

统计学导论 课程教学大纲

Introduction to Statistics Subject Syllabus

一、课程信息 Subject Information

课程编号: Subject ID	UTS-AS-37151	开课学期: Semester	1
课程分类: Category	专业教育 PA	所属课群: Section	专业基础 MF
课程学分: Credit Points	5	总学时/周: Total Hours/Weeks	80
理论学时: LECT. Hours	74	实验学时: EXP. Hours	6
PBL 学时: PBL Hours	0	实践学时/周: PRAC. Hours/Weeks	0
开课学院: College	东北大学 悉尼智能科技学院	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
课程协调人: Coordinator	王宪良 Wang Xianliang	成绩记载方式: Result Type	百分制 Marks
先修课程: Requisites	无 None		
英文参考教材: EN Textbooks	1. Walpole, Myers, Myers, Ye, Probability & Statistics for Engineers & Scientists, 9th Edition, GLOBAL EDITION, Pearson Education Limited, 2016 2. David Freedman, Robert Pisani, Roger Purves, Statistics, 4th Edition, W. W. Norton & Company, 2007		
中文参考教材: CN Textbooks	1. 罗纳德·沃波尔; 雷蒙德·迈尔斯; 沙伦·迈尔斯, 概率与统计(理工类第九版), 中国人民大学出版社, 2016 2. David Freedman, Robert Pisani, Roger Purves, 统计学(第二版), 中国统计出版社, 1997		
教学资源: Resources	https://lms.cloudcampus.com.cn/courses/14		
课程负责人(撰写人): Subject Director	王宪良 Wang Xianliang	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	马蒂亚斯·奎罗斯、艾西瓦亚·巴斯卡兰、王宪良、刘莹、 Matias Quiroz、Aishwarya Bhaskaran、Wang xianliang、Liu Ying		
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.

<p>整体目标: Overall Objective</p>	<p>统计学导论是应用统计学专业的必修课，主要包括概率论的重要概念，经典统计推断及其与概率论的联系，抽样分布及其在置信区间及假设检验中的应用，以及简单的线性回归和方差分析技术。本课程培养学生使用概率语言在统计框架中的研究技能和解决复杂问题的能力，对取得的成果在社会主义核心价值观下进行批判性评价和分析，并以各种方式向不同的受众（专家和非专家）简洁准确地表达信息、推理和结论。</p> <p>Introduction to Statistics is a required course for Applied Statistics. This subject mainly introduces the students to important concepts in probability, classical statistical inference and its connection to probability theory, sampling distributions and their use in constructing confidence intervals and hypothesis testing, simple linear regression and analysis of variance techniques. Students learn how to use the language of probability, and how this is applied in a statistical framework to solve outstanding problems with a critical evaluation and analysis of the obtained results account for the core socialist values then succinct and accurate presentation of information, reasoning and conclusions in a variety of modes, to diverse audiences (expert and non-expert).</p>	
<p>(1) 专业目标: Professional Ability</p>	<p>1-1</p>	<p>掌握统计学领域的理论和技术知识，结合演绎推理解决问题复杂的问题。研究数学科学中一系列基础领域的原理和概念（微积分，离散数学、线性代数、概率论、统计学和定量管理）。Develop theoretical and technical knowledge in an area of statistics, incorporating deductive reasoning to solve complex problems. Examine the principles and concepts of a range of fundamental areas in the mathematical sciences (calculus, discrete mathematics, linear algebra, probability, statistics and quantitative management).</p>
	<p>1-2</p>	<p>培养研究技能和解决突出问题的能力，具有批判性的评估和分析能力获得的结果。在证据的基础上进行论证，并在选择方法的基础上进行模拟（例如，分析与数值/实验、不同的统计测试、不同的启发式算法）以及各种数据和知识来源。</p> <p>Develop research skills and ability to solve outstanding problems, with a critical evaluation and analysis of the obtained results. Make arguments based on proof and conduct simulations based on selection of approaches (e.g. analytic vs numerical/experimental, different statistical tests, different heuristic algorithms) and various sources of data and knowledge.</p>
	<p>1-3</p>	<p>在个人或团队环境下高效、负责地工作的能力。Ability to work effectively and responsibly in an individual or team context.</p>
	<p>1-4</p>	<p>展示自我反省、个人和独立学习策略，扩展现有知识。培养信息检索和整合技能，以批判性地评估数据的数学/统计方面创造性地思考并尝试不同的方法来解决问题。Demonstrate self-reflection, and individual and independent learning strategies to extend existing knowledge. Develop information retrieval and consolidation skills to</p>

