**COURSE CODE: QF622**

**COURSE TITLE: Credit Risk Models**

Instructor : Dr. Sun Nanfeng

Title : Adjunct Faculty

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**Pre-requisite/CO-REQUISITE/MUTUALLY EXCLUSIVE cOURSE(S)**

Probability Theory, Risk Neutral Pricing

**COURSE AREA**

1. Quantitative Finance

**Grading BaSIS**

Graded

**Course UNIT**

1 CU

**FIRST OFFERING TERM**

Academic Year: AY2024-25

Academic Term: Term 3

# COURSE DESCRIPTION

This course focuses on the modelling aspects of credit risk. It starts with an overview of credit markets. This is followed by an introduction to structural models for credit defaults and a detailed investigation of reduced-form models for default times. With the foundation of modelling single-name credits, a framework for modelling dependency structure of multi-name credits is surveyed. Along the way, typical instruments in the credit markets and how they are priced with such models are discussed. The concept of counterparty credit risk for the OTC derivatives market is subsequently introduced and an exposure modelling framework is explored. The course is concluded with an introduction of post-GFC regulatory reforms, e.g., on central clearing, regulatory capital, and margin requirements.

# LEARNING OBJECTIVES

By the end of this course, students will be able to:

* Understand how credit risk arises from the trading of market instruments.
* Use reduced form models for the valuation and risk management of typical credit instruments, including bonds, asset swaps, credit default swaps and default baskets.
* Gain experience in the modelling of counterparty credit exposures and risk mitigants including collaterals.
* Understand the post-GFC regulatory reform and its impacts on the financial industry.

**ASSESsMENT METHODS**

The various key assessment components are as follows:

Class Participation 10%

Homework assignment 40%

Exam 50%

**ACADEMIC INTEGRITY**

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences.

All work presented in class must be the student’s own work.  Any student caught violating this policy may result in the student receiving zero marks for the component assessment or a fail grade for the course.  This policy applies to all works (whether oral or written) submitted for purposes of assessment.

When in doubt, students are encouraged to consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at [http://www.smuscd.org/resources.html](about:blank).

**RECOMMENDED TEXT AND READINGS**

1. Dominic O'Kane, Modelling Single-name and Multi-name Credit Derivatives. John Wiley & Sons, 2008.
2. John Gregory, Counterparty Credit Risk and Credit Value Adjustment, John Wiley & Sons, 2012.
3. John Hull, Options, Futures, and Other Derivatives. Prentice Hall. Any recent edition.

**WEEKLY LESSON PLAN (subject to change)**

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| Week | Topics |
| 1 | Introduction to credit risk |
| 2-4 | Single-name credit products and their modelling |
| 5-6 | Multi-name credit products and their modelling |
| 6-7 | Counterparty credit risk, exposure measures, and credit value adjustment |
| 8-9 | Counterparty credit risk exposure modelling |
| 9-10 | Post-GFC regulatory reform and the Basel Framework |