School of Economics and Management

INFC20, Informatics: Advanced Database Systems, 7.5 credits
Informatik: Avancerade databassystem, 7,5 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Board of the Department of Informatics on 2013-09-20 and was last revised on 2024-09-18. The revised syllabus comes into effect 2025-03-15 and is valid from the autumn semester 2025.

General information

The course is optional within the Bachelor's Programme in Design of Information Systems. It is also given as a freestanding course.

Language of instruction: English

Main field of study	Specialisation
Informatics	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements
Information Systems	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Learning outcomes

On completion of the course, students shall have acquired increased understanding of advanced data modelling and schema design as well as of the theories and techniques of database systems. On the basis of these techniques and modern development tools, the student shall have increased their ability to model, plan and implement database systems.

Knowledge and understanding

To pass the course, the student must demonstrate knowledge of and understanding of

- techniques for optimising database searches
- different tools for database management

- problems and possibilities in database management, such as simultaneity, performance, dead-lock, dirty read and recovery management
- problems of working with different models for clients and servers
- principles for distributed databases
- normal forms and relations between data attributes
- normalisation of relationships and normalisation-related problems
- relational algebra as a basis for query languages
- criteria for sound database design and for design of the logical data model
- integrity rules in databases

Competence and skills

To pass the course, the student must demonstrate competence and skills individually or in groups to

- apply techniques for efficiently storing, retrieving, saving and recovering data
- implement advanced solutions for relational databases
- apply techniques for improving database performance with regard to the use of CPU and memory
- apply techniques for distributed databases
- develop and implement database triggers and stored procedures
- apply design and quality control of conceptual operational data models utilising different modelling notations
- transform an operational data model to a different implementation-oriented data model
- use advanced search operations and other database operations

Judgement and approach

To pass the course, the student must demonstrate the ability to

- evaluate database models designed according to different criteria
- evaluate data models designed according to different criteria

Course content

The following topics will be covered:

- problems of data modelling and transformation of data models
- the relational model and relational algebra
- higher normal forms and problems connected to decomposition in normalisation
- advanced SQL (Structured Query Language)
- techniques for securing database integrity
- storage of data in markup language formats
- transaction management

- restoration of transactions
- recovery of data
- distributed databases
- stored procedures, functions and triggers
- optimisation of database systems
- client programming for database systems
- object-relation mapping

Course design

The teaching consists of lectures, lessons, laboratory sessions and supervision.

Assessment

The assessment is based on an on-campus written exam, case and assignments.

Re-examinations are offered in close conjunction with the first examination.

The test and course grades are determined by the course examiner. The examiner is entitled to change the grades given by the teachers on the course if this does not violate Chapter 6, Section 24 of the Higher Education Ordinance (1993:100).

Academic misconduct such as cheating, plagiarism, fabrication and falsification is considered a serious offence in higher education (see Chapter 10 of the Higher Education Ordinance). The disciplinary measures that may be taken as a result of such offences are caution or suspension for a limited period of time from the university (and all the faculties of the university).

Examinations

- On-Campus Written Exam, 4.5 cr, grading scale: U-A, individual examination
- Case, 2.0 cr, grading scale: U-G, group examination
- Assignments, 1.0 cr, grading scale: U-G, group examination

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Grades

Grading scale includes the grades: U=Fail, E=Sufficient, D=Satisfactory, C=Good, B=Very Good, A=Excellent

Grade (Definition) Points or percentage out of maximum points. Characteristic.

A (Excellent) 85-100. A distinguished result that is excellent with regard to theoretical depth, practical relevance, analytical ability and independent thought.

B (Very good) 75-84. A very good result with regard to theoretical depth, practical relevance, analytical ability and independent thought.

C (Good) 65-74. The result is of a good standard with regard to theoretical depth, practical relevance, analytical ability and independent thought and lives up to expectations.

D (Satisfactory) 55-64. The result is of a satisfactory standard with regard to theoretical depth, practical relevance, analytical ability and independent thought.

E (Sufficient) 50-54. The result satisfies the minimum requirements with regard to theoretical depth, practical relevance, analytical ability and independent thought, but not more.

U (Fail) 0-49. The result does not meet the minimum requirements with regard to theoretical depth, practical relevance, analytical ability and independent thought.

To pass the course, the student must have been awarded the grade of E or higher.

Grading rules and definitions

Examination grades

Examinations are graded according to the grading scale U-A or the grading scale U-G (Fail-Pass).

Course grade

A passing grade on all examinations is required to pass the course.

1. For each examination with the grading scale U-A, the obtained points are multiplied by the number of credits for the examination. Grades without points are converted as follows: A = 92, B = 80, C = 70, D = 60, E = 52.
2. The products of the included examinations are summed up and divided by the total number of credits of the included examinations.
3. This results in a weighted average which determines the course grade. 85–100 gives the grade A, 75-84 gives the grade B, 65-74 gives the grade C, 55–64 gives the grade D, 50–54 gives the grade E.

Examinations with the grading scale U-G are not included in the calculation of the course grade.

Entry requirements

Admission to the course requires general requirements and English 6 as well as the courses: "Informatics: Introduction to Information Systems, 1-30 cr" and "Informatics: Information Systems and Business Development, 31-60 cr" or the equivalent.

An exception for the general entry requirement in Swedish will be granted when the course is given in English.

Further information

It is compulsory to attend the introduction meeting, where a roll call will be taken. Absence without notification means that the admitted student will lose their seat on the course.

For transitional provisions with regard to previous courses, please contact the study advisor for an individual assessment.

If the course is discontinued, there may be limited opportunities for re-examination. Please contact the study advisor for information.