应用回归分析 教学大纲

Regression Analysis Subject Syllabus

一、课程信息 Subject Information

课程编号: Subject ID	3100313004	开课学期: Semester	3
课程分类: Category		所属课群: Section	专业方向类
课程学分: Credit Points	4.25	总学时/周: Total Hours/Weeks	68
理论学时: LECT. Hours	48	实验学时: EXP. Hours	20
PBL 学时: PBL Hours	0	实践学时/周: PRAC. Hours/Weeks	0
开课学院: College	数学与统计学院	适用专业: Stream	应用统计学 AS
课程属性: Pattern	必修 Compulsory	课程模式: Mode	引进 UTS
中方课程协调人: NEU Coordinator	薛昌涛 Changtao Xue	成绩记载方式: Result Type	百分制 Marks
先修课程: Requisites	统计学导论 Introduction to Statistics		
英文参考教材: EN Textbooks	N.R. Draper, H. Smith., Applied Aggression Analysis(3rd ed), A Wiley-Interscience Publication JOHN WILEY & SONS, INC. New York,1998.		
中文参考教材: CN Textbooks	何晓群，应用回归分析（第五版），中国人民大学出版社，2019.		
教学资源: Resources	https://lms.cloudcampus.com.cn/courses/20		
课程负责人(撰写人): Subject Director	薛昌涛 Changtao Xue	提交日期: Submitted Date	单击或点击此处输入日期。
任课教师(含负责人): Taught by	薛昌涛 Joanna Wang Changtao Xue Joanna Wang		
审核人: Checked by	韩鹏	批准人: Approved by	史闻博
		批准日期: Approved Date	单击或点击此处输入日期。

二、教学目标 Subject Learning Objectives (SLOs)

注：毕业要求及指标点可参照悉尼学院本科生培养方案，可根据实际情况增减行数

Note: GA and index can be referred from undergraduate program in SSTC website. Please add/reduce lines based on subject.

整体目标: Overall Objective	《应用回归分析》是应用统计学专业重要的专业基础课程之一。本课程主要包括一元和多元线性回归方程的参数估计、显著性检验及其应用，违背回归模型基本假设的异方差、自相关等问题的诊断和处理方法，回归变量选择，逐步回归方法及多重共线性等内容。本门课使学生掌握统计学的基本思想、理论和方法的主要课程，以及培养学生熟练应用计算机软件处理统计数据能力。 Applied regression analysis is one of the important professional basic courses of students majoring in Statistics. This course mainly includes parameter estimation, significance test and application of simple and multivariate linear regression equations, diagnosis and treatment methods of heteroscedasticity, autocorrelation and other problems that violate the basic assumptions of regression model, selection of regression variables, stepwise regression method and multicollinearity. This course enables students to master the basic ideas, theories and methods of statistics, and cultivate students' ability to skillfully use computer software to process statistical data.	
（1）专业目标: Professional Ability	1-1	了解回归分析的起源与发展 A brief history of Regression Analysis and its development
	1-2	了解随机变量的定义、性质以及描述方法； Definition, properties and description methods of RV
	1-3	掌握简单线性回归模型的建立与检验 Master the construction and testing of simple linear regressive model
	1-4	掌握多元线性回归模型的建立与检验 Master the construction and testing of multiple linear regressive model
	1-5	掌握“非线性”线性回归的方法 Master the “Non-linear” linear regression
	1-6	掌握广义和加权最小二乘法 Master GLS and WLS
	1-7	掌握分类随机变量分析以及逻辑回归模型 Analysis of Categorical RVs and Logistic regression model
（2）德育目标: Essential Quality	2-1	培养遵守法律、懂规则、守规则的新时代公民 Cultivate citizens of the new era who abide by the law, understand and obey the rules
	2-2	了解主要矛盾和次要矛盾，在面对复杂问题的时候要实事求是、抓住主要矛盾 Understand the main contradiction and secondary contradiction, seek truth from facts and grasp the main contradiction in the face of complex problems
	2-3	培养服务意识，具有“以人为本”的服务精神 Cultivate service consciousness and have the service spirit of

