



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove računalništva
Course title:	Fundamentals of Computer Science

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	1.	1.
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30			45		105	6

Nosilec predmeta / Lecturer:

Andrej Taranenko

Jeziki /

Predavanja / Lectures: Slovenski/Slovenian

Languages:

Vaje / Tutorial: slovenski/Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Vsaka izmed naštetih obveznosti mora biti ocenjena s pozitivno oceno.

Pozitivna ocena za kolokvij in sprotne naloge je pogoj za pristop k pisnemu izpitu.

Prerequisites:

Each of the assessments must be graded with a passing grade.

A passing grade for each of the midterm exam and coursework is required for taking the written exam.

Vsebina:

- Zgradba osebnega računalnika: centralna procesna enota, pomnilniške enote, vhodno izhodne enote.
- Predstavitev informacije v računalniku: dvojiški zapis, količina informacije, predstavitev števil, znakov in grafike.
- Programski jeziki: strojni, zbirni, višji programski jeziki, programski jeziki 4. generacije, primeri.
- Osnove strukturiranega programiranja (struktura programa, spremenljivke in konstante, branje in izpis, aritmetični in logični izrazi ter prireditveni stavek).
- Krmilni stavki: zaporedje, vejitve in zanke.
- Podatkovni tipi: osnovni, sestavljeni.
- Reševanje preprostih problemov in zapis algoritmov.
- Izbrana uporabniška programska oprema.

Content (Syllabus outline):

- Computer hardware: central processing unit, RAM and secondary storage, input and output devices.
- Representation of information: binary sistem, representation of numbers, characters and graphics.
- Programming languages: machine languages, assembly languages, high-level languages, fourth generation languages.
- Basics of structural programming (program structure, variables and constants, read and write procedures, arithmetic and logic expressions, assignment statement).
- Structured statements: compound, conditional and loop statements.
- Data types: simple, structural.
- Solving simple problems and using algorithms.
- Selected user software.

Temeljni literatura in viri / Readings:

Deloma odvisni od izbranega programskega jezika (npr.):

- E. R. Scheinerman, *C++ for mathematicians: an introduction for students and professionals*. Boca Raton: Chapman & Hall/CRC, 2006.
- D. M. Capper, *Introducing C++ for scientists, engineers, and mathematicians*, 2nd ed. London: Springer, 2001.
- G. Anželj idr., *Računalništvo in informatika 1: e-učbenik za informatiko v gimnaziji*. Koper; Ljubljana; Maribor: Založba Univerze na Primorskem; Založba Fakultete za računalništvo in informatiko; Fakulteta za elektrotehniko, računalništvo in informatiko, 2015. [Na spletu]. Dostopno na: <http://lusy.fri.uni-lj.si/ucbenik/>
- R. A. Szymanski, D. P. Szymanski, in D. M. Pulschen, *Introduction to computers and software*. Upper Saddle River (New Jersey): Prentice Hall, 1996.

Cilji in kompetence:

Spoznati temeljne koncepte računalništva in informatike (zgradba računalnika, predstavitev informacije v računalniku, vrste programskih jezikov) ter osnove višjega programskega jezika.

Objectives and competences:

Know fundamental concepts from computer science (computer hardware, representation of information, programming languages) and the fundamental principles of a high-level programming language.

Predvideni študijski rezultati:**Intended learning outcomes:**

Znanje in razumevanje: - Poznavanje zgradbe računalnika. - Spoznati različne generacije programskih jezikov. - Spoznati osnove izbranega programskega jezika. - Sposobnost pisanja preprostejših programov. - Razumevanje preprostih algoritmov. Prenesljive/ključne spretnosti in drugi atributi: - Prenos znanja računalništva na druga področja (matematika, biologija, kemija, optimizacija, ...)	Knowledge and Understanding: - To know the computer hardware. - To know a variety of programming languages. - To know the fundamental principles of a high-level programming language. - Be able to write a simple computer program. - Understanding simple algorithms. Transferable/Key Skills and other attributes: - Knowledge transfer of methods of computer science into other fields (mathematics, chemistry, biology, optimization, ...)
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Metode poučevanja in učenja:
Learning and teaching methods:

Predavanja Računalniške vaje	Lectures Computer exercises
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Delež (v %) /

Načini ocenjevanja:
Weight (in %)
Assessment:

<u>kolokvij</u>	30 %	<u>midterm exam</u>
<u>sprotne naloge</u>	40 %	<u>coursework</u>
<u>pisni izpit</u>	30 %	<u>written exam</u>

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, TARANENKO, Andrej. <i>Span of a graph : keeping the safety distance</i>. Discrete mathematics & theoretical computer science. 2023, vol. 25, no. 1, 19 str. ISSN 1365-8050, DOI: 10.46298/dmtcs.9859, DOI: 20.500.12556/DKUM-88137. [COBISS.SI-ID 148408835] 2. DRAVEC, Tanja, TARANENKO, Andrej. <i>Daisy Hamming graphs</i>. Discussiones mathematicae. Graph theory. 2023, vol. 43, no. 2, str. 421-436. ISSN 1234-3099, DOI: 10.7151/dmgt.2373, DOI: 20.500.12556/DKUM-88118. [COBISS.SI-ID 137313795] 3. TARANENKO, Andrej. <i>Daisy cubes: a characterization and a generalization</i>. European journal of combinatorics. March 2020, vol. 85, art. 103058 [10 str.]. ISSN 0195-6698. https://doi.org/10.1016/j.ejc.2019.103058, DOI: 10.1016/j.ejc.2019.103058. [COBISS.SI-ID 18934105] 4. ZHU, Enqiang, TARANENKO, Andrej, SHAO, Zehui, XU, Jin. <i>On graphs with the maximum edge metric dimension</i>. Discrete applied mathematics. [Print ed.]. March 2019, vol. 257, str. 317-324. ISSN 0166-218X. https://doi.org/10.1016/j.dam.2018.08.031, DOI: 10.1016/j.dam.2018.08.031. [COBISS.SI-ID 18584665] 5. PETERIN, Iztok, SCHREYER, Jens, FECKOVÁ ŠKRABUL'ÁKOVÁ, Erika, TARANENKO, Andrej. <i>A note on the Thue chromatic number of lexicographic products of graphs</i>. Discussiones mathematicae. Graph theory. 2018, vol. 38, iss. 3, str. 635-643. ISSN 1234-3099. http://www.discuss.wmie.uz.zgora.pl/php/discuss3.php?ip=&url=pdf&nIdA=25507&nIdSesji=-1, DOI: 10.7151/dmgt.2032. [COBISS.SI-ID 18373465]
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