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		105	6

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 strukture, Računalniški praktikum	Algorithms, Data structures, Programming practicum

Vsebina:	**Content (Syllabus outline):**
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 ključem. Medomrežno povezovanje in zaščita: varnostni	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 cryptography methods, public key

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

Temeljni literatura in viri / Readings:

J. F. Kurose, K. W. Ross: Računalniška omrežja : compiled from Computer networking, sixth edition, Pearson, 2015.

A. S. Tanenbaum, D. Wetherall: Computer Networks, Pearson Infia, cop. 2018.

W. Easttom: Modern Cryptography : Applied Mathematics for Encryption and Information Security, Springer, 2023.

Cilji in kompetence:	**Objectives and competences:**
Cilji in kompetence tega predmeta so, da študentje spoznajo matematične osnove, teorijo in temeljne koncepte računalniških omrežij ternadgradijo znanja pridobljena pri drugih predmetih (diskretne matematiki, algoritmih,...) za potrebe računalniških omrežij.	The objectives and competences of this course are for students to know mathematical theory and fundamental concepts of computer networks and upgrade the knowledge obtained with other subjects (algorithms, discrete mathematics, ...) for computer networks.

Predvideni študijski rezultati:

Intended learning outcomes:

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 Prenesljive/ključne spretnosti in drugi atributi: • Pridobljena znanja se prenašajo na druge z računalništvom povezane predmete.	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:

Learning and teaching methods:

• Predavanja • Računalniške vaje	• Lectures • Computer exercises

Načini ocenjevanja:

Assessment:

	Delež (v %) /	

	Weight (in %)	
Sprotno preverjanje: Pisni testi – teorija (3 do 5 pisnih testov na semester)	50%	Mid-term testing: Written tests – theory (from 3 to 5 written tests during the semester)
Izpit: Pisni izpit – praktični del	50%	Exams: Written exam – practical part
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. Binary coding of resonance graphs of catacondensed polyhexes. *Match : communications in mathematical and in computer chemistry*. 2023, vol. 90, no. 2, str. 429-452. ISSN 0340-6253. DOI: 10.46793/match.90-2.429V. [COBISS.SI-ID 148521219]

2. KORŽE, Danilo, VESEL, Aleksander. General Position Sets in Two Families of Cartesian Product Graphs. *Mediterranean journal of mathematics*. Published 06 May 2023, 12 str. ISSN 1660-5446. DOI: 10.1007/s00009-023-02416-z. [COBISS.SI-ID 151233539]

3. KORŽE, Danilo, SHAO, Zehui, VESEL, Aleksander. New results on radio k-labelings of distance graphs. *Discrete applied mathematics*. [Print ed.]. 15 Oct. 2022, vol. 319, str. 472-479. ISSN 0166-218X. DOI: 10.1016/j.dam.2021.09.007. [COBISS.SI-ID 78298371].

4. DENG, Fei, SHAO, Zehui, VESEL, Aleksander. On the packing coloring of base-3 Sierpiński graphs and H-graphs. *Aequationes mathematicae*. 2021, vol. 95, iss. 2, str. 329-341. ISSN 0001-9054. DOI: 10.1007/s00010-020-00747-w. [COBISS.SI-ID 27121667].

5. VESEL, Aleksander. Efficient proper embedding of a daisy cube. *Ars mathematica contemporanea*. [Tiskana izd.]. 2021, vol. 21, no. 2, str. 271-282. ISSN 1855-3966. https://amc-journal.eu/index.php/amc/article/download/2454/1711, http://www.dlib.si/details/URN:NBN:SI:doc-LNSLRXNG, DOI: 10.26493/1855-3974.2454.892. [COBISS.SI-ID 72352259].