Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Napredno programiranje
Course title:	Advanced programming

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 1. stopnja		**3.**	**6.**
Mathematics, 1st degree		**3.**	**6.**

Vrsta predmeta / Course type Izbirni

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		**45**			**90**	**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:

Pozitivne ocenje pri kolokvijih in projektu so pogoj za pristop k pisnemu izpitu.

Prerequisits:

Passing grades for midterm exams and the project are required for taking the written exam.

Vsebina:

Vsebina in programski jezik predmeta se prilagajata aktualnim potrebam in razvoju.

Npr. za programski jezik Python in Java:

- ponovitev osnov jezika,
- standardne knjižnice,
- objektno usmerjeno načrtovanje,
- tehnike funkcijskega programiranja,
- metodologije testiranja.

Content (Syllabus outline):

The contents and the choice of the programming language of this subject are chosen according to the current needs and development.

E.g. for Python and Java programming language:

- quick introduction to language,
- standard libraries,
- object oriented design,
- functional programming,
- methodologies for testing.

Temeljni literatura in viri / Readings:

L. Fürst, Java od začetka. Ljubljana: Fakulteta za računalništvo in informatiko, 2023, str. XII, 401. [Na spletu]. Dostopno na: http://zalozba.fri.uni-lj.si/fuerst2023.pdf
Y. E. Osais, Computer simulation : a foundational approach using Python, CRC Press, 2018.
H. P. Langtangen, Python Scripting for Computational Science, Springer, 2006.

Dodatna literatura / Additional Readings:J. Payne, Beginning Python : using Python 2.6 and Python 3.1, Wiley, 2010.
C. Dürr, J. Vie, Competitive programming in Python : 128 algorithms to develop your coding skills, Cambridge University Press, 2021.

Cilji in kompetence:

Spoznati osnove in naprednejše pristope sodobnih programskih jezikov.

Ustvarjati dobro načrtovane programske projekte, uporabiti standardne knjižnice in uporabiti metode testiranja za zahtevnejše naloge.

Objectives and competences:

Know basics and advanced approaches to modern programming languages.

Create well-designed software project, use standard libraries and apply testing techniques for complex tasks.

Predvideni študijski rezultati:

Znanje in razumevanje:

- prepoznati vse gradnike izbranega jezika,
- utemeljiti razloge za izbiro gradnika,
- pojasniti alternative pri načrtovanju modularnih in razširljivih programov.

Prenesljive/ključne spretnosti in drugi atributi:

- uporaba matematičnih pojmov v programskih aplikacijah
- uporaba ustreznih podatkovnih struktur pri implementaciji matematičnih algoritmov
- pridobljena znanja se prenašajo na druge z računalništvom povezane predmete

Intended learning outcomes:

Knowledge and Understanding:

- recognize all constructs of the chosen language,
- explain design choices of chosen constructs,
- explain alternative for the desing of modular and scalable programms.

Transferable/Key Skills and other attributes:

- the usage of mathematical notions in applications
- the usage of appropriate data structures while implementing mathematical algorithms
- the obtained knowledge is transferable to the other computer science oriented subjects

Metode poučevanja in učenja:

- Predavanja
- Praktične vaje

Learning and teaching methods:

- Lectures
- Practical 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.