

## 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	基于 LabVIEW 的通信电子设计 Communication Electronic Design based on LabVIEW
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	EES202
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	夏季 Summer
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)	吴光，电子与电气工程系 Dr. Guang Wu, Department of Electrical and Electronic Engineering Email: <a href="mailto:wug@sustech.edu.cn">wug@sustech.edu.cn</a>
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	无 NA
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	8		24		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	EE206 通信原理 EE206 Communication Principles EE313 无线通信 EE313 Wireless Communications
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

本课程将针对智能硬件研发中的方案设计和原型实现两个关键环节进行教学。主要内容包括：LabVIEW 界面设计和优化，智能硬件开发平台架构，图像采集和视觉算法，FPGA 宽带无线信号接收机。

This course will focus on the critical issues in the solution design and prototype implementation of intelligent hardware. The main topics include: LabVIEW interface design and optimization, platform architecture of intelligent hardware, image acquisition and vision algorithms, FPGA-based wideband wireless receiver.

#### 16. 预达学习成果 Learning Outcomes

通过课程的学习，学生将具备如下能力：

1. 能够运用 LabVIEW 软件进行复杂工程控制界面设计和优化；
2. 能够深入理解智能硬件开发平台架构，并能够进行硬件调试、数据分析和处理；
3. 能够使用智能硬件开发平台和视频采集设备进行图像采集和视觉算法开发；
4. 能够理解 LabVIEW FPGA 编译过程，并能够使用 FPGA 进行实时信号捕获、处理和显示。

After completing this course, the students will be able to

1. Conduct the complex interface design and optimization using LabVIEW software.
2. Understand deeply the architecture of intelligent hardware, and conduct debugging, data analysis and processing.
3. Conduct the research and development of image acquisition and vision algorithms using the intelligent hardware and professional video camera.
4. Understand deeply the compile process of LabVIEW FPGA, and conduct the real-time signal capture, processing and display using FPGA.

#### 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.)**

Lab1 LabVIEW 高级编程: 事件结构, 状态机结构, 生产者-消费者结构, 队列管理, 界面布局和优化等。

Lab1 LabVIEW advanced programming: Event structure, Producer consumer architecture, State machine architecture, Queue management, and interface layout and optimization.

Lab2 NI myRIO 硬件架构: ARM+FPAG, myRIO 工具包安装, 硬件连接和测试, 项目实现: 十字路口交通灯

Lab2 NI myRIO hardware architecture: ARM+FPGA, Toolkit installation for myRIO, Hardware connection and testing, Project: Traffic lights at intersections.

Lab3 图像采集和视觉算法: 视觉采集驱动函数, 视觉采集助手, 边缘检测, 颜色识别, 文本识别算法, 项目实现: 颜色识别器。

Lab3 Image acquisition and vision algorithms: acquisition functions, Vision assistant, edge detection, Color recognition, Text recognition algorithm, Project: Color recognizer.

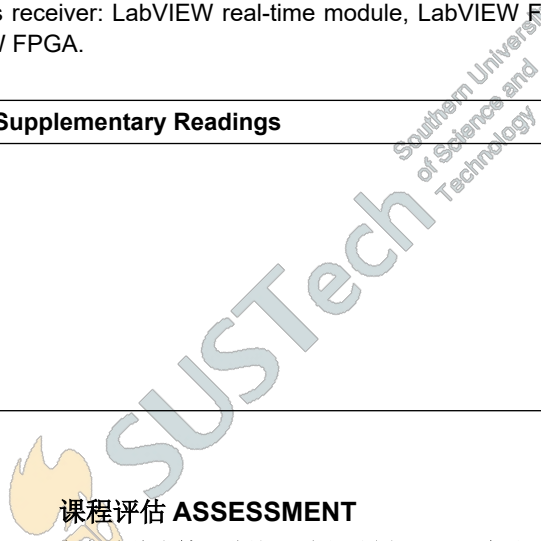
Lab4 基于 LabVIEW FPGA 实时无线接收机: LabVIEW 实时模块, LabVIEW FPGA 模块, 频谱分析模块, LabVIEW FPGA 编译过程。

Lab4 FPGA-based real-time wireless receiver: LabVIEW real-time module, LabVIEW FPGA module, spectrum analysis module, compile process of LabVIEW FPGA.

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

[1] NI myRIO 入门指南, 2015.

[2] Introduction to NI myRIO, 2015.



**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		20%		
小测验 Quiz				
课程项目 Projects		30%		
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)**

	50%		

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**

