

NATIONAL TAIWAN UNIVERSITY
College of Management
Financial Computation

Associate Professor Jr-Yan Wang
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Spring 2012
Tuesday 14:20-17:20
02-33664987

COURSE DESCRIPTION

This course of Financial Computation 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 derivative-pricing problems by computer programming. Although this course is designed for students who do not major in Finance, the students are required to have prior knowledge in financial theories (especially about derivatives). In addition, basic ability of computer programming is needed (or can be learned yourself via assigned homework). Nevertheless, some background knowledge still will 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, such as Asian options, Barrier options, Lookback options, Convertible Bonds, and Rainbow options. It is my hope that you can learn many financial theories, good programming practices, advanced mathematics, and most importantly, the true meaning of the financial engineering in this course.

TEXT AND REFERENCES

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, 8th ed., 2011.

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, 2003.

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, Saul A. Teukolsky, William T. Vetterling, and Brian P. Flannery, 1992.
7. 金融工程學：金融商品創新與選擇權理論，第三版，陳松男，2008
8. C++財務程式設計，戴天時，2005

OFFICE HOURS

Monday 14:00-16:00

Room 513, Building 2, College of Management

EXAMS AND GRADINGS

Homework (5 computer programs) 100%

COURSE OUTLINE

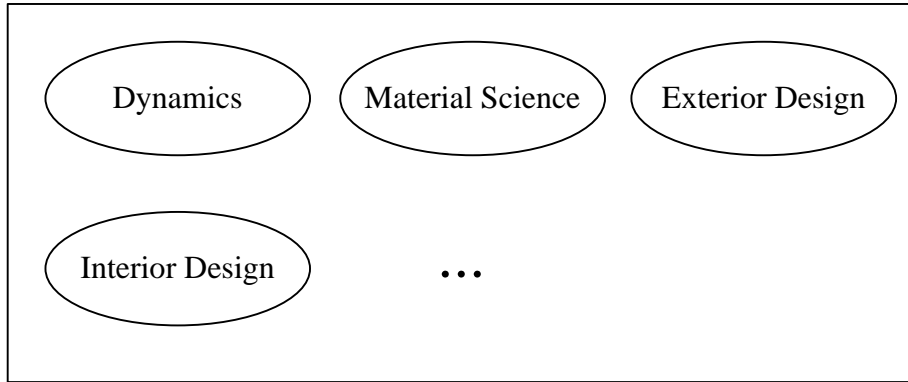
1. Overview of Options (Ch 3)
2. Stochastic Process (Ch 1)
3. Option Pricing Methods (Ch 2*, Ch 5*)
4. Monte-Carlo Simulation and Rainbow Options (Ch 6*[†])
5. Barrier Options (Ch 9)
6. Lookback Options (Ch 10*)
7. Asian Options (Ch 11*)
8. Monte-Carlo Simulation for American Options (Ch12[†])
9. Non-constant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

* Homework supposed [†] Bonus homework

TEACHING ASSISTANT

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Civil Engineering



101 Building

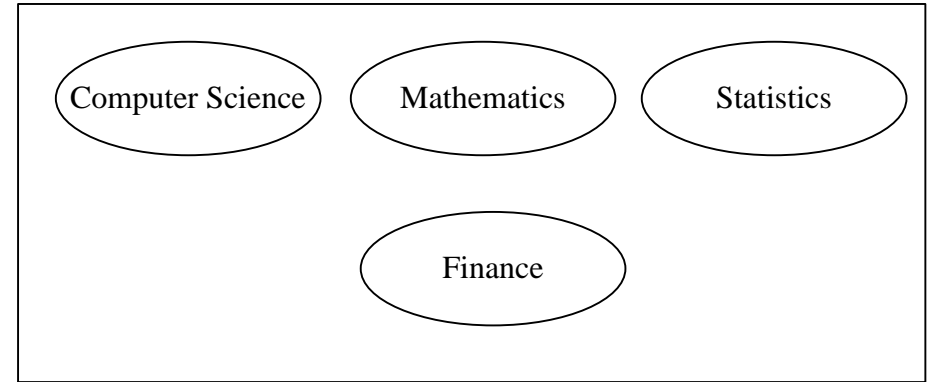
Golden Gate
Bridge

Empire
Building

Hotel

Apartment

Financial Engineering



Convertible
Bonds

Structured
Notes

Collateralized
debt
obligations

Rainbow
Options

Vanilla
Options,
Futures, or
Swaps

❖ Common business model: Produce or create products with least costs, and sell these products with highest prices