

## Mathematical Analysis for Finance 1

Course Name	Course section (credit/hours)	Required course(3/3)			course code	I119
	course item				course component	
	Target students Division/major/grade				opening semester	2021 1ST SEMESTER
	Class time and classroom	Tue F(Da406)Thu E(Da406)			English Grade	A(100%English)
Reference to this course	Credit compositon	Theory(0) + Design(0) + Practice(0)				
	Prerequisite courses					
	Related basic courses					
	Recommanded concurrent courses					
	Related advanced course					
Instructor	Name (title/division)		Hyeng Keun Koo(Professor, Financial Engineering)			
	Office Room Number	다525	Extension Number	2706	e-mail	hkoo@ajou.ac.kr
	Office hour	Tuesday 3:00-4:00		Homepage address	https://sites.google.com/ajou.ac.kr/hkoo/	
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	asj92@ajou.ac.kr

### 1. Course Introduction

We will study mathematical analysis which provides a foundational methodology for financial engineering in this course. We will first study basic mathematical concepts, sets, functions, and real and complex numbers. We will next study metric spaces, which form foundation of the course. We will then study sequences and series, continuity, and differentiation.

### 2. Course Objectives & course outcome

The objective of the course is to enable students to grasp basic concepts and tools of mathematical analysis so that they will be able to solve problems arising from financial engineering by using mathematical tools.

### 3. Class types and activities

We will have online classes, which will consist of uploaded video lectures and real time classes once every two weeks. 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. Each team will upload the presentation material (e.g., ppt file) on the Ajou Bb by the midnight the day before the presentation.
4. 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.
5. 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.
6. We request that each team will upload their presentation video by May 29 (Sat).

### 4. Teaching Method

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|---|---|
| <input checked="" type="checkbox"/> lecture                                     | <input checked="" 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

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|--|--|---|
| <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 checked="" type="checkbox"/> PBL(Problem Based Learning) | <input checked="" type="checkbox"/> CBL(Case Based Learning) | <input checked="" 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. Evaluation method of course outcome

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10%	
midterm exam		30%	
final exam		30%	
quiz		20%	2 quizzes
presentation	1	10%	
discussion			
homework			
etc			
study hours			

## 8. Textbook and Reference material

Main/Sub	Title	Writer	Publisher	Publication year
Main	Principles of Mathematical Analysis	Walter Rudin	MaGraw Hill	2013
Ref.	Real Analysis with Economic Applications	Efe A. Ok	Princeton University Press	2007
Ref.	Microeconomic Theory	Mas-Collel, Winston, Green	Oxford University Press	2012

## 9. Class system and Class shedule

<p>The course will introduce basic concepts and tools of mathematical analysis. It will cover the following contents:</p> <ol style="list-style-type: none"><li>1. Sets, functions, real &amp; complex numbers</li><li>2. Metric spaces</li><li>3. Sequences and series</li><li>4. Continuous functions</li><li>5. Differentiation</li></ol>
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### < Schedule >

\* language : K-korean, E-English

Weeks	Title of lecture	language	time distribution(minutes)			Teaching Method	evaluation method
			theory	design	experiment practice		
1	Introduction	E	3			online/lecture	
2	Real and complex numbers	E	3			online/lecture	
3	Sets and functions 1	E	3			online/lecture	
4	Sets and functions 2	E	3			online/lecture	
5	Metric Spaces 1	E	3			online/lecture	
6	Metric Spaces 2	E	3			online/lecture	
7	Metric Spaces 3	E	3			online/lecture	
8	Mid-term	E	3			offline/exam	written exam
9	Sequences and series 1	E	3			online/lecture	
10	Sequences and series 2	E	3			online/lecture	
11	Continuity 1	E	3			online/lecture	
12	Continuity 2	E	3			online/lecture	
13	Differentiation 1	E	3			online/lecture	
14	Differentiation 2	E	3			online/lecture	
15	Presentations	E	3			online/presentations	Presentations
16	Presentation and Overview	E	3			online/presentations and lecture	presentation and lecture

### 10. Contribution index of the course for attaining ABEEK program outcomes

course outcome	contribution scale
No Data	

### 11. Analysis of improved matters for the previous semester

13. Reference items

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