STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
(-)	**1010401261010421280**

Field of study	Profile of study (general academic, practical)	Year /Semester
TECHNICAL PHYSICS	**general academic**	**3 / 6**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**elective**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **2** Classes: **-** Laboratory: **-** Project/seminars: **-**	**12**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
major	**from field**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**12 100%**
Technical sciences	**12 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of physics and mathematics in the first degree studies. Basic knowledge in optics, atomic physics and quantum
2	**Skills**	Ability to solve basic problems of physics on the basis of their knowledge, skills in obtaining information from identified sources
3	**Social competencies**	Willingness to work together as a team. Understanding the need to expand their competences

Assumptions and objectives of the course:

Provide basic knowledge on the design and use of lasers and practical skills in research planning and the use of laser radiation with measurements carried out with very high accuracy

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. He knows the basic concepts of physical conditions in the description of the experimental research, to use the basic knowledge in the field of metrology, knows the different methods of measurement using coherent light - [W01]
2. knows the structure and scope of applicability of the basic measuring devices, modules, components can recognize test equipment, to determine their role in measuring poultice - [W02]

Skills:

1. can benefit from an understanding of scientific publications and gain knowledge from other sources, in a synthetic way to make the development of the acquired knowledge - [U01]
2. able to design experimental systems or make changes in the construction of test equipment in order to comply with special requirements - [U02]
3. can handle basic measuring devices and laser equipment in accordance with the requirements and safety rules - [U03]

Social competencies:

1. can actively and independently expand their skills and work together as a team - [-]

Assessment methods of study outcomes

Lecture - Examination, laboratory - assessment, project - assessment

Course description
Physical basics of lasers, construction, types, and distribution of lasers. Spectroscopy using tunable lasers. Lasers for materials processing. Lasers in metrology, the use of the atomic clocks. Lasers in medical diagnostics and therapy. The use of strong beam of light in a non-linear spectroscopy. Frequency doubling and mixing light cooling and trapping of atoms
Basic bibliography:
Additional bibliography:

Result of average student's workload	
Activity	**Time (working hours)**
1. Participation to the lectures	30
2. preparation for the exam	20
3. exam	3
4. Participation in the laboratory	75
5. preparation for the laboratory	45
6. development of results	30
7. construction of the project	45
8. participation in consultations related to laboratory and project	30
9. participation in consultations related to the lecture	15
10. Participation in the seminar	15

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	308	12
Contact hours	135	5
Practical activities	75	3