

浙江大学研究生课程教学大纲

课程编号	3411185	开课院系	海洋学院		
中文课程名称	板壳理论	授课语言	中文		
英文课程名称	Theory of Plate and Shell				
课程性质	专业学位课	课程类别	博士生课	课程体系	学术学位
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教学学时	24	实验学时	0	实践学时	0
其他学时	0	总学时	24	自学学时	0
学分数	1.5	考核方式	课堂闭卷	开课学期	冬
课程内容中文简介	<p>板壳理论是进行船舶结构设计与分析的重要基础，是本领域高层次专业人才必须具备的关键理论知识，本课程属于应用力学的范畴，主要讲述工程中涉及板壳应力应变行为的基本关系和方程，注重基本概念、基本理论的教授，同时也兼顾解决实际问题的方法。主要课程内容包括：薄板小挠度问题的基本假设、基本微分方程、边界条件以及变分方程；圆柱坐标系薄板的轴对称弯曲微分方程和非轴对称弯曲微分方程及其边界条件与连续条件；简支矩形板的纳维解法，矩形薄板的列维解法及一般解法（包括广义简支边的概念）；薄板小挠度问题的变分方法（能量原理）及伽辽金方法；薄板大挠度问题的基本假设及边值问题的建立；基于曲面微分的弹性薄壳的一般理论，无矩壳体理论和有矩壳体理论，扁壳应力状态的基本方程及应用；弹性薄板的稳定性基本概念，求解方法和过屈曲变形行为；弹性薄壳稳定性的基本方程，轴对称薄壳的扭转失稳和轴压失稳分析。</p>				
课程内容英文简介	<p>Theory of plate and shell is an important basis for ship structural analysis and design, which is the essential key theoretical knowledge for high-level professionals in this field. This course, which belongs to the category of applied mechanics, mainly introduces the basic relations and equations of the stress-strain behaviors of plates and shells in engineering, and focuses on basic concepts, basic theory teaching, as well as the methods of solving practical problems. This course mainly deals with the basic assumptions, differential equations, boundary conditions and variational equations of thin plates with small deflections; differential equations for axisymmetric bending and non-axisymmetric bending, boundary conditions and continuity conditions of thin plates in the cylindrical coordinate system; Navier's solution on simply-supported rectangular plates, Navier's and general solutions on thin rectangular plates (including the concepts of generalized simply-supported edges); variational method (energy theory) and Galerkin's method of thin plates with small deflections; basic assumptions and boundary value problems of thin plates with large deflections; general theories based on curved surface differential of elastic thin shells, shell bending and non-bending theories, basic equations and applications on the stress state of shallow shells; basic concepts of stability, solutions and post-buckling behaviors of elastic plate; basic stability equations of elastic thin shell, twisting destabilization and axial collapse analyses of axisymmetric thin shell.</p>				
预备知识要求	<p>(1) 对材料力学相关知识有良好的掌握，能够理解相关领域的专业术语和词汇。(2) 对于曲面微积分和变分原理等相关数学知识有基本理解。(3) 对板壳理论的工程应用前沿技术和发展动态比较关注，有着良好的专业兴趣和求知欲。</p>				
教学目的	<p>本课程属于应用力学的范围，目的是使学生在连续介质力学和弹性力学的基础上，用所学过的知识解决工程实际中涉及板壳应力和变形的某些问题，着重于板壳一般关系方程的建模与简化求解方法的介绍。要求研究生掌握工程中几类重要问题的建模和求解，包括薄板的小挠度理论及应用、薄板的自由振动、</p>				

