



UNIwersYTET
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W POZNANIU

Physical chemistry

Educational subject description sheet

Basic information

Study programme Chemistry	Didactic cycle 2023/24
Speciality -	Subject code 02CHSS.22P.00982.23
Organizational unit Faculty of Chemistry	Lecture languages English
Study level Second-cycle programme	Course type Obligatory
Study form Full-time	Block Basic subjects
Education profile General academic	
Subject coordinator	Andrzej Molski
Lecturer	Andrzej Molski, Marta Waligórska
Period Semester 2	Activities and hours • Lecture: 15, Exam • Laboratories: 30, Graded credit
	Number of ECTS points 5

Goals

Code	Goal
C1	To familiarize with the terminology and concepts from selected fields of advanced physical chemistry.
C2	To develop the ability to apply the terminology and concepts of physical chemistry in natural sciences.
C3	To develop skills necessary for the measurements of physicochemical quantities.
C4	To develop the ability to interpret quantitatively the results of physicochemical experiments.
C5	To develop the ability to present, report and discuss experimental data.
C6	To develop skills necessary for the modelling of physicochemical phenomena.
C7	To develop skills necessary for the visualization of physicochemical phenomena.

Entry requirements

No prerequisites required.

Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
Knowledge - Student:			
W1	knows and understand selected topics in advanced physical chemistry.	CHS_K2_W01, CHS_K2_W02	Written exam, Written colloquium, Oral colloquium
Skills - Student:			
U1	is able to analyse the results of laboratory experiments and prepare reports.	CHS_K2_U01, CHS_K2_U06, CHS_K2_U07, CHS_K2_U11, CHS_K2_U13, CHS_K2_U14	Report
U2	is able to carry out physicochemical calculations and interpret their results.	CHS_K2_U05, CHS_K2_U06, CHS_K2_U07, CHS_K2_U11, CHS_K2_U14	Written colloquium, Oral colloquium, Report
U3	is able to use the measuring equipment to run physicochemical experiments.	CHS_K2_U03, CHS_K2_U06	Written colloquium, Oral colloquium
U4	is able to present selected topics of advanced physical chemistry.	CHS_K2_U01, CHS_K2_U02, CHS_K2_U07, CHS_K2_U08, CHS_K2_U10, CHS_K2_U12, CHS_K2_U15	Written exam, Written colloquium, Oral colloquium, Report
Social competences - Student:			
K1	is ready for group work and for promoting and observing professional ethics in their own and others' activities.	CHS_K2_K03, CHS_K2_K04	Oral colloquium, Report

Code	Outcomes in terms of	Learning outcomes	Examination methods
K2	is ready to participate in group discussions and shows respect for other participants views.	CHS_K2_K01, CHS_K2_K02, CHS_K2_K03, CHS_K2_K04	Written colloquium, Oral colloquium, Report
K3	is ready to recognize and bring out physicochemical aspects in natural sciences.	CHS_K2_K01, CHS_K2_K02	Written exam, Written colloquium, Oral colloquium, Report

Study content

No.	Course content	Subject learning outcomes	Activities
1.	Kinetics of physicochemical processes.	W1, U1, U2, U3, U4	Lecture, Laboratories
2.	Equilibria of physicochemical processes.	W1, U1, U2, U3, U4	Lecture, Laboratories
3.	Modelling and visualization of physicochemical processes.	U4, K2, K3	Lecture, Laboratories
4.	Analysis of physicochemical data.	U1, U2, U4, K1, K2	Lecture, Laboratories

Additional information

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues
Laboratories	Solving tasks (e.g. computational, artistic, practical), Laboratory method, Research method (scientific inquiry), Demonstration and observation, Work in groups

Activities	Credit conditions
Lecture	<p>The final grade will be assigned based on a written exam and the lab grade. You need to pass the lab in order to pass the course. Additional points will be added to the exam score (but not to retake exams!) for positive lab grades.</p> <p>Grading scale with applied percentage distribution:</p> <ul style="list-style-type: none"> • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%. • good (4.0): achievement of student learning outcomes 70.0% - 79.9%. • average (3.5): achievement of student learning outcomes 60.0% - 69.9%. • satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.

Activities	Credit conditions
Laboratories	<p>To pass the course, a minimum attendance of 80% of lab practicals is required. Before each laboratory, the knowledge and skills concerning the current topic will be checked (written and oral colloquium). A report is required for each lab exercise.</p> <p>Grading scale with applied percentage distribution:</p> <ul style="list-style-type: none"> • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%. • good (4.0): achievement of student learning outcomes 70.0% - 79.9%. • average (3.5): achievement of student learning outcomes 60.0% - 69.9%. • satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.

Literature

Obligatory

1. Atkins P., de Paula J.-Physical Chemistry (10th ed.)-Oxford University Press (2014)

Optional

1. <https://chemfiz.home.amu.edu.pl/>

Calculation of ECTS points

Activities	Activity hours*
Lecture	15
Laboratories	30
Preparation for classes	20
Report preparation	40
Preparation for the exam	30
Reading the indicated literature	15
Student workload	Hours 150
Number of ECTS points	ECTS 5

* academic hour = 45 minutes

Efekty uczenia się dla kierunku

Kod	Treść
CHS_K2_K01	The graduate is ready to identify and evaluate cognitive and practical problems in the field of chemical research
CHS_K2_K02	The graduate is ready to evaluate the collected information critically
CHS_K2_K03	The graduate is ready to propose alternative solutions aimed at responsible decision-making, taking into account economic and social factors
CHS_K2_K04	The graduate is ready to appreciating, promoting and adhering to professional ethics in their own and others' activities
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_U05	The graduate can use mathematical methods in calculations for complex chemical and physicochemical systems and to evaluate the obtained results critically
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_U10	The graduate can use English at the B2 + level of the European System for the Description of Language Education in the field of chemistry and the discipline in which conducts research
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_W02	The graduate knows and understands concepts and relationships allowing for a quantitative description of complex physico-chemical phenomena