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**	**传感器与应用** **Sensors and applications**
2.	**授课院系** **Originating Department**	电子与电气工程 Electrical and Electronic Engineering
3.	**课程编号** **Course Code**	EE342
4.	**课程学分 Credit Value**	3
5.	**课程类别** **Course Type**	专业核心课 Major Core Courses
6.	**授课学期** **Semester**	春季 Spring
7.	**授课语言** **Teaching Language**	中英双语 Chinese & English
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）**	王太宏，讲席教授，电子与电气工程系 办公室：台州楼 203 室 Email：wangth@sustc.edu.cn 电话：0755-8801-8520 Wang Taihong, Chair Prof., Department of Electrical and Electronic Engineering Office: Room No. 203, Taizhou Building 2 Email: wangth@sustech.edu.cn Telephone: 0755-8801-8520
9.	**实验员/助教、所属学系、联系方式** **Tutor/TA(s), Contact**	段小川，副教授；肖松华，博士后。电子与电气工程系 第一教学楼 501 室 duanxc@mail.sustech.edu.cn 0755-8801-8520 Duan Xiaochuan, Associate Prof.; Xiao Songhua,Potdoc,, Department of Electrical and Electronic Engineering Rm.203,Taizhou lou. duanxc@mail.sustech.edu.cn 0755-8801-5520
10.	**选课人数限额(可不填)** **Maximum Enrolment（Optional）**	47

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	48	0	0		48

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	无 NA
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

《传感器与应用》是电子科学与技术专业的专业选修课程。通过本课程的学习，学生能了解传感器的基本概念、传感器的构成、传感器工作的有关定律、传感器的作用、传感器和现代检测技术发展的趋势；培养学生利用现代电子技术、传感器技术和计算机技术解决生产实际中信息采集与处理问题的能力，为工业信息获取与测控系统的设计、开发奠定基础。

Sensors and applications is a professional elective for students with the department of electronic science and technology. Through this course, students should understand the basic concepts and structures of sensors, the critical rules for a sensor to work, the roles of sensors, and the development of sensors and modern detection technologies. Students are expected to develop the abilities to use modern electronic technologies, sensor technologies and computer technologies to solve information acquisition and processing tasks in practical problems, and to establish the basic skills for the design and development of measuring and control systems.

16. 预达学习成果 Learning Outcomes

通过本课程的学习，学生（1）掌握传感器的定义和分类，了解测量系统的组成。掌握各类常用传感器的工作原理、性能特点、配用电路和实际应用。（2）掌握测量系统中选用传感器的原则，能根据实际需要选用合适的传感器，可以针对应用需求，分析和设计一些简单的传感器。（3）了解传感器在工程、科研实例中的重要作用，理解电学、光学、机械学、测量、控制等综合技术的相关性。能够针对传感技术进行有效沟通和交流，具有对传感器的发展动态和新成果的自学能力。

Through this course, students should (1) Master the definition and classification of sensors and understand the composition of the measurement system. Master the working principle, performance characteristics, matching circuits and practical applications of various commonly used sensors.(2) Master the principle of selecting sensors in the measurement system, and select suitable sensors according to actual needs. Some simple sensors can be analyzed and designed according to application requirements.(3) Understand the important role of sensors in engineering and scientific research examples, and understand the relevance of integrated technologies such as electricity, optics, mechanics, measurement, and control. He/she is able to communicate effectively with sensing technology, and has the ability to self-learn the development of sensors and new results.

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.)

课程将讲授各类传感器的基本原理、特性及相应的测量电路，同时也介绍各类传感器的实际应用及传感器技术发展的状况及新成果， 具体按以下12章来讲授。
第一章、初识传感器
第二章、电阻应变式传感器•力及力矩的测量
第三章、电容式传感器•压力测量
第四章、电感式传感器•线位移及尺寸测量
第五章、压电式传感器•加速度测量
第六章、光电式传感器•转速测量测量及接近开关
第七章、温度传感器
第八章、集成化智能传感器
第九章、传感器的标定
第十章传感器在大健康产业的应用
第十一章 自主驾驶传感器
第十二章 传感器研究方法

The course will teach the basic principles, characteristics and corresponding measurement circuits of various types of sensors. It also introduces the practical application of various sensors and the development status and new results of sensor technology. The details are as follows.
Chapter 1, Preliminary Understanding of Sensors
Chapter 2, Resistance Strain Sensors • Measurement of Force and Torque
Chapter 3, Capacitive Sensors • Pressure Measurement
Chapter 4, Inductive Sensors • Line Displacement and Dimensional Measurement
Chapter 5, Piezoelectric Sensors • Acceleration Measurement
Chapter 6, Photoelectric Sensors • Speed Measurement and Proximity Switches
Chapter 7, Temperature Sensor
Chapter 8, Integrated Smart Sensors
Chapter 9, Calibration of Sensors
Chapter 10 Application of Sensors in the Health Industry
Chapter 11 Autonomous Driving Sensor
Chapter 12 Sensor Research Methods

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

无

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		10%		
课堂表现 Class Performance		30%		
小测验 Quiz				
课程项目 Projects		40%		
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试				

Final Exam				
期末报告 Final Presentation		20%		
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