

NATIONAL TAIWAN UNIVERSITY
Department of International Business
Financial Computation

Assistant Professor Jr-Yan Wang

Spring 2010

Room 305, Building 2, College of Management

Thursday 14:20 ~ 17:20

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02-33664987

COURSE DESCRIPTION

This course of Financial Calculus is the combination of three fields: finance, computer science, and mathematics. It is the major goal of this course that students will practice to solve many finance-related problems by computer programming. Although this course is designed for students who major in Business, the students are required to have prior knowledge in financial theories (especially about the derivatives). In addition, basic ability of computer programming is needed (or can be learned yourself via assigned homework). Nevertheless, some background knowledge will still be reviewed in the class, such as the option pricing theory, the term structure of interest rates, the stochastic process, some basic numerical methods, the concept of data structure in computer programming, etc.

The pricing algorithms or methods for various exotic options will be emphasized in this course, for example, Asian options, Barrier options, Lookback options, Convertible Bonds, Rainbow options, etc. It is my hope that you will learn many financial theories, good programming practices, advanced mathematics, and most importantly, the true meaning of the financial engineering in this course.

TEXT AND READINGS

Lecture Notes: <http://www.management.ntu.edu.tw/~jywang/> → Course Information →

Financial Computation or Financial Engineering (graduate level)

Required: Options, Futures, and Other Derivatives, by J. C. Hull, 7th ed, 2008

Reference:

1. Financial Engineering and Computation: Principles, Mathematics, Algorithms, by Yuh-Dauh Lyuu, 2002
2. Derivatives: The Theory and Practice of Financial Engineering, by P. Wilmott, 1998
3. Monte Carlo Methods in Financial Engineering (Stochastic Modelling and Applied

- Probability), by Paul Glasserman, 2005
4. Introduction to Stochastic Calculus with Applications, by Fima C. Klebaner, 2005
 5. Financial Calculus: An Introduction to Derivative Pricing, by Martin Baxter and Andrew Rennie, 1996
 6. Numerical Recipes in C: The Art of Scientific Computing, by William H. Press, Brian P. Flannery, Saul A. Teukolsky, and William T. Vetterling, 1992
 7. 金融工程學: 金融商品創新與選擇權理論, 陳松男, 2002
 8. C++財務程式設計, 戴天時, 2005

OFFICE HOUR

Room 513, Building 2, College of Management
Friday 15:00 ~ 17:00 or after class or by appointment

EXAMS AND GRADINGS

Homework (6 computer programs at least) 90% Class Participation 10%

COURSE OUTLINE

1. Introduction
2. Overview of Options (Ch 3)
3. Stochastic Process (Ch 1)
4. Option Pricing Methods (Ch 2*, Ch 5*)
5. Monte-Carlo Simulation and Rainbow Options (Ch 6*)
6. Barrier Options (Ch 9)
7. Lookback Options (Ch 10*)
8. Asian Options (Ch 11*)
9. Non-constant Volatility (Ch 7)
10. Monte-Carlo Simulation for American Options (Ch12*)
11. The Greek Letters (Ch 8)
12. Interest Rate Models (Ch 13)

* Homework supposed