

Module/Course Syllabus
Field of study: Computer Science
 Full-time study of the second degree

Course:	Design and implementation of business intelligence systems
Course type:	<i>Obligatory</i>
Course code:	I2S3.14
Year:	II
Semester:	3
Form of the degree programme:	Full-time
Form of classes and number of hours per semester:	60
Lecture	30
Classes	0
Laboratory	30
Project	0
Number of ECTS credits:	3
Form of assessment:	course completion assessment
Course language:	English

Course objectives	
C1	Gaining competencies enabling the proper data preparation for their use in business intelligence (BI) systems.
C2	Gaining competencies enabling the designing and implementation of business intelligence (BI) systems.

Prerequisites in terms of knowledge, skills and other competencies	
1	Database fundamentals and SQL
2	English language skills

Learning outcomes	
	In terms of knowledge:
LO 1	Student knows the data models used in business intelligence (BI) systems.
LO 2	Student knows IT tools and techniques for designing and implementing business intelligence (BI) systems.
	In terms of skills:
LO 3	Student is able to prepare data for their efficient use in business intelligence (BI) systems.
LO 4	Student is able to design and implement a business intelligence (BI) system with the use of modern IT tools.
	In terms of social competencies:
LO 5	Student is able to think creatively while designing and implementing of business intelligence (BI) systems.
LO 6	Student understands the need for continuous development of analytical competencies.

Course content	
Form of classes – lectures (L)	
	Curriculum content
L1	Basic terms related to business intelligence (BI). Place of BI in the architecture of information

	systems. Implementation areas of BI systems.
L2	Architecture of BI systems. Place and role of data warehouse in BI systems. Place of the data warehouse in the hierarchy of information systems. Application areas of data warehouse. Differences between data mart and data warehouse.
L3	Data models used in data warehouses: types, advantages, and disadvantages of particular models.
L4	ETL processes: extraction and integration of transactional data, their conversion, aggregation, and loading into the target storage environment. The current state of the ETL tools market. Modern IT tools used for the implementation of ETL tasks and their functionality.
L5	The current state of the data visualization and analysis tools market. Modern IT tools used to build BI systems. Methodology of building analytical reports and dashboards in dedicated IT tools.
L6	Data visualization techniques in BI systems and the principles of their selection taking into account the nature of the data.
L7	Types of data analysis performed in BI systems. Methods of data analysis in BI systems and techniques of their implementation in selected IT tools.
L8	Trends in the development of analytical data collection environments and BI systems.
Form of classes – laboratories (Lab)	
	Curriculum content
Lab1	Identification of transactional data sources required to build a BI system. Building a data mart data model describing a selected reality.
Lab2	Designing the ETL process supplying with data the data mart: defining the methods of data integration, their transformation, and aggregation to the form required in the BI system. Testing the correctness of data flow definitions.
Lab3	Building a BI system repository: joining and blending data, mapping data dependencies, creating new columns and calculated measures.
Lab4	Designing and implementing static analytical reports: defining the report structure, defining simple columns and measures calculated with the use of built-in functions, using simple types of data visualization, implementing quick table calculations.
Lab5	Designing and implementing dynamic analytical reports: defining complex columns and calculated measures, applying advanced types of data visualization, filtering data, using parameters as a responsive technique for changing the report content, defining a hierarchy of dimensions.
Lab6	Implementation of advanced computational techniques in analytical reports using LOD expressions.
Lab7	Design and implementation of a single dashboard. The use of containers for effective management of the dashboard's content. Building a BI application consisting of many dashboards.
Lab8	Designing and implementing stories (storytelling): definition of the structure of the story and implementation of its content.

Didactic methods	
1	<i>Information lecture</i>
2	<i>Computer-based programming method: performing tasks defined by the teacher and using the indicated data sources available on the e-learning platform</i>

Assessment methods and criteria		
Assessment method	Assessment methods and criteria	Passing threshold

symbol		
A1	Laboratory - credit in the form of solving tasks on a computer, randomly selected from a database on an e-learning platform.	51%
A2	Lecture – credit in the form of a multiple-choice test conducted on an e-learning platform.	51%

Required textbooks and other course materials		
1	Pelikant Adam, <i>Hurtownie danych: od przetwarzania analitycznego do raportowania</i> , Gliwice, Helion S.A., 2021	
2	KNIME Course Material, <i>KNIME Analytics Platform for Data Scientists: Basics</i> , https://www.knime.com/sites/default/files/2021-07/slides-l1-ds.pdf	
3	Tableau Online Resources, Free Training Videos, https://www.tableau.com/learn/training/20201	
4	Raviv Gil, <i>Power Query w Excelu i Power BI: zbieranie i przekształcanie danych</i> , Gliwice, Helion, 2020	
Recommended textbooks and other course materials		
1	Rumiński Jacek, <i>Wprowadzenie do hurtowni i eksploracji danych</i> , Gdańsk, Wydawnictwo Politechniki Gdańskiej, 2015	
2	Muryjas Piotr, Wawer Monika, Rzemieniak Magdalena, <i>Managing the Process of Evaluation of the Academic Teachers with the Use of Data Mart and Business Intelligence</i> , European Research Studies Journal, Pireus, International Strategic Management Association (ISMA) - ISSN 1108-2976, 2021	
3	Wawer Monika, Muryjas Piotr, <i>Ocena wiedzy współczesnych menedżerów w zakresie narzędzi klasy business intelligence</i> , Edukacja - Technika - Informatyka, Rzeszów, Zakład Dydaktyki Techniki i Informatyki Uniwersytetu Rzeszowskiego.- ISSN 2080-9069 (print), ISSN 2450-9221 (on-line), 2018	
4	Ferrari Alberto, Russo Marco, <i>Introducing Microsoft Power BI</i> , Microsoft Press, 2016 https://download.microsoft.com/download/0/8/1/0816F8D1-D1A5-4F60-9AF5-BC91E18D6D64/Microsoft_Press_ebook_Introducing_Power_BI_PDF_mobile.pdf	

Student workload	
Form of activity	Average number of hours to complete the activity
Contact hours with teacher, included:	
<i>participation in lectures</i>	30
<i>participation in laboratories</i>	30
Student's own homework, included:	
<i>preparation for the lecture completion</i>	5
<i>preparation for the laboratory</i>	10
Total working time of the student	75
Total number of ECTS points for the course	3

Macierz efektów uczenia się					
Efekt uczenia się	Odniesienie danego efektu uczenia się do efektów zdefiniowanych dla kierunku studiów	Cele przedmiotu	Treści programowe	Metody dydaktyczne	Metody oceny
LO 1	I2A_W01 ++ I2A_W02 +++ I2A_W06 +++	CO1	L1, L2, L3, L4, L8	1	A2

LO 2	I2A_W01 ++ I2A_W02 +++ I2A_W07 +++ I2A_W08 +++	CO2	L1, L2, L5, L6, L7, L8	1	A2
LO 3	I2A_U01 +++ I2A_U05 +++ I2A_U07 +++ I2A_U09 +++ I2A_U15 +++	CO1	Lab1, Lab2, Lab3	2	A1
LO 4	I2A_U01 +++ I2A_U05 +++ I2A_U07 +++ I2A_U09 +++ I2A_U18 +++	CO2	Lab4 - Lab8	2	A1
LO 5	I2A_K02 ++	CO1, CO2	L3-L7, Lab1-Lab8	1, 2	A1, A2
LO 6	I2A_K01 ++	CO1, CO2	L1-L8, Lab4-Lab8	1, 2	A1, A2

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