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 / Languages:	**Predavanja / Lectures:**	slovenski Slovenian
	Vaje / Tutorial:	slovenski/Slovenian

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

Jih ni.

Prerequisits:

None.

Vsebina:

Content (Syllabus outline):

• 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.	• 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.):

- npr. Edward R. Scheinerman, C++ for mathematicians : an introduction for students and professionals, Chapman & Hall/CRC, 2006
- npr. D. M. Capper, Introducing C++ for scientists, engineers, and mathematicians, Springer, 2001.
- R. A. Szymanski et al., Introduction to computers and software, Prentice-Hall, 1996.
- J. G. Brookshear, Computer science: an overview, Addison-Wesley, 2005.
- D. Hankerson, Introduction to Information Theory and Data Compression, Chapman & Hall/CRC, 2003.

Cilji in kompetence:	**Objectives and competences:**
Spoznati temeljne koncepte računalništva in informatike (zgradba računalnika, predstavitev informacije v računalniku, vrste programskih jezikov) ter osnove višjega programskega jezika.	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.	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.

Prenesljive/ključne spretnosti in drugi atributi:	Transferable/Key Skills and other attributes:
• Prenos znanja računalništva na druga področja (matematika, biologija, kemija, optimizacija, ...)	• Knowledge transfer of methods of computer science into other fields (mathematics, chemistry, biology, optimization, …)

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja Računalniške vaje	Lectures Computer exercises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
<u>Sprotno preverjanje:</u> Pisni testi – teorija (3 do 5 pisnih testov na semester) Naloge <u>Izpit:</u> Pisni izpit – problemi Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Opravljene sprotne obveznosti so pogoj za pristop k izpitu.	 30% 40% 30%	<u>Mid-term testing:</u> Written tests – theory (from 3 to 5 written tests during the semester) Coursework <u>Exams:</u> Written exam - problems Each of the mentioned commitments must be assessed with a passing grade. Passing grades of all mid-term testings are required for taking the exam.

Reference nosilca / Lecturer's references:

1. ZHU, Enqiang, TARANENKO, Andrej, SHAO, Zehui, XU, Jin. On graphs with the maximum edge metric dimension. Discrete applied mathematics, ISSN 0166-218X. [Print ed.], March 2019, vol. 257, str. 317-324. https://doi.org/10.1016/j.dam.2018.08.031, doi: 10.1016/j.dam.2018.08.031. [COBISS.SI-ID 18584665]
2. PETERIN, Iztok, SCHREYER, Jens, FECKOVÁ ŠKRABUL'ÁKOVÁ, Erika, TARANENKO, Andrej. A note on the Thue chromatic number of lexicographic produts of graphs. Discussiones mathematicae, Graph theory, ISSN 1234-3099, 2018, vol. 38, iss. 3, str. 635-643. 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]
3. KELENC, Aleksander, KUZIAK, Dorota, TARANENKO, Andrej, YERO, Ismael G. Mixed metric dimension of graphs. Applied mathematics and computation, ISSN 0096-3003. [Print ed.], 2017, vol. 314, str. 429-438, doi: 10.1016/j.amc.2017.07.027. [COBISS.SI-ID 23331080]
4. BANIČ, Iztok, TARANENKO, Andrej. Measuring closeness of graphs - the Hausdorff distance. Bulletin of the Malaysian Mathematical Society, ISSN 0126-6705, 2017, vol. 40, iss. 1, str. 75-95, doi: 10.1007/s40840-015-0259-1. [COBISS.SI-ID 21722376]
5. KELENC, Aleksander, TARANENKO, Andrej. On the Hausdorff distance between some families of chemical graph. MATCH Communications in Mathematical and in Computer Chemistry, ISSN 0340-6253, 2015, vol. 74, no. 2, str. 223-246.

http://match.pmf.kg.ac.rs/electronic_versions/Match74/n2/match74n2_223-246.pdf. [COBISS.SI-ID 21391368]