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OF THE
CURIOUS

CT60A4304 - BASICS OF DATABASE SYSTEMS

ABOUT THE COURSE

Lecture

Jiri Musto, D.Sc.

TABLE OF CONTENTS

GENERAL INFORMATION

- Lecturer: Jiri Musto
  - Doctoral researcher
  - Data and information quality, information systems, data mining, data analysis, relational databases, NoSQL databases, object-oriented programming, Android development, game development, web-development
- Teaching assistant: Harish Ramesh
- Lectures: 2h each week at campus, streamed online and recorded
- Exercises: 2h each week* at campus, online attendance possible
- *Amount of exercise hours can be increased if required

COURSE OBJECTIVES – FORMAL

- **Learning goals -** At the end of the course the student will be able to:
  - 1. Design and model relational databases
  - 2. Understand how the evolution of relational algebra led to SQL databases
  - 3. Model real world problems with ER and transform the ER model to relational databases
  - 4. Understand and solve issues related to relational database design, such as optimization and normalization
  - 5. Implement relational databases in practice and embed them in applications
- **Course content**
  - Database systems. Database design. Object-centric modeling and ER-modeling. Specifying relation models. SQL and object languages. Perspectives into database design: How database is designed, how information is modeled, and what are information storage structures and access methods. Transforming ER models to relation model, and then to relation databases. The use of different file formats in different environments. Perspectives to database programming: queries and other operations, database management, e.g. triggers. Implementing databases in practice and how to use SQL databases from other programs.

COURSE OBJECTIVES – INFORMAL

- **Learning goals -** At the end of the course the student will be able to:
  - Design a functional database. You are not expected to be experts in databases but you should be able to design a functional database for any project even if it is not the most optimal database.
  - Understand models and diagrams of databases, how to read and use them.
  - Able to use SQL to create, query, and modify relational databases. To improve your skills in SQL usage, you have to continuously use it just like any programming language.
  - Can implement and use a relational database in a program
- **Course content**
  - Databases in general, main focus on relational databases
  - Database design and modelling using ER-models
  - Structured Query Language (SQL): The language used to operate relational databases. SQL is the general language used but most database systems have their own unique twists to it

COURSE MATERIAL

- Lecture material
  - Slides
  - Lectures
- Exercise material
- Tools
  - SQLite
  - Python
  - Possible database management systems you can look into: PostgreSQL, SQL Server, MySQL
- Additional material

COURSE COMPLETION & EVALUATION

- No compulsory attendance
  - Lectures will be available online as a recording
  - Exercises are voluntary
- Grading is based on the following:
  - Assignments – 20 to 50 %
  - Project – 20 to 50 %
  - You need minimum of 41 % to pass the course, +88.5 % gets you 5
- There are assignments for each topic / week. Assignments are voluntary, but you need minimum 20 % to be eligible for a grade.
- Project will be a design & development work. Completion is mandatory.

HOMEWORK / ASSIGNMENTS

- Each topic has individual assignments
- Assignments are automatically tested and graded
  - By using Moodle plugins and specific activities
- Assignments count to maximum 50% of your grade
- Assignments are optional but you need minimum 20% from them to pass the course
- There are some harder assignments that give only one normal point and one extra point
  - Extra points can cover for other assignments

PROJECT

- Project description is available in Moodle
- Project is individual and mandatory
- Project parts
  1. Theoretical, design documentation.
     1. Design (description of the topic and limitations; ER-model and integrity rules and constraints)
     2. Transformation to a relational model
     3. Description of the program
  2. Practical implementation with SQLite and Python
  3. Peer-review
- Project counts to maximum of 50 % of your grade.
  - Minimum of 20 % is required to pass the course
  - Peer-review counts as 10 %

QUESTIONS, ISSUES, PROBLEMS?

Related to	Who to contact	How to contact
Grading, late returns	Jiri Musto, teacher in charge	Email
Grading, wrong grade	Jiri Musto, teacher in charge	Email
Lectures	Jiri Musto, teacher in charge	Email
Tool usage, installation, etc	Harish Ramesh, TA	Ask during exercise or email
Homework, need help, etc	Harish Ramesh, TA	Ask during exercise or email
Exercises	Harish Ramesh, TA	Ask during exercise or email
Project	Harish Ramesh, Jiri Musto if necessary	Ask during exercise or email
Topic not mentioned here	Jiri Musto by default	Email


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