		"people-oriented"
	2-4	培养具有不畏困难、不惧失败、锲而不舍、敢于尝试、迎难而上的精神，并在学习过程中培养自己的细心和耐心的勇气和精神 Cultivate the spirit of not fearing difficulties or failure, perseverance, daring to try, and cultivate their own careful and patient courage and spirit in the process of learning
	2-5	培养有条理和计划，做到心中有数、有条不紊、循序渐进地完成一项工作 Cultivate a sense of order and plan, and complete a work in an orderly and gradual manner

课程教学目标与毕业要求的对应关系 Matrix of GA & SLOs

毕业要求 GA	指标点 GA Index	教学目标 SLOs
1、理学知识：具有扎实的数学基础，能够将数学、自然科学和专业知识用于解决复杂实际问题。	1-1：具有较强的演绎推理能力、准确计算能力、分析归纳能力、抽象思维能力，掌握数学、自然科学和相关专业知识，并使用其建立正确的数学、物理学等模型以解释复杂实际问题；	1-1 到 1-7
	1-2：掌握统计调查、统计数据处理、统计分析、计算机与统计软件使用等应用统计学的基本理论、知识与方法，具备采集、处理、分析数据的能力，熟悉预研报告、可行性分析报告、研究方案等文档的撰写规范；	
2、问题分析：能够借助应用统计学的基本原理、方法和手段，识别、表达、并通过文献研究分析复杂实际问题，以获得有效结论。	2-1：能够借助应用统计学的基本原理、方法和手段，分析、识别、表达本专业相关的复杂实际问题；	1-1 到 1-7
	2-2：能够借助应用统计学的基本原理、方法和手段，针对复杂实际问题设计针对性的方案，并综合运用文献、科学理论和技术手段予以解决。	
11、项目管理与财务：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。	11-1：掌握基本的工程管理原理和经济决策方法，能对应用统计相关领域的新技术、新应用进行技术分析和比较；	1-1 到 1-7

三、教学内容 Content (Topics)

注：以中英文填写，各部分内容的表格可根据实际知识单元数量进行复制、扩展或缩减

Note: Filled in both CN and EN, extend or reduce based on the actual numbers of knowledge unit

(1) 理论教学 Lecture

知识单元序号:	1	支撑教学目标:	1-1、2-4

Knowledge Unit No.		SLOs Supported	
知识单元名称 Unit Title	回归分析概述 Introduction to Regression Analysis		
知识点: Knowledge Delivery	回归分析的起源与发展 A brief history of Regression Analysis and its development		
学习目标: Learning Objectives	了解: Recognize	回归分析的起源与发展 A brief history of Regression Analysis and its development	
	理解: Understand	回归分析的目的 The aim of Regression Analysis	
	掌握: Master	回归分析的基本步骤 Basic steps of Regression Analysis	
德育目标 Moral Objectives	培养具有不畏困难、不惧失败、锲而不舍、敢于尝试、迎难而上的精神，并在学习过程中培养自己的细心和耐心的勇气和精神 Cultivate the spirit of not fearing difficulties or failure, perseverance, daring to try, and cultivate their own careful and patient courage and spirit in the process of learning		
	培养服务意识，具有“以人为本”的服务精神 Cultivate service consciousness and have the service spirit of "people-oriented"		
	培养遵守法律、懂规则、守规则的新时代公民 Cultivate citizens of the new era who abide by the law, understand and obey the rules		
重点: Key Points	回归分析的起源与发展 A brief history of Regression Analysis and its development		
	回归分析的目的 The aim of Regression Analysis		
难点: Focal Points	回归分析的基本步骤 Basic steps of Regression Analysis		

知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-2，2-2
知识单元名称 Unit Title	统计基础知识回顾 Statistics review		
知识点: Knowledge Delivery	随机变量的描述方法； Random variable		
	总体统计量； Population statistics		
	样本统计； Sample statistics		
	假设检验。 Hypothesis testing		

学习目标: Learning Objectives	了解: Recognize	随机变量的定义、性质以及描述方法; Definition, properties and description methods of RV
	理解: Understand	基本统计量与样本统计; Basic statistics and sample statistics;
	掌握: Master	假设检验的方法; Hypothesis testing
德育目标 Moral Objectives	了解主要矛盾和次要矛盾，在面对复杂问题的时候要实事求是、抓住主要矛盾 Understand the main contradiction and secondary contradiction, seek truth from facts and grasp the main contradiction in the face of complex problems	
重点: Key Points	几种重要的假设检验; Several important hypothesis tests	
难点: Focal points	假设检验的统计量的构造。 Construction of statistics of hypothesis test	

