Big Data for Cyber-Physical Systems

Lecturer, Phd, Eng.
TEODORA SANISLAV

February 2024

Who teaches

- Teodora Sanislav - lectures and laboratory sessions
  - Personal website: `http://users.utcluj.ro/~tsanislav/`
  - Email: Teodora.Sanislav@aut.utcluj.ro
  - Office address:
    - 2 Observatorului Street, Room 301
    - 8 Baritiu Street, Room BT 6.06

When is taught

- Lectures: 2 hours/week, 14 weeks with all students – every Monday, between 6:00 P.M. - 8:00 P.M., 26-28 Baritiu Street, Room S4.1 (possibly soon Room BT 6.03)
- Laboratory sessions: 1 hour/week, 14 weeks with each half-group – every Monday, between 8:00 P.M. - 9:00 P.M., 26-28 Baritiu Street, Room S4.1 (possibly soon Room BT 6.03)
- Self-study: 58 hours during the entire semester
- Worth 4 credits

BDCPS, 2023 - 2024 Team, General chanel link:
`https://bit.ly/3SCxIMt`
BDCPS, 2023 - 2024 Team code: nsknwrp

Where are the classrooms

- 26-28 Baritiu Street, Room S4.1
- 8 Baritiu Street, Room BT 6.03

What is taught

- To understand the characteristics and aspects associated with Big Data
- To get familiar with tools and platforms supporting Big Data
- To understand the Big Data storage models
- To assimilate the techniques for Big Data analysis

Means of teaching

- Lectures
  - Introduction to Big Data. Definitions, characteristics. Traditional approach vs Big Data. Applicability in the context of Cyber-Physical Systems
  - Big Data Platforms. The Apache Hadoop platform
  - Tools for Big Data analytics (MapReduce, Apache Hive, Apache Pig)
  - The Apache Spark platform
  - Algorithms for Big Data analytics (Machine Learning)
  - Big Data analytics and visualization with Spark's Machine Learning (ML) Library
  - Big Data analytics and visualization using R programming language
- Lectures resources
  - Slides available at `http://users.utcluj.ro/~tsanislav/teaching.html#bdcps`. The slides are made available in time for each lecture.
  - Access password: CJBDCPS
  - Other materials/books available on BDCPS, 2023 - 2024 Team

Means of teaching

- Laboratories
  - Installation of Big Data platforms and understanding of the concept
  - Big Data exemplification using Apache Hadoop, MapReduce, Apache Hive, Apache Pig
  - Big Data exemplification using Apache Spark
  - Application of Machine Learning algorithms in Big Data and visualization of results

Means of teaching

- Laboratories structure by weeks

1st Week	2nd Week	...	12th Week	13th Week	14th Week
- Labor Protection - A short presentation of each student about him(her)self - BDCPS syllabus presentation	Lab1	...	Lab12	Lab13	Evaluation

- Laboratory sessions resources
  - Personal laptops equipped with Apache Hadoop Ecosystem

Rules

- To pass the exam
  - Attend the laboratory sessions
    - Maximum 2 laboratory absents are allowed and they will be recovered at the end of the semester
    - $2 \leqslant$ No. of absents $\geqslant 4 \Rightarrow$ Recovery fee
    - `https://www.utcluj.ro/media/decisions/2022/06/24/Regulamentul_ECTS.pdf` - articles 6.4, 6.5
  - Study and learn
- Grading
  - 100% project presentation