THE UNIVERSITY OF HONG KONG

FACULTY OF BUSINESS AND ECONOMICS

FINA4341 – Quantitative Risk Management

Second Semester, 2022/2023

GENERAL INFORMATION

Instructor: Dr. Huiyan QIU

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Lecture: Semester 2, time and location to be determined

Pre-requisites: FINA3350 Mathematical Finance

Mutually exclusive: STAT4608 Market risk analysis

Tutor: to be determined

Course Website: MOODLE via HKU portal

COURSE DESCRIPTION

This course introduces concepts, techniques and framework for quantitative risk management at financial institutions. Financial firms, with their complicated list of positions in a mixture of instruments, are exposed to various sources of financial risk. This class focuses mainly on market risk, the risk of unexpected changes in prices and rates. The first part of the course introduces basic concepts in risk management and builds the toolkit for measuring risk quantitatively. The second part of the course is devoted to studying the widely accepted Value at Risk (VaR) systems, including calculations, back testing and flaws of VaR. The course also touches on other aspects of financial risk such as liquidity risk, credit risk and operational risk.

COURSE OBJECTIVES

1. To learn the general concept of risk and risk management and to understand the goal and benefit of risk management.
2. To learn the quantitative tools for measuring risk.
3. To understand the framework of Value-at-Risk and its limitation and flaws.
4. To understand the basics of credit risk, liquidity risk and operational risk.

FACULTY LEARNING GOALS

FLG1: Acquisition and internalization of knowledge of the programme discipline

FLG2: Application and integration of knowledge

FLG3: Inculcating professionalism

FLG4: Developing global outlook

FLG5: Mastering communication skills

FLG6: Cultivating leadership

COURSE LEARNING OUTCOMES

Course Learning Outcomes (CLOs)	Aligned Faculty Learning Goals (FLGs)

CLO1.	Learn the general concept of risk and risk management. Understand different sources of risk faced by financial institutions, how they manage risk internally and the related regulation requirement.	FLG 2, 3, 4, 5, 6
CLO2.	Acquire quantitative tools for measuring risk and know how to apply these techniques for hedging.	FLG 1, 2
CLO3.	Understand the framework of Value-at-Risk. Use both analytic and simulation approaches to estimate VaR for single derivatives and complicated portfolios. Understand the pros and cons of different VaR estimation methods. Know how to do back testing for VaR using historical data. Understand the limitation and flaws of VaR.	FLG 1, 2
CLO4.	Understand the basics of credit risk, liquidity risk and operational risk.	FLG 3, 4, 5

COURSE TEACHING AND LEARNING ACTIVITIES

Course Teaching and Learning Activities	Expected study hour	Study Load (% of study)
T&L1. Lectures	36 hours	30
T&L2. Assignments and project	36 hours	30
T&L3. Self-study	48 hours	40
Total	128 hours	100%

Assessment Methods	Weights	Aligned Course Learning Outcomes
A1. Attendance and Participation	5%	CLO 1, 2, 3, 4
A2. Individual Assignments	20%	CLO 1, 2, 3, 4
A3. Group Project	20%	CLO 1, 2, 3, 4
A4. Mid-term Examination	20%	CLO 1, 2, 3, 4
A5. Final Examination	35%	CLO 1, 2, 3, 4
Total	100%	

Coursework / Examination Ratio: 45   % /   55   %

No late submission of assignment or group project will be accepted.

There will be a mid-term exam and a comprehensive final exam to test students' breadth and depth of the understanding of the major concepts covered in the course and students' ability to integrate and apply this knowledge. No make-up midterm examination will be given. Students missing the midterm exam will receive 0 unless they obtain approval from instructor with convincing reasons and evidence prior to the exam. Approved students who have missed the midterm will have 90% of their final exam score as the midterm exam score.

STANDARDS FOR ASSESSMENT

Course Grade Descriptors

A+, A, A-	Exhibited high level of understanding of the course materials through excellent performance in class discussion, assignments, group project and exams.
B+, B, B-	Exhibited reasonably high level of understanding of the course materials through good performance in class discussion, assignments, group project and exams.
C+, C, C-	Exhibited fair level of understanding of the course materials.
D+, D	Exhibited limited level of understanding of the course materials.
F	Exhibited low level of understanding of the course materials.

Assessment Rubrics for Each Assessment

A1 In-Class and Tutorial Performance

A+ A A-	B+ B B-	C+ C C-	D+ D	F
Extremely well prepared for class discussion, very active in sharing views and attended almost all lectures and tutorials.	Partially prepared for class discussion, quite active in sharing views and attended most of the lectures and tutorials.	Not well prepared for class discussion, limited active in sharing views and attended many of the lectures and tutorials.	Not well prepared for class discussion, no sharing of views and attended some of the lectures and tutorials.	Poorly prepared for class discussion and no sharing of views and experience and rarely attended lectures and tutorials.

A2 Assignments: for numerical questions/homework

A+ A A-	B+ B B-	C+ C C-	D+ D	F
Submitted all homework with excellent accuracy.	Submitted well written homework with good accuracy.	Submitted homework with fair level accuracy.	Submitted homework with limited accuracy.	Poorly written homework or no submission.

