Syllabus
BT4016: Risk Analytics for Financial Services
National University of Singapore, School of Computing
2024/2025 Semester 2

Assistant Professor Freddy Lim

Office: COM2-04-37
Email: freddy@nus.edu.sg
Office hours: Thursdays, 11am – 12pm, LT12, or by email appointment

Classes: Thursdays, 12pm – 2pm, LT12
Final exam: 7 May 2025, 1pm – 3pm (always check official schedule for latest updates)
Tutorials and instructors: COM4-02-02

1. Tutorial Group 1, Thursdays, 2pm – 3pm, Sun Yichen (yc.sun@nus.edu.sg)
2. Tutorial Group 2, Thursdays, 3pm – 4pm, Sun Yichen
3. Tutorial Group 3, Thursdays, 4pm – 5pm, Sun Yichen
4. Tutorial Group 4, Fridays, 11am – 12pm, Freddy Lim

Assignment grader: Wang Qianyi (e0492489@u.nus.edu)

Prerequisites:
Foundation courses in probability, statistics, and calculus.

Course materials:

1. Main text (*Hull*): John Hull, Risk Management and Financial Institutions, 6th edition
2. Supplementary text (*BKM*): Zvi Bodie, Alex Kane, Alan Marcus, Investments, 13th edition
3. Course project case study: Silicon Valley Bank The Role of Risk (Mis)Management

Course description:
This course covers the fundamentals of risk management in financial institutions. The course will begin with an introduction to financial markets and a general framework for modeling risk and return tradeoffs. We then cover 4 major topics: interest rate risk, value at risk/expected shortfall, derivatives risk, and credit risk. We will mainly follow John Hull's text. This is a popular text for advanced undergraduates, graduates, practitioners, and candidates for the FRM industry certification.

This course assumes no finance background, but requires foundation courses in probability, statistics, and calculus. There may also be some coding involved. This is an introductory class to financial risk management, and we will cover a carefully curated set of fundamental concepts. We will aim for a deep and intuitive understanding of these concepts so that students can go on to more advanced classes with a good foundation.

Course grading:

1. Participation (5%)
   You will get participation scores if you complete short course surveys that are sent out during the semester. These surveys will help me to improve the course.

2. Assignments (30%)
   There will be 9 individual assignments in this course. Each assignment corresponds to a class topic, and are due before the start of the following class. The assignments are meant to incentivize and encourage consistent work, so that you don't fall behind on the content. As such, grading will be mainly based on effort – if you put in good effort to write up the assignments, you will get good scores.

   You can either handwrite or type up your answers. If you handwrite, you must ensure that it is neat and legible, otherwise points will be deducted.

   I will drop your 3 lowest assignment scores, i.e. only your best 6 out of 9 assignments count. This will account for any unforeseen circumstances that may result in you missing work for a couple of weeks.

3. Course project (35%)
   The course project is done in groups of 4. Groups must submit a **typed** PDF report before the start of class in the final Week 13. Groups will read a risk management case study, and answer the questions posted. More details will be provided in a separate course project document.

4. Final exam (30%)
   The final exam is an open-book, written paper exam. Only calculators are allowed; all other electronic computing devices are prohibited.

Honor code:

All university level codes of conduct apply. Most of it is just common sense – do not cheat or plagiarize. Any violations will be escalated to university administration and will be dealt with harshly.

Use of AI:

There are no restrictions on the use of AI tools in this class. I encourage you to make use of AI tools responsibly to enable a smoother learning experience and to help you succeed. However, take note that the final exam is still a written assessment. Therefore, simply using AI tools to do your assignments is setting yourself up for failure.

You may also use the assistance of AI tools to help in the course project report. This is no different from what you will do in your future work, in which you may routinely use AI tools to help draft and polish reports. **However, take note that you still own every single word of the final report, and all its potential errors and flaws.** If your report suffers from poor organization, logical flaws, hallucinations etc., it will be graded very poorly. Therefore, do not use AI tools blindly. Instead, use them smartly to complement your work and cover your weaknesses.

Course roadmap:

Week	1	2	3	4	5	6	Reading	7	8	9	10	11	12	13	Reading	Exams
Dates	13 Jan - 17 Jan	20 Jan - 24 Jan	27 Jan - 31 Jan	3 Feb - 7 Feb	10 Feb - 14 Feb	17 Feb - 21 Feb	22 Feb - 2 Mar	3 Mar - 7 Mar	10 Mar - 14 Mar	17 Mar - 21 Mar	24 Mar - 28 Mar	31 Mar - 4 Apr	7 Apr - 11 Apr	14 Apr - 18 Apr	19 Apr - 25 Apr	26 Apr - 10 May
Classes	Intro, Financial markets	Risk & return, CAPM	*Chinese New Year (no classes)*	Interest rate risk 1	Interest rate risk 2	Silicon Valley Bank case study	*No classes*	Value at risk/expected shortfall 1	Value at risk/expected shortfall 2	Derivatives risk 1	Derivatives risk 2	Credit risk 1	Credit risk 2	Course recap	*No classes*	*No classes*
Readings (App for Appendix, C for Chapter)	BKM C2, Hull C5	Hull C1		BKM C14, Hull App A & C14	Hull App B & C14			Hull C11	Hull C8 & C12	BKM C20 & C21, Hull App C	Hull App E & C15	Hull C17	Hull C17			
Tutorials				✅	✅			✅	✅	✅	✅	✅	✅	✅		
Assignments (30%) (Drop 3 lowest scores; Due before start of next class)		W2		W4	W5			W7	W8	W9	W10	W11	W12			
				W2 due	W4 due	W5 due			W7 due	W8 due	W9 due	W10 due	W11 due	W12 due		
Course group project (35%)	Case Study: Silicon Valley Bank The Role of Risk (Mis)Management Due before start of Week 13 final class															
Final exam (30%)																Final exam
Participation (5%)	Short course surveys will be sent out over the semester. Submit these to get participation grades.															