



UNIWERSYTET  
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W POZNANIU

## Research laboratory - didactic laboratory of physical and theoretical chemistry

### Educational subject description sheet

#### Basic information

<b>Study programme</b> Chemistry		<b>Didactic cycle</b> 2023/24	
<b>Speciality</b> -		<b>Subject code</b> 02CHSS.28P.01295.23	
<b>Organizational unit</b> Faculty of Chemistry		<b>Lecture languages</b> English	
<b>Study level</b> Second-cycle programme		<b>Course type</b> Elective	
<b>Study form</b> Full-time		<b>Block</b> Basic subjects	
<b>Education profile</b> General academic			
<b>Subject coordinator</b>	Renata Jastrząb, Marcin Podsiadło		
<b>Lecturer</b>	Renata Jastrząb, Marcin Podsiadło		
<b>Period</b> Semester 4	<b>Activities and hours</b> • Laboratories: 30, Graded credit		<b>Number of ECTS points</b> 2

#### Goals

Code	Goal
C1	To teach students techniques and skills for conducting scientific research in the discipline of chemical sciences.
C2	Develop the ability to select appropriate research methods leading to the solution of a research problem.
C3	Develop the ability to analyse the data obtained from performed studies.
C4	Develop the ability to prepare reports and present the results of your research.

## Entry requirements

No prerequisites required.

## Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
<b>Knowledge - Student:</b>			
W1	knows and understands test methods used in physical and theoretical chemistry.	CHS_K2_W01, CHS_K2_W02, CHS_K2_W06, CHS_K2_W09	Project
W2	knows and understands the chemical properties of the materials tested.	CHS_K2_W01, CHS_K2_W04, CHS_K2_W07	Project
<b>Skills - Student:</b>			
U1	can select appropriate methods leading to the solution of a research problem in physical and theoretical chemistry.	CHS_K2_U07, CHS_K2_U08, CHS_K2_U09, CHS_K2_U10	Project
U2	is able to conduct scientific research on issues relating to physical and theoretical chemistry.	CHS_K2_U03, CHS_K2_U06, CHS_K2_U08, CHS_K2_U10	Project
U3	is able to analyse the data obtained, prepare reports and present the results of his/her research.	CHS_K2_U02, CHS_K2_U07, CHS_K2_U11	Project

## Study content

No.	Course content	Subject learning outcomes	Activities
1.	Design of research experiments.	W1, W2, U1	Laboratories
2.	Analysis of experimental and statistical data.	W1, U3	Laboratories
3.	Sample preparation and application of different measurement techniques.	W1, W2, U2	Laboratories
4.	Data analysis and preparation of the scientific report.	W1, U3	Laboratories

## Additional information

Activities	Teaching and learning methods and activities
Laboratories	Discussion, Work with text, Solving tasks (e.g. computational, artistic, practical), Laboratory method, Research method (scientific inquiry)

Activities	Credit conditions
Laboratories	<p>The completion of a research project is a requirement for credit. Grading scale with applied percentage distribution:</p> <ul style="list-style-type: none"> <li>• excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%.</li> <li>• very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%.</li> <li>• good (4.0): achievement of student learning outcomes 70.0% - 79.9%.</li> <li>• average (3.5): achievement of student learning outcomes 60.0% - 69.9%.</li> <li>• satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%.</li> <li>• unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.</li> </ul>

## Literature

### Obligatory

1. Literature provided by the research laboratory supervisor on physical and theoretical chemistry

### Calculation of ECTS points

Activities	Activity hours*
Laboratories	30
Preparation for classes	10
Preparation of a project	10
Report preparation	10
<b>Student workload</b>	<b>Hours</b> 60
<b>Number of ECTS points</b>	<b>ECTS</b> 2

\* academic hour = 45 minutes

## Efekty uczenia się dla kierunku

Kod	Treść
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_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_U09	The graduate can use information and communication techniques in order to deepen his knowledge and communication in specialist circles of recipients
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_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
CHS_K2_W04	The graduate knows and understands physico-chemical properties of chemical compounds and materials depending on their structure / composition
CHS_K2_W06	The graduate knows and understands the use of chemicals of key importance for the progress of science
CHS_K2_W07	The graduate knows and understands classifies advanced laboratory, analytical and instrumental techniques used in chemistry
CHS_K2_W09	The graduate knows and understands the ethical, legal and economic conditions applicable in the field of chemical sciences