COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ecology Industry

Course

Field of study
Management and Production Engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
12

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Faculty of Mechanical Engineering

Piotrowo 3 Str., 60-965 Poznan, Poland

Responsible for the course/lecturer:

Prerequisites

Basic knowledge in field of materials technology, chemistry, and plastics recycling and management.

Course objective

Learning basic problems related to waste management, sustanability and their importance for sustainable civilization development.

Course-related learning outcomes

Knowledge

The student should be able to characterize the basic issues of industrial ecology and recycling. The

student should be able to characterize the methods of ecobalances and describe the principles of eco-design of products. The student should be able to use "clean production" methods.

Skills

The student will be able to evaluate the environmental aspects. The student will be able to analyze the product life cycle and select the techniques of ecobalances. The student will able to design a product or process according to a selected method, taking into account the principles of recycling.

Social competences

The student will be aware of the effects of engineering activities both in the technical and non-technical areas. The student will understand the need for lifelong learning; can inspire and organize the learning process of other people. The student will be aware of the importance of the relationship between the manufacturing processes and the environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Written a test (10 questions), criterion: 3 from 50.1 to 60%, 3.5 from 60.1 to 70%, 4 from 70.1 to 80%, 4.5 from 80.1 to 90.0% and 5 above 90.1% .

Programme content

Introduction to the industrial ecology (history, definitions). The importance of industrial ecology - system analysis. IT tools used in industrial ecology (LCA, MFA). Indicators of environmental loading of polymeric materials. The scope and importance of the methods of eco-indicators. Types of used eco-balances. Environmental Life Cycle Assessment. Eco-technologies in various industries, e.g. municipal waste management, plastics processing. Eco-design of products (rules and legal bases, IPP, EuP, WEEE, RoHS). Environmental labeling of products (role, importance, standards, examples in industrial practice). Cleaner production (principles, examples of industrial implementation).

Teaching methods

Lecture: multimedia presentation. Laboratory exercises: performing exercises, discussion, team work.

Bibliography

Basic

1. Górzyński J.: Podstawy analizy środowiskowej wyrobów i obiektów, Wyd. Naukowo-Techniczne W-wa 2007.

2. Johanson A.: Czysta technologia, środowisko, technika, Wyd. Naukowo-Techniczne W-wa 1997.

3. Jabłoński J.: Technologie zero emisji, Wyd. Politechniki Poznańskiej, Poznań 2011.

Additional

1. Kowalski Z.:Ekologiczna ocena cyklu życia procesów wytwórczych (LCA), PWN, W-wa 2007

2. Antoinettevan Schaik, Markus A.Reuter. Handbook of Recycling, State-of-the-art for Practitioners, Analysts, and Scientists 2014, Pages 307-378.

3. Åkermark AM. (1997) Design for Disassembly and Recycling. In: Krause FL., Seliger G. (eds) Life Cycle Networks. Springer, Boston, MA. https://doi.org/10.1007/978-1-4615-6381-5_20

4. Robert U. Ayres and Leslie W. Ayres, A Handbook of Industrial Ecology. eds. 2002. Edward Elgar Publishing, Northampton, MA

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	35	1,5

[1] delete or add other activities as appropriate