电子科学创新实验 I（EE317）课程大纲

南方科技大学 SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	**电子科学创新实验 I** **Advanced Electronic Science Experiments I**
2.	**授课院系** **Originating Department**	电子与电气工程系 Department of Electrical and Electronic Engineering
3.	**课程编号** **Course Code**	EE317
4.	**课程学分 Credit Value**	1
5.	**课程类别** **Course Type**	专业选修课 Major Elective Courses
6.	**授课学期** **Semester**	秋季 Fall
7.	**授课语言** **Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师）** **Instructor(s), Affiliation& Contact** **（For team teaching, please list all instructors）**	无 NA
9.	**实验员/助教、所属学系、联系方式** **Tutor/TA(s), Contact**	待公布 To be announced
10.	**选课人数限额(可不填)** **Maximum Enrolment（Optional）**	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
学时数 Credit Hours			32		32

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无 NA
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14. 其它要求修读本课程的学系 Cross-listing Dept.	无 NA

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

选修此课程的学生需要选择 1 位我系教授作为导师，并在其指导下从事科研工作。

本课程希望通过让学生参与教授的科研工作，培养学生的科学素养，自学能力，以及创新思维。同时，接触世界前沿的科学知识，了解先进科研仪器，从而为未来攻读研究生学位或从事研发工作打好基础。

Each student selects a professor as course supervisor from the Department of Electrical and Electronic Engineering, joins the research group of the supervisor, and participates in a research project suggested by the supervisor.

Through the training of this course, students are expected to build up motivations and acquire basic knowledge required for scientific research, and to cultivate self-learning and critical thinking skills. In the meanwhile, students are expected to learn the state-of-the-art scientific techniques in their selected areas, and to master skills to operate advanced experiment equipment. By taking this course, students may have opportunities to gain their research experience, abilities and competitiveness for their future graduate studies or R&D work in industry.

16. 预达学习成果 Learning Outcomes

通过这门课程，学生有望具有
1. 查找和阅读科技文献，以及自学能力
2. 运用数学，科学和工程知识进行科学探索的能力
3. 明确，规划，并解决工程问题的能力
4. 设计并实施实验，设计元器件或系统，以及/或开发算法能力
5. 使用现代工具和/或软件探索并解决工程问题的能力。
6. 分析和解释数据的能力
7. 与同学老师有效交流沟通的能力

By taking this course, students are expected to be able to
1. Search and read literature for a given topic;
2. Apply the knowledge of mathematics, science and engineering to investigate a research problem;
3. Identify, formulate and solve engineering problems;
4. Design and conduct experiment, and/or design a component or system, and/or develop algorithms
5. Use modern tools and software to investigate and solve engineering problems
6. Analyse and interpret data,
7. Communicate effectively with peer students and professors.
8. Cultivate self-disciplinary working altitude.

17. **课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）**
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

第 1-3 周：学生选择创新实验项目，递交课题简介表。
第 4-14 周：学生进行创新实验项目 (第 8 周递交项目期中审核表)。
第 15-16 周：准备创新实验项目口头报告和书面报告，考核小组现场评估和审核项目报告。

Week 1-3: Students choose research projects, and submit project information forms.
Week 4-14: Students participant in chosen research projects (and submit mid-term project evaluation forms at week 8).
Week 15-16: Students give oral presentations and submit written reports, and the panel evaluates project reports.

18. **教材及其它参考资料 Textbook and Supplementary Readings**

无 NA

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试				

Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation		80		口头报告和书面报告 Project oral presentation and written report
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)		20		期中审核：20% Mid-term evaluation: 20%

20. **记分方式 GRADING SYSTEM**

十三级等级制 Letter Grading

课程审批 REVIEW AND APPROVAL

21. **本课程设置已经过以下责任人/委员会审议通过**
This Course has been approved by the following person or committee of authority

电子与电气工程系 Department of Electrical and Electronic Engineering

南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

课程详述
COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	电子科学创新实验 I Advanced Electronic Science Experiment I
2.	**授课院系** **Originating Department**	电子与电气工程系 Department of Electrical and Electronic Engineering
3.	**课程编号** **Course Code**	EE317
4.	**课程学分 Credit Value**	1
5.	**课程类别** **Course Type**	专业核心课 Major Core Courses
6.	**授课学期** **Semester**	春季 Spring 和 秋季 Fall
7.	**授课语言** **Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师）** **Instructor(s), Affiliation& Contact** **（For team teaching, please list all instructors）**	徐琳琳，教学工程师 电邮: xull@sustech.edu.cn Linlin Xu, Teaching Engineer, Email: xull@sustc.edu.cn 王小静，教学工程师 电邮: wangxj@sustech.edu.cn Xiaojing Wang, Teaching Engineer, Email: wangxj@sustc.edu.cn
9.	**实验员/助教、所属学系、联系方式** **Tutor/TA(s), Contact**	待公布 To be announced
10.	**选课人数限额(可不填)** **Maximum Enrolment（Optional）**	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
学时数 Credit Hours			32		

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	EE201-17 模拟电路或 EE202-17 数字电路
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	《电子科学创新实验 II》和《电子科学创新实验 III》
14. 其它要求修读本课程的学系 Cross-listing Dept.	

