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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Komunikacijski sistemi | | | | | | | | | | | | | | |
| **Course title:** | | | Communication Systems | | | | | | | | | | | | | | |
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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. | | zimski | | |
| 1st cycle academic study programme Electrical Engineering | | | | | **No study fileds** | | | | | | | | **2.** | | **winter** | | |
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| **Vrsta predmeta / Course type** | | | | | | | | | | | | Obvezni – strokovi/compulsory professional | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | 64114 | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| **45** |  | | | **45** | | |  | | | |  | | | **85** | |  | **7** |
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| **Nosilec predmeta / Lecturer:** | | | | | Janez Bešter, Andrej Kos | | | | | | | | | | | | |
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| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | slovenski | | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | slovenski | | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Vpis v letnik študija. | | | | | | | | |  | Enrolment in the year of the course. | | | | | | | |
| **Vsebina:** | | | | | | | |  | | **Content (Syllabus outline):** | | | | | | | |
| Temeljni pojmi s področja informacijskih in komunikacijskih sistemov. Informacijska družba in informacijski viri. Uporaba informacijskih virov, podatkov in informacij ter komunikacijske storitve v izobraževanju.  Digitalna transformacija. Uporabniki in ponudniki informacijskih in komunikacijskih storitev, storitve in vsebine ter njihove aplikacije.  Model komunikacijskega kanala. Digitalni prenos podatkov.  Pomen komunikacijskih slojev, skladov, protokolov, protokolnih enot; referenčni model OSI in sklad TCP/IP.  Komunikacijska vodila. Sinhroni/asinhroni prenos podatkov. Lastnosti vodil in omejitve pri delovanju.  Arhitekture komunikacijskih omrežij, dostop, jedro in omrežja nosilnih storitev. Primeri in delovanje nekaterih sistemov za zagotavljanje komunikacijskih storitev: brezžična in mobilna komunikacijska omrežja, širokopasovni internetni sistem, satelitska in RTV omrežja.  Osnove spleta in spletnih tehnologij. Klasične storitve internetnega okolja in internetne aplikacije. Koncept in praktični primeri uporabe interneta stvari. | | | | | | | |  | | Fundamentals of information and communication systems. Information society. Information resources. Application of information resources; communication services in education.  Digital transformation. Users and information-communication service and content providers, services and their application.  Communication channel model. Digital data transmission.  Purpose of layered models and communication protocols, protocol data units. OSI and TCP/IP reference models. Fundamentals of communication systems: multiplexing, packet and circuit transfer modes, connection-oriented and connection-less communications.  Communication buses. Synchronous and asynchronous transfer modes. Features of various buses and limitations in their operation.  Architectures of communication networks; access and core networks. Examples and operation of selected systems in communication services provisioning: Ethernet, xDSL, wireless and mobile networks, Internet systems with TCP/IP, satellite networks.  Broadband concept, mobility, and multimedia.  Fundamentals of Web and Web technologies. Traditional Internet services and applications. Internet of things – concept and application examples. | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1. Comer, D.: Internetworking with TCP/IP, Vol 1 (6th Edition), ISBN-10: 013608530X, 2013, Addison-Wesley. 2. Tannenbaum, A.S.: Computer networks, 5th ed., international ed., ISBN 978-0-13-255317-9, 2011, Pearson. 3. Stallings, W.: Data and computer communications, 10th ed., ISBN 978-0-13-350648-8, 2013, Pearson. 4. Sauter, M., From GSM to LTE-Advanced: An Introduction to Mobile Networks and Mobile Broadband, John Wiley & Sons, Chichester, 2014 5. Članki, objavljenih v revijah, npr. / Articles published in magazines, i.e.: IEEE Communications Surveys & Tutorials, <http://www.comsoc.org/livepubs/surveys/index.html> | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Cilj predmeta je podati temeljna znanja s področja rabe in delovanja informacijskih in komunikacijskih sistemov, ki so potrebna za bodoče inženirje tehnične stroke.  