

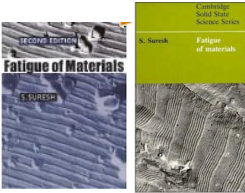
ME 530- Fatigue Analysis, Fall 20, CRN:30320

Class Hours- MW 1-3 pm

Instructor- Prof. Huseyin Sehitoglu, Rm. 237 CAB, 333-4112, huseyin@illinois.edu

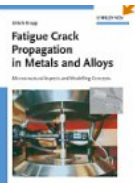
Office Hours – Send an e-mail for zoom session.

Recommended Texts:



“Fatigue of Materials ‘ S. Suresh, Cambridge University Press, 1991, 1998, [Cambridge Core - Full text online](#), uiuc library

This is the most comprehensive book on the subject. We will make references to this text but the class notes will not correspond to the text material. Our approach will be more theoretical than this book.



“Fatigue Crack Propagation in Metals and Alloys’, U. Krupp, Wiley, 2007, online uiuc library

This book is more focused on fatigue crack propagation with up to date references.

<https://onlinelibrary-wiley-com.proxy2.library.illinois.edu/doi/book/10.1002/9783527610686>

Grade:

Homework: 25%

Project : 20%

Mid-term: 25%

Final : 30%

Late Homework will not be accepted.

Coverage:

- (1) **Historical Perspectives on Fatigue**
- (2) **Mathematical Preliminaries, Single Crystal Slip**
- (3) **Dislocation Theory, Elastic Inclusions- The Eshelby Approach**
- (4) **Cyclic Deformation at the Micro- and Macro- scales**

- (5) Fatigue Crack Initiation and Modeling in Metallic Alloys**
- (6) Fracture Mechanics and Fatigue Crack Growth Modeling**
- (7) Multiaxial Fatigue**
- (8) Variable Amplitude Fatigue, Cumulative Damage**
- (9) Thermo-mechanical Fatigue**
- (10) Fatigue in Brittle Materials**

Below are the recommended texts for ME 530.

Hull/ Bacon; Introduction to Dislocations, 4th Edition [online source available]

Polák, Jaroslav; Cyclic Plasticity and Low Cycle Fatigue Life of Metals, call no. 620.1633 P757C (will be on reserve at Grainger)

Hull, Derek; Introduction to Dislocations, 5th Edition [online electronic resource]