- **Course Number and Title:** CHME 361. Engineering Materials
- **Catalog Description:** Bonding and crystal structure of simple materials. Electrical and mechanical properties of materials. Phase diagrams and heat treatment. Corrosion and environmental effects. Application of concepts to metal alloys, ceramics, polymers, and composites. Selection of materials for engineering design.
- **Credit Hours:** 3 Credits (3)
- **Prerequisite(s) / Corequisite(s)** Prerequisite(s): CHEM 1215G or CHEM 1216
  Pre/Corequisite(s): None
- **Required:** Required for BSME and BSAE Degrees
- **Course Availability:** Fall and Spring Semesters + Summer
- **Instructor (Usual):** Dr. Paul Andersen (See https://chme.nmsu.edu/Personnel/Faculty.html)
- **Textbook:** Ashby, M.F., and Jones, D.R.H., *Engineering Materials 1: An Introduction to Properties, Applications, and Design*, 4th Ed., 2012 (https://www.elsevier.com/books/engineering-materials-1/jones/978-0-08-096665-6)
- **Course Learning Objectives:** After completing this course, a student should be able to:
  1) Explain the relationships between composition, bonding, structure, and properties.
  2) Explain the effects of supply and demand on materials prices.
  3) Compute stress and strain and identify important mechanical properties.
  4) Explain the effects of defects on material properties.
  5) Explain the common modes of materials failure.
  6) Predict rates of materials failures.
  7) Select materials to avoid failure.
  8) Explain the origins of electrical and magnetic properties.
  9) Discuss contemporary issues in materials science and engineering.
- **Topics Covered:**
  - Materials and Properties
  - Price and Availability
  - Bonding and Structure
  - Stress and Strain
  - Yielding and Ductility
  - Fracture and Toughness
  - Fatigue
  - Creep Deformation and Fracture
  - Oxidation and Corrosion

- Friction and Wear
- Electric and Magnetic Properties
- Hoop stress (Optional)