

# MS4226: FINANCIAL RISK ANALYTICS

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Financial Risk Analytics

### Subject Code

MS - Management Sciences

### Course Number

4226

### Academic Unit

Management Sciences (MS)

### College/School

College of Business (CB)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Nil

### Equivalent Courses

Nil

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

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.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Distinguish various risk categories, including operational risk, market risk, credit risk, liquidity risk, etc.	20		x	
2	Select appropriate models for measuring risks in complex business problems.	20		x	x
3	Assess the risks of a business organization based on statistical tools and make recommendations on managing these risks.	40		x	x
4	Align risk mitigation strategies with the needs of particular organizations.	20		x	x

#### 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 real-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.

### Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	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.	1, 2, 3, 4

2	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.	2, 3, 4	
3	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.	3, 4	

**Assessment Tasks / Activities (ATs)**

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1 Group Project and Presentation Students will work in groups to analyse a risk management case based on analysis of the data they collect.	1, 2, 3, 4	30	
2 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.	1, 2, 3	10	

**Continuous Assessment (%)**

40

**Examination (%)**

60

**Examination Duration (Hours)**

2

**Additional Information for ATs**

Examination

Students will be assessed via the examination on their understanding of the concepts and skills of risk management.

**Assessment Rubrics (AR)****Assessment Task**

Group Project and Presentation

**Criterion**

ABILITY to PRODUCE a collaboratively written report of a risk management case.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

Individual Assignments

**Criterion**

ABILITY to PRACTISE the problem-solving skills.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

Written Examination

**Criterion**

ABILITY to APPLY the risk management concepts to solve business problems.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

## Part III Other Information

**Keyword Syllabus****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.

**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.

**Market Risk Analytics**

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

**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.

**Management of Market and Credit Risk**

Possible actions of risk transferring. Hedging using financial instruments.

**Regulations and Compliance**

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

**Reading List****Compulsory Readings**

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

**Additional Readings**

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