UNIWERSYTET GDAŃSKI

Course title
Monographic lecture – Application of oxidation processes in chemistry / Wykład monograficzny – Zastosowanie procesów utleniania w chemii

ECTS code
13.3.1236

Name of unit administrating study
Faculty of Chemistry

Studies

Field of study	Type	Form	
Chemical Business	Master	Full-time studies	

Teaching staff
Prof. dr hab. Lech Chmurzyński, dr hab. Joanna Makowska, prof UG, dr Aleksandra Tesmar, dr hab. Dariusz Wyrzykowski, prof. dr hab. Ewa Siedlecka

Forms of classes, the realization and number of hours

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

B. The realization of activities
In-class learning

C. Number of hours
30 h lecture

ECTS credits 3

classes - 30 h
tutorial classes – 10 h
student's own work – 35 h

Total: 75 h - 3 ECTS

The academic cycle
Second year, winter semester

Type of course
Obligatory

Language of instruction
Polish

Teaching methods

- Cases study
- Discussion
- Work in groups
- Problem lecture
- Lecture with multimedia presentation

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

A. Final evaluation, in accordance with the UG study regulations
credit with a grade

B. Assessment methods
performance of final work - project or presentation
determining the final grade on the basis of partial grades received during the semester

D. **The basic criteria for evaluation** or exam requirements
positive assessment of the presentation and activity in discussions covering the subject

Required courses and introductory requirements
general chemistry, inorganic chemistry, analytical chemistry, physical chemistry, organic chemistry

Aims of education
presentation of the development of physicochemical research in solid and liquid phases over the last century,
• familiarization with the basic instrumental methods used in the characterization of test substances in scientific works,
• presentation of the diversity of scientific works carried out under the supervision of KChOiN employees,
• developing the ability to independently plan experimental work and solve problems
• preparation for independent selection of scientific literature, leading consequently to the preparation of a master's thesis

Course contents
Radicals and their types, radical reactions, the role of radical reactions in nature, classification of advanced oxidation processes (AOP), methods generation of radicals and other chemical species of the nature of oxidants and reducing agents, the use of AOP in water treatment, the use of AOP in wastewater treatment, the use of reduction processes in the production of fuels, the use of radicals in medicine, the use of radicals in chemical synthesis, a review of the experimental methods used to study the antioxidant activity of natural compounds and synthetic compounds, including complex compounds, methods based on the HAT mechanism (hydrogen atom transfer), methods based on the mechanism SET (single electron transfer), electrochemical methods, factors determining the antioxidant activity of compounds

Bibliography of literature

A. **Literature required to pass the course**
B. **Extracurricular readings**

Literature provided by the teacher during the class

Knowledge

Can classify radicals and radicals reactions; divides AOP methods depending on a method for generating hydroxyl radicals; lists the applications of radicals, redox chemical species and their reaction in environmental protection, medicine, chemical synthesis; can list methods commonly used in the analysis and diagnosis of radicals reactions; understands the description and the course of AOP processes; characterizes and understands the process of transfer electrons; explains the relationship between the structure of the relationship and its redox activity

Skills

understands the interpretation of the results presented in scientific works; shows connections between the topics presented during the lecture and life; can indicate the application nature of the discussed and analyzed issues cases study; discusses the potential economic usefulness of the application of innovative methods that use radicals and chemical species of redox nature

Social competence

Discusses in a group collaborates with the colleagues, assumes various social roles (leader or performer etc.)