



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Experimental Physics [S1FT2>FD2]

Course

Field of study

Technical Physics

Year/Semester

1/2

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 (e.g. online)

0

Tutorials

60

Projects/seminars

0

Number of credit points

9,00

Coordinators

dr inż. Adam Buczek prof. PP
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Lecturers

Prerequisites

1. Basic mathematics knowledge (differential and integral equations, operator calculations) and experimental physics knowledge (covering first term). 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: differential and integral equations, linear algebra and analytical geometry

W02. Orderly and theoretical supported knowledge within electricity and magnetism, optics and elements of modern physics

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 base 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,
Electricity and magnetism,

Optics,

Elements of Modern Physics.

Course topics

Mathematical knowledge necessary to description of physical laws and solving physical problems:

- Scalars and Vectors,
- Symbolic Calculations,
- Differential and Integral Equations,
- Operator Calculations,

Electricity and magnetism:

- Electric Charges and Fields,
- Gauss's Law,
- Electric Potential,
- Capacitance,
- Current and Resistance,
- Direct-Current Circuits,
- Magnetic Forces and Fields,
- Sources of Magnetic Fields,
- Electromagnetic Induction,
- Inductance,
- Alternating-Current Circuits,

- Electromagnetic Waves,
- Optics:
 - The Nature of Light,
 - Geometric Optics and Image Formation,
 - Interference,
 - Diffraction,
- Elements of Modern Physics:
 - Relativity,

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. 2, 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	3,00