

# Preface

Fracture mechanics is a large and always growing field. A search of the Cornell Library in winter 2006 uncovered over 181 entries containing “fracture mechanics” in the subject heading and 10,000 entries in a relevance keyword search. This book is written for students who want to begin to understand, apply and contribute to this important field. It is assumed that the reader is familiar with the theory of linear elasticity, vector calculus, linear algebra and indicial notation.

There are many approaches to teaching fracture. Here the emphasis is on continuum mechanics models for crack tip fields and energy flows. A brief discussion of computational fracture, fracture toughness testing and fracture criteria is given. They contain very little on fracture at the micromechanical level or on applications. Both the mechanics and the materials sides of fracture should be studied in order to obtain a balanced, complete picture of the field. So, if you start with fracture *mechanics*, keep going, study the physical aspects of fracture across a broad class of materials and read up on fracture case studies [1] to learn about applications.

I use these notes in a one-semester graduate level course at Cornell. Although these notes grow out of my experience teaching, they also owe much to Ares Rosakis from whom I took fracture mechanics at Caltech and to Hutchinson’s notes on nonlinear fracture [2]. Textbooks consulted include Lawn’s book on the fracture of brittle materials [3], Suresh on fatigue [4] and Janssen [5], Anderson [6], Sanford [7], Hellan [8] and Broberg [9].

I would like to thank Prof. E.K. Tscheegg for generously hosting me during my 2004 sabbatical leave in Vienna, during which I started these notes. Thanks also to my students who encouraged me to write and, in particular, to former students Mike Czabaj and Jake Hochhalter who each contributed sections.

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<http://www.springer.com/978-94-007-2594-2>

Fracture Mechanics

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2012, XIV, 226 p., Hardcover

ISBN: 978-94-007-2594-2