工程领导力 教学大纲

Communication Engineering Subject Syllabus

一、课程信息 Subject Information

课程编号: Subject ID	3100212003	开课学期: Semester	2
课程分类: Category	专业教育 PA	所属课群: Section	工程能力 EA
课程学分: Credit Points	3	总学时/周: Total Hours/Weeks	48/12
理论学时: LECT. Hours	48	实验学时: EXP. Hours	0
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 Sydney Smart Technology College Northeastern University	适用专业: Stream	CST/CE
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	王新宇 Wang Xinyu	成绩记载方式: Result Type	百分制 Marks
先修课程: Requisites	C 程序设计基础 Fundamentals of C Programming		
英文参考教材: EN Textbooks	Dowling, D., Hadgraft, R., Carew, A., McCarthy, T., Hargreaves, D., Ballie, C., Male, S. (2019). Engineering Your Future - An Australasian Guide (4th Edition). Wiley.		
中文参考教材: CN Textbooks	无 None		
教学资源: Resources	https://lms.cloudcampus.com.cn/courses/13/modules		
课程负责人(撰写人): Subject Director	王新宇	提交日期: Submitted Date	4/6/2023
任课教师(含负责人): Taught by	Eva Cheng, Jennifer Choy, Huang Gavan, 李岩, 王新宇 Li Yan, Wang Xinyu		
审核人: Checked by	韩鹏	批准人: Approved by	史闻博
		批准日期: Approved Date	4/10/2023

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	本课程在实际工程项目的背景下培养学生的专业工程实践技能。学生们以小组的形式为给定的问题创造一个适当的设计解决方案，在无国界工程师挑战设计概要中列出。在理解工程实践中有效沟通和团队合作的核心作用的同时，学生也能理解专业工程师的社会、文化、经济和环境责任。本课程是学生在整个学习和职业生涯中作为专业工程师进行持续专业发展的起点。培养学生具备良好的团队合作能力、项目管理能力与领导力，通晓本专业相关的法律法规与职业规范，具有优异的创新精神和终身学习能力，学习与运用新技术的能力突出，能够适应持续的环境变化与技术变革。 This subject develops students' professional engineering practice skills within the context of a real-life engineering project. Students work in teams to create an appropriate design solution for a given problem as set out in the Engineers Without Borders (EWB) Challenge Design Brief. While appreciating the central role of effective communication and teamwork in engineering practice, students develop an understanding of the social, cultural, economic and environmental responsibilities of a professional engineer. This subject is a starting point for students' ongoing professional development that they undertake throughout their studies and as a professional engineer in their career. Develop students great ability in teamwork, project management and leadership, being familiar with the relevant laws and regulations and professional norms related to this major, innovation spirit and ability of lifelong learning, learning and applying new technologies, and be able to adapt to continuous environmental changes and technological changes;	
（1）专业目标: Professional Ability	1-1	培养学生在专业工程环境中运用工程领导力的基本原理，理论和实践；查找，评估，参考和记录信息，并进行研究以支持决策;在应用问题识别，制定和解决方案中应用的工程设计思路。 Apply the basic principles, theories and practice of communication in professional engineering contexts. Find, evaluate, reference and document information sources, and conduct research to support decision making. Apply the engineering design process of problem identification, formulation and solution.
	1-2	具有卓越的工程技术素养，具备突出的信息技术与工程实践技能，具备在计算机及其相关领域通过科学技术理论和工程实践方法创造性的解决复杂工程问题、从事学术前沿问题研究的能力； Excellent engineering literacy, outstanding practical skills in

