Business intelligence systems - course description

General information

Course name	Business intelligence systems
Course ID	11.9-WE-INFD-BusIntSys-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Computer Science
Education profile	academic
Level of studies	Second-cycle Erasmus programme
Beginning semester	winter term 2021/2022

Course information

Semester	2
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	• dr hab. inż. Marek Kowal, prof. UZ

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	30	2	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade

Aim of the course

- developing skills in the design and implementation of data warehouses
- familiarize students with the methods of business data mining

Prerequisites

Scope

Data Warehouses. Data Sources. Data Integration. Review and characteristics of typical data transformation operations. Planning and implementation of data integration processes. Data collection in data warehouses, relational and multidimensional approach. Design and implementation of OLAP cubes. Presentation of analysis results in the form of reports. Programming ETL packages using MS SQL Server Integration Services and creating data cubes using MS SQL Server Analysis Services.

Data mining. Methods for discovering outliers and automatic completion of missing data. Selection of relevant variables. Methods for discovering association rules and sequences. Data clustering using hierarchical and iterative-optimization algorithms. Data Classification. Methods: k-nearest neighbors algorithm, decision trees, naive Bayesian classifier and SVM. Time series analysis using parametric models. The use of artificial neural networks for data mining. Practical exercises in data mining using SAS Enterprise Miner software.

Teaching methods

Lecture, laboratory exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
The student knows the relational and multidimensional data model.		• a multiple choice and open questions test	• Lecture
The student can apply known methods to explore real business data		• activity during the classes • carrying out laboratory reports	• Laboratory
The student is able to prepare the ETL package for the integration of data from heterogeneous sources		• activity during the classes • carrying out laboratory reports	• Laboratory
The student can design and implement a multidimensional data cube based on a star or snowflake scheme		• activity during the classes • carrying out laboratory reports	• Laboratory
The student knows the theoretical foundations of artificial neural networks and is able to apply it to business data mining		• a multiple choice and open questions test	• Lecture
The student can list and characterize IT modules from which data warehouse systems are built		• a multiple choice and open questions test	• Lecture

Outcome description	Outcomesymbols	Methods of verification	The class form
The student understands the theoretical basis of classification, data clustering and methods of discovering association rules and time series analysis		• activity during the classes • carrying out laboratory reports	• Laboratory

Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the final test.

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

Calculation of the final grade: lecture 50% + laboratory 50%

Recommended reading

1. Aggarwal C.C.: Data mining, Springer, 2015.
2. Kimball R., Ross M.: The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling (Second Edition), Wiley, 2002.
3. Goodfellow I., Bengio Y. Courville A. Deep learning, MIT, 2016
4. James G, Witten D., Hastie T., Tibshirani R. An Introduction to Statistical Learning, Springer, 2014
5. Russo M., Ferrari A. Tabular Modeling in Microsoft SQL Server Analysis Services, Microsoft Press, 2017
6. SQL Server 2012 Tutorials: Analysis Services - Multidimensional Modeling SQL Server 2012 Books Online, Microsoft, 2012
7. Sarka D., Lah M. Jerkic, Implementing a Data Warehouse with Microsoft SQL Server 2012, O'Reilly, 201

Further reading

Notes

Modified by dr hab. inż. Marek Kowal, prof. UZ (last modification: 20-07-2021 10:10)