Advanced Data Models and Databases

Programme course

6 credits

Datamodeller och databaser, avancerad kurs

TDDD43

Valid from: 2017 Spring semester

Determined by
Board of Studies for Computer Science and Media Technology

Date determined
2017-01-25

Main field of study

Information Technology, Computer Science and Engineering, Computer Science

Course level

Second cycle

Advancement level

A1X

Course offered for

- Computer Science, Master's Programme
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Computer Science and Software Engineering, M Sc in Engineering
- Computer Science and Engineering, M Sc in Engineering
- Information Technology, M Sc in Engineering
- Computer Science, Master's programme

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Programming, Databases.

Intended learning outcomes

The increase of variation in modern data applications and in data sets available on the Internet puts higher and higher requirements on technology for information retrieval and storage. The aim of this course is to gain theoretical and practical knowledge about principles for storage and retrieval in text, semi-structured and structured data. The course also discusses alternative data models for databases, XML and NoSQL databases

and representation of semantic information, e.g. knowledge bases. After the completion of the course you should be able to:

- explain differences between text, semi-structured and structured data, data models and knowledge-based data; further, given a data set state advantages and disadvantages of search and storage techniques
- describe different algorithms for information retrieval in text
- describe the properties of semi-structured data and how it differs from text and traditional data models
- represent a given semi-structured data set using XML or RDF
- design, implement and use XML schema and the query language XQuery
- represent a given semi-structured data set using an object-oriented data model
- describe the main principles of NoSQL databases
- describe the main principles of knowledge bases
- design, implement and use a knowledge base represented using OWL
- describe methods and difficulties for data integration

Course content

- Information retrieval for text; Models, evaluation, query languages, query operations, text operations, indexing and search.
- Semi-structured data: representation of semi-structured data using XML and RDF.
- Data models: NoSQL and XML databases, XQuery, XML Schema, RDF.
- Knowledge bases: ontologies, description logics, OWL, query languages and knowledge deduction for knowledge bases.
- Data integration.

Teaching and working methods

The course consists of lectures, laboratory work and a project. Lectures are devoted to theory and methodology, and give practical examples. During the laboratory work students work with a number of exercises that illustrate principles for the data models, algorithms and database models that are discussed during the lectures.

Examination

TEN1	Written examination	U, 3, 4, 5	3 credits
LAB1	Laboratory work	U, G	3 credits
UPG1	Voluntary assignment	U, G	0 credits

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Patrick Lambrix

Examiner

Patrick Lambrix

Course website and other links

http://www.ida.liu.se/~TDDD43/index.en.shtml

Education components

Preliminär schemalagd tid: 42 h
Rekommenderad självstudietid: 118 h

Course literature

Kompletterande litteratur

Artiklar

Articles

Övrigt

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.