		information technology, and capable of creatively solving complex engineering problems in computer science and related fields through scientific and technological theories and engineering practical methods, as well as the ability of doing academic cutting-edge project research;
	1-3	具有扎实的专业基础与学科特长，系统掌握现代信息处理理论、大数据与人工智能系统、项目管理与决策等方面的专门知识与技能； A solid professional foundation and competency, systematical mastery of the specialized knowledge and skills in modern information processing theory, big data and artificial intelligence, project management and decision-making;
	1-4	具有卓越的技术素养和突出的领导能力，具备在工程技术及通信学及其相关领域通过科学技术理论和方法创造性的解决复杂问题、从事学术前沿问题研究的能力。 Excellent technical literacy, outstanding practical skills in Engineering technology and communications, and capable of creatively solving complex engineering problems in applied statistics and related fields through scientific and technological theories and engineering practical methods, as well as the ability of doing academic cutting-edge project research.
（2）德育目标: Essential Quality	2-1	理解工程领导教育对提高自主创新能力，建设创新型国家的重要意义。Understand the significant meanings of engineering communication education in improving the ability of independent innovation and building an innovation-oriented country.
	2-2	认知提升工程科技人才的创新创业能力、构建产学合作的教育网络提高中国在全球发展核心竞争力。 Enhance the innovation and entrepreneurship ability of engineering science and technology talents and construct the education network of industry-university cooperation to improve the core competitiveness of China in the global development.

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、工程知识：能够将数学、自然科学、工程基础和专业知识用于解决复杂工程问题。	指标点 1-3：了解本专业涉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工程设计、技术创新的能力。	1-1，1-2，2-2
3、设计/开发解决方案：能够设计针对复杂工程问题的解决方案，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	指标点 3-1：能够设计针对本专业相关复杂工程问题的解决方案；	1-4，2-1，2-2
	指标点 3-3：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。	1-3，1-4

全、法律、文化以及环境等因素。		
4、研究：能够基于科学原理并采用科学方法对复杂工程问题进行研究，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。	指标点 4-3：能够追踪国际前沿技术动态，掌握本专业涉及的重要技术指标以及达到指标所需的技术途径。	1-4，2-1，2-2
11、项目管理与金融：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。	指标点 11-1：掌握基本的工程管理原理和经济决策方法，能对通信相关领域的新技术、新应用进行技术分析和比较；	1-3，1-4

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	1-1，1-2,1-3，1-4
知识单元名称 Unit Title	课程简介与设计过程 Introductions and the Design Process		
知识点: Knowledge Delivery	课程简介与学生分组 Introductions and Students breakdown		
	完成课前作业 Prework		
学习目标: Learning Objectives	了解: Recognize	课程内容设计结构与意义 Porotype and significance of Engineering degign	
	理解: Understand	课程要求 The requirements of course	
	掌握: Master	小组合作模式 Master the module of group collaboration	
德育目标 Moral Objectives	了解工程项目设计对于社会经济发展、区域安全的重要意义 Be aware of the significant meanings of engineering project design in society development and district security		
重点: Key Points	了解课程，自我介绍，完成课题分组 Strategy of brainstorming		
难点: Focal points	有效进行小组合作与沟通 Behavior and communicate well in group collaboration		

知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	判断信息来源 Evaluating sources		

知识点: Knowledge Delivery	判断信息的指标：Currency 流行性；Relevance 相关性；Authority 权威性；Purpose 目的性	
	小组反馈方式 Approaches of team reflection	
学习目标: Learning Objectives	了解: Recognize	判断信息来源的重要性 The importance of evaluating sources
	理解: Understand	CRAP 信息指标的概念 The concept of CRAP criteria
	掌握: Master	评价信息的四个指标 Four criteria of evaluating sources
德育目标 Moral Objectives	通过具体案例学会如何评价信息 Strength engineering ethics and professional morality through positive and negative cases during engineering projects implementation	
重点: Key Points	如何评价信息来源真假 How to evaluate the sources	
难点: Focal points	评价指标的掌握	

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-1，1-2，1-3，1-4
知识单元名称 Unit Title	参考文献 Referencing		
知识点: Knowledge Delivery	参考文献的使用方法 Brief introduction of Reference		
	小组反馈方式 Approaches of team reflection		
学习目标: Learning Objectives	了解: Recognize	使用参考文献的目的 The purpose of reference	
	理解: Understand	如何根据参考文献判断信息来源 How to evaluate sources from references	
	掌握: Master	参考文献的正确使用方法 Proper use of references	
德育目标 Moral Objectives	培养工程思维，基于信息来源做出评断 Developing engineering mind, and make judgments based on information sources		
重点: Key Points	正确书写参考文献 Write references correctly		
难点: Focal points	小组集中合作与反馈 Collaboration and feedback in teams		

