**Study programme(s): Applied Mathematics (MAP)**

**Course title: BASIC PRINCIPLES OF DATA ANALYTICS (P103)**

**Lecturer(s): Dora Seleši**

**Course status: compulsory on module: Data Analytics and Statistics**

**ECTS points: 4**

**Requirements:**

**Learning Objectives**

Introducing students to the initial steps of data analytics and analytical reasoning. Encouraging students' ability for critical thinking, teamwork, and communication.

**Learning Outcomes**

Acquiring basic knowledge of various methods for data analytics, their software implementation, drawing conclusions and presentation of results in a wide range of application domains.

**Syllabus**

*Theoretical instructions*

Introduction to data description and naïve statistical reasoning: descriptive statistics, data visualization, infographics, numerical and visual representation of data, data exploration. Introduction to basic concepts of analytics and decision-making: clustering, naïve frequency probability, likelihood, etc. Real-life data analytics applications: shape recognition, facial recognition, text recognition, spam filters, chat-bot applications, optimization of recommendations (e.g. movies and advertisements), sports analytics prediction, product quality prediction, social media analytics, etc. Model evaluation, interpretation and conclusions, reporting, review and communication of results.

*Practical instructions*

Students will gain insight into data analytics and its applications in social spheres, implementation of data analytics in various software packages (*Python, Statistica, R)* and analytical decision making.

**Literature**


1. John V. Guttag, **Introduction to Computation and Programming Using Python: With Application to Understanding Data**, The MIT Press, 2016
2. Christian Heumann, Michael S. Shalabh, **Introduction to Statistics and Data Analysis with Exercises, Solutions and Applications in R,** Springer, 2016
3. Dimitris Bertsimas, Allison O'Hair, Bill Pulleyblank, **The Analytics Edge**, Dynamic Ideas, 2016.
4. Nathalie Henry Riche, Christophe Hurter, Nicholas Diakopoulos, Sheelagh Carpendale, **Data-Driven Storytelling**, AK Peters Visualization Series, CRC Press, 2018.


| **Number of active classes** | **Lectures: 3** | **Practical teaching: 0** |
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**Teaching methods**

Plenary lectures on a given topic followed by independent research work or teamwork by students with interactive guidance of the teacher; workshop form (problem-solving sessions, student teamwork) on the selected real problem. Presentations of students' works and discussion.

**Grading (maximum number of points 100)**

| **Pre-exam obligations** | Points | **Final exam** | Points |
|---|---|---|---|
| practical work | **70** | project presentation | **30** |