

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	能源材料表征技术 Characterization Technique of Energy Materials
2.	授课院系 Originating Department	机械与能源工程系 Department of Mechanical and Energy Engineering
3.	课程编号 Course Code	ME378
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	中文 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)	李一举, 机械与能源工程系, 18003603061 Yiju Li, Department of Mechanical and Energy Engineering, 18003603061
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
	48	0	0	0	48
学时数 Credit Hours					
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	ME304 能源工程基础或 ME273 能源科学基础 ME304 Fundamentals of Energy Engineering or ME273 Introduction to Energy Science				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	无				
14. 其它要求修读本课程的学系 Cross-listing Dept.	无				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程旨在介绍在能源材料领域广泛应用的先进表征分析技术，包括其工作原理，适用范围，技术优势，以及当前局限。通过课程学习，掌握仪器及分析对象特性，了解各分析表征技术间在不同学科和研究领域中相互补充支撑的关系，熟悉当前分析表征的发展方向，使学生对多学科交叉产生一定认识，理解不同技术使用范围和掌握对应表征技术的数据分析方法。

This course introduces the widely used state-of-the-art characterization techniques for energy material study, including their working principles, applicability, advantages, and their limits. From this course, students will manage different characterization techniques and the properties of the analyzed materials, understand the pros and cons of various techniques and how they complement each other, seeing the current progress and trend of developing state-of-the-art techniques for resolving remaining technical issues and bottlenecks. Thus, the students will obtain certain interdisciplinary knowledge, understand the feasibility of a technique under a certain condition, as well as the proper data processing method.

16. 预达学习成果 Learning Outcomes

熟悉各种能源材料及相关表征，进一步了解能源材料研究方向。

Master various energy materials and related characterizations, and further understand the research directions of energy materials.

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.)

- Lecture 1 能源材料基础 Energy Materials Fundamentals (3 学时)
- Lecture 2 能源材料进展 Progress in Energy Materials (3 学时)
- Lecture 3 能源材料应用 Application of Energy Materials (6 学时)
- Lecture 4 电化学与电化学阻抗谱表征技术 Electrochemistry and Electrochemical Impedance Spectroscopy Characterization Technology (6 学时)
- Lecture 5 光谱学表征技术 (红外光谱和拉曼光谱) Spectroscopy Characterization Technology (Raman and FTIR) (6 学时)
- Lecture 6 光谱学表征技术 (光电子能谱和超快光谱) Spectroscopy Characterization Technology (ultrafast and X-ray photoelectron spectroscopy) (6 学时)
- Lecture 7 显微成像表征技术 (扫描电子和透射电子显微技术) Microscopy Characterization Technology (scanning and transmission electron microscopy) (6 学时)
- Lecture 8 显微成像表征技术 (原子力显微和扫描电化学显微技术) Microscopy Characterization Technology (atomic force and scanning electrochemical microscopy) (6 学时)
- Lecture 9 其他能源材料表征技术 Other Energy Materials Characterization Technology (3 学时)
- Lecture 10 课程内容梳理与答疑 Content Review and Q&A (3 学时)

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

- 上官文峰、江治屠、恒勇、沈水云. 能源材料——原理与应用, 上海交通大学出版社, 2017, ISBN:978-7-313-17251-8
- 杨玉平. 纳米材料制备与表征——理论与技术, 科学出版社, 2021, ISBN: 9787030712653

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		20		
课堂表现 Class Performance		0		
小测验 Quiz		0		
课程项目 Projects		0		
平时作业 Assignments		20		
期中考试 Mid-Term Test		0		
期末考试		60		

Final Exam				
期末报告 Final Presentation		0		
其它（可根据需要 改写以上评估方 式） Others (The above may be modified as necessary)		0		

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