

# 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) 塑性加工中的算法分析			
	(英文 English) Algorithm Analysis for Forming Process			
*学分 Credits	2	*学时 Teaching Hours	32 学时 (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 个学期 Semesters (含夏季学期)。
*课程类型 Course Type	专业选修课 Program Elective 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	论文 Essay	
*开课院系 School	050 材料科学与工程学院 School of Material Science and Engineering			
所属学科 Subject	材料科学与工程 Material Science and Engineering			
负责教师 Person in charge	姓名 Name	工号 ID	单位 School	联系方式 E-mail
	谢叻		材料科学与工程	<a href="mailto:Lexie@sjtu.edu.cn">Lexie@sjtu.edu.cn</a>
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>塑性成形技术是以金属成形为重要标志出现在人类社会中的最古老的生产技术之一。塑性成形技术的发展从最早原始的经验制造到今天的以计算机技术、信息技术为支撑的成形理论，走过了漫长的道路。随着计算机辅助技术渗透到塑性成形技术的方方面面，计算机技术已经成为塑性成形理论和技术的支撑技术，塑性成形技术领域的研究离不开塑性成形软件产品，也需要不断地开发完善塑性成形软件。</p> <p>本课程将以塑性成形加工中算法为切入点，讲解软件编程的技巧，讲解的软件算法涉及到塑性成形技术中的 CAD/CAM/CAE 多个关键技术，学生编程实现其中的多个算法。</p> <p>使得学生们 (1) 掌握塑性成形技术中的 CAD/CAM/CAE 多个关键技术；(2) 对工程领域涉及的软件能有更深入的感性的认识；(3) 掌握编程基本技巧，能够编程实现塑性成形技术中的多个算法。</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>Plastic forming technology is one of the oldest production technologies in human society, and metal forming is its important symbol. The development of plastic forming technology has gone a long way from the earliest experience manufacturing to today's forming theory supported by computer and information technology. With the deeply penetration of computer aided technology on most aspects of plastic forming technology, computer has become an important support for plastic forming theory and technology. The research in the field of plastic forming technology cannot be inseparable from plastic forming software products, and also the later need constantly develop and improvement.</p> <p>This course will take the algorithm in plastic forming as the breakthrough point,</p>			

	<p>and explain the skills of software programming. The algorithm involves several key technologies in CAD/CAM/CAE in plastic forming technology, and the students will be able to realize many of them by their own programming.</p> <p>So that the students can achieve the following aims. (1) Master the key technologies of CAD/ CAM/CAE in plastic forming; (2) Have a deeper perceptual understanding of the software involved in the engineering field; (3) Master the basic programming skills and be able to realize several algorithms in plastic forming technology.</p>		
	(建议列表形式, 各列内容: 章节、主要内容、课时数、教学方式等)		
	教学内容 Content	授课学时 Hours	教学方式 Format
*教学大纲 (中文) Syllabus	介绍计算机辅助技术发展状况, 我国计算机辅助软件发展现状。讲解图形变换技术。介绍图形绘制工具 OpenGL	2	课堂
	介绍几何造型方法。讲解样条曲线概念, 讲解 Coons 样条曲面。讲解 Bezier 样条曲线及其性质和优缺点。讲解 Bezier 样条曲线几何作图方法。讲解 Bezier 样条曲面。绘制 Bezier 曲线曲面。	6	课堂
	讲解 B 样条曲线构造, B 样条曲面构造; 讲解 NURBS 曲线曲面。绘制 B 样条曲线曲面。	6	课堂
	讲解曲面造型技术, 曲面求交、曲面裁剪	2	课堂
	介绍数控加工发展, 数控加工机床, 数控加工工艺。讲解曲面偏置。讲解数控加工编程技术, 绘制数控加工刀轨。	4	课堂
	介绍 CAE 技术, 讲解曲面三角化离散技术。介绍 CAE 可视化技术, 讲解 CAE 可视化中等值线生成方法。讲解科学数据可视化动态展示技术。绘制等值线, 展示动态可视化数据。	6	课堂
	曲面造型、数控编程、CAE 数据可视化技术学习展示。	2	课堂
	算法复杂度计算方式、大 O 表示法、复杂度案例讲解	2	课堂
	CAD 二次开发原理、方式, CAD 二次开发环境配置、基本程序框架与类库介绍	2	课堂
		(须与中文一致, 翻译请力求信达雅。)	
*教学大纲 (English) Syllabus	Introduce the development of computer-aided technology and corresponding software in China; Graphics transformation technology and OpenGL.	2	Classr oom
	Introduce geometric modeling methods. Explain the following concepts: Spline curve and Coons spline surface; Bezier spline curve, its properties and its advantages and disadvantages; the method of Bezier spline geometry drawing; Bezier splines surfaces. Draw the Bezier curves and surfaces.	6	Classr oom
	Explain the following concepts: B-spline curve and surface construction, NURBS curve and surface. Draw the B-spline curve and surface.	6	Classr oom
	Explain surface modeling technology, surface intersection and surface cutting.	2	Classr oom

	Introduce the development of NC machining, NC machine tools and NC machining process; surface offsets; NC programming technology. Draw the NC tool path.	4	Classr oom
	Introduce CAE technology and surface triangulation discrete technology; the technology of CAE visualization. Explains the method of contour generation in CAE visualization; the visualization and dynamic display technology of scientific data. Draw the isolines to show dynamic visualization data.	6	Classr oom
	Surface modeling, NC programming, CAE data visualization technology learning display.	2	Classr oom
	Introduce the method of algorithm complexity calculation, "big O" notation and case explanation.	2	Classr oom
	Introduce the principles and methods of CAD secondary development, configuration of CAD secondary development environment, basic program framework and class library.	2	Classr oom
*课程要求 (中文) Requirements	<p>(课程考核方式、考核标准等; 不少于 50 字)</p> <p>平时布置作业, 编程实现算法, 课程最后阶段选择关键算法, 学生编写实现算法的软件模块。</p> <p>考试以最后阶段编写的软件模块与平时成绩来衡量。平时成绩以作业和课堂表现评价, 最后阶段编写的软件模块以功能实现程度, 软件的可移植性, 操作的便捷性来考察。</p>		
*课程要求 (English) Requirements	<p>(须与中文一致, 翻译请力求信达雅。)</p> <p>Usual assignments are algorithm programming. In the final stage of this course, the students choose the key algorithm, and write the software module to realize the algorithm.</p> <p>The scores are measured by the software modules written in the final stage and the usual evaluation. In the final stage, the software modules are examined by the degree of function realization, the portability of software and the convenience of operation.</p>		
*课程资源 (中文) Resources	<p>(教材、教参、网站资料等。)</p> <p>周雄辉: 现代模具设计制造理论与技术, 上海交通大学出版社</p> <p>龙昭华: 面向对象程序设计教程, 西安电子科技大学出版社</p>		
*课程资源 (English) Resources	<p>(须与中文一致, 请力求信达雅。)</p> <p>Xionghui Zhou: Modern Mold Design and Manufacturing: Theory and Technology, Shanghai Jiao Tong University Press</p> <p>Zhaohua Long: Object-Oriented Programming Design, Xi'an University of Electronic Science and Technology Press</p>		
备注 Note			