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-3，2-5
知识单元名称 Unit Title	简单线性回归 Simple Linear Regression		
知识点: Knowledge Delivery	数据的直线拟合 Fitting lines to data		
	模型的假设、参数与估计; Continuity of solution depending on initial value and differentiability theorem.		
	估计的统计性质 Statistical properties of estimates		
	模型的统计性质 Statistical properties of estimates		
	模型拟合 Model fit		
学习目标: Learning Objectives	了解: Recognize	数据的拟合直线 Fitting lines to data	
	理解: Understand	简单线性模型 Simple linear model	
	掌握: Master	模型的建立与检验 Establishment and test of model	
德育目标 Moral Objectives	培养有条理和计划，做到心中有数、有条不紊、循序渐进地完成一项工作 Cultivate a sense of order and plan, and complete a work in an orderly and gradual manner		
重点: Key Points	模型的建立与检验 Establishment and test of model		

难点: Focal points	模型拟合时的方差分析、残差分析 ANOVA and residual analysis

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-4，2-3
知识单元名称 Unit Title	多元线性回归 Multiple Linear Regression		
知识点: Knowledge Delivery	多维最小二乘法 Multidimensional least squares		
	模型假设与统计量 Model assumptions and statistical properties		
	模型拟合 Model fit		
	模型的选取(向前、向后、逐步回归) Model selection (forward selection、backward elimination、stepwise regression)		
	分类预测因子、相互作用效应、偏和平方与 F 检验 categorical predictors、interaction effects、partial sum squares and F-test		
学习目标: Learning Objectives	了解: Recognize	多维数据的最小二乘法 Multidimensional least squares of multiple dimensional	
	理解: Understand	多元线性模型的拟合与检验 Fitting and testing of multivariate linear models	
	掌握: Master	模型的选择方法 Model selection	
德育目标 Moral Objectives	培养服务意识，具有“以人为本”的服务精神 Cultivate service consciousness and have the service spirit of "people-oriented"		
重点: Key Points	多元线性模型的拟合与检验 Fitting and testing of multivariate linear models		
难点: Focal points	模型的选择方法 Model selection		

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-5，2-3
知识单元名称 Unit Title	“非线性”线性回归 “Non-linear” linear regression		
知识点: Knowledge Delivery	变换变量 Transforming variables		
	变换自变量 Transforming independent variable		
	变换因变量 Transforming dependent variable		
学习目标:	了解:	非线性模型；	

Learning Objectives	Recognize	Non-linear model
	理解: Understand	二次模型和多项式模型 Quadratic models and polynomial models
	掌握: Master	自变量和因变量的变换； Transforming variables and dependent variable
德育目标 Moral Objectives	培养服务意识，具有“以人为本”的服务精神 Cultivate service consciousness and have the service spirit of "people-oriented"	
重点: Key Points	模型的选择 Model selecting	
难点: Focal points	模型的确定与检验 Model fitting and examing	

知识单元序号: Knowledge Unit No.	6	支撑教学目标: SLOs Supported	1-6，2-5
知识单元名称 Unit Title	广义最小二乘法 Generalised Least Squares		
知识点: Knowledge Delivery	广义最小二乘法 Generalised Least Squares		
	加权最小二乘法 weighted least squares (WLS)		
学习目标: Learning Objectives	了解: Recognize	广义最小二乘法概念 Definition of Generalised Least Squares	
	理解: Understand	广义和加权最小二乘法的实质 Essence of GLS and WLS	
	掌握: Master	广义和加权最小二乘法 GLS and WLS	
德育目标 Moral Objectives	培养有条理和计划，做到心中有数、有条不紊、循序渐进地完成一项工作 Cultivate a sense of order and plan, and complete a work in an orderly and gradual manner		
重点: Key Points	广义和加权最小二乘法 GLS and WLS		
难点: Focal points	广义和加权最小二乘法 GLS and WLS		

知识单元序号: Knowledge Unit No.	7	支撑教学目标: SLOs Supported	1-7，2-1
知识单元名称 Unit Title	分类随机变量分析 Analysis of Categorical RVs		
知识点: Knowledge Delivery	多维正态分布（多项式分布） Multinomial distribution		

