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. P. Mrhar, Spoznajmo Delphi: osnove jezika, Flamingo, 2002.
- 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. Transferable/Key Skills and other attributes:

Prenesljive/ključne spretnosti in drugi atributi: • 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:**
Sprotno preverjanje: Pisni testi – teorija (3 do 5 pisnih testov na semester) Naloge Izpit: 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%	Mid-term testing: Written tests – theory (from 3 to 5 written tests during the semester) Coursework Exams: 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. TARANENKO, Andrej, VESEL, Aleksander. 1-factors and characterization of reducible faces of plane elementary bipartite graphs. Discuss. Math., Graph Theory, 2012, vol. 32, no. 2, str. 289-297, doi: 10.7151/dmgt.1607. [COBISS.SI-ID 19104264]
2. TARANENKO, Andrej, ŽIGERT, Petra. Resonant sets of benzenoid graphs and hypercubes of their resonance graphs. MATCH Commun. Math. Comput. Chem. (Krag.), 2012, vol. 68, no. 1, str. 65-77. http://www.pmf.kg.ac.rs/match/content68n1.htm. [COBISS.SI-ID 16051990]
3. KLAVŽAR, Sandi, SALEM, Khaled, TARANENKO, Andrej. Maximum cardinality resonant sets and maximal alternating sets of hexagonal systems. Comput. math. appl. (1987). [Print ed.], 2010, vol. 59, no. 1, str. 506-513.http://dx.doi.org/10.1016/j.camwa.2009.06.011. [COBISS.SI-ID 15383641]
4. TARANENKO, Andrej, VESEL, Aleksander. Characterization of reducible hexagons and fast decomposition of elementary benzenoid graphs. Discrete appl. math.. [Print ed.], 2008, vol. 156, iss. 10, str. 1711-1724. http://dx.doi.org/10.1016/j.dam.2007.08.029, doi:10.1016/j.dam.2007.08.029. [COBISS.SI-ID 16140552]
5. TARANENKO, Andrej, VESEL, Aleksander. On elementary benzenoid graphs: new characterization and structure of their resonance graphs. MATCH Commun. Math. Comput. Chem. (Krag.), 2008, #Vol. #60, #no. #1, str. 193-216, ilustr. [COBISS.SI-ID1939989]