

# 上海交通大学研究生课程开设申请表

## New Graduate Course Application Form, SJTU

课程基本信息 Basic Information				
<b>*课程名称</b> Course Name	(中文 Chinese) 材料同步辐射表征技术			
	(英文 English) Principles and Application of Synchrotron Characterization in Materials			
<b>*学分</b> Credits	2	<b>*学时</b> Teaching Hours	32 (1 学分≥16 课时)	
<b>*开课学期</b> Semester	秋季学期 Fall	<b>*是否跨学期</b> Cross-semester?	否 No	跨 Spanning over 个学期 Semesters (含夏季学期)。
<b>*课程性质</b> Course Category	专业课 Specialized Course	<b>*课程分类</b> Course Type	全日制课程 For full-time students	
<b>*授课语言</b> Instruction Language	中文 Chinese	<b>主要授课方式</b> Teaching Method	课堂教学 In class teaching	
<b>*成绩类型</b> Grade	等第制 Letter grading	<b>主要考核方式</b> Exam Method	论文 Essay	
<b>*开课院系</b> School	材料科学与工程学院			
<b>所属学科</b> Subject	材料科学与工程			
<b>负责教师</b> Person in charge	<b>姓名 Name</b>	<b>工号 ID</b>	<b>单位 School</b>	<b>联系方式 E-mail</b>
	熊良华		材料科学与工程学院	xionglh@mst.edu.cn
课程扩展信息 Extended Information				
<b>*课程简介</b> (中文) Course Description	(分段概述课程定位、教学目标、主要内容、先修课程等；不少于 200 字。)			
	<p>同步辐射表征技术能高通量原位表征多场耦合条件下材料微结构多维度时空演化、多尺度应力场和服役损伤机理，为新材料设计、内禀机制揭示和验证提供重要支撑。《材料同步辐射表征技术》作为一门专业选修课程，以材料科学专业研究生和博士生为授课对象，在培养学生创新意识，加深学生对先进表征技术的理解，提高学生材料先进表征手段创新等方面具有重要意义。</p> <p>本课程从先进材料的同步辐射先进表征基础理论出发，旨在让学生更加明确先进材料加工工艺、微观组织、力学性能的关联关系；充分掌握多维度多尺度同步辐射先进表征的基本原理和方法，培养学生对高性能金属等先进材料成形与服役性能的创新研发与应用实践能力，能够应用同步辐射先进表征方法来解决工程实践中遇到的实际问题；深入了解当前先进表征技术的科学前沿和发展动态。</p> <p>课程目标和能力要求具体如下：</p> <p>(1) 掌握同步辐射先进表征技术的基本原理、基本知识和基本技能，培养学生理论与应用相互关联和创新能力；</p> <p>(2) 掌握同步辐射先进表征技术在材料科学领域研究进展和动态，具备应用同步辐射原位和非原位表征方法进行相关应用开发和集成创新能力；</p> <p>(3) 通过课程开放课题实践环节，培养学生应用同步辐射先进表征技术解决具体实践问题能力；</p> <p>(4) 通过课程知识学习、光源/实验室实践和前沿讲座，让学生了解国家大科学装置发展现状，培养学生社会服务意识。</p>			
<b>*课程简介</b> (English) Course Description	<p>(须与中文一致，翻译请力求信达雅。)</p> <p>Synchrotron characterization has been applied to investigate microstructure evolution under external stimuli, multi-scale stress/strain evolution and fracture/failure modes under in-service conditions since it can in-situ study advanced materials in 3D with high temporal and spatial resolution, which reveals fundamentals of multi-physics phenomena and provides significant insights for novel materials design. "Principles and Applications of Synchrotron</p>			

	<p>Characterization in Materials” offers graduate students meaningful opportunities to explore advanced characterization techniques in their research via in-situ and ex-situ synchrotron knowledge in order to strengthen their creative and innovative capabilities for materials science. This course focuses on the principles and applications of synchrotron characterization techniques, teaches graduate students current synchrotron research activities, offers opportunities to perform in-situ synchrotron experiments and fosters their passion on large-scale scientific facilities for further career development.</p> <p>The aim of this course is listed as follows:</p> <ol style="list-style-type: none"> <li>(1) Master fundamentals and applications of synchrotron characterization techniques;</li> <li>(2) Know the state-of-the-art synchrotron research and future opportunities;</li> <li>(3) Apply synchrotron characterization skills to investigate on-going research;</li> <li>(4) Know the impact and significance of large-scale scientific facilities for career development.</li> </ol>																														
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<p>*课程资源 (中文) Resources</p>	<p>(教材、教参、网站资料等。)</p> <p>马礼敦、杨家福: “同步辐射应用概论”, 复旦大学出版社</p>																														
<p>*课程资源 (English) Resources</p>	<p>(须与中文一致, 请力求信达雅。)</p> <p><u>Ma Lidun, Yang Jiafu: Introduction to synchrotron applications, Fudan University Press</u></p>																														