University of Gdańsk

Subject card

Subject name and code	Physics II, PG_00080835		
Field of study	Chemical Business		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	Bachelor's studies	Subject group	Obligatory subject group 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 NA
Semester of study	2	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Joanna Gondek	
	Teachers	dr Agata Lazarowska	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	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	30	5.0	15.0	50

Subject objectives	
	to acquaint students with all the issues mentioned in the syllabus of the lecture, to acquaint students with the basics of quantum physics to acquaint students with basic models describing energetic structure of atoms, multi-atomic particles and solids (crystals) to teach students to conduct physical experiments independently (using descriptions included in the instructions) to develop skills of critical evaluation and interpretation of obtained experimental results and analysis of source texts

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BCHINŻ_K03] Independently sets or implements a set action plan specifying priorities for its implementation; critically assesses its progress.	- understanding of the need for continuing education, - taking care of the laboratory equipment entrusted to them, - exercising due care in the handling of laboratory equipment and in handling chemical reagents, - ability to work in a team according to his/her role in the team (team leader/group member), and group leader/member of a group), - awareness of the need for critical analysis of one's own work - cautious criticism of information, especially that available in the mass media, - awareness of the need to work with honesty and integrity.	[SK1] oral statement/conversation/ discussion [SK2] presentation/project/paper/ report [SK6] demonstration of practical skills
[BCHINŻ_K04] Demonstrates responsibility for the safety of her/ his own and others' work.	- understanding of the need for continuing education, - taking care of the laboratory equipment entrusted to them, - exercising due care in the handling of laboratory equipment and in handling chemical reagents, - ability to work in a team according to his/her role in the team (team leader/group member), and group leader/member of a group), - awareness of the need for critical analysis of one's own work - cautious criticism of information, especially that available in the mass media, - awareness of the need to work with honesty and integrity.	[SK1] oral statement/conversation/ discussion [SK8] observation of student's independent or team work
[BCHINŻ_U09] Using the acquired knowledge, skills and various sources of scientific information independently prepares written papers and oral presentations.	- use of quantum physics concepts to describe atoms molecules and electrons; - knowledge of the fundamentals of the energy structure of atoms, molecules and solids; - ability to interpret absorption and luminescence spectra.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU6] demonstration of practical skills
[BCHINŻ_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	- understanding of the need for continuing education, - taking care of the laboratory equipment entrusted to them, - exercising due care in the handling of laboratory equipment and in handling chemical reagents, - ability to work in a team according to his/her role in the team (team leader/group member), and group leader/member of a group), - awareness of the need for critical analysis of one's own work - cautious criticism of information, especially that available in the mass media, - awareness of the need to work with honesty and integrity.	[SK1] oral statement/conversation/ discussion [SK2] presentation/project/paper/ report [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[BCHINŻ_W02] Enumerates basic laws and theories in chemistry, physics and mathematics necessary to formulate and solve simple engineering tasks.	- understanding of the wave nature of particles and the resulting consequences; - knowledge of the structure of one-electron and many-electron atoms; - knowledge of the energy structure of molecules and crystals; - knowledge of basic spectral and X-ray diffraction apparatus X-ray diffraction.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

	Course outcome	Subject outcome	Method of verification
	[BCHINŻ_W03] Describes the techniques of higher mathematics and IT tools necessary to describe and model chemical phenomena and technological processes.	- understanding of the wave nature of particles and the resulting consequences; - knowledge of the structure of one-electron and many-electron atoms; - knowledge of the energy structure of molecules and crystals; - knowledge of basic spectral and X-ray diffraction apparatus X-ray diffraction.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
Subject contents	Corpuscular-wave duality and the foundations of quantum physicsFirst quantisationBosons and fermionsFermi-Dirac and Bose-Einstein statisticsHamiltonian free electron operator, density of statesParticle in a well of potentialSingle-electrode atomMulti-electrode atomQuantum numbers.Electron transitions with emission and absorption of photonsParticles (electron spectra , oscillatory and rotational spectra)Band structure of crystalsMethods of measuring the properties of atoms, molecules and crystals optical and X-ray spectroscopy		
Prerequisites and co-requisites	Basic knowledge of physics in terms of the physics lecture for chemistry students, basic knowledge of mathematical analysis in terms of the application of differential and integral calculus		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquium/entrance	51.0%	40.0%
	written report/report	51.0%	60.0%
Recommended reading	Basic literature	D. Holliday, R. Resnick, J. Walker Fundamentals of Physics vol. 5Z. Les Fundamentals of the Physics of the Atom,	
	Supplementary literature	R. Feynman, R. B. Leighton, M. Sands, Feynman lectures in physics, vol. 3C. Kittel , Introduction to solid state physics	
	eResources addresses		
Example issues/ example questions/ tasks being completed	NA		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.