

WROCLAW UNIVERSITY OF TECHNOLOGY – PHD STUDIES

FACULTY OF	
SUBJECT CARD	
Course name in Polish	Wprowadzenie do mechaniki kwantowej
Course name in English	Introduction to Quantum Mechanics
Course language	Polish
University-wide general course type: 1) <u>basic course (mathematics, physics, chemistry, other)</u> 2) humanity course 3) managerial skills 4) English language 5) other modern language Departmental course developing professional skills: 1) specialized course 2) interdisciplinary course 3) seminar (interdisciplinary, specialized, departmental)	
Type of course (obligatory, <u>optional</u>)	
Educational effects according to ZW 26/2017: P8U_W, P8S_WG, P8S_UW	
Subject code FZP9082	

*delete as applicable

	Lecture	Laboratory	Seminar
Number of hours of organized classes in University (ZZU)	30		
Number of hours of total student workload (CNPS)	180		
Form of crediting	Exam **	Exam / crediting with grade*	Oral presentation
Number of ECTS points	6		
including number of ECTS points for practical (P) classes			
including number of ECTS points for direct teacher-student contact (BK) classes	2		

*delete as applicable **In case of didactic courses also inspections and evaluation classes

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES	
1.	Ability to use methods of mathematical analysis and linear algebra
2.	Knowledge of fundamentals of physics
3.	Ability to work with sources, including scientific literature in English

SUBJECT OBJECTIVES	
C1	Student will become familiar with advanced concepts and methods of quantum mechanics
C2	
C3	
C4	

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SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W01 Student has knowledge about fundamentals of quantum mechanics

PEK_W02 Student has knowledge about select applications of quantum mechanics

PEK_W03 Student can use knowledge about quantum mechanics to analyse select problems in physics

Relating to skills:

PEK_U01 Student has skills related to methods and methodology of conducting research in the area of quantum mechanics

Relating to social competences:

PROGRAM CONTENTS

Form of classes – lecture		Number of hours
Lec 1	<i>Basic ideas of quantum mechanics</i>	2
Lec 2	<i>Space of quantum states</i>	2
Lec 3	<i>Observables, commutativity, uncertainty principles</i>	2
Lec 4	<i>Time evolution; Schrödinger equation</i>	2
Lec 5	<i>Schrödinger equation without time; numerical methods</i>	2
Lec 6	<i>Measurement</i>	2
Lec 7	<i>Basic one-dimensional models</i>	4
Lec 8	<i>Angular momentum</i>	4
Lec 9	<i>Hydrogen atom</i>	4
Lec 10	<i>Many-body systems; spin and statistics; numerical methods</i>	3
Lec 11	<i>Entanglement</i>	3
Total hours		30

Form of classes – laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
Lab 4		
...		
Total hours		

Form of classes – seminar		Number of hours

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Sem 1		
Sem 2		
Sem 3		
Sem 4		
...		
		Total hours

TEACHING TOOLS USED	
N1	Lecture with elements of problem discussion
N2	Calculation problems in form of homework
...	

EVALUATION OF ACHIEVED SUBJECT EDUCATIONAL EFFECTS		
Evaluation: F – forming (partial) C – concluding	Educational effect number	Way of evaluating achievement of educational effects
F1	PEK_W01, PEK_W02, PEK_W03, PEK_U01	Homework
F2	PEK_W01, PEK_W02, PEK_W03, PEK_U01	Test
...		
$C=0.4 \cdot F1 + 0.6 \cdot F2$		

PRIMARY AND SECONDARY LITERATURE
<p><u>PRIMARY LITERATURE:</u> [1] L. Marchildon, Quantum Mechanics</p> <p><u>SECONDARY LITERATURE:</u> [1] L. Schiff, Quantum Mechanics [2] R. Shankar, Principles of Quantum Mechanics</p>

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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