Óbudai University **Donát Bánki Faculty of Mechanical and Safety Engineering**	**Institute of Mechatronics and Vehicle Engineering**

Course name and Neptun-code: Programming language BMXPNE4BNE **Credits*: 4***

Full time, 2nd Semester of the Academic year 2018/19.

Faculties in which the subject is taught: **BSc in Mechatronics**

Supervised by: **Krisztián Kósi PhD**				
Prerequisites conditions: (Neptun Codes)			Informatics II. BMXI2EHBNE	
Lessons per week:	Theory: **2**	Practice (in Auditorium): **0**	Lab: **2**	Consultation:
Exam type (s,v,f):	**exam**			

The Syllabus

Aim: The main goal is to show a modern programming language. Julia is a scientific programming language. Implementing math-based algorithms are easy in Julia. It will be demonstrating from the variable field of engineering, like fractals, genetic algorithms, control theory, data science.

Schedule

Weeks	Topics
1.	*Theory*: Introduction to document creation with LaTeX. Introduction to Julia *Practice*: Julia as a calculator
2.	*Theory*: Variables, types, functions *Practice*: Create your own variable type, extend a Julia function.
3.	*Theory*: If-then statement, Loops *Practice*: Working with Complex numbers.
4.	*Theory*: Algorithmic thinking: Fractals. *Practice*: Create the Mandelbrot set, and Julia sets.
5.	*Theory*: Algorithmic thinking: Genetic Algorithms *Practice*: Find the "to be, or not to be" phrase with genetic algorithms.
6.	*Theory*: **Test 1** *Practice*: Consultation.
7.	*Theory*: Algorithmic thinking: Linear Control Theory. *Practice*: Examples in Linear Control Theory.
8.	*Theory*: VS/SM controller and implementation in Julia I. *Practice*: SISO example
9.	*Theory*: VS/SM controller and implementation in Julia II. *Practice*: MIMO example
10.	*Theory*: RFPT controller and implementation in Julia I. *Practice*: SISO example
11.	*Theory*: RFPT controller and implementation in Julia II. *Practice*: MIMO example
12.	*Theory*: Multidimensional Scaling *Practice*: Example for Multidimensional Scaling
13.	*Theory*: **Test 2** *Practice*: Consultation for a home project.
14.	*Theory:* **Retake the test** *Practice:* **Present your Project**

Requirements

Weeks	Test papers
6	Test I.
13	Test II.

The evaluation criterias

The participation is governed by TVSZ III.23.§ (1)-(4). All main areas of the course are evaluated by test papers. The course is to be considered successfully executed and a **signature** is obtained if and only if both tests and project work are successful. **Midterm grade** is calculated as the average of the test results and project work. All matters which are not covered in this document, the Study and Examination Rules and the provisions of the Study Regulations, valid at Óbuda University, prevails.
The semester closing method (method of examination: written, oral, testing, etc.).
Midterm grade
Literature: Moodle
Quality Assurance: