

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	材料测试分析技术 Material Characterization Techniques				
2.	授课院系 Originating Department	材料科学与工程 Department of Materials Science and Engineering				
3.	课程编号 Course Code	MSE306				
4.	课程学分 Credit Value	3				
5.	课程类别 Course Type	专业基础课 Major Foundational Courses				
6.	授课学期 Semester	春季 Spring				
7.	授课语言 Teaching Language	英文 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)	谷猛 (GU Meng) gum@sustc.edu.cn 副教授 南方科技大学/工学院/材料科学与工程系 深圳市南山区学苑大道1088号 Department of Materials Science and Engineering Southern University of Science and Technology				
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	48	0	0	0	48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MSE001 材料科学与工程基础 Fundamentals of Materials Science and Engineering
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**

This course is the fundamental major course for materials science and engineering. This course is to provide the introduction of X-ray diffraction, spectral analysis, differential thermal analysis, indentation and a variety of other characterization of material properties of the science and technology. The main purpose is to enable students to master the test methods of material analysis, to understand the basic structure, working principle of a variety of analytical instruments, and applications of analytical instruments on the material characterization. This is useful for materials science research.

16. 预达学习成果 **Learning Outcomes**

- (1). Understand the background knowledge of various Materials Characterization techniques.
- (2). Master the commonly used techniques in materials characterization.
- (3). Master the applications of analytical instruments on the material characterization

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.)



SUSTech
Southern University of Science and Technology

- 一、绪论 (3 学时)
- 二、表面张力 (3 学时)
- 三、XRD (6 学时)： (1) XRD 基本原理； (2) 缺陷分析
- 四、扫描电子显微镜 (6 学时)： (1) 信号与原理； (2) 分析举例与应用。
- 五、透射电子显微镜 (18 学时)： (1) 基本原理与发展史； (2) 原子结构照片分析； (3) 电子衍射； (4) 电子能量损失谱； (5) 冷冻电镜与样品制备。
- 六、X-射线光电子能谱及其应用 (6 学时)
- 七、原子力显微镜 (3 学时)
- 八、扫描隧穿显微镜 (3 学时)
- 1. Introduction (3 Credit hours)
- 2. Contact Angle in Surface Analysis (3 Credit hours)
- 3. X-ray Diffraction (6 Credit hours)
- 4. Scanning Electron Microscopy (6 Credit hours)
- 5. Transmission Electron Microscopy (18 Credit hours): TEM sample preparation; TEM Imaging; STEM imaging; Diffraction; ABF imaging; Tomography.
- 6. X-ray Photoelectron Spectroscopy (6 Credit hours)
- 7. Atomic Force Microscopy (3 Credit hours)
- 8. Scanning Tunneling Microscopy (3 Credit hours)

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

- (1) .Materials Characterization, Yang Leng, Wiley-VCH, 2012
- (2) .Transmission Electron Microscopy, Authors: Williams, David B., Carter, C. Barry

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		15		
课程项目 Projects				

平时作业 Assignments		5		
期中考试 Mid-Term Test		40		
期末考试 Final Exam		40		
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

