STOCKHOLM UNIVERSITY
Department of Statistics
Spring 2020, period B

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Course Description for
Financial statistics, 7.5 credit points (ECTS), ST108G

CONTENTS OF THE COURSE

The course provides extended and in-depth knowledge of probability theory and statistical concepts and methods used in economic theory, especially those used in financial statistics.

The concepts discussed in more detail are: probability theory, probability distributions, inferences with decision theory, regression models, index theory, models of time series and forecasts, volatility, options and data management and statistical software.

The course consists of one unit that is examined in two parts:

Exam 1: Financial statistics theory, examination, written test; 6.0 ECTS

Exam 2: Financial statistics application, home assignment in working groups; 1.5 ECTS

Note that each exam/test is graded separately and independently. This means that you, if you pass on one test, are not required to re-take the test should you fail the other. E.g. if you have passed the home assignment but fail to pass the final exam, you will retain the corresponding credits and will not be required to do them again; you are only required to do those exams you have not passed.

LEARNING GOALS

For a passing grade the student must demonstrate ability to:

I. identify, solve and interpret problems in financial statistics

II. carry out statistical analysis of financial data using a statistical software package

COURSE LITERATURE AND OTHER TEACHING MATERIALS

Books

NCT: Newbold, P., Carlson, W. L. & Thorne, B. (2012). *Statistics for Business and Economics with MyMathLab Global XL*. 8th edition. Global edition. NJ.: Prentice Hall.

TLG: Thorburn, D., Larsson, R. & Gustafsson, O. (2018). *Course Compendium Financial Statistics*. Department of Statistics Stockholm University. Available on Athena.

Articles (available on Athena)

AS1: Jondeau, E., Poon, S.H. & Rockinger, M. (2007). Financial Modelling under Non-Gaussian Distributions, Springer, London. Sid 8-18.

AS2: Svetlozar, T.R., Höchstötter, M., Fabozzi, F.J. & Focardi, S.M. (2010). Probability and Statistics for Finance. Wiley, Hoboken. Sid 271-274.

AS3: Sheather, S.J. (2009). A Modern Approach to Regression with R. Springer, New York. Sid 45-50, 59-60, 62-68.

AS4: Chatterjee, S. & Simonoff, J.S. (2013) Handbook of Regression Analysis. Wiley, Hoboken. Sid 23-37.

AS5: Tsay, R.S. (2010) Analysis of Financial Time Series. Wiley, Hoboken. Sid 46-49, 60-61, 66-69, 76-78.

Additional course materials

Other course materials such as lecture notes, practice exams, instructions, etc. will be uploaded onto Athena at relevant times during the course. The teaching plan and reading list will also be made available on Athena when the course begins.

TEACHING FORMAT

Teaching consists of lectures (L1-L12), exercises (E1-E6) and computer exercises (CL1-CL3). See the teaching plan for a description of the teaching content and the reading list. A link to the full schedule is available on the course webpage.

A description of the lecture contents and reading instructions for the course literature is given in the *Reading Instructions* available at the latest when the course starts (see Athena). During the exercises E1-E5 we will solve a selection of different statistical problems. At the final session E6 we will review a selection of problems from one or more old exams. During the computer labs, the Stata software is introduced with focus on those parts that are necessary for the home assignment. To some extent, it will be possible to work with the assignment during the computer labs. Further information about the home assignment will be provided at the first computer lab, CL1.

COMPULSARY ATTENDANCE

Attendance at lectures, exercises and computer labs is optional. This implies that students can decide for themselves which lectures and exercises they wish to attend. However, though attendance is not a formal requirement for passing the course, the first lecture should be treated as compulsory. At this introductory lecture information about the course and the course structure will be given and you will be assigned to working groups for the home assignment, and your presence is strongly recommended. If you are unable to attend, contact the lecturer.

