



Course and Examination Fact Sheet: Autumn Semester 2022

5,255: Mathematics for Economists

ECTS credits: 6

Overview examination/s

(binding regulations see below)

Decentral - Written examination (with defined exam duration) (100%, 120 mins.)

Examination time: term time

Attached courses

Timetable -- Language -- Lecturer

[5,255,1.00 Mathematics for Economists](#) -- Englisch -- [Mahmoud Ola](#)

Course information

Course prerequisites

Assessment level Mathematics A and Mathematics B.

Learning objectives

- Students will learn new mathematical concepts.
- Students gain a clear understanding on how these concepts are applied in economics.

Course content

The knowledge gained in the Mathematics Assessment Level courses will be deepened with a particular view on economic applications. This course is especially useful for students studying Economics and for those intending to continue with a Master in Economics (MEcon) or the Master in Quantitative Economics and Finance (MiQE/F). New mathematical concepts will be introduced and examples of their economic applications will be illustrated.

The course covers the following topics:

- Topics in Mathematical Analysis
- Dynamic Systems and Stability
- Economic Optimization
- Probability Theory and Stochastic Processes

Course structure and indications of the learning and teaching design

The course consists of weekly lectures and exercise sessions.

Course literature

Mahmoud, O. (2022): Mathematics for Economists, Lecture notes on StudyNet (Canvas)

Selected chapters from *De Giorgi, E. (2019): Mathematics B, Sixth Edition.*

References, including academic journal articles, on relevant topics made available on StudyNet (Canvas).

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 (with defined exam duration) (100%, 120 mins.)

Examination time: term time

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, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

Supplementary aids

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Examination languages

Question language: English

Answer language: English

Examination content

Topics

Part I: Topics in Mathematical Analysis and Economic Optimization.

- Taylor polynomials in one and two variables, Taylor's Theorem
- Linear Algebra Review
- Quadratic forms and definite matrices
- Complex numbers
- Method of Lagrange multipliers for optimization problems with several constraints
- Implicit Function Theorem
- Envelope Theorem
- Nonlinear optimization with inequality constraints; Kuhn-Tucker Theorem
- Convex optimization

Part II: Dynamic Systems and Stability.

- Differential equations
- Systems of differential equations and stability

Part III: Probability Theory

- Foundations of probabilities
- Conditional probability and Bayes Theorem



- Random variables, conditional expectations, moment generating function, characteristic function
- Convergence, laws of large numbers, central limit theorem
- Stochastic processes: probabilistic characterization of a stochastic process, Markov processes, fair games and martingales, Brownian motion

Examination relevant literature

Mahmoud, O. (2022). Mathematics for Economists, Lecture notes on StudyNet (Canvas)

De Giorgi, E. (2019). Mathematics A, Sixth Edition (Chapter 5-Section 2, Chapter 10-Section 6)

De Giorgi, E. (2019). Mathematics B, Sixth Edition (Chapters 12,19,20,21)

References, including academic journal articles, on relevant topics as advertised on StudyNet (Canvas).

All materials will be made available on StudyNet (Canvas) before the final exam.

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 (CW51) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 42 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 34 (Thursday, 25 August 2022);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 17 October 2022);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 17 October 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 45 (Monday, 7 November 2022).