



Subject card

Subject name and code	MASTERS'S DIPLOMA THESIS, PG_00066007						
Field of study	Green Technologies						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2025/2026		
Education level	second-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	2	Language of instruction			English		
Semester of study	3	ECTS credits			20.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Robert Aranowski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	0.0	0.0	0
	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	0		50.0		450.0	500
Subject objectives	<p>The objective of the thesis is the experimental investigation of the CO capture and regeneration process using tertiary amines (such as DEMA) that are not commonly applied in the chemical industry, with particular emphasis on determining reaction kinetics and reaction enthalpies.</p> <p>The research will be conducted using reaction calorimetry (RC1), enabling continuous measurement of heat flow throughout the process. An additional objective is to evaluate the effect of activators (PZ, 2-MPZ) on reaction kinetics and the thermal effect of CO absorption, as well as to compare the performance of the studied systems in terms of their potential application in CO capture technologies characterized by reduced energy demand and minimized environmental impact.</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U04] is able to design and supervise environmentally friendly technologies, waste-free technologies, and also perform expert opinions on the environmental impact of technologies already in use	Selects and applies appropriate computational and simulation tools for the design of the CO capture process (e.g., gas-liquid equilibrium models, kinetic models of amine-CO reactions, mass and energy balances).	[SU4] Assessment of ability to use methods and tools
	[K7_U05] formulates and tests hypotheses related to engineering problems and simple research problems concerning environmental protection, the use of new environmental protection technologies and analytical procedures	Analyzes literature, experimental, or simulation data in order to verify the formulated hypotheses, identifying relationships between process parameters (temperature, pressure, amine concentration, hydrodynamic conditions) and CO separation efficiency.	[SU2] Assessment of ability to analyse information
	[K7_W01] identifies problems and defines tasks in the field of environmental protection technologies and modern analytical methods	Demonstrates knowledge of the theoretical fundamentals of separation and reaction processes occurring in gas-liquid systems with chemical reaction, presenting them in a structured and coherent manner in the theoretical part of the thesis.	[SW3] Assessment of knowledge contained in written work and projects
	[K7_K101] acknowledges the importance of knowledge related to the field of study in solving cognitive and practical problems, critically assessing the information obtained	The student demonstrates readiness to critically and responsibly evaluate the obtained research results in the context of literature data on CO absorption and SFR technology.	[SK2] Assessment of progress of work
Subject contents			
Prerequisites and co-requisites	<ul style="list-style-type: none"> • Knowledge of the fundamentals of chemical engineering, in particular chemical reaction kinetics, mass transfer, and mass and energy balances. • Basic knowledge of chemical thermodynamics and gas absorption and desorption processes. • Understanding of the reaction mechanism of CO with amines and the fundamentals of amine chemistry. • Ability to process and analyze experimental data. • Basic laboratory experience and knowledge of safety principles when working with chemicals and gases. • Ability to use scientific literature in English and basic computational tools. 		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	evaluation of the diploma thesis	80.0%	100.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Murray R., How to Write a Thesis, 4th ed., Open University Press, Maidenhead, 2020. 2. Phillips E.M., Pugh D.S., How to Get a PhD: A Handbook for Students and Their Supervisors, 6th ed., Open University Press, Maidenhead, 2015. 3. Day R.A., Gastel B., How to Write and Publish a Scientific Paper, 8th ed., Cambridge University Press, Cambridge, 2016. 4. Swales J.M., Feak C.B., Academic Writing for Graduate Students: Essential Tasks and Skills, 3rd ed., University of Michigan Press, Ann Arbor, 2012. 5. Wallwork A., English for Writing Research Papers, 2nd ed., Springer, Cham, 2016. 6. Booth W.C., Colomb G.G., Williams J.M., Bizup J., Fitzgerald W.T., The Craft of Research, 4th ed., University of Chicago Press, Chicago, 2016. 	
	Supplementary literature	In line with the topic of the diploma thesis.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	https://files.pg.edu.pl/api/v1/file/preview?path=chem%2FStudenci%2FPytania+na+egzamin+y+dplomowe%2FGreen+Technologies%2FMaster+Diplom+content-disposition=attachment		
Practical activities within the subject	Not applicable		

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