EXAMINATION AND GRADING

Students will be assessed based on the course's learning outcomes. Examination of the learning outcomes will be done through an individual written test (Exam 1), and well as a home-assignment done in working groups as a written report (Exam 2). Exam 1 is a written examination with the following seven-point scale:

A = Excellent,
B = Very Good,
C = Good,
D = Satisfactory,
E = Adequate,

Fx = Fail, inadequate
F = Fail, totally inadequate

Exam 2 is graded on a two-point scale where students can either receive a passing grade (G) or a failing grade (U).

Final grading on the course

- To pass the course, students must receive at least an E on the written examination (Exam 1) and must also pass the hand-in assignment (Exam 2). The final grade received for the course will then equal the grade on the written examination.
- Students who have not earned a passing grade on both exams will not receive a final grade.

Additional information

- Students who have received a passing grade on the written exam (at least an E) may not be re-examined for higher grades.
- Both Fx and F are failing grades and require re-examination on the written exam in order to pass the course. Students who receive the grade Fx cannot supplement for a passing grade.
- Students who have received an Fx or F on one exam are entitled to re-examination as long as the course is still given.
- Students who have received an Fx or F on the examination twice by the same examiner are entitled to request that a different examiner assess their examination. Such a request must be made in writing and sent to the head of the department (prefekt).
- If the course is cancelled, students are entitled to be examined once per semester in accordance with course syllabus for the following three semesters. Such a request must be made in writing and sent to the head of the department (prefekt).

DEADLINES AND EXAMINATION SCHEDULE

For each of the course's two exams, there will be two examination opportunities per semester.

Home assignment: (Exam 2)	Deadline: Wednesday, March 18th, 3 PM (kl. 15.00) Feedback given: Wednesday, March 25th Second deadline: Tuesday March 31st, 3 PM (kl. 15.00) Final assessment and return: by agreement with the exercise teacher

- If you miss the first deadline, you have a second chance to hand in the assignment (second deadline). The second deadline is thus equivalent to a second examination opportunity.
- If an assignment handed in by the first submission date fails, you have the opportunity to correct mistakes and hand in the assignment again by the second deadline.
- Feedback for assignments submitted at the second deadline should be available around 5-7 working days after the deadline. Check with your seminar teacher.

NOTE: Students who do not submit their assignment at the first deadline, and submit their reports for the first time by the second deadline, will not have the opportunity to revise and correct their reports.

Written examination:	**Friday March 20, 2020, 9:00 – 14:00** (kl. 9:00-14:00) Place and seating assignment to be announced, see the course schedule Results will be announced no later than Friday, April 10th, 4 PM.
Re-examination:	**Thursday April 23, 2020, 3 PM – 8 PM** (kl. 15:00-20:00) Place and seating assignment to be announced, see the course schedule Results will be announced no later than Thursday May 14, 4 PM.

NOTE: Remember to sign up for the examinations **at least one week before** it takes place. If you are a reregistered student with an older course code, you must contact the student expedition (expedition@stat.su.se) to sign up. If you forget to sign up for the examination, you may not take the exam, no exceptions.

DESCRIPTION OF EXAMS AND GRADING CRITERIA

Financial statistics application, home assignment, in working groups, 1.5 ECTS

The teaching goals examined are goals I and II. The exam is a written assignment that consists of two parts and is completed in groups, each group consisting of 2-4 students. The assignment is graded on a two-point scale where students can receive either a passing grade (G) or a failing grade (U). The grading criteria are described below:

Pass: The student has demonstrated sufficient ability to perform statistical analysis using available software, and the written assignment has been submitted before the deadline and in accordance with the assignment instructions.

Fail: The student has demonstrated insufficient ability to perform statistical analysis using statistical software, or the assignment has not been completed and/or submitted before the deadline.

If an assignment handed in by the first deadline fails, but the revised assignment that is handed in before the second deadline passes, the student will receive a passing grade (G).

NOTE: All parts of the home-assignment must be solved and approved during the current semester in order for the entire assignment to be approved. Partial results are not saved and cannot be transferred to future semesters.

