Subject card

Subject name and code	Quantum mechanics, PG_00037290					
Field of study	Technical Physics					
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024	
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_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
	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 produt for the case of n q-bits	[SU1] Assessment of task fulfilment

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
	Oral exam	50.0%	50.0%
	Practical exercise	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: Mechanika Kwantowa - Kopia - Moodle ID: 14412 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=14412
Example issues/ example questions/ tasks being completed	Qubinary coding Superpotential	
Work placement	Not applicable	