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-2，1-3，1-4
知识单元名称 Unit Title	利害相关者和同理心 Stakeholders and empathy		
知识点:	利害关系辨别 Identify project stakeholders		

Knowledge Delivery	沟通技巧 Communication skills	
	时间管理和项目任务管理 Time management and project task management	
	小组反馈方式 Approaches of team reflection	
学习目标: Learning Objectives	了解: Recognize	利害相关者和同理心 Stakeholders and empathy
	理解: Understand	为什么与利害相关者建立同理心 Why do we build empathy with stakeholders?
	掌握: Master	The aim of team proposal
德育目标 Moral Objectives	通过同理心与沟通技巧与利害相关者建立联系，学会自我管理 Develop relationships with stakeholders through empathy and communication skills, and learn to manage yourself	
重点: Key Points	沟通技巧与时间任务管理 Communication skills,Time management and project task management	
难点: Focal points	小组集中合作与反馈 Collaboration and feedback in teams	

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-1, 1-2，1-4
知识单元名称 Unit Title	明确设计问题与头脑风暴 Defining your design problem and brainstorming		
知识点: Knowledge Delivery	总结设计方案对应的特定问题 Summarize the specific problem for which you are designing a solution		
	团队思考 Brainstorming in teams		
学习目标: Learning Objectives	了解: Recognize	形成构思并将团队已有的想法进行二次提炼 Forming and refining the ideas that teams have existed	
	理解: Understand	深度倾听概念 The concept of deep listening	
	掌握: Master	小组合作模式 Master the module of group collaboration	
德育目标 Moral Objectives	了解工程项目设计对于社会经济发展、区域安全的重要意义 Be aware of the significant meanings of engineering project design in society development and district security		
重点: Key Points	头脑风暴策略 Strategy of brainstorming		
难点: Focal points	有效进行小组合作与沟通 Behavior and communicate well in group collaboration		

知识单元序号: Knowledge Unit No.	6	支撑教学目标: SLOs Supported	1-2，1-4

知识单元名称 Unit Title	决策与工程写作　Decision-Making and Engineering Writing	
知识点: Knowledge Delivery	决策基本要素　Fundamental elements of decision-making	
	有效决策在工程中的重要作用 Vital effects of effective decision-making in engineering	
	工程报告写作基本技巧　Basic writing skills of engineering report	
学习目标: Learning Objectives	了解: Recognize	工程决策阶段注意事项 Announcements in the process of decision-making in engineering
	理解: Understand	决策重要性 The importance of decision-making
	掌握: Master	工程报告撰写规范与技巧 Specification and skills of wiring engineering report
德育目标 Moral Objectives	通过工程项目实施的正面与负面案例强化工程伦理与职业道德 Strength engineering ethics and professional morality through positive and negative cases during engineering projects implementation	
重点: Key Points	工程报告写作训练 Practicing writing of engineering reports	
难点: Focal points	工程决策中的价值问题 Value problem in engineering decision-making	

知识单元序号: Knowledge Unit No.	7	支撑教学目标: SLOs Supported	1-2，1-3，1-4
知识单元名称 Unit Title	EWB 设计论坛与小组反馈 EWB Design Forum and Team Reflection		
知识点: Knowledge Delivery	EWB 挑战设计简介 Brief introduction of EWB challenge design		
	小组反馈方式 Approaches of team reflection		
学习目标: Learning Objectives	了解: Recognize	EWB 设计项目的宗旨 The purpose of EWB design projects	
	理解: Understand	项目实施关键切入点 Key and starting points of project implementation	
	掌握: Master	团队提案的根本目的 The aim of team proposal	
德育目标 Moral Objectives	培养工程思维，基于任务需求选择最适合的技术方法 Developing engineering mind, and matching the most appropriate technical approach with task requirements		
重点: Key Points	需求牵引概述 EWB 问题 Strat with real demand and summarize EWB problem		
难点: Focal points	小组集中合作与反馈 Collaboration and feedback in teams		

