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
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	1.	1.
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type | Obvezni/ Obligatory

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			60		75	6

Nosilec predmeta / Lecturer: | Aleksander Vesel

Jeziki / Languages:	Predavanja / Lectures:	Slovenski/Slovenian
	Vaje / Tutorial:	Slovenski/Slovenian

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

Vsebina:	**Content (Syllabus outline):**
Zgradba računalnika. 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. Struktura programa, spremenljivke in konstante, branje in izpis, aritmetični in logični izrazi ter prireditveni stavek.	Computer hardware. Representation of information: binary sistem, representation of numbers, characters and graphics. Programming languages: machine languages, assembly languages, high-level languages, fourth generation languages. Program structure, variables and constants, read and write procedures, arithmetic and logic expressions, assignment statement.

Krmilni stavki: zaporedje, vejitve in zanke.	Structured statements: compound, conditional and loop statements.
Podatkovni tipi: osnovni, sestavljeni, proceduralni.	Data types: simple, structural, procedural.
Podprogrami in rekurzivni podprogrami.	Procedures and recursive procedures.
Enostavni izobraževalni računalniški programi.	Basic educational computer programs.
Osnovni algoritmi. Zahtevnost algoritmov.	Fundamental algorithms. Algorithm complexity.

Temeljni literatura in viri / Readings:

D. Capper, Introducing C++ for Scientists, Engineers and Mathematicians, Springer, 2001.
J. G. Brookshear, Computer science: an overview, Addison-Wesley, 2014.
G. Bervar, C++ na kolenih, Študentska založba, 2008.
D. Hankerson, Introduction to Information Theory and Data Compression, Chapman & Hall/CRC, 2003.
E.R. Scheinerman, C++ for mathematicians : an introduction for students and professionals, Chapman & Hall/CRC, 2006.

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 of 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:	**Knowledge and understanding:**
- Poznavanje predstavitve informacije v računalniku. - Spoznati različne generacije programskih jezikov - Spoznati osnove izbranega programskega jezika. - Sposobnost pisanja srednje zahtevnih programov.	- To kow the representation of information. - To know a variety of programming languages generations. - To know the fundamental principles of a high-level programming language. - Ability to write a moderately complex computer program.
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

Delež (v %) /

Načini ocenjevanja:	Weight (in %)	Assessment:
Sprotno preverjanje: Pisni testi – teorija (3 do 5 pisnih testov na semester)	40%	Mid-term testing: Written tests – theory (from 3 to 5 written tests during the semester)
Naloge	20%	Coursework
Izpit: Pisni izpit – problemi	40%	Exams: 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. KORŽE, Danilo, MARKUŠ, Žiga, VESEL, Aleksander. A heuristic approach for searching (d,n)-packing colorings of infinite lattices. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], March 2019, vol. 257, str. 353-358. https://doi.org/10.1016/j.dam.2018.09.018,[COBISS.SI-ID 21821462].

2. KORŽE, Danilo, VESEL, Aleksander. Packing coloring of generalized Sierpiński graphs. *Discrete mathematics and theoretical computer science*, ISSN 1365-8050, 2019, vol. 21, no. 3, str. 1-18. https://dmtcs.episciences.org/5178/pdf. [COBISS.SI-ID 22126870].

3. VESEL, Aleksander. Cube-complements of generalized Fibonacci cubes. *Discrete Mathematics*, ISSN 0012-365X. [Print ed.], April 2019, vol. 342, iss. 4, str. 1139-1146. https://doi.org/10.1016/j.disc.2019.01.008, [COBISS.SI-ID 18539097].

4. SHAO, Zehui, VESEL, Aleksander, XU, Jin. The k-distance independence number and 2-distance chromatic number of Cartesian products of cycles. *Bulletin of the Malaysian Mathematical Society*, ISSN 0126-6705, 2018, vol. 41, iss. 3, str. 1377-1391, doi: 10.1007/s40840-016-0397-0. [COBISS.SI-ID 22601992].

5. KORŽE, Danilo, VESEL, Aleksander. (d,n)-packing colorings of infinite lattices. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], March 2018, vol. 237, str. 97-108, doi: 10.1016/j.dam.2017.11.036. [COBISS.SI-ID 21067542].