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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Modul B: Evropska tehniška zakonodaja in infrastruktura | | | | | | | | | | | | | | |
| **Course title:** | | | Module B: European Technical Legislation and Infrastructure | | | | | | | | | | | | | | |
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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:** | | | | | | | | | | | | 64260 | | | | | |
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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:** | | | | | Janko Drnovšek, Gaber Begeš | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | slovenski / Slovenian  angleški / English | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | slovensko / Slovenian  angleški / English | | | | | | | | | | | |
| **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):** | | | | | | | |
| (a) Uvod (osnove evropske tehniške infrastrukture)  (b) Osnovne definicije (kakovosti, standardizacije, akreditacije, itd.)  (c) Direktive in zakonodaja (transpozicija, implementacija, sistem zakonodaje)  (d) Standardizacija (infrastruktura standardizacije, nastanek, vrste, obnavljanje, razumevanje standardov)  (e) Akreditacija (kot infrastruktura, priprava na akreditacijo, presojanje, korektivni ukrepi)  (f) Meroslovje (kot infrastruktura, umerjanje, preskušanje, zakonsko meroslovje)  (g) Ugotavljanje skladnosti (filozofija novega in globalnega pristopa, označevanju evropske skladnosti (CE) proizvodov z zahtevami standardov ter priprava celotne tehniške dokumentacije)  (h) Obravnava splošnih (infrastrukturnih) skupin standardov (smernice za dokumentacijo sistema vodenja kakovosti, ugotavljanje skladnosti, itd.)  (i) Presoja in certificiranje sistemov vodenja kakovosti  (j) Evropska tehniška zakonodaja po področjih (proizvodnja, laboratoriji, storitve, okolje, varnost, zdravstvo, itd.) ter ključne EU tehniške direktive, varnost elektrotehniških proizvodov, nizko napetostna smernica LVD (low voltage directive), varnost medicinskih tehniških sistemov (osnove elektromagnetne kompatibilnosti - EMC v zdravstvu, načrtovanje naprav v skladu z EMC, EMC v bolnišnicah, elektromagnetne interferenca), itd. | | | | | | | |  | | (a) Introduction (basics of European technical infrastructure)  (b) Basic definitions (quality, standardization, accreditation, etc.)  (c) Directives and legislation (transposition, implementation, legislation system)  (d) Standardization (standardization infrastructure, how to develop a standard, types, renewal, standard understanding)  (e) Accreditation (infrastructure, preparations for accreditation, assessments, corrective actions)  (f) Metrology (infrastructure, calibration, testing, legal metrology)  (g) Conformity assessment (philosophy of new and global approach, CE marking of products, technical documentation for product)  (h) Discussing generic (infrastructural) groups of standards (directives for documentation for quality systems and conformity assessment, etc.)  (i) Assessment and quality management system certification  (j) European technical legislation in different fields (production, laboratory, services, environment, safety, health, etc.) and important EU technical directives, safety of electrical products, LVD (Low Voltage Directive), safety of medical technical systems (basics of electromagnetic compatibility - EMC in health, development of products according to EMC, EMC in hospitals, electromagnetic interference), etc. | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1. www.sist.si, www.iso.org, www.iec.ch, www.iecee.org, www.cenelec.org, www.itu.int, www.cenorm.be, www.gov.si/sa, www.ilac.org, www.mirs.si, www.euramet.eu, www.wto.org, www.ansi.org, http://ts.nist.gov, www.conformityassessment.org, www.wssn.net, www.oiml.org, www.asq.org, http://ec.europa.eu/enterprise/newapproach/,http://ec.europa.eu/enterprise/newapproach/index\_en.htm 2. Drnovšek, J.; Pušnik, I.; Bojkovski, J.; Begeš, G.; Kakovost sistemov. Ljubljana: Fakulteta za elektrotehniko 2007 3. J.M.Juran, F.M.Gryna, Quality planning and analysis, Mc Graw-Hill ISBN 0-07-112992-8    * European Union Council Directive 93/42/EEC of 14 June 1993 concerning medical devices (Medical Device Directive), Official Journal L 169    * The Active Implantable Medical Devices Directive, (AIMDD) 90/385/EEC    * In Vitro Diagnostic Directive, (IVD) 98/79/EC 4. Lou Chen: Quality Function Deployment, Addison Wesley Longman, 1995 5. A.J.Marlow: Quality control for Technical Documentation, Amazon, 2005 6. VIM - International Vocabulary of Terms in Legal Metrology (OIML, 2000) 7. Slovenski inštitut za standardizacijo: SIST EN 45020 - Standardizacija in z njo povezane dejavnosti - Splošni slovar, 2007 | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Cilj je naučiti in seznaniti študente s temeljnimi tehniškimi zahtevami v okviru evropske zakonodaje, ki omogočajo proizvodom in storitvam nastopanje na skupnem evropskem in globalnem trgu ter hkrati zagotavljajo njihov prost pretok v vseh smereh. Značilnost in namen evropske tehniške zakonodaje je omogočiti delovanje skupnega trga pod enakimi pogoji za vse članice, hkrati pa predstavlja zaščito pred tehniško neskladnimi proizvodi in storitvami.  