



SZKOŁA GŁÓWNA
GOSPODARSTWA
WIEJSKIEGO

Renewable Energy Sources – Biomass Conversion

Educational subject description sheet

Basic information

<p>Field of study Course Offer for exchange students - second cycle studies, including uniform master studies (MA programmes)</p> <p>Speciality -</p> <p>Organizational unit Course Offer for exchange students</p> <p>Study level second cycle studies, including uniform master studies (MA programmes)</p> <p>Study form full-time studies</p> <p>Education profile General academic</p>	<p>Didactic cycle 2024/25</p> <p>Subject code PWMPWM2S_D.B100000P.06424.24</p> <p>Lecture languages english</p> <p>Mandatory Elective subjects</p> <p>Block Basic subjects</p> <p>Disciplines</p>	
Coordinator	Magdalena Dąbrowska	
Teacher	Magdalena Dąbrowska	
Period Winter semester	Examination Pass with grade	Number of ECTS points 4
	Activities and hours Lecture: 20 Laboratory exercises: 10	

Goals

Code	Goal
C1	To familiarize students with basic knowledge of renewable energy source types, especially methods of conversion for biomass and waste products from agricultural and forestry sectors.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	New methods in the conversion of biomass		Test (written or computer based)
W2	The research equipment needed to measurement of basic physical properties of plant raw materials		Test (written or computer based)
Skills - Student can:			
U1	Determine the physical properties of biomass raw materials and solid fuels		Presentation
Social competences - Student is ready to:			
K1	work individual and in groups during experimental research projects		Presentation

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	<p>The main aim of lectures within the course is to present and discuss topics related to renewable energy sources, especially the conversion of biomass. The lectures will include several main topics of biomass processing: pressure agglomeration process, biogas production, pyrolysis process, the potential of biomass in individual areas, mechanical and physio-chemical properties of biomass and agglomerates, use of binders to improve pellets and briquettes quality, use of agricultural and forest wastes to biomass conversion, methods of biomass conversion into valuable fuels. Moreover, the results of experiments concerning the innovative approach to biomass conversion methods and the use of binders and preprocessing methods will be presented.</p> <p>Workshops will include laboratory tests to determine the physical properties of raw materials and agglomerates: particle size distribution, density, moisture content, calorific value, strength parameters, durability of pellets and briquettes and production of agglomerates on the laboratory scale.</p> <p>Students will take part in laboratory tests carried out according to standards and will prepare a report of their measurements.</p>	W1, W2, U1, K1	Lecture, Laboratory exercises

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture, Conversation lecture, Discussion
Laboratory exercises	Case study, Laboratory (experiment), learning by experiment, Measurement

Activities	Examination method	Percentage
Lecture	Test (written or computer based)	50%
Laboratory exercises	Presentation	50%

Activities	Credit conditions
Lecture	minimum 50% points from the test
Laboratory exercises	positive evaluation of the presentation

Literature

Obligatory

1. Adapa P., Tabil L., Schoenau G. 2009: Compression characteristics of selected ground agricultural biomass.
2. Goldstick T. K. 1962: The Strength of Granules and Agglomerates, Discussion, Agglomeration (W. A. Knepper ed.). Interscience, New York.
3. Hansen M. T., Rosentoft Jein A., Wach E., Bastian M. 2009: The Polish Wood Pellet Handbook. Pelletsatlas.

Calculation of ECTS points

Activity form	Activity hours*
Lecture	20
Laboratory exercises	10
Preparation of a multimedia presentation	30
Preparation for the test	20
Self-study on the content covered in class	20
Student workload	Hours 100
Number of ECTS points	ECTS 4

* hour means 45 minutes