

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	商务分析中的随机模型 Stochastic Models and Business Applications				
2.	授课院系 Originating Department	信息系统与管理工程系 Division of Information Systems & Management Engineering				
3.	课程编号 Course Code	MIS207				
4.	课程学分 Credit Value	3				
5.	课程类别 Course Type	专业选修课 Major Foundational Courses				
6.	授课学期 Semester	秋季 Fall				
7.	授课语言 Teaching Language	英文 English				
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)	顾理一，信息系统与管理工程系，guly@sustech.edu.cn Liyi GU, Division of Information Systems & Management Engineering, guly@sustech.edu.cn				
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	48				48

Credit Hours

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12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无 None
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	无 None
14.	其它要求修读本课程的学系 Cross-listing Dept.	无 None

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程将介绍随机模型和随机过程，并着重于其在商务中的应用。本课程的目的是使学生对一些重要的随机模型和随机过程有所熟悉和直观理解。学生会学习将所学理论应用于各种现实问题的能力，并且能将随机模型视为可以适用于多种商业领域的强大工具。

This course introduces stochastic models and processes, and puts an emphasis on their applications to business. The objective of this course is that students obtain familiarity and an intuitive understanding for the theory and some important classes of stochastic models and processes. Students will further develop the ability to apply the learned theory to various real-world problems and appreciate stochastic models as a powerful tool applicable to several business domains.

16. 预达学习成果 Learning Outcomes

- 对随机模型和随机过程所需的数学基础有良好的了解。
- 熟悉并了解一些重要的随机模型和随机过程，包括泊松过程，更新理论，离散和连续时间马尔可夫链，排队模型，库存模型等。
- 能够应用随机过程来建模和解决商务中的问题。
- have a good understanding of the mathematical foundations needed to apply stochastic models and processes.
- are familiar with and know the properties of some important classes of stochastic models and processes, including Poisson processes, renewal theory, discrete- and continuous-time Markov chains, queueing models, inventory models.
- know how to apply stochastic processes to model and solve problems in business.

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.)

The outline below represents a tentative roadmap for the course. We may deviate from it depending on interest and time.

Week 1-2. Course description and review of probability theory

Course description / probability space / random variables / expected value / independence / important discrete and continuous distributions / conditional expectation / limit theorems

Week 3. Introduction to stochastic processes

Definition of stochastic processes / stationarity / ergodicity / examples and applications

Week 4-6. Poisson process

Definition of Poisson processes / interarrival and waiting time distributions / conditional distribution of arrival times / nonhomogeneous Poisson process / compound Poisson random variables and processes / the M/G/1 queue and business applications

Week 7-9. Renewal theory

Introduction and preliminaries / Wald's equation and limit theorems / alternating renewal processes / delayed renewal processes / renewal reward processes / queueing applications in business / regenerative processes / stationary point processes

Week 10-12. Discrete-time Markov chains

Introduction and examples / Chapman-Kolmogorov equations and classification of states / limit theorems / applications of Markov chains / time-reversible Markov chains / applications in business

Week 13-14. Continuous-time Markov chains

Introduction to continuous-time Markov chains / birth and death processes / Kolmogorov differential equations / limiting probabilities / time reversibility / applications to queueing theory

Week 15. Inventory models

Newsvendor problem / EOQ model / multi-period (s, S) model

Week 16. Markov decision processes

Introduction to MDP / policy iteration / value iteration / applications in business

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

Stochastic Processes, 2nd edition, by Sheldon M. Ross

教辅: Essentials of Stochastic Processes, by Rick Durrett

Foundations of Stochastic Inventory Theory, by Evan L. Porteus

Optimization of Business Processes: An Introduction to Applied Stochastic Modeling, by Ger Koole

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				

课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		30		
期中考试 Mid-Term Test		30		
期末考试 Final Exam		40		
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

