



ISOM4530
Statistical Analysis of Financial Data in R
Fall Semester 2025

Course Outline

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Class Schedule and Location

Class	Tue	12:00 – 15:00	2503
Tutorial	Wed	12:00 – 13:00	6591

Prerequisites ISOM 2500 or equivalent

Course Description

This course intends to introduce the students to modern data analysis with an emphasis on financial applications. In this course, students will study the data exploration methods, applications of regression and time series, gain experience in analyzing financial data; and become proficient in using statistical software to do estimation, modeling, and forecasting.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

- ILO1: Apply data exploration techniques and implement regression and time series analysis to make predictions.
- ILO2: Demonstrate the ability to use R for estimation, modeling, and forecasting.
- ILO3: Be able to think critically and make effective decisions based on appropriate statistical data analysis.

Assessment and Grading

Assessment Task	Contribution to Overall Course grade	Details
Homework assignments	16%	See below for details
In-class exam 1	28%	September 30
In-class exam 2	28%	October 28
In-class exam 3	28%	November 25

Grading Rubrics

Grade	Short Description (Overall mark out of 100)	Explanation
A	Excellent Performance (>85)	Demonstrates a comprehensive grasp and understanding of fundamental statistical concepts for financial data, selection and application of appropriate descriptive and inferential methods in statistics, analysis of financial data, presentation and interpretation of results of the statistical analysis.
B	Good Performance (>70)	Shows a good knowledge of fundamental statistical concepts for financial data, selection and application of appropriate descriptive and inferential methods in statistics, analysis of financial data, presentation and interpretation of results of the statistical analysis.
C	Satisfactory Performance (>55)	Possesses an adequate understanding of fundamental statistical concepts for financial data, selection and application of appropriate descriptive and inferential methods in statistics, analysis of financial data, presentation and interpretation of results of the statistical analysis.
D	Marginal Pass (>40)	Has threshold knowledge of fundamental statistical concepts for financial data, selection and application of appropriate descriptive and inferential methods in statistics, analysis of financial data, presentation and interpretation of results of the statistical analysis.
F	Fail	Demonstrates a lack of fundamental statistical concepts for financial data, selection and application of appropriate descriptive and inferential methods in statistics, analysis of financial data, presentation and interpretation of results of the statistical analysis.

Course Materials and Recordings

- Class slides and other teaching materials are available on course Canvas.
- Reference Textbooks:
 - *Statistical analysis of financial data in R* by René A. Carmona (Springer-Verlag); accessible at <https://lbdiscover.ust.hk/bib/991012694823303412>
 - *Analysis of Financial Time Series* by Ruey S. Tsay (Wiley); accessible at <https://lbdiscover.ust.hk/bib/991012622507603412>
- Additional course material will be distributed through Canvas.
- Required software: **RStudio**
- I will record classes and post the recordings one week later. I don't take attendance regularly, but if I notice that attendance drops below 75%, I may decide to stop recording classes.

Homework

- There are weekly homework assignments, generally assigned on Wednesday and due on **Monday, at 23:59**, the following week.
- The purpose of these homework assignments is for you to learn and practice the material in class, which is why each homework assignment will be graded as “**pass**” or “**fail**”.
- Recognizing that making mistakes is part of the learning process, we will grade a homework assignment as “pass” if you demonstrate **substantial effort** in solving each of the problems in the homework assignments.
- Examples:
 - If you detail all the steps in your argument but reach a wrong conclusion because of a mistake you make, this counts as “pass”.
 - If you write down the correct answer (e.g., the final result) but do not provide any explanations, even though we ask you to, this counts as a “fail”.
 - If you only solve 5 out of 6 questions, this counts as “fail”.
- Fair play: part of the substantial effort criterion is that **you need to handwrite the solutions on paper**, unless otherwise stated. Afterwards please scan and upload your solutions to Canvas as a **single pdf file**.
- “Handwrite” means no typing on a computer and no photocopying. “Paper” means no tablet.
- Please keep all your handwritten homework papers until the end of the semester. I may ask you to show me your physical homework copies. Failure to produce them, for whatever reason, can lead to a “fail” in the corresponding homework assignment(s) ex post.
- A **late** or **missing** homework assignment counts as “fail”. Make sure to check out the lateness policy below.
- You get a “pass” or “fail” for each individual assignment that is due in one week or more after you join this class. Based on that, I will determine your total homework score for the course: it will be a full **16%** mark if you pass all individual homework assignments **except at most two**; for any additional failed assignment, your total homework score decreases by **4%**.

