

电子工程高级实践 教学大纲

Fundamental Studio A Subject Syllabus

一、课程信息 Subject Information

课程编号: Subject ID	3100114002	开课学期: Semester	4
课程分类: Category	专业教育 PA	所属课群: Section	综合实践 PA
课程学分: Credit Points	3	总学时/周: Total Hours/Weeks	3W
理论学时: LECT. Hours	0	实验学时: EXP. Hours	0
PBL 学时: PBL Hours	0	实践学时/周: PRAC. Hours/Weeks	3W
开课学院: College	东北大学 悉尼智能科技学院	适用专业: Stream	通信工程 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	戴庆天 陈霞 Qingtian Dai Xia Chen	成绩记载方式: Result Type	五级制 Five Grades
先修课程: Requisites	C++程序设计基础 Fundamentals of C++ Programming		
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	https://lms.cloudcampus.com.cn/courses/31		
课程负责人(撰写人): Subject Director	戴庆天 陈霞 Qingtian Dai Xia Chen	提交日期: Submitted Date	3/1/2023
任课教师(含负责人): Taught by	Diep N. Nguyen, Danny Phung, 戴庆天, 陈霞		
审核人: Checked by	韩鹏	批准人: Approved by	史闻博
		批准日期: Approved Date	3/3/2023

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.

<p>整体目标: Overall Objective</p>	<p>学生应了解完成工程作品过程中所需要的相关专业基础知识。在创造力培养，探索新的方法，培养团队意识方面获得提升。同时在运用专业能力和沟通管理能力方面提升。学生需将从新的工程设计和和其他课程项目中学到的新的知识，并扩展知识广度和学习深度。</p> <p>Students focus on learning fundamental knowledge and skills needed to achieve the basic functionality of their chosen product. There is an emphasis on creativity and exploration of different approaches, both in developing technical expertise, as well as teamwork, communication, and project management. Students should use this as an opportunity to extend the knowledge gained from other coursework subjects by learning new topics of personal interest</p>	
<p>(1) 专业目标: Professional Ability</p>	<p>1-1</p>	<p>根据计划，确定产品所需要的需求，并制定产品需求来满足这些需求。 Identify needs of a product owner and formulate product requirements to address those needs.</p>
	<p>1-2</p>	<p>模型或者原型的构建，根据计划满足产品的要求 Model, prototype and/or build a product to meet requirements.</p>
	<p>1-3</p>	<p>理解并掌握工程项目的基础原理和方法，了解应用原型 Understand the primary principles and methods of a certain project, understand application prototype.</p>
	<p>1-4</p>	<p>展示学生的基本知识，技能和工程记录技能的进步 Demonstrate advancement of fundamental knowledge, skills appropriate to the student's discipline and engineering record-keeping skills</p>
	<p>1-5</p>	<p>团队有效合作，解决复杂问题 Work effectively in a team to solve complex problems.</p>
<p>(2) 德育目标: Essential Quality</p>	<p>2-1</p>	<p>具有正确的价值观和社会责任感，培养优秀的职业道德和行为规范。获得良好的口头和书面沟通能力，团队协作意识和人际交往能力。 Have correct values and sense of social responsibility and cultivate excellent professional ethics and codes of conduct. Obtain good oral and written communication skills, teamwork awareness and interpersonal skills.</p>
	<p>2-2</p>	<p>提高学生的创新意识，不怕困难和有效解决实际问题的能力 Improving students' sense of innovation, not afraid of difficulties and the ability to effectively solve practical problems</p>
	<p>2-3</p>	<p>拥有良好的跨文化和领域的沟通能力，培养能对专业领域的任务进行合理的规划，分解任务并按时、高效率和高质量完成的能力。 Possessing good cross-cultural and field communication skills</p>

		and cultivate the ability to reasonably plan tasks in the professional field, break down tasks and complete them on time, with high efficiency and high quality.
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, 1-3, 1-4
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、安全、法律、文化以及环境等因素。	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,能够设计和开发实现特定功能、满足特定需求的信息传输、信号处理或网络通信系统;	1-1, 1-2, 1-4
	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。	
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 4-1: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工程问题设计实验进行研究;	1-1, 1-2, 1-4
5、使用现代工具:能够针对复杂工程问题,开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具,包括对复杂工程问题的预测与模拟,并能够理解其局限性。	指标点 5-2:熟悉解决本专业相关复杂工程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;	1-4, 2-2
9、个人和团队: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。	指标点 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。	1-4, 2-1, 2-2, 2-3

