MECH 7300/7306: Fracture Mechanics  
(Spring 2016)

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Tentative Course Outline:
1. Introduction
2. Ideal strength of solids and micro-mechanical issues
3. Energy balance in cracked bodies - energy release rate and crack growth resistance
4. Quick review of theory of elasticity
5. General solution to biharmonic equation and applications to stress concentration problems
6. Modes of fracture; Crack tip stress, strain, displacement fields - Westergaard’s method
7. Stress intensity factor and energy release rate
8. Methods of evaluating stress intensity factors; Fracture testing
10. Williams’ asymptotic analysis of cracked bodies (monolithic, bimaterial interface)
11. Crack tip plasticity; Small scale yielding - Irwin’s and Dugdale models
12. HRR equations – the J-integral
13. Dynamic crack growth in brittle solids - preliminaries


Suggested References:

Student Evaluation Method (Tentative):
Homework: 60%  Final Exam: 15%  Project / Term Paper: 25%
A, B: Equal to or above class average  
C, D, F: Below class average

Note to Off-Campus Students:
For off-campus students, assignments will be considered ‘on time’ if they are postmarked, faxed, or sent by email on the due date. The due dates for on-campus and off-campus students will be the same unless mentioned otherwise. Late submissions will be graded at the discretion of the instructor. If graded, a penalty will be assessed. Please note that late submission close to the end of the semester will likely lead to an ‘incomplete’ grade.