	卡方拟合优度检验 Chi-square goodness-of-fit test	
	双向表 two-way tables	
	卡方独立性检验 Chi-square independence test	
	相对风险 Relative risks	
	优势和优势比 Odds and odds ratios	
学习目标: Learning Objectives	了解: Recognize	多维正态分布（多项式分布） Multinomial distribution
	理解: Understand	卡方拟合优度检验 Chi-square goodness-of-fit test
	掌握: Master	卡方独立性检验 Chi-square independence test
德育目标 Moral Objectives	培养遵守法律、懂规则、守规则的新时代公民 Cultivate citizens of the new era who abide by the law, understand and obey the rules	
重点: Key Points	卡方独立性检验 Chi-square independence test	
难点: Focal points	卡方拟合优度检验 Chi-square goodness-of-fit test	

知识单元序号: Knowledge Unit No.	8	支撑教学目标: SLOs Supported	1-7，2-5
知识单元名称 Unit Title	逻辑回归 Logistic Regression		
知识点: Knowledge Delivery	二进制响应变量 Binary response variable		
	链接功能 Link functions		
	简单逻辑回归 Simple logistic regression		
	多元 logistic 回归 Multiple logistic regression		
学习目标: Learning Objectives	了解: Recognize	二进制响应变量 Binary response variable	
	理解: Understand	链接功能 Link functions	
	掌握: Master	简单逻辑回归 Simple logistic regression	
德育目标 Moral Objectives	培养有条理和计划，做到心中有数、有条不紊、循序渐进地完成一项工作		

	Cultivate a sense of order and plan, and complete a work in an orderly and gradual manner
重点: Key Points	逻辑回归模型 Logistic regression model
难点: Focal points	多元 logistic 回归 Multiple logistic regression

(2) 实验教学 Experiments

注：可根据实际情况增减行数。实验类型可分为验证性、设计性、综合性，实验性质可分为选做、必做。

Note: Please add/reduce lines based on subject. The Type contains Verify, Design, and Comprehensive, while the Pattern contains Required and Elective

序号 No.	实验项目名称 Experiment Topic	学时 Hours	每组人数 MPG*	实验类型 Type	实验性质 Pattern
1	简单线性回归（一） Simple Linear Regression I	2	1	验证性 Verify	必做 Elec
2	简单线性回归（二） Simple Linear Regression II	2	1	验证性 Verify	必做 Elec
3	多元线性回归（一） Multiple Linear Regression I	2	1	验证性 Verify	必做 Elec
4	多元线性回归（二） Multiple Linear Regression II	2	1	验证性 Verify	必做 Elec
5	多元线性回归（三） Multiple Linear Regression III	2	1	验证性 Verify	必做 Elec
6	非线性回归 Non-linear Regression	2	1	验证性 Verify	必做 Elec
7	加权最小二乘回归 Weighted Least Squares Regression	2	1	验证性 Verify	必做 Elec
8	分类随机变量 Analysis of Categorical RVs	2	1	验证性 Verify	必做 Elec
9	简单逻辑回归 Simple Logistic Regression	2	1	验证性 Verify	必做 Elec
10	多元逻辑回归 Multiple Logistic Regression	2	1	验证性 Verify	必做 Elec
	总计 Total	20			

*MPG: Members per group

实验项目序号: Experiment No.	1	支撑教学目标: SLOs Supported	1-2, 1-3
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	简单线性回归（一） Simple Linear Regression I		
实验内容: Content	建立简单线性回归模型 Establish simple linear regression model		
学习目标: Learning Objectives	掌握基本的利用 R 做简单线性回归方法 Master the method of Simple Linear Regression by R		
教学要求: Requirements	对给定的问题，学习求解简单线性回归模型的基本步骤。 Given data, learn and master the steps to solve the problem in simple linear regression.		
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078		
实验软硬件设备: Software/Hardware	计算机 Computer		

实验项目序号: Experiment No.	2	支撑教学目标: SLOs Supported	1-2, 1-3
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	简单线性回归（二） Simple Linear Regression II		
实验内容: Content	对给定数据建立简单线性回归方程 A simple linear regression equation is established for the given data		
学习目标: Learning Objectives	掌握一般的利用 R 做简单线性回归方法 Master the method of Simple Linear Regression by R		
教学要求: Requirements	对给定的问题，会通过 R 求出简单线性回归模型，并掌握对回归系数以及模型的显著性检验。 Given the inear programming problems, learn and master the steps to solve the problem in simple linear regression, and master the method of testing the coefficients and model.		
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078		
实验软硬件设备: Software/Hardware	计算机 Computer		

