



Subject card

Subject name and code	Physics of electronic collisions, PG_00021073						
Field of study	Technical Physics						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2027/2028		
Education level	first-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	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Division of Electron Collisions Physics -> Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor						
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczenie source address: https://enauczenie.pg.edu.pl/2025/course/view.php?id=946						
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	2.0	18.0	50		
Subject objectives	Fundamentals of the physics of electron collisions. Review of the basic experimental and theoretical methods used in the study of electron scattering on atoms and molecules.						
Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K6_W02] has systematized knowledge of the basics of physics, including mechanics, thermodynamics, electricity and magnetism, optics, atomic and particle physics, solid-state physics, nuclear and elementary particle physics	Knowledge of the theoretical description of electron scattering from atoms and molecules. Ability to choose an experimental method to study a given collisional process.	[SW1] Assessment of factual knowledge				
	[K6_U09] uses technical literature in English	Knowledge of the latest trends in the study of electron-matter interactions.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools				
Subject contents	Course content – lecture 1) Collisional processes 2) Total cross section and differential cross section 3) Linear transmission method - total cross-sections measurements 4) Basic methods of generating and monoenergizing electron beams 5) Theoretical description of the collision process 6) Elastic scattering of two identical spin-less particles in the Born approximation 7) Partial wave analysis						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	exam	65.0%	100.0%				

Recommended reading	Basic literature	1) S.P. Khare "Introduction to the Theory of Collisions of Electrons with Atoms and Molecules" Springer DOI 10.1007/978-1-4615-0611-9 2) I. Shimamura, K. Takayanagi "Electron-Molecule Collisions" Springer DOI: 10.1007/978-1-4613-2357-0
	Supplementary literature	H. Massey "Zderzenia atomowe i cząsteczkowe" PWN 1982
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Present the assumptions of the linear transmission method. 2. Define the total and differential cross section. 	
Practical activities within the subject	Not applicable	

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