		critically evaluate mathematical/statistical aspects of information to think creatively and try different approaches to solving problems.
	1-5	简洁准确地呈现信息，推理和结论的多种模式，适用于不同的场合受众（专家和非专家）。Succinct and accurate presentation of information, reasoning and conclusions in a variety of modes, to diverse audiences (expert and non-expert).
(2) 德育目标: Essential Quality	2-1	具有正确的价值观与社会责任感、优秀的职业道德与行为规范。Having correct values and sense of social responsibility, good professional ethics and conduct.
	2-2	坚定“融贯东西、鼎新致远”的奋斗信念，胸怀“自强不息、知行合一”的东大品格，成为有理想、有本领、有担当的时代英才。Strong belief of “Integrate east and west, innovate for the long-term development”, character of “Striving constantly for improvement and behaving in conformity with truth”, and becoming talents with ideals, abilities, and responsibilities.

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、自然科学和专业用于解决复杂实际问题。 GA1. Science Knowledge: Apply knowledge of mathematics, natural science, fundamentals and an engineering specialization to the solution of complex engineering problems.	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。Capable of deductive reasoning, accurate calculation, analysis and induction and abstract thinking. Establishing correct mathematics, physics models with the professional knowledge of mathematics, natural science, etc. to solve complex practical problems.	1-1
	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。Mastery the basic theories, knowledge and methods of applied statistics, such as statistical investigation, statistical data processing, statistical analysis, and the use of computers and statistical software; capable of data collecting, processing, and analyzing; familiar with the writing norms of pre-research reports, feasibility analysis reports, and research plans.	1-1, 1-2
	1-3 了解本专业涉及及相关行业的发展趋势以及相关产业的运营模式，具备在本专业相关领域进行方案设计、技术创新的能力。Understanding the development and operations of related industries in this stream; capable of conducting program design and technological innovation in related fields of this stream.	1-1, 1-2

<p>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。</p> <p>GA2. Problem Analysis: Identify, formulate, research literature and analyze complex practical problems reaching substantiated conclusions using first principles of mathematics and sciences.</p>	<p>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。Capable of analyzing, identifying and elaborating complex practical problems related to this stream with the applying of the basic principles of applied statistics.</p>	1-2, 1-5
	<p>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。Capable of drawing on the basic principles of applied statistics to design targeted schemes for complex practical problems, and using literature, scientific theories and technical means to solve them.</p>	1-2, 1-5
<p>3、设计/开发解决方案： 能够设计针对复杂实际问题的解决方案，设计满足特定需求的系统、单元或流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。</p> <p>GA3. Design/Development of Solutions: Design solutions for complex practical problems and design systems, components or processes that meet specified needs with appropriate consideration for public health, and safety, cultural, societal and environmental considerations.</p>	<p>3-1 能够设计针对本专业相关复杂实际问题的解决方案。Capable of designing solutions to complex practical problems related to this stream.</p>	1-2
	<p>3-2 能够对不同设计方案进行比较和优化，在工作各环节中具有创新意识和批判意识，善于发现、分析、系统表述和解决实际问题。Capable of comparing and optimizing different design schemes, having a sense of innovation and criticism in all aspects of work, and be good at discovering, analyzing, systematically elaborating and solving practical problems.</p>	1-2, 1-4
<p>4、研究： 能够基于科学原理并采用科学方法对复杂实际问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。</p> <p>GA4. Investigation: Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.</p>	<p>4-1 能够基于科学原理并采用科学方法，在本专业相关理论指导下对复杂实际问题设计实验进行研究。Capable of design experiments on complex problems with scientific knowledge and research methods of this stream.</p>	1-2
	<p>4-2 能够结合本专业对实验数据进行分析与解释，设计并优化实验方案，并通过信息综合得到合理有效的结论。Capable of analyzing and interpreting the experimental data, designing and optimizing the experimental schemes with the knowledge of this stream; reasonable and effective conclusions are obtained through information synthesis.</p>	1-2, 2-1, 2-2
<p>6、工程与社会： 能够基于本专业相关背景知识和相关法规标准进行合理分析，评价本专业实践活动和复杂实际问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。</p> <p>GA6. The engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional practice and solutions to complex practical problems.</p>	<p>6-1 能够基于本专业相关背景知识进行合理分析，评价通信相关实践活动和复杂实际问题解决方案对社会、健康、安全、法律以及文化的影响。Capable of analyzing and evaluating the social, health, safety, legal and cultural impact of statistics-related engineering practices and complex engineering problem solutions based on the relevant background knowledge of the stream.</p>	1-4, 2-1, 2-2
	<p>6-2 理解本专业实践活动和相关行业工程问题解决方案对社会、健康、安全、法律以及文化应承担的责任。Understanding of the responsibility of the professional</p>	1-4, 2-1, 2-2

