Databases for Bioinformatics

Programme course

6 credits

Databaser för bioinformatik

TDDD74

Valid from: 2017 Spring semester

Determined by
Board of Studies for Chemistry, Biology
and Biotechnology

Date determined
2017-01-25

Replaced by
TDDE49

Main field of study

Biotechnology, Computer Science and Engineering

Course level

First cycle

Advancement level

G2X

Course offered for

- Engineering Biology, M Sc in Engineering
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Specific information

The course is not availble for exchange students

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

Basic programming course.

Intended learning outcomes

The aim of this course is to give a thorough introduction to the theoretical and practical issues underlying the design and implementation of modern biological database systems that are used in bioinformatics research.
After the completion of the course you should:

- understand and be able to use important terminology in text-based information management in a correct way.
- be able to design a data model using EER diagrams.
- be able to design and use a relational database.
- understand the theory behind the relational model and how this affects good design of databases.
- understand which file structures in the database management system can be used to implement a database system.
- know the basic principles for indexing a database.
- understand which problems can occur when several users use the database and solutions to this.
- understand how a database can guarantee persistence of data och how this is solved using recovery and back-up.
- understand which problems can occur when a user needs to integrate information from different databases and solutions to this.

Course content

Methods for storage of information: text, semi-structured data, data models, rules. Text: basic issues in information retrieval, conceptual models, file models, query mechanisms, ranking. Semi-structured data: conceptual model, query mechanisms. Data models: relational model, object-oriented model. Databases: General database management systems (DBMS). Methods for data modelling and database design. Physical database. Data structures for databases. Query language. Multiple user issues: transactions, concurrency control and recovery. Integration of biological databases.

Teaching and working methods

The course consists of lectures, laboratory work and a project. Some lectures are given in English. Lectures are devoted to theory and techniques. Database design and implementation techniques are practised in the laboratory work. During the project work a number of well-known biological databases are studied and a database system that integrates the information in these sources is implemented.

Examination

LAB1	Laboratory work and project	3 credits	U, G
TEN1	Written examination	3 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Advanced Data Models and Databases; data mining

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Patrick Lambrix

Examiner

José M Pena

Course website and other links

http://www.ida.liu.se/~TDDD74/

Education components

Preliminary scheduled hours: 46 h
Recommended self-study hours: 114 h

Course literature

Elmasri, R. and Navathe, S. B. Fundamentals of Database Systems, 3e, 4e, 5e eller
6e upplaga, Addison Wesley. OBS: Den 6e upplagans titel är: Database Systems -
Models, Languages, Design, and Application Programming. Artikelsamling 2015.

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.