In-class Exams

- There will be 3 in-class exams, each accounting for 28% of your final grade.
- The exams take place in class at the times announced above.
- Quizzes and exams will be **closed-book with no aids whatsoever allowed**, except for a **non-programmable** calculator that **cannot access the internet**.

Marks

- Marks for homework assignments (pass/fail) and exams will be communicated via Canvas.
- If you have any questions about your marks, please contact the TA **within one week** of releasing the grades. We reserve the right to deny regrading requests after one week’s time.
- Regrading requests need to be substantiated and will be considered based on the merit of your own work only. In handling a regrading request, we consider the whole quiz/exam, not just a particular question. Marks can go up or down as a result of a regrading request.
- In the rare circumstance where we discover a grading error, we reserve the right to regrade all exams of the class. As a result, your marks can go up or down even if you have not made a regrading request. This is to ensure all marks are solely merit-based.

Course AI Policy

No restrictions on the use of the internet including generative AI for homework assignments. Use of generative AI or the internet is prohibited for in-class exams.

Lateness Policy

- If you submit homework late, for whatever reason, it counts as “fail”.
- Your homework submission counts as late if **Canvas flags it as late**. Canvas is very strict: If the deadline is 23:59, it might happen that it already flags it as late if you submit at 23:59:01.
- I have seen many reasons why students fail to submit on time: internet failure, falling asleep, forgetting the deadline, mixing up this with another course, traveling (time zone issues), “I submitted on time but Canvas still flags it as late”, “I submitted on Canvas but it didn’t work” (appears to happen often if you submit on your phone), “I had headache”, etc.
- Such reasons are already accounted for by the two exceptions you automatically receive. Remember: you can fail two homework assignments and still get a full mark on homework.
- The only circumstances under which I grant additional exceptions are severe illness (see below) and other extraordinary and documented circumstances of severe gravity (which will be handled case-by-case).

Sickness Policy

- If you miss any exam without prior approval, you will get **0%** for the exam.
- If you fall sick and as a result are going to miss an exam, notify me by e-mail or in person **beforehand** and provide a **same-day medical certificate**.

Questions & Contacting Us

- We operate a Q&A forum on Canvas under **Discussions**.
- If you have any **general interest questions** about the course, go to Canvas Discussions and check whether someone has already asked the same question. If not, post your question and we try to answer your question within 1 business day.
- General interest questions include questions about class material, questions about homework assignments or any question where the answer is beneficial to all students.
- If you have a **personal question**, send an e-mail to the TA first. He will handle your question and involve me, if necessary. This applies to, for example, questions regarding your homework/quiz/exam grading.
- If you have a personal question of high sensitivity, you are welcome to contact me directly via e-mail. Typical examples include severe illness, complaints, known absence from quizzes/exams or issues related to academic integrity.
- **Note:** Do not send me or the TA direct messages on Canvas. We won’t receive them.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST - Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Tentative Schedule

Week 1-4: Univariate and Multivariate Data Analysis

Week 5: In-class exam 1

Week 6-8: Parametric Regression

Week 9: In-class exam 2

Week 10-12: Time Series Models

Week 13: In-class exam 3

Note: There will be no class on October 7 (public holiday). Instead, there will be a 1h make-up class on October 8 during the time of the tutorial.