	practice activities and related industry engineering problem solutions to society, health, safety, law and culture.	
<p>7、环境与可持续发展： 能够理解和评价针对本专业相关复杂实际问题的实践活动对环境、社会可持续发展的影响。</p> <p>GA7. Environment and Sustainability: Understand and evaluate the sustainability and impact of professional work in the solution of complex practical problems in societal and environmental contexts.</p>	7-1 了解本专业相关的环境与可持续发展方针政策和法律法规,理解实践活动中所应承担的责任。The knowledge of the environmental and sustainable development policies, laws and regulations related to this stream, and understanding of the responsibilities that should be undertaken in practical activities.	2-1, 2-2
	7-2 能够正确认识并评价本专业实践活动对环境、社会可持续发展的影响。Capable of understanding and evaluating the impact of practice activities on the environment and the sustainable development of society.	2-1, 2-2
<p>8、职业规范： 具有人文社会科学素养、社会责任感,能够在实践活动中理解并遵守职业道德和规范,履行责任。</p> <p>GA8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of practice.</p>	8-1 具备健全的人格,坚定的理想信念和社会责任感,科学的世界观、人生观和价值观,良好的人文社会科学素养。Possessing of a sound personality, firm ideals and beliefs and a sense of social responsibility, a scientific outlook on world, life and values, and good humanities and social science literacy.	2-1, 2-2
	8-2 了解本专业相关的职业道德与规范并认识其重要性,具备良好的职业道德和社会责任感,能够对实践活动的社会道德进行判断和评鉴,并履行相应的责任。Understanding of the professional ethics and norms related to the stream and recognition of their importance, having a good professional ethics and social responsibility, capable of judging and evaluating the social ethics of practical activities, and performing corresponding responsibilities.	2-1, 2-2
<p>9、个人与团队： 能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。</p> <p>GA9. Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.</p>	9-1 能够认识团队协作的重要性,具有强烈的团队协作意识和能力、卓越的组织管理能力、较强的表达能力和人际交往能力。Recognition of the importance of teamwork, a strong sense and capability of teamwork, excellent organization and management skills, strong expression and interpersonal skills.	1-3, 1-5
	9-2 具有良好的跨文化、跨领域沟通交流能力,适应本专业相关行业的团队协作机制,积极主动的在团队中发挥作用。Good cross-cultural and cross-field communication skills, adaption to the team cooperation mechanism of the relevant industry of the stream, and actively play a role in the team.	1-3, 1-5
<p>10、沟通：能够就本专业复杂实际问题与业界同行及社会公众进行有效沟通和交流,包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。具备一定的国际视野,能够在跨文化背景下进行沟通和交流。</p> <p>GA10. Communication: Communicate effectively</p>	10-1 能够就应用统计领域相关复杂实际问题与业界同行及社会公众进行有效沟通和交流,能够通过口头或书面方式实现有效表达; Capable of effectively communicating and communicating with industry peers and the public on complex practical issues related to the applied statistics, and effective expression through oral or written forms;	1-3, 1-5

on complex practical activities with the community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions. Be able to communicate in a cross-cultural context with an International vision.	10-2 熟练掌握英语，能够在本专业相关领域进行有效的技术沟通和交流。Proficient in English, and capable of carrying out effective technical communication and exchange in related fields of the major.	
--	--	--

