

教師：葉銘泉

學分：3

教室：工一 430

上課時間：M3、4、R4

References:

1. Mathematical Theory of Elasticity by Sokolnikoff
2. Theory of Elasticity by Timoshenko and Goodier
3. Foundations of Solid Mechanics by Y. C. Fung
4. Elasticity: Theory, Applications, and Numerics by Sadd
5. Elasticity by Barber
5. A Treatise on the Mathematical Theory of Elasticity by Love

Course Outlines:

1. Mathematical Preliminaries
Vectors, Indicical Notations, Coordinate Rotation, Cartesian Tensors
2. Analysis of Strains
Deformation, Displacement Transformation, Components of Strain, Principal Strains, Equation of Compatibility
3. Analysis of Stresses
Stress Tensor, Equation of Equilibrium, Principal Stresses, Special State of Stress
4. Constitutive Equation
Stress-Strain Relations, Elastic Constants, Isotropic Media, Strain Energy
5. Problem classification
Field Equations, Definition of Fundamental Problems
6. Basic Theorems
Uniqueness Theorem, Reciprocal Theorem, Minimum Energy Principles, Stress Functions
7. Torsion
Torsion of a Shaft, Stress Function, Torsion of Elliptical Cylinder, Rectangular and triangular Prisms
8. Flexure
Flexure of Rectangular, Cylindrical and Elliptical Beams, Flexure Center, Flexure Function
9. Two Dimensional Problems
Plane Strain, Generalized Plane Stress, Airy's Stress Function, Boundary Value Problem in Plane Elasticity
10. Three Dimensional Problems
General Solution, Concentrated Forces, Deformation of Elastic Half Space, The Problem of Boussinesq ect.