COURSE DESCRIPTION CARD - SYLLABUS

Course name
Environmental engineering [S1IChiP1>IŚ]

Course

Field of study
Chemical and Process Engineering

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr hab. Małgorzata Osińska
malgorzata.osinska@put.poznan.pl

Lecturers

Prerequisites

The student should have background in analytical chemistry. The student should have background in analytical physical chemistry and chemical kinetics. The student should know the basic chemical apparatus. The student should know and use English. The student should be able to implement self-learning. The student should understand the need for further self-learning and teaching of other people (students).

Course objective

To introduce students to current aspects of environmental protection (air, water and soil) as well as modern methods of pollution prevention and removal, as well as their recycling and disposal. To introduce students to selected aspects of engineering projects in the field of waste water disposal and energy production.

Course-related learning outcomes

Knowledge:
1. student knows the principles of environmental protection engineering related to chemical production and waste management - [k_w08]
2. student has general knowledge necessary to understand social, economic, legal and other non-

technical conditions of engineering activities - [k_w16]

Skills:
1. the student is able to obtain information from literature, databases and other sources related to chemical and process engineering, also in a foreign language, integrate, interpret and draw conclusions and form opinions [k-u01]
2. the student has the ability to self-study [k-u05]
3. student is able to use the principles of saving raw materials and energy, and through modernization of equipment and processes obtains favorable economic indicators and reduction of environmental load [k-u14]

Social competences:
1. the student understands the need for further training and improving their professional and personal competences [k_k01]
2. the student is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the environment and the associated responsibility for the decisions taken [k_k02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lectures end with a written exam about understanding the whole material and the ability to draw conclusions from this knowledge. The exam is a single-choice test.

Programme content

Current aspects of environmental protection.

Course topics

The structure and functioning of the ecosystem, global aspects of anthropopressure on the environment, threat to ecological balance, environmental cleanliness, ecological standards. Water and sewage management, sewage sludge management. Equipment and engineering developments in the operation of sewage treatment plants. Types, properties and strategies of waste management in the aspect of environmental nuisance and possibilities of their utilization and neutralization. International waste trading. Soil contamination and remediation. Origin, condition and effects of air pollutants. Legal bases for air purity protection in Poland. Methods for reducing emissions to the atmosphere. Exhaust gas treatment. Objectives and tasks of environmental monitoring. International cooperation in the field of environmental protection. Environmental pollution and human health. Energy and the state of the environment. Power engineering - apparatus and engineering solutions in the operation of power plants.

Teaching methods

1. Lecture: multimedia presentation.

Bibliography

Basic
1. „Oczyszczalnie ścieków i ich eksploatacja” Łukasz Karamus, Wydawnictwo KaBe Krosnno, 2017;
2. „Elementy budownictwa ochrony środowiska” Stanisław Pisarczyk, Oficyna Wydawnicza Politechniki Warszawskiej, 2008;
3. „Gospodarka osadami ściekowymi i uciążliwości w małych i średnich oczyszczalniach ścieków” J. B. Bień, M. Gałwa-Widera, T. Kamizela, M. Kowalczyk, K. Wystalska, Wydawnictwo Politechniki Częstochowskiej, Częstochowa, 2016;
4. „Komunalne osady ściekowe – zagospodarowanie energetyczne i przyrodnicze”, J. B. Bień, M. Kacprzak, T. Kamizela, M. Kowalczyk, E. Neczaj, T. Pająk, K. Wystalska, Wydawnictwo Politechniki Częstochowskiej, Częstochowa, 2015;
5. „ Elektrownie” Maciej Pawlik, Franciszek Strzelczyk, Warszawa, WNT, 2012;
8. „Maszynoznawstwo energetyczne”, Z. Gnutek, W. Kordylewski, Oficyna Wydawnicza Politechniki

Wrocławskiej, 2003;
9. „Nowoczesne elektrownie jądrowe”, Jerzy Kubowski, WNT, Warszawa, 2010.
Additional
1. Gospodarowanie zasobami środowiska. Podstawy ekonomiki ochrony środowiska, M. Wąsowicz, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2011;
2. Kierunki przeróbki i zagospodarowania osadów ściekowych, Praca zbiorowa, Wydawnictwo Seidel-Przywecki, Warszawa, 2010.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,20
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,80