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: Knowledge Unit No.	1	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	统计与数据分析导言 Introduction to Statistics and Data Analysis		
知识点: Knowledge Delivery	数据收集 Data collection		
	位置和方差的测量 Location and variability measure		
	离散和连续型变量 Discrete and continuous variables		
	图形诊断 Graphical inspections		
	样本空间和事件 Sample spaces and events		
学习目标: Learning Objectives	了解: Recognize	样本和总体的基本概念 What's Sample and Population	
	理解: Understand	样本空间和事件 Sample spaces and events	
	掌握: Master	位置和方差的测量; 图形诊断 Location and variability measure; Graphical inspections	
德育目标 Moral Objectives	2-1, 2-2		
重点: Key Points	位置和方差的测量; 图形诊断 Location and variability measure; Graphical inspections		
难点: Focal points	图形诊断 Graphical inspections		
知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5

知识单元名称 Unit Title	概率 Probability	
知识点: Knowledge Delivery	事件; 样本点计数; 事件的概率 Events; Counting outcomes; Probability of events	
	条件概率、独立性及乘积法则 Conditional probability, independence and the product rule	
	全概法则; 贝叶斯法则 The law of total probability; Bayes' rule	
学习目标: Learning Objectives	了解: Recognize	事件; 样本点计数 Events; Counting outcomes
	理解: Understand	事件的概率 Probability of events;
	掌握: Master	条件概率、独立性及乘积法则; 全概法则; 贝叶斯法则 Conditional probability, independence and the product rule; The law of total probability; Bayes' rule
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	条件概率、独立性; 全概法则; 贝叶斯法则 Conditional probability; independence; The law of total probability; Bayes' rule	
难点: Focal points	全概法则; 贝叶斯法则 The law of total probability; Bayes' rule	

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	随机变量和概率分布 Random Variables and Probability Distribution		
知识点: Knowledge Delivery	随机变量; 离散和连续变量 Random variables, discrete and continuous		
	离散型概率分布 Discrete probability distributions		
	连续型概率分布 Continuous probability distributions		
	联合、边际和条件概率分布 Joint, marginal and conditional probability		
	统计独立 Statistical independence		
学习目标: Learning Objectives	了解: Recognize	随机变量 Random Variables	
	理解: Understand	各种概率分布及统计独立 All kinds of probability distributions	
	掌握: Master	各种概率分布及统计独立	

	Master	All kinds of probability distributions
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	各种概率分布及统计独立 All kinds of probability distributions	
难点: Focal points	联合概率分布 Joint probability distributions	

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	数学期望 Mathematical Expectation		
知识点: Knowledge Delivery	随机变量的期望 Expected value of a random variable		
	方差和协方差 Variance and covariance of random variables		
	随机变量线性组合的均值和方差 Means and variances of linear combinations		
	切比雪夫定理 Chebyshev's Theorem		
学习目标: Learning Objectives	了解: Recognize	切比雪夫定理 Chebyshev's Theorem	
	理解: Understand	随机变量线性组合的均值和方差 Means and variances of linear combinations	
	掌握: Master	随机变量的期望; 方差和协方差 Expected value of a random variable; Variance and covariance of random variables	
德育目标 Moral Objectives	2-1, 2-2		
重点: Key Points	随机变量的方差 Variance		
难点: Focal points	随机变量线性组合的均值和方差 Means and variances of linear combinations		

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	几个离散型概率分布 Some Continuous Probability Distributions		
知识点: Knowledge Delivery	离散概率分布介绍 Introduction to discrete probability distributions		
	二项分布 Binomial distribution		
	超几何分布		

	Hypergeometric distribution	
	负二项分布和几何分布 Negative binomial and geometric distributions	
	泊松分布和泊松过程 Poisson distribution and the Poisson process	
学习目标: Learning Objectives	了解: Recognize	离散概率分布介绍 Introduction to discrete probability distributions
	理解: Understand	超几何分布; 负二项分布和几何分布; 泊松分布和泊松过程 Hypergeometric distribution; Negative binomial and geometric distributions; Poisson distribution and the Poisson process
	掌握: Master	二项分布 Binomial distribution
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	二项分布 Binomial distribution	
难点: Focal points	泊松分布和泊松过程 Poisson distribution and the Poisson process	

