

科学实践原理
课程教学大纲
Principals of Scientific
Subject Syllabus
Practice

一、课程信息 Subject Information

课程编号: Subject ID	3100313001	开课学期: Semester	2
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	1	总学时/周: Total Hours/Weeks	16
理论学时: LECT. Hours	12	实验学时: EXP. Hours	4
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	互认 EQV
课程协调人: Coordinator	张建波 Zhang Jianbo	成绩记载方式: Result Type	五级制 Five Grades
先修课程: Requisites	无 None		
英文参考教材: EN Textbooks	无 None		
中文参考教材: CN Textbooks	无 None		
教学资源: Resources	无 None		
课程负责人(撰写人): Subject Director	张建波 Zhang Jianbo	提交日期: Submitted Date	4/21/2023
任课教师(含负责人): Taught by	张建波 Zhang Jianbo		
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>本课程为应用统计学专业必修课，旨在介绍科学活动的一般过程，了解科技论文的特点及其写作规律，能够用中、英文检索系统查找期刊和论文，并下载论文，了解本科生毕业论文的格式和写作方法，了解 TeX 软件的基本使用方法等，为学生今后的学习、科技创新和科研活动打下基础。This is a compulsory course for the Applied Statistics major, aiming to introduce the general process of scientific activities, understand the characteristics and writing rules of scientific papers, be able to use Chinese and English retrieval systems to search for journals and papers, and download papers, understand the format and writing methods of graduate thesis, and understand the basic usage methods of TeX software, and lay a foundation for students to study and participate in various scientific and technological innovation and research activities.</p>	
<p>(1) 专业目标: Professional Ability</p>	<p>1-1</p>	<p>熟悉科技论文和报告的特点及结构，掌握科技论文的撰写规范。 Familiar with the characteristics and structure of scientific papers and reports, and master the writing standards of scientific papers.</p>
	<p>1-2</p>	<p>能够运用常见的中英文检索系统查阅期刊和论文，并能下载论文。Able to use common Chinese and English retrieval systems to access journals and papers, and be able to download papers.</p>
	<p>1-3</p>	<p>了解学位论文的一般结构，掌握引言部分的一般写法。 Understand the general structure of the thesis and grasp the general results of the introduction section.</p>
<p>(2) 德育目标: Essential Quality</p>	<p>2-1</p>	<p>对科研有正确的认识，了解什么是负责任的科研行为。Have a correct understanding of scientific research and understand what constitutes responsible research behavior.</p>
	<p>2-2</p>	<p>了解科学家精神，牢记科研工作者应恪守的价值观念、社会责任和行为规范。Understand the spirit of scientists, remember the values, social responsibilities, and behavioral norms that scientific researchers should adhere to</p>
<p>课程教学目标与毕业要求的对应关系 Matrix of GA & SLOs</p>		
<p>毕业要求 GA</p>	<p>指标点 GA Index</p>	<p>教学 目标 SLOs</p>

<p>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。</p> <p>Science Knowledge: Apply knowledge of mathematics, natural science, fundamentals and an engineering specialization to the solution of complex engineering problems.</p>	<p>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。</p> <p>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.</p>	<p>1-1 1-2 1-3</p>
<p>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>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>能够在设计和开发的各个环节中综合考虑社会、健康、安全、法律、文化以及环境等因素。Able to comprehensively consider social, health, safety, legal, cultural, and environmental factors in all aspects of design and development.</p>	<p>2-1 2-2</p>
<p>使用现代工具: 能够针对复杂实际问题,开发、选择与使用恰当的技术、资源、现代信息技术工具,包括对复杂实际问题的预测与模拟,并能够理解其局限性。</p> <p>Modern Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling, to complex practical problems, with an understanding of the limitations.</p>	<p>熟悉解决本专业相关复杂实际问题所需的技术和资源,能够运用现代信息技术进行文献检索和资料查询,获取专业解决方案。Familiar with the technology and resources required to solve complex practical problems related to the stream, capable of using modern information technology to conduct document retrieval and data query, and obtaining professional solutions.</p> <p>能够针对本专业相关复杂实际问题,选择与使用恰当的技术、资源、现代信息技术工具。Capable of selecting and using appropriate technology, resources, and modern information technology tools in response to complex practical problems related to the stream.</p>	<p>1-2 1-2</p>
<p>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。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</p>	<p>能够基于本专业相关背景知识进行合理分析,评价专业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>	<p>2-1 2-2</p>

practical problems.	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 practice activities and related industry engineering problem solutions to society, health, safety, law and culture.	2-1 2-2
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。 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.	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
	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
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。 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of practice.	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
	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

