

Advanced Statistics for Finance

Course Name	Course type (credit/hours)	Required course(3/3)	Course code	1094
	Target students Division/major/grade	Financial Engineering/Sophomore	Opening semester	2021 2ND SEMESTER
	Class time and classroom	Tue D(Da406)Thu C(Da406)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses	Basic Statistics for finance		
	Recommended concurrent courses			
	Related advanced courses			

Instructor	Name (title/division)		Hyeng Keun Koo(Professor, Financial Engineering)			
	Office Room Number	Dasan 525	Office phone Number	2706	e-mail	
	Office hours	화 3-4:20		Homepage address	https://sites.google.com/ajou.ac.kr/hkoo/	
Teaching Assistant	Name (title/division)					
	Office Room Number	다산관525	Office phone Number	2706	e-mail	asj92@ajou.ac.kr

1. Introduction

In this course students will learn mathematical statistics that is useful for application to financial engineering. The topics will include probability and random variables, simulation, moment generating functions, characteristic functions, sampling, estimation and hypothesis tests.

2. Course Objectives

The objective of the course is to let students get accustomed to statistical analysis and simulation.

3. Class types and activities

We will have offline-online classes. The course will consist of lectures and presentations. Presentations will be scheduled around final two weeks of the course.

Presentations:

1. A team will select a topic related to the course material and do research on the topic.
2. The instructor will randomly select the order of presentations and make announcement..
3. Every member of a team will need to participate in presentation. The time for presentation for each team will be about 15 minutes including the time for Q&A.
4. Students will need to form teams, each team will consist of 2 (or 3) members. When, it's difficult to form a team for a student, the instructor will assign the student to a team.

4. Teaching Method

- | | |
|---|---|
| <input checked="" type="checkbox"/> lecture | <input type="checkbox"/> discussion and debate |
| <input checked="" type="checkbox"/> team project(presentation and case studies) | <input type="checkbox"/> experiments(role-playing,etc) |
| <input type="checkbox"/> designing and production | <input type="checkbox"/> on-site learning(on-site training) |
| <input type="checkbox"/> others | |

5. Support Systems in Use

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> AjouBb | <input checked="" type="checkbox"/> automatic recording system | <input type="checkbox"/> web-based assignment |
| <input type="checkbox"/> cyber lecture | <input type="checkbox"/> online content | |
| <input type="checkbox"/> class behavior analyzing system | <input type="checkbox"/> others | |

6. Teaching Tools

- | | | |
|--|---|---|
| <input type="checkbox"/> PBL(Problem Based Learning) | <input type="checkbox"/> CBL(Case Based Learning) | <input type="checkbox"/> TBL(Team Based Learning) |
| <input type="checkbox"/> UR(Undergraduate Research) | <input type="checkbox"/> FL(Flipped Learning) | <input type="checkbox"/> DSAL(Data Science Active Learning) |
| <input type="checkbox"/> others | | |

7. Knowledge and ability required for taking this course

Elementary statistics, calculus, linear algebra

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10%	
midterm exam	1	25%	
final exam	1	25%	
quiz		20%	quizzes and question sets
presentation	1	20%	
discussion			
homework			
etc			
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Introduction to Mathematical Statistics	Hogg, McKean, Craig	Pearson	2018

10. Class system and Class shedule

The course will cover the following topics:

1. Probability
2. Random variables and moments
3. Moment generating functions and characteristic functions
4. Multivariate Distributions
5. Some Special Distributions
6. Unbiasedness, Consistency, and Limiting Distributions
7. Elementary Statistical Inferences
8. Maximum Likelihood Methods

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction		Hyeng Keun Koo			
2	Probability		Hyeng Keun Koo			
3	Random variables and moments		Hyeng Keun Koo			
4	Moment generating functions and characteristic functions		Hyeng Keun Koo			
5	Multi-variate distributions		Hyeng Keun Koo			
6	Some special distributions		Hyeng Keun Koo			
7	Convergence in Distribution		Hyeng Keun Koo			
8	Mid-term Exam		Hyeng Keun Koo			
9	Central limit theorem		Hyeng Keun Koo			
10	Sampling and statistics		Hyeng Keun Koo			
11	Order statistics		Hyeng Keun Koo			
12	Confidence Intervals		Hyeng Keun Koo			
13	Hypothesis testing		Hyeng Keun Koo			
14	Maximum likelihood methods		Hyeng Keun Koo			
15	Presentations 1		Hyeng Keun Koo			
16	Presentations 2		Hyeng Keun Koo			

11. Other items of notification