Predmet sestavlja teoretična osnova, ki je navezana na praktična znanja iz prakse in realnih okolij projektov. Snov predstavlja zaključeno celoto, zanimivo za vse študente elektrotehnike in multimedije, hkrati pa je osnova za spremljanje strokovnih predmetov v višjih letnikih študija informacijski in komunikacijskih tehnologij ter multimedije. | |  | | The objective of the course is to introduce fundamental knowledge about operation and application of information and communicaton systems.  The course combines theoretical background with practical applications and real-world examples. The topics build an integral whole, which is of interest and necessary for all students of electrical engineering and multimedia. At the same time it facilitates involvement in professional subjects on information and communicaton technologies and multimedia in the continuation of the study. | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| Znanje temeljnih konceptov komunikacijskih tehnologij, sistemov in storitev za uporabo študijske in projektne namene.  Na podlagi temeljnih znanj se pridobi možnost za vrednotenje in nadaljnji študij informacijsko komunikacijskih tehnologij in multimedijskih storitev.  Možnost nadgradnje temeljnih sistemskih znanj in povezovanja interdisciplinarnih problematik | | |  | Knowledge of basic concepts of information-communication technologies and systems, for study and project purposes.  Based on the knowledge of basic concepts ability to understand, use or analyse existing and future communication systems, and critically compare and judge them.  Ability to extend basic system comprehension, as well as intra- and cross-domain knowledge binding. | |
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| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja, na katerih se študent seznani s teoretičnimi osnovami, ter laboratorijske vaje, kjer probleme spozna tudi praktično in jih v timu rešuje skozi projektno delo. Eizobraževanje. Ogledi in vabljeni predavatelji. | | |  | Lectures for theoretical aspects,  laboratory exercises and team-work for real-case scenarios and problem solving through project work. Elearning. Study visits and invited lecturers. | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Način: pisni izpit, ustni izpit.  Ocene od 1 do vključno 5 so negativne, ocene od vključno 6 do 10 so pozitivne.  Uspešna izvedba 80% laboratorijskih vaj je predpogoj za prijavo na pisni izpit.  Prispevki k oceni:  pisni izpit  ustni izpit | 50%  50% | | | | Type: written exam, oral exam.  Negative grades: from 1 to 5, positive grades: from 6 to 10.  Successful completion of at least 80% of the laboratory exercises is prerequisite for the written exam.  Contributions to final grade:  written exam  oral examination |
| **Reference nosilca / Lecturer's references:** | | | | | |
| 1. KOS, Andrej, HOMAN, Peter, BEŠTER, Janez. Performance evaluation of a synchronous bulk packet switch under real traffic conditions. IEICE transactions on communications, ISSN 0916-8516, 2003, vol. E86-B, no. 5, str. 1612-1624. 2. SEDLAR, Urban, BEŠTER, Janez, KOS, Andrej. Računalništvo v oblaku v telekomunikacijah in primeri uporabe. V: MLINAR, Tomi (ur.), CAF, Dušan (ur.), ROBNIK, Ana (ur.), HUDOBIVNIK, Alojz (ur.), MEŠE, Pavel (ur.). Šestindvajseta delavnica o telekomunikacijah, 7. in 8. november 2011, Brdo pri Kranju. Komunikacije in računalništvo v oblaku : zbornik referatov, (VITEL). Ljubljana: Elektrotehniška zveza Slovenije, cop. 2011, f. 3-6. 3. KOS, Andrej, BEŠTER, Janez. Research and development organisation in the field of telecommunications at the Faculty of Electrical Engineering. V: *Building, exploitation and development of telecommunication networks*. Sarajevo: Faculty of electrical engineering, 2006, [4] str. 4. KOS, Andrej, BEŠTER, Janez. Evolucija hrbteničnih IP-omrežij v smeri MPLS. Elektrotehniški vestnik, ISSN 0013-5852. [Slovenska tiskana izd.], 2001, letn. 68, št. 4, str. 200-206. 5. KOS, Andrej, BEŠTER, Janez. Razvoj in uvajanje novih telekomunikacijskih storitev. Elektrotehniški vestnik, ISSN 0013-5852. [Slovenska tiskana izd.], 2002, letn. 69, št. 3-4, str. 221-226. | | | | | |