MODULE DESCRIPTION

Module code	full-time studies:	**Z-ZIP1-E-723**
	part-time studies:	**Z-ZIPN1-E-723**
Module name	**Data Visualisation**	
Module name in Polish	**Wizualizacja danych**	
Valid from academic year	**2019/2020**	

MODULE PLACEMENT IN THE SYLLABUS

Field of study	**MANAGEMENT AND PRODUCTION ENGINEERING**
Level of education	**1st degree**
Studies profile	**General**
Form and method of conducting classes	**Full-time and Part-time**
Specialisation	**Computer Science for Management and Modelling**
Unit conducting the module	**Department of Computer Science Technologies**
Module co-ordinator	**Karolina Bęben, MSc**
Approved by:	

MODULE OVERVIEW

Type of subject / group of subjects	**Specialist subject**
Module status	**Non-compulsory**
Language of conducting classes	**English**
Module placement in the syllabus - semester	**Semester VII**
Initial requirements	**Information Technologies** **Fundamentals of Computer Science** **Advanced Spreadsheets Usage**
Examination (YES/NO)	**NO**
Number of ECTS credit points	**2**

Method of conducting classes		Lecture	Classes	Laborato-ry	Project	Other
Per semester	full-time studies:	**15**		**15**		
	part-time studies:	**9**		**9**		

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Category	Symbol	Learning outcomes	Assignations to the directional learning outcomes
Knowledge	W01	The student knows the applications of data visualization in engineering issues and issues in the field of economics and management.	ZIP1_W05 ZIP1_W18
	W02	The student has knowledge of the methods and IT tools used for data visualization.	ZIP1_W04 ZIP1_W05
Skills	U01	The student is able to use visualization techniques to analyze data from various sources and to create appropriate reports to support management and production decisions.	ZIP1_U01 ZIP1_U03 ZIP1_U14
	U02	The student is able to choose the technique of data visualization depending on the type of data and the context of the analysis.	ZIP1_U19
	U03	The student is able to use selected IT tools for data visualization.	ZIP1_U04 ZIP1_U06
Social competences	K01	The student is able to work in a team during the implementation of the project and preparation of documentation on a given topic.	ZIP1_K04
	K02	The student understands the need to follow development trends in the field of data visualization techniques.	ZIP1_K01

TEACHING CONTENTS

Method of conducting classes	Teaching contents
Lecture	1. Perception of images and colors. Attributes and color palettes. Relationship of perception with data visualization. Applications of data visualization in engineering and business issues. 2. Graphical forms of data presentation depending on their type and the context of the analysis. Examples of IT tools for data visualization. 3. Visualization of one-dimensional data - histogram, density graph, box graph, pie and bar graphs, heat map. 4. Visualization of two-dimensional data - scatter, mosaic, violin and line charts. Standardization and normalization of data. 5. Visualization of multidimensional data - charts: bubble, surface, ring, radar, tree map, tag cloud. Multidimensional scaling. 6. Interactive visualizations and charts on maps. Good practices. Customize the appearance of charts.
Laboratory	1. Acquainting with selected tools (software) for data visualization. Obtaining data sets for analyzes, identifying these sets. 2. Graphical presentation of acquired data - charts for raw data. Work in the selected environment. 3. Visualization of variable distributions - data preparation and interpretation of results. Work in the selected environment. 4. Visualization of relationships between variables - data preparation and interpretation of results. Work in the selected environment. 5. Graphical presentation of the obtained data - complex graphs (categorized, cross-sectional, arrangement of many graphs). Work in the selected environment. 6. Implementation of the project including the selection of the appropriate form of presentation and performance of data visualization on the selected issue. Preparation of a report and presentation of the obtained results.

METODS OF ASSESSING TEACHING RESULTS

Symbol	Methods of checking the learning outcomes (select X)					
	Oral exam	Written exam	Test	Project	Statement	Other
W01			X			
W02			X			
U01				X	X	
U02				X	X	
U03				X	X	
K01						X
K02						X

FORM AND CONDITIONS OF PASSING

Form of classes	Form of credit	Passing conditions
Lecture	Credit with grade	Obtaining at least 50% of the marks in the final test.
Laboratory	Credit with grade	Obtaining at least 50% of the points from the project implementation and the report on exercises, being a member of a two-person team.

STUDENT WORKLOAD

Balance of ECTS points												
No.	Type of student's activity	Student's workload										Unit
		full-time					part-time					
1.	Participation in the activities	Lc	C	Lb	P	O	Lc	C	Lb	P	O	h
		15		15			9		9			
2.	Other (consultation, exam)	2		2			2		2			h
3.	**Number of hours of a student's assisted work**	**34**					**22**					h
4.	**Number of ECTS credit points which are allocated for assisted work**	**1,4**					**0,9**					ECTS
5.	**Number of hours of a student's unassisted work**	**16**					**28**					h
6.	**Number of ECTS credit points which a student receives for unassisted work**	**0,6**					**1,1**					ECTS
7.	**Work input connected with practical classes**	**25**					**25**					h
8.	**Number of ECTS credit points which a student receives for practical classes**	**1,0**					**1,0**					ECTS
9.	**Total number of hours of a student's work**	**50**					**50**					h
10.	**Punkty ECTS za moduł** *1 ECTS=25 hours*	**2**										ECTS

LITERATURE

1. Dudycz H. (1998), *Wizualizacja danych jako narzędzie wspomagania zarządzania przedsiębiorstwem*, Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu, Wrocław.
2. Grant R. (2019), Data Visualization: Charts, Maps, and Interactive Graphics, CRC Press, Florida.
3. Mokrzycki W. (2010), *Wprowadzenie do przetwarzania informacji wizualnej. Percepcja, akwizycja, wizualizacja*, Akademicka Oficyna Wydawnicza Exit, Warszawa.
4. Telea A.C. (2015), *Data Visualization: Principles and Practice, Second Edition*, CRC Press, Florida.