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:**
Pozitivne ocenje pri kolokvijih in projektu so pogoj za pristop k pisnemu izpitu.	Passing grades for midterm exams and the project are required for taking the written exam.

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

Medomrežno povezovanje in zaščita: varnostni zid.	cryptography methods, public key 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.

H. Delfs, H. Knebl, , Introduction to Cryptography: Principles and Applications, Deutsches MAB-Nationalkomitee beim Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, 2007

Dodatna literatura / Additional Readings:

W. Easttom: Modern Cryptography : Applied Mathematics for Encryption and Information Security, Springer, 2023.S. A. M. Rizvi, V. K. Sharma: An introduction to computer networks, Alpha Science International Ltd., cop. 2011.

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 %)	
kolokvij	30 %	midterm exam
projekt	40 %	project
pisni izpit	30 %	written exam
Reference nosilca / Lecturer's references:		

1. KORŽE, Danilo, VESEL, Aleksander. Variety of mutual-visibility problems in hypercubes. *Applied mathematics and computation*. 15 April 2025, vol. 491, [article no.] 129218, 10 str.
2. 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.
3. KORŽE, Danilo, VESEL, Aleksander. General Position Sets in Two Families of Cartesian Product Graphs. *Mediterranean journal of mathematics*. 2023, vol. 20, [article no.] 203, 12 str.
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.
5. VESEL, Aleksander. Efficient proper embedding of a daisy cube. *Ars mathematica contemporanea*. [Tiskana izd.]. 2021, vol. 21, no. 2, str. 271-282.