Database Technology 7.5 credits D0018E

Databasteknik

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2021-02-17

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Database Technology 7.5 credits D0018E

Databasteknik

First cycle, D0018E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Datalogi	Computer Technology

Main field of study

Digital Curation

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and courses of at least 60 credits at first cycle including the following knowledge/courses: Basic knowledge about object-oriented programming (D0010E Object-oriented Programming and Design), data structures and algorithms (D0012E Algorithms and Data Structures or D0041D Data Structures and algorithms).

Selection

The selection is based on 1-165 credits.

Course Aim

After completing the course the student shall be able to show knowledge and skills as follows:

- Knowledge on established methods and theories for database design.
- Ability to creatively and critically model, formulate and implement a database schema using various methods and tools for data modelling and schema design.
- Ability to use query languages.
- Knowledge on the internal architecture of a database management system (DBMS) for concurrent operation by multiple users with high performance and trust.
- Ability to evaluate and analyze trade-offs (pros and cons) of different types of database systems such as relational databased, key-value stores, document databases, graph databases and time-series databases.
- Ability to carry out agile development of a small web-based application including a database back-end.
- Ability to judge societal and ethical aspects related to database systems.

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Contents

You will acquire knowledge on databases and persistent data storage in a system perspective. You will get insights in relational databases including strengths and weaknesses. You will learn to identify requirements and roles in order to design an appropriate database schema.

You will get an overview of other kinds of databases (e.g., key-value, document, graph, time-series) and understand some major trade-offs on their strengths and weaknesses. You will learn to identify application requirements that are relevant to make the right choice of database in your solution.

You will practice agile development in a small group of people by developing a complete system from a high-level problem specification where you will define objectives, user roles and requirements.

Theoretical content: System architectures, database theory, methods for conceptual and logical data modelling, relational algebra, query languages, ER/EER modelling, functional dependencies, normalization, data storage and indexing, transactions execution, criteria for data modification (e.g., Atomic, Consistent, Isolated, Durable), criteria for distributed databases, methods for increased performance and availability, fail-over, transaction/command logs, database programming.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

Teaching and learning activities include scheduled (live) classes, labs, and quizzes. Recorded classes will be provided to registered participants. During scheduled labs, supervisors will be available (e.g., online). At other times correspondence is in the course room or by email.

One large lab assignment is carried out in small groups of students. It is problem oriented and defined only at a high level in order to practice agile development (SCRUM) in a small project, according to CDIO (Conceive-Design-Implement-Operate). It is your task to conceive the solution by specifying objectives, user roles, requirements, etc. You must design your solution, plan the implementation and demonstrate how it is operated at each sprint review, where sprints have 1-2 weeks duration. At every sprint review, status and plans in your report will be covered, and a small demo will be run. You will maintain a backlog of identified and prioritized tasks. At the sprint review, your lab supervisor will provide feed-back and feed-forward. Your final result should be part of your portfolio as a demo and a report written for a third party.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Assessment in carried out by lab reporting, written exam and quizzes. Each part has a weight in the online course room. To pass the course, it is necessary to pass both lab and written exam (while the results on quizzes are only weighted into the final grade). The course grade on the scale U 3 4 5 is given by the weighted results of the parts. Note therefore that the grade on the written exam may differ from the total course grade.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Laboratory work	U G#	3	Mandatory	A12	
0003	Written exam	G U 3 4 5	4.5	Mandatory	A21	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Jonny Johansson, HUL SRT 2021-02-17

Syllabus established

by Jonny Johansson, HUL SRT 2012-03-14

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