Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Programiranje II**
Course title:	**Programming II**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	1.	2.
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type	Obvezni/ Obligatory
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
30		3	42		135	7

Nosilec predmeta / Lecturer:	Mernik Marjan

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski / slovene
	Vaje / Tutorial:	slovenski / slovene

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

Ni pogojev.

Prerequisits:

None.

Vsebina:

- Uvod v objektno usmerjeno programiranje: slabosti strukturiranega programiranja, prednosti objektno usmerjenega programiranja.
- Razredi in objekti: razred in komponente razreda, ustvarjanje objektov, posebne metode, delo z viri, konstantni objekti, statični elementi razreda, skrivanje informacij.

Content (Syllabus outline):

- Introduction to object-oriented programming: shortcomings of structured programming, advantages of object-oriented programming.
- Classes and objects: class and class members, object creation, special member functions, resource management, constant objects, static class members, information hiding.

- Kazalci: kazalci na objekte, kazalec this, dinamične podatkovne strukture.
- Prekrivanje: prekrivanje metod, prekrivanje operatorjev, operatorji kot prijateljske funkcije.
- Dedovanje: nadrazredi in izpeljani razredi, zaščiteni elementi, virtualne funkcije, abstraktni razredi, dinamično povezovanje, večkratno dedovanje.
- Uvod v objektno usmerjeno analizo in načrtovanje: analiza, načrtovanje, osnove UML.
- Šablone: šablone funkcij, šablone razredov, knjižnica STL.
- Izjeme: zbujanje izjem, lovljenje izjem.
- Podatkovni tokovi: vhodni tokovi, izhodni tokovi, datoteke, vhod/izhod za uporabniško definirane tipe.
- Novi konstrukti v jeziku C++11 in C++14.

- Pointers: pointer to objects, this pointer, dynamic data structures.
- Overloading: method overloading, operator overloading, operators as friend functions.
- Inheritance: super classes, derived classes, protected members, virtual functions, abstract classes, dynamic binding, multiple inheritance.
- Introduction to object-oriented analysis and design: analysis, design, UML fundamentals.
- Templates: function templates, class templates, Standard Template Library (STL).
- Exceptions: throwing exceptions, exception handling.
- Data streams: input streams, output streams, files, I/O streams for user defined types.
- New language features of C++11 and C++14.

Temeljni literatura in viri / Readings:

- B. Stroustrup: *Programming: Principles and Practice Using C++*, Addison-Wesley, Reading, 2014.
- B. Stroustrup: The C++ Programming Language, Second Edition, Addison-Wesley, Reading, 1991.
- H. M. Deitel, P. J. Deitel: *C++ How to Program*, Fourth Edition, Prentice Hall, London, 2002.
- F. M. Carrano: *Data Abstraction and Problem Solving with C++: Walls and Mirrors*, Fourth Edition, Addison Wesley, Reading, 2004.
- F. L. Friedman, E. B. Koffman: Problem Solving, Abstraction, and Design Using C++, Addison-Wesley, Reading, 1994.

Cilji in kompetence:

Cilj tega predmeta je razumeti osnove objektno usmerjenega programiranja in jih naučiti načrtovanja, kodiranja, razhroščevanja, testiranja in dokumentiranja programov.

Objectives and competences:

The objective of this course is to understand the fundamentals of object-oriented programming and to teach them how to design, implement, debug, test, and document programs.

Predvideni študijski rezultati:

Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben

- razumeti tehnike objektno usmerjenega programiranja,
- razumeti razlike med strukturiranim in objektno usmerjenim programiranjem,

Intended learning outcomes:

Knowledge and understanding:

On completion of this course the student will be able to

- understand object-oriented programming techniques,
- understand differences between structured and object-oriented programming,

• definirati razrede in podrazrede, ustvarjati objekte, definirati polimorfne metode, • razumeti, kako so objekti implementirani v jeziku C++, • uporabljati knjižnico STL, • načrtovanja, implementiranja, razhroščevanja in dokumentiranja preprostejših programov.	• define classes and subclasses, create objects and define polymorphic methods, • understand how objects are implemented in C++ language, • use Standard Template Library, • design, implement, debug and document simple programs.
Prenosljive/ključne spretnosti in drugi atributi: • *Spretnosti komuniciranja:* ustni zagovor laboratorijskih vaj, pisno izražanje pri pisnem izpitu. • *Uporaba informacijske tehnologije:* uporaba programskih orodij za načrtovanje, implementacijo, razhroščevanje in testiranje programov. • *Reševanje problemov:* načrtovanje in implementacija programov.	**Transferable/Key Skills and other attributes:** • *Communication skills:* oral lab work defence, manner of expression at written examination. • *Use of information technology:* use of different tools for program design, implementation, debugging and testing. • *Problem solving:* design and implementation of programs.

Metode poučevanja in učenja:	**Learning and teaching methods:**
• predavanja, • laboratorijske vaje.	• lectures, • lab work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
• laboratorijske vaje	50 %	• lab work
• 1. kolokvij,	25 %	• 1st midterm written exam,
• 2. kolokvij.	25 %	• 2nd midterm written exam.
		– .
		•

Opomba:

Kolokvija se lahko nadomestita s pisnim izpitom v deležu 50 %.

Note:

The midterm examinations may be replaced by written exam in the weight of 50%.

Reference nosilca / Lecturer's references:

- KOSAR, Tomaž, ZHENLI, Lu, MERNIK, Marjan, HORVAT, Marjan, ČREPINŠEK, Matej. A case study on the design and implementation of a platform for hand rehabilitation. Applied sciences. 2021, vol. 11, iss. 1, str. 1-21, ilustr. ISSN 2076-3417. DOI: 10.3390/app11010389. [COBISS.SI-ID 45500163]
- KOS, Tomaž, MERNIK, Marjan, KOSAR, Tomaž Evolution of domain-specific modeling language: an example of an industrial case study on an RT-sequencer. Applied sciences. 28 Nov. 2022, vol. 12, iss. 23, 23 str, ilustr. ISSN 2076-3417. DOI: 10.3390/app122312286. [COBISS.SI-ID 131987715]

- SLIVNIK, Boštjan, KOVAČEVIĆ, Željko, MERNIK, Marjan, KOSAR, Tomaž. On comprehension of genetic programming solutions : a controlled experiment on semantic inference. Mathematics. Sep. 2022, vol. 10, iss. 18, str. 1-17, ilustr. ISSN 2227-7390. https://www.mdpi.com/2227-7390/10/18/3386, DOI: 10.3390/math10183386. [COBISS. SI-ID 122033411]