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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | |
| **Predmet:** | | | Programiranje mikrokrmilnikov | | | | | | | | | | | | | | |
| **Course title:** | | | Microcontroller Programming | | | | | | | | | | | | | | |
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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** | | | | | | | | 1. | | letni | | |
| 1st cycle academic study programme Electrical Engineering | | | | | **/** | | | | | | | | **1.** | | **summer** | | |
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| **Vrsta predmeta / Course type** | | | | | | | | | | | | Obvezni – strokovni /compulsory professional | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | 64108 | | | | | |
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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** |
|  | | | | | | | | | | | | | | | | | |
| **Nosilec predmeta / Lecturer:** | | | | | Iztok Fajfar | | | | | | | | | | | | |
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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):** | | | | | | | |
| Predmet je logično nadaljevanje predmeta Osnove programiranja, čeprav ga je mogoče poslušati tudi neodvisno od Osnov programiranja. Razdeljen je na tri osnovne sklope:  -Uvod v jezik C s poudarkom na razlike med jezikoma C in JavaScript:  -skriptni jeziki in prevajalniki  -operacijski sistemi  -operatorji  -podatkovni tipi  -objekti in spremenljivke  -Programski jezik C:  -podatkovne strukture  -programske tehnike  -nižjenivojske operacije  -Učni sistem Arduino:  -osnove vgrajenih sistemov  -priklop in krmiljenje perifernih naprav  -večopravilni sistemi in sistemi v realnem času  -osnovni mehanizem prekinitev | | | | | | | |  | | The subject is a logical continuation of the Introduction to computer programming although it can be regarded as an independent unit as well. It is sectioned into three main topics:  -Introduction to C programming with emphasis on differences between C and JavaScript:  -script languages and compilers  -operating systems  -operators  -data types  -objects and variables  -C programming language  -data structures  -programming techniques  -low-level operations    -Learning board Arduino  -basics of embedded systems  -connecting and control of peripheral devices  -multitasking and real-time systems  -basic interrupt mechanism | | | | | | | |

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| **Temeljni literatura in viri / Readings:** | | | | | |
| 1. I. Fajfar: Uvod v programski jezik C, zapiski predavanj, 2014  2. S. G. Kochan: Programming in C (4th Edition), 2014  3. K. N. King: C Programming - A Modern Approach, 2008  4. H. Schildt: Teach Yourself C, McGraw-Hill, 1997  5. R. P. Halpern: C for Yourself: Learning C Using Experiments, Oxford University Press, 1997  5. How C Programming Works (www.howstuffworks.com)  6. Spletna stran, www.cprogramming.com | | | | | |
| **Cilji in kompetence:** | |  | | **Objectives and competences:** | |
| Študenti bodo osvojili osnovno znanje programskega jezika C. Spoznali bodo osnovne principe delovanja mikrokrmilnikov, priključevanja naprav ter osnovnih načel sistemov v realnem času | |  | | Students will have basic knowledge of C programming language. They will learn basic microcontroller principles, device connecting and basic real time systems principles. | |
| **Predvideni študijski rezultati:** | | |  | **Intended learning outcomes:** | |
| Osnovna načela delovanja mikrokrmilnikov in gradnje preprostih mikrokrmilniških sklopov  Reševanje tehničnih problemov, ki vključujejo digitalni računalnik  Povezovanje osvojenega znanja s primeri delovanja naprav iz vsakdanjega življenja  Programski jezik C | | |  | Basic principles of microcontroller operation and building simple microcontroller systems  Solving technical problems using a digital computer  Linking learned subject with functioning devices that students know from everyday life.  C programming language. | |
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| **Metode poučevanja in učenja:** | | |  | **Learning and teaching methods:** | |
| Predavanja, praktični prikazi, laboratorijske vaje, individualno delo z zahtevnejšimi študenti, uporaba spletnih tehnologij, domače naloge | | |  | Lectures, practical demonstrations, laboratory work, individual work with advanced students, web technologies, homeworks | |
| **Načini ocenjevanja:** | Delež (v %) /  Weight (in %) | | | | **Assessment:** |
| Laboratorijske vaje in domače naloge. Pismeni in ustni del izpita. Kandidat, ki je bil aktivno prisoten na vseh laboratorijskih vajah in je izkazal vsaj 85% uspešnost pri reševanju domačih nalog, se lahko udeleži pismenega dela izpita. Kandidat, ki na pismenem delu izpita zbere vsaj 50 % možnih točk, lahko pristopi k ustnemu delu izpita. Skupna končna ocena se oblikuje na podlagi ocene pismenega in ustnega dela izpita.  Ocenjevalna lestvica:  nezadostno (od 1 do 5), zadostno (6), dobro (7), prav dobro (8), prav dobro (9), odlično (10).  Uspešno opravljene laboratorijske vaje in domače naloge (glej zgoraj) so pogoj za pristop k izpitu.  Prispevki k končni oceni:  pisni izpit  ustni izpit | 50%  50% | | | | Laboratory practical work and homework assignments. Written and oral exam. Candidates which have been actively present at all of the scheduled practical laboratory classes and have completed given homework assignments with at least 85% success rate can take the written exam. Candidates are then eligible fort the oral exam if they scored at least 50% or better in the written exam. The final grade is formed based on the succes in the written and oral exams.  Grading System:  Inadequate (from 1 to 5), Acceptable (6), Adequate (7), Good (8), Good (9), Outstanding (10)  Successfully completed laboratory exercises and homework assignments (see above) is a prerequisite for the exam.  Contributions to final grade:  written exam  oral exam |
| **Reference nosilca / Lecturer's references:** | | | | | |
| 1. BÜRMEN, Arpad, TUMA, Tadej, FAJFAR, Iztok. Meta-optimisation on a high-performance computing system. Elektrotehniški vestnik, ISSN 2232-3228. [English print ed.], 2012, vol. 79, no. 5, str. 231-236  2. FAJFAR, Iztok, TUMA, Tadej, PUHAN, Janez, OLENŠEK, Jernej, BÜRMEN, Arpad. Towards smaller populations in differential evolution = K manjšim populacijam v diferencialni evoluciji. Informacije MIDEM, ISSN 0352-9045, sep. 2012, letn. 42, št. 3, str. 152-163  3. FAJFAR, Iztok, PUHAN, Janez, TOMAŽIČ, Sašo, BÜRMEN, Arpad. On selection in differential evolution. Elektrotehniški vestnik, ISSN 2232-3228. [English print ed.], 2011, vol. 78, no. 5, str. 275-280  4. PUHAN, Janez, BÜRMEN, Arpad, TUMA, Tadej, FAJFAR, Iztok. Teaching assembly and C language concurrently. International journal of electrical engineering education, ISSN 0020-7209, Apr. 2010, vol. 47, no. 2, str. 120-131  5. FAJFAR, Iztok, TUMA, Tadej, BÜRMEN, Arpad, PUHAN, Janez. A top down approach to teaching embedded systems programming = Pristop k učenju programiranja vgrajenih sistemov z vrha navzdol. Informacije MIDEM, ISSN 0352-9045, mar. 2009, letn. 39, št. 1, str. 53-60 | | | | | |