实验项目序号: Experiment No.	3	支撑教学目标: SLOs Supported	1-4
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue

实验名称: Experiment Title	多元线性回归（一） Multiple Linear Regression I
实验内容: Content	通过绘图检验各变量的相关性 The correlation of variables was tested by scatter diagram
	写下估计的回归方程，并解释估计的β系数 Write down the estimated regression equation and provide interpretations of the estimated beta coefficients
	测试整体回归是否在 0.05 水平上显著 Test if the overall regression is significant at the 0.05 level
	在正态性、独立性和恒定方差假设下，分析残差 Perform a visual analysis of the residuals for compliance with the normality, independence and constant variance assumptions
学习目标: Learning Objectives	掌握基本的利用 R 做多元线性回归方法 Master the method of Multiple Linear Regression by R
教学要求: Requirements	对给定的问题，学习求解多元线性回归模型的基本步骤。 Given data, learn and master the steps to solve the problem in multiple linear regression.
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078
实验软硬件设备: Software/Hardware	计算机 Computer

实验项目序号: Experiment No.	4	支撑教学目标: SLOs Supported	1-4
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	多元线性回归（二） Multiple Linear Regression II		
实验内容: Content	基于相关性，选择两个预测因子作为多元回归的候选预测因子 Based on correlations, chose two predictors as candidate predictors for a multiple regression		
	写出前进法中每一步的模型 Write down the model selected at each step of the forward procedure		
	写下在后退过程的每个步骤中选择的模型 Write down the model selected at each step of the backward procedure		
	描述前进法的最终模型优于后退法的一种方式 Describe one way in which the final model of the forward procedure is superior to that of the backward model		
	描述两种方式，其中反向过程的最终模型优于正向模型 Describe two ways in which the final model of the backward procedure is superior to that of the forward model		
学习目标: Learning Objectives	学会多元回归中的前进法和后退法 Learn the forward method and backward method in multiple regression		

教学要求: Requirements	对给定数据，熟练运用 R 做二元回归 For the given data, skillfully use R to do multiple regression
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078
实验软硬件设备: Software/Hardware	计算机 Computer

实验项目序号: Experiment No.	5	支撑教学目标: SLOs Supported	1-4
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	多元线性回归（三） Multiple Linear Regression III		
实验内容: Content	写下估计的回归方程，并解释估计的β系数 Write down the estimated regression equation and provide interpretations of the estimated beta coefficients		
	确定是否存在违反独立性假设的序列相关性的统计证据 Determine if there is any statistical evidence of serial correlation which would violate the assumption of independence		
	确定是否存在多重共线性的统计证据 Determine if there is any statistical evidence of multicollinearity		
	分析残差是否符合正态性、独立性和恒定方差假设 Perform a visual analysis of the residuals for compliance with the normality, independence and constant variance assumptions		
	使用 0.05 显著性水平，对残差的正态性进行假设检验 Using 0.05 significance level, perform a hypothesis test as to the normality of the residuals		
学习目标: Learning Objectives	掌握多重共线性和残差分析 Master multicollinearity and residual analysis		
教学要求: Requirements	学会利用 R 进行多元回归模型的多重共线性和残差分析 Learn to use R for multicollinearity and residual analysis of multiple regression model		
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078		
实验软硬件设备: Software/Hardware	计算机 Computer		

实验项目序号: Experiment No.	6	支撑教学目标: SLOs Supported	1-5
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	非线性回归 Non-linear Regression		

实验内容: Content	描述 wall 和 weight 之间关系的方向、类型和强度 Describe the direction, type and strength of the relationship between wall and weight
	如果数据采用直线模型，我们会发现残差有哪两个问题? If a straight-line model was fitted to the data, what two problems would we see with the residuals?
	Write down the estimated regression model and provide interpretations of the estimated beta coefficients 写下估计回归模型，并提供估计贝塔系数的解释
	以对数单位记录估计回归模型，并提供估计 β 系数的解释 Write down the estimated regression model in log-unitsand provide interpretations of the estimated beta coefficients
学习目标: Learning Objectives	掌握不能用直线模型而选用 log-units 模型的方法 Master the method of choosing log-units model instead of linear model
教学要求: Requirements	理解 log-units 的优点 Understand the benefits of log- units
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078
实验软硬件设备: Software/Hardware	计算机 Computer

