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| **WSB UNIVERSITY Branch/Department of Jaworzno**  |
| **Field of study: Computer Science**  |
| **Subject: Databases**  |
| **Educational profile: practical**  |
| **Level of education: undergraduate studies**  |
| **Number of hours**  **per semester**  | 1  | 2  | 3  | 4  |
| I  | II  | III  | IV  | V  | VI  | VII  |
| **Full-time studies** (w/w/lab/pr/e)\*  |   |   |   | **16w / 16lab**  |   |  |  |
| **Part-time studies** (w/æw/lab/pr/e)  |   |   |   | **12w / 12lab**  |   |  |  |
| **LANGUAGE OF** **INSTRUCTION**  | Polish  |
| **LECTURER**  | Dr.-Ing. Badura Dariusz, Prof. AWSB, M.Sc. Pawlak Bartłomiej  |
| **FORM OF ACTIVITIES**  | Lecture, laboratory, consultation  |
| **SUBJECT** **OBJECTIVES**  | The aim is to introduce the student to database issues. Relational database issues are presented. The SQL language is introduced as well as databases of the type, No-SQL  |
| **Reference to learning outcomes**  | **Description of learning outcomes**  | **Means of verification of the effect** **learning**  |
| **Directional effect**  | **PRK**  |
| **NEWS**  |
| INF\_W04  | P6S\_WG  | The student has a structured, theoretically based knowledge of databases.  |  • Written examination  |
| INF\_W04  | P6S\_WG  | The student knows and understands the relational model of databases.  | * Written examination
* Completion of relevant laboratory tasks, working in groups.
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| INF\_W11  | P6S\_WG  | The student knows and understands the principles of designing database systems both based on physical and logical models according to the principles of standardisation.  | * Written examination
* Completion of relevant laboratory tasks, working in groups.
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| INF\_W10  | P6S\_WG  | The student knows and understands data manipulation methods, operations such as DQL, DML, DDL.  | * Written examination
* Completion of relevant laboratory tasks, working in groups.
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| **SKILLS**  |
| INF\_U10 INF\_U11  | P6S\_UW P6S\_UW  | The student is able to design and implement usable database systems based on standardisation principles by creating source code (scripts).  | * Completion of relevant laboratory tasks, working in groups.
* Card.
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| INF\_U07   | P6S\_UK   | The student is able to present the completed database schema clearly.  | • Presentation and discussion of the laboratory exercise performed.  |
| INF\_U03   | P6S\_UW   | The student is able to manipulate a lot of data placed in a relational database.  | • Completion of relevant laboratory tasks, working in groups.  |
| INF\_U08   | P6S\_UU   | Able to independently acquire the relevant knowledge and skills necessary to complete  | • Completion of relevant laboratory tasks, working in groups.  |

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|  |  | laboratory tasks.  |  |
| **SOCIAL COMPETENCES**  |
| INF\_K01  | P6S\_KK  | The student is ready to critically evaluate his/her knowledge and perceived content concerning the achievements of computer science, recognizing the importance of knowledge in solving cognitive problems  | Observation of students during classes  |
| **Student workload (in teaching hours 1h =45 minutes)\*\***   |
| **Stationary Part-time** attendance at lectures = 16 attendance at lectures = 12 participation in exercises = 16 participation in exercises = 12 preparation for exercise = 30 preparation for exercise = 32 lecture preparation = 20 lecture preparation = 26 exam preparation = 10 exam preparation = 10 implementation of project tasks = implementation of project tasks = e-learning = e-learning = Pass/examination = 4 Pass/examination = 4 other (consultation) = 4 other (consultation) = 4 **TOTAL: 100h TOTAL: 100h** **Number of ECTS credits: 4 Number of ECTS credits: 4** **including in practical classes: 2 including in practical classes: 2**  |
| **PREREQUISITES**  | Fundamentals of computer programming, including object-oriented programming. |
| **SUBJECT** **CONTENT**  | Lecture: * Introduction to database issues
* Relational data model
* File organisation,
* SQL language
* Indexes,
* Transactional processing,
* Algorithms for managing concurrent execution of transactions

 Lab: * Relational database design, normalisation, good practice and patterns, constraints, relationships, attributes, indexes, data types, keys...,
* Database modelling from both the physical and logical model side, ERD diagrams...,
* Implementation of the created model in the form of source code (scripts), DDL operations in the selected database environment,
* Semantics and syntax for database read operations (Select - DQL),
* Semantics and syntax for record modification operations in the database (Update, Delete, Insert - DML)...,
* Exercises in building queries, joins, grouping, sorting, creating conditions, applying time functions, aggregating based on various tasks and business processes modelled in the relevant database...,
* Exercises in adding new objects to the database, deleting them and updating them,
* An introduction to the more advanced elements of databases - subqueries, views, procedures, functions, table types, how to optimise databases, triggers, transactions, temporary tables.

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| **LITERATURE**  **COMPULSORY**  | * Date C. J., An Introduction to Database System, vol. II, Adison-Wesley Pub. Comp., also WNT - W-wa, (series: Klasyka Informatyki), latest edition
* Elmasri R., Navathe S., Fundamentals of Database Systems, Adison-Wesley Pub. Comp.,(4th Edition), 2002
* Garcia-Molina H., Ullman J.D., Widom J., Implementation of database systems, WNT, 2003

(series: Klasyka Informatyki)  |
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| **LITERATURE**  **SUPPLEMENTARY**   | * Elmasri R., Navathe S., Introduction to Database Systems, Helion Publishers, (4th Edition), 2005
* R. Ramakrishnan, J. Gehrke, Database Management Systems, 2nd edition, WCB/McGraw-Hill, 2001
* [L. Rockoff,](https://helion.pl/autorzy/larry-rockoff) The SQL language. A friendly handbook. 2nd Edition, Helion, Gliwice, 2017,
* C. J. Date, Relational databases. Helion, Gliwice 2006,
* P. Wilton, J. Colby, SQL. From scratch. Helion, Gliwice, 2005.
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| **TEACHING** **METHODS**    | Lectures, laboratories using the Onlinewsb platform and MS Teams applications, virtual laboratories. * Brief theoretical introduction using a multimedia projector,
* Demos demonstrating the use of relevant tools, technologies and then performing tasks on computers independently and under supervision with guidance from the instructor.
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| **LEARNING AIDS**  | Multimedia presentations, tools to help perform relevant data operations (in this case MS SQL SERVER).  |
| **PROJECT**   | Not applicable  |
| **FORM AND** **CONDITIONS OF** **PASSING**   | Written exam. Tasks performed in groups on the basis of data presented in class. Successful completion of all laboratories is a prerequisite for passing. Independent completion of specified tasks.  |