UNIWERSYTET IM. ADAMA MICKIEWICZA W POZNANIU

Chemical technology

Educational subject description sheet

Basic information

Study programme Chemistry **Speciality** - **Organizational unit** Faculty of Chemistry **Study level** Second-cycle programme **Study form** Full-time **Education profile** General academic	**Didactic cycle** 2024/25 **Subject code** 02CHSS.21P.00975.24 **Lecture languages** English **Course type** Obligatory **Block** Basic subjects

Subject coordinator	Maciej Trejda
Lecturer	Maciej Trejda, Ewa Janiszewska, Agnieszka Held

Period	**Activities and hours**	**Number of ECTS points**
Semester 1	• Lecture: 15, Exam; including sub-activities: ◦ Synchronous lecture: 15 • Field classes: 15, Graded credit • Laboratories: 30, Graded credit	7

Goals

Code	Goal
C1	The aim of the course is detail presentation of common and modern technological processes related to the transformation of raw materials and production of different chemicals agents and substrates.

Entry requirements

No prerequisites required.

Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
Knowledge – Student:			
W1	knows and understands the main processes used in chemical technology.	CHS_K2_W01, CHS_K2_W08	Written exam, Written colloquium, Test
W2	knows and understands the analytical techniques used in chemical technology to resolve research problem.	CHS_K2_W07, CHS_K2_W08	Written exam
W3	knows and understands terminology and nomenclature typical for chemical technology.	CHS_K2_W01, CHS_K2_W08	Written exam, Written colloquium
W4	knows and understands traditional and novel processes used in chemical technology.	CHS_K2_W08	Written exam, Written colloquium, Test, Report
Skills – Student:			
U1	is able to enumerates and describes the main processes used in chemical technology.	CHS_K2_U04, CHS_K2_U11	Written exam, Written colloquium
U2	is able to selects and applies the analytical techniques used in chemical technology to resolve research problem.	CHS_K2_U02, CHS_K2_U06	Written exam, Test
U3	is able to uses terminology and nomenclature typical for chemical technology.	CHS_K2_U01, CHS_K2_U04	Written exam
U4	is able to describes and explains traditional and novel processes used in chemical technology.	CHS_K2_U11, CHS_K2_U14	Written exam, Written colloquium, Report
U5	is able to selects the proper reagents for technological processes in order to obtain a target product.	CHS_K2_U03, CHS_K2_U11	Test
U6	is able to uses a different literature data to enlarge his/her knowledge concerning chemical technology and well as to resolve research problems.	CHS_K2_U08, CHS_K2_U13	Report
U7	is able to performs a critical evaluation of research results, draws the conclusions and prepares the research report.	CHS_K2_U07, CHS_K2_U12	Report
U8	is able to applies the principle of occupational health and safety in the laboratory.	CHS_K2_U15	Observation
Social competences – Student:			
K1	is ready to apply critical evaluation of research results.	CHS_K2_K02	Written exam

Study content

No.	Course content	Subject learning outcomes	Activities
1.	Occupational health and safety in the laboratory.	U8	Laboratories
2.	Processes of inorganic technology (production of sulphur, nitrogen and phosphorus compounds).	W1, W3, W4, U1, U3, U4, U6	Lecture, Synchronous lecture

No.	Course content	Subject learning outcomes	Activities
3.	Processing of fossil fuels.	W1, W3, W4, U1, U3, U4, U6	Lecture, Synchronous lecture
4.	Processes of organic chemistry (production of methanol, aldehydes, epoxides).	W1, W3, W4, U1, U3, U4, U6	Lecture, Synchronous lecture
5.	Processes based on renewable sources (biofuels, biofuel' additives, valuable chemicals).	W1, W3, W4, U1, U3, U4, U6	Lecture, Synchronous lecture
6.	Ecological aspects of chemical technology.	W1, W3, W4, U1, U3, U4, U6	Lecture, Field classes, Synchronous lecture
7.	Analytical techniques used to design and control technological processes (chemical, spectral and chromatographic).	W2, U2, U6	Laboratories
8.	Conducting of technological processes in laboratory scale.	U2, U5, U7, U8, K1	Laboratories

