KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title

Advanced processes in environment protection

ECTS code

13.3.1212

Name of unit administrating study

null

Studies

faculty	field of study		
Faculty of Chemistry	Chemical Business	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Chemistry	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Environmental Protection	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all

Teaching staff

prof. dr hab. Ewa Siedlecka

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes, Lecture

The realization of activities

lectures in the classroom

Number of hours

Lecture: 10 hours, Laboratory classes: 20 hours

ECTS credits

4
Lecture – 10h
Laboratory classes – 20 h
tutorial classes – 5 h
student's work – 65 h

Total – 100 h – 4 ECTS

The academic cycle

2022/2023 winter semester

Type of course

an elective course

Language of instruction

english

Teaching methods

- chemical experiments, analysis of obtained results, presentation and discussion
- multimedia-based lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

exam with open and closed questions

The basic criteria for evaluation

Lecture: a positive note from an exam with open and closed questions, positive note from the laboratory classes
Laboratory classes: a positive note from all reports and its presentation

91-100%:	5.0
81-90%:	4.5
71-80%:	4.0
61-70%:	3.5
51-60%:	3.0
< 51%:	2.0

Method of verifying required learning outcomes

Lecture: a written exam consisting of open questions covering the issues presented during the lectures; students solve problems (oral answer) in the field of lecture subject.
Laboratory classes: written reports during the laboratory exercises, the student solves problems in writing (reports) or oral (oral answer) related to the topic.
The method of verifying the acquisition of skills: Assessment of the student's involvement in discussions on the issues related to the subject. Assessment of independent conducting of chemical experiments by the student. Evaluation of the student's explanation of the course of chemical experiments, assessing the correctness of the analysis of the results, drawing conclusions from the experiments, and preparing reports.
The method of verifying the acquisition of social competencies: Assessment of the student's ability to solve scientific and research problems based on individual and teamwork.

Required courses and introductory requirements

A. Formal requirements
lack

B. Prerequisites
lack

Aims of education

presenting fundamental issues connected with advanced processes applied in synthesis
introducing basic issues related to advanced processes involved in environmental protection
familiarise students with aspects of water treatment and waste disposal methods
familiarise students with the commonly used experimental methods and data processing

Course contents

Advanced processes in the synthesis: production of fuels and polymers from waste as technologies ensuring sustainable development of society, synthesis of biodegradable materials, selective synthesis assisted by electromagnetic radiation. Advanced processes in environmental protection: water treatment, water disinfection, pharmaceuticals and microplastics removal, application of biological membrane reactors, electrochemical oxidation, and ozonation as a method of removing micropollutants or water disinfection, the Fenton method for the disposal of hazardous waste.

Bibliography of literature

Literature required to pass the course
instructions for laboratory exercises prepared by the teachers
scientific articles indicated by the teachers

The learning outcomes (for the field of study and specialization)

Chemical Business:
K_BChII_W01 knows and understands in-depth complex physicochemical processes and is able to analyse their coursee in connection with other fields of science
K_BChII_W06 knows and understands tasks in the field of chemistry, environmental protection and economics that are the subject of human activity to a degree that allows independent work on a research, scientific and measurement position
K_BChII_U03 is able to present, based on the current state of knowledge, scientific discoveries and the results of own research in the field of chemical and economic sciences, through skilful debate and public speeches
K_BChII_U05 is able to choose and apply, based on the literature achievements of chemical sciences in Polish and English, appropriate methods and tools to solve problems in chemistry and related sciences
K_BChII_K03 s willing to critically assess the level of his/her own knowledge in the light of the achievements of the studied scientific discipline

Chemistry:
K_W07 selects experimental and theoretical techniques to the extent necessary to understand the description and modelling of extended complexity chemical processes
K_W11 demonstrates in-depth knowledge about the current trends in the development of chemistry as a science and

Knowledge

Students: describing fundamental issues connected with advanced processes applied in synthesis and industrial production; classifying advanced processes involved in environmental protection; describing advanced processes of water and waste treatment

Skills

Students: propose the solutions to environmental problems connected with anthropogenic pollutants reduction; present plainly – in both speech and writing – correct chemical argumentation; present and explain advanced environmental protection processes, interpret and analyse information connected with environmental protection; explain relations between the environment pollution and proposed treatment method; explains the course of various phenomena occurring in the environment with the use of chemical knowledge in correlation with other sciences;

Social competence

Students: understand the need for learning, inspire others for learning; cooperate in a group, taking different roles; exhibit creativity in the determination of priorities necessary for the realisation of various tasks; understand social aspects of practical use of knowledge and abilities as well as connected with their responsibility

the latest discoveries in this field K_U01 plans and implements chemical experiments of extended complexity K_U06 presents the results of scientific discoveries in chemistry and related disciplines in an understandable way K_K01 knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so **Environmental Protection:** K_OŚII_W03 characterises the effects of human interference in the natural environment and explains the mechanisms of reaction of living organisms to its pollution K_OŚII_W05 describes in an in-depth manner development directions and the latest discoveries in the field of scientific disciplines related to environmental protection K_OŚII_U01 on the basis of the acquired knowledge, proposes to solve environmental problems K_OŚII_U03 plans and performs research tasks in the field or laboratory and interprets research results on environmental issues (working individually or in a team assuming various roles, including managerial functions) K_OŚII_K02 recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work K_OŚII_K06 recognises the importance of knowledge in solving encountered cognitive and practical problems and consults experts in the event of difficulties in solving a problem on her/his own	

Contact

ewa.siedlecka@ug.edu.pl