COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics

Course

Field of study
Aerospace Engineering

Year/Semester
1

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes

Other (e.g. online)

Tutorials
15

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
dr Ewa Chrzumnicka

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Responsible for the course/lecturer:

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.

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

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.

Methods for verifying learning outcomes and assessment criteria

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 choosen 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

Classical mechanics:

-) Scalars and Vectors:Algebra of Vectors and Products of Vectors

-) Movement classification:motion along a straight line, motion in two and three dimension,instantaneous vielocity and speed, average,

Newton's Laws of Motions:

-)Forces ,Newton's First Law, Newton's Second Law, Mass and Weight, Newton’s Third Law , Applications of Newton's Laws,

-)Work and Energy,

-)Potential Energy and Conservation of Energy,

-)Linear Momentum and Collisions,

-)Fixed-Axis Rotation: Moment of Inertia and Rotational Kinetic Energy

-)Angular Momentum

Gravitation:

-)Newton's Law of Universal Gravitation, Gravitation Near Earth's Surface, Gravitational Potential Energy and Total Energy, Satellite Orbits and Energy, Kepler's Laws of Planetary Motion,

Fluid Mechanics:

-)Fluids, Density, and Pressure,Measuring Pressure,Pascal's Principle and Hydraulics, rchimedes' Principle and Buoyancy, Fluid Dynamics, Bernoulli's Equation.Viscosity and Turbulence,

Waves and Acoustics:

-)Oscillations, Oscillations, Sound,The Doppler Effect,Shock Waves

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,

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)

Teaching methods

Lecture: multimedial presentation, animations, movies.

Math exercises: practical exercises.

Bibliography

Basic

1)R. Resnick, D. Halliday, Fizyka , t. 1- 5, PWN, Warszawa 2005

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

3)MODERN PHYSICS (Modern Physics 4e) Paul A. Tipler and Ralph A. Llewellyn Physics for scientists and engineers Paul M. Fishbane. - 2. ed., extended. - Upper Saddle River, NJ : Prentice Hall, c 1996

4)J. Orear, Fizyka, t. 1- 2, WNT, W-wa 1990

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	60	2.5
Student's own work (literature studies, preparation for math exercises, preparation for tests/exam) [1]	40	1.5

[1] delete or add other activities as appropriate