Prerequisite:	Knowledge of strength of materials and differential equations is required to take this or strongly recommended.
Catalog Description:	Governing equations of linear elasticity, plane elasticity, boundary value problems, Airy simple three dimensional solutions
Textbook:	Elasticity, by J.R. Barber, Kluwer Academic Publishers,1992
References:	Elasticity in Engineering Mechanics, by A.P. Boresi and K.P. Chong, Elsevier, 1987.
	Theoretical Elasticity, by A.E. Green and W. Zerna, 1968.
	Elasticity, by R.W. Little, 1973.
	A Treatise on the Mathematical Theory of Elasticity, by A.E.H. Love, 1944.
	Some Basic Problems of the Mathematical Theory of Elasticity, by N. Muskhelishvili, 1
	Mathematical Theory of Elasticity, by I.S. Sokolnikoff.
Instructors:	Jasiuk, Lynch, Neu, Qu, Zhou

Goal:

- This class will introduce governing equations of linear elasticity and will focus on solutions of boundary value problems in both two and three dimensions using several different methods.

Audience: First year graduate students in ME, AE, CE, and MSE.

Topics:

Governing Equations of Linear Elasticity

(Review of Continuum Mechanics Concepts)

- Traction, stresses, equilibrium equations (2h)

- Deformation, strains, compatibility conditions (2h)

- Constitutive equations (1h)

- Boundary conditions (1h)

Uniqueness of Solution

St. Venant Law

Plane Elasticity

- Plane stress and plane strain (1h)

- Problems in polar coordinates (14h)

* Curved beams (1h)

* Michell's general solution (2h)

* Inclusion problems (3h)

* Contact problems (3h)

* Singular solutions (5h)

(Flamant solution, crack tip fields, dislocations)

- Green's function method (2h)

- Complex variables method (3h)

- Dundurs constants (1h)

Three-dimensional Elasticity

- Displacement potentials method (2h)

- Radial symmetric problems (4h)

- Torsion of prismatic bars (4h)

Course Approval Form