

**Course title: Analysis of Algorithms and Heuristic Problem Solving**

**Course code: 63263**

**ECTS: 6**

**Professor: Marko Robnik Šikonja**

**Undergraduate program**

**Prerequisite knowledge :**

- Knowledge of algorithms and data structures
- Solid knowledge of mathematics

**Short course description:**

- Introduction to big data: Characteristics of big data. Big data and data science. Relational databases and big data. Distributed data systems. Hadoop ecosystem.
- Big data management: Structured and semi-structured data models. Non-relational (NoSQL) data models. Data models and database systems for big data. Domain-specific languages for big data. Monitoring big data systems.
- Big data processing: Querying and retrieval. Paradigms for computing with data. Processing pipelines and aggregators. Basic algorithmic building blocks and patterns. Hadoop. Spark. Data analytics with big data.
- Data analytics tools: Basic statistics. Clustering. Associations. Predictive modeling. Spark machine learning library MLlib.
- Big data and graph analytics: NoSQL graph databases for big data. Neo4j graph database. Graph querying with CYPHER. Basic graph analytics with Neo4j and CYPHER.
- Practical aspects of big data analytics: Processing heterogeneous data. Processing data streams.