



Course and Examination Fact Sheet: Spring Semester 2022

6,274: Data Handling: Databases

ECTS credits: 3

Overview examination/s

(binding regulations see below)

Decentral - examination paper written at home (individual) (75%)

Examination time: term time

Decentral - Active participation (25%)

Examination time: term time

Attached courses

Timetable -- Language -- Lecturer

[6,274,1.00 Data Handling: Databases](#) -- Englisch -- [Grossniklaus Michael](#)

Course information

Course prerequisites

- **Mathematics:** algebra, discrete mathematics, statistics
- **Computer Science:** elementary programming skills

Learning objectives

The goal of this course is to learn the database programming language SQL. SQL is the standard programming language for relational database systems, the most used database systems in practice. SQL can be used to manage databases, to manipulate data in the database, and to specify queries that process and analyze the data.

Course content

This course teaches students the practical skills required to use database systems to manage and process large data sets.

In the introductory part, students will learn two different ways to create a database: a forward-engineering approach that uses conceptual modelling to design a database schema and a reverse-engineering approach that uses normalization to construct a database schema from existing data.

In the main part, the course will teach students how to program using the database language SQL. Apart from covering basic functionality of SQL such as setting up and configuring databases as well as data manipulation, i.e., inserting, updating, and deleting data, the course provides an in-depth into the use of SQL as a database query language.

The course will feature six practical exercises that will enable students to apply their knowledge by going through the process of setting up and querying their own database. These practical exercises will be based on the open-source database management system PostgreSQL, which students will install on their own computers as it is available for many operating systems and platforms.

The take-home exam will take the form of a database development project that students complete individually.

Course structure and indications of the learning and teaching design

Part I: Introduction

- Course Overview
- The Relational Data Model



- Database Design
 - Forward-Engineering Approach using the ER Model
 - Reverse-Engineering Approach using normal forms and normalization

Part II: Basic SQL

- Basic queries (SELECT... FROM... WHERE...)
- Join queries
- Duplicate elimination
- Non-monotonic queries
- Nested queries

Part III: Advanced SQL

- Aggregation functions
- Grouping and sorting
- Recursive queries
- Triggers
- Data manipulation and database management

The course will be taught based on an extensive slide deck that will also be provided to students as a replacement for a textbook. Apart from the slide presentation, the course will feature interactive elements such as small in-class assignments and six longer practical exercises.

Course literature

- Alfons Kemper und André Eickler: Datenbanksysteme: Eine Einführung (9. Auflage), 2013
- Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems (3rd Edition), McGraw-Hill, 2002

Additional course information

In the case of the President's Board having to implement new directives due to the SARS-CoV-2 pandemic in SpS2022, the course information listed above will be changed as follows:

- The course is conducted online via the platform Zoom;
- The lecturer informs via StudyNet on the changed implementation modalities of the course.

The examination information listed below would be changed as follows:

- There are no changes necessary to the examination information.

Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form

Decentral - examination paper written at home (individual) (75%)

Examination time: term time

Remark

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Examination-aid rule

Term papers

Written work must be written without outside help according to the known citation standards, and a declaration of authorship must be attached, which is available as a template on the StudentWeb.



Documentation (quotations, bibliography, etc.) must be carried out universally and consistently according to the requirements of the chosen/specified citation standard such as e.g. APA or MLA.

The legal standard is recommended for legal work (cf. by way of example: FORSTMOSER, P., OGOREK R., SCHINDLER B., Juristisches Arbeiten: Eine Anleitung für Studierende (the latest edition in each case), or according to the recommendations of the Law School).

The reference sources of information (paraphrases, quotations, etc.) that has been taken over literally or in the sense of the original text must be integrated into the text in accordance with the requirements of the citation standard used. Informative and bibliographical notes must be included as footnotes (recommendations and standards e.g. in METZGER, C., Lern- und Arbeitsstrategien (latest edition)).

For all written work at the University of St.Gallen, the indication of page numbers is mandatory, regardless of the standard chosen. Where page numbers are missing in sources, the precise designation must be made differently: chapter or section title, section number, article, etc.

Supplementary aids

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Examination languages

Question language: English

Answer language: English

2. Examination sub part (2/2)

Examination time and form

Decentral - Active participation (25%)

Examination time: term time

Remark

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Examination-aid rule

Active classroom participation

In the "Active classroom participation" examination form, regular participation in class is assessed.

The assessment criteria can be as follows:

- Requests to speak enrich the discussion (productive) / requests to speak disturb the discussion (counterproductive);
- Requests to speak are correct/requests to speak are incorrect;
- Requests to speak are frequent/average/rare;
- No requests to speak, but students follow the lesson/no requests to speak and students do not noticeably follow the lessons.

Supplementary aids

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Examination languages

Question language: English

Answer language: English

Examination content

The take-home exam will take the form of a database development project that students complete individually. Students will need to design and setup their own database in PostgreSQL. This database will then serve as the basis for the various SQL programming tasks that they will be asked to complete. As a consequence, the take-home exam covers all parts of the course.



Examination relevant literature

The slides used in the course is the mandatory basis for the examination.

Additionally, the following books provide supplementary reference.

- Alfons Kemper und André Eickler: Datenbanksysteme: Eine Einführung (9. Auflage), 2013
- Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems (3rd Edition), McGraw-Hill, 2002

Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are binding and takes precedence over other information, such as information on StudyNet (Canvas), on lecturers' websites and information in lectures etc.

Any references and links to third-party content within the fact sheet are only of a supplementary, informative nature and lie outside the area of responsibility of the University of St.Gallen.

Documents and materials are only relevant for central examinations if they are available by the end of the lecture period (CW21) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 12 are relevant for testing.

Binding nature of the fact sheets:

- Course information as well as examination date (organised centrally/decentrally) and form of examination: from bidding start in CW 04 (Thursday, 27 January 2022);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 12 (Monday, 21 March 2022);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 12 (Monday, 21 March 2022);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the registration period in CW 15 (Monday, 11 April 2022).