POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Data Visualization [S2Teleinf2-SDP>WD]

Course

Field of study	Year/Semester
Teleinformatics	2/3
Area of study (specialization)	Profile of study
Software-defined systems	general academic
Level of study	Course offered in
second-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
14	24	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

4,00

Coordinators	Lecturers
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Prerequisites

Basic knowledge of Python programming language, knowledge of data structures, basic knowledge of data analysis (basic statistics, measures of central tendency), knowledge of basic terminology (dataset, variable, observation), knowledge of basic data analysis tools (Microsoft Excel) and statistical analysis tools (Jupyter Notebook), knowledge of basic concepts related to databases (relations, tables, queries), communication skills, in particular the ability to understand the issue in enough detail to be able to present it in an understandable and attractive way (with the help of created graphics and charts).

Course objective

The Data Visualization course aims to familiarize students with the techniques and tools of data visualization, which is an extremely important topic in the modern world filled with information and data. Thanks to these classes, students will be able to present complex data sets in a concise and easy to understand way. During this course, theoretical knowledge and practical skills in creating effective data visualizations and data analysis will be provided. In addition, the course will guarantee participants the acquisition of the ability to analyze issues in detail and present them in a clear and understandable way.

Course-related learning outcomes

Knowledge:
He/she has an expanded and in-depth knowledge of how to present complex data sets in a concise and easy to understand manner. K2_W01, K2_W11
Is familiar with and comprehends advanced artificial intelligence methods used in the design of data visualization systems and the processing of information in such systems. K2_W06

Skills:
He/she is able to acquire information from literature, databases, and other sources about data visualization systems; integrate the obtained information; interpret and critically evaluate it; draw conclusions; and formulate and thoroughly justify opinions. K2_U01, K2_U15, K2_U17, K2_U16
Can prepare a data visualization, present and discuss the selected solution and the result obtained, conduct a discussion on the selected solution. K2_U02, K2_U03, K2_U04,

Social competences:
Is ready to recognize the significance of knowledge in solving cognitive and practical problems dealing with data visualization and to critically evaluate received content. K2_K01

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written test, open questions
Laboratory - project
Grading scale: <=50% 2,0; 51%-60% 3,0; 61%-70% 3,5; 71%-80% 4,0; 81%-90% 4,5; 91%-100% 5,0

Programme content

1. Basics of data visualization:
-The importance of data visualization in data analysis,
-Basic data visualization techniques,
-Selection of appropriate types of charts and graphics depending on the type of data.
2. The use of data visualization tools:
- Overview of popular data visualization tools,
- Familiarize yourself with the interfaces of data visualization tools and the possibilities of creating different types of visualizations.
3. Designing effective data visualizations:
-Principles of designing clear and attractive visualizations,
-Choosing the right colors, fonts and layout for different types of data,
-Working with multidimensional data and their representation.
4. Interactive data visualization:
-Creation of interactive data visualizations that allow users to explore data,
-Use of technologies such as Python, JavaScript and visualization libraries to create interactive elements.
5. Data visualization in practice:
-Practical application of data visualization in various fields (science, medicine, business, etc.)
-Examples of successful data visualizations and analysis of their effectiveness.

Course topics

Teaching methods

Hybrid lecture with an addition of educational materials such as videos.
Laboratory - in the initial phase of the course, discussion and presentation of proposed project topics, then, using the group work method, project implementation.

Bibliography

Basic:
1. A. C. Telea: Data Visualization: Principles and Practice
2. S. Murray: Interactive data visualization

3. C. O. Wilke: Fundamentals of data visualization. A Primer on Making Informative and Compelling Figures
4. B. Fry: Visualizing data
5. C. Ware: Information visualization: Perception for Design: Second Edition

Additional:
1. C. N. Knaflic: Storytelling with Data: A Data Visualization Guide for Business Professionals
2. J. VanderPlasa: Python Data Science Handbook
3. L. Wilkinson: The Grammar of Graphics

Breakdown of average student's workload

	Hours	ECTS
Total workload	103	4,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50