1. Course title: **DATA MINING Data visualization**

2. Course code: **DM_DV**


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/selective

14. Language of instruction: English


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:

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

8. Student is able to construct and implement algorithms for data visualization.

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.


4. Examples of tools for data visualization I.


6. Examples of tools for data visualization II. Visualizing data streams.


**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:


22. Secondary sources:


23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Teaching mode</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>15/15</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>15/15</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>/</td>
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<tr>
<td>5</td>
<td>BA/MA Seminar</td>
<td>/</td>
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<tr>
<td>6</td>
<td>Other</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>30/30</td>
</tr>
</tbody>
</table>

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
Approved:

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