实验项目序号: Experiment No.	7	支撑教学目标: SLOs Supported	1-5
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	加权最小二乘回归 Weighted Least Squares Regression		
实验内容: Content	获取照片 obs1 和照片 obs2 的散点图（矩阵散点图即可）。如果对 photo 与 obs1 或 photo 与 obs2 进行简单的线性回归，会遇到什么问题？ Obtain scatter plots of photo versus obs1 and of photo versus obs2 (a matrix scatter plot will do). If you carried out a simple linear regression of photo versus obs1 or photo versus obs2, what problems would you expect?		
	照片与 obs1 的 WLS 回归权重是多少？ What would the weights be for the WLS regression of photo versus obs1?		
	对于两个 WLS 模型，使用包含自变量的散点图分析 Student-T 标准化加权残差 For both WLS models, analyse the Student-T version of the standardised, weighted residuals using scatter plots involving the independent variables.		

学习目标: Learning Objectives	学会 WTS 模型的实质与关键步骤 Learn the essence and key steps of WTS model
教学要求: Requirements	掌握利用 R 得到 WTS 模型的方法 Master the method of obtaining WTS model by R
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078
实验软硬件设备: Software/Hardware	计算机 Computer

实验项目序号: Experiment No.	8	支撑教学目标: SLOs Supported	1-7
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	分类随机变量 Analysis of Categorical RVs		
实验内容: Content	根据测试结果，你对研究问题“场上进球成功与比赛时间季度有关”得出了什么结论？ Based on the test output, what do you conclude in relation to the research question “is field goal success linked to game time quarter”?		
	使用计数数据（而非行概率），计算第一节比赛时间（qtr=1）内成功射门的几率（良好=1） Using the count data (not the row probabilities), calculate the odds of successful field goal attempts (good = 1) in the first quarter of game time (qtr = 1)		
	根据测试结果，你对研究问题“射门成功与踢腿距离四分位数有关”得出了什么结论？ Based on the test output, what do you conclude in relation to the research question “is field goal success linked to kicking distance quartile”?		
学习目标: Learning Objectives	学习分类随机变量 Analysis of Categorical RVs		
教学要求: Requirements	对于具体问题，分析分类随机变量 For specific problems, analyze and classify random variables		
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078		
实验软硬件设备: Software/Hardware	计算机 Computer		

实验项目序号: Experiment No.	9	支撑教学目标: SLOs Supported	1-7
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue

实验名称: Experiment Title	简单逻辑回归 Simple Logistic Regression
实验内容: Content	在对数优势度、优势度和概率度中记录拟合的逻辑回归模型 Write down the fitted logistic regression model in log-odds scale, odds scale and probability scale
	使用回归模型，进行计算，以表明第 1 季度和第 4 季度成功实现野战目标的几率几乎与第 8 实验中计算的一致 Using the regression model, carry-out the calculations to show that the odds of successful field goal in quarter 1 and in quarter 4 almost match those calculated in Lab 8
	解释距离对对数优势度和优势度的影响 Interpret the impact of distance on the log-odds scale and the odds scale
学习目标: Learning Objectives	掌握逻辑回归模型的建立方法 Master the establishment method of logistic regression model
教学要求: Requirements	对具体数据，建立合适的逻辑回归模型 For specific data, an appropriate logistic regression model is established
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078
实验软硬件设备: Software/Hardware	计算机 Computer

实验项目序号: Experiment No.	10	支撑教学目标: SLOs Supported	1-7
每组成员: Members per Group	1	指导教师: Tutor	薛昌涛 Changtao Xue
实验名称: Experiment Title	多元逻辑回归 Multiple Logistic Regression		
实验内容: Content	在对数优势度、优势度和概率度中记录拟合的逻辑回归模型 Write down the fitted logistic regression model in log-odds scale, odds scale and probability scale		
	使用 0.05 显著性水平，检验回归是否显著。用非数学语言写下零假设和替代假设、检验统计量和 p 值、检验结果和结论 Using 0.05 significance level, test if the regression is significant. Write down the null and alternative hypotheses , the test statistic and p-value, the result of the test and a conclusion in non-mathematical language		
	使用 0.05 显著性水平，测试模型是否与数据足够吻合 Using 0.05 significance level, test if the model provides an adequate fit to the data		
学习目标: Learning Objectives	掌握逻辑回归模型的建立方法 Master the establishment method of logistic regression model		

教学要求: Requirements	对具体数据，建立合适的逻辑回归模型 For specific data, an appropriate logistic regression model is established
实验场地: Location	实验室/机房 （科技楼 5078） Computer room 5078
实验软硬件设备: Software/Hardware	计算机 Computer

四、教学安排 Teaching Schedule

注：可根据实际情况增减行数

Note: Please add/reduce lines based on subject.

