课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	**金融衍生品 Options, Futures and Financial Derivatives**
2.	**授课院系 Originating Department**	金融系 Department of Finance
3.	**课程编号 Course Code**	FIN305
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业核心课 Major Core Courses
6.	**授课学期 Semester**	秋季 Fall
7.	**授课语言 Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	向巨, 助理教授，金融系 Ju Xiang, Assistant Professor, Department of Finance 邮箱/Email: xiangj@sustech.edu.cn 电话/Tel: 13556833511 办公室/office:慧园 3 栋 326, Wisdom Valley 3#326 周倜 ,助理教授,金融系 ZHOU Ti, Assistant Professor, Department of Finance, 邮箱/Email:zhout@sustech.edu.cn 办公室/office:慧园 3 栋 323, Wisdom Valley 3#323
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	待公布 To be announced
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
学时数 Credit Hours	42		无 N/A	复习、考试（2 周）6 小时 Revision & Exam (2 weeks) 6-hours	48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	公司金融 Corporate Finance FIN206 （先选） 金融投资概论 Financial Investments FIN301（先选）
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	其它涉及金融衍生品的高级专业课程，如固定收益等。 Other advanced financial courses covering financial derivatives including Fixed Income Securities.
14. 其它要求修读本课程的学系 Cross-listing Dept.	无 N/A

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

过去二三十年，金融衍生品的全面兴起和发展极大地改变着国际金融市场，是这一阶段最为显著的创新。Merton 和 Scholes 以期权定价公式获得 1997 年度诺贝尔经济学奖。2008 年的次贷危机中金融衍生品也扮演了重要角色。我国也将在今年内推出和大力发展 ETF 期权和股指期货期权，学生必须学习和掌握这方面知识以迎接这个巨大的机会。

通过课堂讲授、多媒体教学、案例分析、课堂讨论，还将充分利用我校金融实验室和 Bloomberg 终端让学生获得对衍生工具市场、VIX 模型、定价及投资交易的亲身体验。

Over the past thirty years, the overall rise and development of financial derivatives is greatly changing the global financial market, as the most significant innovation for this stage. Merton and Scholes' option pricing formula won them the 1997 Nobel prize in economics. In the 2008 subprime mortgage crisis, financial derivatives also played an important role. As the mainland China is launching ETF options and stock index options in the coming year, students must learn to master knowledge of this aspect to embrace this huge opportunity.

Through classroom lecturing, multimedia presentation, case analysis, classroom discussion, working at financial laboratory and Bloomberg terminal, students can gain comprehensive knowledge and experience of derivatives market, VIX model, valuations and basic derivatives investment methods.

16. 预达学习成果 Learning Outcomes

作为全世界几乎所有金融学和金融工程专业本科的必修核心课程，本课程将系统地讲授金融衍生品(远期、期货、互换和期权等基本衍生工具，以及股票市场和债券市场上的创新产品)。对每种衍生工具将具体讲述其运作机制、价格决定以及简单投资交易策略这三方面。此外，在讲述这三方面的过程中，本课程也将讲解衍生工具在风险管理方面的作用及金融创新。

As a compulsory core courses for almost all the undergraduate finance and financial engineering specialities, this course will systematically cover financial derivatives (Futures, Forwards, Swaps, Options and other derivatives, as well as innovative products in stock and bond markets). Each kind of derivatives' operation mechanism, valuation and simple investment and trading strategies will be discussed. Their roles in financial innovation and risk management will also be explained.

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

第一章：金融衍生品介绍（2 学时）

在第一章中，我们首先讨论衍生品市场及其变化，我们还将描述远期、期货和期权市场，然后我们将概括地讨论在市场上对冲者、投机者以及套利者如何使用这些衍生产品。

第二章：期货市场运作机制（2 学时）

在第二章中，我们将详细介绍期货市场的具体运作机制。我们将讨论合约条款的规定、保证金账户的运作、交易所的组织结构、市场监管规则、期货报价方式以及有关期货的财会与税务处理等内容。

第三章：利用期货进行对冲（2 学时）

在第三章中，我们将介绍对冲者是如何建立对冲来规避和降低风险的。在本章，我们主要基于保完即忘策略。

第四章：利率（2 学时）

在第四章中，我们将考虑关于度量和分析利率的一些基本问题。我们将解释复利频率、连续复利的含义。我们将介绍零息利率、平价收益率、收益率曲线以及债券定价分析等方面内容。我们还将讨论远期利率、远期利率合约以及关于利率期限结构的不同理论。