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

1. 详细介绍移动 App 开发的基础知识、移动 App 开发流程和设计一般过程等；

2. 详细讲解手机 App，如计算器 App、音乐播放器 App、近场通信（NFC）App 等的设计流程和方法；

3. 详细介绍 STM32 的基础架构、基本原理，开发流程和开发方法；

4. 通过几个案例，让学生熟悉 STM32 的最为典型的外设和功能模块：GPIO 的输入输出、TIMER 和 PWM、A/D、D/A 等的工作原理、应用设计和程序实现。

1. Introduce in detail the basic knowledge of mobile App development、 development process and general design process of the mobile App, etc;

2. Introduce in detail the design process and methods of mobile phone Apps, such as Calculator, Music Player, Near Field Communication (NFC) ,etc;

3. Introduce the structure, basic principle, development process and development method of STM32 in detail;

4. Through several cases, let students be familiar with the most typical peripherals and functional modules of STM32: the working principle, application design and program implementation of GPIO input and output, timer and PWM, A/D, D/A, etc.

16. 预达学习成果 Learning Outcomes

通过该课程的学习，学生有望具有：

1. 掌握移动 App 开发基础知识、移动 App 开发流程和设计的一般过程；

2. 通过实战操作，掌握手机 App 的设计流程和方法；

3. 带领大家进入 STM32 的大门，着重对基础的培训，并初步具备项目实践能力。

4. 通过一些简单的实战项目，掌握 STM32 项目开发流程，可以做到基本掌握 STM32 的使用，并初步具备独立完成 STM32 项目开发的能力。

5. 主要内容包括：STM32 基本概念介绍、开发环境搭建、C 语言基础讲解、基本外设使用、高级外设使用、项目实战等内容。引领学员进入 STM32 的大门。

Through the study of this course, students are expected to have:

1. Master the basic knowledge of mobile App development, mobile App development process and general design process;

2. Master the design process and methods of mobile phone Apps;

3. Get into the gate of STM32, focus on basic training, and initially have project practice ability.

4. Master the development process of STM32 project through some simple practical projects, basically master the use of STM32, and initially have the ability to independently complete the development of STM32 project.

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

第 1 周：软件编程开发基础知识介绍和移动 App 开发介绍；移动 App 开发环境和开发工具安装。

第 2 周：计算器 App 设计

第 3 周：音乐播放器 App 设计

第 4 周：近场通信（NFC）App 设计

第 5 和 6 周：手机安全助手 App 设计

第 7 和 8 周：手机购物 App 设计

第 9 周：STM32 基本概念介绍、开发环境搭建（安装使用嵌入式系统开发中常用的编译软件，并建立示例工程，熟悉嵌入式系统开发流程）、C 语言基础讲解；

第 10 周：GPIO 输出——点亮 LED；

第 11 周：GPIO 输入——单功能按键及复用按键；

第 12 周：TIMER 和 PWM——检测输入方波的频率；

第 13 周：TIMER 和 PWM——呼吸灯及电机转速控制；

第 14 周：USART 及其应用——STM32 与 PC 通信；

第 15 周：人机界面——按键输入及液晶显示；

第 16 周：ADC——模拟电平输入检测；

Week 1: Introduction to basic knowledge of software programming and development of mobile App; Mobile App development environment and development tool installation.

Week 2: Calculator App design

Week 3: Music Player App design

Week 4: Near Field Communication (NFC) App design

Weeks 5 and 6: Mobile Phone Security Assistant App design

Weeks 7 and 8: Shopping App design

Week 9: Introduction to basic concepts of STM32, construction of development environment (installation and use of compiler software commonly used in embedded system development, establishment of example projects, familiarity with embedded system development process),basic explanation of C language;

Week 10: GPIO output - turn on the LED;

Week 11: GPIO input - single function key and multiplex key;

Week 12: Timer and PWM - detect the frequency of input square wave;

Week 13: Timer and PWM - breathing lamp and motor speed control;

Week 14: USART and its application - communication between STM32 and PC;

Week 15: Human-computer interaction - key input and LCD display;

Week 16: ADC - analog input detection;

18. **教材及其它参考资料 Textbook and Supplementary Readings**

无 NA

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects		100		
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation				
其它（可根据需要				

改写以上评估方式） **Others (The above may be modified as necessary)**				

20. 记分方式 **GRADING SYSTEM**

☑ A. 十三级等级制 **Letter Grading**
☐ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority