**DESCRIPTION OF A STUDY COURSE – SYLLABUS**

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| **Title of a course** | **Databases** | | | | |
| **Study programme** | **Professional undergraduate study Telematics** | | | | |
| **Status of a course** | Obligatory | | | | |
| **Year of study** | 2 | **Semester** | W | **ECTS credits** | 6 |
| **Goals of a course** | | | | | |
| Acquiring knowledge and competences on the procedures of conceptual and logical data modelling. Acquiring knowledge and competences on the processes of creating relational databases. Acquiring competencies in the application of SQL in managing structure and data in a relational database. | | | | | |
| **Conditions for enrolling course** | | | | | |
| No conditions | | | | | |
| **Learning outcomes on a level of a study programme which includes course** | | | | | |
| Outcome 4: Use computer principles and methods related to the architecture and organization of computers and computer networks.  Outcome 5: Use computer principles and methods related to programming languages, databases, and operating systems.  Outcome 6: Design and implement desktop, web and mobile computer applications and computer programs for microcomputers and microcontrollers, with or without a database.  Outcome 10: Analyse and implement an information system in the field of telematics.  Outcome 15: Participate in teamwork and independently present professional content in written and spoken form in Croatian and English. | | | | | |
| **Expected learning outcomes on a level of a course** | | | | | |
| 1. Explain concepts related to data modelling. 2. Identify and extract elements from a system description for the purpose of constructing a data model. 3. Apply the EV method to design a conceptual data model, construct a logical relational data model, and perform the normalization process. 4. Describe the physical structure of a database and explain the differences between a traditional file organization and the DBMS database organization. 5. Use SQL to manipulate the data and structure in databases. 6. Explain the process and distinguish database development steps. 7. Investigate some of the offered specific capabilities and applications of database systems, and present the results of research learning. | | | | | |
| **Content of a course** | | | | | |
| Theory of databases. Databases modelling using ER method. Notation types of ER model. The concept of functional interdependence. Interdependence in relational databases. The key of relational scheme. Entity integrity. External key. Referential integrity. “File sharing” and DBMS architecture of databases. Types of program systems for database users (standalone, client-server, web). Types of data (logical, physical). Redundancy, anomalies, decomposition. Normalization through decomposition and normal forms (1NF, 2NF, 3NF i BCNF). Codd's rules and outline of their application. Relational algebra, relational operators. Rissanen's principle of reversibility. Introduction into SQL. DDL, DML, DQL and DD. Joining relations: natural joining, external joining of relations. Horizontal division of relation (group by). Data integrity (referential integrity – cascade, restriction, zeroing). The right to access a database. | | | | | |