

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Zaawansowane metody w oczyszczaniu wody i ścieków
Name of the course in English	Advanced methods in water and wastewater treatment
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Elective
Field of education	Engineering and Technology
Discipline of education	Environmental engineering, ,mining and power engineering
Person responsible for the course Contact	Małgorzata Cimochowicz-Rybicka, <i>doctor hab.</i> , MSc in Eng., professor of CUT mcrybicka@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical class	Laboratory	Computer Laboratory	Project class	Seminar
3	G	15	0	0	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Introduction to the modern technologies in water treatment, wastewater treatment, treatment of wastewater sludge.
Objective 2	Introduction to the development trends of facilities and equipment in selected sectors of the municipal economy.
Objective 3	Acquiring the ability to critically choose the right solution to a problem in the municipal economy.

Learning Outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUT SD	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student knows the modern technological solutions for water and wastewater treatment, and wastewater sludge processing.	E_W01 E_W02	Involvement in class activities, written test
EUW2	The doctoral student knows the methods and solutions minimizing the impact of water and wastewater infrastructure on the environment	E_W01 E_W02	Involvement in class activities, written test
OUTCOMES RELATED TO SKILLS			

EUU1	The doctoral student is able to identify properly technological solutions for water and wastewater infrastructure in the municipal economy.	E_U01	Involvement in class activities, discussion, test
EUU2	The doctoral student is able to critically identify appropriate conventional and unconventional solutions in selected sectors of municipal infrastructure.	E_U01	Involvement in class activities, discussion, test
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is prepared to refer to the issues known in the literature: related to modern technologies of water and wastewater treatment, related to the principles of circular economy.	E_K01 E_K03	Discussion, test

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE/ PRACTICAL CLASS			
W1	Circular economy in selected sectors of municipal economy - development trends	EUU1, EUW2 EUU2	3
W2	By-products of water treatment - directions and trends. Micropollutants in water and their minimization.	EUW1, EUU1, EUK1	4
W3	Development trends of small wastewater treatment facilities. Highly efficient phosphorus removal and recovery in wastewater treatment processes.	EUW2, EUU12 EUK1	4
W4	Directions of formal changes in waste / sludge management. Modern methods of final technological waste management.	EUU2, EUK1	4

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH THE ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	1
HOURS WITHOUT THE PARTICIPATION OF THE ACADEMIC TEACHER	
Independent study of the course contents	8
Preparation of a paper, report, project, presentation, discussion	4
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Knowledge of basic processes in water and wastewater technology, treatment of wastewater sludge
2	Knowledge of the English language

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	Minimum 75% attendance in class.
2	Written test
METHOD OF THE FINAL GRADE CALCULATION	
	Credit assigned on the grounds of the result from the written test, which admits only the students whose attendance is minimum 75%

Additional information

None

The course reading list

1	Textbooks, studies on the subjects such as: water and wastewater technology, methods of sludge treatment, problems of circular economy in the water and wastewater sector of municipal management - the list provided during the first class. Nawrocki J. - Water treatment, part. 1 and 2, 2010 Metcalf i in. – Wastewater Engineering, treatment and resource recovery, 2014 Henze M. i in. – Biological wastewater treatment, 2008 Heidrich Z. - Anaerobic stabilization of sewage sludge, 1999
2	Materials from conferences, scientific seminars, symposiums, webinars, publications and scientific studies - the list is given during the classes