

The Hong Kong University of Science and Technology

RMBI/IPO

Offer Special Topic course, ISOM 4000E, in Fall 2025

Semester: Fall 2025

Course code: ISOM 4000E (1 credit)

Course title: Risk Management for Algo Trading

Abbreviated title:

Course instructor: Prof. Peter Wu

Target students: UG

Class quota: 50

Classroom needed: Yes/No

Grading requirement: Letter grades

Full description of the course

This course will examine various types of risks that impact algo trading nowadays, both buy side and sell side; for example, these risks can be further categorized into market risk, credit risk, counterparty risk, liquidity risks and etc. Furthermore, there are other non-financial risks to consider; like operational risks, regulatory/compliance risks, technology risk, cybersecurity/infosec risk and etc. This short course will provide an overview of these different types of risk and discuss a few real-life cases so that students can effectively analyze different types of risks and apply appropriate mitigations.

Algo Trading are increasingly a key force in secondary market trading. Its automated fashion and super high-speed post great challenges to the risk managers and regulators. In addition to risk managers, the demands for risk managements knowhow of algo developers, IT supports, managers and data scientists are increasing every day. While it is important to make money, but even more important is not to bankrupt the firm with a fat finger, software bug, hardware/network failure, improper release, or even a cyber-attack. A good financial services institution has the risk management culture and awareness ingrained in everyone's mind and reflect on everyday work.

In addition to the overviews of risks, we will also go over a few real-life cases of each type and discuss some possible mechanisms and remedies for prevention or damage controls. We will touch base on the risk dimensions and tradeoffs. Homework and Projects will be more deep-dive into each type of risks and proposing ways to prevent it. There will be a final presentation of each team and taking critics from others.

Students are expected to have basic knowledge about trading and asset classes and the derivatives. Basic understanding of market data, market structure and how algo trading works. I will go over the basic overview, but very quickly. These basic knowledges are available on the internet. I will also list a few books that you want a more in-depth study.

Course Intended Learning Outcomes (CILO)

- CILO – 1, knowledge development
- CILO – 2, potential solutions in various risk type and tradeoffs

- CILO – 3, presentation skills and handling of opposing views
- CILO – 4, critical thinking with creative solution

The critical skills in information gathering, analyzing data, communication, team work, conflict resolution and presentation will be developed. Our students learn to work individually as well as collaboratively in groups. Students will acquire additional tools such as algo trading basics, how to deal with different risk types via real-life cases and interactive team presentations.

This course will not have lab, but I intended to offer subsequent courses for students to practice in the lab environment to experience the causes and impacts of different risk types and effectiveness of preventions and remedies.

Assessment Items and Weighting

Assessment Task	Proportion of Final Grade (%)
Final tests	25%
Project report	20%
Presentation & Questions	30%
Course participation	25%
	100%

Course weekly topics and schedule

Class	Topics	Assignments
1	Introduction to Algo Trading, asset classes and basic market structure, different dimensions of a risk, prevention vs containment vs remedy	Trading knowledge on internet or from recommended readings below
2	Discuss Financial Risks and cases: market risk, credit risk, counterparty risk and liquidity risk. Form project teams and half of the teams will do projects for Financial Risks	Detailed reports on incidents, available on internet. Focus on the projects you are assigned
3	Discuss Non-Financial Risks and cases: operational risk, technology risk, regulatory/compliance risk, cybersecurity/infosec risk and etc. The second half of the teams will do projects for Non-Financial Risks	Detailed reports on incidents, available on internet. Focus on the projects you are assigned
4	Presentation on Financial Risks and cross-exam. Grades will not only be given to presenting teams, but also teams with good questions and points	Prepare your presentations and questions for other teams
5	Presentation on non-Financial Risks and cross-exam Final Exam for 30 min Final revised Project report is due in 2 weeks.	Prepare your presentations and questions for other teams. Prepare for final and revise your ppt to address feedbacks from others

Class participation

Class participation is an important element for final grade. Grade given to a student's participation is a careful and subjective assessment of the values of their inputs to the learning environment. Student's contributions to each class will be kept track, and these include (and not restricted to):

- Attend class on time
- Active participation in discussions
- Respond to general and individual questions
- Ask thoughtful and stimulating questions
- Contribute to background or perspectives on a topic that enhances discussion.
- Presentations – We will divide the class into multiple teams, each will have an assigned topic that students must prepare the presentation and anticipate questions and challenges from other students. Grade will be given on your presentation as well as the quality of the contents and Q&A. Bonus points will be given for creative thoughts and meaningful challenging questions.

The emphasis will be on the quality of contributions, rather than the frequency. Lack of preparation, unthoughtful comments, or improper in-class behaviors will deteriorate grades. Consistent attendance and active participation are very important.

References or readings

Most of the basic knowledge are readily available on the internet. But if you want for in-depth knowledge, here are some books you can read about.

- The Risk of Trading: Mastering the Most Important Element in Financial Speculation -by Michael Toma
- The Art of Risk Management - by Christopher Parsons
- Risk Management in Trading - by Davis Edwards
- Trading in the Zone: Master the Market with Confidence – by Mark Douglas
- Trading Risk: Enhanced Profitability Through Risk Control – by Kenneth L. Grant
- The Art and Science of Technical Analysis: Market Structure – by Adam Grimes
- Quantitative Trading: How to Build Your Own Algorithmic Trading Business – by Earnest P. Chan