



## Subject card

|   |  |  |          |                                     |  |            |     |
|---|--|--|----------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Non-Relational Databases, PG_00047966  |  |          |                                     |  |            |     |
| Field of study                              | Informatics  |  |          |                                     |  |            |     |
| Date of commencement of studies             | October 2022   | Academic year of realisation of subject                  |          |                                     | 2025/2026  |            |     |
| Education level                             | first-cycle studies  | Subject group  |          |                                     | Optional subject group<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | Full-time studies  | Mode of delivery   |          |                                     | blended-learning   |            |     |
| Year of study                               | 4  | Language of instruction                                  |          |                                     | Polish   |            |     |
| Semester of study                           | 7  | ECTS credits   |          |                                     | 4.0  |            |     |
| Learning profile                            | general academic profile   | Assessment form  |          |                                     | exam   |            |     |
| Conducting unit                             | Department of Software Engineering -> Faculty of Electronics, Telecommunications and Informatics   |  |          |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   | dr inż. Grzegorz Gołaszewski                             |          |                                     |  |            |     |
|   | Teachers   | dr inż. Grzegorz Gołaszewski                             |          |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type  | Lecture  | Tutorial | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours  | 15.0   | 0.0      | 30.0                                | 0.0  | 0.0        | 45  |
|   | E-learning hours included: 15.0  |  |          |                                     |  |            |     |
| 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  | 45   |          | 4.0                                 |  | 51.0       | 100 |
| Subject objectives                          | The main goal is to introduce theoretical issues of NoSQL databases. Moreover, four types of NoSQL databases are presented. After this course students should be acknowledged with MongoDB, HBase, Oracle NoSQL and Neo4J. |  |          |                                     |  |            |     |

| Learning outcomes               | Course outcome   | Subject outcome   | Method of verification  |
|---------------------------------|--|---|---|
|                                 | [K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment | During the course students learn how to choose the appropriate database for specific business applications.   | [SU4] Assessment of ability to use methods and tools<br>[SU3] Assessment of ability to use knowledge gained from the subject<br>[SU2] Assessment of ability to analyse information<br>[SU1] Assessment of task fulfilment |
|                                 | [K6_W41] Knows and understands, to an advanced extent, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining   | During the course students learn models of data distribution: sharding and replication, and CAP and BASE theory.  | [SW1] Assessment of factual knowledge   |
|                                 | [K6_U41] can produce, test or evaluate software using modern programming platforms, tools, languages and paradigms of different levels, as well as use software packages supporting scientific and research processes as well as business decision-making processes and teamwork   | The student is able to assess the database design by checking the feasibility of queries.   | [SU4] Assessment of ability to use methods and tools<br>[SU1] Assessment of task fulfilment   |
|                                 | [K6_W42] Knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human cooperation with computers and computer-aided teamwork                     | W ramach przedmiotu studenci zapoznają się z modelami przetwarzania danych typu NoSQL: dokumentami, grafami, danymi o organizacji kolumnowej oraz struktur danych typu klucz-wartość. | [SW1] Assessment of factual knowledge   |
| Subject contents                | 1. Introduction to NoSQL databases<br><br>- types of NoSQL databases<br><br>- introduction to distributed databases<br><br>- CAP<br><br>- BASE<br><br>2. Document database - MongoDB<br><br>3. Hadoop, MapReduce and HBase as a column-oriented database<br><br>4. Key-value databases - Oracle NoSQL<br><br>5. Graph databases - Neo4J  |   |   |
| Prerequisites and co-requisites | 1. Knowledge of relational modeling<br><br>2. Very good knowledge of SQL language<br><br>3. Knowledge of OLTP  |   |   |

| Assessment methods and criteria                                | Subject passing criteria   | Passing threshold   | Percentage of the final grade |
|--|--|---|-------------------------------|
|  | Workshop tasks   | 50.0%   | 80.0%                         |
|  | Exam   | 50.0%   | 20.0%                         |
| Recommended reading  | Basic literature   | 1. Professional NoSQL, Shashanki Tiwari, Wiley, 2011.<br><br>2. MongoDB, The Definitive Guide, Kristina Chodorow, O'Reilly, 2013<br><br>3. Graph Databases: New Opportunities for Connected Data, Ian Robinson and Jim Webber, O'Reilly 2015. |                               |
|  | Supplementary literature   | Documentation of NoSQL databases.   |                               |
|  | eResources addresses   | Adresy na platformie eNauczanie:  |                               |
| Example issues/<br>example questions/<br>tasks being completed | 1. Model NoSQL database (of any type)<br><br>2. Define and execute queries<br><br>3. Simulate distribution of data |   |                               |
| Work placement   | Not applicable   |   |                               |