A2 Assignments: for essay type problems and A3 Group Project

Grade	Depth and breadth of Coverage, critical elements, structure, language and conventions
A+,A, A-	All aspects were addressed and researched in great depth.
	Demonstrated a clear understanding of and the ability to apply the theory, concepts and issues relating to the topic.
	Clearly identified the most critical aspects of the task and adopted a critical perspective.
	Developed excellent argument and offered a logically consistent and well-articulated analysis and insight into the subject.
	Drew widely from the academic literature and elsewhere whilst maintaining relevance.
	All aspects conformed to a high academic / professional standard.
B+, B, B-	Most aspects were addressed and researched in depth.
	Demonstrated a good understanding and some application of the theory and issues relating to the topic.
	Identified critical aspects of the task and adopted a critical perspective.
	Showed some evidence of analysis, supported by logical argument and insight into the subject.
	Drew on relevant academic and other material.
	Most aspects conformed to a high academic / professional standard.
C+, C, C-	Most aspects were addressed and researched adequately.
	Demonstrated a good understanding of the theory, concepts and issues relating to the topic but limited application relating to the topic.
	Some presented argument showed some insight but not always consistent and logical.
	Drew upon an adequate range of academic and other material.
	Most aspects conformed to an acceptable academic / professional standard.
D+, D	Basic aspects were addressed and researched adequately. Demonstrated mainly description, showing basic understanding of the topic but no application.
	Showed little evidence of analysis but no clear and logical argument relating to the subject.

	Drew primarily upon course materials.
	Limited aspects conformed to academic / professional standards.
F	Basic aspects were superficial, inadequate or absent.
	Demonstrated limited understanding of the topic and drew conclusions unrelated to the topic.
	The written work was not of an academic / professional standard.

A4 and A5 Midterm and Final Exam

Midterm and final exam may include three types of questions: multiple choice, calculation problems, and essay questions. Multiple choice and calculation problems are graded according to the marks assigned to each question. Essay questions are graded according to the following criteria:

A+ A A-	B+ B B-	C+ C C-	D+ D	F
Idea development is insightful and sophisticated; Supporting evidence is convincing, accurate and detailed. Well written with clear focus.	Idea development is clear and thoughtful; Supporting evidence is sufficient and accurate. Well written.	Idea development is simplistic and lacking in relevance; Supporting evidence insufficient but accurate. Somewhat well written.	Idea development is superficial and ineffective; Supporting evidence is insufficient and inaccurate. Writing is unclear.	Idea development is absent; Supporting evidence is vague or missing. Poorly written.

COURSE CONTENT AND TENTATIVE TEACHING SCHEDULE

The following topics will be covered:

- Goal and Benefit of Risk Management
- Banks; Managing Risk Exposures
- Interest Rate Risk
- Value at Risk and Expected Shortfall
- Volatility
- Market Risk VaR: Model Based Approach
- Market Risk VaR: Historical Simulation Approach
- Regulations

The tentative teaching outline will be available on the course Moodle page.

REQUIRED/RECOMMENDED READINGS & ONLINE MATERIALS

Textbook:

John. C. Hull. Risk Management and Financial Institutions. Wiley Finance

Useful references:

1. Philippe Jorion. Value at Risk, the new benchmark for managing financial risk. McGraw Hill.
2. Michael B. Miller. Quantitative Financial Risk Management. Wiley Finance
3. John C. Hull. Options, Futures, and other derivatives. Pearson

MEANS/PROCESSES FOR STUDENT FEEDBACK ON COURSE

- Conducting the Student Evaluation of Teaching and Learning (SETL) around the end of the semester
- Using Discussion Forum in the course Moodle to seek for students' feedback throughout the semester

COURSE POLICY

Class Conduct

Students are required to attend all classes on time. If you miss a class, it is entirely your responsibility for what you have missed. In case you have to leave the class early, please inform the instructor beforehand and leave quietly.

No use of mobile phone or chatting is allowed when the class is in session. Remember to turn off or mute the phone before each session. The instructor has the discretion to give penalty in case of class misconduct.

Respect your instructors and your fellow students. Be considerate to others.

Academic Dishonesty

The University Regulations on academic dishonesty will be strictly enforced! Please check the University Statement on plagiarism on the web: http://www.hku.hk/plagiarism/

Academic dishonesty is any act that misrepresents a person's own academic work or that compromises the academic work of another. It includes (but not limited to) cheating on assignments or examinations; plagiarizing, i.e., representing someone else's ideas as if they are one's own; sabotaging another's work.

If you are caught in an act of academic dishonesty or misconduct, you will receive an "F" grade for the subject. The relevant Board of Examiners may impose other penalty in relation to the seriousness of the offense.

ADDITIONAL COURSE INFORMATION

- Announcements, assignments, and lecture slides will be posted on the course MOODLE website. Hard copy of lecture notes will not be provided except for the first two sessions.
- No late assignment submission will be accepted.