UNIWERSYTET GDAŃSKI

Course title
Technologia ochrony atmosfery/Technology of the atmosphere protection

ECTS code
13.3.0394

Name of unit administrating study
Faculty of Chemistry

Studies

Field of study	Type	Form	
Chemistry	Master	Full-time studies	

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Forms of classes, the realization and number of hours

A. Forms of classes, in accordance with the UG Rector's regulations
Lecture, laboratory classes

B. The realization of activities
In-class learning

Number of hours
lecture 15 h, laboratory classes 15 h

ECTS credits
classes 30 h
Tutorial classes 5 h
Student's own work 40 h
TOTAL: 75 h - 3 ECTS

The academic cycle
2019/2020 summer semester

Type of course
obligatory

Language of instruction
Polish

Teaching methods
Lectures including multimodal presentations
Laboratory experiments

Form and method of assessment and basic criteria for evaluation or examination requirements

A. Final evaluation, in accordance with the UG study regulations
Course completion (with a grade), exam

B. Assessment methods
final grade based on partial grades received during the semester
written exam with open and test questions

C. The basic criteria for evaluation or exam requirements
Lecture
- written test: a positive grade of the written test consisting of open questions covering the issues listed in the program content of the lecture and laboratory exercisesthe grade scale according to the UG Study Regulatory
- oral examination - supplement to the written test, but only for those students who obtained 40-50% of points possible to receive from the written credit,
Laboratory exercises:
average of grades obtained from laboratory exercises and the final test, the scale is in accordance with the University of Gdańsk Studies Regulations. Obtaining above 51% of points from laboratory exercises, i.e.: entrance tests covering the subject of performed experiments, preparation of the experimental part, preparation of results obtained in the experimental part (reports), activity and cooperation in the group, and compliance with the principles of work safety in the chemical laboratory and obtaining over 51% of

	points from the final test covering the abovementioned scope

Required courses and introductory requirements

basic chemistry, inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry.
Basic knowledge of basic chemistry, organic chemistry and physical chemistry, as well as basic knowledge of chemical analysis methods.

Aims of education

•Introduce students with all issues listed in the lecture program content.
• Introduce students with the main stages of the technological process used to remove contaminants from the gas phase
• Introduce students with techniques of instrumental analysis.
• Developing the skill of making independent calculations necessary for correct interpretation of analysis results
• Developing the ability to independently select the appropriate technology for removing impurities from air streams.

Course contents

A.Problems of the lecture:
Particle size distribution and dust characteristics. Aerosol particle characteristics. Physical basics of gas de-dusting process. Air purification and dedusting equipment. Dust collectors: cyclones, electrostatic precipitators, vacuum collectors, scrubbers. Aerosol removers. Removal of gaseous pollutants. Emission control in fermentation installations, chemical installations, refineries and the pulp and paper industry. SO2 removal from flue gas. H2S removal and odor control. Removal of CO2 and H2S from gas streams. Removal of organic compounds. Control of e SO2 and NOx emissions. Flue gas desulphurization methods. Adsorption and absorption processes. Thermal and catalytic combustion. Processes for cleaning / deodorizing and disinfecting air from enclosed spaces.
B.Problems of laboratory exercises:
Basics of laboratory work, performance of exercises thematically related to technologies for removing impurities from the gas phase

Bibliography of literature

A. Literature required to pass the course

A.1. Literature used during classes:
Lewandowski W., Techniczno-technologiczne i aparaturowe aspekty ochrony powietrza, WPG Gdańsk 2011.
A.2. Literature for individual studies:
Konieczyński J., Ochrona powietrza przed szkodliwymi gazami. Metody, aparatura i instalacje. Wydawnictwo Politechniki Gliwickiej, Gliwice 2004.
Ciok Z., Ochrona środowiska w elektroenergetyce, PWN Warszawa 2001.

B. Extracurricular readings

Kucowski J., Laudyn D., Przekwas M., Energetyka a ochrona środowiska, WNT Warszawa 1997.
Warych J., Oczyszczanie gazów. Procesy i aparatura, WNT Warszawa 1998.
Warych J., Oczyszczanie przemysłowych gazów odlotowych, WNT Warszawa 1988

Knowledge

1. Student defines the basics of risk assessment of the spread of pollutants in the atmosphere.
2. Understands the relationship between the properties of pollution and the selection of air stream cleaning technology
3. Lists and classifies technologies used for gas phase purification
4. Distinguishes and characterizes individual technologies used to reduce the level of emissions of pollutants into the atmosphere

Skills

1. Classifies types and sources of pollution
2. Demonstrates the ability to perform basic physicochemical and technological measurements relevant for removing air pollutants
3. Plans and develops atmosphere protection technologies
4. Plans and conducts simple experiments in the field of technology for removing impurities from air streams
5. Talks about the issues of atmosphere protection technology in understandable language, using the correct nomenclature.
6. Evaluates selected properties of polluted air streams and assesses the effectiveness of gas and exhaust gas purification methods

Social competence

1. Understands the need for further education.
2. Demonstrates creativity in independent and team work.
3. Consciously assesses the impact of human activities on the natural environment at local and global level.
4. Is responsible for the safety of his own work and that of others: he is careful in handling chemicals, he is careful in handling measuring instruments.