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, 1-3
知识单元名称 Unit Title	科技论文的特点及结构 Characteristics and Structure of Scientific and Technological Papers		
知识点:	什么是科技论文		

Knowledge Delivery	What is a scientific paper	
	科技论文的基本特征 Basic Characteristics of Scientific and Technological Papers	
	科技论文的分类 Classification of scientific and technological papers	
	科技论文的格式 Format of scientific and technological papers	
学习目标: Learning Objectives	了解: Recognize	什么是科技论文? What is a scientific paper? 科技论文的基本特征 Basic Characteristics of Scientific and Technological Papers
	理解: Understand	科技论文的分类 Classification of scientific and technological papers
	掌握: Master	科技论文的格式 Format of scientific and technological papers
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	科技论文的格式 Format of scientific and technological papers	
难点: Focal points	无 None	

知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-1, 1-3
知识单元名称 Unit Title	科技论文的写作及注意事项 Writing and Precautions for Scientific and Technological Papers		
知识点: Knowledge Delivery	科技论文的选题及应注意的问题 Topic Selection and Issues to Pay Attention to in Scientific and Technological Papers		
学习目标: Learning Objectives	了解: Recognize	科技论文选题的一般方法 General methods for selecting topics in scientific and technological papers	
	理解: Understand	科技论文选题应注意的事项 Precautions for selecting topics in scientific and technological papers	
	掌握: Master	无 None	
德育目标 Moral Objectives	2-1, 2-2		
重点: Key Points	科技论文选题的一般方法 General methods for selecting topics in scientific and technological papers 科技论文选题应注意的事项		

	Precautions for selecting topics in scientific and technological papers
难点: Focal points	无 None

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-2
知识单元名称 Unit Title	期刊的查找与论文的发表和检索 Journal search and publication of papers with their retrieval		
知识点: Knowledge Delivery	常见期刊的查找: 施普林格、爱思唯尔、IEEE Search for common journals: Springer, Elsevier, IEEE		
	特殊期刊的查找: 科学、自然、细胞 Search for special journals: Science, Nature, Cell		
	中文期刊的查找: 中国知网(一般期刊和核心期刊) Search for Chinese Journals: CNKI ((general journals and core journals))		
	论文的检索: SCI、EI Retrieval of papers: SCI, EI		
	中科院文献情报中心期刊分区表 Journal partition table of the Literature and Information Center of the Chinese Academy of Sciences		
学习目标: Learning Objectives	了解: Recognize	常见期刊的查找: 施普林格、爱思唯尔、IEEE Search for common journals: Springer, Elsevier, IEEE 特殊期刊的查找: 科学、自然、细胞 Search for special journals: Science, Nature, Cell	
	理解: Understand	中文期刊的查找: 中国知网(一般期刊和核心期刊) Search for Chinese Journals: CNKI ((general journals and core journals)) 中科院文献情报中心期刊分区表 Journal partition table of the Literature and Information Center of the Chinese Academy of Sciences	
	掌握: Master	论文的检索: SCI、EI Retrieval of papers: SCI, EI	
德育目标 Moral Objectives	2-1, 2-2		
重点: Key Points	中文期刊的查找: 中国知网(一般期刊和核心期刊) Search for Chinese Journals: CNKI ((general journals and core journals))		
难点: Focal points	论文的检索: SCI、EI Retrieval of papers: SCI, EI		

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-2, 1-3
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知识单元名称 Unit Title	学位论文（本科论文）的一般结构与写作方法 General Structure and Writing Methods of Degree Thesis (Undergraduate Thesis)	
知识点: Knowledge Delivery	毕业设计（论文）的一般步骤 General Steps for Graduation Design (Thesis)	
	毕业设计（论文）的结构 Structure of Graduation Design (Thesis)	
	毕业设计（论文）的选题 Topic selection for graduation project (thesis)	
	学位论文引言部分的一般撰写方式 General Writing Methods for the Introduction of a Degree Thesis	
学习目标: Learning Objectives	了解: Recognize	毕业设计（论文）的一般步骤 General Steps for Graduation Design (Thesis) 毕业设计（论文）的选题 Topic selection for graduation project (thesis)
	理解: Understand	毕业设计（论文）的结构 Structure of Graduation Design (Thesis)
	掌握: Master	学位论文引言部分的一般撰写方法 General Writing Methods for the Introduction of a Degree Thesis
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	毕业设计（论文）的结构 Structure of Graduation Design (Thesis)	
难点: Focal points	选择适当类型的图表和表，以显示不同类型的数据 Choose appropriate types of graphs and tables to present different types of data 学位论文引言部分的一般撰写方法 General Writing Methods for the Introduction of a Degree Thesis	

