University of Gdańsk

Subject card

Subject name and code	Physico-chemical analytical methods, PG_00082039						
Field of study	Chemistry						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Karol Krzymiński				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		0.0		0.0	30
Subject objectives	Familiarize students with practical aspects contained in the contents of the course. Deepening and enriching physicochemical knowledge with experimental aspects related to the application of instrumental measurements in modern analysis. Understanding physicochemical processes with the emphasis on natural environment and everyday life. Development of practical skills related to the implementation of physicochemical measurements with the participation of apparatus and calculations, processing and evaluation of results associated with them.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_W10] Enumerates and describes the basic aspects of the construction, operation and use of measuring apparatus and equipment used in experimental works in the field of chemistry and related sciences.	Student knows and understands the basic physicochemical methods used in the study of matter and is able to describe the construction and principles of operation of the apparatus used. The student is able to identify individual components of the apparatus.	[SW4] test/exam - oral or written
[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	Student can analyze and solve problems using the known laws and methods, correctly draw conclusions from the results of the measurements and prove their correctness on the basis of the available literature.	[SU2] presentation/project/paper/ report
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Student is able to plan experimental research using the physicochemical analytical methods and can use selected equipment for physicochemical tests: refractometer, conductometer calorimetric kit, UV-Vis spectrophotometer, stationary spectrofluorimeter and plate luminometer.	[SU4] test/exam - oral or written
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	Student knows and understands the basic physicochemical methods used in study of chemical compounds and can plan the analysis of chemical compounds.	[SW4] test/exam - oral or written
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	Student can work independently and cooperate and interact in the group adopting various roles, adhere to the safety rules during execution of experiments, comply with the rules concerning the executed experiments.	[SK6] demonstration of practical skills
[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	Student can carry out the planned experiments in the laboratory, analyze and solve problems using the known laws and methods and correctly draw conclusions from the results of the measurements.	[SU2] presentation/project/paper/ report [SU6] demonstration of practical skills
[CHEML3_U05] Uses basic statistical methods and IT techniques to describe chemical processes and analyse experimental data.	Student can solve calculation problems using appropriate theories, formulas and statistical methods.	[SU2] presentation/project/paper/ report
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	Student knows and understands basic physicochemical methods used in the study of matter and gives examples of their applications.	[SW4] test/exam - oral or written

Subject contents

Six laboratory experiments:

1. Measurement of the heat of dilution and neutralization of inorganic substance.
2. Determination of acetic acid partition coefficient between organic and inorganic phase.
3. Refractometric determination of glycerine content in cosmetic products and sugar content in fruit juices.
4. Spectrophotometric determination of caffeine concentration in tea/coffee.
5. Fluorimetric determination of vitamin B1 (thiamine).
6. Luminometric determination of of antioxidant properties of dietary supplements.

Prerequisites and co-requisites

Completion of courses at the bachelor level: mathematics, physics, general chemistry, physical chemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
reports	51.0%	50.0%
test	51.0%	50.0%

Recommended reading

Basic literature	Electronic materials provided by the lecturers.
Supplementary literature	1. P.W. Atkins, Chemia fizyczna, Wydawnictwo naukowe PWN, Warszawa 2003. 2. L. Sobczyk, A. Kisza, K. Gatner, A. Koll, Eksperymentalna chemia fizyczna, PWN Warszawa 1982. 3. E. Więckowska-Bryłka, Eksperymentalna chemia fizyczna, Wydawnictwo SGGW, Warszawa 2007.
eResources addresses	

Example issues/ example questions/ tasks being completed	1. What are open, closed and isolated systems? Give an example of each system. 2. Nernsts distribution law. 3. Draw the pathway of light between two media of different densities. Explain each symbol. 4. What is a monochromator? 5. Describe the importance of vitamin B1 supplementation for human health. 6. What is chemiluminescence? Give names of two substances that are good chemiluminogens.
Work placement	Not applicable

Document generated electronically. Does not require a seal or signature.