City University of Hong Kong
Course Syllabus

offered by Department of Management Sciences
with effect from Semester A 2019/20

Part I Course Overview

Course Title:	Financial Risk Analytics
Course Code:	MS4226
Course Duration:	One semester
Credit Units:	3
Level:	B4
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

Data and analytical tools are playing crucial roles in driving business decisions and managing risk in financial services industry. This course on financial risk analytics focuses on data-driven modelling, computation, and statistical estimation of credit and market risks. In particular, it aims to

- provide students with basic terminology of various risks in complex business situations.
- provide students with widely used techniques to measure and manage risks, with emphasis on analytical tools from operations research and statistics.
- equip students with modelling and computing skills to solve business problems in the area of financial risk management.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Distinguish various risk categories, including operational risk, market risk, credit risk, liquidity risk, etc.	20%		✓	
2.	Select appropriate models for measuring risks in complex business problems.	20%		✓	✓
3.	Assess the risks of a business organization based on statistical tools and make recommendations on managing these risks.	40%		✓	✓
4.	Align risk mitigation strategies with the needs of particular organizations.	20%		✓	✓
	** If weighting is assigned to CILOs, they should add up to 100%.*	100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
Interactive Lectures	• Students listen to lectures and share their ideas and views via in-class discussions. • Students work in groups to brainstorm ideas or discuss the answers to questions arising from case study problems.	✓	✓	✓	✓			
Group Work	Students work in teams to analyze a risk management case. They analyze the data they have collected and present their findings in a collaboratively written report and in an in-class presentation.		✓	✓	✓			
Group Discussions	Students and the instructor discuss risk management cases in teams after class. Students reflect their findings and difficulties in analyzing the cases, while the instructor provides directional supervision.			✓	✓			

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: __40__%								
Group Project and Presentation Students will work in groups to analyse a risk management case based on analysis of the data they collect.	✓	✓	✓	✓			30%	
Individual Assignments Students will work individually to answer written questions in a set of assignments, by applying risk management knowledge they learn in the course.	✓	✓	✓				10%	
Examination: __60__% (duration: 2 hours , if applicable)								
Examination Students will be assessed via the examination on their understanding of the concepts and skills of risk management.	✓	✓	✓				60%	
** The weightings should add up to 100%.*							100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Group Project and Presentation	ABILITY to PRODUCE a collaboratively written report of a risk management case.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Individual Assignments	ABILITY to PRACTISE the problem-solving skills.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Written Examination	ABILITY to APPLY the risk management concepts to solve business problems.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

1. An Introduction to Financial Risk Terminology

Nature, scope and terminology of risk management. Trade-off between returns and risks. Simple models: Markowitz model. Data format and sources for risk analytics.

2. Value-at-Risk and Expected Shortfall

Risk measures. Value-at-Risk (VaR) and expected shortfalls (ES). Measurement of risks of financial portfolios. Statistical tests for VaR models.

3. Market Risk Analytics

Sources of market risk. Data-driven modeling and computation of market risk VaR and ES. Interest rate risk.

4. Credit Risk Analytics

Specifics of default risk. Default risk measurement. Credit rating. Data-driven credit scoring models. Risk measurement of credit portfolios. Credit derivatives and hedging of credit risk.

5. Management of Market and Credit Risk

Possible actions of risk transferring. Hedging using financial instruments.

6. Regulations and Compliance

Introduction to Basel Capital Accords. Regulatory capital and economic capital. Risk capital charge.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	John C. Hull. 2015. Risk Management and Financial Institutions, Fourth Edition, Wiley.

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Kevin Dowd. 2002. An Introduction to Market Risk Measurement. Wiley.
2.	Bart Barsens, Deniel Rosch, and Harald Scheule. 2017. Credit Risk Analytics: Measurement Techniques, Applications and Examples in SAS. Wiley.