**研究生课程教学大纲（Syllabus）**

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| 课程代码  Course Code | STAT6001 | \*学时  Teaching Hours | | 48 | | | \*学分  Credits | | | 3 | |
| \*课程名称  Course Name | 基础数理统计 | | | | | | | | | | |
| Basic Mathematical Statistics | | | | | | | | | | |
| \*授课语言  Instruction Language | 中文  Chinese | | | | | | | | | | |
| \*开课院系  School | 数学科学学院  School of Mathematical Sciences | | | | | | | | | | |
| 先修课程  Prerequisite | 微积分，线性代数， 概率统计  Calculus, Linear Algebra, Probability and Statistics | | | | | | | | | | |
| 授课教师  Instructors | 姓名Name | | 职称Title | | 单位Department | | | | 联系方式E-mail | | |
| 罗珊 | | 副教授 | | 统计系 | | | | sluomath@sjtu.edu.cn | | |
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| \*课程简介（中文）Course Description | 本课程是非统计专业研究生的随机数学系列课程之一，该系列现开设《基础数理统计》，《随机过程》和《生物数学》，以满足不同学科学生的需要。  数理统计是研究怎样用有效的方法去收集和使用带随机性影响的数据的一门数学学科，其应用及其广泛。其方法被广泛应用于信息，经济，工程等各个领域。要想处理大量的数据并从中得出有助于决策的量化结论，就必须掌握不断更新的数理统计知识。另外，为了便于处理各种统计问题的计算，需要学生掌握相应的统计软件。  通过该门课程的学习，期望学生能较好地理解数理统计的基本思想，掌握数理统计的数学理论。掌握几个基本而常用的数据的处理方法，如Bootstrap，参数推断，假设检验，贝叶斯推断，线性回归和Logistic回归，非参数曲线估计，分类器等；进而会应用R软件解决实际问题。从而提高学生的数学素质，加强学生开展科研工作和解决实际问题的能力。 | | | | | | | | | | |
| \*课程简介（English）Course Description | This course is one of a series of random mathematics courses for postgraduate students from non-statistics major. The series now offers basic mathematical statistics, random process and Biomathematics to meet the needs of different subjects and students.  Mathematical statistics is a mathematical subject that studies how to collect and use the data with random influence by effective methods, and its application is extensive. Its method is widely used in information, economy, engineering and other fields. In order to deal with a large number of data and draw quantitative conclusions that are helpful for decision-making, it is necessary to master constantly updated mathematical statistics knowledge. In addition, in order to facilitate the calculation of various statistical problems, students need to master the corresponding statistical software.  Through the study of this course, students are expected to better understand the basic idea of mathematical statistics and master the mathematical theory of mathematical statistics. Master several basic and common data processing methods, such as Bootstrap, parametric inference, hypothesis testing, Bayesian inference, Linear and Logistic regression analysis, nonparametric curve estimation, classifiers, etc.; be able to use R software to solve practical problems. So as to improve the mathematical quality of students, strengthen the ability of students to carry out scientific research and solve practical problems. | | | | | | | | | | |
| \*教学安排  Schedules | 教学内容Content | | | | | 授课学时  Hours | | 教学方式  Format | | | 授课教师  Instructor |
| 概率：概率相关基本概念，随机变量，数学期望，随机变量的收敛 | | | | | 6 | | 面授 | | | 罗珊 |
| 参数与非参数模型、统计推断的基本概念 | | | | | 1 | | 面授 | | | 罗珊 |
| 经验分布函数和统计泛函 | | | | | 1 | | 面授 | | | 罗珊 |
| 随机模拟，Bootstrap方差估计，Bootstrap置信区间 | | | | | 2 | | 面授 | | | 罗珊 |
| 参数推断：极大似然估计及极大似然估计的性质、相合性、同变性、渐近正态性 | | | | | 3 | | 面授 | | | 罗珊 |
| 极大似然估计的最优性、Delta方法、多参数模型、参数Bootstrap方法 | | | | | 3 | | 面授 | | | 罗珊 |
| Wald检验，卡方检验，置换检验 | | | | | 3 | | 面授 | | | 罗珊 |
| 似然比检验，多重检验，拟合优度检验 | | | | | 3 | | 面授 | | | 罗珊 |
| 贝叶斯推断 | | | | | 4 | | 面授 | | | 罗珊 |
| 线性回归 | | | | | 4 | | 面授 | | | 罗珊 |
| Logistic回归 | | | | | 2 | | 面授 | | | 罗珊 |
| 非参数曲线估计：偏差-方差平衡，直方图 | | | | | 3 | | 面授 | | | 罗珊 |
| 核密度估计 | | | | | 3 | | 面授 | | | 罗珊 |
| 非参数回归 | | | | | 3 | | 面授 | | | 罗珊 |
| 分类：错判率，贝叶斯分类器，高斯分类器，线性分类器，支持向量机 | | | | | 4 | | 面授 | | | 罗珊 |
| 期末考试 | | | | | 3 | | 面授 | | | 罗珊 |
| \*考核方式Grading Policy | 平时作业30%+期末闭卷考试70% | | | | | | | | | | |
| \*教材或参考资料Textbooks & References | 统计学完全教程。L沃塞曼著，张波，刘中华，魏秋萍，代金译。科学出版社。  应用数理统计。邰淑彩，孙韫玉，何娟娟著。武汉大学出版社。  应用数理统计。李忠范，高文森主编。高等教育出版社。 | | | | | | | | | | |
| 备注  Notes |  | | | | | | | | | | |

备注说明：

1．带\*内容为必填项；

2．课程简介字数为300-500字；教学内容、进度安排等以表述清楚教学安排为宜，字数不限。