



Univerza v Mariboru



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Fakulteta za naravoslovje in
matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Teorija programskih jezikov
Course title:	Theory of programming languages

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 2. stopnja		1. ali 2.	1. ali 3.
Mathematics, 2 nd degree		1. or 2.	1. or 3.

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:

Krista RIZMAN ŽALIK

Jeziki /

Languages:

Predavanja /

Lectures:

SLOVENSKO/SLOVENE

Vaje / Tutorial:

SLOVENSKO/SLOVENE

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

Prerequisites:

Vsebina:

Formalna logika kot programski jezik, avtomatsko dokazovanje izrekov kot interpretiranje nepostopkovnih programov.

Formalna semantika programskih jezikov: operacijska semantika, denotacijska semantika, aksiomska semantika.

Uporaba semantike (dokazovanje pravilnosti in lastnosti programov, statična analiza programov).

Content (Syllabus outline):

Formal logic as programming languages, automatic proof of lemmas as interpreting of nonprocedural programs.

Semantic of programming languages: operational semantics, denotational semantics, axiomatic semantics, the use of semantic (proving of correctness, characteristics of programmes, static analysis of programmes).

Koncepti objektno usmerjenih jezikov: meta-razred, podrazredi in podtipi, kovarianca in kontravarianca, polimorfizem. Formalni opis objektno usmerjenih jezikov.

Funkcijski programski jeziki.

Lambda kalkulus: proste in vezane spremenljivke, redukcije, pretvorbe, rekurzija, izračunljive funkcije, typed lambda calculus, second-order lambda calculus.

Basic concepts of object-oriented programming languages : meta-class, subclass and subtype, covariance in contravariance, polymorphism. Formal description of object-oriented languages.

Functional programming languages. Lambda calculus: free and bound variables, reduction, conversions, recursions, computable functions, typed lambda calculus, second-order lambda calculus.

Temeljni literatura in viri / Readings:

D. A. Watt: Programming Language Concepts and Paradigms, Prentice-Hall, New York 1990.

H.R. Nielson, F. Nielson. Semantics with Applications: A Formal Introduction. John Wiley & Sons, Chichester, 1992.

M. Abadi, L. Cardelli. A Theory of Objects. Springer-Verlag, New York, 1996.

K. Bruce. Foundations of Object-Oriented Languages: Types and Semantics. The MIT Press, 2002.

H. P. Barendregt. The Lambda Calculus: Its Syntax and Semantics. Studies in Logic and the Foundations of Mathematics, Volume 103, North-Holland, 1984.

H. P. Barendregt. Introduction to Lambda Calculus. Workshop on Implementation of Functional Languages, 1988.

Cilji in kompetence:

Poglobiti znanje iz teoretičnih osnov programskih jezikov.

Objectives and competences:

The main objective is to provide students with a theoretical background of programming languages.

Predvideni študijski rezultati:

Znanje in razumevanje:
- Teoretičnih osnov programskih jezikov

Intended learning outcomes:

Knowledge and Understanding:
- Theoretical background of programming languages

Metode poučevanja in učenja:

- Predavanja
- Računalniške vaje

Learning and teaching methods:

- Computer exercises
- Written exam

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)
- Računalniške vaje
- Pisni izpit

- Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.

Delež (v %) /
Weight (in %)
50%
50%

Assessment:

Type (examination, oral, coursework, project):
- Computer exercises
- Written exam

- Each of the mentioned commitments must be assessed with a passing grade.

- Pozitivna ocena pri vajah je pogoj za pristop k izpitu.		- Passing grade of the exercises is required for taking the exam.
Reference nosilca / Lecturer's references:		
1. RIZMAN ŽALIK, Krista, ŽALIK, Borut. Validity index for clusters of different sizes and densities. Pattern recogn. lett. (Print). [Print ed.], Jan. 2011, vol. 32, iss. 2, str. 221-234, doi: 10.1016/j.patrec.2010.08.007. [COBISS.SI-ID 14640150] 2. RIZMAN ŽALIK, Krista. Cluster validity index for estimation of fuzzy clusters of different sizes and densities. Pattern recogn.. [Print ed.], Oct. 2010, vol. 43, iss. 10, str. 3374-3390, doi: 10.1016/j.patcog.2010.04.025. [COBISS.SI-ID 14640406] 3. RIZMAN ŽALIK, Krista, ŽALIK, Borut. A sweep-line algorithm for spatial clustering. Adv. eng. softw. (1992). [Print ed.], Jun. 2009, vol. 40, iss. 6, str. 445-451, doi: 10.1016/j.advengsoft.2008.06.003. [COBISS.SI-ID 12450582] 4. RIZMAN ŽALIK, Krista. An efficient k'-means clustering algorithm. Pattern recogn. lett. (Print). [Print ed.], July 2008, vol. 29, iss. 9, str. 1385-1391. http://dx.doi.org/10.1016/j.patrec.2008.02.014. [COBISS.SI-ID 12121366] 5. RIZMAN ŽALIK, Krista. Discovering significant biclusters in gene expression data. WSEAS transactions on information science and applications, Sep. 2005, vol. 2, iss. 9, str. 1454-1461. [COBISS.SI-ID 14906120]		