厦门大学本科课程大纲

XMU Undergraduate Course Syllabus

课程名称 Course title (in Chinese & English)	回归分析 Regression Analysis		
课程编号 Course number		学分/周学时 Credit/weekly teaching hour	3 credit /4 teaching hours per week
开课学期 Semester	2021 秋季 Fal 2021	开课学年 Academic year	2021-2022
课程类型 Course type	学科通修课程 Compulsory		
先修课程 Prerequisite course	高等数学、线性代数、概率论、数理统计 Advanced Calculus, Linear Algebra, Probability Theory, Mathematical Statistics		
选用教材 Required textbook	无		
选用教材（英文） Required English-written textbook	无		
主要参考书 Main reference book	Introduction to Regression Modeling, by Bovas Abraham, Johannes Ledolter, Cengage Learning, 2006. ISBN-13: 978-0-534-42075-8（无对应的中译本）		
主要参考书（英文） Main English-written reference book	Introduction to Regression Modeling, by Bovas Abraham, Johannes Ledolter, Cengage Learning, 2006. ISBN-13: 978-0-534-42075-8		

一、课程性质、目的与任务 Course description and objectives

　　本课程为统计学专业本科生的必修课，是应用统计学中最重要的问题之一：回归。首先，我们将详细学习和掌握经典回归问题。我们将从经典的模型假设出发，学习经典最小二乘估计量的最优性质，并研究这些假设下的基本统计推论问题。然后，我们将解决各种应用问题和违背经典模型假设的情况，包括诸如交互作用、模型选择、多重共线性、序列相关性等相关问题。还将介绍诸如岭回归等现代统计方法来帮助理解某些情况下有偏估计的重要性。最后，我们还将简要介绍广义线性模型，尤其是二元数据的逻辑回归。在整个课程中，我们还将遇到诸如偏差方差平衡和维数诅咒等概念。同时，本课程将使用 R 语言编程进行基本回归建模和数据分析。

　　This course is compulsory for students major in Statistics, and is about one of the most important problems in applied statistics: regression. We will begin by studying the classic regression problem in some detail. We will examine the assumptions under which the classic least square estimators can be regarded as optimal, and study the basic estimation and inferential problems under these assumptions. We will then address various applied issues and violations to the classic assumptions, including such topics as interaction effects, model selection, multicollinearity, serial correlation, etc. Modern techniques such as ridge regression will also be treated to help students understand the significance of biased estimation. Finally, we will briefly

introduce students to generalized linear models, focusing primarily on logistic regression for binary data. Throughout the course, students will also encounter concepts such as the bias-variance trade-off, and the curse of dimensionality. This course will use R programming language for basic regression modeling and data analysis.

二、教学基本要求 Course requirements

该课程为统计学专业本科生的必修课。教学基本要求如下：

1. 学生必须要求按时上课，不得缺勤，不得早退。

2. 学生通过学习本门课程必须要掌握如下知识：线性回归模型、高斯马尔科夫假设、参数的最小二乘估计及其性质、假设检验、变量选择等。

3.平时作业必须按时完成和提交，否则不得计入成绩。除非提前至少两天请假并有可允许的理由，否则作业不得晚交。每节课将会进行课堂考勤，保证每次都要参加课程。课堂小测验随机进行，用于及时检验学生对于课程的掌握和理解。课程小论文题目不限，只要与所学知识相关即可。期中考试安排在学期中（第 7-8 周），期末考试安排在最后一周。所有考试都是闭卷考试。所有作业和考试禁止抄袭，一经发现，本门课程将不能及格，并上报学院和教务部门严肃处理。

This course is compulsory for students major in Statistics. There are the course requirements:

1. Students should attend every lecture.

2. Students should master the following knowledge after studying this course: linear regression model, Gauss-Markov assumptions, least square estimation method and properties, hypothesis testing, variable selection etc.

3. Homework assignments must be submitted on time before the lecture start. No late homework is acceptable unless a valid reason is reported to the instructor at least two days before the due day. Attendance is required for all lectures. Quizzes are randomly given in the lecture. You will need to finish a course project. Topics of the course projects are not pre-assigned, as long as they are related to this course. Both midterm exam and final exam are closed-book. Any cheating activity is zero tolerant in all exams and assignments. Once a cheating activity is identify, the student will receive zero grade for this course as the minimum penalty.

三、主要内容及学时安排 Main content and schedule

章或节 Chapter/Session	主要内容 Main Contents	学时安排 Teaching hours
第一章 Chapter 1	回归模型简介 Introduction to Regression	4
第二章 Chapter 2	简单线性回归 Simple Linear Regression	12
第三章 Chapter 3	多重线性回归 Multiple Linear Regression	12
第四章 Chapter 4	模型诊断：变换和残差分析 Model Checking: Transformation and Residual Analysis	8
第五章 Chapter 5	模型选择（变量选择） Model Selection (Variable Selection)	8
第六章 Chapter 6	多重共线性及岭回归 Multicollinearity and Ridge Regression	4
第七章 Chapter 7	逻辑回归和广义线性模型 Logistic Regression and Generalized Linear Models	4
第八章 Chapter 8	非线性回归与非参数回归简介 Introduction to Nonlinear Regression and Nonparametric	4

	Regression		
合计：		56	

四、考核方式：考勤与课堂测验（5%），作业（15%），期中考试（30%），期末笔试（40%）和课程论文（10%）

Grading policy: Attendance and quizzes (5%), assignments (15%), midterm exam (30%), final exam (40%) and course project (10%)

五、开课专业：统计学双学位（思明校区）

Majors that the course is designed for Double-degree major in Statistics (Siming Campus)

六、大纲制定者：王淳林   大纲审定者：

The syllabus is made by: Chunlin Wang   The syllabus is approved by:

七、大纲制定时间：2021 年 9 月 10 日

The syllabus is made on: 2021   YY   09   MM   10   DD

厦门大学本科课程大纲填写说明：

1. 课程中英文名称必须准确、规范。英文名称每个单词打头字母应用大写。

2. 课程类型是指公共基本课程、校通识课程、院系通识课程、学科类通修课程或学科类方向性课程。

3. 先修课程是与该课程具有严格的前后逻辑关系，非先修课程则无法学习该课程。

4. 选用教材和主要参考书要求注明作者、书目、出版社、出版年限。例如，"黄叔武、杨一平编：《计算机网络工程教程》，1999 年 7 月。"

5. 开课专业必须明确，不能出现"等"字样，如"经济学、会计学等专业"。

6. 课程性质、目的和任务不少于 200 字。

7. 教学基本要求不少于 400 字。

8. 考核方式是指笔试（开卷或闭卷）、口试或其它考查方式。

9. 其它信息是指该课程获奖情况，例如"优秀课程"、"名牌课程"、"精品课程"或者"双语教学课程"等。获奖情况必须注明获奖等级、级别。