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Course explores the relationship between the microscopic structure and macroscopic properties of materials used in engineering applications. The origin of mechanical and physical properties is studied. Emphasized is an understanding of the fundamental aspects of atomic and microstructural concepts for proper materials selection and enhancement of engineering properties. Materials under study are metals, ceramics, polymers, composites, nano-sized/structured materials, biomaterials, smart materials, and semi- and super-conductors. Laboratory exercises are incorporated throughout the course to provide practical experience in making decisions concerning material composition and processing in order to optimize engineering properties. Experiences from the field are detailed to demonstrate application of concepts.

**Lessons:** 42 @ 55 min (2.500 Att/wk)  
**Labs:** 5 @ 120 min

**Special Requirements:** The completion of an out-of-class design problem requiring the equivalent of 0.5 credit hours of effort.

**Prerequisite(s):**  
- CH102 MC364  
- CH152 MC364  
- CE364 CH102  
- CE364 CH152

**Disqualifier(s):** ME380