|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UČNI NAČRT PREDMETA / COURSE SYLLABUS | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Modul D: Multimedijski sistemi | | | | | | | | | | | | | |
| **Course title:** | | | Module D: Multimedia Systems | | | | | | | | | | | | | |
|  | | | | |  | | | | | | |  | |  | | |
| **Študijski program in stopnja**  **Study programme and level** | | | | | **Študijska smer**  **Study field** | | | | | | | **Letnik**  **Academic year** | | **Semester**  **Semester** | | |
| Univerzitetni študijski program prve stopnje Elektrotehnika | | | | | **Vse smeri** | | | | | | | 3. | | letni | | |
| 1st cycle academic study programme Electrical Engineering | | | | | **All fields** | | | | | | | 3. | | summer | | |
|  | | | | | | | | | | | | | | | | |
| **Vrsta predmeta / Course type** | | | | | | | | | | | Izbirni – splošni/ elective - general | | | | | |
|  | | | | | | | | | | |  | | | | | |
| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | 64141 | | | | | |
|  | | | | | | | | | | | | | | | | |
| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **work** | | | **Druge oblike študija** | | | **Samost. delo**  **Individ. work** | |  | **ECTS** |
| **45** |  | | | **15** | | |  | | |  | | | **65** | |  | **5** |
|  | | | | | | | | | | | | | | | | |
| **Nosilec predmeta / Lecturer:** | | | | | Janez Bešter, Matevž Pogačnik | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| **Jeziki /**  **Languages:** | | **Predavanja / Lectures:** | | | | Slovenski | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | Slovenski | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | |  | **Prerequisits:** | | | | | | | |
| Vpis v letnik študija. Poznavanje vsebin predmeta: Komunikacijski sistemi. | | | | | | | |  | Enrolment in the class. Acquaintance with content of following courses: Communication systems | | | | | | | |

|  |  |  |
| --- | --- | --- |
| **Vsebina:** |  | **Content (Syllabus outline):** |
| • Osnove multimedije ter značilnosti multimedijskih elementov (tekst, slika, animacije, zvok, video).  • Tehnološke osnove multimedije:  o Lastnosti analogne ter digitalne oblike multimedijskih elementov ter razlogi za digitalizacijo.  o Kompresija in najznačilnejši formati zapisa multimedijskih elementov.  o Prenos multimedijskih vsebin (strujanje, mehanizmi in protokoli za prenos vsebin)  • Osnovne multimedijske storitve (IPTV storitve, mobilne video storitve, spletne video storitve).  • Arhitektura in značilnosti operaterskih multimedijskih sistemov: IPTV, radiodifuzni prenos TV in radia (DAB, DVB-x). Zagotavljanje kvalitete storitev (QoS/QoE).  • Arhitekture in značilnosti ne-operaterskih multimedijskih sistemov: spletne TV, video portali, mobilne aplikacije,…  • Značilnosti terminalne opreme za uporabo multimedijskih storitev (TV komunikator, mobilni terminal, osebni računalnik, tablični računalnik).  • Pomen in lastnosti uporabniških vmesnikov v multimediji (strojni uporabniški vmesniki, programski uporabniški vmesniki). Načrtovanje interaktivnosti.  Sistemi za zaščito multimedijskih vsebin in njihova integracija (sistemi pogojnega dostopa, sistemi DRM). |  | • Basics of multimedia and properties of multimedia elements (text, image, animation, avdio, video).  • Technology basics of multimedia:  o Properties of analogue and digital forms of multimedia elements, and the reasons for digitalization.  o Compression and most relevant multimedia formats.  o Transmition of multimedia content (streaming, content transmition mechanisms and protocols)  • Basic multimedia services ( IPTV services, mobile services , online services).  • Architecture and features of operator based multimedia systems: IPTV, broadcasting TV and radio (DAB , DVB- T). QoS and QoE aspects.  • Architecture and features of over-the- top multimedia systems: Web TV, video portals. Mobile applications  • Characteristics of terminal equipment used in multimedia systems (TV, mobile terminal, PC, Tablet PC) .  • The importance and characteristics of user interfaces in multimedia (hardware user interfaces, software user interfaces). Interaction design.  Multimedia content protection systems and their integration (conditional access systems, DRM systems). |

