COURSE DESCRIPTION CARD - SYLLABUS

Course name
Aspects of the physics of the XXI century [S2Trans1E>AFXXIw]

Course

Field of study
Transport

Year/Semester
1/1

Area of study (specialization)
Sustainable Transport

Profile of study
general academic

Level of study
second-cycle

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

dr hab. Arkadiusz Ptak prof. PP
arkadiusz.ptak@put.poznan.pl

Lecturers

Prerequisites

Basics of mathematics, chemistry and physics, Using literature (textbooks, internet), the ability to perceive lecture content, Awareness of the need to deepen engineering knowledge and its place in everyday life.

Course objective

Providing students with basic knowledge of the physical aspects of the functioning of the world around us in the scope defined by the curriculum content appropriate for the field of study.

Course-related learning outcomes

Knowledge:
Student has ordered and theoretically founded general knowledge related to key issues in the field of transport engineering

Skills:
Student is able to plan and conduct experiments, including measurements and simulations, interpret the obtained results and draw conclusions, as well as formulate and verify hypotheses related to complex engineering problems and simple research problems

Student is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks and simple research problems

Social competences:
Student understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Written credit.
In case of doubts related to the assessment, an oral exam is allowed.

Programme content

1. Introductory lecture–the essence of physics.
2. Physical quantities and units–new definitions (from 2019).
3. The conservation laws in a contemporary perspective.
4. Ideas of quantization, quantum physics, quantum computers.
5. Structure of matter – from elementary particles to the universe.
6. How to see invisible – imaging at the nanoscale, nanoscience and nanoengineering.
7. Discussion on hot topics in modern physics.

Teaching methods

Multimedia presentation

Bibliography

Basic
1. Pdfs and notes from the lecture
2. R. Resnick, D. Halliday, J. Walker: Fundamentals of Physics
3. P. G. Hewitt: Conceptual Physics
4. P. A. Tipler, R. A. Llewellyn: Modern Physics

Supplementary
1. S. Gibilisco: Physics Demystified : A Self-Teaching Guide
2. Nanoscience: Nanotechnologies and Nanophysics, C. Dupas, Ph. Houdy, M. Lahmani (Eds), Springer-Verlag Berlin 2007
3. Nanoscale Science and Technology, R. W. Kelsall, I. W. Hamley, M. Geoghegan (Eds), John Wiley & Sons, Ltd (https://www.academia.edu/38081022/Nanoscale_Science_and_Technology–free pdf)

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	0,50