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**	概率论与数理统计　　Probability and Statistics
2.	**授课院系 Originating Department**	数学系　　Department of Mathematics
3.	**课程编号 Course Code**	MA212
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	通识必修课程 General Education (GE)Required Courses
6.	**授课学期 Semester**	春季 Spring
7.	**授课语言 Teaching Language**	英文 English/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）**	杨丽丽，数学系 慧园 3 栋 521 房间 Yangll@sustc.edu.cn 13691617384 Lili Yang, Department of Mathematics Rm.521, Building 3, Wisdom Park, Yangll@sustc.edu.cn 13691617384
9.	**实验员/助教、所属学系、联系方式** **Tutor/TA(s), Contact**	
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	48	32			80

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	数学分析 II(H)或者数学分析 II（MA102a）或 高等数学（下）A（MA102B） Mathematical Analysis II(H) or Mathematical Analysis II (MA102a) or Calculus II A (MA102B)
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14. 其它要求修读本课程的学系 Cross-listing Dept.	

教学大纲及教学日历 SYLLABUS

15. **教学目标 Course Objectives**

介绍概率论和数理统计的基本理论，基本方法和简单应用，为应用统计学以及更高层次的概率理论及统计理论打下基础。同时着重介绍如何正确地应用统计方法以及对统计意义的正确阐释。本课程的重点是概率和统计方法的应用。

To introduce the basic concepts in probability and statistics which form the basis for all applications of statistics, and for further probability and statistical theory. Also to introduce statistical methods with a strong emphasis on applying standard statistical techniques appropriately and with clear interpretation. The emphasis is on applications.

16. **预达学习成果 Learning Outcomes**

通过本课程的学习，学生将掌握一些基本的概率方法和技术。熟悉能够解决实际生活中带有概率性质的问题的基本方法和技术，对一系列常用统计方法获得理论联系实践的理解。学生还应对一些统计软件建立初步的了解。

After completing this course, students should understand basic probability methods and techniques. They should be familiar with a range of techniques for solving real life problems of the probabilistic nature and should have a conceptual and practical understanding of a range of commonly applied statistical procedures. They should have also developed some familiarity with the statistical package.

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 1 章 概率 Probability（7 学时）

样本空间、随机事件、概率测度、计数方法、条件概率、独立事件、贝叶斯公式

Chapter 1 Probability (6 hours):

sample spaces, random events, probability measures, probability calculation, conditional probability, independent event, Bayesian formula

第 2 章 随机变量 Random Variables（7 学时）

离散型随机变量：概率分布函数，常见的离散型随机变量，如伯努利随机变量、二项分布、几何分布和负二项分布、超几何分布及泊松分布等。

Chapter 2 Random variables (8 hours):

discrete random variables: probability distribution function, Bernoulli random variables, Binomial distribution, geometric and negative binomial distribution, hypergeometric distribution, Poisson distribution

连续性随机变量：概率密度函数、常见的连续型随机变量，如均匀分布、指数分布、正态分布等。

Continuous random variables: probability density function, uniform distribution, exponential distribution, normal distribution

第 3 章 联合分布（8 学时）

随机变量的联合累积分布函数、边缘累积分布函数 。

离散型随机变量的联合概率质量函数、边缘概率质量函数。

连续型随机变量的联合密度函数，边缘密度函数。

独立随机变量、条件分布及联合分布的随机变量函数。

Chapter 3 Joint Distributions (8 hours)

Random variable, discrete random variable, continuous random variable, independent random variable, joint distribution

第 4 章 期望 Expectation（6 学时）

随机变量的期望、方差和标准差、协方差和相关系数、条件期望。

Chapter 4 Expectation (6 hours)

Expected value, variance, standard deviation, correlation, correction coefficient, conditional expected value

第 5 章 极限定理 Limit Theorems（2 学时）

大数定律和中心极限定理

Chapter 5 Limit theorems (4 hours)

The law of large numbers, central limit theorem

第 6 章 数理统计的基本概念及抽样分布 Sampling Distributions of Estimators（4 学时）

数理统计的基本概念：总体和样本、统计推断等。

样本分布，常用统计量。

t 分布，F 分布。

Chapter 6 Sampling distributions of estimates (4 hours)

Basic concepts of statistics: sample set and sample, statistic assumption

Sample distribution, commonly used statistics, t distribution, F distribution

第 7 章 参数估计 Parametric Estimation Problems（6 学时）

点估计, 区间估计

Chapter 7 Parametric estimation problems

Point estimation and interval estimation

第 8 章 假设检验 Testing Hypothesis（6 学时）

单样本正态总体均值和方差的检验、两独立样本比较、配对样本比较。

Chapter 8 Testing hypothesis (6 hours)

Specification of the significance level and the concept of a p-value, NULL Hypothesis, duality of confidence intervals and hypothesis

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

数理统计与数据分析，Mathematical Statistics and Data Analysis, John A. Rice, 3rd Ed.

推荐参考资料：

Probability and Statistics, 5th edition, Jay L. Devore

概率论基础教程(第 8 版), 罗斯(Sheldon M. Ross)

概率论与数理统计（第 4 版），盛骤 谢式千 潘承毅 著，高等教育出版社

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		5%		
课堂表现 Class Performance				
小测验 Quiz		10%		
课程项目 Projects				
平时作业 Assignments		10%		
期中考试 Mid-Term Test		25%		
期末考试 Final Exam		50%		
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**

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
