University of St.Gallen

Course and Examination Fact Sheet: Autumn Semester 2020

7,305: Statistics

ECTS credits: 4

Overview examination/s
(binding regulations see below)
Decentral - Oral examination (individual) (100%, 20 mins.)
Examination time: term time

Attached courses
Timetable -- Language -- Lecturer
7,305,1.00 Statistics -- Englisch -- Audrino Francesco

Course information

Course prerequisites
Bachelor level knowledge of Mathematics, Statistics, and Econometrics similar to the one gained in the Bachelor in Economics at the HSG (for example, having followed the course "3.222 Data Analytics I: Statistics").

Learning objectives
Students will learn how to deal with stochastic environments and will be able to work properly under conditions where uncertainty plays a major role. Moreover, students will identify and estimate key quantities (parameters) that drive the distributions of the relevant random variables under investigation.

Course content

Introductory course in Probability and Statistics for Master students.

The course will emphasize topics needed in the further study of economics, finance, and econometrics and will provide the needed quantitative preparation for the understanding and analysis of the different economic and financial applications taught in the later terms.

Course structure

1. **Main probability distributions employed in statistical modeling: the discrete case**

   - Discrete probability functions and distribution functions
   - Special discrete distributions
   - Relations among certain discrete distributions
   - Expectation and other moments
   - Multivariate discrete distributions
   - Moment generating function

2. **Main probability distributions employed in statistical modeling: the continuous case**
   - Probability density function and cumulative distribution function
   - Special continuous distributions
   - Expectation and other moments
   - Multivariate continuous distributions
   - Moment generating function
   - Distribution of functions of continuous random variables

       ○ Estimation of distribution functions and probability density functions: the empiric distribution function

3. **Point estimation**
   - The point estimation problem
   - The method of least squares
   - Maximum likelihood estimation
   - The method of moments

4. **Confidence sets and tests of hypothesis**
   - Excursus: The Central Limit Theorem
   - Confidence interval
   - Confidence set and its construction
   - Test of hypothesis

5. **The likelihood-ratio test and alternative "large-sample" equivalents of it**
   - Testing normal means and normal variances
   - The likelihood-ratio test
   - The chi-squared test

Course literature

Mandatory literature:

- F. Audrino, Lecture Notes, provided via Canvas at the beginning of the term.

Recommended literature:

- E.J. Dudewicz and S.N. Mishra, *Modern mathematical statistics*, Wiley, New York, 1988

Additional course information

Due to the current pandemic and the limits on the lecture rooms' capacity to maintain the proper social distancing measures in place, it is highly realistic that the class will be split into two groups and each group will alternate face-to-face teaching on Monday's and Tuesday's lectures. Sessions will be simultaneously broadcasted and recorded via Zoom in the cloud for the group of students not present in the classroom.

Wednesday's lectures will be taught online and recorded in the cloud via Zoom for all students.

In the case that this course is disrupted and/or discontinued due to the coronavirus pandemic, all classes will continue online via Zoom and will be recorded in the cloud. The oral examinations will be conducted online via Zoom.

The lecturer informs via Canvas (and email) on the changed implementation modalities of the course.

Examination information

Examination sub part/s

1. Examination sub part (1/1)

Examination time and form
Decentral - Oral examination (individual) (100%, 20 mins.)
Examination time: term time

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
None

Examination languages
Question language: English
Answer language: English

Examination content

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   - Distribution of functions of continuous random variables
   - Estimation of distribution functions and probability density functions: the empiric distribution function
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Examination relevant literature

- Lecture Notes (available on Canvas at the beginning of the teaching term).

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Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are is 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, 20 August 2020);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 12 October 2020);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 12 October 2020);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the registration period in CW 44 (Thursday, 29 October 2020).