

ME/MSE/PTFE 6796: Structure-Property Relationships in Materials
9:35 – 10:55 am T/R Love (MRDC II) 183

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Office hours: Thursdays 11am-12pm

- Credit Hours: 3-0-3
- Prerequisites: Graduate standing in engineering or related discipline. 3.0/4.0 or above in MSE2001: Introduction to Materials or equivalent course.
- Catalog Description: Introduction to the multiscale structure effects on material properties. For MSE students, this is a survey course that will lay the foundation for future in-depth courses on specific properties of materials. For non-MSE students, the course will provide a background in materials and may serve as part of the program of study for a minor in materials. Cross-listed ME, MSE and PTFE.
- Reference Material: R.E. Newnham, "Properties of Materials: Anisotropy, Symmetry, Structure," Oxford University Press
W.D. Kingery, H.K. Bowen, D.R. Huhlmann, "Introduction to Ceramics," Wiley Interscience
G.S. Rohrer, "Structure and Bonding in Crystalline Materials," Cambridge University Press
R.G. Borg, G.J. Dienes, "The Physical Chemistry of Solids," Academic Press
- Objective: To understand how physical and chemical properties are related to atomistic composition, chemical bonding, crystal structure and microstructure of a material.
- Topics outline: Atoms
Bonding
Solid Solutions and Alloys
Phase Transitions
Elements of Crystallography
Structure-Property Relations: Neumann's Law
Thermal Properties
Optical Properties
Electrical Properties
Dielectric Properties
Magnetic Properties
Mechanical Properties
- Grading: Problem sets: 20%, Midterms (2): 40%, Final 40%