I. **Elasticity**

A. **Boundary Conditions**
Cauchy's stress theorem
Saint Venant's Principle
Linear Superposition

B. **Stress transformation**

C. **Airy Stress (general)**

D. **Strain Energy (formulas provided)**

E. **Problems**
Write BC's for some elasticity problem
Use Saint Venant's principle to write equivalent BC's
Dissect a problem into the sum of smaller problems
Outline Airy Stress solution

II. **Griffith Fracture**

A. **Theoretical Strength**
Atomic strength
Strength proportional to stiffness
Imperfections

B. **Griffith Fracture Theory** Crack's exist in most materials
Energy required to create new crack surface
external work must equal the sum of work to create a new surface and the change in strain energy

C. **Problems**
strain energy release rate for simple geometry
explain theoretical stress

III. **Stress Field**

A. **Fracture Modes**

B. **Westergaard Function**

C. **Fundamental Stress Intensity**

D. **K-dominance, fracture-based failure**

E. **Problems**
Check BC's with given Westergaard
Stress Intensity from Z_I, Z_{II}, or Z_{III}
K-dominance significance
Calculate failure from fracture toughness