知识单元序号: Knowledge Unit No.	6	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	几个连续型概率分布 Some Continuous Probability Distribution		
知识点: Knowledge Delivery	连续型分布 Continuous distributions		
	正态分布; 正态分布下的面积; 正态分布的应用 Uniform distribution; Normal distribution; Area under the normal curve; Applications of normal distribution		
	二项分布的正态近似 Normal approximation to the Binomial distribution		
	指数分布 Exponential distribution		
学习目标: Learning Objectives	了解: Recognize	连续型分布 Continuous distributions	
	理解: Understand	二项分布的正态近似; 指数分布 Normal approximation to the Binomial distribution; Exponential distribution	
	掌握: Master	正态分布; 正态分布下的面积; 正态分布的应用 Uniform distribution; Normal distribution; Area under the normal curve; Applications of normal distribution	
德育目标 Moral Objectives	2-1, 2-2		

重点: Key Points	正态分布及应用 Applications of normal distribution
难点: Focal points	指数分布 Exponential distribution

知识单元序号: Knowledge Unit No.	7	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	基本的抽样分布和描述性数据分析 Fundamental Sampling Distributions and Data Descriptions		
知识点: Knowledge Delivery	随机抽样; 总体和样本; 一些重要的统计量 Random sampling; Population and sample; Some important statistics		
	抽样分布; 抽样分布的均值 Sampling distributions; Sampling distribution of the mean		
	中心极限定理 The Central Limit Theorem		
	方差的抽样分布; F分布 Sampling distribution of S^2 ; F-distribution		
学习目标: Learning Objectives	了解: Recognize	方差的抽样分布; F分布 Sampling distribution of S^2 ; F-distribution	
	理解: Understand	中心极限定理 The Central Limit Theorem	
	掌握: Master	随机抽样; 总体和样本; 一些重要的统计量; 抽样分布的均值 Random sampling; Population and sample; Some important statistics; Sampling distribution of the mean	
德育目标 Moral Objectives	2-1, 2-2		
重点: Key Points	随机抽样; 抽样分布 Random sampling; Sampling distributions		
难点: Focal points	抽样分布的均值; 方差的抽样分布 Sampling distribution of the mean; Sampling distribution of S^2		

知识单元序号: Knowledge Unit No.	8	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	单样本和两样本的估计问题 One- and Two-Sample Estimation Problems		
知识点: Knowledge Delivery	统计推断; 点估计和区间估计 Statistical inference; Point and interval estimates		
	均值估计; 置信区间和标准误 Estimating a mean; Confidence intervals; Standard error		
	预测区间 Prediction intervals		
	两样本均值之差的估计; 配对观测 Estimating the difference between two means; Paired observations		

	比例估计；两个比例之差的估计 Estimating a proportion; Estimating the difference between two proportions	
	方差估计；两个方差比的估计 the variance; Estimating the ratio of two variances	
学习目标: Learning Objectives	了解: Recognize	统计推断；点估计和区间估计 Statistical inference; Point and interval estimates
	理解: Understand	置信区间和标准误；两个比例之差的估计；两个方差比的估计 Confidence intervals; Standard error; Estimating the difference between two proportions; Estimating the ratio of two variances
	掌握: Master	两样本均值之差的估计；配对观测 Estimating the difference between two means; Paired observations
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	置信区间和标准误 Confidence intervals; Standard error	
难点: Focal points	两样本均值之差的估计；配对观测；两个比例之差的估计；两个方差比的估计 Estimating the difference between two means; Paired observations; Estimating the difference between two proportions; Estimating the ratio of two variances	

知识单元序号: Knowledge Unit No.	9	支撑教学目标: SLOs Supported	1-1, 1-2, 1-3, 1-4, 1-5
知识单元名称 Unit Title	单样本和两样本假设检验 One- and Two-Sample Tests of Hypotheses		
知识点: Knowledge Delivery	统计假设；假设检验 Statistical hypothesis		
	第一和第二类错误；p 值 Hypothesis testing; Type I and Type II errors; P-values		
	单样本均值检验；双样本均值检验 Hypothesis test on a mean; Hypothesis test on two means		
	样本容量的选取 Choice of sample size		
	单样本比例检验；双样本比例检验 Hypothesis test on a proportion; Hypothesis test on two proportions		
	方差的单样本和双样本检验 Hypothesis tests concerning variances;		
	分类数据独立性检验 Hypothesis test for independence of categorical data		
学习目标:	了解:	统计假设；假设检验；分类数据独立性检验	

