



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics [S1TCh2>FIZ1]

### Course

Field of study

Chemical Technology

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

45

Laboratory classes

0

Other

0

Tutorials

15

Projects/seminars

0

### Number of credit points

5,00

### Coordinators

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### Lecturers

### Prerequisites

Basic knowledge concerning physics and mathematics. Solving elementary physical problems based on acquired knowledge, ability to acquire information from given sources. Understanding of necessity of own competence broadening, readiness to cooperate within group.

### Course objective

Educate students in the basic concepts and physical laws in the field of classical physics, including their applications in technical sciences, develop students' skills to solve problems in the field of technical physics, recognize its potential applications in the studied field, develop students' teamwork skills.

### Course-related learning outcomes

Knowledge:

Advanced knowledge within classical mechanics, thermodynamics, gravity and electrical interactions with special emphasis on their applications in studied subject. Basic knowledge about constructing, principles of working and lifetime of modern engineering systems. (K\_W02)

Skills:

Using (with understanding) recommended knowledge sources (catalog data, applications notes) and derive knowledge from other sources for self-education purpose. Carry out and analyze basic physical experiments and measurements on electrical systems with results interpretation and presentation in numerical and graphical forms.(K\_U01, K\_U02)

Social competences:

Understanding of role of knowledge in problems solutions and in increasing level of professional, personal and social skills. Ability of logical and enterprising thinking in electrical engineering field. (K\_K01,K\_K02)

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows: Lecture:

Oral or written exam that is aimed at students knowledge evaluation based on their explanations of chosen physics problems, current evaluation of students activity

Math exercises:

Substantial evaluation of methods of problem solving: proper physical formula application, logical line of thinking, mathematical efficiency in formula calculations also with numerical data and units, capabilities to solve problems using different methods, clarity and aesthetics of task solutions, current evaluation of students activity

### Programme content

The lecture discusses the basic branches of physics: mechanics (kinematics, dynamics, harmonic vibrations, mechanical waves), the science of heat, the science of electricity and magnetism, optics and the basics of modern physics.

### Course topics

1. Classical mechanics: movement classification, work, power, potential and kinetic energy, conservative and non-conservative forces, dynamics of linear and curvilinear motion (dynamics and conservation rules), harmonic free vibrations, forced vibrations (resonance), damping vibrations, description of periodic processes with vector diagrams, mechanical waves.
2. Thermodynamics: pressure, temperature, 0 thermodynamics law, heat, heat conduction, 1st law of thermodynamics, elements of kinetic gas theory, gas processes, heat machines, 2nd law of thermodynamics.
3. Gravitational interactions: law of universal gravitation, scalar and vector description of gravitational field.
4. Electromagnetic interactions: magnetostatics (Gauss, Ampere's, Biot-Savart's laws), magnetic properties of matter, charge movement in magnetic field (Lorentz's, electrodynamic forces), electromagnetic induction (Faraday's law), Maxwell's equations and electromagnetic waves.
- Optics: geometrical optics (reflection and refraction laws), wave optics (interference and diffraction)
5. Modern physics achievements: elements of special relativity theory, quantum theory basic elements, chosen aspects of atomic, molecular, solid state, nuclear and particles physics problems connected with study.

### Teaching methods

Lecture: multimedia presentation, animations, movies.

Math exercises: practical exercises.

### Bibliography

Basic:

1. J. Orear, Fizyka, t. 1- 2, WNT, W-wa 1990
2. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t 1-5, PWN, Warszawa 2005.
3. K.Jeziński, B.Kołodka, K.Sierański, Fizyka. Zadania z rozwiązaniami t 1-2, Oficyna Wydawnicza Scripta, Wrocław 2007

Additional:

1. J.Massalski, M.Massalska, Fizyka dla inżynierów t.1-2, WNT, Warszawa 2006

2. e-Fizyka" to internet course z Fizyki AGH : Autors: Zbigniew Kąkol i Jan Żukrowski.

#### Breakdown of average student's workload

|                                                                                                                                         | Hours | ECTS |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Total workload                                                                                                                          | 125   | 5,00 |
| Classes requiring direct contact with the teacher                                                                                       | 63    | 2,50 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 62    | 2,50 |