**Course name**
Advanced Database Systems and Data Warehouses

**Course code**
FCS-00028

**Forms and number of hours of tuition**

<table>
<thead>
<tr>
<th>Form</th>
<th>L</th>
<th>C</th>
<th>LC</th>
<th>P</th>
<th>SW</th>
<th>FW</th>
<th>S</th>
<th>Semester</th>
<th>No. of ECTS credits</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>30</td>
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<td>2</td>
<td>6</td>
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**Entry requirements**

The aim is this course is to familiarize students with the subject of advanced database objects, procedural SQL, data warehouse, query optimization, NoSQL databases, and data analysis based on Bayesian networks. Most of these issues will also be carried out as part of classes from a specialist studio.

Prerequisites:
Knowledge of relational databases and the SQL language. Ability to design relational databases and programming in SQL.

**Course objectives**

Lecture:
1. Procedural SQL.
3. Optimizing queries in practice.
4. Data models in data warehouses.
5. Data warehouse architecture.
6. Advanced SQL: Grouping.
8. Data integration.
9. NoSQL databases.
10. Data analysis with Bayesian network models.

Specialistic workshop:
1. Procedural SQL.
3. Data models in data warehouses.
5. Advanced SQL: Analytical functions.
6. Data integration.
7. NoSQL databases.
8. Data analysis with Bayesian network models.

**Teaching methods**

lecture problem, programming,

**Assessment method**

Homework assignments, advanced SQL test, quizzes, project

**Symbol of learning outcome**

<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>Reference to the learning outcomes for the field of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO1</td>
<td>knows the rules of implementing advanced SQL queries based on analytical functions; can create this kind of query</td>
</tr>
<tr>
<td>LO2</td>
<td>can use the NoSQL database and formulate commands for selecting data and modifying them</td>
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<tr>
<td>LO3</td>
<td>a student knows how to design data warehouse model</td>
</tr>
<tr>
<td>LO4</td>
<td>a student knows how to integrate the data coming from different sources</td>
</tr>
<tr>
<td>LO5</td>
<td>a student knows how to analyze data with Bayesian network models</td>
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</table>

**Methods of assessing the learning outcomes**

<table>
<thead>
<tr>
<th>Type of tuition during which the outcome is assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO1</td>
</tr>
<tr>
<td>LO2</td>
</tr>
<tr>
<td>LO3</td>
</tr>
<tr>
<td>LO4</td>
</tr>
<tr>
<td>LO5</td>
</tr>
</tbody>
</table>

**Calculation**

1. Lecture participation - 2x15h  
   2. Specialistic workshop participation - 2x15h  
   3. Preparation for specialistic workshop -  
   4. Participation in office hours -  
   5. Implementing project -  
   6. Preparation for advanced SQL test -  
   7. Doing homework and preparing report -  
   **TOTAL:** 150

**Student workload (in hours)**

<table>
<thead>
<tr>
<th>Student workload - activities that require direct teacher participation</th>
<th>HOURS</th>
<th>No. of ECTS credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65</td>
<td>2.6</td>
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<tr>
<td>Student workload - practical activities</td>
<td>45</td>
<td>1.8</td>
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**Basic references**


**Supplementary references**


**Organisational unit conducting the course**
Software Department

**Author of the programme**
dr hab. inż. Agnieszka Drużdżel

**Date of issuing the programme**
Feb. 17, 2022