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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Elektrostatika  površin in nanostruktur | | | | | | | | | | | | | | |
| **Course title:** | | | Electrostatics of surfaces and nanostructures | | | | | | | | | | | | | | |
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| **Študijski program in stopnja**  **Study programme and level** | | | | | **Študijska smer**  **Study field** | | | | | | | | **Letnik**  **Academic year** | | **Semester**  **Semester** | | |
| doktorski študijski program tretje stopnje Elektrotehnika | | | | | Ni smeri | | | | | | | | 1 | |  | | |
| 3rd cycle: doctoral study programme Electrical Engineering | | | | |  | | | | | | | |  | |  | | |
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| **Vrsta predmeta / Course type** | | | | | | | | | | | | Izbirni /elective | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | 64803 | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| **25** | **15** | | | **0** | | |  | | | |  | | | **80** | |  | **5 KT** |
|  | | | | | | | | | | | | | | | | | |
| **Nosilec predmeta / Lecturer:** | | | | | prof. ddr. Aleš Iglič | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | **Slovenski, angleški**  **Slovenian, English** | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | **Slovenski, angleški/Slovenian, English** | | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Vpis na doktorski študij na Univerzi v Ljubljani | | | | | | | | |  | course enrollment - doctoral student of the University of Ljubljana | | | | | | | |
| **Vsebina:** | | | | | | | |  | | **Content (Syllabus outline):** | | | | | | | |
| Osnove statistične termodinamike, teoretični opis naelektrene površine v stiku z elektrolitsko raztopino (teorija električne dvojne plasti), dielektrične lastnosti električne dvojne plasti, elektrostatika nanostruktur, vpliv nanodelcev na interakcije med naelektrenimi površinami, adsorpcija naelektrenih nanodelcev na naelektrene površine, interakcija naelektrenih nanodelcev z naelektrenimi nanostrukturiranimi kovinskimi in polprevodniškimi površinami | | | | | | | |  | | Thermodynamic description of systems with a large number of particles, theoretical description of electrolyte solution in contact with charged surface (electric double layer theory), dielectric properties of electric double layer, electrostatics of nanostructures, adsorption of charged nanoparticles on charged surfaces, influence of charged nanoparticles on mediated interactions between charged surfaces, interaction of charged nanoparticles with nanostructured metallic and/or semiconductor surfaces | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1.Iglič A, Drobne D, Kralj Iglič V (2015) Nanostructures in biological systems - theory and applications, Pan Stanford Publishing , Singapur  2. Israelachvili J (2011) Intermolecular and Surface Forces, Academic Press, London  3.Aktualni znanstveni članki iz področja, ki jih sproti določijo izvajalci predmeta | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Poznavanje teoretičnih eksperimentalnih osnov elektrostatskih interakcij v sistemih naelektrenih površin in nanodelcev. | |  | | Students are familiarised with physical description of electrostatic interactions in the systems of charged surfaces and charged nanoparticles. | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| Kandidata usposobiti za izvedbo raziskav elektrostatskih interakcij v različnih sistemih naelektrenih površin in nanodelcev. | | |  | To qualify the candidate for carrying out the research in the field of electrostatic interactions in the systems of charged surfaces and charged nanoparticles. | |
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| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja, konzultacije, projektno/seminarsko delo. | | |  | Lectures, consultations, project/seminar work. | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Seminar ali projekt. | 100 % for seminar or  100 % for project | | | | Seminar or project |
| **Reference nosilca / Lecturer's references:** | | | | | |
| **prof. ddr. Aleš iglič**   1. Gongadze E, Velikonja A, Perutkova Š, Kramar P, Maček-Lebar A, Kralj-Iglič V, Iglič A (2014) Ions and water molecules in an electrolyte solution in contact with charged and dipolar surfaces. Electrochim Acta, 126: 42-60 2. Imani R,Iglič A, Turner APF, Tiwari A (2014) Electrochemical detection of DNA damage through visible-light-induced ROS using mesoporous TiO2 microbeads.Electrochem Comm 40 : 84–87 3. Gongadze E, Velikonja A, Slivnik T, Kralj-Iglič V, Iglič A (2013) The quadrupole moment of water molecules and the permittivity ofwater near a charged surface. Electrochim Acta 109: 656-662 4. Perutkova S, Frank-Bertoncelj M, Rozman B, Kralj-Iglič V, Iglič A (2013) Influence of ionic strength and beta2-glycoprotein I concentration on agglutination of like-charged phospholipid membranes. Coll Surf B 111: 699-706 5. Eleršič K, Pavlič J, Iglič A, Vesel A, Mozetič M (2012) Electric-feld controlled liposome formation with embedded superparamagnetic iron oxide nanoparticles**.** Chem. Phys. Lipids 165: 120-124 | | | | | |