



Course and Examination Fact Sheet: Autumn Semester 2019

7,300: Mathematics

ECTS credits: 4

Overview examination/s

(binding regulations see below)

Decentral - Written examination (100%, 90 mins.)

Attached courses

Timetable -- Language -- Lecturer

[7,300,1.00 Mathematics](#) -- Englisch -- [De Giorgi Enrico](#)

Course information

Course prerequisites

Topics of the assessment lectures "Mathematics A" and "Mathematics B" plus differential equations (cf. assessment book by Enrico De Giorgi) .

Course content

Quantitative methods provide the foundation for many of the theoretical advancements of modern economics. The course introduces mathematical tools and methods used in economic analysis. The lectures combine theoretical parts with exercises.

Content

I. Optimization and Sensitivity Analysis

- Implicit Function Theorem
- Optimization under Constraints
- Envelope Theorem
- Convex Optimization

II. Optimal Control

- Maximum Principle
- Transversality Conditions
- Current Value Hamiltonian

III. Selected Topics in Measure Theory

- Riemann-Stieltjes Integral
- Lebesgue Measures
- Measurability of Functions
- Lebesgue Integral

IV. Selected Topics in Probability theory



- Probability spaces
- Random variables
- Expectations

Course structure

Lectures and exercise sessions during the first 6 weeks of the semester.

Course literature

De Giorgi, Enrico (2019): Mathematics, Lecture Notes (slides).

Pre-requisite:

De Giorgi, Enrico (2017): "Mathematics", University of St.Gallen (the book covers all topics introduced at the Bachelor level at the University of St.Gallen).

Additional Literature:

Boyd, Stephen and Vandenberghe, Lieven (2004): Convex Optimization, Cambridge University Press.

Kamien, Morton I. and Schwarz, Nancy L. (1991): Dynamic Optimization, North-Holland. • Simon, Carl P. and Lawrence, Blume (1994): Mathematics for Economists, W.W. Norton and Company.

Durett, Rick (2010): Probability: Theory and Examples, Cambridge University Press, 2010.

Grimmett, Geoffrey and Stirzaker, David (2001): Probability and Random Processes. Oxford University Press.

Additional course information

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Examination information

Examination sub part/s

1. Examination sub part (1/1)

Examination time and form

Decentral - Written examination (100%, 90 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

No supplementary aids.

Examination languages

Question language: English

Answer language: English

Examination content

I. Optimization and Sensitivity Analysis

- Implicit Function Theorem
- Optimization under Constraints
- Envelope Theorem
- Convex Optimization

II. Optimal Control

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III. Selected Topics in Measure Theory

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IV. Selected Topics in Probability theory

- Probability spaces
- Random variables
- Expectations

Examination relevant literature

De Giorgi, Enrico (2017): Mathematics, Book, Fifth Edition.

De Giorgi, Enrico (2019): Lecture Notes (slides).



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.