

Class syllabus

Computational Finance

Professor	Name	Chan-Ho Min	Subject	Main course target	Department	Department of Financial Engineering
	Position	Assistant Professor			Major	Financial Engineering
	Department	Department of Financial Engineering				

1. Overview of the subject

In this class, you will be able to understand the theoretical background of pricing of derivatives, risk measurement and management and hedging, and at the same time apply several numerical analysis techniques using Python, which is widely used in financial practice. Based on a theoretical/practical understanding of derivatives, the ability to produce and operate derivatives embedded financial investment instruments is cultivated.

2. Overview of how classes operate

This class consists of lectures, practice (coding), midterms, and final projects. In class, the relevant theory explanation and practice are mainly conducted, and Python practice tasks are given after the lecture. The mid-term exam will have theoretical questions about derivatives and numerical analysis techniques, and the final exam will be replaced by the final project. The final project is the task of calculating the price of Equity Linked Securities (ELS), a representative Derivatives Linked Securities.

3. Learning evaluation method

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4. Textbooks and references

Classification	Textbook title (Website)	Author	Publisher	Publication year
Auxiliary Textbook	An Introduction to Financial Option Valuation	Higham, Desmond J.	Cambridge Univ Pr	2004
Auxiliary Textbook	Option Pricing: Mathematical models and computation	Wilmot Paul, Jeff Dewynne, and Sam Howison	Oxford: Oxford Financial Press	2000
Main Textbook	Lecture Notes	professor in charge		

5. Class progress plan

Week	Teaching Contents	Form of a class	Note
1	Option valuation preliminaries	lecture	9/7
2	No class (Chuseok)	lecture	9/14(Supplementary lecture date to be announced later)
3	Black-Scholes-Merton (BSM) formulas and the Greeks	lecture	9/21
4	Implied volatility and volatility smile	lecture	9/28
5	Monte-Carlo method and binomial method	lecture	10/5
6	Cash-or-nothing options and American options	lecture	10/12
7	Exotic options	lecture	10/19
8	Midterm exam	lecture	10/26
9	Finite difference methods (FDM) and the BSM PDE revisited (1)	lecture	11/2
10	Finite difference methods (FDM) and the BSM PDE revisited (2)	lecture	11/9
11	Multidimensional PDE (1) ? ADI method	lecture	11/16
12	Multidimensional PDE (2) ? OS method	lecture	11/23
13	Introduction to ELS	lecture	11/30
14	ELS pricing	lecture	12/7
15	Team project (1)	Project lecture	12/14
16	Team project (2)	Project lecture	12/21

6. Other notes

- * This class is held jointly by undergraduate and graduate schools.
- * This class combines theory and practice, so we use two classrooms. The location of the class will be announced every week according to the class schedule.
- * We have a Q&A session every week after class.