GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Photochemistry, PG_00037383		
Field of study	Green Technologies		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Pladzyk	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	15.0	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	5.0	25.0	75

Subject objectives

The goal is for the student to gain a basic knowledge of the various physical, chemical and biological processes induced by electromagnetic radiation and the practical use of such processes in modern technology, medicine and environmental protection

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] can formulate and test hypotheses related to the problems of engineering and simple research problems relating to the protection of the environment, new environmental technologies and analytical procedures	Student is able to explain the spectral properties of systems generated by the presence of radiation electromagnetic radiation, understands the importance of the participation of light in many physical and chemical processes, has the ability to properly selection of measurement technique allowing to describe properties of a given system in the presence of light	[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment
[K7_W02] a broader and deeper knowledge of the soil, air and water from pollution useful to formulate and solve complex tasks in the field of environmental technologies and modern analytical methods	The student has knowledge of technologies based on photochemical processes in purifying the environment from pollutants, knows their effectiveness and research on finding new technological solutions based precisely on photochemical processes.	[SW1] Assessment of factual knowledge
[K7_K01] is ready to solve the most common problems associated with the profession of engineer, correctly identifies and resolves dilemmas associated with the profession of engineer, assesses risks and is able to assess the effects of the activity	Student is able to analyze the problem given which relates to phenomena in which electromagnetic radiation plays an important role	[SK4] Assessment of communication skills, including language correctness

<table>
<tr><td>Subject contents</td><td>Basic basic photochemical principles and concepts - electron excited states, FranckCondon rule, Jablonski diagram, selection rules, quenching of excited states. Photochemical reactions in solutions, quantum yield of photochemical reactions, actinometry. Photochemistry of the atmosphere. Applied photochemistry- photochemical industrial syntheses, photochromism, photolithography, OLEDs, optical brighteners. Photochemistry of polymers- photopolymerization and photodegradation of polymers, photoinitiators of polymerization. Photochemical methods of solar energy storage. Photochemistry in biology and medicine- vision process, UV filters, phototherapy. Application of photochemical processes in environmental protection.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge in the following subjects: physics, inorganic chemistry, organic chemistry, physical chemistry, biochemistry</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>seminar presentation</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>10 lecture test</td><td>60.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Paul Suppan "Chemia i światło" PWN Warszawa 1997.

2. Stefan Paszyc "Podstawy fotochemii" PWN Warszawa. 1992

3. "Fotochemia polimerów. Teoria i zastosowanie" Praca zbiorowa pod red, J. Pączkowskiego Wydawnictwo UMK 2003.

4. Zofia Stasicka "Procesy fotochemiczne w środowisku" Wydawnictwo UJ 2001.</td></tr>
<tr><td>Supplementary literature</td><td>Scientific publications on the application and effects of electromagnetic radiation on processes and materials of various applications</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. the Jablonski diagram2 Types of extinction of excited states.3. Photochemical processes in the atmosphere.4. Photodegradation and photostabilization of polymers5. Removal of environmental pollutants using photochemical processes</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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