COURSE DESCRIPTION CARD - SYLLABUS

Course name
Water and wastewater treatment technologies [S1TCh2>TUWiOŚ]

Course

Field of study
Chemical Technology

Year/Semester
4/7

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

2,00

Coordinators

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Lecturers

Prerequisites

The student: has basic knowledge of general, inorganic, organic and analytical chemistry resulting from the previous course in the I, II and III year of engineering studies. Has basic skills in general, inorganic, organic and analytical chemistry resulting from the previous course in the I, II and III year of engineering studies and is aware of the important role of water treatment for the environment with regard to the growing deficiencies of this life-giving substance.

Course objective

The purpose of the subject is to acquire basic knowledge in the field of different methods of water treatment and wastewater treatment.

Course-related learning outcomes

Knowledge:
W1. Has detailed knowledge regarding water and wastewater quality indicators and the consequences of exceeding them. K_W03, K_W07
W2. Has knowledge related to the use of physical and chemical methods for water and wastewater treatment. K_W08

W3. Has knowledge regardring designing tap water treatment systems. K_W15
W4. Has knowledge about the construction and operation of municipal and industrial sewage treatment plants. K_W17
W5. He knows the methods of disposal and management of sewage sludge. K_W07

Skills:
Student: gains knowledge and skills in the field of water treatment and wastewater treatment methods and processes:
U1 - the student knows the rules for the selection of wastewater treatment processes depending on the type of contaminants contained, knows the basic technologies using mechanical, chemical, membrane and biological methods. K_U01, K_U16
U2 - Can plan basic technological research on water and sewage. K_U03, K_U33
U3 - Can assess the efficiency of sewage treatment systems. K_04,
U4 - Can propose a block technological scheme for surface, underground and wastewater treatment. K_U08
U5 - Can critically analyze various water treatment options and the possibilities of using new techniques and technologies. K_030

Social competences:
K1. Student broadens the awareness regarding the importance of water treatment and wastewater treatment technologies in environmental aspects and quality of life. K_01
K2. He knows the legal, financial, social and ecological consequences of exceeding the indicators of water and wastewater quality. K_01
K3. Has a sense of great responsibility for decisions related to the state of the environment. K_02

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Final colloquium. It is also possible to gain points during the lecture which affect the final grade.

Programme content

Issues concerning basic knowledge in the field of different methods of water treatment and wastewater treatment.

Course topics

1. Properties of water and concepts of its creation on Earth.
2. Characteristics of waters and sewage.
3. Physical, chemical and biological indicators of water quality.
4. Surfactants as the main source of synthetic organic carbon in surface waters.
5. Biological and non-biological processes applied in water and wastewater treatment (neutralization, coagulation, flocculation, sedimentation, filtration, adsorption, oxidation processes, disinfection).
6. Water treatment technologies.
7. Wastewater treatment technologies.
8. The role of biological processes in wastewater treatment.
9. Construction and operation of a typical municipal sewage treatment plant.
10. Processes of neutralization and management of sewage sludge.
11. Household sewage treatment plants.

Teaching methods

Interactive lecture - students have the opportunity to ask questions, discuss and express their opinions during the lecture. Practical presentation of instruments for assessing water quality. Simple practical tests to assess water quality. Virtual tour of the classic wastewater treatment plant (Central Sewage Treatment Plant in Koziegłowy).

Bibliography

Basic:
1. Z. Dymaczewski, Poradnik eksploratora oczyszczalni ścieków, PZIITS, 2012.

2. A.Bauer, G.Dietze, W.Mueler, K.J.Soine, D.Weideling, Poradnik eksploatatora systemów zaopatrzenia w wodę, Wydawnictwo Seidel Przywecki, 2005.
2. J. Beler, A. Stein, H. Teichmann, Zaawansowane metody oczyszczania ścieków, Oficyna Wydawnicza Projprzem-EKO, Bydgoszcz, 1997.
3. A. Anielak, Chemiczne i fizykochemiczne oczyszczanie ścieków, Wydawnictwo Naukowe PWN, Warszawa, 2000.
4. A. L. Kowal A.L., M. Świderska-Bróż, Oczyszczanie wody, Wydawnictwo Naukowe PWN, Warszawa, 2009.

Additional:
Current publications and reports in the field of surface water treatment, sewage and water treatment.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00