### COURSE DESCRIPTION

<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 knows different algorithms of classification, regression, grouping, association analysis and outlier detection.</td>
<td>Final test</td>
<td>Lecture, Laboratory</td>
<td>K1A_W02 K1A_W12</td>
</tr>
<tr>
<td>2</td>
<td>Student can apply algorithms of outlier and anomaly detection properly, even if they need some modifications.</td>
<td>Final test</td>
<td>Laboratory</td>
<td>K1A_U03 K1A_U08 K1A_U10 K1A_U14</td>
</tr>
<tr>
<td>3</td>
<td>Student can apply algorithms of data grouping properly, even if they need some modifications. Student can evaluate the grouping results.</td>
<td>Final test</td>
<td>Laboratory</td>
<td>K1A_U03 K1A_U08 K1A_U10 K1A_U14</td>
</tr>
<tr>
<td>4</td>
<td>Student can apply (and if it necessary – to modify) algorithms of association analysis and evaluate results on the background of training data.</td>
<td>Final test</td>
<td>Laboratory</td>
<td>K1A_U03 K1A_U08 K1A_U10 K1A_U14</td>
</tr>
<tr>
<td>5</td>
<td>Student can apply (and if it necessary – to modify) algorithms of classification and evaluate results on the background of training data.</td>
<td>Final test</td>
<td>Laboratory</td>
<td>K1A_U03 K1A_U08 K1A_U10 K1A_U14</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>6</td>
<td>Student can apply (and if it necessary – to modify) algorithms of regression and evaluate results on the background of training data.</td>
<td>Final test</td>
<td>Laboratory</td>
<td>K1A_U03 K1A_U08 K1A_U10 K1A_U14</td>
</tr>
</tbody>
</table>

18. Teaching modes and hours

**Lecture / BA /MA Seminar / Class / Project / Laboratory**

30 h (Lecture), 15 h (Laboratory).

19. Syllabus description:

Lectures and laboratories are leader in a traditional way. During the lecture the definitions, block diagrams of data analysis algorithms and computational intelligence methods are presented, together with sample applications. Students can observe the reasoning process, ask questions, participate and cooperate in algorithms modifications. Laboratories are assumed to be the place of practical analytical tasks applications, illustrating possibilities and purposefulness of using of methods presented at lectures.

**Lectures:**

1. Introduction to data analysis and exploration (typical tasks, evaluation of obtained analytical models, methods of experimental evaluation and analytical models comparison).
2. Introduction to RapidMiner environment.
3. Initial data quality evaluation. Data preprocessing.
5. Association analysis (contingence tables, association rules, results evaluation).
7. Building classifiers of non-symbolic data representation (support vector machines, naive Bayes, k-NN).
8. Building regression models of symbolic data representation (rules, trees).
9. Building regression models of non-symbolic data representation (support vector machines, linear and non-linear regression, multiple regression, k-NN).

Collective approaches to classification and regression tasks (bagging, boosting).

**Laboratory:**

1. Data preprocessing
2. Clustering the data.
3. Association analysis.
5. Building and validation of regression models.

20. Examination: 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>30/30</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>-/-</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>15/45</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>-/-</td>
</tr>
<tr>
<td>5</td>
<td>BA/ MA Seminar</td>
<td>-/-</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>10/20</td>
</tr>
</tbody>
</table>

**Total number of hours**: 55/95

# 24. Total hours: 150

# 25. Number of ECTS credits: 5

# 26. Number of ECTS credits allocated for contact hours: 2

# 27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 3

# 26. Comments:

Approved:

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