#### card of course

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| Subject name | Introduction to Data Warehouse |

1. The placement of the subject in the study system

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| 1.1. Field of study | Computer science |
| 1.2. Form and path of study | Full-time/Part-time |
| 1.3. Level of education | First-cycle studies |
| 1.4. Study profile | Practical |
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| 1.5. Specialty | Databases |
| 1.6. Subject Coordinator | Dr Rafal Stęgierski |

2. General characteristics of the subject

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| 2.1. Belonging to a subject group | Optional/practical |
| 2.2. Number of ECTS | 5 |
| 2.3. Language of lectures | English |
| 2.4. Semesters in which the subject is taught | III |
| 2.5.Criteria for selecting course participants | For specialization: Databases |

1. Learning outcomes and course delivery
   1. Subject Objectives

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| No. | Subject Objectives |
|
| C1 | Familiarization with the concept of data storage, data warehouse and BI. |
| C2 | Introduction to the architecture of data warehouses and their use and methods of data integration, ETL. |
| C3 | Learning tools for building queries for warehouses and reporting systems. |
| C4 | To familiarize students with the DFM model and multidimensional modeling. |
| C5 | Creation of projects based on PowerBI and data from the MSSQL WH warehouse. |

* 1. Subject-specific learning outcomes, divided into knowledge , skills and competences , with reference to the directional learning outcomes

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Description of subject  learning outcomes | Reference to  the directional learning outcomes (symbols) | Method of implementation (mark "X") | | | |
| ST | | NST | |
| Classes at the University | Activities on  the platform | Classes at the University | Activities on  the platform |
| After passing the course, the student knows and understands **the knowledge** | | | | | | |
| W1 | Knows the concepts of data in the context of non-homogeneous sets, knows how to design and use systems of this type for their own needs | INF\_W04  INF\_W12 | X |  |  | X |
| W2 | Knows how to use cloud tools in the OLAP data processing process | X |  |  | X |
| After passing the course, the student is **able** to: | | | | | | |
| U1 | Is able to indicate the required elements for building a data warehouse environment based on various sources. | INF\_U01 INF\_U02 INF\_U06 INF\_U13 INF\_U14 INF\_U27 | X |  | X |  |
| U2 | Is able to indicate the best technical solutions related to data collection within data warehouses and storage facilities and assess their cost-effectiveness and profitability | X |  | X |  |
| U3 | Is able to define a model that will be optimal at the level of collecting and analyzing data within the warehouse | X |  | X |  |
| U4 | Can create reports and analytical queries | X |  | X |  |
| After completing the course, the student is ready to take part in **social competences.** | | | | | | |
| K1 | Can indicate optional solutions and scenarios | INF\_K03 INF\_K04 | X |  | X |  |
| K2 | Has the ability to plan the sequence of activities in the construction of a data warehouse system | X |  | X |  |

3.3. Forms of teaching and their number of hours - Full-time studies (ST), Part-time studies (NST)

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Path | Lecture | Exercises | Design | Workshop | Laboratory | Seminar | Lecturer | Classes conducted using distance learning methods and techniques in the form of a lecture | Other | **ECTS points** |
| **ST** | 20 |  |  |  | 30 |  |  |  |  | 5 |
| **NST** |  |  |  |  | 15 |  |  | 10 |  | 5 |

3.4. Content of education (separately for each form of classes: (W, ĆW, PROJ, WAR, LAB, LEK, OTHER). It should be marked (X) how the given content will be implemented (classes at the university or classes on the e-learning platform conducted using distance learning methods and techniques)

TYPE OF CLASS: LECTURE

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Content of the course | Reference to subject-specific learning outcomes | Method of implementation (mark "X") | | | |
| ST | | NST | |
| **Classes at the University** | **Activities on  the platform** | **Classes at the University** | **Activities on  the platform** |
| 1. | Familiarization with the concept of data warehouses, their types and applications | W1-W2 | X |  |  | X |
| 2. | Learning the concept of BI (Business Intelligence) and its use cases | W1-W2 | X |  |  | X |
| 3. | Introduction to the concept of data integration models and sample procedures | W1-W2 | X |  |  | X |
| 3. | Discussion of DFM, multidimensional modeling, OLAP operators with a number of practical examples | W1-W2 | X |  |  | X |
| 4. | Data warehouse implementation models with reference to the types of underlying systems | W1-W2 | X |  |  | X |
| 5. | Introduction of the idea of an analytical system and their classification | W1-W2 | X |  |  | X |
| 6. | Creating analytical solutions based on Oracle APEX | W1-W2 | X |  |  | X |
| 7. | Summary of classes and discussion of grades. |  | X |  |  | X |

