Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Osnove računalništva in informatike**
Course title:	Fundamentals of Computer Science and Informatics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 1. stopnja		**1.**	**1.**
Mathematics, 1st degree		**1.**	**1.**

Vrsta predmeta / Course type

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
45			**45**		**120**	**7**

Nosilec predmeta / Lecturer: Aleksander VESEL

Jeziki / Languages:	**Predavanja / Lectures:**	SLOVENSKO/SLOVENE
	Vaje / Tutorial:	SLOVENSKO/SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Jih ni.	There are none.

Vsebina:	**Content (Syllabus outline):**
Zgradba osebnega računalnika: centralna procesna enota, pomnilniške enote, vhodno izhodne enote. Matematične osnove predstavitve informacije v računalniku: dvojiški zapis, količina informacije, predstavitev števil, znakov in grafike. Programski jeziki: strojni, zbirni, višji programski jeziki, programski jeziki 4. generacije, primeri.	Computer hardware: central processing unit, RAM and secondary storage, input and output devices. Mathematical basis for representation of information: binary sistem, representation of numbers, characters and graphics. Programming languages: machine languages, assembly languages, high-level languages, fourth generation languages.

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, proceduralni. Podprogrami in rekurzivni podprogrami. Osnovni matematični algoritmi: Evklidov, Hornerjev, linearne, kvadratne in rekurzivne funkcije. Datoteke: vrste datotek, delo z datotekami.	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, procedural. Procedures and recursive procedures. Fundamental mathematical algorithms: Euclid's, Horner's, linear, quadratic and recursive functions. Files: file types, working with files.

Temeljni literatura in viri / Readings:

Deloma odvisni od izbranega programskega jezika:
D. 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 matematične koncepte računalništva in informatike (zgradba računalnika, predstavitev informacije v računalniku, vrste programskih jezikov) ter osnove višjega programskega jezika.	Know fundamental mathematical 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 srednje zahtevnih programov. Prenesljive/ključne spretnosti in drugi atributi:	Knowledge and Understanding: • To kow 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 moderately complex computer program. Transferable/Key Skills and other attributes:

• Prenos znanja matematičnih konceptov računalništva na druga področja (matematika, biologija, kemija)	• Knowledge transfer of mathematical concepts of computer science into other fields (mathematics, chemistry, biology)
Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Računalniške vaje	• Lectures • Computer exercises

Načini ocenjevanja:		**Assessment:**
	Delež (v %) / Weight (in %)	
Sprotno preverjanje:		Mid-term testing:
Pisni testi – teorija (3 do 5 pisnih testov na semester)	40%	Written tests – theory (from 3 to 5 written tests during the semester)
Naloge	20%	Coursework
Izpit:		Exams:
Pisni izpit – problemi	40%	Written exam - problems
Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.		Each of the mentioned commitments must be assessed with a passing grade.
Opravljene sprotne obveznosti so pogoj za pristop k izpitu.		Passing grades of all mid-term testings are required for taking the exam.

Reference nosilca / Lecturer's references:

1. VESEL, Aleksander. Fibonacci dimension of the resonance graphs of catacondensed benzenoid graphs. *Discrete appl. math.*. [Print ed.], 2013, str. 1-11, doi: 10.1016/j.dam.2013.03.019.
2. SHAO, Zehui, VESEL, Aleksander. A note on the chromatic number of the square of the Cartesian product of two cycles. *Discrete math.*. [Print ed.], 2013, vol. 313, iss. 9, str. 999-1001.
3. KORŽE, Danilo, VESEL, Aleksander. A note on the independence number of strong products of odd cycles. *Ars comb.*, 2012, vol. 106, str. 473-481. [COBISS.SI-ID 16138006]
4. 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]
5. SALEM, Khaled, KLAVŽAR, Sandi, VESEL, Aleksander, ŽIGERT, Petra. The Clar formulas of a benzenoid system and the resonance graph. *Discrete appl. math.*. [Print ed.], 2009, vol. 157, iss. 11, str. 2565-2569. http://dx.doi.org/10.1016/j.dam.2009.02.016. [COBISS.SI-ID 15142489]