



Subject card

Subject name and code	Quantum mechanics, PG_00037290						
Field of study	Technical Physics						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
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	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Theoretical Physics and Quantum Information -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Marek Czachor				
	Teachers		prof. dr hab. Marek Czachor				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	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	60		5.0		60.0	125
Subject objectives	Introduction to basic structures of quantum mechanics						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U02	Student: Derives basic properties of the Schroedinger equation Solves Schroedinger equation for harmonic oscillator and 1/r potential by creation-annihilation operator techniques Derives basic properties of orbital angular momentum and its eigenproblems Derives properties of the tensor product for the case of n q-bits			[SU1] Assessment of task fulfilment		
	K6_W02	Quantum mechanics forms a common element of many branches of science and thus helps to see them all in a unified way.			[SW1] Assessment of factual knowledge		
Subject contents	Introduction to nonrelativistic quantum mechanics of one and two spinless particles. Factorization method as a technique of solving Schroedinger equation. Angular momentum as an example of eigenvalue problem and special functions. Introduction to mathematical formalism of quantum information.						
Prerequisites and co-requisites	Theoretical mechanics and mathematical methods of physics						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Practical exercise		50.0%		50.0%		
	Oral exam		50.0%		50.0%		
Recommended reading	Basic literature		I. Białynicki-Birula i in., Teoria kwantów, PWN, 1994 R. Schankar, Mechanika kwantowa, PWN, 2005 L. Landau, E. Lifszyc, Mechanika kwantowa - teoria nierelatywistyczna, PWN, 1980				
	Supplementary literature		No requirements				
	eResources addresses		Adresy na platformie eNauczanie:				

Example issues/ example questions/ tasks being completed	Qubinary coding Superpotential
Work placement	Not applicable