AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Module name: Environmental risk modeling in energetics

Academic year: 2019/2020 Code: ZSDA-3-0006-s ECTS credits: 4

Faculty of: Szkoła Doktorska AGH

Field of study: Szkoła Doktorska AGH Specialty: —

Study level: Third-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 0

Course homepage: —

Responsible teacher: prof. dr hab. inż. Sobczyk Wiktoria (sobczyk@agh.edu.pl)

Module summary

Implementation of pillars and indicators of sustainable development in conventional and alternative energy. Types of risk in the energy sector. The models used in the risk assessment. Carrying out modeling on a selected example.

Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Social competence: is able to			
M_K001	The student has an insight into international policy for solving ecological problems. The student knows how conventional and unconventional energy affect the environment	SDA3A_K01, SDA3A_W03, SDA3A_K03, SDA3A_W01, SDA3A_K02, SDA3A_U01, SDA3A_U04	Participation in a discussion
M_K002	The student is aware of the need for permanent education in the field of processes occurring in the environment.	SDA3A_K01, SDA3A_K02	
Skills: he can			
M_U001	The student can list trends and strategies in modern energy. The student can observe and document the object of alternative energy	SDA3A_U02, SDA3A_U01, SDA3A_U04	Project

Knowledge: he knows and understands			
M_W001	The student knows how to model the system of interaction of energy systems.	SDA3A_W03	Activity during classes
M_W002	The student knows the basic classifications of energy sources.	SDA3A_W02, SDA3A_W01	Activity during classes

Number of hours for each form of classes

	Form of classes										
Suma	Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
30	10	0	0	20	0	0	0	0	0	0	0

FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes										
		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
Social competence: is able to												
M_K001	The student has an insight into international policy for solving ecological problems. The student knows how conventional and unconventional energy affect the environment	+	-	-	+	-	-	-	-	-	-	-
M_K002	The student is aware of the need for permanent education in the field of processes occurring in the environment.	+	-	-	+	-	-	-	-	-	-	-
Skills: he can												
M_U001	The student can list trends and strategies in modern energy. The student can observe and document the object of alternative energy	+	-	-	+	-	-	-	-	-	-	-
Knowledge: he knows and understands												
M_W001	The student knows how to model the system of interaction of energy systems.	+	-	-	+	-	-	-	-	-	-	-

M_W002	The student knows the basic classifications of energy sources.	+	-	-	-	-	-	-	-	-	-	-

Student workload (ECTS credits balance)

Student activity form	Student workload
Udział w zajęciach dydaktycznych/praktyka	30 h
Preparation for classes	10 h
przygotowanie projektu, prezentacji, pracy pisemnej, sprawozdania	40 h
Realization of independently performed tasks	20 h
Examination or Final test	2 h
Contact hours	2 h
Summary student workload	104 h
Module ECTS credits	4 ECTS

Additional information

Module content

Lectures

The process of shaping the idea of sustainable development. Sustainable development is a determinant for conducting activities in the field of environmental protection. Comprehensive perception of environmental issues
General characteristics of the concept of sustainable development. Ecological and civilization perception of sustainable development. Intra-systematic sustainability – pillars (habits) of sustainable development: economic, ecological, social, and institutional.
Indicators of the pillars of sustainable development and their characteristics
The issue of sustainable development in conventional and alternative energy
The concept of risk analysis. Economic, ecological and health risks
Methods and procedures for assessing environmental and health risks
Decision support systems for risk assessment
Work, energy, heat. Definitions and SI units
Carbon footprint. A reference to the ecological footprint. Carbon dioxide equivalent
Direct and indirect sources of carbon dioxide emissions. How to reduce carbon dioxide emissions? Compensation of carbon dioxide emissions. Measurement of carbon footprints
How can you reduce the carbon footprint. How can you control climate change. Personal CO2 emission calculator.
Resistance of environmental components to the impact of energy

Project classes

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Teaching methods and techniques:
Lectures: lecture, projects, panel discussion, brainstorming
Project classes: project, panel discussion, brainstorming

Warunki i sposób zaliczenia poszczególnych form zajęć, w tym zasady zaliczeń poprawkowych, a także warunki dopuszczenia do egzaminu:
Students will be required to prepare a presentation on ecological engineering topics. Most of the examples will be case studies from around the world to illustrate the application of ecological engineering. Student will also attend an open discussion session. 60% of project classes in the form of e-learning. The project exercise rating takes into account: the activity, the substantive value of the paper and the quality and manner of its presentation.Participation in lectures is not obligatory, however, the activity in lectures can be rewarded by raising the final grade. A prerequisite to take the exam is to provide the reporter with a mandatory project. Passing the project must be obtained on a basic date (one date) until the end of the given semester. It is allowed to pass the exercises in one correction period. Presence on project exercises is obligatory. If the student has left more than 25% of the project exercises, he would not be allowed to pass exam. Excluded absences from classes can be made with another group, but only on the condition of the teacher’s consent.
The exam in the subject takes place in writing and covers the content given in lectures. The exam takes place in one basic and one correction period. Positive rating can not be improved.

