#### card of course

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| Subject name | Database programming |

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/Web Technologies and Internet of Things |
| 1.6. Subject Coordinator | Dr Barbara Gocłowska |

2. General characteristics of the subject

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| 2.1. Belonging to a subject group | Optional/practical |
| 2.2. Number of ECTS | 6 |
| 2.3. Language of lectures | Polish |
| 2.4. Semesters in which the subject is taught | III |
| 2.5.Criteria for selecting course participants | For the specialization: Web Technologies and Internet of Things |

1. Learning outcomes and course delivery
   1. Subject Objectives

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| No. | Subject Objectives |
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| C1 | Acquiring skills in programming non-relational databases, taking into account structures, relationships and optimization. |
| C2 | Acquiring skills in programming non-relational databases. |
| C3 | Acquiring knowledge of database management, including creating stored procedures. |

* 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  directional effects  learning (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 | Principles of database design, including normalization and structure optimization. | INF\_W03  INF\_W04 | X |  | X | X |
| W2 | Possesses knowledge of transactions and their significance in the context of the database. | X |  |  | X |
| W3 | Rules for creating views, importing and exporting data. | X |  |  | X |
| W4 | Rules for creating document databases | X |  |  | X |
| After passing the course, the student is **able** to: | | | | | | |
| U1 | identify and resolve database problems. | INF\_U01 INF\_U14 INF\_U23 | X |  | X |  |
| U2 | create and manage procedures, triggers | X |  | X |  |
| U3 | independently design both relational and nosql databases | X |  | X |  |
| After completing the course, the student is ready to take part in **social competences.** | | | | | | |
| K1 | analyzing and solving database problems | INF\_K02 | X |  | X |  |
| K2 | identifying threats related to the exploitation of databases | X |  | 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 |  |  |  | 40 |  |  |  |  | 6 |
| **NST** |  |  |  |  | 15 |  |  | 10 |  | 6 |

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. | Definition of databases and their importance. | W1 | X |  |  | X |
| 2. | Differences between different types of databases (including sql and nosql) | W1 | X |  |  | X |
| 3. | Creating and managing databases. | W3 | X |  |  | X |
| 4. | Database design and normalization. | W2 | X |  |  | X |
| 5. | Creating tables, primary keys, and foreign keys. | W2 | X |  |  | X |
| 6. | Advanced operations on relational databases | W1 | X |  |  | X |
| 7. | Creating Stored Procedures and Functions | W4 | X |  |  | X |
| 8. | Database transactions | W2 | X |  |  | X |
| 9. | Creating triggers | W3 | X |  |  | X |
| 10. | Creating document databases | W3 | X |  |  | X |
| 11. | Queries on documents (selections, operations, etc.). | **W1** | X |  |  | X |
| 12. | Using conditional instructions on document databases | W4 | X |  |  | X |
| 13. | 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. | Basic Operations Recap | U1 | X |  | X |  |
| 2. | Advanced Database Operations Reminder | U1 | X |  | X |  |
| 3. | Advanced new database operations | U1 | X |  | X |  |
| 4. | Creating databases, database management exercises. | U2 | X |  | X |  |
| 5. | Creating a database project (relational and document) | U3 | X |  | X |  |
| 6. | Exercises in creating tables, primary keys, and foreign keys. | U3 | X |  | X |  |
| 7. | Designing and creating stored functions and procedures | U1 | X |  | X |  |
| 8. | Designing and creating triggers | U1 | X |  | X |  |
| 9. | Designing document databases | U3 | X |  | X |  |
| 10. | Operations on document databases | U2 | X |  | X |  |
| 11. | Pipeline aggregation | U3 | X |  | X |  |
| 12. | Problem Solving and Practice | U2, K1, K2 | X |  | X |  |
| 13. | 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)

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| --- | --- | --- | --- |
| Subject Effects | Teaching methods | Methods of verifying learning outcomes | Documentation methods |
| KNOWLEDGE | | | |
| W1-W4 | complex multimedia presentation, problem solving | Oral examination based on the final paper: critical discussion of 12 queries to the database created by the student  Student's indication of sources used while creating the project | Oral examination report and final paper |
| SKILLS | | | |
| U1-U3 | complex multimedia presentation, problem solving, practical method, group work, brainstorming | Term paper.  Student's final project - project and scripts for creating a database (sql or nosql type), preparation of 12 queries to the database  Student's indication of sources used while creating the project | Archived term paper |
| SOCIAL COMPETENCES | | | |
| K1-K2 | complex multimedia presentation, problem solving, practical method, group work, brainstorming | Term paper.  Student's final project - - project and scripts for creating a database (sql or nosql type), preparation of 12 queries to the database  Student's indication of sources used while creating the project | Archived term paper |

Accurate indications for laboratory evaluation

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| --- | --- | --- | --- | --- |
| 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 |
| Create a sql database project. Develop 12 queries for it  Or  Create a nosql database project. Develop 12 queries for it. | Create a sql database project. Develop 12 interesting queries for it.  Or  Create a nosql database project. Develop 12 interesting queries for it. | Create a unique sql database design. Develop 12 interesting queries for it, including at least one stored function and one procedure as well as at least one trigger.  Or  Create an interesting and unique nosql database project. Develop 12 interesting queries for it. | Create an interesting and unique sql database project. Develop 12 interesting queries for it, including at least one stored function and two procedures as well as at least one trigger. Or  Create an interesting and unique nosql database project. Develop 12 interesting queries for it. | Create an interesting and unique sql database project. Develop 12 interesting queries for it, including at least 2 stored functions and two procedures as well as at least one trigger. Or  Create an interesting and unique nosql database project. Develop 12 interesting queries for it. |

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/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. SQL. Przewodnik dla początkujących. Jak zacząć efektywną pracę z danymi.  Walter Shields,
2. <https://www.mysqltutorial.org/mysql-stored-procedure/>
3. <https://neon.tech/postgresql/tutorial>
4. <https://www.mongodbtutorial.org/>

**Supplementary**

1. <https://www.w3schools.com/sql/default.asp>

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** | **60** | **25** |
| Classes included in the study plan | 60 | 25 |
| **Student's own work** | **90** | **125** |
| Ongoing preparation for classes, preparation of project work/presentations/etc. | 45 | 65 |
| Preparation for passing classes | 45 | 60 |
| **TOTAL STUDENT HOURLY LOAD** | **150** | **150** |
| **Number of ECTS points** | **6** | **6** |

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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. |