



Univerza v Mariboru



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Fakulteta za naravoslovje in
matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove računalniških omrežij
Course title:	Principles of Computer Networks

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika	Uporabna matematika	3.	5. ali 6.
Mathematics	Applied Mathematics	3.	5. or 6.

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			30		135	7

Nosilec predmeta / Lecturer:

Aleksander VESEL

Jeziki /

Languages:

Predavanja /

Lectures:

Vaje / Tutorial:

SLOVENSKO/SLOVENE

SLOVENSKO/SLOVENE

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

Algoritmi, Podatkovne strukture, Računalniški praktikum

Vsebina:

Matematične osnove in teorija računalniških omrežij: teorija grafov, usmerjevalni postopki, dodeljevanje frekvenc.

Referenčna modela OSI in TCP/IP.

Spoznavanje omrežij z vidika različnih slojev po referenčnem modelu.

Varnost v omrežjih.

Zaščita vsebine prenosa podatkov: standardne kriptografske metode, kriptografija z javnim

Prerequisites:

Algorithms, Data structures, Programming practicum

Content (Syllabus outline):

Mathematical principles and theory of computer networks: graph theory, routing algorithms, frequency assignment.

Reference models OSI and TCP/IP.

Different layers of a network reference model.

Network security.

Secure data transmission: standard data

ključem. Medomrežno povezovanje in zaščita: varnostni zid.	cryptography methods, public key cryptography. Inter-network communications and security: firewall.
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Temeljni literatura in viri / Readings:

T. Vidmar: Računalniška omrežja in storitve, Atlantis, 1997
A. S. Tanenbaum: Computer Networks, Prentice-Hall, 2003.
B. Schneier: Applied cryptography: protocols, algorithms, and source code in C, Wiley and Sons, 1996
O. Goldreich: Modern cryptography, probabilistic proofs and pseudorandomness, Berlin, Springer, 1999.
S. Garfinkel: Practical UNIX and Internet Security, Bonn, O'Reilly, 1996.
W. Mao: Modern cryptography : theory and practice, Upper Saddle River, Prentice-Hall, 2004.

Cilji in kompetence:

Spoznati matematične osnove, teorijo in temeljne koncepte računalniških omrežij.
Nadgraditi znanja pridobljena pri drugih predmetih (diskretne matematiki, algoritmih,...) za potrebe računalniških omrežij.

Objectives and competences:

Know mathematical theory and fundamental concepts of computer networks. Upgrade the knowledge obtained with other subjects (algorithms, discrete mathematics, ...) for computer networks.

Predvideni študijski rezultati:

Znanje in razumevanje: - Razumeti matematične principe in teorijo - Spoznati algoritme za usmerjanje ter algoritme za dodeljevanje frekvenc. - Spoznati osnove varnosti in zaščite podatkov v računalniških omrežjih
Prenosljive/ključne spretnosti in drugi atributi: Pridobljena znanja se prenašajo na druge z računalništvom povezane predmete.

Intended learning outcomes:

Knowledge and Understanding: - To understand mathematical principles and theory - To know routing algorithms and frequency assignment algorithms. - To know basics of network security To understand secure data transmission methods
Transferable/Key Skills and other attributes: The obtained knowledge is transferable to the other computer science oriented subjects.

Metode poučevanja in učenja:

- Predavanja - Računalniške vaje

Learning and teaching methods:

- Lectures - Computer exercises
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Načini ocenjevanja:

Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, projekt) Pisni test – praktični del Izpit (ustni) – teoretični del Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Pozitivna ocena pri pisnem testu je pogoj za pristop k izpitu.	Delež (v %) / Weight (in %) 50% 50%	Type (examination, oral, coursework, project): Written test – practical part Exam (oral) – theoretical part Each of the mentioned commitments must be assessed with a passing grade. Passing grade of the written test is required for taking the exam.
Reference nosilca / Lecturer's references:		
1. KORŽE, Danilo, VESEL, Aleksander. A note on the independence number of strong products of odd cycles. <i>Ars comb.</i>, 2012, vol. 106, str. 473-481. [COBISS.SI-ID 16138006] 2. TARANENKO, Andrej, VESEL, Aleksander. 1-factors and characterization of reducible faces of plane elementary bipartite graphs. <i>Discuss. Math., Graph Theory</i>, 2012, vol. 32, no. 2, str. 289-297, doi: 10.7151/dmgt.1607. [COBISS.SI-ID 19104264] 3. SALEM, Khaled, KLAVŽAR, Sandi, VESEL, Aleksander, ŽIGERT, Petra. The Clar formulas of a benzenoid system and the resonance graph. <i>Discrete appl. math.</i>. [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] 4. VESEL, Aleksander. 4-tilings of benzenoid graphs. <i>MATCH Commun. Math. Comput. Chem. (Krag.)</i>, 2009, vol. 62, no. 1, str. 221-234. [COBISS.SI-ID 16886536] 5. TARANENKO, Andrej, VESEL, Aleksander. Characterization of reducible hexagons and fast decomposition of elementary benzenoid graphs. <i>Discrete appl. math.</i>. [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]		