



Subject card

Subject name and code	PROCESS ANALYTICS, PG_00064302						
Field of study	ANALITYKA PROCESOWA						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Błażej Kudlak				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	15.0	0.0	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		8.0		57.0	125
Subject objectives	The aim of course is giving students knowledge on applicability of using analytical chemistry in widely understood analytics of performing industrial processes.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U04] predicts the properties of the materials obtained and the course of processes involving them, based on knowledge of technology and related fields and computer methods of data analysis, modelling and simulation		student is able to recognize abilities of materials obtained and process run based on knowledge in the area of technology and CAD methods in data analytics, modelling and simulations		[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania [SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU2] Ocena umiejętności analizy informacji [SU1] Ocena realizacji zadania		
	[K7_K02] understands the non-technical aspects and implications of graduate activity, including the impact on the environment		Student understands non-technical aspects and results of His/Her actions including impact on environment		[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce [SK4] Ocena umiejętności komunikacji, w tym poprawności językowej [SK3] Ocena umiejętności organizacji pracy [SK2] Ocena postępów pracy [SK1] Ocena umiejętności pracy w grupie		
	[K7_W04] recognises scientific, technological, organisational and economic opportunities and constraints in technology and related fields		Student is able, based on knowledge gained, to recognize abilities in research, scientific, technological, organizational, economic area of technology and related fields of science		[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym [SW1] Ocena wiedzy faktograficznej		

Subject contents	Course content – lecture Lectures General issues: Types of measurement signals, measuring range and measurement error, the class of the instrument, the dynamic properties. Selectivity and specificity. Response time and analysis cost. Control of physical and physicochemical properties. Calibration of the instruments. General characteristics of the industrial measurements. Measurements of physical and physicochemical properties of substances (hydrogen ion concentration measurements, density measurements, viscosity measurements). Measurements of chemical composition. Problems of sampling. Representativeness and sample preparation for continuous analysis - examples. Automated processes based on procedural analysis on the example of pH control. Continuous methods of analysis. Gas analysis: dispersive and non-dispersive IR, the use of paramagnetic properties of gases, electrochemical measurements at low and high temperatures, the determination of thermal conductivity of gases, determination of gas density, the use of the chemical properties of gases. Liquid analysis: FIA, determination of viscosity, flash point determination, the determination of liquidity point, atomic absorption. Analysis of solids: X-ray fluorescence. hybrid form of performing classes		
	Course content – laboratory Laboratory Static and dynamic methods of control of indoor air quality Determination of water content in petroleum products by Carl Fischer methods LIRA infrared analyzer of CO Determination of the total sulfur content in petroleum products Auer stationary explosimeter Fluorescent oil analyzer type UP 82_F3 Oxygen analyzer for the water type OXI 149A Servomex magnetodynamic oxygen analyzer type OA 269 thermoparamagnetic oxygen analyser, Simple gas chromatograph Visit at quality control and process laboratory Asphalts and emulsions in hydroisolation applications hybrid form of performing classes		
	Course content – project Preparing project of selecting detectors and analysers of flammable and explosive gases in selected refining units based on actual scientific literature; hybrid form of performing classes		
	Prerequisites and co-requisites Basic knowledge of chemical analysis		
	Assessment methods and criteria		
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Grade from presentation of project and activity during seminars	60.0%	20.0%
	Lecture: written exam	60.0%	60.0%
	Laboratory: average from the tests at the beginning of laboratories	60.0%	20.0%
Recommended reading	Basic literature	1. E. Romer, Miernictwo przemysłowe, PWN, Warszawa, 1970 2. M. Trojanowicz, Automatyzacja w analizie chemicznej, WNT, Warszawa, 1972 3. J. Piotrowski (red), Pomiary. Czujniki i metody pomiarowe wybranych wielkosci fizycznych i składu chemicznego, WNT, Warszawa, 2009	
	Supplementary literature	P.N. Cheremisinoff, H.J. Perlis, Analytical measurements and instrumentation for process and pollution control, Ann Arbor Science, 1981	
	eResources addresses		
Example issues/ example questions/ tasks being completed	see above		
Practical activites within the subject	Not applicable		

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