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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Mehanika in termodinamika | | | | | | | | | | | | | | |
| **Course title:** | | | Mechanics and thermodynamics | | | | | | | | | | | | | | |
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| **Študijski program in stopnja**  **Study programme and level** | | | | | **Študijska smer**  **Study field** | | | | | | | | **Letnik**  **Academic year** | | **Semester**  **Semester** | | |
| Univerzitetni študij 1. stopnje Elektrotehnika | | | | | **Ni smeri** | | | | | | | | **1.** | | **zimski** | | |
| 1st cycle academic study programme Electrical Engineering | | | | | **/** | | | | | | | | **1.** | | **winter** | | |
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| **Vrsta predmeta / Course type** | | | | | | | | | | | | Obvezni – splošni/ compulsory general | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | 64147 | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| 60 |  | | | 45 | | |  | | | |  | | | **95** | |  | 8 |
|  | | | | | | | | | | | | | | | | | |
| **Nosilec predmeta / Lecturer:** | | | | | Aleš Iglič | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | Slovenski/angleški | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | Slovenski/angleški | | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Vpis v letnik. | | | | | | | | |  | Enrolment in the year of the course. | | | | | | | |
| **Vsebina:** | | | | | | | |  | | **Content (Syllabus outline):** | | | | | | | |
| **MEHANIKA:**  kinematika, Newtonovi zakoni, izrek o vrtilni količini, izrek o kinetični in potencialni energiji, harmonično nedušeno nihanje, dušeno nihanje, vsiljeno nihanje, sklopljeno nihanje, deformacija trdnih snovi, osnovne lastnosti tekočin, opis gibanja tekočin, pretakanje viskozne tekočine po cevi, Bernoullijeva enačba, sile na telesa v tekočini, Laplace-ova enačba, Young-ova enačba, mehansko valovanje  **TERMODINAMIKA:**  kinetična teorija plinov, entropijski zakon, termodinamske funkcije in termodinamsko ravnovesje sistema, prenos toplote, toplotni in hladilni stroji, toplotno raztezanje trdnih snovi in kapljevin | | | | | | | |  | | **MECHANICS**: kinematics, Newton's laws, angular momentum, law of gravity, kinetic and potential energy, conservation of energy, harmonic oscillations, damped oscillations, forced oscillation, coupled oscillation, introduction to continuum mechanics, introduction to fluid mechanics (Bernoulli equation, viscosity, Poiseuille – Hagen equation), surface tension (Laplace equation, Young equation), Stokes law, quadratic friction law, mechanical waves  **THERMODYNAMICS**: kinetic theory of gases,  first law of thermodynamics, entropy and second law of thermodynamics, thermodynamic functions, thermodynamic equilibrium of the system, heat transfer, heat engines, thermal expansion of solids and liquids | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1. Raymond A. Serway: Physics (international edition), Sounders Golden Sunburst Series (vsakokratna nova izdaja) 2. Aleš Iglič, Veronika Kralj-Iglič: Mehanika in termodinamika, Založba FE in FRI, vsakokratna nova izdaja, je tudi na domači strani:   <http://physics.fe.uni-lj.si/students/predavanja/zapiski_iglic_fiz1.html>   1. T. Gyergyek, V. Kralj-Iglič, A. Iglič, M. Fošnarič: [Vaje iz Fizike 1](http://physics.fe.uni-lj.si/students/literatura/Vaje_iz_Fizike_1_2009.pdf), Univerza v Ljubljani, Fakulteta za elektrotehniko, vsakokratna nova izdaja je tudi na domači strani:   <http://physics.fe.uni-lj.si/students/predavanja/zapiski_iglic_fiz1.html>   1. J. Strnad: Fizika 1. del: Mehanika, toplota, DMFA, najnovejša izdaja | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| -splošne osnove tehnične in naravoslovne izobrazbe.  -pridobljena sposobnost logičnega naravoslovnega in tehničnega razmišljanja. | |  | | - to acquire a general education in technical and natural sciences  - to gain better understanding of theoretical and experimental methods in natural and technical sciences | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| znanje in razumevanje temeljnih zakonitosti v fiziki in tehniki pri reševanju tehničnih problemov z uporabo mehanike in termodinamike. | | |  | knowledge and understanding of the basic laws of mechanics and thermodynamics with a special emphasis to applications in engineering | |
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| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja, vaje, demonstracijski poskusi med predavanji, obiski znanstvenih inštiitutov, predavanja gostujočih profesorjev iz tujine. | | |  | Lectures, tutorials, demonstrative experiments during lectures and lectures of visiting professors from abroad. | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Način: pisni izpit, ustni izpit, projekt  Ocene od 1 do vključno 5 so negativne, ocene od vključno 6 do 10 so pozitivne.  Pozitivna ocena pisnega izpita je pogoj za pristop k ustnem izpitu.  Prispevki k oceni:  pisni izpit  ustno izpraševanje  projekt | 40 %  50 %  10 % | | | | Type: written examination, oral examination, project  Negative grades: from 1 to 5, positive grades: from 6 to 10.  Positive evaluation of written examination is a prerequisite for the oral examinations.  Contributions to final grade:  oral examination  written examination  project |
| **Reference nosilca / Lecturer's references:** | | | | | |
| 1.MESAREC, Luka, GÓŹDŹ, Wojciech, KRALJ-IGLIČ, Veronika, KRALJ, Samo, IGLIČ, Aleš. Closed membrane shapes with attached BAR domains subject to external force of actin filaments. Colloids and Surfaces. B, Biointerfaces, 2016, vol. 141, str. 132-140.  2.DRABIK, Dominik, PRZYBYŁO, Magda, CHODACZEK, Grzegorz, IGLIČ, Aleš, LANGNER, Marek. The modified fluorescence based vesicle fluctuation spectroscopy technique for determination of lipid bilayer bending properties. Biochimica et Biophysica Acta -Biomembranes, 2016, vol. 1858, no. 2, str. 244-252.  3.KULKARNI, Mukta Vishwanath, PATIL-SEN, Yogita, JUNKAR, Ita, KULKARNI, Chandrashekhar, LORENZETTI, Martina, IGLIČ, Aleš. Wettability studies of topologically distinct titanium surfaces. Colloids and Surfaces. B, Biointerfaces, 2015, vol. 129, str. 47-53.  4.PENIČ, Samo, IGLIČ, Aleš, BIVAS, Isak, FOŠNARIČ, Miha. Bending elasticity of vesicle membranes studied by Monte Carlo simulations of vesicle thermal shape fluctuations. Soft Matter, 2015, vol. 11, no. 25, str. 5004-5009.  5.NARENDRAKUMAR, Krunal, KULKARNI, Mukta Vishwanath, ADDISON, Owen, MAZARE, Anca, JUNKAR, Ita, SCHMUKI, Patrik, SAMMONS, Rachel, IGLIČ, Aleš. Adherence of oral streptococci to nanostructured titanium surfaces. Dental Materials, 2015, vol. 31, no. 12, str. 1460-1468. | | | | | |