南方科技大学 SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

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	大数据金融 Data analytics in finance
2.	授课院系 Originating Department	数学系 Department of Mathematics
3.	课程编号 Course Code	MA212-1
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业选修课 Major Elective Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	根据学生的情况可以是英文、中文或者两者相结合。 English, Chinese, or both
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）	李景治博士，数学系 Dr. Jingzhi Li, Department of Mathematics
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	To be announced 待公布
10.	选课人数限额(可不填) Maximum Enrolment（Optional）	50

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	48				48

12.	先修课程、其它学习要求 **Pre-requisites or Other Academic Requirements**	大数据导论(MA333) Introduction to big data 概率论与数理统计(MA212) Probability and statistics 数理统计(MA204) mathematical statistics 常微分方程 A(MA201a) Ordinary differential equation
13.	后续课程、其它学习规划 **Courses for which this course is a pre-requisite**	本课程是为金融数学专业学生开设的专业选修课。它研究用基于金融大数据以及计算机的编程方法解决投资问题，是金融数学专业学生应该理解和掌握的专业基础知识。 This course is an elective course for students majored in Financial Mathematics in the following years. It is about the modern programming methods and big data theory in solving quantitative investment problems by computers.
14.	其它要求修读本课程的学系 **Cross-listing Dept.**	计算机系 Department of Computer Science

教学大纲及教学日历 SYLLABUS

15. **教学目标 Course Objectives**

介绍量化投资的基本概念，重要的投资模型策略，python 的实践方法；主要介绍量化投资平台的使用和提高，技术分析模型，基本面分析模型，机器学习模型，和高频交易等。

To introduce the basic concepts and terminologies of quantitative investment, the important theories of investment model, and the practical programming with python.

To mainly focus on the use of investment platforms, technical analysis models, fundamental analysis models, machine learning models, and high frequency trading.

16. **预达学习成果 Learning Outcomes**

通过本课程的教学使学生能了解现代量化投资中常用的基本概念及其实现，系统掌握量化投资的基本概念和分析问题、解决问题的基本方法，为运用金融大数据分析的理论知识并为掌握更复杂的投资模型打好基础。

Students should understand the basic knowledge and terminology of quantitative investment and its assorted implementation in Python or other programming languages. They should also have a solid grasp of basic concepts in quantitative investment and its fundamental methods in analysing and solving the problems. The course helps build the foundation for financial big data modelling and analysis as well as for more complex modern investment methods.

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.)

1 章：量化投资概念（3 学时）：量化投资定义；量化投资与传统投资比较； 量化投资历史； 量化投资的主要内容和主要方法。

Ch1. The concepts of quantitative investment (6h): The definition of quantitative investment; the comparison between quantitative investment and traditional investment; the history of quantitative investment; the main contents and methods for quantitative investment.

2 章：量化投资平台的初步使用（3 学时）：使用 Ricequant 量化投资平台获取金融数据； python 基础。

Ch2. Basic use of quantitative investment platform (3h): Use Ricequant to get financial data and analyse the data, rudimentals of python..

3 章：量化投资平台的进阶使用（3 学时）：构建模型并回测，python 进阶，投资组合评价指标。

Ch3: The Advanced use of quantitative investment platform (3h): To build models and back-testing, advanced python, portfolio evaluation.

4 章：短期策略（6 学时）：技术指标，趋势追踪模型，舆情数据等

Ch4: Short term strategy (6h): Technical indicators, trend tracking models, public opinion data

5 章: 长期策略（6 学时）：基本面分析；财务报表分析。

Ch5: Long term strategy (6h): Fundamental analysis; financial statement analysis

6 章：智能策略（6 学时）：机器学习的概念，机器学习在量化投资中的运用。

Ch6: Intelligent strategy (6h): The concepts of machine learning, the use of machine learning in quantitative investment.

7 章：高频交易（6 学时）：高频交易的特点，做市商，程序化交易。

Ch7: high frequency trading (6h): The characteristics of high frequency trading, market maker, programming trading.

8 章：业界实战经验分享（12 学时）：真实市场如何赚钱。

Ch8: experience sharing(12h): How to earn money in real world.

9 章：量化投资策略模拟交易（9 学时）：回测打分；交易竞赛；模拟盘实战；project 展示。

Ch9: Quantitative investment strategy for simulated trading (9h): Back-test evaluation; trading competition; simulation of actual market; project presentation.

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

基本教材 Required Textbook：
1.丁鹏，量化投资-策略与技术，电子工业出版社 ，2012 年
2. Active Portfolio Management：A Quantitative Approach, Richard C.Grinold
3. Algorithmic and High-Frequency Trading (Mathematics, Finance and Risk), Álvaro Cartea

参考教材：
1.周英大数据挖掘-系统方法与实例分析，机械工业出版社，2016 年 。

2. 卓金武，量化投资-数据挖掘技术与实践，电子工业出版社，2015 年 。
3. Python for Finance, Yves Hilpisch
4. High Frequency Trading – A Practical Guide to Algorithmic Strategies and Trading Systems, Irene Aldridge, Wiley 2010

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		20%		
课程项目 Projects		30%		
平时作业 Assignments		10%		
期中考试 Mid-Term Test		15%		
期末考试 Final Exam		15%		
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

√☐ 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

数学系课程规划与审核委员会
Curriculum Planning and Review Committee, Department of Mathematics