GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Photophysics of biological systems, PG_00046105		
Field of study	Technical Physics		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Dampc	
	Teachers	dr inż. Marcin Dampc	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=10282

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	15	1.0	9.0	25

Subject objectives

The interactions between emectromagnetic radiation and biological systems will be presented and discussed. Biological systems will be represented by wide range of systems from isolated biomolecules to macroscopic sytems. Phenomena of radiation absorption and emission will serve as a foundation for further discussion of photochemistry in biosystems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W02] Has enhanced, theoretically-founded, detailed knowledge of selected field of physics, and sufficient knowledge of related fields of science or technology.	Fully understand excitation processes in molecules and atoms.	[SW1] Assessment of factual knowledge
[K7_W03] Has general knowledge of current development paths and discoveries in the scope of physics and related fields of science and technology.	Can select the appropriate experimental technique for investigating phenomenta.	[SW1] Assessment of factual knowledge

Subject contents

Radiation interactions with matter. Electronic, vibrational, rotational excitation. Photoionization. Fragmentation. Jabłoński`s diagram. Radiatian emission. Photochemistry. Multiphoton processes. Femtosecond photophysics. Free radicals. Photosynthesis. Radiation demage to DNA. Bioluminescence. Clinical phototherapies.

Prerequisites and co-requisites

Introduction to spectroscopy.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Seminar	50.0%	50.0%
Written assessment	50.0%	50.0%

Recommended reading

Basic literature	1. Z. Kęcki "Introduction to molecular spectroscopy" PWN 1975 2. P. Suppan Chemistry and light, PWN 1997
Supplementary literature	1. B. Mielewska "Biophysics" Wydawnictwo PG, 2015
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Selection rules for optical transitions. 2. Present and discuss one expamle of bioluminescence 3. Present and discuss one example of photoisomerisation process with practical application in medicine.
Work placement	Not applicable

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