Instructor: Dr. Ashok Saxena, 422 Administration Building

Pre-requisite: An undergraduate course on Mechanics of Materials or equivalent or graduate standing

This 3 credit hour course is being designed as an elective course for seniors or graduate students in Biomedical, Mechanical Aerospace, and Civil Engineering.

Fracture/rupture in engineering components, devices and in soft materials/tissues occur unexpectedly and can potentially have catastrophic consequences. The course will cover the concepts of linear-elastic, elastic-plastic and time-dependent Fracture Mechanics concepts as applied to fracture in a variety of materials, structures, and operating conditions. The examples will include fracture in large components such as aircraft, bridges and pressure vessels but also in bones and in soft materials and human tissue. The topics include the following:

1. Overview of fracture and its consequences
2. Early theories and atomic view of fracture
3. Fundamentals of linear elastic fracture mechanics
4. Nonlinear and time-dependent fracture mechanics
5. Examples of fracture in:
   a. Fracture in engineering components
   b. Fracture in Biomedical implants
   c. Rupture in soft tissues/materials

Textbook: None – Class notes provided in digital media

All examinations will be closed book.