

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Ekologia przemysłowa - wybrane zagadnienia**  
 Name in English: **Industrial ecology - selected problems**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable): **Renewable Energy Sources**  
 Level and form of studies: **2nd level, full-time**  
 Kind of subject: **obligatory**  
 Subject code: **ELR051314**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	15				
Number of hours of total student workload (CNPS):	30				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	1				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	0.70				

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Basic knowledge of biology at the secondary school level.
2. Can efficiently and effectively apply the knowledge from publicly available sources of information.

**SUBJECT OBJECTIVES**

- C1. Knowledge of various aspects of industrial ecology.
- C2. Capability of analysis and recognition of problems related to waste reduction and modeling of industrial processes in accordance with principles of laws of nature.

**SUBJECT LEARNING OUTCOMES***relating to knowledge:*

- PEU\_W01 Knows the basic principles of ecology. Has a basic knowledge of environmental issues and the design of industrial systems modelled on biological systems.
- PEU\_W02 Has knowledge of the science of environmental sustainability and industrial engineering. Knows the tools to analyze the impact of industrial processes on the environment.
- PEU\_W03 Has ordered knowledge of the application of industrial ecology in the business, cost reduction, organizational optimization and integration of new technologies

*relating to skills:**relating to social competences:*

- PEU\_K01 Is aware of the importance and understanding of non-technical aspects and impacts of engineering, including its impact on the environment, and consequently the responsibility for decisions.

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
Lec 1	General presentation of industrial ecology. The role of biodiversification in human activity. Industry as living system within living systems.	2
Lec 2	Capability of imitation of the nature. Fundamental laws of industrial ecology	2
Lec 3	Dynamics of ecosystems, its limitations in industry. Ecological systems and natural systems.	2
Lec 4	Methods and tools of industrial ecology.	2
Lec 5	Industrial metabolism. Modeling of input/output dynamics. Waste prevention, examples	2
Lec 6	New opportunities for administration, policy and regulations, local government, government's role.	2
Lec 7	Strategies and implementation of IE. Decentralized processes, social and economic control. Public/private dialog, research.	2
Lec 8	Test.	1
Total hours:		<b>15</b>

TEACHING TOOLS USED
N1. Lecture using traditional techniques, audiovisual, multimedia presentations, transparencies

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEU_W01 PEU_W02 PEU_W03 PEU_K01	Written test
P(w)	P=F1	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b> [1] Graedel T E, Allenby B.: Industrial Ecology and Sustainable Engineering, Pearson Education, Inc., 2010. [2] Allenby B, Allenby R, Deanna J.: The Greening of Industrial Ecosystems, National Academy Press, Washington, 1994. [3] IEEE White Paper on Sustainable Development and Industrial Ecology, IEEE 1995.
<b>SECONDARY LITERATURE:</b> Literature provided by the lecturer.

SUBJECT SUPERVISOR
Zbigniew Leonowicz, zbigniew.leonowicz@pwr.wroc.pl