课程大纲
COURSE SYLLABUS

1.	课程代码/名称 **Course Code/Title**	MAT7096 金融衍生品定价模型与计算 Models and computational methods for pricing Financial Derivatives
2.	课程性质 **Compulsory/Elective**	选修 **Elective**
3.	课程学分/学时 **Course Credit/Hours**	3/48
4.	授课语言 **Teaching Language**	中英文 Chinese and English
5.	授课教师 **Instructor(s)**	曾萍萍 助理教授
6.	是否面向本科生开放 **Open to undergraduates or not**	否 No
7.	先修要求 **Pre-requisites**	（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.） 概率论与数理统计 Probability and Statistics. 最好已修如下两门课程 Better to have finished these two courses：(1) 偏微分方程 Partial Differential Equations (2)应用随机过程 Applied Stochastic Processes
8.	教学目标 **Course Objectives**	

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

本课程将介绍一些著名的金融数学模型，基本定价原理和各种各样的方法对金融衍生品（包括各种路径依赖期权，比如亚式期权和百慕大期权等）定价。

This course will introduce some popular mathematical models, pricing theories and various computational methods for pricing financial derivatives (including various path dependent options, like Asian options and Bermudan options, etc).

9.	教学方法 **Teaching Methods**	

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

上课+讨论+课题 lectures + discussion + projects

10.	教学内容 **Course Contents** （如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）	
	Section 1	基本金融衍生品简介 Introduction to Financial Derivatives

Section 2	离散二叉树模型
	(1) 单时段模型，包括模型描述，投资组合和无套利理论，风险中性定价理论，欧式期权等。
	(2) 多时段模型，包括条件期望和离散时间鞅理论，对欧式期权和美式期权定价。
	Discrete-time binomial model
	(1) The one period model, this part includes model description, portfolios and no arbitrage, risk neutral valuation, European options, etc.
	(2) The multiperiod model, this part covers conditional expectation and discrete-time martingale, pricing European options and American options.
Section 3	随机过程在金融中的应用
	介绍布朗运动及其他相关随机过程，鞅理论，随机分析，伊藤公式，Girsanov's Theorem 等。
	Financial applications of stochastic processes
	Introduce Brownian Motion and related processes, martingales, stochastic calculus, the Ito's formula, Girsanov's Theorem, etc.
Section 4	Black-Scholes-Merton 模型下的期权定价
	Black-Scholes-Merton 模型，风险中性定价，波动率，平价关系，希腊字母，Delta 和 Gamma 对冲.
	Options pricing under the Black-Scholes-Merton model
	The Black-Scholes-Merton model, risk neutral valuation, volatility, parity relations, the Greeks, Delta and Gamma hedging.
Section 5	隐含波动率
	Volatility smile
Section 6	对路径依赖期权定价
	介绍各种数值方法对障碍期权、亚式期权、回望期权、百慕大期权、美式期权等定价。

		Pricing path dependent options This section introduces various methods for pricing barrier options、Asian options、lookback options、Bermudan options and American options, etc.
Section 7		随机波动率模型下的期权定价 Options pricing under stochastic volatility models
Section 8		
Section 9		
Section 10		
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11.	课程考核 Course Assessment

（①考核形式 Form of examination；②.分数构成 grading policy；③如面向本科生开放，请注明区分内容。If the course is open to undergraduates, please indicate the difference.）

期中考试 Midterm （30%） 作业 Homework （15%） 课题 Project （15%）
期末考试 Final exam（40%）

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

参考教材 Textbook：

Mathematical Models of Financial Derivatives (2rd Edition), Yue-Kuen Kwok, Springer, 2008.

Options, Futures, and Other Derivatives (9th Edition), John.C.Hull, 2014, ISBN-10: 0-13-345631-5, ISBN-13: 978-0-13-345631-8.

A course in Financial Calculus, Alison Etheridge, 2002.

Introduction to the Economics and Mathematics of Financial Markets, Jaksa Cvitanic, Fernando Zapatero, 2004

其他参考资料 Supplementary Readings：

Stochastic Calculus for Finance I: The Binomial Asset Pricing Model, Steven E. Shreve, Springer,2004

Stochastic Calculus for Finance II: Continuous-Time Models, Steven E. Shreve, Springer, 2004.