应用力学基础

**Fundamental Applied Mechanics**

**教学目的**

（1）了解和掌握固体弹性理论中的基本概念、基本方程以及基本的理论和数值求解方法；

（2）初步建立利用弹性力学知识对实际工程问题进行理论建模以及理论和数值求解的能力；

（3）培养利用固体力学问题的解，对材料和结构在外载作用下的变形和强度进行分析，并对材料和结构进行优化设计的基础能力；

**课程内容介绍**

主要讲述弹性力学的基础理论知识，包括弹性力学中的基本假设、应力分析、应变分析、线弹性本构方程、边界条件的描述、弹性力学边值问题的建模、弹性力学问题常用求解方法以及弹性力学问题解在实际工程中的应用等。在此基础上，介绍塑性力学的基本概念以及简单和复杂应力状态下的屈服准则。最后通过简单的例子对有限元的基本概念和步骤进行介绍。

**先修课程**

理论力学，材料力学，高等数学

**Teaching Objectives**

1. （1）To understand the basic concepts and equations of solid mechanics and master the basic theories and numerical solution methods in solid mechanics;
2. （2）To build up the ability to use the knowledge of elastic solid mechanics to theoretically and numerically model and solve practical engineering problems ;
3. （3）To develop the capacity to conduct the deformation and strength analysis of materials and structures under external loads and carry out optimal design of materials and structures in terms of solid mechanics.

**Curriculum**

This course will introduce the basic theoretical knowledge of elastic mechanics, including the basic assumptions, stress analysis, strain analysis, linear elastic constitutive equation, description of boundary conditions, modeling of boundary value problems of elastic mechanics, solving methods and applications of solutions of elastic mechanics problem in practical engineering. Moreover, conceptual framework of plastic mechanics and yield criterion under simple and complex stress states will also be introduced. Finally, basic concepts and procedure of finite element method will be illuminated through simple examples.

**Prerequisite courses**

*Theoretical Mechanics, Mechanics of Materials, Advanced Mathematics*