

DESCRIPTION OF THE STUDY SUBJECT

Title

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|----------------|
| PHYSICS |
|----------------|

Scope of the subject

| Semester | Mode of studies | Structure* | | | | | Total number of hours | Number of credits | Group and type of subjects |
|----------|-----------------|------------|----|----|----|----|-----------------------|-------------------|--|
| | | L | PS | C | Lw | S | | | |
| I | Full-time | 24 | 18 | 12 | 24 | 79 | 157 | 6 | Compulsory subjects of the study field |
| I | Part-time | 12 | 8 | 42 | 16 | 79 | 157 | 6 | |

*L – lectures, PS – practical activities, seminars, LW – laboratory work, PR – practice, CP – course paper, C – consultations, S – self-study

Aim of the subject

To apply basic knowledge of mechanics, electricity, semiconductor physics required for electrotechnics, electronics, optics and other subjects related to physics, to solve problems and, doing laboratory work, to logically simulate the sequence of operations, this way enabling to work independently and make decisions.

Necessary background knowledge for studying the subject

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Content of the subject

| Title of the topic and description of the content | Number of contact hours | | | | S | Total number of hours |
|---|-------------------------|----|---|----|----|-----------------------|
| | L | PS | C | Lw | | |
| 1. Achievements in the science of physics and future challenges in Lithuania and the world. The system of units SI. Kinematics of reciprocating motion of the material point. Reference systems. Speed, acceleration. | 3 | 2 | 1 | - | 2 | 8 |
| Laboratory work. Assessment of direct and indirect measurement errors. | - | - | - | 2 | 2 | 4 |
| Laboratory work. Study of spring pendulum oscillations. | - | - | - | 2 | 2 | 4 |
| 2. Basics of molecular-kinetic theory of ideal gas. Ideal gas. Equation of state, their laws, izoprocesses. Transference phenomena. | 2 | - | 1 | - | 4 | 7 |
| Laboratory work. Identification of thermal expansion coefficient of solid bodies. | - | - | - | 2 | 2 | 4 |
| 3. Real gases. Internal energy of gas. | 2 | - | 1 | - | 2 | 5 |
| Laboratory work. Identification of temperature coefficient of resistance of metals. | - | - | - | 2 | 2 | 4 |
| 4. Basics of thermodynamics. Cyclic processes. | 2 | 2 | 1 | - | 4 | 9 |
| Test | - | 2 | 1 | - | 3 | 6 |
| 5. Electrostatics. Electric charge, Coulomb's law. The electric field potential. Constant current. | 3 | - | 1 | - | 4 | 8 |
| Laboratory work. Measurement of electrical quantities and measurement errors. | - | - | - | 2 | 1 | 3 |
| Laboratory work. Measurement of resistance using the Wheatstone bridge. | - | - | - | 2 | 2 | 4 |
| Laboratory work. The study of the potentiometer. | - | - | - | 2 | 1 | 3 |
| 6. Magnetism, its characteristics. The Ampere and Lorentz force. Work. The magnetic field energy. | 3 | 3 | 2 | - | 4 | 12 |
| Laboratory work. Study of the oscilloscope. | - | - | - | 2 | 2 | 4 |
| 7. Electromagnetic oscillations and waves. Induction. Alternating current its receiving, parameters. | 3 | 4 | 1 | - | 4 | 12 |
| 8. Basics of geometrical optics. Spread of light by fibre. | 2 | 2 | 1 | - | 4 | 9 |
| Laboratory work. Identification of the focal length of lenses. | - | - | - | 2 | 2 | 4 |
| 9. Elements of semiconductor physics. | 4 | 3 | 2 | - | 4 | 13 |
| Laboratory work. The study of rectifier of the AC of the semiconductor. | - | - | - | 2 | 3 | 5 |
| Laboratory work. Study of the solar battery. | - | - | - | 4 | 4 | 8 |
| Preparation and taking the exam | | | | | 21 | 21 |

| Title of the topic and description of the content | Number of contact hours | | | | S | Total number of hours |
|---|-------------------------|-----------|-----------|-----------|-----------|-----------------------|
| | L | PS | C | Lw | | |
| Total number of hours | 24 | 18 | 12 | 24 | 79 | 157 |

Assessment of learning outcomes

Ten-point criteria-based assessment system as well as cumulative assessment using individual cumulative index (ICI) are applied. The overall grade consists of the marks for intermediate accountings and examination (E) multiplied by weighted coefficients. $ICI = 0,4 E + 0,4 Lw + 0,2 T$, Lw – laboratory works, T – test.

Recommended literature

| Key literature | | | | | | |
|----------------|--------------------|---|------------------------------------|---|----------------|-------------------|
| No. | Year of publishing | Author(s) and title of the publication | Publishing house | Number of copies and/or internet link | | |
| | | | | ŠSC library | Other premises | Other libraries * |
| 1. | 2011, 2010 | Bogdanovičius A. Fizikos pagrindai inžinerijoje. 1-2 d. | Technika | 4 | - | 8 |
| 2. | 2008 | Martinėnas B. Fizika | Technologija | 2 | - | 8 |
| 3. | 2007 | Stasiūnienė I. Fizikos laboratoriniai darbai | Šiaulių kolegijos leidybos centras | 120 | - | 4 |
| 4. | | Bogdanovičius A. Fizikos pagrindai inžinerijoje. I-II d | VG TU | http://ezproxy.svako.lt:2068/product/fizikos-pagrindai-ininerijoje-1-2-dalis | | |
| 5. | | Liudvikas Augulis, Alvydas Jotautis ir kt. Fizika: mechanika, termodinamika, elektromagnetizmas | Technologija | http://www.ebooks.ktu.lt/eb/656/fizika_mechanika_termodinamika_elektromagnetizmas/ | | |

Additional literature

| No. | Year of publishing | Author(s) and title of the publication | Publishing house and/or internet link |
|-----|--------------------|---|--|
| 1. | 2011 | Šatkovskis, E., Stupakova, J., Gradauskas, J., Sužiedėlis, A., Mitkevičius, R.,. 2011 Sensitivity improvement in porous silicon microwavedetector. Lithuanian Journal of Physics. Vol. 51, no. 2, p. 143-146. | www.itpa.lt/LFD/Lfz/LFZ.html |
| 2. | 2005 | Požėla I., Sukackas V., Radvilavičius Č. Fizika. Elektromagnetizmas, optika, atomo fizika. | Technologija |
| 3. | 2004 | Tamašauskas A., Tamulevičius S. Fizikos laboratoriniai darbai. | Technologija |

* ŠAVB – Šiauliai Region Povilas Višinskis Public Library, ŠU – library of Šiauliai University

Required material resources and their short description

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| <ul style="list-style-type: none"> Equipment (devices): a computer with Internet access, multimedia projector, laboratory equipment for performance of laboratory works of mechanics, thermodynamics, optics, electrodynamics, semiconductor physics. |
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The description prepared by:

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