



Course and Examination Fact Sheet: Autumn Semester 2019

3,584: Mathematical Tools for Data Science

ECTS credits: 3

Overview examination/s

(binding regulations see below)

Central - Written examination (60%, 60 mins.)

Decentral - Group examination paper (all given the same grades) (40%)

Attached courses

Timetable -- Language -- Lecturer

[3,584,1.00 Mathematical Tools for Data Science](#) -- Englisch -- [Horlemann Anna-Lena](#)

Course information

Course prerequisites

Basic mathematical knowledge from the assessment level.

Course content

The idea of this course is to give a better understanding of the abstract mathematics that underlie many applied problems and procedures. For this, we will go through the basic mathematics of proving theorems, set theory, probability and measure theory, while illustrating the need for those with some applied examples. The participants will learn how to think, read and write like a mathematician, which will make them understand mathematically or technically advanced books and papers. This is especially helpful for those who aim at a more technically inclined master thesis/program.

Topics covered in this course are:

- Basic logic
- Proof by contradiction, proof by induction
- Set theory: operations on sets, countability, open sets, etc.
- Measures on sets, sigma algebras
- Probability theory based on measures

Course structure

There will be one class of two hours each week. The weekly homework exercises will complement the content learned in class.

Course literature

Lecture notes. Further literature recommendations will be given in class.

Additional course information

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Examination information

Examination sub part/s



1. Examination sub part (1/2)

Examination time and form

Central - Written examination (60%, 60 mins.)

Remark

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Examination-aid rule

Extended Closed Book

The use of aids is limited; any additional aids permitted are exhaustively listed under "Supplementary aids". Basically, the following is applicable:

- At such examinations, all the pocket calculators of the Texas Instruments TI-30 series and mono- or bilingual dictionaries (no subject-specific dictionaries) without hand-written notes are admissible. Any other pocket calculator models and any electronic dictionaries are inadmissible.
- In addition, any type of communication, as well as any electronic devices that can be programmed and are capable of communication such as notebooks, tablets, PDAs, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

Supplementary aids

1 sheet of A4 paper with arbitrary content (both sides may used, either hand- or computer-written)

Examination languages

Question language: English

Answer language: English

2. Examination sub part (2/2)

Examination time and form

Decentral - Group examination paper (all given the same grades) (40%)

Remark

Homework exercises

Examination-aid rule

Term papers

- Term papers must be written without anyone else's help and in accordance with the known quotation standards, and they must contain a declaration of authorship.
- The documentation of sources (quotations, bibliography) has to be done throughout and consistently in accordance with the APA or MLA standards. The indications of the sources of information taken over verbatim or in paraphrase (quotations) must be integrated into the text in accordance with the precepts of the applicable quotation standard, while informative and bibliographical notes must be added as footnotes (recommendations and standards can be found, for example, in METZGER, C. (2017), Lern- und Arbeitsstrategien (12th ed., Cornelsen Schweiz).
- For any work written at the HSG, the indication of the page numbers both according to the MLA and the APA standard is never optional.
- Where there are no page numbers in sources, precise references must be provided in a different way: titles of chapters or sections, section numbers, acts, scenes, verses, etc.
- For papers in law, the legal standard is recommended (by way of example, cf. FORSTMOSER, P., OGORÉK R. et SCHINDLER B. (2018), Juristisches Arbeiten: Eine Anleitung für Studierende (6. Auflage), Zürich: Schulthess, or the recommendations of the Law School).

Supplementary aids

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Examination languages

Question language: English

Answer language: English



Examination content

There will be weekly homework exercises that may be solved in groups of up to three participants.

In the final exam you will have to solve exercises similar to the homework exercises. Possible topics will be:

- Propositional and predicate logic
- Proof by contradiction, proof by contrapositive, proof by induction
- Set theory: operations on sets, countability, open sets, etc.
- Vector spaces, metric spaces, sigma algebras
- Measures
- Probability theory based on measures

Examination relevant literature

The lecture notes and homework solutions should give you all the information needed to prepare for the exam. Advanced mathematics books can be used for additional information.

Please note

Please note that this fact sheet alone is binding and has priority over any other information such as StudyNet (Canvas), personal databases or faculty members' websites and information provided in their lectures, etc.

Any possible references and links within the fact sheet to information provided by third parties are merely supplementary and informative in nature and are outside the University of St.Gallen's scope of responsibility and guarantee.

Documents and materials that have been submitted no later than the end of term time (CW51) are relevant to central examinations.

Binding nature of the fact sheet:

- Information about courses and examination time (central/decentral) and examination type starting from the beginning of the bidding on 22 August 2019
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for decentral examinations after the 4th semester week on 14 October 2019
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for central examinations as from the starting date for examination registration on 4 November 2019

Please consult the fact sheet again after these deadlines have expired.