

DATABASES

| Faculty of Computer Science | | | |
|--------------------------------|--|-------------|---|
| Study programme: | Computer Science | | Degree level: Engineer's degree full-time programme |
| Specialization | --- | | Diploma path: 2026/2027W - 2026/2027S |
| Module name: | Databases (Bazy danych) | | |
| Module type: | obligatory | Semester: 1 | ECTS:5 Module ID:FCS-00108 |
| No. of hrs in semester: | Lecture (L) - 30 Classes(C) - 0 Specialization workshop (SW) - 30 Project (P) - 0 Laboratory classes (LC) - 0 Seminar (S) - 0 | | |
| Prerequisites | - | | |
| Aims and objectives: | <p>Familiarizing students with the process of creating a relational database. Teaching methods for writing SQL queries to retrieve data from tables, as well as DDL, DML, and DCL commands. Introducing the fundamentals of database operation, including the physical organization of data in a database, indexes, and transactions.</p> <p>References to the SFIA micro-competency educational framework: Database design (DBMS) - Level 3 Data modelling and design (DTAN) - Level 3 Data analytics (DAAN) - Level 2</p> | | |
| Forms of teaching activities:: | lecture, specialization workshop, | Assessment: | Evaluation must be relevant to the intended learning outcomes: Lecture: written exam. Sw: tests, quizzes. |
| Module content: | <p>Lecture: Introduction to databases. Basics of SQL Relational algebra. SQL basics continued. Character functions Integrity constraints. Numeric functions. Aggregate functions Stages of relational database design. Nested queries Complex queries. Normalization of relations Entity-relationship diagrams. Nested queries Outer joins. Hierarchical queries. Use of CONNECT BY PRIOR and START WITH Types of relationship joins in the Oracle Database. Set and multiset operators From entity-relationship diagrams to relations DDL, DML, DCL Physical organization of the database. Data dictionary Indexes Transactions Transactions continued Optimization</p> <p>Specialist workshop: Presentation of course completion requirements and the course syllabus. Introduction to databases SQL Developer. Example relations. Select queries Complex conditions in SQL queries. Functions: character, numeric and date Aggregate functions Complex queries in which the subquery returns exactly one value Complex queries in which the subquery may return multiple values Complex queries in which the subquery may appear in the SELECT or FROM clause Outer joins. Hierarchical queries. Use of CONNECT BY PRIOR and START WITH Test 1 Types of relationship joins in the Oracle Database. Set and multiset operators DDL language DML language Creating views and indexes Test 2 Test and course completion retake</p> | | |
| Teaching methods: | subject exercises, programming, lecture problem, informative lecture, | | |
| Learning outcomes | | | |
| Symbol | Specify min. 4, max. 8 learning outcomes in the following order: knowledge – skills – competence. Each learning outcome must be verifiable | | Reference to the programme learning outcomes of education |
| E1 | rules for creating relational databases and retrieving information from them | | INF1_W07 |
| E2 | fundamentals of relational database systems operation | | INF1_W07 |
| E3 | design and create a relational database schema | | INF1_U08 |
| E4 | can use the SQL language to build, modify and extract information from a relational database | | INF1_U08 |
| E5 | create a digitally accessible document presenting the results of their work | | INF1_U07 |
| No. of learning outcome | Methods of assessing the learning outcome | | Type of teaching activities (if more than one) during which the outcome is assessed |
| E1 | Exam | | L |
| E2 | Exam | | L |

| | | | |
|----------------------------------|--|--------------------------|--|
| E3 | test | Sw | |
| E4 | test, quizzes | Sw | |
| E5 | test | Sw | |
| Student's workload (in hours) | 1 - participation in lectures | None | 30 |
| | 2 - participation in other forms of classes | None | 30 |
| | 3 - participation in the exam | None | 2 |
| | 4 - individual substantive support of the learning process, participation in assessments conducted outside the class schedule | None | 4 |
| | 5 - preparation for the exam | None | 10 |
| | 7 - preparation for ongoing classes | None | 29 |
| | 8 - preparation for course completion | None | 20 |
| | | TOTAL: | |
| Quantitative indicators | Student's workload - activities that require direct teacher participation: (3)+(1)+(2) | 62 | ECTS 2.5 |
| | Student's workload connected with practical classes (2)+(7)+(8) | 79 | 3.2 |
| Basic references: | 1. T. Connolly, C. Begg, Database Systems: A Practical Approach to Design, Implementation and Management, 4th edition, Addison Wesley, 2005 | | |
| Further reading | 1. T. Kyte, Expert Oracle Database Architecture: Oracle Database 9i, 10g, and 11g Programming Techniques and Solutions, 2nd edition, APress 2010 | | |
| Unit: | Software Department | Lecturer/ instructor | dr hab. inż. Agnieszka Drużdżel, dr hab. inż. Małgorzata Krętowska |
| Date of issuing the programme: | 4th April 2025 | Author of the programme: | dr hab. inż. Agnieszka Drużdżel, dr hab. inż. Małgorzata Krętowska |

L - lecture, C - classes, LC - laboratory classes, P-project, SW - specialization workshop, S - seminar