Course name: Alternative sources of energy

ECTS	3
Course status	*optional*
Course final assessment /evaluation of outcomes	credit for evaluation
Prerequisite	non

Main field of study:

Educational profile	general academic
Code of studies and education level	bachelor
Semester of studies	winter
Language of instruction	English

Course offered by:

Name of faculty offering the course	Faculty of Agriculture and Economics
Name of department offering the course	Agroecology and Plant Production
Course coordinator	Agnieszka Synowiec

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands:			
ASE_W1	what energy sources exist and how do they affect the environment	RO1_W18	RR
SKILLS – student is able to:			
ASE_U1	choose appropriate alternative energy sources for the conditions in your region	RO1_U03 RO1_U24	RR
SOCIAL COMPETENCIES – student is ready to:			
ASE_K1	the need for continuous study, due to the very rapid progress in this field of knowledge	RO1_K01	RR

Teaching contents

Lectures	**20 hours**
Topics	Energy situation in Poland and worldwide. Impact of conventional energy sources on the environment (climate change, erosion, acid rain, etc.). Water energy Wind energy Solar energy Geothermal energy Liquid biofuels Gas biofuels Energy crops Possibility of using renewable energy sources in agriculture
Accomplished learning outcomes	*ASE_W1*
Means of verification, rules and criteria of assessment	*Oral exam* *Grade E (2.0) Lack of basic knowledge about energy sources* *Grade D (3.0) Basic knowledge about renewable energy sources* *Grade C (3.5) Basic knowledge about methods of obtaining alternative energy* *Grade B (4.0) Good knowledge of renewable energy sources and methods of obtaining it*

	Grade B + (4.5) Good knowledge of renewable energy sources, methods of obtaining them and using them *Grade A (5.0) The student is proficient in knowledge about alternative energy sources and their use in various situations and needs*

Classes:	**5 hours**
Topics	Project: Calculation of energy value for selected energy crops

Accomplished learning outcomes	*ASE_U1, ASE_K1*
Means of verification, rules and criteria of assessment	*Positive grade from the project*

Field classes:	**5 hours**
Topics	Implemented in plants using renewable energy sources

Accomplished learning outcomes	*ASE_U1, ASE_K1*
Means of verification, rules and criteria of assessment	*Attendance and report from field classes*

References:

Basic	Maczulak, A. E. (2010). Renewable energy: sources and methods. Infobase Publishing.
Supplementary	Klima, K., Puła, J., Synowiec, A., Kliszcz, A., & Lepiarczyk, A. (2019). Biomass yield and calorific value of Multiflora Rose (Rosa multiflora Thunb.) irradiated with laser beams and estimation of CO2 equivalent emission during the extensive cultivation. Journal of Biobased Materials and Bioenergy, 13(3), 424-427.

Structure of learning outcomes

Area of academic study:	3	ECTS

Structure of student activity

Contact hours		38	hrs.	1.5	ECTS**
Including:	lectures	20	hrs.		
	classes and seminars	10	hrs.		
	consultations	5	hrs.		
	participation in research		hrs.		
	obligatory traineeships		hrs.		
	participation in examination	3	hrs.		
e-learning			hrs.		ECTS**
student own work		37	hrs.	1.5	ECTS**

*Areas of academic study in the fields of: H- humanities; S - social studies; P – biological sciences; T – technological sciences; M- medical, sport and health sciences; R – Agricultural, forestry and veterinary sciences; A – the arts

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25 - 30 hours of classes