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) 实践教学 Practice

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

知识单元名称 Unit Title	课程介绍, 电子工程高级实践课程总体内容与产品介绍 Subject journey, Introduction to the course and the provided product list. The content of Fundamentals Studio A	
知识点: Knowledge Delivery	课程介绍 Subject journey	
	课程产品所用软硬件简介 Introduction to the SW and HW used during the subject	
	个人设计日志和小组学习计划的撰写 Personal Design Journal and Group Learning Contract.	
学习目标: Learning Objectives	了解: Recognize	课程概况和要求 Subject overview and requirements
	理解: Understand	工程实践的方法与原则 Methods and principles of engineering practice
	掌握: Master	个人设计日志和小组学习计划的撰写 Personal Design Journal and Group Learning Contract.
德育目标 Moral Objectives	培养正确的价值观和社会责任感, 培养优秀的职业道德和行为规范。培养具有不畏困难、不惧失败、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良好品质。 Cultivate correct values and social responsibility and cultivate excellent professional ethics and codes of conduct. Cultivate the spirit of not being afraid of difficulties, not afraid of failure, daring to try, and facing difficulties, and cultivate their own good qualities of care and patience in the learning process.	
重点: Key Points	个人设计日志和小组学习计划的撰写 How to write Personal Design Journal and Group Learning Contract.	
难点: Focal Points	工程计划制定 Making Project proposal	

知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-2、2-3
知识单元名称 Unit Title	课程产品详细介绍 Detailed introduction to the course product		
知识点: Knowledge Delivery	团队协作工具的应用 Application of Trello and other tool for Personal Design Journal		
	个人调研与小组学习计划的创建 Individual surveys and start creating Group Learning Contracts		
	小组学习计划的理念 Concept of Group Learning Contract		
学习目标: Learning Objectives	了解: Recognize	Trello 或者其他用于个人设计日志的工具 Trello or other tool for Personal Design Journal	
	理解: Understand	小组学习计划的理念 Concept of Group Learning Contract	
	掌握: Master	团队协作工具的应用 Application of Trello and other tool for Personal Design Journal	

德育目标 Moral Objectives	熟悉跨文化跨领域的有效沟通和交流的方法，掌握获取知识的有效途径。 Familiar with cross-cultural and cross-domain effective communication and communication methods, and master effective ways to acquire knowledge.
重点: Key Points	团队协作工具的应用 Application of Trello and other tool for Personal Design Journal
难点: Focal Points	小组学习计划的理念 Concept of Group Learning Contract

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-1、1-2、1-4、2-3
知识单元名称 Unit Title	根据需要选择团队和产品 Team and Product selection		
知识点: Knowledge Delivery	产品的软硬件细节 Details of products		
	产品计划书的创建 the Product Proposal writing		
	小组学习计划的实现 Implement of Group Learning Contract.		
学习目标: Learning Objectives	了解: Recognize	产品的软硬件细节 Details of products	
	理解: Understand	根据需要选择团队和产品 Team and Product selection	
	掌握: Master	本课程所使用的软硬件设备 The specific software and hardware used in the assignment of the subject	
德育目标 Moral Objectives	培养的学科应用的整体观，鼓励学生创新和解决问题的能力 Cultivate a holistic view of subject application, encourage students to innovate and solve problems		
重点: Key Points	本课程需要使用的软硬件设备 The specific software and hardware used in the assignment of the subject		
难点: Focal Points	本课程需要使用的软硬件设备 The specific software and hardware used in the assignment of the subject		

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-3、2-3
知识单元名称 Unit Title	完善产品计划书 提交每周工作日志 Work on Product Proposal Submit PDJ Weekly Progress		
知识点: Knowledge Delivery	小组学习计划准备 Preparation of Group Learning Contracts		

