MODULE DESCRIPTION

Module code	**Z-ZIP-485z**
Module name	**Inżynieria Proekologiczna**
Module name in English	**Pro-ecological Engeeniering**
Valid from academic year	**2016/2017**

A. MODULE PLACEMENT IN THE SYLLABUS

Field of study	**Management and Production Engineering**
Level of education	**1st degree** *(1st degree / 2nd degree)*
Studies profile	**General** *(general / practical)*
Form and method of conducting classes	**Full-time** *(full-time / part-time)*
Specialisation	**Production and Innovations Management**
Unit conducting the module	**The Department of Production Engineering**
Module co-ordinator	**Danuta Gierulska, PhD**
Approved by:	

B. MODULE OVERVIEW

Type of subject/group of subjects	**Specialist subject** *(basic / major / specialist subject / conjoint / other HES)*
Module status	**Compulsory** *(compulsory / non-compulsory)*
Language of conducting classes	**English**
Module placement in the syllabus - semester	**7th semester**
Subject realisation in the academic year	**Winter semester** *(winter semester/ summer)*
Initial requirements	**No requirement** *(module codes / module names)*
Examination	**No** *(yes / no)*
Number of ECTS credit points	**2**

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	**15**			**15**	

C. TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the module is technical and ecological education of students during which they are acquainted with social development planning in its natural environment in order to achieve common benefits for both the society and the environment.

Effect symbol	Teaching results	Teaching methods *(l/c/lab/p/other)*	Reference to subject effects	Reference to effects of a field of study
W_01	A student has basic knowledge as regards development and innovation trends in politics end pro-ecological activity.	l	K_W18	T1A_W05
W_02	A student has basic knowledge of creating and analysing technical documentation with the elements of pro-ecological engineering designing, in particular concerning the subject of saving energy.	l	K_W06	T1A_W04
W_03	A student has basic knowledge as regards making optimal choices of the selected pro-ecological activities (thermomodernisation undertakings).	l	K_W15	T1A_W06
U_01	A student is able to obtain information from the literature on the subject, databases and other sources; a student can also associate the obtained information, make analyses and interpretations, draw conclusions, and formulate as well as justify opinions as regards pro-ecological data.	p	K_U01 K_U06	TA1_U01 TA1_U05
U_02	A student is able to work individually and in a team; a student can estimate time needed to realise a given task; finally, a student is able to set work schedule which guarantees meeting a deadline.	p	K_U02 K_U06	TA1_U02 TA1_U05
U-03	A student can prepare a simple documentation concerning an engineering as well as organisational task; a student is also able to prepare a text containing a discussion of results and a task realisation process in terms of pro-ecological issues.	p	K_U03 K_U06	TA1_U03 TA1_U05
K_01	A student is aware of and understands the significance of connections between engineering and non-technical activities concerning the effects of influencing the environment and he/she is aware of bearing responsibility for his/her own decisions.	l/p	K_K02	T1A_K02
K_02	A student is aware of the responsibility for his/her own work; a student is also able to conform to teamwork principles and bear responsibility for the tasks realised collectively.	l/p	K_K04	T1A_K03 T1A_K04

Teaching contents:

1. Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	Introduction. The targets and tasks of pro-ecological engineering. The principles of pro-ecological engineering. Discussing the subjects and project structures. Thermomodernisation of buildings. Energy-efficient buildings. Passive buildings.	W_01 K_01 W_02 K_02 W_03

2	Thermomodernisation of buildings. The stages of an energy audit. The systems of building insulation. Selecting an optimal thermomodernisation variant.	W_01 K_01 W_02 K_02 W_03
3	Thermomodernisation variants: change of windows and doors; flat roof insulation; and inslutating side walls.	W_01 K_01 W_02 K_02 W_03
4	The prospects of developing the market of renewable energy resources in Poland. The fundamentals of wind energy. General information. A block diagram of producing electric power.	W_01 K_01 W_02 K_02 W_03
5	Small Wind Energy (SWE). The types of turbines. The choice of a turbine depending on electric power demand. Hybrid systems to prepare warm utility water (SWE + solar collectors) – case study.	W_01 K_01 W_02 K_02 W_03
6	Solar collectors. Types, structure, principle of operation, the installation of warm utility water preparation with the use of solar collectors. The principles of designing installations of warm utility water preparation with the use of solar collectors.	W_01 K_01 W_02 K_02 W_03
7	Pro-ecological engineering applications. Case studies illustrating pro-ecological activities of, e.g. “Wawel” (confectionery producer), Elektrociepłownia Kielce (a heat and power plant in Kielce), Cementownia Małogoszcz (a cement plant in Malogoszcz).	W_01 K_01 W_02 K_02 W_03
8	A final test.	

2. Teaching contents as regards classes

Class number	Teaching contents	Reference to teaching results for a module

3. Teaching contents as regards laboratory classes

Laboratory class number	Teaching contents	Reference to teaching results for a module

4. The characteristics of project assignments

Project assignments have been divided into the following focus groups:

1. A project of insulating side walls of a given facility with polystyrene foam/rock wool
2. A project illustrating the choice of an optimal thermomodernisation variant (in the case of the assigned project, the following is taken into consideration: changing windows, insulating side walls and flat roof).
3. A project as regards the installation of warm utility water preparation with the use of solar collectors.

4. A project of a lighting installation with the use of a Small Wind Turbine (SWT).

The subjects of projects can be changed in terms of conformity with the subjects of lectures.
Projects are prepared by teams of 3 students. Projects are diversified by indicating specific data concerning a particular installation.
Prior to receiving acceptance to obtain a credit, projects are consulted during individual meetings with project teams.
Projects obtain a credit on the basis of a submitted work in written and electronic forms as well as checking knowledge during the discussion while submitting the project.