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-3
知识单元名称 Unit Title	TeX 软件的使用 Use of TeX software		
知识点: Knowledge Delivery	TeX 软件的介绍、安装与配置 Introduction, Installation, and Configuration of Software		
	一般文本的编辑 Editing of general text		
	常见数学公式的编辑 Editing common mathematical formulas		
	图和表的设计与编辑 Design and Editing of Figures and Tables		

学习目标: Learning Objectives	了解: Recognize	TeX 软件的介绍、安装与配置 Introduction, Installation, and Configuration of Software
	理解: Understand	一般文本的编辑 Editing of general text
	掌握: Master	常见数学公式的编辑 Editing common mathematical formulas 图和表的设计与编辑 Design and Editing of Figures and Tables
德育目标 Moral Objectives	2-1, 2-2	
重点: Key Points	一般文本的编辑 Editing of general text 常见数学公式的编辑 Editing common mathematical formulas	
难点: Focal points	图和表的设计与编辑 Design and Editing of Figures and Tables	

(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	科技文献的检索 Retrieval of Scientific Literature	2	1	验证型	
2	科研数据的可视化 Visualization of Scientific Data	2	1	验证型	
	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	1-1 1-2
每组成员: Members per Group	1	指导教师: Tutor	张建波 Zhang Jianbo
实验名称: Experiment Title	科技文献的检索 Retrieval of Scientific Literature		
实验内容: Content	掌握三大科技文献平台 (IEEE Xplore、Elsevier、Springer) Master the method to search and download scientific literatures from the platforms of IEEE Xplore, Elsevier and Springer		
	掌握两大检索平台 (ISI Web of Science、Ei Village) Master the method to retrieve scientific literatures from ISI Web of Science and Ei Village		

	了解《中国科学院文献情报中心期刊分区表》的使用 Understand the usage of “Journal Division Table of Literature and Information Center of Chinese Academy of Sciences”
	了解一般科技论文的结构 Understand the structure of general scientific paper
学习目标: Learning Objectives	掌握常见的检索库与期刊库的使用方法 Master the usage of common retrieval databases and periodical databases
实验场地: Location	机房 Computer room
实验软硬件设备: Software/Hardware	浏览器、电脑 Browser, Computer

实验项目序号: Experiment No.	2	支撑教学目标: SLOs Supported	1-1 1-2
每组成员: Members per Group	1	指导教师: Tutor	张建波 Zhang Jianbo
实验名称: Experiment Title	科研数据的可视化 Visualization of Scientific Data		
实验内容: Content	掌握科研数据用表格可视化的一般方法 Master the general approach to visualize scientific data using tables 掌握科研数据用图可视化的一般方法 Master the general approach to visualize scientific data using figures		
学习目标: Learning Objectives	掌握科研报告中的常见表格与作图方法 Mastering the common methods to design the tables and figures in scientific research		
实验场地: Location	机房 Computer room		
实验软硬件设备: Software/Hardware	文字编辑软件、电脑 Software for text-editing, Computer		

(3) 课外实践教学 PBL

None

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

科技论文的特点及结构 Characteristics and Structure of Scientific and Technological Papers	3			
科技论文的写作及注意事项 Writing and Precautions for Scientific and Technological Papers	1	2		
期刊的查找与论文的发表和检索 Journal search and publication of papers with their retrieval	2	2		
学位论文（本科论文）的一般结构与写作方法 General Structure and Writing Methods of Degree Thesis (Undergraduate Thesis)	2			
TeX 软件的使用 Use of TeX software	4			
总计 Total	12	4	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-basedlecturing
<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 Knowledgedeliverywithethiceducation
<input type="checkbox"/>	PBL 教学：问题驱动的分组学习与交流 Problem-basedlearning
<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	实验 EXP	环节负责人: Director	张建波 Zhang Jianbo
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	20

考核方式: Measures	实验报告 1 Experiment report 1		
考核环节: Assessment Content	实验 EXP	环节负责人: Director	张建波 Zhang Jianbo
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	20
考核方式: Measures	实验报告 2 Experiment report 2		

考核环节: Assessment Content	其他 Others	环节负责人: Director	张建波 Zhang Jianbo
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	30
考核方式: Measures	大作业: 科研论文中引言与参考文献的撰写 Homework: writing of introduction and reference in scientific paper		
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	30
考核方式: Measures	大作业: TeX 的使用 Homework: usage of TeX software		

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.		