



## Subject card

Subject name and code	Photochemistry, PG_00037383						
Field of study	Green Technologies						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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_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		
	[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_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			[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		

Subject contents	Basic basic photochemical principles and concepts - electron excited states, Franck-Condon 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.		
Prerequisites and co-requisites	Basic knowledge in the following subjects: physics, inorganic chemistry, organic chemistry, physical chemistry, biochemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	10 lecture test	60.0%	50.0%
	seminar presentation	60.0%	50.0%
Recommended reading	Basic literature	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.	
	Supplementary literature	Scientific publications on the application and effects of electromagnetic radiation on processes and materials of various applications	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. the Jablonski diagram 2 Types of extinction of excited states. 3. Photochemical processes in the atmosphere. 4. Photodegradation and photostabilization of polymers 5. Removal of environmental pollutants using photochemical processes		
Work placement	Not applicable		