

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Aspects of the physics of the XXI century		Code 1010632211010416351
Field of study Mechanika i budowa maszyn	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Gas technology and renewable energy	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: -		No. of credits 1
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art the sciences Physical sciences		ECTS distribution (number and %) 1 100% 1 100%
Responsible for subject / lecturer: Prof. dr hab. Danuta Wróbel email: danuta.wrobel@put.poznan.pl tel. +4861 665-3179 Technical Physics ul. Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of classical and quantum physics, and mathematics (to the extent specified by the content of the curriculum relevant to the field of study)
2	Skills	Ability to solve elementary problems in physics and technology on the basis of their knowledge, the ability to acquire information from the indicated sources
3	Social competencies	Understanding of the need to broaden knowledge and skills
Assumptions and objectives of the course: 1. Provide students with knowledge of the achievements of modern physics 2. Develop students' ability to see examples of the achievements of modern physics in the principles of operation and construction of equipment used in science and technology 3. Develop students' skills in understanding the popular scientific sources, describing the achievements of modern physics and their innovative applications		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Define the basic concepts of quantum physics - [K2A_W03] 2. Formulate and clarify the fundamental laws of quantum physics and give examples of their application to the description of phenomena in the surrounding world - [K2A_W03] 3. Give examples of successes of quantum physics in the operation and construction of equipment used in science and technology - [K2A_W03]		
Skills: 1. Apply the basic laws of quantum physics and simplified models to describe phenomena in the surrounding world and the actions selected devices, which are used in the achievement of modern physics - [K2A_U02] 2. Specify the principles for the design and operation of research facilities using the achievements of modern physics - [K2A_U02] 3. Benefit from an understanding of the identified sources of knowledge (basic bibliography) and gain knowledge from other sources - [K2A_U09]		
Social competencies: 1. Independently develop and enhance knowledge and skills - [K2A_K01]		

Assessment methods of study outcomes		
Five Written tests: (3) 50.1%-70.0%, (4) 70.1%-90.0%, (5) from 90.1%		
Course description		
1.Precision spectroscopy 2.Ion and atomic traps 3.Rabbi method and its applications 4.Quadrupole spectrometer 5.Patterns of time and frequency 6.Applications of lasers in technology 7.Precision metrology equipment 8.Devices for material engineering		
Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture/seminar participation	28	
2. Consultation	4	
3. Preparation for assessment	28	
4. Assessment participation	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	62	1
Contact hours	34	0
Practical activities	0	0