STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Physics	**1010534111010440382**

Field of study	Profile of study (general academic, practical)	Year /Semester
Automatic Control and Robotics	**general academic**	**1 / 1**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
-	**Polish**	**obligatory**

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

No. of hours					No. of credits
Lecture: **12**	Classes: **8**	Laboratory: **12**	Project/seminars: **-**		**5**

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

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**5 100%**
Technical sciences	**5 100%**

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 (the secondary school curriculum, primary level)
2	**Skills**	Skill in elementary physical problem solving, skill in acquiring information from listed sources
3	**Social competencies**	Understanding the necesity of personal competence development, readiness to cooperate in a team. Understanding the necesity of personal competence development, readiness to cooperate in a team.

Assumptions and objectives of the course:

1. Introduction of basic knowledge in physics within the scope of curriculum content specific for the field of study
2. Development of skills in simple problem solving, carying out simple experiments and results analysis
3. Team work ability development

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

Knowledge:

1. Student, who has completed the course, is able to define basic physical terms within the scope of curriculum content specific for the field of study and give simple examples of their application in real world - [K_W2+++, K_W3+++]
2. Student, who has completed the course, is able to formulate and explain basic physics laws within the scope of curriculum content specific for the field of study, explain the range of application and give examples of their application to real world problems - [K_W2+++, K_W3+++]
3. Student, who has completed the course, is able to explain purpose and importance of simplified models in physical phenomena description - [K_W2+++, K_W3+++]

Skills:

1. Student, who has completed the course, is able to apply basic physics laws and simplified models to solve simple problems within the scope of curriculum content specific for the field of study - [K_U1++, K_U2++]

2. Student, who has completed the course, is able to prepare and carry out standard measurements of basic physical phenomena, identify basic sources of measurement errors - [K_U1++, K_U2++]

3. Student, who has completed the course, is able to perform qualitative and quantitative analysis of simple physical experiments results - [K_U2++]

4. Student, who has completed the course, is able to formulate basic conclusions concerning obtained results of measurements and calculations - [K_U2++]

5. Student, who has completed the course, is able to make use of the listed sources of knowledge (basic literature list) and acquire information from other sources - [K_U1++]

Social competencies:

1. Student, who has completed the course, is able to actively involve in solving problems, develop and expand personal competence - [K_K1+]

2. Student, who has completed the course, is able to work in a team, carry out tasks arising from dividing up of work in a team, to take responsibility for team work results - [K_K1+, K_K5+]

Assessment methods of study outcomes

1. Lecture

Assessment of knowledge and skills during a written exam (knowledge of basic physical terms, ability to explain meaning and application scope of physics laws). Assessment of ability to extract information from the listed literature in case of self-study problems.

2. Classes

Assessment of knowledge and skills during a written test at the last class in the semester (2 hours). The scope of test includes problems solved during the classes and listed self-study problems. Exam and test are assessed on the basis of percentage score:

3,0	50,1%-60,0%
3,5	60,1%-70,0%
4,0	70,1%-80,0%
4,5	80,1%-90,0%
5,0	od 90,1%.

3. Laboratory

Continuous assessment of knowledge of current exercise and ability to make use of the listed literature, performed in written or oral form. Continuous assessment of planning and carrying out standard measurements of basic physical quantities with the use of information from the listed literature abilities. Assessment of team work skill. Assessment of skill in analysis of measurements and presentation of results in written reports.

Detailed assessment regulations are in accordance with the rules of I Pracownia fizyczna, and are presented by the lecturer during the first laboratory classes.

Course description

1. Kinematics and dynamics of linear motion
- definitions of basic quantities
- Newton's laws
- work, mechanical energy
- conservation of energy and linear momentum

2. Kinematics and dynamics of circular motion
- definitions of basic quantities
- Newton's laws, conservation of angular momentum

3. Harmonic oscillations
- simple, damped and forced harmonic oscillations
- harmonic and anharmonic oscillations - physical pendulum
- resonance phenomenon
- propagation of oscillations in elastic medium - mechanical waves

4. Fundamental forces of nature
- gravitational field
- electric field
- magnetic field
- motion of a particle in a field of force

5. Thermodynamics

- basic terms
- laws of thermodynamics
- elements of the kinetic theory of gases

6. Electric current
- mechanism of electric conduction
- magnetic field produced by current-carrying conductors

7. Electromagnetism
- electromagnetic induction
- electromagnetic waves

Basic bibliography:

1. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t. 1-5, Wydawnictwo Naukowe PWN, Warszawa 2015
2. J.Walker, Podstawy fizyki. Zbiór zadań, Wydawnictwo Naukowe PWN, Warszawa 2008
3. K. Jezierski, B. Kołodka, K. Sierański, Fizyka. Zadania z rozwiązaniami. Cz. 1 ? Mechanika, Oficyna Wyd. Scripta, Wrocław 2000
4. K. Jezierski, B. Kołodka, K. Sierański, Fizyka. Zadania z rozwiązaniami. Cz. 2 ? Termodynamika, elektryczność i magnetyzm, fizyka kwantowa, Oficyna Wyd. Scripta, Wrocław 1999
5. S.Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

Additional bibliography:

1. J.Massalski, M.Massalska, Fizyka dla inżynierów t.1, Wydawnictwa Naukowo-Techniczne, Warszawa 2006
2. J.Massalski, Fizyka dla inżynierów t.2, Wydawnictwa Naukowo-Techniczne, Warszawa 2006
3. H. Szydłowski, Pracownia fizyczna wspomagana komputerem, Wydawnictwo Naukowe PWN, Warszawa 2012

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lectures	12
2. Participation in the classes	8
3. Participation in lab classes	12
4. Preparation for the classes	6
5. Preparation for lab classes	12
6. Making reports of lab classes	18
7. Preparation for the final test of classes	30
8. Preparation for the exam	30
9. Participation in the exam	2

Student’s workload

Source of workload	hours	ECTS
Total workload	132	5
Contact hours	34	1
Practical activities	42	2