Learning Objectives	Recognize	Statistical hypothesis; Hypothesis test for independence of categorical data
	理解: Understand	第一和第二类错误; 单样本比例检验; 双样本比例检验; 方差的单样本和双样本检验 Hypothesis testing; Type I and Type II errors; Hypothesis test on a proportion; Hypothesis test on two proportions; Hypothesis tests concerning variances;
	掌握: Master	p 值; 单样本均值检验; 双样本均值检验; 样本容量的选取 Hypothesis test on a mean; Hypothesis test on two means; P-values; Choice of sample size
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	假设检验; 双样本均值检验; 样本容量的选取 Hypothesis testing; Hypothesis test on two means; Choice of sample size	
难点: Focal points	双样本比例检验; 方差的单样本和双样本检验 Hypothesis test on two proportions; Hypothesis tests concerning variances	

知识单元序号: Knowledge Unit No.	10	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	简单线性回归和相关性 Simple Linear Regression and Correlation		
知识点: Knowledge Delivery	线性回归简介; 简单线性回归模型 Introduction to linear regression; The simple linear regression model;		
	最小二乘估计; 最小二乘估计的性质 Least squares estimation; Properties of the Least square's estimators		
	回归系数的推断; 预测; 回归模型的选取; 与相关性的关系 Inferences on regression coefficients; Prediction; Choice of regression model; Relation to correlation		
	回归的局限性 Limitations of regression		
学习目标: Learning Objectives	了解: Recognize	线性回归简介; 简单线性回归模型 Introduction to linear regression; The simple linear regression model;	
	理解: Understand	最小二乘估计; 回归的局限性 Least squares estimation; Limitations of regression	
	掌握: Master	最小二乘估计的性质; 回归系数的推断; 预测; 回归模型的选取; 与相关性的关系 Properties of the Least square's estimators; Inferences on regression coefficients; Prediction; Choice of regression model; Relation to correlation	

德育目标 Moral Objectives	2-1, 2-2
重点: Key Points	最小二乘估计; 最小二乘估计的性质 Least squares estimation; Properties of the Least square's estimators
难点: Focal points	回归系数的推断 Inferences on regression coefficients

知识单元序号: Knowledge Unit No.	11	支撑教学目标: SLOs Supported	1-1, 1-2, 1-4, 1-5
知识单元名称 Unit Title	方差分析 Analysis of Variance		
知识点: Knowledge Delivery	线性回归的方差分析; Analysis of variance for linear regression;		
	方差分析技术 Analysis of variance		
	单样本方差分析 One-way ANOVA		
学习目标: Learning Objectives	了解: Recognize	方差分析技术 Analysis of variance	
	理解: Understand	线性回归的方差分析; Analysis of variance for linear regression;	
	掌握: Master	单样本方差分析 One-way ANOVA	
德育目标 Moral Objectives	2-1, 2-2		
重点: Key Points	线性回归的方差分析 Analysis of variance for linear regression;		
难点: Focal points	方差来源 Source of Variation		

(2) 实验教学 Experiments

注: 可根据实际情况增减行数

Note: Please add/reduce lines based on subject.

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	R 语言的介绍; 探索性数据分析的应用 Introduction to R; Exploratory Data Analysis using the Boston Housing Dataset	2	4-5	综合性 Comprehensive	必做 Required

2	以描述性和图形化的方式总结数据集的几个特征 descriptively and graphically summarize several features of a dataset	2	4-5	综合性 Comprehensive	必做 Required
3	简单线性回归及其在现代计算语言 R 中的实现 simple linear regression and its implementation in the modern computing language R.	2	4-5	综合性 Comprehensive	必做 Required
	总计 Total	4			

