POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Monitoring of the circular economy [S1TOZ1>MGwOZ]

Course

Field of study
Circular System Technologies

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points
3,00

Coordinators	Lecturers
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Prerequisites

The student has basic general knowledge of the circular economy, sustainable development. The student has the ability to obtain the necessary information from literature, laws and regulations and databases.

Course objective

The aim of the lecture is introduction of students with the functioning of the circular economy as a solution to some environmental problems and to discuss issues related to the monitoring of the circular economy in four aspects: production and consumption, waste management, secondary raw materials, as well as competitiveness and innovation.

Course-related learning outcomes

Knowledge:
k_w03 the student has knowledge of mathematics, physics and chemistry necessary to describe the concepts and principles of circular system technology and the characteristics of connections and dependencies between its components.
k_w09 the student knows the techniques and methods of monitoring typical chemical environmental pollutants.

k_w10 the student has knowledge of raw materials, products and processes used in circular system technologies.
k_w11 the student has knowledge of techniques, methods of identification and characterization of main and by-products in circular system technologies.
k_w12 the student has a basic knowledge of the life cycle of products, devices and installations used in circular system technologies.
k_w26 the student knows the basic legal acts concerning the circular economy.

Skills:
k_u01 the student is able to obtain information from literature, databases and other sources related to circular system technologies, also in a foreign language, integrate them, interpret them, and draw conclusions and formulate opinions.
k_u04 the student has the ability to self-study, is able to use source information in polish and a foreign language in accordance with the rules of ethics, reads with understanding, conducts analyzes, syntheses, summaries, critical assessments and correct conclusions.
k_u05 the student correctly uses in the discussion and properly uses the nomenclature and terminology in the field of circular system economy, chemistry, technology and chemical engineering, environmental protection and related disciplines, also in a foreign language.

Social competences:
k_k05 the student objectively assesses the level of his knowledge and skills, understands the importance of improving professional and personal competences adequately to the changing social conditions and the progress of science.
k_k06 the student thinks and acts in an entrepreneurial manner.
k_k09 the student supports the idea of a harmonious, global civilization and economic development, promoting the principles of a circular economy, sustainable development and rational management of natural environment resources on a local and global scale.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Current knowledge control during lectures, checking the knowledge of the subject - assessment in the form of a test. Obtaining at least 51% of the points on the test.

Programme content

The concept of development of the circular economy. Product life cycle. Monitoring of the circular economy in the regulations of the European Union. Selected existing framework for monitoring of the circular economy. A framework for monitoring of the circular economy according to the European Commission. The framework for monitoring of the circular economy according to OECD. Circularity indicators. Set of circular economy indicators for the Polish economy at the regional level.

Course topics

1. The concept of development of the circular economy.
2. Product life cycle.
3. Monitoring of the circular economy in the regulations of the European Union.
4. Selected existing framework for monitoring of the circular economy proposed by:
- European Commission (2018),
- OECD (2017),
- World Bank (2017),
- European Environment Agency (2016),
5. A framework for monitoring of the circular economy according to the European Commission:
a) Production and consumption:
- EU self-sufficiency in raw materials,
- green public procurement,
- waste generation,
- food waste.
b) Waste management:

- total recycling rate,
- recycling rates for individual waste streams.
c) Secondary raw materials:
- the impact of recycled materials on the demand for raw materials,
- trade in raw materials that can be recycled.
d) Competitiveness and innovation:
- private sector investments,
- workplaces
- gross value added
- patents.
5. The framework for monitoring of the circular economy according to OECD:
a) the productivity of the use of raw materials
b) regulations supporting circular transformation
c) exploiting the natural resource base
d) the impact of activities consistent with circular concepts on the quality of people"s lives.
6. Circularity indicators.
7. Set of circular economy indicators for the Polish economy at the regional level:
a) Major (change in the value of assets in the region"s economy, value added, impairment, EU net export)
b) Auxiliary (material consumption, non-renewable energy consumption, drinking water consumption, ratio of household expenditure on repairs and modernization of assets in relation to total consumption expenditure, use of recycled materials in production processes, total weight of waste, weight of food waste)
c) Contextual (environmental footprint, percentage of full-time jobs in industries related to circular concepts in relation to total employment, value of circular public procurement in total public procurement)

Teaching methods

Lecture: multimedia presentation, analysis of examples concerning the monitoring of the circular economy - in the form of a discussion

Bibliography

Basic
Lorek, A. (2018). ZNACZENIE POSTAW I ZACHOWAŃ KONSUMENTÓW W KSZTAŁTOWANIU GOSPODARKI
OBIEGU ZAMKNIĘTEGO. Research Papers of the Wroclaw University of Economics Prace Naukowe Uniwersytetu Ekonomicznego we Wroclawiu, (533).
Górzyński K.: Wprowadzenie do oceny cyklu życia (LCA) – nowej techniki w ochronie środowiska.Inżynieria Środowiska 2006, t. 11, z. 1, 111-113.
Zarębska, J., & Joachimiak-Lechman, K. (2016). Gospodarka o obiegu zamkniętym – rola LCA, szanse, bariery, wyzwania. Logistyka Odzysku, (1 (18)), 41-45.
Additional
Rutkowska, M., & Popławski, Ł. (2017). Model zrównoważonej gospodarki o obiegu zamkniętym. Studia i Prace WNEiZ US, (47 T. 2. Problemy współczesnej ekonomii), 119-128.
Rosik-Dulewska, C. (2007). Podstawy gospodarki odpadami. Wydawnictwo Naukowe PWN.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	37	1,50