GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Inorganic Technology, PG_00060868		
Field of study	Chemical Technology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
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 hab. inż. Marek Lieder	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	0.0	45

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	45	2.0	28.0	75

Subject objectives

Learns the practical aspects of producing inorganic chemical compounds. The student is able to combine theoretical knowledge with technological implementation.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] Possesses the chemical knowledge necessary to synthesize, analyze and evaluate the properties of compounds and processes used in chemical technology.	Knows the principles of selecting technological parameters that affect the efficiency and selectivity of chemical processes. Skills. Is able to analyse the course of chemical processes and assess their effectiveness and safety from the point of view of industrial practice.	[SW1] Assessment of factual knowledge
[K6_W04] Possesses the technical knowledge necessary to analyze processes and design installations in the chemical industry.	Knows the principles of selecting apparatus and process equipment in chemical installations. Is able to develop a technological and apparatus concept for a chemical installation, taking into account material and energy balances.	[SW1] Assessment of factual knowledge
[K6_W05] Has knowledge of electrical engineering, automation and computer science, including the operation of measurement and control systems	Knows the principles of operation of basic measurement systems and is able to select measurement circuit components for a specific task.	[SW1] Assessment of factual knowledge

Subject contents	Course content – lecture 1. Soda technology 2. Sulphuric acid production 3. Technology of phosphorus, inorganic phosphorus compounds and phosphorus fertilisers 4. Technology of inorganic nitrogen compounds synthesis of ammonia, nitric acid and urea 5. Chlorine production technology 6. Combustion and energy conversion technology. 7. Water technology 8. Metallurgical processes 9. Hydrogen technologies Course content – exercises Material balance of a carbonator producing soda Degree of utilisation of NaCl and NH_3 in the carbonation process Recovery of ammonia from mother liquors in the soda production process Obtaining SO_2 from pyrite Determining the degree of conversion of the SO_2 oxidation reaction Material balance of phosphoric acid production using the wet method. Determination of the ammonia content in equilibrium for a stoichiometric mixture of reagents. Determination of the theoretical temperature of catalytic combustion of ammonia in nitric acid production technology (V) Material and heat balance of the contact apparatus for ammonia combustion Determination of the excess air coefficient based on the composition of the exhaust gases Determination of the quantity and composition of exhaust gases produced by the combustion of fuel with a defined elemental composition Determination of the flammability limits of gases and their mixtures
Prerequisites and co-requisites	Fundamentals of Chemical Technology. Basic level.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Exercise test	60.0%	40.0%
Lecture examination	60.0%	60.0%

<table>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Bortel E., Koneczny H. Zarys technologii chemicznej Wydawnictwo Naukowe PWN Warszawa 1992
2. Kępiński J. Technologia chemiczna nieorganiczna Państwowe Wydawnictwo Naukowe Warszawa 1984
3. Schmidt-Szałowski K., Sentek J. Podstawy technologii chemicznej. Organizacja procesów produkcyjnych Oficyna Wydawnicza Politechniki Warszawskiej Warszawa 2001
4. Schmidt-Szałowski K., Sentek J., Raabe J., Bobryk E. Podstawy technologii chemicznej. Procesy w przemyśle nieorganicznym Oficyna Wydawnicza Politechniki Warszawskiej Warszawa 2004</td></tr>
<tr><td>Supplementary literature</td><td>1. Praca zbiorowa pod redakcja K. Schmidt-Szałowskiego Podstawy technologii chemicznej. Bilanse procesów technologicznych Oficyna Wydawnicza Politechniki Warszawskiej Warszawa 1997
2. Kowalski W., Nowe kierunki w technologii kwasu siarkowego, WNT Warszawa 1980</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Explain why coke is a dirty (non-ecological) fuel, while methane is not.

2. There are three gases in the soda production plant. What is their role and how are they introduced into the

plant?

3. Hydrogen and nitrogen are needed for ammonia synthesis. The former is obtained as a result of ... (complete

the sentence with the reaction)? How is nitrogen introduced into the mixture, and is this associated with any

chemical transformation?

4. Can alkaliisation of the electrolyte occur in mercury-based chlorine production technology? Justify your answer with the

reaction

5. Recirculation is used in both phosphoric acid production technologies. Describe what is recirculated and what

purpose it serves in each of these technologies

6. Obtaining nitric acid:

a) write down 3 reactions of ammonia combustion

b) why is the concentration of ammonia in a mixture with air approximately 11%?

c) What catalyst is used and is a carrier used?

d) If the ammonia contains an admixture (impurity) of CO, is this dangerous for the course of the

reaction? Justify your answer.

e) Are high-pressure installations a better solution than low-pressure installations? Justify your answer.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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