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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Energetika in okolje | | | | | | | | | | | | | | |
| **Course title:** | | | Energy and Environment | | | | | | | | | | | | | | |
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| **Študijski program in stopnja**  **Study programme and level** | | | | | **Študijska smer**  **Study field** | | | | | | | | **Letnik**  **Academic year** | | **Semester**  **Semester** | | |
| Univerzitetni študijski program prve stopnje Elektrotehnika | | | | | **Ni smeri** | | | | | | | | 2. | | letni | | |
| 1st cycle academic study programme Electrical Engineering | | | | | **/** | | | | | | | | **2.** | | **summer** | | |
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| **Vrsta predmeta / Course type** | | | | | | | | | | | | Izbirni – strokovni/elective professional | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | 64121 | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| **30** |  | | | **30** | | |  | | | |  | | | **65** | |  | **5** |
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| **Nosilec predmeta / Lecturer:** | | | | | Marko Čepin | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | slovenski | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | slovenski | | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Pogoj za vključitev v študij predmeta je vpis v letnik. Pogoj za opravljanje izpita so opravljene laboratorijske vaje. | | | | | | | | |  | Enrolment into the program. Prerequisite for exam includes the well performed laboratory exercises. | | | | | | | |
| **Vsebina:** | | | | | | | |  | | **Content (Syllabus outline):** | | | | | | | |
| Potrebe po energiji. Vloga energije v družbi. Primarni viri energije. Osnove energetskih pretvorb v električno energijo. Konvencionalni viri električne energije. Obnovljivi viri električne energije. Alternativni viri električne energije. Izkoristki pretvorbe energije. Vplivi proizvodnje električne energije na okolje. Vloga in osnovne značilnosti elektroenergetskih sistemov. Osnove obratovanja elektroenergetskih sistemov. Osnove prenosa električne energije. Osnove razdeljevanja električne energije. Značilnosti odjema električne energije. Smotrna raba energije. Aktualna problematika preskrbe z električno energijo: okoljevarstvena vprašanja (NIMBY efekt, BANANA efekt). Povečanje prenosnih zmogljivosti (zastale investicije, okoljevarstveni razlogi). Zanesljivost dobave električne energije. Kakovost električne energije. Trg z električno energijo in njegovi vplivi. Načrtovanje elektroenergetskih sistemov. Vzdrževanje elektroenergetskih sistemov. Nove tehnologije proizvodnje, prenosa, razdeljevanja in porabe električne energije. | | | | | | | |  | | The energy needs. The role of energy in society. The primary sources of energy. Fundamentals of energy conversion into electric energy. Conventional sources of electric energy. Renewable sources of electric energy. Alternative sources of electricity. The energy conversion efficiencies. Impact of electric power generation on the environment. The role and the basic characteristics of electric power systems. Fundamentals of the operation of electric power systems. The features of electric energy transmission. Distribution of electric energy. Characteristics of electric energy consumption. Rational use of energy. The current issues of electric power supply. Environmental issues (NIMBY effect - Not In My Back Yard, banana effect - Build Absolutely Nothing Anywhere Near Anything - or Anyone). Increasing transmission capacity (investments not finished, environmental protection). Reliability of electric power supply. Power quality. Electricity market and its impacts. Design of power systems. Maintenance of power systems. New technology for generation, transmission, distribution and consumption of electric energy. | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1. Standard Handbook for Electrical Engineers, The McGraw-Hill, 2006  2. B. Sorensen, Renewable Energy, Fourth Edition, Elsevier Inc., 2010  3. Solar Energy Engineering, Elsevier Inc., 2009  4. Renewable Energy Conversion, Transmission and Storage, Elsevier Inc., 2007  5. S. Pryja, D. J. Inman, Energy Harvesting Technology, Springer, 2009  6. R. A. Higgins, Energy Storage, Springer, 2010 | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Slušatelji si bodo ustvarili celostno sliko potreb po energiji in izkoriščanju primarnih virov. Pridobili bodo osnovna znanja na področju oskrbe z električno energijo skozi spoznavanje proizvodnje, prenosa in razdeljevanja električne energije. V okviru aktualne problematike predmet izpostavlja okoljevarstvene vidike, vpliv trga z električno energijo in razvoj novih tehnologij, obnovljive vire energije (veter, voda, sonce, biomasa itn.) in predvsem učinkovito rabo energije. | |  | | Students will get a comprehensive view of energy demand and exploitation of primary energy resources. They will acquire basic knowledge in the field of electric power supply through learning about the electric energy generation, its transmission and distribution. The subject highlights the environmental aspects, the impact of the electricity market the development of new technologies, renewable energy sources (wind, water, solar, biomass) and efficient use of energy. | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| Študent bo razumel, kakšne so potrebe po energiji, kako se pridobiva električna energija iz primarnih virov energije, kakšne so posledice na okolje, kako se energija prenaša in razdeljuje med odjemalce. Z osnovnim znanjem bo slušatelj sposoben reševati osnovne probleme na področju energetike, ki zajema smotrno rabo energije, nove tehnologije, kakovost električne energije in trgovanje z električno energijo. | | |  | Student will understand, what are the needs for energy, how the electric energy is transformed from the primary sources of energy, what are the consequences to the environment, how the electric energy is transmitted and distributes to the customers. The student will be capable to solve the main problems in the field of energy including renewable sources of energy and new technologies considering the quality of electric energy and the electric market. | |
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| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja in vaje. | | |  | Lectures and exercises. | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Način: laboratorijske vaje, izpit.  Ocene od 1 do vključno 5 so negativne, ocene od vključno 6 do 10 so pozitivne.  Pozitivna ocena laboratorijskih vaj je pogoj za pristop k izpitu.  Prispevki k oceni:  laboratorijske vaje  izpit | 50%  50% | | | | Type: laboratory exercises, exam.  Negative grades: from 1 to 5, positive grades: from 6 to 10.  Positive evaluation of laboratory exercises is a prerequisite for the exam.  Contributions to final grade:  laboratory exercises  exam |
| **Reference nosilca / Lecturer's references:** | | | | | |
| 1. ČEPIN, Marko. Assessment of power system reliability. Springer, 2011.  2. TRBUŠIĆ, Mislav, ČEPIN, Marko. Surge wave distribution over the power transformer continuous disc winding. Elektrotehniški vestnik, 2012, vol. 78, no. 3, str. 106-111.  3. GJORGIEV, Blaže, KANČEV, Duško, ČEPIN, Marko. Risk-informed decision making in the nuclear industry: application and effectiveness comparison of different genetic algorithm techniques. Nuclear Engineering and Design, 2012, vol. 250, str. 701-712.  4. BRICMAN REJC, Živa, ČEPIN, Marko. Izboljšana metoda za oceno zanesljivosti proizvodnje v elektroenergetskem sistemu. Elektrotehniški vestnik, 2013, letn. 80, št. 1/2, str. 57-63.  5. ČEPIN, Marko, VOLKANOVSKI, Andrija. Nova faktorja pomembnosti v elektroenergetskih sistemih. Elektrotehniški vestnik, 2009, letn. 76, št. 4, str. 177-181. | | | | | |