第五章：如何确定远期和期货价格（2 学时）

在第五章中，我们讨论远期价格和期货价格与标的资产即期价格之间的关系。我们还将推导远期价格（或期货价格）与即期价格的一个重要关系式。

第六章：利率期货（2 学时）

在第六章中，我们将讨论在美国市场上流行的国债期货合约和欧洲美元期货合约。我们还将说明如何使用期货合约对冲公司的利率风险敞口。

第七章：互换（2 学时）

在第七章中，我们了解到互换是指两个公司之间达成的在将来交换现金流的合约。我们将介绍互换合约的机制以及市场上流行的互换比如利率互换等。

第八章：期权市场机制（2 学时）

在第八章中，我们将介绍股票期权，以及一些货币期权、股指期权和期货期权合约的简单内容。我们将学习到期权合约和期货合约的区别。

第九章：股票期权的性质（2 学时）

在第九章中，我们将介绍影响股票期权价格的因素。我们将给出欧式看涨期权和看跌期权之间的看跌-看涨平价关系式。并且就美式期权是否提前行权也给出了讨论。

第十章：期权交易策略（2 学时）

在第十章中，我们将讨论期权交易策略。包括单一期权和股票的策略、牛市差价、熊市差价、盒式差价、蝶式差价、日历差价、对角差价、跨市组合等策略。

第十一章：二叉树（3 学时）

在第十一章中，我们将介绍期权定价模型——基础二叉树。我们将解释用来定价的无套利假设的特点、二叉树数值方法、风险中性定价原理。

第十二章：维纳过程和伊藤引理（4 学时）

在十二章中，我们将建立关于股票价格的连续变量、连续时间的随机过程。同时解释一个重要结论：伊藤引理。伊藤引理对衍生品定价至关重要。

第十三章：布莱克-斯科尔斯-莫顿模型（4 学时）

在第十三章中，我们将推导布莱克-斯科尔斯-默顿模型。并且解释如何运用这个模型从历史数据估计波动率或由期权价格计算隐含波动率。我们还将说明如何使用风险中性定价方法。我们将学习到如何扩展该模型用于支付股息的欧式看涨看跌期权，并提供一些关于支付股息的美式看涨期权的结果。

第十四章：雇员股票期权（2 学时）

在第十四章中，我们将解释雇员股票期权是如何运作以及定价。

第十五章：股指期权与货币期权（3 学时）

在第十五章中，我们将详细地介绍股指期权与货币期权的运作过程以及应用。我们将使用布莱克斯科尔斯莫顿模型推广到已知股息率的欧式期权。然后我们将发现股指期权和货币期权都类似于支付股息率的股票期权。

第十六章：期货期权（2 学时）

在第十六章中，我们讨论期货期权的运作方式以及其与即期期权的差别。我们将讨论如何使用二叉树和布莱克斯科尔斯莫顿模型对期货期权定价。

第十七章：希腊值（2 学时）

在第十七章，我们将介绍用来度量期权头寸的某种特定风险的希腊值。包括 Delta，Theta，Gamma，Vega，Rho。同时我们将讨论如何以合成的形式构造期权。

第十八章：波动率微笑（2 学时）

在第十八章中，我们将了解到波动率微笑是指描述期权隐含波动率与执行价格函数关系的图形。我们将描述交易员在股票与货币市场所采用的波动率微笑。我们将解释波动率微笑与所假设的将来标的资产价格风险中性概率分布之间的关系。我们还将讨论交易员如何将波动率曲面作为定价的工具。

Chapter 1. Introduction (2 hours)

In Chapter 1, we first discuss the derivatives market and its changes. We will also describe the forward, futures, and options markets. Then we will discuss in general how hedgers, speculators, and arbitrageurs use these derivatives in the market..

Chapter 2. Mechanics of Futures Markets (2 hours)

In Chapter 2, we cover the details of how futures markets work. We examine issues such as specification of contracts, the operation of margin accounts, the organization of exchanges, the regulation of markets, the way in which quote are made, and the treatment of futures transaction s for accounting and tax purposes.

Chapter 3. Hedging Strategies Using Futures (2 hours)

In Chapter 3, we will describe how hedgers set up hedges to eliminate(or reduce) risk. In this chapter, we mainly introduce hedge-and-forget strategies.

Chapter 4. Interest Rates (2 hours)

In Chapter 4, we will consider some basic issues about measuring and analysing interest rates. We will explain the meaning of compounding frequency and continuously compounded interest rates. We will introduce zero interest rate, par yields, yield curve and bond pricing analysis. We will also discuss forward rates, forward rate agreements and different theories about the term structure of interest rates.

Chapter 5. Determination of Forward and Futures Prices (2 hours)

In Chapter 5, we will examine how forward prices and futures prices are related to the spot price of the underlying asset. We will also derive an important result between forward price (or futures price) and spot price.

