

Materials Science and Engineering

Graduate Courses

Spring 2006

MSE 508 Solid State Thermodynamic & Kinetics

TuTh 6:00 – 7:50 p.m. MEC 113 Bill Knowlton

The laws of thermodynamics are applied to multicomponent, multiphase reacting systems, and electrochemical systems. These concepts are used to discuss equilibrium phase diagrams. The energy effects due to the geometry of solid surfaces are discussed in regards to capillarity effects. The field of kinetics is introduced using applications of thermodynamics to mass transport (e.g., diffusion and drift) and chemical reaction kinetics. Differential equations describing coupled diffusion and reaction kinetics are examined. PREREQ: MATH 333, CHEM 322 or ENGR 320 or PHYSICS 432.

MSE 512 Mechanical Properties of Materials

MWF 7:40 – 8:30 a.m. MEC 309 Peter Müllner

Study of deformation and fracture in engineering materials, including elastic and plastic deformations; dislocation theory; alloy hardening and creep deformation; fracture mechanisms; linear elastic and nonlinear elastic fracture mechanics; toughening of metals, ceramics, and composites; environmentally assisted failure. PREREQ: ENGR 245.

MSE 597 Microelectronic Packaging Materials

MW 6:30 – 7:45 p.m. MEC 113 Larry Moresco

This course includes key "first order" engineering analysis of electronic packaging materials and how they impact: Electrical design, assembly, reliability, thermal management, shock and vibration survival, fatigue life, failure modes, and qualification test results. The course will review the selection process for packaging materials, the choices for manufacturing and assembly; system interconnect in hierarchy, and the evolution of single and multi-chip packaging assembly. PREREQ: MSE 245

CHEM 440G Spectrometric Identification

**MWF 9:40 – 10:30 a.m. MP 201 Edward Matjeka
Brad Bammel**

Identification of compounds using modern spectrometric techniques. PREREQ: CHEM 309 and CHEM 321.

EE 541 Advanced Silicon Technology

MW 3:40 – 4:55 p.m. MEC 309 Jeff Jessing

Advanced models for unit processes such as diffusion, oxidation, ion implantation, thin film deposition, etching, rapid thermal processing, chemical mechanical polishing, lithography. CMOS, bipolar, and micro electro mechanical systems (MEMS) process integration. Process and device modeling using TCAD. PREREQ: EE 440/540.

PHYS 515 Solid State Physics

MW 4:40 – 5:55 p.m. MP 408 Dennis Abramsohn

Quantum physics applied to understanding the properties of materials, including semiconductors, metals, superconductors, and magnetic systems. PREREQ: PHYS 309.

MSE 598 Seminar

F 1:40 – 2:30 p.m. MEC 106 Peter Müllner

Section 001 is for attending the seminars only.
Section 002 is for presentation only.
Section 003 is for attending the seminars and doing a presentation.