



The course is designed to give a broad overview of modern financial theory and derivative markets. We start from revisiting Brownian motions, stochastic calculus, and their applications to Black-Scholes-Merton's theory. Then markets and models of several risk sectors related to equity, interest rate, credit, volatility, etc, are introduced as well as some basic statistical estimations and computational methods. We also discuss risk measures and the management of risks by trading derivative contracts.

**Instructor:** Dr. Chuan-Hsiang Han (韓傳祥). Department of Quantitative Finance, NTHU

**Office:** Room 756 TSMC BLD(台積館)

**Office Hours:** 10 - 12 Tuesday, 10 - 12 Wednesday, or by appointment

**Phone:** 03-5742224

**Email:** [chhan@mx.nthu.edu.tw](mailto:chhan@mx.nthu.edu.tw)

**URL:** [mx.nthu.edu.tw/~chhan](http://mx.nthu.edu.tw/~chhan)

**Class Hours:** W 7-9

**Classroom:** Room 224, TSMC BLD(台積館)

**Prerequisite:**

equivalent to STAT 387500 (basic knowledge of probability and statistics.)

**Textbook:**

(1) John Hull, "Options, Futures, and Other Derivatives," Prentice Hall, (8th edition) 2011.

(2) 韓傳祥, "金融隨機計算," 新陸書局, 2012.

**References:**

- (1) R. K. Sundaram and S. R. Das, "Derivatives: principles and practice," McGraw-Hill/Irwin. (1st edition) 2010.

- (2) Alison Etheridge, "A Course in Financial Calculus," Cambridge University Press, (1st edition) 2002.

### Grading:

Assignments 30%, Exams(midterm and final) 50%, Biweekly Report 10%, Course Project 10%.

### Course Contents:

1. Review Binomial Tree Models with Pricing Derivatives
2. Basic Stochastic Calculus in Finance
3. The Black-Scholes-Merton Pricing Theory
4. The Greek Letters
5. Option markets
6. Volatility Smiles
7. Basic Numerical Procedures
8. (Conditional) Value at Risk and backtesting
9. Estimating Volatilities and Correlations
10. Credit Risk
11. Credit Derivatives
12. Exotic Options
13. More of Models and Numerical Procedures
14. Martingales and Measures
15. Interest Rate Derivatives: The Standard Market Models