

# 上海交通大学研究生专业课程信息收集表

## Information Form for SJTU Graduate Profession Courses

课程基本信息 Basic Information				
*课程名称 Course Name	(中文 Chinese) 显微学与谱学表征			
	(英文 English) Microscopy and Spectroscopy Characterization			
*学分 Credits	3	*学时 Teaching Hours	48 (1 学分=16 课时)	
*开课学期 Semester	秋季学期 Fall	*是否跨学期 Cross-semester?	否 No	跨 Spanning over 个学期 Semesters (含夏季学期)。
*课程类型 Course Type	专业基础课 Program Core Course	*课程分类 Course Type	全日制课程 For full-time students	
*课程性质 Course Category	专业课 Specialized Course	课程层次 Targeting Students	硕博共用 All graduates	
*授课语言 Instruction Language	中文 Chinese	主要授课方式 Teaching Method	课堂教学 In class teaching	
*成绩类型 Grade	等第制 Letter grading	主要考核方式 Exam Method	考查 Tests	
*开课院系 School	材料科学与工程学院			
所属学科 Subject				
负责教师 Person in charge	姓名 Name	工号 ID	单位 School	联系方式 E-mail
	王晓东		材料学院	xdwang77@sjtu.edu.cn
课程扩展信息 Extended Information				
*课程简介 (中文) Course Description	<p>(分段概述课程定位、教学目标、主要教学内容、先修课程等；不少于 200 字。)</p> <p>《显微学与谱学表征》是材料类和冶金类专业的一门研究生主干课，也是该专业的核心技术基础课。该课程是掌握分析电子显微镜原理和应用的入门课程。通过讲课、课堂讨论、实验演示、分组汇报等各个教学环节，将透射电镜分析材料基本原理和实际应用融合为一体，以研究材料微观结构，注重于材料的结构和成分，特别是纳米甚至原子尺度的分析，指导材料的设计和应用。教学内容主要分为显微学部分，主要以 TEM 为主；谱学部分，主要以 STEM 为主。先修课程有材料科学基础，材料组织结构表征。</p>			
*课程简介 (English) Course Description	<p>(须与中文一致，翻译请力求信达雅。)</p> <p>《Microscopy and Spectroscopy Characterization》is a major graduate course for materials and metallurgy majors, and it is also the main technical basic course for the majors. This course is an introductory course to master the principles and applications of analytical electron microscopy. Through lectures, classroom discussions, experimental demonstrations, team work and other teaching links, the basic principles and practical applications of TEM analysis are integrated to study the microstructure of materials, focusing on the structure and composition of materials, especially the analysis of nanometer or even atomic scale, to guide the design and application of materials. The main contents include microscopy based on the TEM mode and spectroscopy based on the STEM mode. Prerequisite course: Fundamental of Materials Science, Microstructure Characterization of Materials.</p>			
*教学大纲 (中文) Syllabus	(建议列表形式，各列内容：章节、主要内容、课时数、教学方式等)			
	章节	主要内容	课时数	教学方式
	第一章	绪论，电镜结构及原理	3	课堂教学
	第二章	样品制备	2	课堂教学
	第三章	电子衍射	10	课堂教学
	第四章	衍射衬度成像	6	课堂教学

	第五章	非弹性散射	12	课堂教学
	第六章	高分辨和高空间分析电子显微术	6	课堂教学
	实验一	选区电子衍射, 衬度成像实验演示	3	演示实验
	实验二	高分辨, STEM, EDS 演示	3	演示实验
	课堂答辩	分组答辩	3	课堂答辩
*教学大纲 (English) Syllabus	(须与中文一致, 翻译请力求信达雅。)			
	Chapter	Contents	Hours	Mode
	1	Introduction, Structure of TEM	3	Class teaching
	2	Sample preparation	2	Class teaching
	3	Electron diffraction	10	Class teaching
	4	Diffraction contrast imaging	6	Class teaching
	5	Inelastic scattering	12	Class teaching
	6	High resolution and high spatial resolution TEM	6	Class teaching
	7	Demo experiment 1	3	Demo experiment
	8	Demo experiment 2	3	Demo experiment
	9	Final defense	3	Team defense
*课程要求 (中文) Requirements	(课程考核方式、考核标准等; 不少于 50 字) 考查: 平时成绩: 40% (出勤+课堂表现 15%, 作业 25%) 分组答辩: 60% (课堂答辩, 分小组进行, 每组 5-7 人, 提前两周布置题目。考核学生对知识点掌握程度、思维方式及解决方法。)			
*课程要求 (English) Requirements	(须与中文一致, 翻译请力求信达雅。) Test: peacetime grade, 40% (Attendance, 15%, homework, 25%) Group defense, 60% (Class defense, in groups of 5-7, give the topics two weeks in advance)			
*课程资源 (中文) Resources	(教材、教参、网站资料等。) 1) 戎咏华, 分析电子显微学导论 (第二版) 高等教育出版社, 2015. 2) David B. William & C. Barry Carter, 《Transmission electron microscopy: A textbook for Materials Science》, Springer, 2 edition, 2009 3) Ray F. Egerton, 《Electron energy-loss spectroscopy in the electron microscope》, Springer, 3rd, 2011			
*课程资源 (English) Resources	(须与中文一致, 请力求信达雅。) 1) Rong Yonghua, Introduction to analytical electron microscopy, Second edition, Higher Education Press, 2015 2) David B. William & C. Barry Carter, 《Transmission electron microscopy: A textbook for Materials Science》, Springer, 2 edition, 2009 3) Ray F. Egerton, 《Electron energy-loss spectroscopy in the electron microscope》, Springer, 3rd, 2011			
备注 Note				