

ISOM4520 Statistics for Financial Risk Management Spring Semester 2025

Course Outline

Instructor	Carsten CHONG Assistant Professor Department of ISOM
Office Hours	By appointment
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Class Schedule and Location

Wed 9:00 - 12:00

Prerequisites ISOM3540, working command of R

Course Description

This course provides an introduction to financial risk management. Topics include how to measure market risks, statistical properties of returns and volatility, volatility modeling, value at risk and expected shortfall, historical simulation, option pricing, and credit risk. Students will learn how to use R to perform risk management tasks.

Intended Learning Outcomes (ILOs)

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

- ILO1: Understand theoretical concepts and methods in financial risk management, decide what risk management techniques are most appropriate to use in a given situation, and state their advantages and limitations.
- ILO2: Apply both descriptive and/or statistical methods to solve real problems in financial risk management, and interpret and present statistical results that are either self-produced or provided by others.
- ILO3: Make data-driven risk management decisions and communicate them.

LSK 4580

Assessment and Grading

Assessment Task	Contribution to Overall	Details	
	Course grade		
Homework assignments	10%	See below for details	
In-class quizzes	20% + 20%	See below for details	
In-class exam 1	25%	March 19	
In-class exam 2	25%	May 7	

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, selection and application of appropriate descriptive and inferential methods in Statistics, analysis of the data, presentation and interpretation of results of the statistical analysis.
В	Good Performance (>70)	Shows a good knowledge of fundamental statistical concepts, selection and application of appropriate descriptive and inferential methods in Statistics, analysis of the data, presentation and interpretation of results of the statistical analysis.
С	Satisfactory Performance (>55)	Possesses an adequate understanding of fundamental statistical concepts, selection and application of appropriate descriptive and inferential methods in Statistics, analysis of the data, presentation and interpretation of results of the statistical analysis.
D	Marginal Pass (>40)	Has threshold knowledge of fundamental statistical concepts, selection and application of appropriate descriptive and inferential methods in Statistics, analysis of the data, presentation and interpretation of results of the statistical analysis.
F	Fail	Demonstrates a lack of understanding of fundamental statistical concepts, insufficient knowledge in selection and application of appropriate descriptive and inferential methods in Statistics, and analysis of the data, and poor skills in presentation and interpretation of results of the statistical analysis.

Course Materials and Recordings

- Class slides and other teaching materials are available on course Canvas.
- Recommended Textbook: Peter F. Christoffersen., "Elements of Financial Risk Management", 2nd Edition.
- 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 **Tuesday**, **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**.
- 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).
- 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 10% mark if you pass all individual homework assignments **except at most two**; otherwise, your total homework score will be 0%.

Quizzes and Exams

- There will be two in-class quizzes, each accounting for 20% of your final grade.
- The quizzes will take place on Feb 26 and Apr 16.
- The in-class exams account for 25% of your final grade each.
- Date for the first in-class exam: March 19, 2025.
- Date for the second in-class exam: May 7, 2025
- Quizzes and exams will be closed-book with no aids whatsoever allowed, except for a nonprogrammable calculator that cannot access the internet.

Marks

- Marks for homework assignments (pass/fail), quizzes and exams will be communicated via Canvas, within one week for homework assignments and two weeks for everything else.
- 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. 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 quizzes and 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", mild illness, 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 of 10% on homework.
- The only circumstances under which I grant additional exceptions are severe illness (see below) and other extraordinary circumstances of severe gravity (which will be handled case-by-case).

Sickness Policy

- If you miss any quiz or exam without prior approval, you will get **0%** for the missed quiz/exam.
- If you fall sick and as a result are going to miss a quiz or an exam, notify me by e-mail or in person **beforehand** and provide a **same-day medical certificate**.
- I will not grant deadline extensions for homework submissions unless you are severely sick, which means that you are sick for three or more consecutive days as documented by a medical certificate. Remember: Mild sickness (for a day or two) is automatically accounted for by the two exceptions you receive.

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 email. 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 <u>Academic Integrity | HKUST - Academic Registry</u> for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Tentative Schedule

Module/Activity	Date	Chapters in Textbook
Module 0. Overview	Feb 5	1
Module 1. Return, Volatility, and Diversification	Feb 5, 12, 19	1,7
Quiz 1	Feb 26	
Module 2: Stochastic Volatility: Realized Variance	Feb 26	5
Module 3. Stochastic Volatility: GARCH	Mar 5, Mar 12	4
In-class exam 1	Mar 19	
Module 4. VaR, ES, Historical Simulation	Mar 19, 26	2
Module 5. Option Pricing I	Apr 9	10
Quiz 2	Apr 16	
Module 6. Option Pricing II	Apr 16, 23	11
Module 7. Credit Risk	Apr 30	12
In-class exam 2	May 7	