教学内容 Teaching Content	学时(周) Hour(Week)			
	理论 LECT.	实验 EXP.	课外实践 PBL	集中实践 PRAC.
回归分析概述 Introduction to Regression Analysis 统计基础知识回顾 Statistics review	8	0		
简单线性回归 Simple Linear Regression	8	4		
多元线性回归 Multiple Linear Regression	12	6		
“非线性”线性回归 “Non-linear” linear regression	4	2		
广义最小二乘法 Generalised Least Squares	4	2		
分类随机变量分析 Analysis of Categorical RVs	4	2		
逻辑回归 Logistic Regression	8	4		
总计 Total	48	20		

五、教学方法 Teaching Methodology

注：可根据实际情况增减行数或修改内容

Note: Please add/reduce lines or revise content based on subject.

勾选 Check	教学方法与特色 Teaching Methodology & Characters
☑	多媒体教学：基于信息化设备的课堂教学

	Multi-media-based lecturing
☑	实践能力传授：理论与行业、实际案例相结合 Combining theory with industrial practical problems
☑	课程思政建设：知识讲授与德育相结合 Knowledge delivery with ethic education
□	PBL 教学：问题驱动的分组学习与交流 Problem-based learning
□	其他:单击或点击此处输入文字。 Other:单击或点击此处输入文字。

六、成绩评定 Assessment

注：可根据实际情况增减行数或修改内容

Note: Please add/reduce lines or revise content based on subject.

考核环节: Assessment Content	平时 Behavior	环节负责人: Director	薛昌涛 Changtao Xue
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	20
考核方式: Measures	满分 100 分，使用“学习通”进行。出勤，50 分；作业，50 分。 The full score is 100 points. Students' usual classroom performance is recorded by "XueXiTong". 5 points are counted for each attendance, and no score is given for absence. And 5 points are counted for each assignment, no score for plagiarism, plagiarism for others or no assignment. The final total score is not more than 100 points, not less than 0 points		

考核环节: Assessment Content	实验 Experiment	环节负责人: Director	薛昌涛 Changtao Xue
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	30
考核方式: Measures	满分 100 分，共 10 次上机实验课，每次课需要提交一个报告，每次报告 10 分。 The full score is 100 points. There are 10 computer experiment classes in total. Each class needs to submit a report, with 10 points for each report.		

考核环节: Assessment Content	期末 Final	环节负责人: Director	薛昌涛 Changtao Xue
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	50
考核方式: Measures	满分 100 分，通过批阅期末考试试卷给出学生成绩。 The full score is 100, and the students' scores are given by marking the final examination papers.		

七、改进机制 Improvement Mechanism

注：未尽事宜以教学团队以及学院教学指导委员会商定为准。

Note: Matters not covered in this file shall be determined by TAB of SSTC, NEU.

教学大纲改进机制 Subject Syllabus Improvement Mechanism			
考核周期(年): Check Period (YR)	4	修订周期(年): Revise Period (YR)	4
改进措施: Measures	课程负责人根据课程教学内容与人才培养目标组织课程团队讨论并修改教学大纲，报分管教学工作副院长审核后由执行院长批准。 The subject coordinator shall be responsible for the syllabus discussion and improvement, and the revised version shall be submitted to deputy dean (teaching affairs) for reviewing then to executive dean for approval		
成绩评定改进机制 Assessment Improvement Mechanism			
考核周期(年): Check Period (YR)	1	修订周期(年): Revise Period (YR)	1
改进措施: Measures	课程负责人根据课程教学内容、课堂教学效果以及成绩分布，对课程教学方法和成绩评定环节进行改进，并同步优化评定办法。 The subject coordinator shall revise the syllabus based on the teaching content, effect and result distribution while optimize the assessment measures.		