EMAT - Materials Engineering

EMAT 251 Materials Structures and Prop: 3 Credits (3 Lec)
PREREQUISITE: CHMY 141 or CHMY 121N
COREQUISITE: M 165Q OR M 171Q. Chemistry and internal structure of solids and the relationship of structure to physical and mechanical properties of metals and nonmetallic solids.

EMAT 252 Materials Struct and Prop Lab: 1 Credits (1 Lab)
PREREQUISITE: WRIT 101W; and CHMY 141 or CHMY 121N
COREQUISITE: EMEC 250; and M 172 or M 165Q. (F, Sp) This course is intended to supplement current materials lecture course offerings. Provides students with hands-on lab experience to identify and quantify physical, electrical, and mechanical properties of engineering materials via experimental measurements. Experimental procedures and reporting are emphasized.

EMAT 350 Engineering Materials: 3 Credits (3 Lec)
PREREQUISITE: EMAT 251 or EMEC 250 and EMAT 252. (Sp) Application of materials selection to the engineering design process. Development of microstructure-processing-properties relationships on the mechanical and functional behavior of materials.

EMAT 460 Polymeric Materials: 3 Credits (3 Lec)
PREREQUISITE: EMAT 251 or EMEC 250. (F) Interrelationships of molecular structure, morphology and mechanical behaviors of polymers. Topics will also include manufacture and application of polymeric materials.

EMAT 511 Catalysis/Applied Surface Chem: 3 Credits (3 Lec)
PREREQUISITE: CHBE 328. The fundamental principles of catalysis, surface chemistry, and reactor design at a working research level.

EMAT 552 Advanced Ceramics: 3 Credits (3 Lec)
PREREQUISITE: Either EMAT 251 or EMEC 250, and both EMAT 252 and EMAT 350. Advanced treatment of ceramic material including phase transformations, defect chemistry, thermodynamics, synthesis/processing, sintering theory, grain growth, and characterization. Emphasis is placed on functional properties of oxide ceramics for applications in energy conversion.

EMAT 553 Advanced Composite Materials: 3 Credits (3 Lec)
PREREQUISITE: EMAT 463. Advanced treatment of composite materials, including constituent properties, interfaces, micromechanics, microscopic behavior, modes and mechanisms of failure.

EMAT 560 Polymeric Materials: 3 Credits (3 Lec)
PREREQUISITE: Equivalent of EMAT 251 or EMEC 250 (undergraduate course in Materials Science, requiring an introductory chemistry class and lab as a prerequisite) or a sufficient related background in materials or chemistry, as evaluated by the instructor. Interrelationships of molecular structure, morphology and mechanical behaviors of polymers. Topics will also include manufacture and application of polymeric materials.