Zasady udziału w poszczególnych zajęciach, ze wskazaniem, czy obecność studenta na zajęciach jest obowiązkowa:
Lectures:
– Attendance is mandatory: No
– Participation rules in classes: Participation in the lectures is not obligatory, however, the activity at the lectures can affect the increase of the final grade.
Project classes:
– Attendance is mandatory: Yes
– Participation rules in classes: Presence on project exercises is obligatory. If the student has left more than 25% of the project exercises, he will not be admitted to the exam. Excused absences on exercises can be made up with another group, but only on condition consent of the teacher.

Method of calculating the final grade
The final grade is average grade from tests of the lectures (weight 0.4) and project classes (weight 0.6).

Sposób i tryb wyrównywania zaległości powstałych wskutek nieobecności studenta na zajęciach:
If the student has left more than 25% of the project exercises, he would not be allowed to pass exam. Excluded absences from classes can be made with another group, but only on the condition of the teacher’s consent.
The exam in the subject takes place in writing and covers the content given in lectures. The exam takes place in one basic and one correction period. Positive rating can not be improved.

Prerequisites and additional requirements
Knowledge of the basic laws of physics. Knowledge of mathematics at the technical level of a university.

Recommended literature and teaching resources
Declaration from Rio de Janeiro. in: Final Documents of the United Nations Conference ,, Environment and Development, Rio de Janeiro, June 3-14, 1992, Earth Summit, Warsaw 1993, pp. 13.
Strategy for Sustainable Development of Poland until 2025
Sobczyk W.: Evaluation of harvest of energetic basket willow, TEKA Komisji Motoryzacji i Energetyki Rolnictwa PAN 2011, vol. XI, p. 343-352.

Sobczyk W., Kowalska A.: The techniques of producing energy from biomass. TEKA Commission of Motorization and Energetics in Agiculture PAN 2012, vol. 12,p. 257-261.
Ostrowska A., Sobczyk W., Pawul M.: Evaluation of economic and ecological effects of solar energy use on the example of a single-family home. Annual Set The Environment Protection, Vol. 15, Middle Pomeranian Scientific Society of the Environment Protection, Koszalin 2013. ISSN 1506-218X, p. 2697–2710.
Sobczyk W.: Sustainable development of rural areas. Problems of Sustainable Development 2014, vol. 9, no 1, 119-126.
Sobczyk W., Kowalska A., Sobczyk E.J., 2014: The use of multi-criteria AHP and Leopold’s matrix to assess the impact of gravel-sand deposits on the natural environment of the Jasiołki Valley. Mineral Resources Management, vol. 2, pp. 157-172.
Sobczyk W., Sternik K., Sobczyk E.J., Noga H.: Evaluation of yielding of willow fertilized with sewage sludge. Annual Set The Environment Protection, Vol. 17, Middle Pomeranian Scientific Society of the Environment Protection, Koszalin 2015, p. 1113-1124.
Sobczyk W.: Sustainable development of Middle East Region. Problems of Sustainable Development 2015, vol. 12, no 2, p. 51-62.
Sobczyk W., Gałka P., Nawrocka M.: Performance of sustainable development indexes in alternative power generation as exemplified by biomass. Scientific Papers of the Institute for Mineral Resources and Energy PAN, 2018, 104, pp. 119–130.
Sobczyk W., Poros M. Geoparks and its importance in environmental education and in geotourism in the context of planned post-mining sites reclamation. SCHOLA 2018. Open Online Journal for Research and Education Special Issue Dec. 2018, s. 1-11.

Scientific publications of module course instructors related to the topic of the module

Sobczyk W.: Evaluation of harvest of energetic basket willow, TEKA Commission for the Automotive and Power Industry of Agriculture PAN 2011, vol. XI, p. 343-352.
Sobczyk W., Kowalska A.: The techniques of producing energy from biomass. TEKA Commission of Motorization and Energetics in Agiculture PAN 2012, vol. 12,p. 257-261.
Ostrowska A., Sobczyk W., Pawul M.: Evaluation of economic and ecological effects of solar energy use on the example of a single-family home. Annual Set The Environment Protection, Vol. 15, Middle Pomeranian Scientific Society of the Environment Protection, Koszalin 2013. ISSN 1506-218X, p. 2697–2710.
Sobczyk W., Kowalska A., Sobczyk E.J., 2014: The use of multi-criteria AHP and Leopold’s matrix to assess the impact of gravel-sand deposits on the natural environment of the Jasiołki Valley. Mineral Resources Management, vol. 2, pp. 157-172.
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Sobczyk W., Sternik K., Sobczyk E.J., Noga H.: Evaluation of yielding of willow fertilized with sewage sludge. Annual Set The Environment Protection, Vol. 17, Middle Pomeranian Scientific Society of the Environment Protection, Koszalin 2015, p. 1113-1124.
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Sobczyk W.: Sustainable development of Middle East Region. Problems of Sustainable Development 2015, vol. 12, no 2, p. 51-62.Sobczyk W., Gałka P., Nawrocka M.: Realizacja wskaźników zrównoważonego rozwoju w energetyce alternatywnej na przykładzie biomasy. Performance of sustainable development indexes in alternative power generation as exemplified by biomass. Zeszyty Naukowe Instytutu Gospodarki Surowcami Mineralnymi i Energią PAN, 2018 nr 104, s. 119–130.
Sobczyk W., Poros M. Geoparks and its importance in environmental education and in geotourism in the context of planned post-mining sites reclamation. SCHOLA 2018. Open Online Journal for Research and Education Special Issue Dec. 2018, s. 1-11.

Additional information

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