知识单元序号: Knowledge Unit No.	8	支撑教学目标: SLOs Supported	1-2，1-3，1-4

知识单元名称 Unit Title	团队思维与原型设计 Groupthink and Prototyping	
知识点: Knowledge Delivery	工程项目实施进程中团队思维构建 Construction of groupthink in the process of engineering project implementation	
	聚焦实际工程问题的原型设计 Focusing on prototyping of practical engineering problems	
学习目标: Learning Objectives	了解: Recognize	团队思维整合理念 Integration concept of groupthink
	理解: Understand	团队思维在原型设计环节的引导性 Guidance of groupthink in prototype designs
	掌握: Master	原型设计的实用性准则 Practical guidelines for prototype designs
德育目标 Moral Objectives	了解工程项目设计对于社会经济发展、区域安全的重要意义 Be aware of the significant meanings of engineering project design in society development and district security	
重点: Key Points	团队思维与原型设计环节的有效融合 Effective integration of groupthink and prototypes	
难点: Focal points	在原型设计中融入社会、文化、经济和环境等人文元素 Mixing social, cultural, economic and environmental elements into prototype designs	

周: Week.	9, 10	支撑教学目标: SLOs Supported	1-1，1-2，1-3，1-4
知识单元名称 Unit Title	逆向项目概要 Reverse Project Brief		
知识点: Knowledge Delivery	针对所设计解决方案的特定问题总结； Summarise the specific problem for which you are designing a solution		
	有关当地情况的关键因素考虑； Taking into account the key considerations regarding the local situation		
	项目中涉及的风险考虑，以及实现项目最终目标的方法； Consider risks involved in the project, and the ultimate objectives the project is intended to achieve.		
学习目标: Learning Objectives	了解: Recognize	风险因素控制； Consideration risks involved in the project	
	理解: Understand	来源的可信度和相关性信息的分析； Credibility and relevance of sources	
	掌握: Master	信息的完整性；以及表达的质量和清晰度； Completeness of information; and quality and clarity of expression	
重点: Key Points	信息的综合分析； Analysis and synthesis of information		
难点: Focal points	与内容契合的研究与背景内容； Appropriate research and background content in relation to the context		

<table>
<tr><td>周:
Week</td><td colspan="2">11</td><td>支撑教学目标:
SLOs Supported</td><td>1-1，1-2，1-3，1-4</td></tr>
<tr><td>知识单元名称
Unit Title</td><td colspan="4">EWB Challenge 报告
EWB Challenge Report</td></tr>
<tr><td rowspan="2">知识点:
Knowledge Delivery</td><td colspan="4">通过决策，问题解决以及通过协作团队合作和项目管理进行项目设计与开发；
Developed the team’s design solution through decisionmaking, problem solving and project design and development through collaborative teamwork and project management.</td></tr>
<tr><td colspan="4">书面工程报告文档中针对 EWB Challenge 进行交流，记录并证明设计解决方案；
Communicate, document and justify your design solution for the EWB Challenge in a written engineering report document</td></tr>
<tr><td rowspan="8">学习目标:
Learning Objectives</td><td rowspan="2">了解:
Recognize</td><td colspan="3">翔实摘要的书写和富有洞察力的团队反思；
Clear and informative Executive Summary & Insightful team reflection</td></tr>
<tr><td colspan="3">简介需提供相关的背景信息，明确的问题定义和范围；
Introduction: provides relevant background context, clear problem definition and scope</td></tr>
<tr><td rowspan="3">理解:
Understand</td><td colspan="3">适合社会环境的设计解决方案；
Design solution appropriate to the community context</td></tr>
<tr><td colspan="3">信息的完整性，质量和表达的清晰度；
Completeness of information, quality and clarity of expression</td></tr>
<tr><td colspan="3">正确引用
Correct referencing</td></tr>
<tr><td rowspan="2">掌握:
Master</td><td colspan="3">正文应提出合理决策，设计标准，成本核算和实施计划的设计解决方案
Body: design solution presented with justified decision-making, design criteria, costings and implementation plan</td></tr>
<tr><td colspan="3">结论应简要总结报告的要点
Conclusion: succinctly summarises key points of the report</td></tr>
<tr><td>重点:
Key Points</td><td colspan="4">说明设计解决方案和可行性，设计原型，测试/评估以及建议；
Detail your design solution and feasibility, design prototype, testing/evaluation, and recommendations</td></tr>
<tr><td>难点:
Focal points</td><td colspan="4">提出合理决策，设计标准，成本核算和实施计划的设计解决方案；
Design solution presented with justified decision-making, design criteria, costings and implementation plan</td></tr>
</table>

