



## **Problem Solving Using Open-Source Languages; R and Python,**

**3 ECTS**

### **General information**

Number of ECTS: 3

Language: English

Modality: Blended

Proposed period: Winter Semester

Number of Participants: 20

Prerequisites: none

Lecturers: **Dr. Predrag Kojić, Assistant Professor, Faculty of Technology, University of Novi Sad**  
**Dr. Jelena Lubura Stošić, Assistant Professor, Faculty of Technology, University of Novi Sad**

### **Week 1: Introduction to R and Python (Tuesday-Wednesday from 8:30-15:30)**

- Overview of R and Python
- Setting up the environment
- Basic syntax and data types
- Basic data manipulation and analysis

### **Week 2: Data Manipulation and Visualization (Tuesday-Wednesday from 8:30-15:30)**

- Data input/output
- Data manipulation using dplyr in R and pandas in Python
- Data visualization using ggplot2 in R and matplotlib/seaborn in Python

### **Week 3: Statistical Analysis and Machine Learning (Tuesday-Wednesday from 8:30-15:30)**

- Statistical analysis using R and Python
- Introduction to machine learning
- Supervised learning algorithm
- s: linear regression, logistic regression, decision trees, and random forests

### **Weekend: Final Project, on-site (Friday-Saturday)**

- Students will work on a final project using R and/or Python, where they will apply the skills and concepts learned throughout the course.

### **Learning outcomes**

Upon completion of a course on Problem Solving Using Open-Source Languages R and Python, learners can expect to achieve the following learning outcomes:

- Proficiency in programming with both R and Python and the ability to solve problems in both languages.
- Ability to perform data manipulation and visualization tasks using the respective tools/packages of R and Python.
- Understanding of basic statistical concepts and ability to analyze data using statistical techniques in both R and Python.
- Familiarity with the principles of machine learning, its algorithms, and its application in both R and Python.
- Ability to think critically and creatively to solve real-world problems using R and/or Python.
- Ability to work collaboratively and communicate effectively in a team to complete a final project that applies concepts learned in the course.

### **Grades Marking scale: Fail, Pass.**

**Pass.** A result that satisfies the requirements with regard to theoretical parts and active participation, project-based cost and performance analysis and in-class micro tests.

**Fail.** An inadequate result with regard to theoretical parts and active participation, project-based cost and performance analysis and in-class micro tests.