Written test: Financial statistics theory, examination, 6.0 ECTS

The learning goal examined is mainly goal I and is examined with an individual written test.

Students can receive a maximum of 60 points, and a minimum of 30 points is required for a passing grade. The examination consists of two sections. A multiple-choice section where students are required to select one of five answer alternatives. The second section involves presenting detailed solutions to exam problems.

The examination is graded on a seven-point scale. To receive a passing grade, students must obtain an A, B, C, D or E, where A is the highest grade and E is the lowest passing grade. Grades F and Fx

are failing grades where F is lower than Fx. Students that receive a passing grade are not eligible for re-examination.

A: Excellent. The student has in a well-structured and correct manner solved and analyzed basic statistical problems that reflect the course material, furthermore the student has also presented the ability to solve problems that have not explicitly been explored in the course material. The student is also able to choose suitable methods for analysis and clearly motivate his or her choices. At least 54 points is required for an A.

B: Very good. The student has in a well-structured and correct manner solved and analyzed basic statistical problems that reflect the course material and that are directly explored in the course material. The student is also able to conduct a nuanced discussion regarding which conclusions he or she can draw from the statistical analysis. 48-53 points is required for a B

C: Good. The student has in a well-structured and correct manner solved and analyzed basic statistical problems that reflect most of the course material and that are directly explored in the course material. The student is also able to choose suitable methods for analysis and draw conclusions from, interpret and discuss the results of his or her analysis. 42-47 points is required for a C.

D: Satisfactory. The student has correctly solved and analyzed basic statistical problems that reflect most of the course material and that are directly explored in the course material. The students is able to draw conclusions from and interpret results. 36-41 points is required for a D.

E: Adequate. The student can, for the most part, present correct solutions and analysis to statistical problems that reflect enough of the course material and that are directly explored in the course material. The student is also able to interpret the results from his or her analysis. 30-35 points is required for an E.

Fx: Fail, inadequate. The student fulfils some but not all requirements for an E grade. 24-29 points will result in an Fx. Re-examination is required.

F: Fail, totally inadequate. The student has failed to demonstrate the ability to perform statistical analysis or solve basic problems in statistics which are directly discussed in the course material. 0-23 points will result in an F grade. Re-examination is required.

Approved tools and aids and cheating on the examination

The hand-in assignment is executed in groups. Naturally discussion and collaboration between group members is both necessary and encouraged. Note however that grades are set individually and can vary between group members, and that it is the individual's performance in the group work that is examined. Cooperation between groups is also allowed, however all groups must submit a unique report. Plagiarism of all types is prohibited, and **text matching software** may be used if needed.

The written examination is to be done individually. During the examination all forms of collaboration and discussion are prohibited. For this course, only calculators without stored text and data are allowed, other tools cannot be used during the exam. Mobile phones with calculator applications are not permitted. The booklet "Formula sheet and Statistical Distribution Tables" will be provided at the exam and should be returned when the student submits their exam. Special tools may, if necessary be allowed upon request and after approval of the examiner. Students who need special support and tools should contact the department's student counsellor as soon as possible, no later than 3 weeks before the exam. More information regarding examination regulations is available on the department and Stockholm University webpages.

Use of unauthorized means of assistance in examinations or in other ways attempts to mislead during exams or when study performance is to be otherwise assessed will be reported to the disciplinary board in accordance with university rules.

EXAMINER, TEACHERS AND GENERAL INFORMATION

Teacher	Reception Hours	Room	Email
Andriy Andreev – examiner, course co-ordinator	*On request*	B739	andriy.andreev@stat.su.se
Ulf Högnäs (prel.) – exercises & computer labs	*On request*	B759	ulf.hognas@stat.su.se
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The Department of Statistics is located on the 7th floor in the B building, Södra Husen, Frescati. More information about the department (student office, phone numbers, schedule, etc.) can be found on the department's webpage, www.statistics.su.se. Specific course information is typically made available on Athena and via e-mail during the course.