
(course load)

- Lectures	**8**
- Practical classes	**4**
Total number of hours:	**12**

OBJECTIVE OF THE COURSE:

To increase the theoretical and practical knowledge about RES implementation in animal production.
To show the practical solutions for the reduction of environmental impact from the animal sector (study cases in the experimental farms of PULS).

TEACHING METHODS:

- Lectures
- Study tour
- Discussion about study cases

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 specific problems related to a given discipline along with the resulting implications for practice 2. the latest theories and trends in disciplines, within which education was offered at the Doctoral School, thus facilitating the creation of original research concepts and their scientific interpretation 3. principles of planning and financing of research and evaluation of projects	(P8U_W_1) (P8U_W_2) (P8U_W_3)
In the area of skills (PhD students know how to): 4. innovatively solve research tasks using independently gained knowledge concerning state-of-the-art methods and research tools 5. independently plan and realize their scientific development, as well as inspire and/or organize the development of others	(P8U_U_2) (P8U_U_4)
In the area of social competencies (PhD students are capable to): 6. creatively solve challenges in professional and public life, considering their ethical aspects - initiate actions for the public good	(P8U_K_2) (P8U_K_3)

Methods of evaluation of outcomes achievement:

Oral presentations and discussion. – effects no: 1-6

* 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

TEACHING CONTENT:

- Renewable energy installations (biogas plant, PV, windmill, hybrid systems) – Prof. Jacek Dach
- Animal manures as a way for bioenergy production and carbon footprint reduction – Prof. Jacek Dach
- Animal production and bioenergy installation: study tour – Prof. Jacek Dach
- Properties of biomass and waste – Prof. Wojciech Czekała
- Management of biomass and waste – Prof. Wojciech Czekała

The course completion criteria and methods:	Percent of a final grade:
Oral presentations	70 %
Discussion	30%
Criteria • Minimum 80% attendance • Active participation in class (participation in discussions, answers to lecturer's questions)	
☒ **pass (Z)** ☐ **course credit with a grade** ☐ **examination**	

RECOMMENDED LITERATURE:

1. Czekala W. (2023) Biological Treatment of Waste and By-Products from Food Industry. Springer Link
2. Czekala W, Stevens CV. (2023) Biogas Plants - Waste Management, Energy Production, and Carbon Footprint Reduction. John Wiley & Sons. Springer Nature
3. Lund H. (2014) Renewable Energy Systems - A Smart Energy Systems Approach to the Choice and Modeling of 100% Renewable Solutions. Academic Press.