

研究生课程教学大纲 (Syllabus)

课程代码 Course Code	PO6011	*学时 Teaching Hours	48	*学分 Credits	3
*课程名称 Course Name	(中文) 多相流与传热 (English) Multiphase flow and heat transfer				
*授课语言 Instruction Language	英文/English				
*开课院系 School	机械与动力工程学院/ School of Mechanical Engineering				
先修课程 Prerequisite	传热学, 流体力学, 高等数学/ Heat transfer, fluid dynamics, advanced mathematics				
授课教师 Instructors	姓名 Name	职称 Title	单位 Department	联系方式 E-mail	
	胡珀/Hu,Po	讲师/Lecturer	机械与动力工程学院/ School of Mechanical Engineering	Pohu@sjtu.edu.cn	
*课程简介 (中文) Course Description	<p>多相流现象在热动工程、核工程、化工、机械等众多工业领域及日常生活中有广泛存在, 对多相流的研究在众多学科中已通过实验和分析等手段广泛开展, 许多相关专题仍然是前沿课题。本课程将通过课堂授课, 使学生掌握多相流的主要概念、模型与分析方法, 理解主要的多相流研究思路, 了解当前多相流的前沿问题。</p> <p>教学目标:</p> <p>使学生具备运用所学的多相流知识, 针对各专业的实际问题, 分析求解或设计实验求解的能力, 本课程旨在教会给学生以下内容:</p> <ol style="list-style-type: none"> 1. 理解多相流基本特征和掌握运动方程 2. 通过学习多相流的动力学分析方法, 具备实际分析多相流问题的能力。 3. 通过实践环节的锻炼, 加强对专业知识的积累 				

<p>*课程简介 (English) Course Description</p>	<p>Multiphase flow exists widely in industries and everyday life, such as thermal energy and power engineering, nuclear engineering, chemical engineering and power machinery engineering. The research on multiphase flow has been carried out in various fields using analytic and experimental methods. Many of them are still on-going research topics. The current course covers major ideas, models, analytic methods and frontier topics in multiphase flow.</p> <p>Objectives:</p> <p>The course will help students to develop capability to analyze or design an experiment to solve specific problems emerging from different fields. It is intended to provide students with the following benefits:</p> <ol style="list-style-type: none"> 1, Understand the characteristics of multiphase flow and master motion equations. 2, Learn multiphase flow dynamics, and be capable of analyzing the multiphase flow problem. 3, Reinforce knowledge through practice with realistic problems 			
<p>*教学安排 Schedules</p>	<p>教学内容 Content</p>	<p>授课学时 Hours</p>	<p>教学方式 Format</p>	<p>授课教师 Instructor</p>
	<p>多相流导论: Introduction</p>	<p>3</p>	<p>课堂教学 Lecture</p>	<p>胡珀 Po Hu</p>
	<p>多相流运动方程: Motion equations</p>	<p>3</p>	<p>课堂教学 Lecture</p>	<p>胡珀 Po Hu</p>
	<p>粒子运动 I: Particle motion I</p>	<p>3</p>	<p>课堂教学 Lecture</p>	<p>胡珀 Po Hu</p>
	<p>粒子运动 II: Particle motion II</p>	<p>3</p>	<p>课堂教学 Lecture</p>	<p>胡珀 Po Hu</p>
	<p>气泡和空泡研究: Bubble and cavitation</p>	<p>3</p>	<p>课堂教学 Lecture</p>	<p>胡珀 Po Hu</p>

	沸腾和凝结 Boiling and condensation	3	课堂教学 Lecture	胡珀 Po Hu												
	多相流的流型 Flow pattern	3	课堂教学 Lecture	胡珀 Po Hu												
	均相流模型 Homogeneous flow model	3	课堂教学 Lecture	胡珀 Po Hu												
	分离流模型 Separated flow mode	3	课堂教学 Lecture	胡珀 Po Hu												
	漂移流模型 Separated flow mode	3	课堂教学 Lecture	胡珀 Po Hu												
	泡状流分析 Flow with bubble	3	课堂教学 Lecture	胡珀 Po Hu												
	滴状流分析 Flow with gas	3	课堂教学 Lecture	胡珀 Po Hu												
	颗粒流分析 Granular flow	3	课堂教学 Lecture	胡珀 Po Hu												
	多相流稳定性分析 Multiphase flow stability	3	课堂教学 Lecture	胡珀 Po Hu												
	多相流实验技术和前沿 Experiment and frontier topics	3	课堂教学 Lecture	胡珀 Po Hu												
	课程设计（大作业）Project	3	实践 Practice	胡珀 Po Hu												
*考核方式 Grading Policy	<table border="1"> <tbody> <tr> <td>1</td> <td>课堂出席</td> <td>10%</td> </tr> <tr> <td>2</td> <td>个人作业</td> <td>15%</td> </tr> <tr> <td>4</td> <td>课程设计</td> <td>60%</td> </tr> <tr> <td>5</td> <td>答辩评估</td> <td>15%</td> </tr> </tbody> </table>				1	课堂出席	10%	2	个人作业	15%	4	课程设计	60%	5	答辩评估	15%
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	<p>每人独立完成一个与多相流相关的设计/分析小课题，并提交小论文。这个课题实践的目的在于，让所有学生应用他们在课堂中学到的知识，初步解决感兴趣的专业问题。要求学生由教师指定或自己提议的课题题目，并在教师的指导下，确认需要分析的问题，通过分析或数值方法求解。</p> <p>Course activities are weighted in the following way:</p> <table border="1"> <tbody> <tr> <td>1</td> <td>Class attendance</td> <td>10%</td> </tr> </tbody> </table>				1	Class attendance	10%									
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	<table border="1"> <tr> <td>2</td> <td>Individual assignments</td> <td>15%</td> </tr> <tr> <td>4</td> <td>Final project</td> <td>60%</td> </tr> <tr> <td>5</td> <td>Presentation assessments</td> <td>15%</td> </tr> </table> <p>A key component of this class is for each student to solve a realistic problem or design an experiment to explore new phenomena in the final class session. Final report/mini-paper is expected on the specific problem selected together with the professor. Then the report together with a presentation will be graded according to its technical quality, and skill of independent research.</p>	2	Individual assignments	15%	4	Final project	60%	5	Presentation assessments	15%
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5	Presentation assessments	15%								
*教材或参考资料 Textbooks & References	Fundamentals of multiphase flow Christopher E. Brennen Cambridge University press 2005 ISBN 0521 848040									
备注 Notes										

备注说明:

1. 带*内容为必填项;
2. 课程简介字数为 300-500 字; 教学内容、进度安排等以表述清楚教学安排为宜, 字数不限。