



Subject card

Subject name and code	Analytical laboratory management, PG_00060781						
Field of study	Chemical Technology						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2026/2027		
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_U13] performs an initial economic evaluation of proposed solutions and engineering activities undertaken, is able to apply knowledge of the humanities or social sciences to solve problems	The student is able to conduct a preliminary economic analysis of proposed technological solutions, including cost identification, profitability estimation, and comparison of design options. The student is able to assess the effectiveness of engineering activities, taking into account technical, economic, and organizational criteria.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K6_U05] recognises and identifies the relationship between technological issues, implemented in industrial practice, and their impact on various elements of the environment, in the context of mechanisms and conditions of sustainable development, recognizes their systemic and non-technical aspects	The student is able to analyze the relationships between technological processes and their impact on the environment, taking into account emissions, resource consumption, and waste generation. They are able to identify and assess the impact of industrial activities on individual elements of the environment (air, water, soil, biodiversity) using basic environmental assessment methods.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	[K6_W05] has knowledge of chemical technology based on mineral or energy resources and modern energy sources, understands the concept of sustainable development, knows the principles of green chemistry and environmentally friendly process engineering, has knowledge of occupational safety in the chemical industry	The student knows the types and properties of mineral and energy resources used in chemical technology and their importance in industrial processes. They have knowledge of modern energy sources and their applications in the chemical industry. They understand the concept of sustainable development and its importance for the design and operation of production processes.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
	[K6_K04] is able to think and act in an entrepreneurial way	The student demonstrates initiative and a proactive approach to problem solving and value creation. They are ready to take responsible risks and learn from successes and failures.	[SK3] Assessment of ability to organize work [SK1] Assessment of group work skills
Subject contents	<p>Course content – lecture</p> <p>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.</p> <p>Course content – project</p> <p>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</p> <ul style="list-style-type: none"> - 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. <p>Course content – seminar</p> <p>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.</p>		
Prerequisites and co-requisites	Subject knowledge: Laboratory techniques, Analytical chemistry, Inorganic chemistry, Physical chemistry, Instrumental analysis, Fundamentals of chemical metrology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	60.0%	60.0%
	seminar	60.0%	20.0%
	lecture	60.0%	20.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 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 Komenskigo / materiały Eurachem. 6. PN-EN ISO/IEC 17025: Ogólne wymagania dotyczące kompetencji laboratoriów badawczych i wzorcujących, Polski Komitet Normalizacyjny. 	

	Supplementary literature	<ol style="list-style-type: none"> 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.
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 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. 	
Practical activities within the subject	Not applicable	

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