UNIVERSITY OF GOTHENBURG

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DIT032 Data Management, 7.5 credits

Systematisk Datahantering, 7,5 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Computer Science and Engineering on 2017-01-05 and was last revised on 2019-02-07 to be valid from 2020-01-20, spring semester of 2020.

Field of education: Science 100%
Department: Department of Computer Science and Engineering

Position in the educational system

The course is a compulsory course in the N1SOF Software Engineering and Management Bachelor's Programme. The course is also a single subject course at the University of Gothenburg.

The course can be part of the following programmes: 1) Applied Data Science Master's Programme (N2ADS), 2) Software Engineering and Management Bachelor's Programme (N1SOF) and 3) Software Engineering and Management, Bachelor's Programme (N1SEM)

Main field of studies	*Specialization*
Software Engineering	G1N, First cycle, has only upper-secondary level entry requirements

Entry requirements

General entrance requirements for university studies and the Swedish upper secondary courses English B, Mathematics C or English 6, Mathematics 3b/3c or equivalent.

Learning outcomes

On successful completion of the course the student will be able to:

Knowledge and understanding

- explain the differences between data, information and knowledge
- explain basic concepts: relational data model, non-relational data model, entity-relationship model, relational database design, relational algebra and the database language SQL
- explain the ideas of distributed and NoSQL databases, and contrast them to the relational model

Competence and skills

- construct an algorithm for querying and filtering data based on predefined criteria
- manage the process of collecting and representing data in a database
- build a data model (entity-relationship model)
- create database tables, and formulate database queries in SQL
- experiment with data technologies such as big data and open data
- manage and query NoSQL database systems

Judgement and approach

- assess the quality of data and correctness of data models
- evaluate the applicability of data management techniques for a given purpose, especially with respect to comparing monolithic and distributed, and relational and NoSQL database management systems

Course content

The course introduces the student to the role of data, information, and knowledge in software engineering. The course has two general themes: (1) fundamental concepts related to data in software engineering; (2) basic principles of database systems as seen by users, application programmers and database administrators.

The course introduces concepts and techniques related to working with data, information and knowledge, although the focus is mostly on data and information. Techniques related to extraction, representation, modeling, and access , and visualization of data are discussed.

The course then introduces the role of databases and database management systems, covering topics such as algebra and the relational database, logical and physical design of databases, and the use of SQL. This includes programming in SQL, from the perspective of a user querying or modifying an existing database, by a database designer, and by an application programmer invoking SQL from a host language. Further, the student learns to query NoSQL databases, and contrast them to the relational model. The course also covers different data models such as XML, RDF, and JSON.

Sub-courses

1. **Written exam** *(Tentamen),* 4.5 credits
   Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)
2. **Assignments** *(Inlämningsuppgifter),* 3 credits
   Grading scale: Pass (G) and Fail (U)

Form of teaching

The teaching consists of lectures, group work, exercises, as well as supervision in connection to the exercises.

Language of instruction: English

Assessment

The course is examined by an individual written exam carried out in an examination hall at the end of course and written assignments normally carried out in groups of 2–3 students.

The sub-course assignments is examined on the basis of solutions to compulsory problems handed in during the course and on the basis of individual contribution to the group work.

The student is required to complete written self- and peer-assessment forms during the course which will be part of the assessment of the student's individual contribution to the project.

The sub-course Assignments is reexamined by individual assignments and an individual oral examination.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course was given.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
A Pass grade (G) for the entire course requires a Pass grade for all sub-courses.To be awarded Pass with Distinction (VG) for a full course, the student must, in addition, receive a VG on the sub-course written exam.

Course evaluation

The course is evaluated through a meeting after the course between teachers and student representatives. Further, an anonymous questionnaire is used to ensure written information. The outcome of the evaluations serves to improve the course by indicating which parts could be added, improved, changed or removed.

Additional information

The course is a joint course together with Chalmers.

Course literature to be announced the latest 8 weeks prior to the start of the course.