Univerza v Mariboru

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		3.	6.
Mathematics		3.	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:	SLOVENSKO/SLOVENE
	Vaje / Tutorial:	SLOVENSKO/SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Algoritmi, Podatkovne struktrure, Računalniški praktikum	Algorithms, Data structures, Programming practicum

Vsebina:	**Content (Syllabus outline):**
Matematične osnove in teorija računalniških omrežij: teorija grafov, usmerjevalni postopki, dodeljevanje frekvenc.	Mathematical principles and theory of computer networks: graph theory, routing algorithms, frequency assignment.
Referenčna modela OSI in TCP/IP.	Reference models OSI and TCP/IP.
Spoznavanje omrežij z vidika različnih slojev po referenčnem modelu.	Different layers of a network reference model.
Varnost v omrežjih.	Network security.
Zaščita vsebine prenosa podatkov: standardne kriptografske metode, kriptografija z javnim ključem.	Secure data transmission: standard data cryptography methods, public key
Medomrežno povezovanje in zaščita: varnostni	

zid.	cryptography.
	Inter-network communications and security: firewall.

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: Parctical UNIX and Internet Security, Bonn, O'Reilly, 1996.

W. Mao: Modern cryptography : theory and practice, Upper Saddle River, Prentice-Hall, 2004.

Cilji in kompetence:	**Objectives and competences:**
Spoznati matematične osnove, teorijo in temeljne koncepte računalniških omrežij. Nadgraditi znanja pridobljena pri drugih predmetih (diskretne matematiki, algoritmih,...) za potrebe računalniških omrežij.	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: / **Intended learning outcomes:**

Znanje in razumevanje:	Knowledge and Understanding:
• Razumeti matematične principe in teorijo • Spoznati algoritme za usmerjanje ter algoritme za dodeljevanje frekvenc. • Spoznati osnove varnosti in zaščite podatkov v računalniških omrežjih	• 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
Prenesljive/ključne spretnosti in drugi atributi: • Pridobljena znanja se prenašajo na druge z računalništvom povezane predmete.	Transferable/Key Skills and other attributes: • The obtained knowledge is transferable to the other computer science oriented subjects.

Metode poučevanja in učenja: / **Learning and teaching methods:**

• Predavanja • Računalniške vaje	• Lectures • Computer exercises

Načini ocenjevanja:		Assessment:
	Delež (v %) / Weight (in %)	
Izpit:		Exams:
Pisni izpit – praktični del	50%	Written exam – practical part
Ustni izpit – teorija	50%	Oral exam – theory
Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.		Each of the mentioned commitments must be assessed with a passing grade.
Opravljen pisni izpit – praktični del je pogoj za pristop k ustnemu izpitu.		Passing grades of written exam – practical part is required for taking the oral exam.
Reference nosilca / Lecturer's references:		

1. 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]

2. 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]

3. 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]

4. VESEL, Aleksander. 4-tilings of benzenoid graphs. *MATCH Commun. Math. Comput. Chem. (Krag.)*, 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. *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]