*MPG: Members per group

实验项目序号: Experiment No.	1	支撑教学目标: SLOs Supported	1-3, 2-1, 2-2
每组成员: Members per Group	4-5	指导教师: Tutor	王宪良 Wang Xianliang
实验名称: Experiment Title	R 语言的介绍 Introduction to R		
实验内容: Content	R 语言的安装及简单操作介绍 Introduction to R		
	数据的均值、方差和相关性分析 Data Analysis: Mean, Variance and Correlation		
学习目标: Learning Objectives	学会安装和使用 R 语言; 能够进行简单的数据分析 Learn to install and use The R Project for Statistical Computing; be able to do simple data analysis		
教学要求: Requirements	设置合适的题目, 从简单到复杂, 由学生分组实验并给出分析结果 Set appropriate questions, from simple to complex, by the students group experiment and give the analysis results		
实验场地: Location	科技楼 5082 Computer Room 5082		
实验软硬件设备: Software/Hardware	R 软件 R software		

实验项目序号: Experiment No.	2	支撑教学目标: SLOs Supported	1-3, 2-1, 2-2
每组成员: Members per Group	4-5	指导教师: Tutor	王宪良 Wang Xianliang
实验名称: Experiment Title	数据可视化 Data visualization		
实验内容: Content	画图展示和描述数据关系 Descriptively and graphically the data relationship		

学习目标: Learning Objectives	掌握较流行的数据可视化方法 Master popular data visualization methods
教学要求: Requirements	对给定数据集或自选数据进行可视化操作并给出正确的描述 Visualize the given data set or optional data and give the correct description
实验场地: Location	科技楼 5082 Computer Room 5082
实验软硬件设备: Software/Hardware	R 软件 R software

实验项目序号: Experiment No.	3	支撑教学目标: SLOs Supported	1-3, 2-1, 2-2
每组成员: Members per Group	4-5	指导教师: Tutor	王宪良 Wang Xianliang
实验名称: Experiment Title	简单线性回归 simple linear regression		
实验内容: Content	用 R 语言进行线性回归 Linear regression with R Software		
学习目标: Learning Objectives	学会使用 R 语言实现简单线性回归并进行合理的解释和分析 Learn to use R Software to realize simple linear regression and make reasonable explanation		
教学要求: Requirements	展示简单线性回归的步骤和结果分析 Show the steps and result analysis of simple linear regression		
实验场地: Location	科技楼 5082 Computer Room 5082		
实验软硬件设备: Software/Hardware	R 软件 R software		

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.	实践 PRAC.	PBL
马蒂亚斯·奎罗斯 Matias Quiroz	48	0	0	
艾西瓦亚·巴斯卡兰 Aishwarya Bhaskaran	0	6	0	0

王宪良 Wang Xianliang	74	6	0	0
刘莹 Liu Ying	74	6	0	0
总计 Total	74	6	0	0

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
<input checked="" type="checkbox"/>	多媒体教学：基于信息化设备的课堂教学 Multi-media-based lecturing
<input checked="" type="checkbox"/>	实践能力传授：理论与行业、实际案例相结合 Combining theory with industrial practical problems
<input checked="" type="checkbox"/>	课程思政建设：知识讲授与德育相结合 Knowledge delivery with ethic education
<input type="checkbox"/>	PBL 教学：问题驱动的分组学习与交流 Problem-based learning
<input type="checkbox"/>	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	平时成绩 Usual performance	环节负责人: Director	刘莹 Liu Ying
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	20
考核方式: Measures	平时成绩，以学生平时课堂表现，学生平时作业完成情况综合评定，其中，学生平时课堂表现占比 10%，学生平时作业完成情况占比 90%。 According to comprehensive report and question performance, the mark is evaluated, where question performance accounts for 10%, assignments performance accounts for 90%.		

考核环节: Assessment Content	实验 Experiment	环节负责人: Director	王宪良 Wang Xianliang
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	30

考核方式: Measures	类型: 项目 Type: Project 分组: 每组 4-5 人 Groupwork: Group, 4-5 individuals/group 方式: 每组提交一份实验报告 Method: Each group provide a report for each Computer Lab (all three)
-------------------	---

考核环节: Assessment Content	期末考试 final exam	环节负责人: Director	王宪良 Wang Xianliang
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	50
考核方式: Measures	期末考试包括本课程介绍的所有内容。采取闭卷方式, 每个人独立答题, 不允许携带任何与考试相关的资料及电脑等电子设备。如果期末考试的成绩小于 40 分, 则本门课程需要重修。 The final exam includes all the contents introduced in this course. No one is allowed to take the test paper and other related information by electronic means. If the final exam score is less than 40, the course needs to be retaken.		

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 AAB 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.		