TYPE OF CLASS: LABORATORY

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Content of the course | Reference to subject-specific learning outcomes | Method of implementation (mark "X") | | | |
| ST | | NST | |
| **Classes at the University** | **Activities on  the platform** | **Classes at the University** | **Activities on  the platform** |
| 1. | Familiarization with PowerBI and MSSQL WH tools in the context of use as a data warehouse | U1 | X |  | X |  |
| 2. | Data preparation along with planning and implementation of ETL data preparation processes | U2-U3, K1-K2 | X |  | X |  |
| 3. | Practical use of data loading mechanisms | U2-U3, K1-K2 | X |  | X |  |
| 4. | Data modeling for warehouse needs along with model implementation | U3-U4, K1-K2 | X |  | X |  |
| 5. | Designing reports in PowerBI using data of various nature and origin | U2-U4, K1-K2 | X |  | X |  |
| 6. | Familiarization with the Oracle APEX environment in the context of data analysis | U2-U4, K1-K2 | X |  | X |  |
| 7. | Building a Responsive Application in Oracle APEX | U2-U4, K1-K2 | X |  | X |  |
| 6. | Summary of classes and discussion of grades. |  | X |  | X |  |

3.5. Methods of verifying learning outcomes (indication and description of methods of conducting classes and verification of achievement of learning outcomes and method of documentation)

Methods of verifying learning outcomes:

Lecture - practical exam

Laboratory – solving 10 tasks with equal weighting for the final grade (0.1).

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| Subject Effects | Teaching methods | Methods of verifying learning outcomes | Documentation methods |
| KNOWLEDGE | | | |
| W1-W2 | Informative, conversational and multimedia lecture | Exam – 100% of the final grade from the lecture | Graded exam |
| SKILLS | | | |
| U1-U4 | Performing practical tasks | Assessment and checking of task results - 100% of the final grade from the laboratory  (description above) | Archiving tasks on the platform |
| SOCIAL COMPETENCES | | | |
| K1-K2 | Discussion, brainstorming | Assessment and checking of task results - 100% of the final grade from the laboratory  (description above) | Archiving tasks on the platform |

3.6. Assessment criteria for the achieved learning outcomes

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| Learning effect | For a grade of 3 or "pass."  the student knows and understands/is able to/is ready to | For a grade of 3.5, the student knows and understands/is able to/is ready to | For a grade of 4, the student knows and understands/is able to/is ready to | For a grade of 4.5, the student knows and understands/is able to/is ready to | For a grade of 5, the student knows and understands/is able to/is ready to |
| W | 51-60% of knowledge indicated in learning outcomes | 61-70% of knowledge indicated in learning outcomes | 71-80% of knowledge indicated in learning outcomes | 81-90% of knowledge indicated in learning outcomes | 91-100% of knowledge indicated in learning outcomes |
| U | 51-60% of skills indicated in learning outcomes | 61-70% of skills indicated in learning outcomes | 71-80% of skills indicated in learning outcomes | 81-90% of skills indicated in learning outcomes | 91-100% of skills indicated in learning outcomes |
| K | 51-60% of skills indicated in learning outcomes | 61-70% of skills indicated in learning outcomes | 71-80% of skills indicated in learning outcomes | 81-90% of skills indicated in learning outcomes | 91-100% of skills indicated in learning outcomes |

3.7. Literature

**Basic**

1. Finch Victor Data Analytics For Beginners: Your Ultimate Guide To Learn And Master Data Analysis. Get Your Business Intelligence Right – Accelerate Growth And Close More Sales Createspace Independent Publishing Platform; Scotts Valley 2017
2. Wprowadzenie do systemów baz danych. Ramez Elmasri, Shamkant B. Navathe. Helion.
3. Pierwsze kroki w Power BI. Kompletny przewodnik po praktycznej analityce biznesowej. Greg Deckler. Helion.

**Supplementary**

1. https://learn.microsoft.com/en-us/power-bi/

4. Student workload - ECTS points balance

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| --- | --- | --- |
| **Types of student activity** | **Student Load** | |
| **ST** | **NST** |
| **Classes requiring direct contact between the student and the academic teacher at the university premises** | **50** | **25** |
| Classes included in the study plan | 50 | 25 |
| **Student's own work** | **75** | **100** |
| Ongoing preparation for classes, preparation of project work/presentations/etc. | 40 | 50 |
| Preparation for passing classes | 35 | 50 |
| **TOTAL STUDENT HOURLY LOAD** | **125** | **125** |
| **Number of ECTS points** | **5** | **5** |

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| Last change date | 30/09/2024 |
| The changes were introduced | INF Education Quality Team |
| The changes were approved | Arkadiusz Gwarda, M.A. |