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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Modul E: Energetika | | | | | | | | | | | | | | |
| **Course title:** | | | Module E: Power Engineering | | | | | | | | | | | | | | |
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| **Študijski program in stopnja**  **Study programme and level** | | | | | **Študijska smer**  **Study field** | | | | | | | | **Letnik**  **Academic year** | | **Semester**  **Semester** | | |
| Podiplomski magistrski študijski program druge stopnje Elektrotehnika | | | | | Vse smeri | | | | | | | | 1 | | 2 | | |
| 2nd cycle masters study programme in Electrical Engineering | | | | | All study fields | | | | | | | | 1 | | 2 | | |
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| **Vrsta predmeta / Course type** | | | | | | | | | | | | Izbirni-strokovni /elective professional | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | 64267 | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| 45 |  | | | 30 | | |  | | | |  | | | 75 | |  | 6 |
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| **Nosilec predmeta / Lecturer:** | | | | | Rafael Mihalič | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | slovenski / slovenian | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | slovenski / slovenian | | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Vpis v letnik predmeta | | | | | | | | |  | Enrolment in the year of the course | | | | | | | |
| **Vsebina:** | | | | | | | |  | | **Content (Syllabus outline):** | | | | | | | |
| Vloga izkoriščanja energetskih virov pri razvoju civilizacije in družbe, globalni pogled na problematiko oskrbe z energijo, razdelitev energetskih virov in osnovne energetske pretvorbe, konvencionalni viri energije (premog, nafta, plin, vodne sile, jedrska energija, les), za vsakega od virov: nastanek in osnovne značilnosti, osnovni fizikalni principi in tehnologija izkoriščanja, svetovni potenciali, izkoristki, osnovni ekonomski kazalci izkoriščanja, trend porabe, zaloge in poraba v Sloveniji.  Nekonvencionalni viri energije (energija sonca, vetra, bibavice, odpadkov, šote, biomase, fuzije, vodikova tehnologija, direktne termične pretvorbe v električno energijo, termoionske pretvorbe, magnetohidrodinamski generatorji). Za vsakega od virov:nastanek in osnovne značilnosti, osnovni fizikalni principi in tehnologija izkoriščanja, svetovni potenciali, izkoristki, osnovni ekonomski kazalci izkoriščanja, trend porabe, zaloge in poraba v Sloveniji.  Dileme in tehnične težave zadovoljevanja energetskih potreb z energijo iz sonaravnih virov, vpliv energetskih pretvorb na okolje, ekonomsko ovrednotenje zadovoljevanja energetskih potreb, pogled v prihodnost | | | | | | | |  | | The role of energy sources exploitation in the civilization and human society development, global overview of energy supply issues, categorization of energy sources and basic energy conversions, conventional sources of energy (coal, oil, gas, water, nuclear energy, wood), for each of sources: origin and basic characteristics, basic physical principles and technologies of its exploitation, world-wide potential, efficiency, basic economic exploitation indices, consumption and supply trends, Slovenian consumption.  Unconventional energy sources (energy of the sun radiation, wind, tide, waste, peat, biomass, nuclear fusion, hydrogen technology, direct thermal conversion to electrical energy, thermoionic conversions, magnetohydrodynamic generator), for each of sources: origin and basic characteristics, basic physical principles and technologies of its exploitation, world-wide potential, efficiency, basic economic exploitation indices, consumption and supply trends, Slovenian consumption.  