

Risk Management and Derivatives

Global Program on Economics and Finance (2021 Fall)

Course Title	Risk Management and Derivatives		
Credit	3	Credit Hours	48 credit hours
Course Objectives	<ul style="list-style-type: none"> - Students will learn when arbitrage arguments are not sufficient to evaluate investment opportunities, and make use of utility theory and mathematical optimization models to determine optimal decisions. - Students will gain a basic structure about quantitative finance, learn the definition and application of the various derivatives, and how to apply binomial trees to price financial derivatives. - Students will master how to the apply risk measures such as Value at Risk and Expected Shortfall in risk management framework. 		
Course Description	<p>This course covers derivatives such as options, forward contracts, futures contracts, and swaps. Students will learn to make decisions by taking into account such features as interest rates, and rates of return. They will learn about the concept of arbitrage, and when consideration of such is sufficient to price different investments. Applications to call and put options will be given. Moreover, we will introduce the hedging strategies using futures and options, and mechanics of option markets, properties of stock options, options on stock indices and currencies as well as the various types of exotic options. Finally, theories about binomial trees, Wiener processes, Ito's Lemma, Black-Scholes-Merton Model will be further illustrated.</p>		
Course Requirements:			
Prerequisites: Foundations of Finance Statistics			
Teaching Methods:			
Lecture (online live) Approximately 3 hours every week			
Course Schedule			
Week	Lecture	Readings	
Week 1	Introduction Futures Markets and Central Counterparties	Chapter 1 Chapter 2	
Week 2	Hedging Strategies Using Futures Interest Rates	Chapter 3 Chapter 4	
Week 3	Determination of Forward and Futures Prices	Chapter 5	
Week 4	Interest Rate Futures	Chapter 6	
Week 5	Swaps	Chapter 7	
Week 6	Mid-term Exam	N/A	

Week 7	Mechanics of Options Markets Properties of Stock Options	Chapter 10 Chapter 11	
Week 8	Options on stock indices and currencies Exotic options	Chapter 17 Chapter 26	
Week 9	Trading Strategies Involving Options	Chapter 12	
Week 10	Binomial Trees The Greek letters	Chapter 13 Chapter 19	
Week 11	Volatility smiles Value at risk and expected shortfall Martingales and measures	Chapter 20 Chapter 22 Chapter 28	
Week 12	Final Exam	N/A	

The design of class discussion or exercise, practice, experience and so on:

Discussion: We may use Wechat, Tencent or Zoom online meetings for class discussion every week.

Practice and exams: There will be two online exams in total as below:

- Mid-term exam (2 hours)
- Final exam (2 hours)

Grading & Evaluation:

Attendance	10%
Mid-term exam	40%
Final Exam	50%

Grading Scale is as follows

Number grade	Letter grade	GPA
90-100	A	4.0
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3.0
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2.0
62-64	C-	1.7
60-61	D	1.0
≤59	F (Failure)	0

Teaching Materials & References:

Options, Futures and Other Derivatives, John C. Hull, 10th Edition, Pearson Education.

Reference Book: 《Fundamentals of Futures and Options Markets》《Introduces Quantitative Finance》