Z1-PU7	WYDANIE N1

(*faculty stamp*)

COURSE DESCRIPTION

1. Course title: DATA MINING Data visualization	**2. Course code DM_DV**
3. Validity of course description: 2018/2019	
4. Level of studies: MSc programme	
5. Mode of studies: intramural studies	
6. Field of study: CONTROL, ELECTRONIC AND INFORMATION ENGINEERING (MACRO)	(FACULTY SYMBOL) RAU-2
7. Profile of studies: ACADEMIC	
8. Programme: DATA SCIENCE	
9. Semester: 2	
10. Faculty teaching the course: Faculty of Automatic Control, Electronics and Computer Science	
11. Course instructor: Dr hab. inż. Adam Świtoński	
12. Course classification: common courses	
13. Course status: compulsory ~~/elective~~	
14. Language of instruction: English	
15. Pre-requisite qualifications: Algebra and analytic geometry, Calculus and differential equations, Physics, Computer programming, Optimization methods, Numerical methods, Statistics and probability theory, Algorithms and data structures.	
16. Course objectives: The aim of the course is making the student familiar with methods, algorithms and tools for visualization of data, numeric data, continuous and discrete, categories, relations, multidimensional data, time series and data streams. Importance of visualization techniques for data analyses and for data based inference is stressed.	

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student distinguishes data types and structures in the aspect of their use in visualization algorithms.	Credit	Lecture	K2A_W01, K2A_W12
2.	Student knows and understands methods of visualization of numeric data, continuous and discrete.	Credit	Lecture	K2A_W01, K2A_W12
3.	Student knows and understands methods of visualization of categories and relations.	Credit	Lecture	K2A_W01, K2A_W12
4.	Student knows and understands methods of visualization of multivariable data and time series data.	Credit	Lecture	K2A_W01, K2A_W12
5.	Student knows and understands methods of visualization of data streams.	Credit	Lecture	K2A_W01, K2A_W12
6.	Student can adjust visualization tool to data type.	Laboratory tasks	Laboratory	K2A_U01, K2A_U02, K2A_U03, K2A_U04

7.	Student is able to use visualization tools.	Laboratory tasks	Laboratory	K2A_U05, K2A_U06, K2A_K01
8.	Student is able to construct and implement algorithms for data visualization.	Laboratory tasks	Laboratory	K2A_U05, K2A_U06, K2A_K01
9.				

18. Teaching modes and hours

Lecture 15 / ~~BA /MA Seminar / Class / Project~~ / Laboratory 15

19. Syllabus description:

Lecture:

1. Introductory issues. Importance of visualization techniques for data analyses and for data based inference. Overview of the course contents.
2. Simple numerical data, numbers, sizes, orders. Bar graphs, histograms, line graphs, pie graphs, scatter plots, symbols, colors.
3. Multidimensional and time series data, categories, relations. Venn diagrams, graphs, flow diagrams, tree maps, heat maps, symbolic layouts, keyword density layouts.
4. Examples of tools for data visualization I.
5. Visualization of data streams. Scenarios, image sequences, films. Mixing, scaling times, dynamic warping scenarios, patching, imputation.
6. Examples of tools for data visualization II. Visualizing data streams.
7. Algorithms and heuristics behind visualization layouts. Hierarchical clustering, biclustering. Examples of applications.

Laboratory:

1. Algorithms and tools for visualizing numbers, sizes, orders, series, relations.
2. Tools for visualization of data streams.
3. Developing an algorithm for a chosen visualization layout.

20. Examination: semester NO

21. Primary sources:

C. Chen, W. Hardle, A. Unwin, (2008), Handbook of Data Visualization, Springer.

22. Secondary sources:

N. Iliinsky, J. Steele, (2011), Designing Data Visualizations, O'Reilly.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	15/15
2	Classes	/
3	Laboratory	15/15
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	30/30

24. Total hours: 60

25. Number of ECTS credits:2

26. Number of ECTS credits allocated for contact hours: 1

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects):1

26. Comments:

Approved:

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(date, Instructor's signature) (*date , the Director of the Faculty Unit signature)*