GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Analytical laboratory management, PG_00060781		
Field of study	Chemical Technology		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2028/2029
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish
Semester of study	7	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Piotr Konieczka	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	30.0	15.0	60

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	60	10.0	50.0	120

Subject objectives

Presentation of the basic requirements for the operation of an analytical laboratory, especially an accredited one.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] Has knowledge in the field of management, entrepreneurship, intellectual property protection and the basics of humanities and social sciences, and also knows specialized chemical nomenclature	The student has knowledge of management and entrepreneurship, knows the basics of intellectual property protection, as well as selected issues from the humanities and social sciences necessary to understand the conditions of engineering activity; in addition, he/she knows the specialized chemical nomenclature used in chemical technology and related fields.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_K04] Understands the non-technical aspects of the work of a chemical engineer, including the impact on the environment, and is aware of professionalism, professional ethics and respect for diversity.	The student understands the non-technical aspects of the work of a chemical engineer, in particular the impact of technical activities on the environment and society; is aware of the importance of professionalism, professional ethics, and respect for diversity, and is prepared to follow these values in professional practice.	[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills
[K6_U05] Is able to make a preliminary economic evaluation of engineering solutions and apply knowledge of the humanities and social sciences to solve problems.	The student is able to make a preliminary economic assessment of proposed engineering solutions, taking into account costs, benefits, and risks; moreover, they are able to apply knowledge from the humanities and social sciences to analyze and solve technical, organizational, and environmental problems.	[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Description of the basic requirements for the operation of an analytical laboratory accredited in accordance with the requirements of ISO 17025. Focus on those aspects of laboratory work that are required by external auditors and concern document circulation, report preparation, internal laboratory quality control, supervision of laboratory equipment, and validation of analytical procedures used.
Course content – project
From among the proposed topics related to the supervision of work in a specific analytical laboratory (medical, food, industrial, cosmetic, environmental), students will choose a given area
- The students' task is to propose a plan for supervising the work of an analytical laboratory - specifying both the method of planning the work and its control.
- The final result of the project will be a report describing the action plan of the selected analytical laboratory in order to obtain/maintain accreditation in accordance with PCA guidelines and recommendations.
Course content – seminar
Presentation of basic statistical tools (control charts, statistical tests, use of reference materials and proficiency testing results) for managing and controlling the quality of laboratory work. Students will perform the relevant calculations using Excel.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Subject knowledge: Laboratory techniques, Analytical chemistry, Inorganic chemistry, Physical chemistry, Instrumental analysis, Fundamentals of chemical metrology</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>seminar</td><td>60.0%</td><td>20.0%</td></tr><tr><td>lecture</td><td>60.0%</td><td>20.0%</td></tr><tr><td>project</td><td>60.0%</td><td>60.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>1. Hering B., Zarządzanie jakością w laboratorium analitycznym, Wydawnictwo Naukowe PWN, Warszawa.
2. Ellison A., Williams A. (red.), Quantifying Uncertainty in Analytical Measurement, Eurachem Guide.
3. Skoog D.A., West D.M., Holler F.J., Crouch S.R., Principles of Instrumental Analysis, Cengage Learning.
4. Kellner R. i in., Analytical Chemistry: A Modern Approach to Analytical Science, Wiley-VCH.
5. Mocak J., Walidacja metod analitycznych, Wydawnictwo Uniwersytetu Komenskiego / materiały Eurachem.
6. PN-EN ISO/IEC 17025: Ogólne wymagania dotyczące kompetencji laboratoriów badawczych i wzorcujących, Polski Komitet Normalizacyjny.</td></tr><tr><td>Supplementary literature</td><td>1. Thompson M., Ellison S.L.R., Wood R., Guide to Quality in Analytical Chemistry, Eurachem/CITAC Guide.
2. Lane R.D., Laboratory Management: Principles and Processes, CRC Press.
3. Meyer W., Przewodnik po metrologii chemicznej, GUM / materiały metrologiczne.
4. Materiały i przewodniki Polskiego Centrum Akredytacji (PCA) dotyczące akredytacji laboratoriów.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. The role and organization of an analytical laboratory structure, functions, tasks, types of laboratories.
2. Quality management systems in laboratories PN-EN ISO/IEC 17025 requirements, quality documentation, quality policy.
3. Validation of analytical methods validation parameters, procedures, validation documentation.
4. Quality control and quality assurance (QC/QA) reference materials, control samples, calibration curves, control charts.
5. Chemical metrology and measurement uncertainty calculation basics, uncertainty budget, interpretation of results.
6. Laboratory resource management apparatus, reagents, auxiliary equipment, calibration and standardization.
7. Laboratory work planning schedules, task allocation, priorities, optimization of analytical processes.
8. Internal and external audits types of audits, preparation, conduct, and reporting.
9. Occupational health and safety in the laboratory risk assessment, safety procedures, chemical waste, emergency situations.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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