

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                                                          |                                     |                                                                                                             |            |     |
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| Subject name and code                       | Databases (P), PG_00155298                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          |                                                                                          |                                     |                                                                                                             |            |     |
| Field of study                              | Informatics                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |                                                                                          |                                     |                                                                                                             |            |     |
| Date of commencement of studies             | October 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                          | Academic year of realisation of subject                                                  |                                     | 2024/2025                                                                                                   |            |     |
| Education level                             | Bachelor's studies                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          | Subject group                                                                            |                                     | Obligatory subject group in the field of study<br>Subject group related to practical vocational preparation |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          | Mode of delivery                                                                         |                                     | at the university                                                                                           |            |     |
| Year of study                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          | Language of instruction                                                                  |                                     | Polish                                                                                                      |            |     |
| Semester of study                           | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          | ECTS credits                                                                             |                                     | 5.0                                                                                                         |            |     |
| Learning profile                            | practical                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          | Assessment form                                                                          |                                     |                                                                                                             |            |     |
| Conducting unit                             | Instytut Informatyki -> Faculty of Mathematics, Physics and Informatics -> Rektor                                                                                                                                                                                                                                                                                                                                                                              |                                                          |                                                                                          |                                     |                                                                                                             |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          | dr Andrzej Borzyszkowski                                                                 |                                     |                                                                                                             |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          | dr inż. Kamila Mazur-Oleszczuk<br><br>dr Andrzej Borzyszkowski<br><br>dr inż. Anna Nenca |                                     |                                                                                                             |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Lecture                                                  | Tutorial                                                                                 | Laboratory                          | Project                                                                                                     | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30.0                                                     | 0.0                                                                                      | 30.0                                | 0.0                                                                                                         | 0.0        | 60  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |                                                                                          |                                     |                                                                                                             |            |     |
| Learning activity and number of study hours | Learning activity                                                                                                                                                                                                                                                                                                                                                                                                                                              | Participation in didactic classes included in study plan |                                                                                          | Participation in consultation hours |                                                                                                             | Self-study | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60                                                       |                                                                                          | 0.0                                 |                                                                                                             | 65.0       | 125 |
| Subject objectives                          | Learning a relational database system. In the practical part, the student will prepare their own database project, as well as master the SQL language, which is a standard in database systems. In the theoretical part, the student will learn about the foundations of database design, the concept of transactions, the principles of integration in a programming environment, the principles of security and confidentiality present in database systems. |                                                          |                                                                                          |                                     |                                                                                                             |            |     |

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| Learning outcomes               | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Subject outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Method of verification                                                                                  |
|                                 | [INFL3_K02] can precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | is able to precisely formulate questions to deepen his own understanding of a given topic or to find a missing element of reasoning                                                                                                                                                                                                                                                                                                                                   | [SK1] oral statement/conversation/discussion<br>[SK8] observation of student's independent or team work |
|                                 | [INFL3_U08] assesses the usefulness of various paradigms and related programming tools to solve various types of problems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | evaluates the usefulness of various paradigms and development tools for solving problems related to database systems                                                                                                                                                                                                                                                                                                                                                  | [SU1] oral statement/conversation/discussion<br>[SU2] presentation/project/paper/report                 |
|                                 | [INFL3_K03] understands the need and appreciates the advantages of teamwork, understands the need for systematic work on team IT projects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | is able to work in a team of IT professionals, make commitments and meet deadlines, communicate using various techniques in a professional environment, including the use of dedicated tools                                                                                                                                                                                                                                                                          | [SK2] presentation/project/paper/report<br>[SK8] observation of student's independent or team work      |
|                                 | [INFL3_U03] is able to work in a team of IT specialists, including being able to manage his/her time, make commitments and meet deadlines, communicate using various techniques in the professional environment, including the use of dedicated tools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | is able to work in a team of IT professionals, make commitments and meet deadlines, communicate using various techniques in a professional environment, including the use of dedicated tools                                                                                                                                                                                                                                                                          | [SU2] presentation/project/paper/report<br>[SU8] observation of student's independent or team work      |
|                                 | [INFL3_W05] has ordered knowledge of the design and use of databases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | knows how to design a database in a relational model<br><br>is able to use various tools in working with a database                                                                                                                                                                                                                                                                                                                                                   | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/report                            |
|                                 | [INFL3_K01] knows the limitations of their own knowledge and understands the need for further education                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | knows the limitations of his own knowledge and understands the need for further learning                                                                                                                                                                                                                                                                                                                                                                              | [SK8] observation of student's independent or team work                                                 |
| Learning outcomes               | [INFL3_U07] has the ability to select the type of database depending on the needs, create an adequate model and use it                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | is able to choose the type of database depending on the needs and create and use an adequate model                                                                                                                                                                                                                                                                                                                                                                    | [SU1] oral statement/conversation/discussion<br>[SU2] presentation/project/paper/report                 |
|                                 | <ul style="list-style-type: none"> <li>• Main concepts: data, database, database management system, properties of database systems.</li> <li>• Data modeling: entity relationship model, entity relationship diagrams, binary relationship classification, normalization.</li> <li>• Relational model: tables, relations vs. tables, relationship schemas, keys and other integrity constraints. Mapping the entity and relationship diagram into a relational model. Relational algebra: choice, projection, joins, set theoretic operations, aggregate functions. Calculus of tuples. Calculus of domains.</li> <li>• SQL: defining data, operating on data, performing relational algebra operations, nested queries, NULL values, perspectives.</li> <li>• Server-side programming, triggers. Client-side programming, access to a database via the Internet.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |
| Subject contents                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |
| Prerequisites and co-requisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                         |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Percentage of the final grade                                                                           |
|                                 | test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20.0%                                                                                                   |
|                                 | exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 40.0%                                                                                                   |
|                                 | project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20.0%                                                                                                   |
|                                 | test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20.0%                                                                                                   |
| Recommended reading             | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1. Richard Stones, Neil Matthew: Bazy danych i PostgreSQL. ISBN: 83-7197-650-X, Helion 2002.                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                         |
|                                 | Supplementary literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2. Eric Johnson, Joshua Jones Modelowanie danych w SQL Server 2005 i 2008. Przewodnik. Helion 2009.<br>3. R. Elmasri, S. Navathe, Fundamentals of Database Systems, Pearson 2007.<br>4. Judith S. Bowman, Sandra L. Emerson, Marcy Darnovsky: Podręcznik języka SQL. ISBN: 83-204-2596-4, Wydawnictwa Naukowo-Techniczne 2001.<br>5. C. J. Date, Wprowadzenie do systemów baz danych, WNT Warszawa, 2000.<br>6. J. D. Ulman. Systemy baz danych. WNT, Warszawa, 1988. |                                                                                                         |
|                                 | eResources addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Adresy na platformie eNauczanie:                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                         |

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| Example issues/<br>example questions/<br>tasks being completed | <p>What is the problem of deletion in the presence of a foreign key? What are the solutions?</p> <p>Give a few examples of the use of triggers.</p> <p>What problems can appear because of concurrent access to a database ?</p> |
| Work placement                                                 | Not applicable                                                                                                                                                                                                                   |

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