周: Week.	12	支撑教学目标: SLOs Supported	1-1，1-2，1-3，1-4
知识单元名称 Unit Title	EWB Challeng 小组答辩 EWB Challenge Group Presentation		
知识点: Knowledge Delivery	EWB Challenge 项目团队提供有关设计解决方案的口头介绍。所有团队成员均为团队口头演讲中作为演讲的一部分，需要幻灯片或类似形式的视觉辅助工具来支持团队的演示； EWB Challenge project team must give an oral presentation to the members of tutorial class about the design solution. All team members are expected to speak as part of a coordinated oral presentation by the team. Visual aids in the form of a slideshow or similar are required to support the team's presentation.		
学习目标: Learning Objectives	了解: Recognize	视觉呈现辅助期望； Visual presentation aids	
		观众参与度； Audience engagement	
	理解: Understand	肢体语言和语音表达； Body language and voice delivery of presentation	
		演示报告的结构； Structure of presentation	
	掌握: Master	内容要以研究为基础，与背景相关，技术水平适合观众/目标； Based on research and relevant to context with level of technicality suited to the audience/purpose.	
重点: Key Points	演示报告的结构； Structure of presentation		
难点: Focal points	内容要以研究为基础，与背景相关，技术水平适合观众/目标； Based on research and relevant to context with level of technicality suited to the audience/purpose		

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
工程与设计进程简介 Introduction to Engineering and the Design Process	2	0	0	0

EWB 挑战项目入门 Getting started on the EWB Challenge	4	0	0	0
引用，学术诚信与组队 Referencing, Academic Integrity and Forming teams	4	0	0	0
项目利益相关者，同理心与时间管理 Project Stakeholder, Empathy and Time Management	4	0	0	0
明确设计问题与头脑风暴 Defining Your Design Problem and Brainstorming	4	0	0	0
决策与工程写作 Decision-Making and Engineering Writing	4	0	0	0
EWB 设计论坛与小组反馈 EWB Design Forum and Team Reflection	4	0	0	0
团队思维与原型设计 Groupthink and Prototyping	4	0	0	0
持续性与进展回顾 Sustainability and Progress Review	4	0	0	0
用户行程映射与报告撰写 User Journey Mapping and Report Writing	4	0	0	0
有效演讲技巧与撰写摘要和反馈 Effective Presentation Skills and Writing an Executive Summary and Reflections	4	0	0	0
EWB 挑战项目团队汇报 EWB Challenge Team Presentation	6	0	0	0
总计 Total	48	0	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
☑	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	过程考核	环节负责人: Director	王新宇
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	100%
考核方式: Measures	最终成绩为五个评估单元成绩之和，五个评估单元（课前测验、个人背景研究总结、逆向项目摘要、EWB Challenge 报告、EWB Challenge 小组答辩）分数所占比例为：10%、20%、20%、30%和20% The final grade is the sum of the seven Assessment Tasks (Pre-Work quizzes, Individual Background Research Summary, Reverse Project Brief, EWB Challenge Report, EWB Challenge Group Presentation) with the proportions of the seven assessment units: 10%, 20%, 20%, 30% and 20%.		

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 improvement.		
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.		