

ME 533 Fracture Mechanics

Fall Semester, 2019

Dept. of Mechanical Engineering, KAIST

Course Description	Fundamentals of linear elastic fracture mechanics are introduced, emphasizing singular nature of stress field at the tip. Energy release rate and J integral are studied together with fracture criteria applied to elastic-plastic fracture. Other fracture related topics such as fatigue, designing against fracture are also briefly introduced.
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Website	klms.kaist.ac.kr
References	<ol style="list-style-type: none">1. Fracture Mechanics, C. T. Sun, Z. -H. Jin, Elsevier Inc., 2012 (You can download every chapter from: https://www.sciencedirect.com/book/9780123850010/fracture-mechanics)2. Fracture Mechanics-Fundamentals and Applications, T. L. Anderson, CRC Press, 20053. http://imechanica.org/node/7448 (Lecture notes written by Prof. Zhigang Suo @ Harvard)4. Principles of Fracture Mechanics by R. J. Sanford, Prentice, 2002
Grading Policy	<ol style="list-style-type: none">1. Homework: 20%, Participation and Attitude: 5%2. Exam grading (2 types of grading)<ul style="list-style-type: none">Type 1 (diligent student): Mid term: 35%, Final Exam: 40%Type 2 (late bloomer): Mid term: 25%, Final Exam: 50%
Lab Tour (tentative)	Planning to schedule 1 lab tour: <ol style="list-style-type: none">1. Observe fracture toughness testing

Course Outline

Week	Topics
1	I. History and Overview of Fracture Mechanics II. The Griffith Paper
2	III. Energy Release rate. Fracture Energy
3	III. Energy Release rate. Fracture Energy IV. Crack-tip Field
4	IV. Crack-tip Field V. Complex Variable Methods
5	V. Complex Variable Methods
6	VI. Linear Elastic Fracture Mechanics
7	VII. Resistance Curve
8	<i>Mid-term Exam</i>
9	VIII. Fatigue
10	IX. The J Integral
11	X. Elastoplastic Fracture Mechanics
12	XI. Fracture Toughness Measurement
13	XII. Crack Bridging
14	XIII. Mixed-mode Fracture
15	XIV. Interfacial Fracture
16	<i>Final Exam</i>