|  |
| --- |
| **Temeljni literatura in viri / Readings:** |
| 1. Simpson w., Greenfield H., IPTV and internet video: expanding the reach of television broadcasting, Focal Press, 2012 2. Steinmetz R., Nahrstedt K., Multimedia Systems, Springer, (2014 edition) 3. Vaughan T., Multimedia: Making it work, McGraw -Hill Osborne media, 2010 4. Benoit H., Digital television: satelite, cable, terestrial, IPTV, Mobile TV in the DVB framework, Focal Press, 2008 5. Izbrani članki, objavljeni v revijah, npr. / Selected articles published in magazines, i.e IEEE Multimedia, IEEE Spectrum |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Definicija pojma multimedije in osnovnih multimedijskih elementov ter njihovih lastnosti. Obravnava arhitekture sodobnih RTV in multimedijskih sistemov, ki so podlaga za izvedbo multimedijskih storitev. Uporaba kompresije multimedijskih elementov. Spoznavanje specifičnosti analogne ter digitalne radiodifuzije. Spoznavanje postopkov produkcije, priprave ter prenosa multimedijskih sistemov. Spoznavanje sistemov IP televizije ter mobilne televizije, zagotavljanje kvalitete storitev. Značilnosti terminalne opreme ter uporabniških vmesnikov. | |  | | The definition of multimedia concepts, basic multimedia elements and their properties. Explanation of the architecture(s) of modern broadcasting and multimedia systems, which serve as the basis for the implementation of multimedia services. Compression of multimedia elements. Understanding of the specifics of analogue and digital broadcasting. Understanding of production, preparation and transfer of multimedia content. Knowledge of the IPTV and mobile TV systems with QoE/QoS aspects. Knowledge of hardware equipment characteristics and user interaction aspects (User experience). | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| Poznavanje in razumevanje multimedije ter lastnosti multimedijskih elementov. Razumevanje tehnološke osnove in arhitekture različnih multimedijskih sistemov ter prednosti in slabosti, ki iz tega sledijo. Poznavanje lastnosti multimedijskih storitev. | | |  | Knowledge and understanding of multimedia features and multimedia elements. Understanding the technological basis of different multimedia systems, their architectures and consequent advantages and disadvantages. Understanding and knowledge of the characteristics of multimedia services. | |
|  | | |  |  | |
| **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. STOJMENOVA DUH, Emilija, GUNA, Jože, POGAČNIK, Matevž, SODNIK, Jaka. Applications of paper and interactive prototypes in designing telecare services for older adults. Journal of medical systems, ISSN 0148-5598, Apr. 2016, vol. 40, no. 4, str. 1-7.  2. POGAČNIK, Matevž, GUNA, Jože, BEŠTER, Janez. A game-based mobile-learning platform - description and evaluation. Elektrotehniški vestnik, ISSN 0013-5852. [Slovenska tiskana izd.], 2010, letn. 77, št. 5, str. 281-286.  3. STOJMENOVA, Emilija, GUNA, Jože, DINEVSKI, Dejan, POGAČNIK, Matevž. A case study from Iskratel : improving the user experience in a telecommunications company. E-society journal, ISSN 2217-3269, 2012, vol. 3, no. 2, str. 77-84.  4. GUNA, Jože, KOVAČ, Rok, STOJMENOVA, Emilija, POGAČNIK, Matevž. MedReminder - an interactive multimedia medical application for the IPTV environment. V: HOLZINGER, Andreas (ur.), SIMONIC, Klaus-Martin (ur.). Information quality in e-health : proceedings, (Lecture notes in computer science, ISSN 0302-9743, 7058). Berlin; Heidelberg: Springer, cop. 2011, str. 635-644.  5. M. Pogačnik, J. Bešter in drugi: Priprava novega Interdisciplinarnega univerzitetnega prvostopenjskega študijskega programa Multimedija, na Fakulteti za elektrotehniko in Fakulteti za računalništvo in informatiko, prvo izvajanje programa v 2014/2015. | | | | | |