|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Title of the course:***  Physics for Engineers | | ***NEPTUN-code***  RKXFI1ABNF | ***Weekly teaching hours:*** *l+cw+lw*  2+2+0 | ***Credit:*** 4  ***Exam type****:* e |
| ***Course leader***  Dr. Szabó Lóránt | | ***Position:***  senior professor | ***Required preliminary knowledge: -***  no | |
| ***Curriculum:*** | | | | |
| The aim of the course is to provide engineering students with the physics fundamentals that are essential for the mastery of engineering and professional subjects. | | | | |
| ***Detailed schedule of the course:*** | | | | |
| Weeks | ***Topics of lectures******and practices*** | | | |
| 1. | Technical acoustics.Sound propagation. Three levels and phon | | | |
| 2. | Thermodynamics. Absolute temperature scale. Thermal expansion of solids and liquids. Phase change. Heat and latent heat. State equation of ideal gases. Internal energy, work done by gas. First law of thermodynamics. | | | |
| 3. | Special processes in the p-V plane. | | | |
| 4. | Heat propagation. Second law of thermodynamics. Thermal Conduction. | | | |
| 5. | Heat engines. Carnot cycle in p-V plane. | | | |
| 6. | Electricity. Electric fields. Coulomb’s law. Motion of charged particles in a uniform electric field. Electric potential. Application of electrostatics | | | |
| 7. | Capacitors. Combinations of capacitor. | | | |
| 8. | Direct current (DC) circuits. Electric current and resistance. Kirchhoff’s laws (junction and loop rule). RC circuit. | | | |
| 9. | Written test 1. Magnetism. Magnetic fields. Magnetic (Lorentz) force. Motion of a charged particle in a uniform magnetic field. Magnetic force between two parallel conductors. Faraday’s law of induction. | | | |
| 10. | Alternating Current (AC) circuits. AC circuit powers. Transformer. | | | |
| 11. | Modern physics. Mass and energy. The photoelectric effect. Atomic physics. Size and density of the nuclei. Natural radioactivity. Atomic power station in Paks. Safety and waste disposal. | | | |
| 12. | Atomic physics. Size and density of the nuclei. Binding energy. Nuclear fission. Natural radioactivity. | | | |
| 13. | Atomic power station in Paks. Safety and waste disposal. Written test 2. | | | |
| 14. | Summary of full semester. Replacement written test and solving the test. | | | |
| ***Mid-semester requirements:*** | | | | |
| *Attendance at lectures and practices:*  It is compulsory to attend the lectures and practices. The rules of education and exam directory (RFB) are the guidelines. | | | | |
| *Tests:*  Written test 1: problems solving and questions (50 points) on the week 9.  Written test 2: problems solving and questions (50 points) on the week 13.  Replacement written test on the week 14. | | | | |
| *Requirements for qualification:*  Two written tests. Total points: 100 (= 2·50 points), if the score is > 40 points (successful) → signature.  Exam written test will be by the contact form.  Total points of the exam test 100 points. Exam marks: 85-100%: excellent (5), 70-84%: good (4), 55-69%: average (3), 40-54%: pass (2), 0-39%: fail (1) | | | | |
| ***Professional competencies:*** | | | | |
| * Knowledge of the general and specific mathematical, scientific and social principles, rules and contexts necessary for the study of engineering. * Their multidisciplinary knowledge enables them to participate creatively in engineering work and to adapt to constantly changing requirements. * Open to professional cooperation with professionals in other fields related to their profession. * Strive to continuously improve their knowledge and keep their knowledge of the world up to date through self-education. | | | | |
| **Literature** | | | | |
| Serway Jewett: Physics for Scientist and Engineers  Lóránt Szabó: Physics for Undergraduate Students  Lóránt Szabó: The World of Engineering Mechanics (electronic book) | | | | |