

**AE 704 – Deformation and Fracture**  
**2017-18, I semester**  
**Aerospace Engineering Department, IIT Kanpur**

L-T-P-D: 3-0-0-0      Units: 4  
Class Schedule: WF 9 – 10.15 AM, NWTF Classroom  
Course Instructor: Dr. Rajesh Kitey  
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**Course Content**

Mechanics of deformation- Engineering materials, elastic, plastic and viscoelastic response of engineering solids, effect of temperature, strain rate and cyclic loading on mechanical behavior of materials

Deformation at microscale - Deformation in single crystal, dislocation theory, strengthening mechanisms, deformation mechanisms in polymers and composites

Fracture and fatigue - Fundamentals of fracture mechanics, microstructural aspects of fracture, fractography, crack growth in metals, polymers and composites, fatigue crack propagation

**References**

- Deformation and fracture mechanics of engineering materials, R. W. Hertzberg, Wiley & Sons
- Elastic and inelastic stress analysis, I. H. Shames and F. A. Cozzarelli, Taylor & Francis
- Mechanical behavior of materials, Marc Meyers and Krishan Chawla, Cambridge Univ Press
- Mechanical Behavior of Materials, N. E. Dowling, Pearson, Prentice Hall
- Mechanics of solid materials, J. Lemaitre and J. –L. Chaboche, Cambridge Univ Press
- Mechanics of fibrous composites, C. T. Herakovich
- Fracture Mechanics, C. T. Sun, Z. H. Jin, Elsevier Publications
- Fracture mechanics of polymers, J. G. Williams, Ellis Horwood Ltd.

**Grading Policy**

Midterm	30%
Final	45%
Assignments, Quizzes and Project	25%

**Note**

1. Appearing in both examination (midterm and final) and 80 % attendance are compulsory, failing which you will be awarded an ‘F’ grade.
2. Students will not be allowed to drop the course after the mid semester examination.
3. Disciplinary actions will be taken against students, if found involved in plagiarism.