ENGR 671-Elasticity
MWF 11:00-11:50 am

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Office Hours: 1:00-2:00 pm M, W or by appointement

Grading

Midterm	30%
Final	30 %
Homework	20 %
Project	20 %

References

1. Mase, G. E., Continuum Mechanics, Schaum's Outline Seriese, McGraw-Hill
2. Tim'oshinko, S. P. and Goodier, J. N., Theory of Elasticity, Mcgraw- Hill, 1970
3. Boresi, A., and Chong, K., Elasticity in Engineering Materials, Elsevier, 1987.
4. Little, R. W., Elasticity, Prentice-Hall, 1973.

TOPICS

Continuum Theory
Stress Principles
    Review
Kinematics of Deformation and Motion
    Review
Constitutive Equations
    Generalized Hook's Law for Anisotropic Materials
    Hooks Law for Isotropic Media, Elastic Constants
Elasticity in Rectangular Coordinates
    Two Dimensional Problems in Elasticity
    Rectangular Coordinates: Plane Stress, Plane Strain, Generalized Plane Strain
    Stress Function Formulation of Plane Problems
    Inverse and Semi Inverse Solution
    Techniques for Bi-harmonic Equation
    Stresses and Displacements using Polynomial Expansions of Stress Function.
Fourier Series In Elasticity
    General Solution of Bi-harmonic Equation
    Real and Complex Form of Fourier Integral Theorem
    Application to infinite Domain Elasticity Problems
Elasticity in Polar Coordinate System
    Transformation of Plane Elasticity equations fro Rectangular to Polar Coordinates
    Thick Walled Cylindrical Vessels Subjected to Pressure Loading
    Stress Concentration Due to Circular Hole
    Inclusion Problems (Micomechanics)
    Half plane problems
    Michell's Problem of Concentrated Vertical and Horizontal Loads on Wedge
Uniqueness of Elasticity Solution and Non Dimensional Analysis
Introduction to Failure Criteria
    One Parameter Failure Models (Rankine Principal Stress, St. Venant, Principal Strain, Tresca Maximum Shear, Misces-Hencky, Distortion or Octahedral Shear Stress Theory)
    Mohr Theory of Failure and Two Parameter Mohr-Colomb Model of Failure.
Introduction to Fracture Mechanics
Special Topics (Project).
    Micromechanics of Fracture
    Viscoelasticity
    Granular Media
    Complex Variable analysis and application to singularity problems
    Elasticity in 3D