Additional information

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues
Field classes	Demonstration and observation
Laboratories	Laboratory method

Activities	Credit conditions
Lecture	The exam will be in written form (open question and test). Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 92.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 84% to 91.9%. • good (4.0): achievement of student learning outcomes 76% to 83.9%. • average (3.5): achievement of student learning outcomes 68% to 75.9%. • satisfactory (3.0): attainment of the student learning outcomes within 60.0% - 67.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 60.0%.
Field classes	The report is necessary to pass the field classes. Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 92.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 84% to 91.9%. • good (4.0): achievement of student learning outcomes 76% to 83.9%. • average (3.5): achievement of student learning outcomes 68% to 75.9%. • satisfactory (3.0): attainment of the student learning outcomes within 60.0% - 67.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 60.0%.

Activities	Credit conditions
Laboratories	Occupational health and safety - formative assessment. The final grade is the average of the grades obtained from individual exercises, and each of the exercises must be passed with a positive grade. Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 92.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 84% to 91.9%. • good (4.0): achievement of student learning outcomes 76% to 83.9%. • average (3.5): achievement of student learning outcomes 68% to 75.9%. • satisfactory (3.0): attainment of the student learning outcomes within 60.0% - 67.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 60.0%.

Literature

Obligatory

1. A. Jess, P. Wasserscheid „Chemical Technology", John Wiley & Sons. Inc., 2013. (selected paragraphs)

Optional

1. C. H. Bartholomew, R. J. Farrauto „Fundamentals of Industrial Catalytic Processes", John Wiley & Sons. Inc., 2005. (selected paragraphs)
2. R. A. van Santen, M. Neurock „Molecular Heterogeneous Catalysis – A conceptual and Computational Approach", Wiley-VCH, 2006. (selected paragraphs)
3. J. M. Thomas, W. J. Thomas „Principles and Practice of Heterogeneous Catalysis", Wiley-VCH, Second Edition, 1997. (selected paragraphs)

Calculation of ECTS points

Activities	Activity hours*
Lecture	15
Field classes	15
Laboratories	30
Reading the indicated literature	30
Preparation for classes	45
Preparation for the exam	60
Report preparation	15
Student workload	**Hours** 210
Number of ECTS points	**ECTS** 7

* academic hour = 45 minutes

Efekty uczenia się dla kierunku

Kod	Treść
CHS_K2_K02	The graduate is ready to evaluate the collected information critically
CHS_K2_U01	The graduate can use chemical terminology consistent with IUPAC recommendations
CHS_K2_U02	The graduate can analyze the physicochemical properties of substances based on the selection of appropriate methods and tools
CHS_K2_U03	The graduate can carry out chemical processes including the selection of reagents and purification of products
CHS_K2_U04	The graduate can interpret technological diagrams and carry out technological processes on a laboratory scale
CHS_K2_U06	The graduate can use analytical and instrumental techniques to describe the qualitative and quantitative interpretation of chemical phenomena
CHS_K2_U07	The graduate can prepare a final report on conducted research projects and conduct a critical analysis of experiments
CHS_K2_U08	The graduate can find and use information obtained from databases and literature resources in order to plan and carry out a research project
CHS_K2_U11	The graduate can present a complex chemical or physicochemical problem and propose a solution
CHS_K2_U12	The graduate can draw conclusion properly and evaluate critically on the basis of data from self-conducted chemical or physicochemical experiments and literature resources
CHS_K2_U13	The graduate can deepens his specialistic knowledge to the extent necessary to solve and interpret the undertaken problem correctly
CHS_K2_U14	The graduate can express in an accessible way the acquired knowledge, conduct a debate and present the results of scientific projects in chemistry
CHS_K2_U15	The graduate can work in a group, performing various roles, including a leader
CHS_K2_W01	The graduate knows and understands selected advanced issues in the field of chemistry
CHS_K2_W07	The graduate knows and understands classifies advanced laboratory, analytical and instrumental techniques used in chemistry
CHS_K2_W08	The graduate knows and understands advanced chemical technology processes