Study programme(s): Information Technologies	

Level: Bachelor

Course title: Programming Paradigms

Lecturer: Mirjana Ivanović

Status: elective

ECTS: 7 ECTS

Requirements: none

Learning objectives

Presentation to students historical and practical reasons for development of a lot of different programming languages. Clarification of specific characteristics, similarities and differences between several widely accepted programming paradigms (object oriented, functional, logical multi-paradigm). Detailed description of several key representative languages from each of mentioned paradigms.

Learning outcomes

Minimal: A the end of the course, it is expected from a successful student to demonstrate general understanding of concepts of several programming languages and understand significance of different programming styles.
Optimal: At the end of the course, it is expected from a successful student to be able to understand concepts of programming languages, understand significance of different programming styles and demonstarte skills of developing and coding programs in several programming paradigms.

Syllabus

Theoretical instruction

Hystory of programming languages developement. Procedural and non-procedural programming languages. Characteristics and usual differences between programming languages. Detailed description and comparison of several programming styles (functional, logical, multiparadigms) and key characteristics of programming language representatives. Sintax and semantics. Basic notions and mathematical background. Data structures.

Practical instruction

Comparative approach in implementation of typical programming tasks and algorithms. Illustration of philosophies that are in essence of programming paradigms and languages presented at theoretical classes. Testing of already existing solutions in different languages, tools, possible applications et cetera. Different programming tasks for each student connected to data types, statements, data structures and so on.

Literature

1. Зоран Будимац, Мирјана Ивановић, Михал Баћонски, Душан Тошић: Програмски језик Scheme, Универзитет у Новом Саду, Природно-математички факултет, Нови Сад, 1998.
2. Марио Радован: Програмирање у PROLOG-у, Информатор, Загреб, 1987.
3. Душан Тошић, Радивој Протић, PROLOG кроз примере, Техничка књига, Београд, 1991.
4. Питер Принц, Тони Крафорд, C за програмере, Микро књига, Београд, 2006.
5. Martin Odersky, Lex Spoon, and Bill Venners, Programming in Scala, Addison-Wesley, 2016.

Weekly teaching load

Lectures: 2	Exercises: 1	Практичне вежбе: 2	Студијски истраживачки рад: 0	Other: /

Teaching methodology

At lectures, classical teaching methodology is applied, with usage of a beam-projector and slides. Essential principles og programming paradigms are illustrated using characteristic examples. During theoretical excersises principles presented on theoretical classes are illustrated, typical problems and their solutions are analysed. After that students can model their own solutions. Acquired knowledge and skills are evaluated via 3 tests while during practical classes students work individually on small projects. During oral exam students have to show understanding of several programming styles.

Grading method (maximal number of points 100)

Pre-exam oblications	points	Final exam	points
Tests	30	Oral exam	40
Practical tasks	30		