TAM 554 - Plasticity
Instructor - Prof. Huseyin Sehitoglu, huseyin@illinois.edu
Class Hours – MW 1-3, Room 260 MEB
Office Hours – Open
Recommended Text - J. Lubliner, Theory of Plasticity, Dover, 2008
Also check http://www.ce.berkeley.edu/~coby/plas/

The class notes will not correspond exactly to text material. We will make references to the above text and others during course coverage.

Grade -
Homework - 30%
Project - 25%
Mid-term - 20%
Final - 25%

Late homework will not be accepted.

Coverage:

1. Mathematical Preliminaries: Indicial Notation, Tensors, Coordinate Transformations

2. Elastic and Plastic Deformation of Materials; Microstructural Basis for Plasticity, Stress and Strain Tensors


4. Stress Analysis for Combined and Thermal Loading: Cylinders and spheres under pressure and temperature gradients

5. Large Strain Plasticity, Multiplicative Decomposition

6. Unusual Material Response Involving Phase Transformations (TRIP, Shape Memory) and Applications

7. Crystal Plasticity, Single crystals, Slip and Twinning

8. Non-associated Flow Rules, Strain Gradient Plasticity, Gurson Model, Cohesive Zone Models

9. Application of Plasticity Concepts in Fatigue, Fracture and Creep of Metals

10. Plane Strain Slip Line Fields: Prandtl Punch Problem, Metal Forming Applications

Recommended Textbooks: