



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
Izobraževalna fizika, 1. stopnja		2. ali 3	4., 5. ali 6.
Educational Physcs, 1 st degree			

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
30			45		105	6

Nosilec predmeta / Lecturer:

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

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

Prerequisites:

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

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

(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.

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:

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:

Znanje in razumevanje:

- Poznavanje zgradbe računalnika.
- Spoznati različne generacije programskih jezikov.
- Spoznati osnove izbranega programskega jezika.
- Sposobnost pisanja preprostejših programov.
- Razumevanje preprostih algoritmov.

Prenosljive/ključne spretnosti in drugi atributi:

- Prenos znanja računalništva na druga področja (matematika, biologija, kemija, optimizacija, ...)

Intended learning outcomes:

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, ...)

Metode poučevanja in učenja:

Learning and teaching methods:

Predavanja Računalniške vaje	Lectures Computer exercises
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Delež (v %) / Weight (in %)		Assessment:
Načini ocenjevanja: <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. 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]