Znanja o evropski tehniški zakonodaji so nepogrešljiv del modernih inženirskih znanj v okviru "EU studies".  Sem spada spoznavanje celotne infrastrukture na tehniškem področju, od standardizacije, akreditacije, meroslovja, sistema celovitega vodenja kakovosti, presoje in certificiranje sistemov za doseganje čim boljših uspehov. Študent pridobi znanje o zakonodaji, tehniških zahtevah in varnosti. Velik poudarek pa je tudi na okoljski problematiki vezani na kakovost. Študent osvoji tudi znanja o evropskih direktivah. Cilj predmeta je prikaz dejavnosti in postopkov, ki jih izvede proizvajalec, da lahko pritrdi na proizvod znak CE, oznako skladnosti z evropskimi direktivami. Na praktičnih primerih se utrdi teoretično znanje.  Prikazana je EU praksa in povezava med zakonodajo, kakovostjo in zaščito potrošnika. | |  | | The aim of the course is to get acquainted with basic technical requirements concerning European legislation that enables products and services to be placed on the common European and global market and at the same time free transfer of goods in all directions. Characteristic and the aim of the European technical legislation is to enable effective common market under the same conditions for all member states and at the same time presents protection from technically non-conform products and services. Knowledge on European technical legislation is indispensable part of modern engineering knowledge in EU studies. This includes learning on whole technical infrastructure from standardization, accreditation, metrology, total quality systems, assessments and certification of systems for achieving the best success. Student gets knowledge on legislation, technical requirements safety and European directives. A great emphasis is also put on environmental problematic connected to quality. The aim of the subject is to present activities and procedures, that manufacturer need to follow to be able to put CE mark (European directives conformity safety mark) on the product. Theoretical knowledge is consolidated with practical examples. Presented is EU practice and connection between legislation, quality and consumer protection. | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| spretnosti uporabe domače in tuje literature ter standardov, direktiv, zakonskih dokumentov, zbiranje, interpretacija tehniških postopkov, implementacija tehniških dokumentov v realne projekte, uporaba različnih metod za reševanje tehniških problemov, interpretacija in ovrednotenje preskusnih rezultatov, široko znanje analize problemov in strukturirano reševanje s ciljem izboljšav | | |  | skills of using domestic and foreign literature and standards, directives and legal documents, collecting and interpreting technical procedures, implementation of technical documents in real projects, use a variety of methods for solving technical problems, interpretation and evaluation of test results, a broad knowledge of problem analysis and solving them structured with the aim of improvements | |
| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja, laboratorijske vaje, seminarska naloga. | | |  | Lectures, exercises, seminar work. | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Način: domače naloge in projekti, ustni izpit.  Ocene od 1 do vključno 5 so negativne, ocene od vključno 6 do 10 so pozitivne.  Pozitivna ocena domačih nalog in projektov je pogoj za pristop k izpitu.  Prispevki k oceni:  domače naloge in projekti  ustni izpit | 50 %  50 % | | | | Type: homework and project, oral exam.  Negative grades: from 1 to 5, positive grades: from 6 to 10.  Positive evaluation of homework and projects is a prerequisite for the exam.  Contributions to final grade:  homework and projects  oral examination |
| **Reference nosilca / Lecturer's references:** | | | | | |
| 1. DRNOVŠEK, Janko, BEGEŠ, Gaber. Evropska tehniška zakonodaja in infrastruktura : povzetek predavanj. 1. izd. Ljubljana: Fakulteta za elektrotehniko, Laboratorij za metrologijo in kakovost, 2015. II, 97 str. 2. BEGEŠ, Gaber, DRNOVŠEK, Janko, OGOREVC, Jaka, BOJKOVSKI, Jovan. Influence of different temperature sensors on measuring energy efficiency and heating-up time of hobs. V: TEMPMEKO 2013 special issue 3 : selected papers of the 12th International Symposium on Temperature, Humidity, Moisture and Thermal Measurements in Industry and Science, (International journal of thermophysics, ISSN 0195-928X, vol. 36, no. 2/3, Mar. 2015) 3. BEGEŠ, Gaber, DRNOVŠEK, Janko. Implementation of international requirements when presenting research results. V: Proceedings of XX IMEKO World Congress : 9 (Sun) - 14 (Fri) September 2012, Bexco, Busan, Republic of Korea. [S. l.]: IMEKO, cop. 2012, str. 1-4. 4. DRNOVŠEK, Janko, PUŠNIK, Igor, BOJKOVSKI, Jovan, BEGEŠ, Gaber. Regional cooperation in proficiency testing : strategy planning and practical experiences in Western Balkan countries. Accreditation and quality assurance, ISSN 0949-1775, Feb. 2010, vol. 15, no. 2, str. 125-131 5. 5. BEGEŠ, Gaber, DRNOVŠEK, Janko, PENDRILL, L. R. Optimising calibration and measurement capabilities in terms of economics in conformity assessment. Accreditation and quality assurance, ISSN 0949-1775, Mar. 2010, vol. 15, no. 3, str. 147-154. | | | | | |