

ME/MSE 516 Schedule of lectures (Winter 2024)
(subject to change)

1. Jan 11	Class Introduction
Chapter 1	History of fracture
2. Jan 16	History of fracture
Chapter 2	Solid mechanics
3. Jan 18	Review of tensors (stresses & strains)
4. Jan 23	Constitutive properties, orthotropy and bimetals
5. Jan 25	Work and potential energy
Chapter 3	Bonding at interfaces
6. Jan 30	Physics of cohesive laws
Chapter 4	Fracture and delamination of interfaces
7. Feb 1	Analytical models for delamination
8. Feb 6	The J-integral
9 Feb 8	Phase angles and superposition
Chapter 5	Beam bending
10 Feb 13	Beam bending
11 Feb 15	Strain energy of beams and columns
12 Feb 20	Stresses in bonded layers
Chapter 6	Delamination of Layered Materials
13 Feb 22	Delamination of thin films
Feb 27.	<i>Spring break</i>
Feb 29	<i>Spring break</i>
14 March 4	Delamination for residual stresses and finite substrates
15 March 6	The fundamental bi-material problem
16 March 12	Axisymmetric geometries
17 March 14	Spalling below an interface
Chapter 7	Transverse shear forces
18 March 19	Effects of root-rotation
19 March 21	J-integral result
20 March 26	Superposition and phase angle
Chapter 8	Common test geometries
21 March 28	Double-cantilever beams
22 April 2	The peel test
23 April 4	The lap-shear test

Additional topics as time / interest allows

24 April 9
25 April 11
26 April 16
27 April 18
28 April 23

Possible topics for these lectures

	Buckling-driven delamination of layers in coatings and composites
	Tensile cracking in surfaces, layered materials, and coatings
Chap 8	Issues in numerical implementations
Chap 9	Experimental methods
Chap 10	Fracture at corners and general stress singularities
Chap 10	Visco-elastic and creep fracture
Chap 10	Fracture in the presence of plasticity
Chap 10	Crack deflection at interfaces