

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Analityka wizualna
Name of subject in English: Visual Analytics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8030G
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15		15	15	
Number of hours of total student workload (CNPS)	25		25	25	
Form of crediting			crediting with grade		
For group of courses mark (X) final course			X		
Number of ECTS points			3		
including number of ECTS points for practical classes (P)			1		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			2,04		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of data mining methods and techniques.
2. Basics of statistical and data visualization software.

SUBJECT OBJECTIVES

C1 Learning advanced algorithms for visual analytics.
 C2 Learning advanced data mining techniques, including clustering and grouping algorithms.
 C3 Acquiring data reporting skills through the use of advanced data visualization.
 C4 Mastering business modelling techniques and analysis techniques to turn data into useful insights in the management process.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 The student has knowledge of the methods and techniques of modern analytics useful in management decision-making processes.

PEU_W02 The student has knowledge of computer decision support tools as well as data visualization and reporting systems.

relating to skills:

PEU_U01 The student is able to properly select data mining techniques and apply them to data analysis.

PEU_U02	The student is able to properly select and apply selected information technologies in order to visualize data and prepare a data report relating to social competences:
PEU_K01	The student is able to interact and work in a group, appropriately dividing the tasks to be performed among individual group members.
PEU_K02	The student is able to independently develop his knowledge and skills, is ready to identify, analysis and solve problems in the identification and analysis of decision problems with the help of data mining, visualization and reporting .

PROGRAMME CONTENT		
Lecture		Number of hours
Lec 1	Introduction to the methodology and practice of applying modern techniques of data mining, analysis, visualization and reporting. Data visualization in Tableau and R.	1
Lec 2, 3	Visualizing descriptive statistics and forecasts. Data preparation. Differences between data analysis and presentation. Iterative process of data mining.	4
Lec 4, 5, 6	Visualizing clustering and grouping. Algorithms and evaluation methods.	6
Lec 7	Spatial and multidimensional visualization. Utilizing decision trees.	2
Lec 8	Visualization as an analytical tool. Description, data analysis, interpretation and drawing conclusions based on data - rules, errors, examples. Good practices of data visualization.	2
Total hours		15

Laboratory		Number of hours
Lab 1	Overview of a design task. Data visualization in Tableau and R.	1
Lab 2, 3	Visualizing descriptive statistics and forecasts. Data preparation. Differences between data analysis and presentation. Iterative process of data mining.	4
Lab 4, 5	Visualizing clustering and grouping. Algorithms and evaluation methods.	4
Lab 6, 7	Spatial and multidimensional visualization. Utilizing decision trees.	4
Lab 8	Visualization as an analytical tool. Description, data analysis, interpretation and drawing conclusions based on data - rules, errors, examples. Good practices of data visualization. Discussion of the final projects.	2
Total hours		15

Project		Number of hours
Pro 1	Principles of the final task. Data visualization in Tableau and R. Work with dedicated software.	1
Pro 2, 3	Visualizing descriptive statistics, data preparation. Data analysis and presentation. Work with dedicated software.	4
Pro 4, 5	Visualizing clustering and grouping. Work with dedicated software.	4

Pro 6	Spatial and multidimensional visualization. Decision trees - work with dedicated software.	2
Pro 7, 8	Visualization, description, data analysis, interpretation and drawing conclusions based on data - rules, errors, examples. Discussion of the final projects.	4
	Total hours	15

TEACHING TOOLS USED	
N1. Multimedia presentations. N2. Data collection. N3. Computer data analysis - software: Tableau, R. N4. Teaching materials published on eportal. N5. Teamwork - group project. N6. Optionally alternative software packages: PowerBI, Alteryxa, Board, Weka	

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, W02	Based on project reports
F2	PEU_U01, U02 PEU_K01, K02	Project reports
P = F1 + F2 - computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE
<u>PRIMARY LITERATURE:</u> <ul style="list-style-type: none"> [1] Nussbaumer Knafllic C., (2015) Storytelling with Data: A Data Visualization Guide for Business Professionals, J. Wiley & Sons [2] Sharda R., Delen D., Turban E., (2015) Business Intelligence and Analytics. Systems for Decision Support, Pearson [3] Larose D.T., (2014) Discovering Knowledge in Data: An Introduction to Data Mining, J. Wiley & Sons
<u>SECONDARY LITERATURE:</u> <ul style="list-style-type: none"> [1] Yau N., (2013) Data points. Visualization that means something, J. Wiley & Sons [2] Loth A., (2019) Visual Analytics with Tableau, J. Wiley & Sons [3] Zumel N., Mount J., (2019) Practical Data Science with R, 2nd ed, Black&white. [4] Morzy T., (2013) Eksploracja danych. Metody i algorytmy, WN PWN [5] Evans J.R., (2016) Business Analytics. Methods, Models, and Decisions, Pearson [6] Larose D.T., (2005) Discovering Knowledge in Data. An Introduction to Data Mining, J. Wiley & Sons [7] Surma J., (2009) Business Intelligence. Systemy wspomagania decyzji biznesowych, WN PWN [8] Wilke C.O., (2020) Podstawy wizualizacji danych: zasady tworzenia atrakcyjnych wykresów, Helion [9] Provost F., Fawcett T., (2015) Analiza danych w biznesie. Sztuka podejmowania skutecznych decyzji, Helion [10] Stephenson D., (2019) Big Data. Nauka o danych i AI bez tajemnic, Helion [11] Foreman J.W., (2017) Mistrz analizy danych. Od danych do wiedzy, Helion
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
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