	个人学习和团队自学习 完善产品 Individual Learning Activities and “Teach the team” Activities
	最终确定产品计划书 Product Proposal agreed to by the lecturer and product owner
学习目标: Learning Objectives	了解: Recognize 小组学习计划准备 Preparation of Group Learning Contracts
	理解: Understand 个人学习和团队自学习 Individual Learning Activities and “Teach the team” Activities
	掌握: Master 确定产品计划书 Product Proposal agreed to by the lecturer and product owner
重点: Key Points	提交每周工作日志 Submit PDJ Weekly Progress
难点: Focal Points	最终确定产品计划书 Product Proposal agreed to by the lecturer and product owner

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-1、1-2、2-3、2-4
知识单元名称 Unit Title	完善产品的具体设计 Product design/implementation		
知识点: Knowledge Delivery	工程项目的概念、分类和实例 Concept of project、classification and prototypes		
	工程调试与设计 Project design and debugging		
	按照计划书要求合理化相关功能 Meeting with Product Owner as required		
学习目标: Learning Objectives	了解: Recognize	工程项目的概念、分类和实例 Concept of project、classification and prototypes	
	理解: Understand	按照计划书要求合理化相关功能 Meeting with Product Owner as required	
	掌握: Master	工程调试与设计 Project design and debugging	
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	工程调试与设计 Project design and debugging		
难点: Focal Points	工程调试与设计 Project design and debugging		

知识单元序号: Knowledge Unit No.	6	支撑教学目标: SLOs Supported	1-4、2-1、2-2、2-3
知识单元名称 Unit Title	软件程序的调试 Programming debugging		

知识点: Knowledge Delivery	软件程序的调试方法 Programming debugging Methods	
	系统设计功能实现的可行性判断 Feasibility judgment of system design function realization	
学习目标: Learning Objectives	了解: Recognize	软件程序的调试 Programming debugging
	理解: Understand	系统设计功能实现的可行性判断 Feasibility judgment of system design function realization
	掌握: Master	程序的调试方法 Programming debugging Methods
德育目标 Moral Objectives	熟悉跨文化跨领域的有效沟通和交流的方法, 掌握获取知识的有效途径。 Familiar with cross-cultural and cross-domain effective communication and communication methods, and master effective ways to acquire knowledge.	
重点: Key Points	程序的调试方法 Programming debugging Methods	
难点: Focal Points	程序的调试方法 Programming debugging Methods	

知识单元序号: Knowledge Unit No.	7	支撑教学目标: SLOs Supported	1-2、1-4、2-1、2-3
知识单元名称 Unit Title	Arduino 的设置 Arduino Setup		
知识点: Knowledge Delivery	Arduino 设置 Arduino Setup		
	树莓派的使用 Using Arduino		
学习目标: Learning Objectives	了解: Recognize	Arduino 和开发历史 Introduction to Arduino and its development history	
	理解: Understand	Arduino 的功能 The function of Arduino	
	掌握: Master	Arduino 的设置和使用 Setup and using of Arduino	
德育目标 Moral Objectives	熟悉跨文化跨领域的有效沟通和交流的方法, 团队分工与合作的实践。 Familiar with cross-cultural and cross-field effective communication and communication methods, team division of labor and the practice of cooperation.		
重点: Key Points	软硬件联合设计 Joint design of software and hardware		
难点: Focal Points	软硬件系统联合设计 Joint design of software and hardware systems		

知识单元序号: Knowledge Unit No.	8	支撑教学目标: SLOs Supported	1-1、1-2、1-4、2-1
知识单元名称 Unit Title	产品功能的完善 Product implementation		
知识点: Knowledge Delivery	结合实际修改功能 Combine the actual modification function		
	按要求修正团队学习计划 Revise Group Learning Contract as required		
	产品报告的修改 Revision of product report		
学习目标: Learning Objectives	了解: Recognize	结合实际修改功能 Combine the actual modification function	
	理解: Understand	按要求修正团队学习计划 Revise Group Learning Contract as required	
	掌握: Master	产品报告的修改 Revision of product report	
德育目标 Moral Objectives	了解无线网络安全对于社会经济发展的重要意义 Be aware of the significant meanings of engineering project design in society economic development.		
重点: Key Points	结合实际修改功能 Combine the actual modification function		
难点: Focal Points	结合实际修改功能 Combine the actual modification function		