Chapter 6. Interest Rate Futures (2 hours)

In Chapter 6, we will explain the popular Treasury bond futures Eurodollar futures contracts that trade in United States. We will also explain how to use futures contracts to hedge the company's exposure to interest rate movement.

Chapter 7. Swaps (2 hours)

In Chapter 7, we will know that swaps are agreements between two companies that exchange cash flows in the future. We will introduce the mechanism of swaps and the popular swaps in the market such as interest rate swaps.

Chapter 8. Mechanics of Options Markets (2 hours)

In Chapter 8, we will introduce stock options, as well as some simple elements of currency options, stock index options, and futures options contracts. We will learn the difference between an option contract and a futures contract.

Chapter 9. Properties of Stock Options (2 hours)

In Chapter 9, we will introduce the factors affecting the price of stock options. We will give a put-call parity, which is a relationship between the price of European call options, the price of put options, and the underlying stock price. We will also examine whether American options are exercised in advance.

Chapter 10. Trading Strategies Involving Options (2 hours)

In Chapter 10, we will examine options trading strategies. Including single option and stock strategy, bull spreads, bear spreads, box spreads, butterfly spreads, calendar spreads, diagonal spreads. Then we will examine combinations of the above stradies and other payoffs.

Chapter 11. Binomial Trees (3 hours)

In Chapter 11, we will introduce the option pricing model, the binomial trees. We will explain the no-arbitrage arguments, the numerical method of binomial trees, and the risk-neutral pricing principle.

Chapter 12. Wiener Processes and Ito's Lemma (4 hours)

In Chapter 12, we will establish a stochastic process of continuous variables and continuous time for stock prices. At the same time we will explain an important result known as Ito's Lemma. Ito's lemma is critical to the pricing of derivatives.

Chapter 13. The Black-Scholes-Merton Model (4 hours)

In Chapter 13, we will derive the Black-Scholes-Merton model. It also explains how volatility can be either estimated from historical implied from option prices using the method. We will also explain how to use risk-neutral pricing principle. We will learn how the model can be extended to deal with European call and put options on dividend-paying stocks and presents some results on the pricing of American call options on dividend-paying stocks.

Chapter 14. Employee Stock Options (2 hours)

In Chapter 14, we will explain how employee stock options operate and are priced.

Chapter 15. Options on Stock Indices and Currencies (3 hours)

In Chapter 15, we will introduce in detail the operation process and application of stock index options and currency options. We will use the Blacks-Scholes-Merton model to cover European options on a stock paying a known dividend yield. Then we will find that stock index options and currency options are similar to stock options that pay dividend yields.

Chapter 16. Options on Futures (2 hours)

In Chapter 16, we discuss how futures options work and how they differ from spot options. We will discuss how to price futures options using the binomial tree and the Blacks-Scholes-Merton model.

Chapter 17. Greek Letters (2 hours)

In Chapter 17, we will introduce the Greek Letters used to measure a particular risk of an option position. The Greek Letters include Delta, Theta, Gamma, Vega the Rho. At the same time we will consider the creation of options synthetically.

Chapter 18. Volatility Smiles (2 hours)

In Chapter 18, we will understand that volatility smile is a plot of the implied volatility of an option as a function of its strike price. We will describe the volatility smiles that traders use in equity and currency markets. We will explain the relationship between the volatility smile and the risk-neutral probability distribution being assumed for the future asset price. We will also discuss how traders use volatility surfaces as pricing tools.

结合网络教学 Financial Engineering and Risk Management

https://www.coursera.org/learn/financial-engineering-1/home/welcome

18. 教材及其它参考资料 Textbook and Supplementary Readings

1、期权、期货和其他衍生品（清华金融学系列英文版教材）（第 9 版），约翰•赫尔 (John C. Hull），清华大学出版社， 2014

Options、Futuers and Other Derivatives (7th Edition), John C. Hull, Tsinghua University Press， 2014

2、期权、期货及其他衍生产品（第 9 版），约翰•赫尔 (John C. Hull)（作者），张陶伟（译者），人民邮电出版社

Options、Futuers and Other Derivatives (6th Edition by John C. Hull), translated by Taowei Zhang, Tsinghua University Press

3□ More readings

http://www.cboe.com
http://www.investopedia.com/
http://www.cxoadvisory.com/
http://www.ssrn.com

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance		10		
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		10		
期中考试 Mid-Term Test		20		
期末考试 Final Exam		60		
期末报告 Final Presentation				
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)				

20. 记分方式 GRADING SYSTEM

☑ A. 十三级等级制 Letter Grading
☐ B. 二级记分制（通过/不通过） Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority

金融系课程规划与审核委员会
Curriculum Planning and Review Committee, Dept. of Finance