University of Gdańsk

Subject card

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|---|---|---|---|
| Subject name and code | Physics for oceanographers - lecture, PG_00103325 | | |
| Field of study | Oceanography | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | 2024/2025 |
| Education level | undergraduate studies | Subject group | |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 2 | ECTS credits | 4.0 |
| Learning profile | academic | Assessment form | |
| Conducting unit | Pracownia Oceanografii Fizycznej -> Katedra Oceanografii Fizycznej i Badań Klimatu -> Faculty of Oceanography and Geography | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Wojciech Brodziński | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 40.0 | 0.0 | 0.0 | 0.0 | 0.0 | 40 |

E-learning hours included: 0.0

Additional information:
If necessary, up to 6 hours of classes can be conducted remotely.

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 40 | 10.0 | 50.0 | 100 |

**Subject objectives**

1. Familiarizing students with basic physical phenomena and processes, the laws governing them and methods of their research.

2. Providing knowledge and developing skills necessary to:

- using the methods of higher mathematics to describe physical phenomena and the physical interpretation of the obtained mathematical solutions;

- carrying out observations of physical pjenomena; collecting, analyzing and interpreting data.

3. Development of creative thinking skills.

4. Creating a basis for the effective use of subsequent courses on marine physics and other areas of oceanography.

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| OCEANL3-W01 | K_W01 - Knows and understands the terminology used in physics at an advanced level | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |
| OCEANL3-U04 | K_U04 - Is able to independently search for information in Polish and English-language specialized literature, as well as on the Internet within the scope of the subject. | [SU4] test/exam - oral or written |
| OCEANL3-W02 | K_W02 - Understands and correctly describes the basic physical phenomena occurring in nature, including the marine environment, and the laws governing them | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |

## Subject contents

A.1 Motion of a material point: Characteristics of motion. Uniform linear motion. Non-uniform linear motion. Motion on a plane. Circular motion. Relativity of motion.

A.2 Dynamics: Force. Newton's 1st - 3rd principles of dynamics. Types of forces in nature. Momentum. Principle of conservation of momentum. Work. Conservative and non-conservative forces. Mechanical energy. Principle of conservation of mechanical energy.

A.3 Mechanical oscillations: Parameters describing harmonic oscillations. Equation of vibrations of a harmonic oscillator. Energy in oscillating motion. Free, damped and forced oscillations. Resonance phenomena.

A.4 Waves: Definition of a wave. Classification of waves. Parameters characterizing a wave. Wave phenomena.

A.5 Electricity and magnetism (selected elements). Electromagnetic waves. Spectrum of electromagnetic radiation.

A.6 Corpuscular-wave nature of light.

A.7 Thermodynamics: Basic concepts: temperature, heat. Mechanisms of heat exchange. The first law of thermodynamics. Ideal gas and its transformations.

A.8 Elements of fluid statics: hydrostatic pressure, Pascal's law, buoyancy force, Archimedes' law.

## Prerequisites and co-requisites

Knowledge of the basics of higher mathematics.The prerequisite for taking the exam is a passing grade in the auditory and laboratory exercises in Physics for oceanographers.

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Final exam | 51.0% | 100.0% |

## Recommended reading

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|---|---|
| Basic literature | 1. Samuel J. Ling, William Moebs , Jeff Sanny, 2018, Fizyka dla szkół wyższych, OpenStax Polska<br>2. Stanisław R. Massel, 2010. Procesy hydrodynamiczne w ekosystemach morskich. Wydawnictwo Uniwersytetu Gdańskiego. |
| Supplementary literature | 1. Jearl Walker, 2011. Podstawy fizyki. Zbiór zadań. Wydawnictwo: Naukowe PWN.<br>2. Paul G. Hewitt, 2010. Fizyka wokół nas Wydawnictwo Naukowe PWN.<br>3. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 1. Mechanika. Wydawnictwo Naukowe PWN.<br>4. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 2. Mechanika, drgania i fale, termodynamika. Wydawnictwo Naukowe<br>PWN.<br>5. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 3. Elektryczność i magnetyzm. Wydawnictwo Naukowe PWN.<br>6. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 4. Fale elektromagnetyczne, optyka i teoria względności. Wydawnictwo Naukowe PWN. |
| eResources addresses | Adresy na platformie eNauczanie: |

## Example issues/ example questions/ tasks being completed

## Work placement

Not applicable

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