COURSE DESCRIPTION CARD - SYLLABUS

Course name
WORKING WITH LARGE DATASETS IN THE CONTEXT OF TEACHING AND RESEARCH (1) [S5SD1>PDZKDB1]

Course

Proposed by Discipline
–

Year/Semester
1/1

Level of study
Doctoral School

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
8

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

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Prerequisites

Basic computer skills and general knowledge of issues related to collecting, organising and using data in research or teaching activities.

Course objective

The aim of the course is to develop knowledge and skills related to the preparation, analysis, interpretation and presentation of data used in teaching and research. Participants learn the basic principles of data collection, organisation, cleaning and quality assurance, as well as methods of data analysis and visualisation. The course also prepares participants to use data in the teaching process, support research projects, and make decisions based on data and evidence.

Course-related learning outcomes

KNOWLEDGE
The participant:
1. knows the basic concepts related to data analysis [P8S_WG / SzD_W03]
2. understands the process of data preparation and analysis [P8S_WG / SzD_W03]

3. knows the possibilities of using data in teaching and research [P8S_WG / SzD_W03]

SKILLS
The participant:
1. organises and prepares data for analysis [P8S_UW / SzD_U01]
2. interprets analysis results and draws conclusions [P8S_UW / SzD_U01]
3. uses data to support teaching and research activities [P8S_UW / SzD_U01]

SOCIAL COMPETENCES
The participant:
1. recognises the importance of reliable data analysis [P8S_KK / SzD_K03]
2. makes decisions based on data and facts [P8S_KK / SzD_K03]
3. is prepared to further develop analytical competences [P8S_UU / SzD_U10]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Final assessment test. Successful completion of the course requires obtaining at least 50% of the available points.

Grading scale:
90–100% – 5.0
80–89% – 4.5
70–79% – 4.0
60–69% – 3.5
50–59% – 3.0
below 50% – 2.0

Programme content

Basic issues related to working with data in the context of teaching and research. Types and sources of data and the importance of data in the teaching process and research activities. Data collection, organisation, cleaning and structuring, as well as data quality assurance. Basic methods of data analysis, interpretation of results and data visualisation. Use of data to support the teaching process, research projects and data-informed decision-making. Practical work with sample datasets, including analysis, presentation of results, and formulation of conclusions and recommendations.

Course topics

1. Introduction to working with data
Types and sources of data, the importance of data in teaching and research, and basic concepts related to data analysis.

2. Data preparation
Data collection and organisation, data cleaning and structuring, and data quality assurance.

3. Data analysis
Basic methods of data analysis, interpretation of results, and data visualisation.

4. Data in teaching and research
Use of data in the teaching process, support for research projects, and data-based decision-making.

5. Practical workshop
Working with sample datasets, analysis and presentation of results, and formulation of conclusions and recommendations.

Teaching methods

Presentation of theoretical concepts, analysis of examples, demonstration of data preparation and analysis methods, and practical exercises. Individual and workshop-based work with sample datasets, including data organisation, analysis, interpretation and visualisation of results. Discussion of obtained results and

formulation of conclusions and recommendations.

Bibliography

1. Prodromou, T. (ed.), Big Data in Education: Pedagogy and Research, Springer, 2021.
2. McKinney, W., Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter, 3rd ed., O'Reilly Media, 2022.
3. Triguero, I., Galar, M., Large-Scale Data Analytics with Python and Spark: A Hands-on Guide to Implementing Machine Learning Solutions, Cambridge University Press, 2023.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	8	0,50
Doctoral student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)	17	0,50