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| Course ID: H00113 | | Course name: PHYSICS I | |
| Cycle: FIRST | Year: FIRST | Semester: I | ECTS credits: 6 |
| Status: MANDATORY | | Total course hours: 90 Lectures : 45 Laboratory work: 30 Auditory exercises: 15 | |
| Teaching participants | Teachers and associates with expertise in the field to which the subject | | |
| Prerequisite for enrollment: | - | | |
| Course aims: | The main aim of this course is to introduce basic physical phenomena and topics from molecular physics, thermodynamic and electrical phenomena so that presented knowledge and acquired skills can be further applied in related fields in chemistry. | | |
| Thematic course units: | <ol style="list-style-type: none">1. Basic mathematical tools, physical models and quantities. International units. Significant digits. Dimensional analysis. Error analysis and measurement. Plotting data.2. Physical and chemical properties of matter. Fundamental interactions. Form of energy and conservation laws.3. Linear oscillator model. Harmonic oscillations. Mechanical energy of LHO. Damped and forced oscillations. Mechanical waves. Sound.4. Buoyancy force and Archimedes law. Pascal's law in fluids. Static and dynamic pressure. Bernoulli equation. Surface tension and viscosity.5. Heat, temperature and internal energy. Phase transitions and heat latent.6. Work in thermodynamic processes. Heat transfer. Ideal gas model. Isoprocesses and adiabatic process. First law of thermodynamics.7. Molecular-kinetic theory. Maxwell-Boltzmann distribution. Dulong-Petit law. Second law of thermodynamics. Entropy.8. Midterm9. Real gases. Van der Waals equation. Joule-Thomson effect. Transport phenomena in gases. Diffusion.10. Electric charge. Conservation of electric charges. Coulomb law. Electric field and Gauss law. Work and energy of the electric field. Electric potential and capacitance.11. Electric dipole. Conductors and dielectrics. Electric polarization of matter in an external electric field.12. Electric current. Resistance in conductors and electrolytes. Joule-Lenz law. Faraday law of electrolysis.13. Alternating current. Resistance in AC circuit.14. Magnetic field. Lorentz force. Ampere law. Magnetic dipole moment.15. Magnetic properties of matter. Types of magnetic materials. | | |

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| | Magnetic susceptibility. | | |
| Learning outcomes: | <p>Knowledge: Basic theoretical and practical knowledge of physical models for solving and analyzing different phenomena in molecular physics, thermodynamics and electrical phenomena.</p> <p>Skills: Independently to analyze and solve problems using model approach.</p> <p>Competences: application of physical model in solving problems, using basic scientific instruments such as oscilloscope, multimeter, photodetectors, AC/DC power supply, etc, and plotting data.</p> | | |
| Metode izvođenja nastave: | Auditory lectures and laboratory work and exercises. | | |
| Assesment methods and grading system¹: | Grading criteria | | |
| | Criteria | Maximal score | Required score |
| | Laboratory work | 20 | 11 |
| | Midterm exam | 40 | 22 |
| | Final exam | 40 | 22 |
| | Total | 100 | 55 |
| | Scores and grading | | |
| | Score | Grade (BiH) | Grade (ECTS) |
| | <55 | 5 | F, FX |
| | 55-64 | 6 | E |
| 65-74 | 7 | D | |
| 75-84 | 8 | C | |
| 85-94 | 9 | B | |
| 95-100 | 10 | A | |
| Literature²: | <p>Mandatory literature:</p> <ol style="list-style-type: none"> Lecture notes. L. Tanović, N. Tanović; Fizika: mehanika, oscilacije i talasi, Svjetlost – Zavod za udžbenike i nastavna sredstava, Sarajevo, 1990. L. Tanović, N. Tanović; Fizika: osnove termodinamike i molekularno-kinetičke teorije gasova, Svjetlost – Zavod za udžbenike i nastavna sredstava, Sarajevo, 1989. Z. Hadžibegović, Fizika I: praktikum laboratorijskih i računskih vježbi, Prirodno-matematički fakultet, Sarajevo, 2011. <p>Supplementary literature:</p> <ol style="list-style-type: none"> S. Bikić, Zbirka riješenih zadataka iz fizike, Dom štampe, Zenica, 1998. | | |

¹ The grading structure for each subject is determined by the Council of the organizational unit before the beginning of the academic year in which the subject is taught as per Article 64, paragraph 6 of the Law on Higher Education of Sarajevo Canton.

² The Senate of the higher education institution, as an institution, or the Council of the organizational unit of the higher education institution, as a public institution, determines by a special decision, which is published on its website before the beginning of the academic year obligatory, mandatory and recommended textbooks and manuals, as well as other recommended literature based on which exams are prepared and taken as per Article 56, paragraph 3 of the Law on Higher Education of the Sarajevo Canton