Dilemmas and technical issues of satisfying all energy needs by applying sustainable energy sources, environmental impacts of energy conversion procedures, economic evaluation of supplying energy needs, glance towards the future. | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1. Požar. H.:Osnove energetikeI, II, III, Školska knjiga, Zagreb, 1992 2. Cleveland, Cutler J., Ayres, Robert U.:Encyclopedia of energy : San Diego, Oxford : Academic Press, cop. 2004 3. J. Voršič:Pretvarjanje v električno energijo Maribor : Fakulteta za elektrotehniko, 4. računalništvo in informatiko, 1996 5. Denno, K.: Power system design and applications for alternative energy sources, Englewood Cliffs, New Jersey : Prentice-Hall, Inc., 1989 6. Willis, H. Lee, Scott, Walter G.: Distributed power generation : planning and 7. evaluation, New York, Basel : M. Dekker, cop. 2000 8. Smil, Vaclav :Energy at the crossroads : global perspectives and uncertainties : Cambridge, Massachusetts, London, England :MIT Press, cop. 2005 9. Medved, Sašo, Novak, Peter: Varstvo okolja in obnovljivi viri energije, Ljubljana : Fakulteta za strojništvo, 2000 | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Slušatelj si bo ustvaril širši pogled na problem oskrbe z energijo, saj do napačnih odločitev na področju oskrbe z energijo prihaja ravno zaradi parcialnega pogleda na problematiko. Poznal bo osnovne značilnosti, tehnične možnosti izkoriščanja ter ekonomske kazalce in perspektive pri izrabi primarnih energentov - globalni vidik in slovenske razmere. Spoznal bo prednosti in omejitve uporabe sonaravnih virov za zadovoljevanje energetskih potreb. | |  | | Student gains a broad, world-wide overview of energy supply issues, as partial view on the subject is often the main reason for making wrong decisions in the energy supply area. One gets familiar with basic characteristics, technical possibilities for exploitation and economic indices together with perspectives when using primary energy sources. This goes both for world-wide as well as Slovenian perspective. Student is presented with advantages and limitations of sustainable energy sources exploitations for covering required energy needs. | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| Poznavanje osnovnih zakonitosti pri pretvarjanju primarnih energetskih virov v ljudem uporabne oblike,  poznavanje globalnih energetskih tokov in trendov,  poznavanje vidikov oskrbe (zaloge) in porabe energentov,  razumevanje energetske politike. | | |  | Understanding and being aware of basic characteristics of primary energy-sources conversion to suitable energy form from human-society’s point of view,  knowledge regarding global energy trends  being aware of different aspects of energy-source supply and consumption issues,  understanding energy-related legislation and regulation. | |
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| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja, laboratorijske vaje, vodeno projektno delo | | |  | Lectures, laboratory practice, project work | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Način: laboratorijske vaje, seminar, ustni izpit.  Ocene od 1 do vključno 5 so negativne, ocene od vključno 6 do 10 so pozitivne.  Pozitivna ocena laboratorijskih vaj in seminarja je pogoj za pristop k izpitu.  Prispevki k oceni:  laboratorijske vaje  seminar  ustni izpit | 20%  40%  40% | | | | Type: laboratory exercises, seminar work, oral exam.  Negative grades: from 1 to 5, positive grades: from 6 to 10.  Positive evaluation of laboratory exercises and seminar work is a prerequisite for the exam.  Contributions to final grade:  laboratory exercises  seminar work  oral examination |
| **Reference nosilca / Lecturer's references:** | | | | | |
| 1. MIHALIČ, Rafael. "Zelena" energija - bližnjica k energetski neodvisnosti ali slepa ulica?. Elektrotehniški vestnik, 2011, letn. 78, št. 5, str. 245-256. 2. AŽBE, Valentin, MIHALIČ, Rafael. Distributed generation from renewable sources in an isolated DC network. Renewable energy, 2006, vol. 31, iss. 14, str. 2370-2384. 3. MIHALIČ, Rafael. Vetrne elektrarne - ni vse zlato, kar se sveti. V: SLAVINEC, Mitja (ur.). Zgodovinska identiteta sveta ob Muri. Murska Sobota: Pomurska akademsko znanstvena unija PAZU, 2008, str. 30-33. 4. AŽBE, Valentin, MIHALIČ, Rafael, POVH, Dušan. Distributed generation from renewable sources in an isolated DC network. V: ALVAREZ, Carlos (ur.), HAMZA, Mohamed H. (ur.). Proceedings of the Third IASTED International Conference on Power and Energy Systems, September 3-5, 2003, Marbella, Spain, (Series on energy and power systems, ISSN 1482-7891). Anaheim; Calgary; Zürich: ACTA Press, cop. 2003, str. 81-86. 5. AŽBE, Valentin, MIHALIČ, Rafael. Razpršena proizvodnja iz obnovljivih virov v enosmernih porabniških omrežjih. Elektrotehniški vestnik, 2004, letn. 71, št. 4, str. 229-236. | | | | | |