Project class number	Teaching contents	Reference to teaching results for a module
1	Discussing project structure; division into teams; agreeing on subjects.	U_01 K_01 U_02 K_02 U_03
2	Tutorials and a discussion concerning project contents.	U_01 K_01 U_02 K_02 U_03
3	Tutorials and a discussion concerning project contents.	U_01 K_01 U_02 K_02 U_03
4	Tutorials and a discussion concerning project contents.	U_01 K_01 U_02 K_02 U_03
5	Presenting, discussing, and assessing projects.	U_01 K_01 U_02 K_02 U_03
6	Presenting, discussing, and assessing projects.	U_01 K_01 U_02 K_02 U_03
7	Presenting, discussing, and assessing projects.	U_01 K_01 U_02 K_02 U_03
8	A summary and a final discussion.	U_01 K_01 U_02 K_02 U_03

The methods of assessing teaching results

Effect symbol	**Methods of assessing teaching results** *(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)*
W_01	Obtaining a credit on the basis of a test.
W_02	Obtaining a credit on the basis of a test and while submitting a project.
W-03	Obtaining a credit on the basis of a test and while submitting a project.
U_01	Obtaining a credit on the basis of tutorials and project contents.
U_02	Obtaining a credit on the basis of tutorials and project contents.
U-03	Obtaining a credit on the basis of tutorials and project contents.
K_01	Obtaining a credit on the basis of a test and while submitting a project.
K_02	Obtaining a credit on the basis of a test and while submitting a project.

STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	**Student's workload**
1	Participation in lectures	**15**
2	Participation in classes	
3	Participation in laboratories	
4	Participation in tutorials (2-3 times per semester)	
5	Participation in project classes	**15**
6	Project tutorials	**2**
7	Participation in an examination	
8		
9	**Number of hours requiring a lecturer's assistance**	**32** *(sum)*
10	**Number of ECTS credit points which are allocated for assisted work** *(1 ECTS point=25-30 hours)*	**1.2**
11	Unassisted study of lecture subjects	**10**
12	Unassisted preparation for classes	
13	Unassisted preparation for tests	
14	Unassisted preparation for laboratories	
15	Preparing reports	
16	Preparing for a final laboratory test	
17	Preparing a project or documentation	**15**
18	Preparing for an examination	
19		
20	**Number of hours of a student's unassisted work**	**25** *(sum)*
21	**Number of ECTS credit points which a student receives for unassisted work** *(1 ECTS point=25-30 hours)*	**0.8**
22	**Total number of hours of a student's work**	**57**
23	**ECTS points per module** *1 ECTS point=25-30 hours*	**2**
24	**Work input connected with practical classes** *Total number of hours connected with practical classes*	**32**
25	**Number of ECTS credit points which a student receives for practical classes** (1 ECTS point=25-30 hours)	**1.2**

D. LITERATURE

Literature list	1. Alloway B.J., Ayres D.C.; *Chemiczne podstawy zanieczyszczania środowiska,* PWN, Warszawa 1999. 2. Bartkiewicz B., *Ścieki przemysłowe*, Oficyna Wydawnicza PW, Warszawa 2000. 3. Cichy M. J., *Czystsza produkcja i jej model fenomenologiczny,* Gliwice 2007. 4. Holzer M., Grabowska B., *Podstawy ochrony środowiska z elementami zarządzania środowiskiem*, Wydawnictwa AGH, 2010. 5. Johnson A., *Czysta technologia – środowisko, technika, przyszłość*; WNT, Warszawa 1997. 6. Kowal A.L., Świderska-Bróż M., *Oczyszczanie wody,* PWN, 1998. 7. Krebs Ch. J., *Ekologia*, PWN, Warszawa 1997. 8. Łomotowski J., Szpindor A., *Nowoczesne systemy oczyszczania ścieków,*

	ARKADY, 1999. 9. Matlack A.S., *Introduction to green chemistry,* Marcel Dekker, Inc., 2001. 10. Mering L. *Prawo ochrony środowiska,* Wydanie II, LEX, 1998. 11. Namieśnik J., Jaśkowski J., *Zarys ekotoksykologii*, Gdańsk 1995. 12. Warych J. *Oczyszczanie gazów. Procesy i aparatura*, WNT, Warszawa 1998. 13. Wiąckowski S. *Ekologia ogólna*, 1998. 14. Wiąckowski S., *Przyrodnicze podstawy inżynierii środowiska*, Kielce 2000. 15. Zarzycki R., Imbierowicz M., Stelmachowski M., *Wprowadzenie do inżynierii i ochrony środowiska. Cz.1 Ochrona środowiska naturalnego*, WNT, Warszawa 2007. 16. Rozporządzenie Ministra Środowiska z dnia 27 września 2001 r. w sprawie katalogu odpadów, Dz.U. Nr 112, poz. 1206. 17. Ustawa z dnia 27 kwietnia 2001 r. o odpadach, Dz.U. 2001 nr 62 poz. 628. 18. Lewandowski W., *Proekologiczne odnawialne źródła energii,* WNT, Warszawa 2007. 19. Klugman-Radziemska E., *Odnawialne Źródła Energii – przykłady obliczeniowe,* Wyd. Politechniki Gdańskiej, Gdańsk 2006. 20. Poskrobko B., *Zarządzanie środowiskiem,* PWE, 2007.
Module website	