知识单元序号: Knowledge Unit No.	9	支撑教学目标: SLOs Supported	1-4、2-1、2-2、2-3
知识单元名称 Unit Title	软硬件联合调试 Joint debugging of software and hardware		
知识点: Knowledge Delivery	修正软硬件运行问题 Fixing program running and hardware problems		
	界面完善和扩展活动 UI Configuration and Extension Activities		
学习目标: Learning Objectives	了解: Recognize	软硬件联合调试 Joint debugging of software and hardware	
	理解: Understand	修正软硬件运行问题 Fixing program running and hardware problems	
	掌握: Master	修正软硬件运行问题的方法 Methods of fixing program running and hardware problems	
重点: Key Points	修正软硬件运行问题 Fixing program running and hardware problems		
难点: Focal Points	修正软硬件运行问题 Fixing program running and hardware problems		

知识单元序号: Knowledge Unit No.	10	支撑教学目标: SLOs Supported	1-1、1-2、1-4、2-3
知识单元名称 Unit Title	系统设计功能与实际运行效果的可行性 Feasibility judgment of system design function realization		
知识点: Knowledge Delivery	界面的完善 UI setup and refinement		
	修改与实际运行不相关的需求 Modify requirements that are not relevant to the actual operation		
学习目标: Learning Objectives	了解: Recognize	系统设计功能与实际运行效果的可行性 Feasibility judgment of system design function realization	
	理解: Understand	修改与实际运行不相关的需求 Modify requirements that are not relevant to the actual operation	
	掌握: Master	界面的完善 UI setup and refinement	
重点: Key Points	修改与实际运行不相关的需求 Modify requirements that are not relevant to the actual operation		
难点: Focal Points	修改与实际运行不相关的需求 Modify requirements that are not relevant to the actual operation		

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.
课程简介，电子工程高级实践课程介绍 Subject journey, Introduction to the course and the provided product list				2
课程产品所用软硬件简介 Introduction to the SW and HW used during the subject				2
课程产品详细介绍，确定题目和分组，个人设计日志的撰写 Team creation, Introduction to Trello or other tool for Personal Design Journal				6
团队和产品的选择以及产品计划书的创建 Team and Product selection and Start the Product Proposal				4
个人学习和团队自学习 完善产品 Individual Learning Activities and “Teach the team” Activities				4
工程调试与设计 Project design and debugging				4
产品功能的初步实现与完善 Product implementation				6
修正程序运行问题 Fixing program running problems				4
界面完善和扩展活动 UI Configuration and Extension Activities				4
系统设计功能实现的可行性判断 Feasibility judgment of system design function realization				4
修正程序运行问题和硬件调试问题和运行问题 Fixing program running problems and hardware debugging problems				4
最终报告展示 完成最终的团队报告和软硬件展示 Final Product Presentations, Complete and submit Group Final Report				4
总计 Total				48

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 checked="" 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： 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	戴庆天 陈霞
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	30
考核方式: Measures	该部分成绩由每周的 PDJ 作业和课堂考勤组成 This part of assessment contains PDJ and students course attendance.		

考核环节: Assessment Content	期末 Final	环节负责人: Director	戴庆天 陈霞
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	70
考核方式: Measures	<p>期末作业分为书面报告、功能演示、小组学习合同 GLC 和产品建议书四个部分，其中书面报告和功能演示占 40%，GLC 和产品建议书各占 15%。提交方式为在有效期内学生自行上传至云校园相关链接。</p> <p>The final assignment is divided into four parts: written report, functional demonstration, group study contract GLC and product proposal, of which 40% is written report and functional demonstration, 15% is GLC and product proposal. The submission method is to upload relevant links to Cloud campus by students within the validity period.</p>		

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.		