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	**现代电动汽车技术 Modern Electric Vehicle Technologies**
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	EE433
4.	课程学分 Credit Value	2
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）	蹇林旎 博士 Dr. Linni Jian 电子与电气工程系 Department of Electrical and Electronic Engineering Email: jianln@sustc.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	石玉君、王思懋 Mr. Yujun Shi, Mr. Simao Wang 电子与电气工程系 Department of Electrical and Electronic Engineering Emails: shiyj3@mail.sustc.edu.cn; 11749124@mail.sustc.edu.cn
10.	选课人数限额(可不填) Maximum Enrolment （Optional）	60

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	24	8	0	0	32

12.	先修课程、其它学习要求 **Pre-requisites or Other Academic Requirements**	EE104 电路基础 Fundamental of Electric Circuits EE208 工程电磁场理论 Engineering Electromagnetics Theory
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.**	

教学大纲及教学日历 SYLLABUS

15. **教学目标 Course Objectives**

电动汽车相较传统内燃机汽车对环境更为友好，具有重要的经济价值和社会价值。本课程将全面介绍电动汽车的相关知识，具体包括：电动汽车分类、电动汽车动力总成技术、充电技术、电动汽车基础设施等。此外，本课程还将介绍现在的电动汽车市场情况以帮助学生掌握电动汽车从产业到市场的系统分析能力。

Electric vehicles (EVs) are eco-friendly in contrast to conventional internal combustion engine vehicles (ICEVs). The EV technologies are regarded as one of the most promising technologies to achieve the sustainable development of the transportation sector. The course will comprehensively introduce the EV-related technologies, including the classification of EVs, EV powertrain technologies, EV charging technologies, EV infrastructures and so on. Moreover, the state of the art of EV development will also be introduced to help students get the analysis skills on EV industries and EV markets.

16. **预达学习成果 Learning Outcomes**

通过本课程的学习，学生将具有以下能力：

1. 了解电动汽车核心零部件技术；
2. 理解电动汽车动力总成技术，及其与传统汽车区别；
3. 理解三种不同的电动汽车充电技术并对比其各自优劣；
4. 对电动汽车基础设施及政策法规有明确的认识。

After taking this course, students should be able to:

1) Comprehend EV core components technologies;
2) Comprehend EV powertrain technologies and explain the difference with ICEVs;
3) Comprehend Battery EV, Hybrid EV, Fuel Cell EV and their respective merits/demerits;
4) Have a full knowledge on EV infrastructures and promotion policies and government regulations.

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.)

第一阶段 Phase I（第 1-2 周 Week 1-2）：

1）电动汽车发展历程及发展背景 History & Background Information

2）电动汽车分类及电动汽车基本原理 Classification & Fundamental Operation Principles

第二阶段 Phase II（第 3-6 周 Week 3-6）：

1）电动汽车驱动电机技术 Electric Motor Technologies for EVs

2）电动汽车驱动控制技术 Electric Drive Control Technologies for EVs

3）电动汽车动力电池技术 EV Battery Technologies

4）电动汽车传动系技术 EV Powertrain Technologies

第三阶段 Phase III（第 7-9 周 Week 7-9）：

1）电动汽车常规充电技术 Traditional EV Charging Technologies

2）电动汽车智能充电技术 EV Smart Charging Technologies

3）电动汽车与智能电网能量交互技术 Vehicle-to-Grid Technologies

第四阶段 Phase IV（第 10-12 周 Week 10-12）：

1）电动汽车配套基础设施 Infrastructure Technologies for EVs

2）电动汽车推广商业模式 EV Marketing & Business Models

3）政府政策与法律法规 Promotion Policies & Government Regulations

第五阶段（第 13 周~第 16 周）：

1）案例分析—特斯拉纯电动汽车 Case Study-Tesla Battery EVs

2）案例分析—普锐斯混合动力汽车 Case Study-Prius Hybrid EVs

3）案例分析—未来燃料电池电动汽车 Case Study-Mirai Fuel Cell EVs

4）案例分析—国家电网/南方电网电动汽车充/换电基础设施建设

Case Study-Infrastructure Development (SGCC/CSPG's Battery Charging/Swapping Station Plans)

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

参考资料：

M. Ehsani, Y. Gao, A. Emadi 著，倪正光等译，现代电动汽车、混合动力电动汽车和燃料电池车——基本原理、理论和设计（第 2 版），机械工业出版社，2010.8

参考资料：

1.M. Ehsani, Y. Gao, A. Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles, 978-0849331541, CRC Press, USA, 2008.8

2.C.C. Chan and K.T. Chau Modern Electric Vehicle Technology. Oxford University Press, UK. 2001. 8

K.T. Chau, Electric Vehicle Machines and Drives – Design, Analysis and Application. Wiley-IEEE Press, USA, 2014. 8

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				
小测验 Quiz				
课程项目 Projects		50		
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation		40		
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