COURSE DESCRIPTION CARD - SYLLABUS

Course name
Experimental Physics [S1FT2>FD1]

Course

Field of study
Technical Physics

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
60

Laboratory classes
0

Other
0

Tutorials
60

Projects/seminars
0

Number of credit points

9,00

Coordinators

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Lecturers

Prerequisites

1. Basic knowledge concerning physics and mathematics (program base for secondary school, basic level). 2. Solving elementary physical problems based on acquired knowledge, ability to acquire information from given sources. 3. Understanding of necessity of own competence broadening, readiness to cooperate within group.

Course objective

1. Hand over basic knowledge concerning physics with special emphasis on applications in technical fields. 2. Mold students abilities to solve physical problems, doing experiments and analyze results based on acquired knowledge. 3. Develop students abilities within literature study.

Course-related learning outcomes

Knowledge:
W01. Mathematical knowledge necessary to description of physical laws and solving physical problems, covering: differenatial and integral equations, linear algebra and analytical geometry
W02. Orderly and theoretical supported knowledge within mechanics, waves, thermodynamics and gravitation

Skills:
U01. Using mathematical and analytical knowledge to phenomenon description, model and algorithm creation in technical physics field and to form and solve problems also in measurements
U02. Using (with understanding) recommended knowledge sources: literature, data baze and others. Ability of interpretation, conclusions, form and justification of opinions
U03. Ability of self-education

Social competences:
K01. Ability to responsible work on appointed tasks, also in group
K02. Responsibility for work effects, reliability and interpretation of obtained results. Obey professional ethics

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Effect: Evaluation form: Evaluation criteria:
W01, W02 Oral / written exam 50.1%-70.0% (3)
U01, U02 Oral / written exam 70.1%-90.0% (4)
Evaluation of answers from 90.1% (5)
U01, U02, U03 Written exam 50.1%-70.0% (3)
70.1%-90.0% (4)
from 90.1% (5)
K01, K02 Evaluation of activity on math exercises:
Student works strongly supported by teacher, with understanding of acquired knowledge. Is able to solve assigned tasks only in common way. Is not capable to analyze more problems than covered by basic scope of teaching. Demonstrate limited engagement during lessons. (3)
Student works independently, occasionally supported by teacher, with understanding of acquired knowledge. Is able to solve assigned tasks in proper way. Sometimes is capable to analyze more problems than covered by basic scope of teaching. Demonstrate engagement during lessons. (4)
Student works fully independently with deep understanding of acquired knowledge. Is able to solve assigned tasks in ingenious and unconventional way. Is capable to analyze more problems than covered by basic scope of teaching. Demonstrate great engagement during lessons. (5)

Programme content

Mathematical knowledge necessary to description of physical laws and solving physical problems,
Mechanics,
Waves and Acoustics,
Gravitation.

Course topics

Mathematical knowledge necessary to description of physical laws and solving physical problems:
- Scalars and Vectors,
- Symbolic Calculations,
- Differenatial and Integral Equations,
- Operator Calculations,

Mechanics:
- Units and Measurement,
- Motion Along a Straight Line,
- Motion in Two and Three Dimensions,
- Newton's Laws of Motion,
- Applications of Newton's Laws,
- Work and Kinetic Energy,
- Potential Energy and Conservation of Energy,
- Linear Momentum and Collisions,
- Fixed-Axis Rotation,
- Angular Momentum,
- Static Equilibrium and Elasticity,

Waves and Acoustics:
- Oscillations,
- Waves,
- Sound,
Gravitation:
- Newton's Law of Universal Gravitation,
- The Gravitational Field,
- Kepler's Laws of Planetary Motion,
- Einstein's Theory of Gravity.

Teaching methods

Lecture: multimedial presentation, movies, animations.
Math exercises: practical exercises, numerical simulations.

Bibliography

Basic:
D.Halliday, R.Resnick, J.Walker: Fundamentals of Physics, Wiley 2015
E-learning Moodle course: Physics without risk. Available under address:
https://moodle.put.poznan.pl/
on category WIMiFT
B. Fabiański, Z. Paczkowski: Zbiór zadań z fizyki, Warszawski Dom Wydawniczy 2000
J. Araminowicz: Zbiór zadań z fizyki, PWN 1998
A. Hennel, W. Krzyżanowski, W. Suszkiewicz, K. Wódkiewicz: Zadania i problemy z fizyki t. 1, PWN 1974

Additional:
Online literature: Universty PHYSICS, OPENSTAX. Available under adress:
https://openstax.org/subjects/science

Breakdown of average student's workload

	Hours	ECTS
Total workload	225	9,00
Classes requiring direct contact with the teacher	122	5,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	103	4,00