Course Unit Descriptor

Study Programme: Information Technologies	
Course Unit Title: Advanced Functional Programming	
Course Unit Code: IT629	
Name of Lecturer(s): Zoran Budimac	
Type and Level of Studies: Bachelor Academic Studies	
Course Status (compulsory/elective): Elective	
Semester (winter/summer): Winter	
Language of instruction: Serbian (primary), English (secondary)	
Mode of course unit delivery (face-to-face/distance learning): Face-to-face	
Number of ECTS Allocated: 6	
Prerequisites: None	

Course Aims:

Introduction to advanced programming techniques in functional and hybrid programming langauges such are Haskell, Erlang, Scala and domain specific embedded languages. The course has two focuses: theoretical and practical, with emphasis to usage of functional programming languages in large-scale projects.

Learning Outcomes:

Minimal: At the end of a course, the successful student will be able to understand advanced concepts of functional programming languages.

Desirable: At the end of a course, apart from minimal learning outcomes, it is expected that successful student understands benefits and flaws of practical usage of functional programming in large scale projects.

Syllabus:

Theory

Introduction to advanced constructs of functional and hybrid programming languages and the means to merge two different paradigms in a single programming language. An overview of at least three programming languages (e.g., Haskell, Erlang, Scala). Monads, functors, automatic program transformations, parallelization, verification, type inference. Advantages of using these languages in big practical projects of industrial strength.

Practice

Work on a big case-study project that is written in one of mentioned languages. Analysis and adding new functionality.

Required Reading:

1. O'Sullivan, B., Stewart, D., Goerzen, J., Real World Haskell, O'Reilly, 2008.
2. Martin Odersky, Lex Spoon, and Bill Venners, Programming in Scala, Addison-Wesley, 2016.
3. Cesarini, F., Thompson, S., Erlang Programming, O'Reilly, 2009.

Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:** 2

Teaching Methods:
Classic methods of teaching are used for theoretical instruction with usage of video beam. Practical exercises are used to analyze a large case-study project, analyze the needs for extensions and new functionalities, and then implement them.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	Points 60	Final exam	Points 40
Active class participation		written exam	
Practical work		oral exam	
Preliminary exam(s)		…….	

Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			