

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) 材料激光制造技术			
	(英文 English) Modern Laser manufacturing technology			
*学分 Credits	2	*学时 Teaching Hours	32 (1 学分=16 课时)	
*开课学期 Semester	春季学期 Spring	*是否跨学期 Cross-semester?	否 No	跨 Spanning over 一个学期 Semesters (含夏季学期)。
*课程类型 Course Type	专业前沿课 Program Frontier 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	硕士课程 Master Level	
*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	论文 Essay	
*开课院系 School	材料科学与工程学院 School of Materials Science and Engineering			
所属学科 Subject	材料科学与工程			
负责教师 Person in charge	姓名 Name	工号 ID	单位 School	联系方式 E-mail
	黄坚 HUANG Jian		材料科学与工程学院 School of Materials Science and Engineering	jhuang@sjtu.edu.cn
课程扩展信息 Extended Information				
*课程简介 (中文) Course Description	<p>激光制造技术作为当今的热点技术之一，以其独具的先进性、高效性和智能化特点成为本世纪制造领域中最具发展潜力的先进制造技术，并已广泛用于工业领域。本课程将介绍激光产生物理基础、激光与材料的相互作用、激光制造关键设备的工作原理，重点介绍激光焊接、激光表面淬火、激光熔覆、激光冲击强化、激光 3D 打印、激光切割与打孔等主要激光制造技术的方法原理/工艺基础和发展现状，介绍典型材料的激光制造工艺性能和典型案例，并培训激光安全防护知识。通过激光焊接实验和激光表面强化实验，让学生深入理解激光制造技术的特点和掌握相关基本操作方法，获得实践认识。最终使学生能够初步掌握材料加工领域中的先进激光制造手段，开阔其视野，提高其未来从事科研开发等工作的适应性。学生应具备材料加工原理（或材料科学基础）的预备知识。</p>			
*课程简介 (English) Course Description	<p><u>Laser manufacturing technology is one of the hot technologies nowadays. Due to its advancement, high efficiency and intelligentization, it has been considered as an advanced manufacturing technology with the highest development potential in the manufacturing industry in the current century, and been widely applied in industries. This course introduces the physical base of laser generating, the interactions between laser and materials, operation principles of lasers and laser manufacturing system, and the main laser manufacturing technologies such as laser welding, laser hardening, laser cladding, laser shocking, laser 3D printing, laser cutting and laser drilling, including principles, processing bases and current development. Furthermore, laser manufacturing process features of typical materials and application cases as well as laser safety and protection have been also introduced. Through laser welding and laser surfacing experiments the students can understand the technology characteristics deeply, know how to operate such kind of equipment, and gather practical experiences. Finally, through the course the students can initially grasp the advanced laser manufacturing methods in field of materials processing, broaden their vision, and improve their adaptability in the future career. Students should occupy the knowledge of materials processing principles as pre-knowledge.</u></p>			

<p>*教学大纲 (中文) Syllabus</p>	<table border="1"> <thead> <tr> <th>章节</th> <th>主要内容</th> <th>课时数</th> <th>教学方式</th> </tr> </thead> <tbody> <tr> <td>第一章</td> <td>激光制造物理基础</td> <td>6</td> <td>课堂讲授</td> </tr> <tr> <td>第二章</td> <td>激光制造设备系统及其控制</td> <td>2</td> <td>课堂讲授</td> </tr> <tr> <td>第三章</td> <td>激光焊接</td> <td>6</td> <td>课堂讲授</td> </tr> <tr> <td>第四章</td> <td>激光原型制造 (3D 打印)</td> <td>3</td> <td>课堂讲授</td> </tr> <tr> <td>第五章</td> <td>激光熔覆与合金化</td> <td>4</td> <td>课堂讲授</td> </tr> <tr> <td>第六章</td> <td>激光表面淬火</td> <td>2</td> <td>课堂讲授</td> </tr> <tr> <td>第七章</td> <td>激光冲击强化</td> <td>2</td> <td>课堂讲授</td> </tr> <tr> <td>第八章</td> <td>激光切割与打孔</td> <td>2</td> <td>课堂讲授</td> </tr> <tr> <td>第九章</td> <td>其它激光制造技术</td> <td>2</td> <td>课堂讲授</td> </tr> <tr> <td>第十章</td> <td>激光制造安全防护</td> <td>1</td> <td>课堂讲授</td> </tr> <tr> <td>实验</td> <td>激光焊接 + 激光表面淬火或熔敷</td> <td>2</td> <td>实验</td> </tr> </tbody> </table>	章节	主要内容	课时数	教学方式	第一章	激光制造物理基础	6	课堂讲授	第二章	激光制造设备系统及其控制	2	课堂讲授	第三章	激光焊接	6	课堂讲授	第四章	激光原型制造 (3D 打印)	3	课堂讲授	第五章	激光熔覆与合金化	4	课堂讲授	第六章	激光表面淬火	2	课堂讲授	第七章	激光冲击强化	2	课堂讲授	第八章	激光切割与打孔	2	课堂讲授	第九章	其它激光制造技术	2	课堂讲授	第十章	激光制造安全防护	1	课堂讲授	实验	激光焊接 + 激光表面淬火或熔敷	2	实验
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