



## Course Description for Financial statistics, 7.5 credit points (ECTS), ST1701

### 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/distributions, inference, (log)-regression analysis, estimation of time series models and their use for forecasting, volatility, basics of options and data management using statistical software.

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

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

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

Note that each exam/test is graded separately and independently. This means that you are not required to re-take the test once passed, even if you fail the other. E.g. if you pass the home assignment but fail to pass the Exam 1, you will retain the corresponding 1.5 credits and will not be required to do the home assignment again. You are required to pass both exams in order to complete and get the grade for the whole course.

### 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 statistical software

### 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*. 8<sup>th</sup> or later 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 labs (CL1-CL4). See the teaching plan for a tentative 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 “R” 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 of 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. If you are unable to attend, contact the lecturer.

## **EXAMINATION AND GRADING**

Students’ knowledge is assessed based on their progress to understand and apply the course material. Examination of achieved level of the learning outcomes is conducted in form of individual written test (Exam 1), as well as a home-assignment done in working groups of three 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). Please note that all group members must be involved in every part of the group work and be able to answer for all parts of the assignment. Individual testing and grading within the group may occur. Discussion between groups is allowed but each group must produce its unique report.

### **Final grading on the course**

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

### **Additional information**

- Students do not receive their final grade for the course until they have earned a passing grade on both the written exam and on the home assignment.
- Students who have received a passing grade on the exam (at least an E) may not be re-examined for higher grades.
- Both Fx and F are failing grades and require re-examination in order to pass the course. Further, 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 no longer offered, 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.

<b>Home assignment:</b> (Exam 2)	Deadline: Monday, March 11th, 3 PM (kl. 15.00) Feedback given: before Friday, March 22nd Second deadline: TBD later but not later than March 27 <sup>th</sup> , 2024 Final assessment and return: by agreement with the exercise teacher
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- 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:** **March 15, 2024, 08:00 – 13:00**

**Written Exam**

Results will be announced in about 3 weeks after the exam date

**Re-examination:** **April 24<sup>th</sup>, 2024, 14:00 – 19:00**

Written Exam

Results will be announced in about 3 weeks after the exam date but possibly earlier

Link to the regulations of on-site exams at Stockholm University: [On-Sight-Exam-Regulations](#)  
Programs for detecting plagiarism or unauthorized of AI (ChatGPT-style) are used at the department.  
Read through the regulations that are currently enforced by Stockholm University:  
[Regulations Disciplinary](#)

**NOTE:** Remember to sign up for the examinations **at least 10 days before** it takes place. The sign up to exams is **open 30 days before the exam**. If you are a reregistered student with an older course code, you must contact the student expedition ([expedition@stat.su.se](mailto: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 (mostly, groups of 3 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 is 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).

The use of AI tools is permitted as an aid during the learning process but not to produce material for any kind of examination.

- Any type of plagiarism is prohibited which includes AI-generated text
- The use of AI tools for the improvement of an originally self-written text is not permitted
- Text matching software and AI-generated text detectors are used by the department

**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 teaching goals I&II are examined by an individual written test. The exam is expected to have two parts: one is computer based and another traditional pen-and-paper solutions.

Grading will be explained during lectures by showing samples of exams from previous years. Collaboration is not allowed. If there is suspicion that two or more students have collaborated, university rules require that examiner submits a report to disciplinary board.

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. The general grading requirements are below. More precise grading criteria are provided together with the exams.

- 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.
- 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.
- 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.
- 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.
- 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.
- Fx:** Fail, inadequate. The student fulfils some but not all requirements for an E grade. 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. Re-examination is required.

### **Approved tools and aids and cheating on the examination**

The hand-in assignment is solved 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.

Use of unauthorized means of assistance during 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 & lecturer & course coordinator	<i>On request but mostly after the lectures</i>		<a href="mailto:andriy.andreev@stat.su.se">andriy.andreev@stat.su.se</a>
Ralf Xhaferi – exercises & computer labs & Jour	<i>On request but mostly after Computer Labs and Exercise sessions</i>		<a href="mailto:ralf.xhaferi@stat.su.se">ralf.xhaferi@stat.su.se</a>

The Department of Statistics is located on the 6<sup>th</sup> floor in the 4th building, Campus Albano. More information about the department (student office, phone numbers, schedule, etc.) can be found on the department's webpage, [www.statistics.su.se](http://www.statistics.su.se). Specific course information is typically made available on Athena and via e-mail during the course.