SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO

Water and Wastewater Technology

Educational subject description sheet

Basic information

Field of study
Course Offer for exchange students - second cycle studies, including uniform master studies (MA programmes)

Speciality
-

Organizational unit
Course Offer for exchange students

Study level
second cycle studies, including uniform master studies (MA programmes)

Study form
full-time studies

Education profile
General academic

Didactic cycle
2024/25

Subject code
PWMPWM2S_D.B100000.06412.24

Lecture languages
english

Mandatory
Elective subjects

Block
Basic subjects

Disciplines

Coordinator	Magdalena Michel
Teacher	Magdalena Michel, Mostafa Azizi

Period	**Examination**	**Number of ECTS points**
Winter semester	Exam/pass with grade **Activities and hours** Laboratory exercises: 32 Project exercises: 20 Field exercises: 8	5

Goals

Code	Goal
C1	The course includes content related to technologies of water and wastewater treatment. The computational-project classes present the basic calculation methods, the requirements and limitations for water and wastewater in municipal and industrial systems and the design methodology of devices of technological systems for water and wastewater treatment. During laboratory classes, experiments are carried out on individual technological water and wastewater treatment processes. The characteristics of water and wastewater treatment unitary processes are performed. The experiments are focused on optimization of the efficiency of purification and characterizing the basic properties of water and wastewater. The results of the experiments are related to technological systems of water and wastewater treatment. During field classes, students visit technological systems of water supply stations and wastewater treatment plants.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	requirements and limitations for water and wastewater in municipal and industrial systems		written reports
W2	the unitary processes of water and wastewater treatment		written reports
Skills – Student can:			
U1	perform basic measurements characterizing water and wastewater and conduct experimental research on the selected treatment process		written reports
U2	do the calculations of chemicals doses, pollution loads and equivalent population		written reports
U3	do the calculations and design of devices for water and wastewater treatment lines		written reports
Social competences – Student is ready to:			
K1	form the opinions on technologies used at water supply stations and wastewater treatment plants and providing the public with reliable knowledge in this regard		written reports

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	The requirements and formal limitations of potable and industrial water supply as well as municipal and industrial wastewater discharging. Water and wastewater quality parameters. Calculations of chemicals doses, pollution loads, and equivalent population. Calculations and design of devices for water and wastewater treatment lines, e.g., sedimentation tanks, filters, chemical reactors, bioreactors, and ion exchange units. Characteristics of basic unit processes of water and wastewater treatment, i.e. sedimentation, filtration, flotation, neutralization, coagulation, iron removal and manganese removal, adsorption, ion exchange, disinfection, activated sludge and biofilm processes, nutrients removal, and membrane processes. Technological systems of water supply stations and wastewater treatment plants – case studies. Health and safety regulations and order regulations in force in the laboratory.	W1, W2, U1, U2, U3, K1	Laboratory exercises, Project exercises, Field exercises

Course advanced

Activities	Methods of conducting classes
Laboratory exercises	Discussion, Teamwork, Interpreting the results, Laboratory (experiment), learning by experiment, Observation, Measurement
Project exercises	Case study, Design method, Repetitive method
Field exercises	Case study, Field measurements, Field observations

Activities	Examination method	Percentage
Laboratory exercises	written reports	40%
Project exercises	written reports	40%
Field exercises	written reports	20%

Activities	Credit conditions
Laboratory exercises	written reports
Project exercises	written reports
Field exercises	written reports

Literature

Obligatory

1. 1. Hendricks, David. 2011. Fundamentals of Water Treatment Unit Processes: Physical, Chemical, and Biological. Boca Raton, Florida, London, [England]: IWA Publishing : CRC Press.
2. Cheremisinoff, Nicholas P. 2002. Handbook of water and wastewater treatment technologies. Boston: Butterworth-Heinemann.
3. Jeguirim, Mejdi, i Salah Jellali. 2021. Wastewater Treatment, Valorization and Reuse. Basel, Switzerland: MDPI - Multidisciplinary Digital Publishing Institute
4. Letterman, Raymond D., i American Water Works Association, red. 1999. Water quality and treatment: a handbook of community water supplies. 5th ed. New York: McGraw-Hill.

Optional

1. legal acts
2. research articles

Calculation of ECTS points

Activity form	**Activity hours***
Laboratory exercises	32
Project exercises	20
Field exercises	8
Preparation for exercises	30
Preparing a report	30
Self-study on the content covered in class	15
Student workload	**Hours** 135
Number of ECTS points	**ECTS** 5

* hour means 45 minutes