

**FACULTY OF COMPUTER SCIENCE AND MANAGEMENT****SUBJECT CARD****Name in Polish: Eksploracja danych****Name in English: Data Mining****Main field of study (if applicable): Management****Specialization (if applicable): Business Information Systems (BIS)****Level and form of studies: 2nd level, full-time****Kind of subject: obligatory****Subject code: IEZ2203****Group of courses NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	<b>15</b>			<b>30</b>	
Number of hours of total student workload (CNPS)	<b>90</b>			<b>60</b>	
Form of crediting	<b>Examination with grade</b>			<b>Crediting with grade</b>	
For group of courses mark (X) final course					
Number of ECTS points	<b>3</b>			<b>2</b>	
including number of ECTS points for practical (P) classes				<b>2</b>	
including number of ECTS points for direct teacher-student contact (BK) classes	<b>0,5</b>			<b>1</b>	

\*delete as applicable

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Student has a basic knowledge of statistical tools.
2. Student has a basic practical skills in working with statistical software.

**SUBJECT OBJECTIVES**

- C1. Acquisition of data mining knowledge in business management processes.
- C2. Getting skills in choosing and using decision support techniques in practical business problems solving.
- C3. Getting social skills in information and communication techniques for management.

**SUBJECT EDUCATIONAL EFFECTS**

relating to knowledge:

- PEK\_W01: Student has a basic knowledge in construction and using some quantitative methods and computer technics in data mining useful in business information systems.
- PEK\_W02: Student has a basic knowledge in applying software in data mining.

relating to skills:

- PEK\_U01: Student can collection data for decision problem.
- PEK\_U02: Student can identify and propose ways of solving data mining problems.
- PEK\_U03: Student is able to build useful tools for data analysis for business decision processes.

relating to social competences:

PEK\_K01: Student can enlarge his knowledge and abilities, can works in groups for solving management data mining problems.

PEK\_K02: Student can find methods for solving decision problems, held accountable for his works, defend his views of the propose way of solving problems.

### PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Data mining – methods and practical applications: examples.	1
Lec 2	Pre-processing.	2
Lec 3	Cluster analysis: nearest (Furthest) algorithm, group average (median) algorithm.	2
Lec 4	k-means algorithm.	2
Lec 5	Hierarchical classification algorithms.	2
Lec 6	Classification and decision trees: CART, C4.5, C5.0 algorithms.	2
Lec 7	Regression trees.	2
Lec 8	Association Methods: A priori methods, FP-growth algorithm, one attribute rule algorithm.	2
	Total hours	15
Form of classes - class		Number of hours
Form of classes - laboratory		Number of hours
Form of classes - project		Number of hours
Proj 1	Data collection; team work.	2
Proj 2	Pre-processing data; team work.	2
Proj 3	Nearest (Furthest) algorithm implementation; team work.	2
Proj 4	k-Means algorithm implementation; team work.	2
Proj 5	Group average (median) algorithm implementation; team work.	2
Proj 6	Hierarchical classification algorithm implementation; team work.	2
Proj 7; Proj 8	Comparison results of cluster and classification algorithms; team work.	4
Proj 9	Presentation result; team work.	2

Proj 10, Proj 11	Classification and regression tree implementation; team work.	4
Proj 12	Comparison results of classification algorithms; team work.	2
Proj 13	Presentation result; team work.	2
Proj 14	Choosing the best method; team work.	2
Proj 15	Final presentation; team work.	2
	Total hours	30

<b>Form of classes - seminar</b>	<b>Number of hours</b>

### TEACHING TOOLS USED

- N1. Multimedia presentation .  
N2. Data collection.  
N3. Computer data analysis.  
N4. Team work.  
N5. Written test (exam).

### EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_U01	Report
F2	PEK_U01, PEK_U02, PEK_U03 PEK_K01, PEK_K02	Team presentation
P1	PEK_W01, PEK_W02	Written test.
P2	PEK_U01, PEK_U02, PEK_U03	Report of team work.

### PRIMARY AND SECONDARY LITERATURE

#### **PRIMARY LITERATURE:**

- [1] David H., Heikki M., Padhraic S., *Data Mining*, MIT, 2001.  
[2] Han J., Kamber M.: *Data Mining. Concept and Techniques*, Elsevier Morgan Kaufmann Publishers, 2006.  
[3] Han J., Jiawei : *Data Mining: Concepts and Technics*, 2006.  
[4] Larose D.T.: *Discovering Knowledge in Data Analysis. An Introduction to Data Mining*, John Wiley & Sons, 2005.  
[5] Shmueli, Galit, *Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner*, Wiley-Interscience, 2006.  
[6] Sumathi S., *Introduction to Data Mining and Its Application*, 2006.

#### **SECONDARY LITERATURE:**

- [1] Cooc D.J., Holder L.B.: *Mining Graph Data*, Hoboken, N.J. : Wiley-Interscience, 2007.  
[2] Morrison D.F.: *Multivariate Statistical Methods*, McGraw-Hill, 1990.  
[3] Olson D.L. *Advance Data Mining Techniques*, Springer, 2008.  
[4] Larose D. T., *Data Mining methods and Models*, IEEE Computer Society Press, 2006.

<b>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</b>
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**MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
Data Mining  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Management  
AND SPECIALIZATION Business Information Systems**

<b>Subject educational effect</b>	<b>Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**</b>	<b>Subject objectives***</b>	<b>Programme content***</b>	<b>Teaching tool number***</b>
PEK_W01 (knowledge)	K2_ZARZ_W08 S2_BIS_W01	C1, C2	Lec01, Lec02, Lec03, Lec 04, Lec 05, Lec 06, Lec07, Lec 08	N1, N5
PEK_W02 (knowledge)	K2_ZARZ_W08 S2_BIS_W01	C1, C2	Lec01, Lec02, Lec03, Lec04, Lec05, Lec 06, Lec07, Lec08	N1, N5
PEK_U01 (skills)	K2_ZARZ_U03	C1, C2	Proj01	N2, N4
PEK_U02 (skills)	K2_ZARZ_U03 S2_BIS_U01	C1, C2	Proj02, ...,Proj15	N1, N3, N4
PEK_U03 (skills)	K2_ZARZ_U03 S2_BIS_U01	C1, C2	Proj02, ...,Proj15	N1, N3, N4
PEK_K01 (social competencies)	K2_ZARZ_K01 K2_ZARZ_K02 K2_ZARZ_K05	C3	Proj01, ...,Proj15	N4
PEK_K02 (social competencies)	K2_ZARZ_K01 K2_ZARZ_K02 K2_ZARZ_K05	C3	Proj01, ...,Proj15	N4