

# Data warehouse and data mining - course description

General information	
Course name	Data warehouse and data mining
Course ID	11.3-WE-INFP-DWaDM-Er
Faculty	<a href="#">Faculty of Computer Science, Electrical Engineering and Automatics</a> .
Field of study	Computer Science
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2019/2020

Course information	
Semester	6
ECTS credits to win	5
Course type	optional
Teaching language	english
Author of syllabus	<ul style="list-style-type: none"><li>dr hab. inż. Wiesław Miczulski, prof. UZ</li><li>dr inż. Jacek Tkacz</li></ul>

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade
Project	15	1	-	-	Credit with grade

## Aim of the course

- acquaint students with architectures of data warehouses and multidimensional data models,
- acquaint students with the basic methods of data mining,
- shaping basic skills in the practical construction of the data warehouse.

## Prerequisites

Databases, Elements of artificial intelligence.

## Scope

*Data warehouses.* Definition of Data Warehouse. Features of Data Warehouse. Exemplary applications. Architectures of Data Warehouses. Layered structure of the Warehouse: data sources, extraction layer, cleaning, transformation and data loading, data access layer. Tools for designing, building, maintaining and administering of the Data Warehouse.

*Multidimensional data models.* Models: MOLAP, ROLAP, HOLAP. Building of exemplary data cube.

Knowledge representation forms: logical rules, decision trees, neural nets.

*Data Mining.* Data preparation process. Selected Data Mining methods: classification, grouping, discovering association and sequences, analysis of time series.

Exemplary Data Mining applications.

## Teaching methods

- lecture: conventional/traditional lecture with elements of discussion.
- laboratory: work in the groups, practical excersises.
- project: the main condition to get a pass are sufficient marks for individual task conducted during the semester. There is also possible, that larger tasks can be carried out in groups, but each student will be assessed individually.

## Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Describes the structure of data warehouse		<ul style="list-style-type: none"><li>• a final test</li><li>• a pass - oral, descriptive, test and other</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li></ul>
Can characterize data models used in data warehouses		<ul style="list-style-type: none"><li>• a final test</li><li>• a pass - oral, descriptive, test and other</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li></ul>
Can work individually and in a team		<ul style="list-style-type: none"><li>• an observation and evaluation of activities during the classes</li></ul>	<ul style="list-style-type: none"><li>• Laboratory</li></ul>

Outcome description	Outcome symbols	Methods of verification	The class form
Applies selected informatics tools in data exploration		<ul style="list-style-type: none"> <li>an observation and evaluation of activities during the classes</li> <li>an observation and evaluation of the student's practical skills</li> <li>carrying out laboratory reports</li> </ul>	<ul style="list-style-type: none"> <li>Laboratory</li> </ul>
Creates example data warehouses		<ul style="list-style-type: none"> <li>a pass - oral, descriptive, test and other</li> <li>a preparation of a project</li> <li>a project</li> </ul>	<ul style="list-style-type: none"> <li>Project</li> </ul>
Can indicate in the life cycle of a data warehouse the activities leading to the improvement of its quality		<ul style="list-style-type: none"> <li>a final test</li> <li>a pass - oral, descriptive, test and other</li> </ul>	<ul style="list-style-type: none"> <li>Lecture</li> </ul>
Can prepare sample data analytics reports		<ul style="list-style-type: none"> <li>a preparation of a project</li> <li>a project</li> <li>an observation and evaluation of the student's practical skills</li> </ul>	<ul style="list-style-type: none"> <li>Project</li> </ul>

## Assignment conditions

Lecture – obtaining a positive grade from test.

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Project - the main condition to get a pass are sufficient marks for individual task conducted during the semester. There is also possible, that larger tasks can be carried out in groups, but each student will be assessed individually.

Calculation of the final grade: lecture 33,3% + laboratory 33,3% + 33,3% project

## Recommended reading

1. Hand D., Mannila H., Smyth P.: *Principles of Data Mining*. Massachusetts Institute of Technology, 2001.
2. Jarke M., Lenzerini M., Vassiliou Y., Vassiliadis P.: *Fundamentals of Data Warehouses*. Springer-Verlag, Berlin, 2002.
3. Larose D.T.: *Discovering Knowledge in Data. An Introduction to Data Mining*. John Wiley & Sonc, Inc., 2005.
4. Larose D.T.: *Data Mining Methods and Models*. John Wiley & Sonc, Inc., 2006.
5. Rutkowski L.: Computational Intelligence. Methods and Techniques. Springer-Verlag, Berlin, 2008.

## Further reading

1. Poe V., Klauer P., Brobst S.: *Building a Data Warehouse for Decision Support*. Prentice-Hall, Inc., a Simon & Schuster Company, 1999.

## Notes

Modified by dr inż. Jacek Tkacz (last modification: 27-04-2020 14:46)

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