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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Računska elektromagnetika | | | | | | | | | | | | | | |
| **Course title:** | | | Computational electromagnetics | | | | | | | | | | | | | | |
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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:** | | | | | | | | | | | | 64805 | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| **30** |  | | |  | | |  | | | |  | | | **95** | |  | **5** |
|  | | | | | | | | | | | | | | | | | |
| **Nosilec predmeta / Lecturer:** | | | | | Prof.dr.Tomaž Slivnik | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | **slovenščina** | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | |  | | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Vpis v letnik študija | | | | | | | | |  | Enrolment in the study year | | | | | | | |
| **Vsebina:** | | | | | | | |  | | **Content (Syllabus outline):** | | | | | | | |
| Osnovne enačbe elektromagnetnega polja (Maxwellove enačbe v različnih oblikah, robni in mejni pogoji, pogoji v neskončnosti, singularnosti v polju, absorbcijski mejni pogoji). Formulacije elektromagnetnih problemov. Metode za numerično reševanje elektromagnetnih problemov (metoda končnih diferenc, metoda končnih elementov, metoda robnih elementov, metoda multipolov, hibridne metode, ostale metode). Reševanje diskretiziranih sistemov enačb (dekompozicijske metode, metode konjugiranih gradientov, iteracijske metode, reševanje problemov lastnih vrednosti). | | | | | | | |  | | Equations of electromagnetic fields (Maxwell equations in different forms, Boundary conditions, Conditions in infinity, absorbing boundary conditions). Formulations of electromagnetic problems. Numerical methods for electromagnetic problems (finite differences, finite elements, boundary elements, fast multipole methods, hybrid methods, other methods). Solution of systems of equations (decomposition methods, conjugate gradient method, iteration methods, eigenvalue problems). | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| Thomas Rylander, Par Ingellstrom, Anders Bondeson: Computational Electromagnetics, Springer, 2012  Jiang-Ming Jin: Theory and Computation of Electromagnetic Fields,Wiley , 2010  Yijun Liu; Fast Multipole Boundary Element Method, Cambridge UP, 2014  Jean Van Bladel: Electromagnetic Fields, IEEE Press, 2007 | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Seznanitev z numeričnimi metodami za izračun elektromagnetnih polj | |  | | To learn numerical methods for computation of electromagnetic fields | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| S pomočjo pridobljenega znanja bi študent izračunal parametre izbranega elektromagnetnega sistema | | |  | Students should compute parameters of chosen electromagnetic system | |
|  | | |  |  | |
| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja | | |  | Lectures | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Pisni izpit, izdelava projekta | 30/70 | | | | Written examination |
| **Reference nosilca / Lecturer's references:** | | | | | |
| GONGADZE, Ekaterina, VELIKONJA, Aljaž, SLIVNIK, Tomaž, KRALJ-IGLIČ, Veronika, IGLIČ, Aleš. The quadrupole moment of water molecules and the permittivity of water near a charged surface. *Electrochimica Acta*, ISSN 0013-4686. [Print ed.], 2013, vol. 109, str. 656-662, ilustr. <http://dx.doi.org/10.1016/j.electacta.2013.07.126>. [COBISS.SI-ID [10049876](http://cobiss.izum.si/scripts/cobiss?command=DISPLAY&base=COBIB&RID=10049876)]  GONGADZE, Ekaterina, KABASO, Doron, BAUER, Sebastian, SLIVNIK, Tomaž, SCHMUKI, Patrik, VAN RIENEN, Ursula, IGLIČ, Aleš. Adhesion of osteoblasts to a nanorough titanium implant surface. *International journal of nanomedicine*, ISSN 1178-2013. [Online ed.], 2011, vol. 6, str. 1801-1816, ilustr. <http://dx.doi.org/10.2147/IJN.S21755>. [COBISS.SI-ID [8562772](http://cobiss.izum.si/scripts/cobiss?command=DISPLAY&base=COBIB&RID=8562772)]  BERKOPEC, Aleš, SLIVNIK, Tomaž. Estimation of W0/WT ratio for cloud-to-ground lightnings. *Journal of electrostatics*, ISSN 0304-3886. [Print ed.], Aug. 2010, vol. 68, no. 4, str. 337-344, ilustr. [COBISS.SI-ID [7852116](http://cobiss.izum.si/scripts/cobiss?command=DISPLAY&base=COBIB&RID=7852116)] | | | | | |