Georgia Tech School of Materials Science and Engineering

MSE Undergraduate Minor

Quick Facts

The School of Materials Science and Engineering offers an undergraduate minor in Materials Science and Engineering for non-MSE majors. Materials are the enabling basis for almost all other engineering and scientific disciplines. The purpose of this minor is to broaden the materials background of non-materials students and to introduce them to materials focus approach to problem solving that is different than that provided by their major. Non-MSE undergraduate majors are encouraged to participate in the program provided they have the appropriate prerequisites and approval of their major program academic advisor.

Requirements

The requirements for earning a minor in Materials Science and Engineering is to complete **15 semester hours** of MSE courses, 12 hours of which must be at the 3000 level or above and none of which may be lower than the 2000 level. Many students will be able to complete a considerable portion of this requirement by scheduling some of the required courses as the free electives required by their major.

Application Process

1. Attend a MSE Minor Information Session (**Optiona**l)
2. Complete Minor form here: Minor Form
3. List Shirley Manchester: shirley.manchester@mse.gatech.edu as Advisor for MSE on form
4. Add Registrar Office Email to Minor Form for signature and final processing (comments@registrar.gatech.edu)

Course Credits

Students should consult with their primary academic advisor to determine if/how these Materials Science and Engineering courses may apply to degree requirements.

Fall 2025 Information Sessions: Zoom Link

September 9, 11:00-12:00pm
October 14, 11:00-11:45am
November 11, 11:00-11:45am

Contact Information

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Course Options

Materials Classes of General Interest
MSE 2001 (3-0-3) - 3hrs
MSE 2021 (3-3-4) - 4hrs
MSE 4010 (3-0-3) - 3hrs

Classes Focused on Polymeric and Composite Materials
MSE 4791 (3-0-3) - 3hrs
MSE 4793 (3-0-3) - 3hrs

Fundamental Material Science Classes
MSE 3001 (3-0-3) - 3hrs
MSE 3005 (3-0-3) - 3hrs
MSE 3021 (1-3-2) - 2hrs
MSE 4022 (1-3-2) - 2hrs

Classes Focused on Electronic Materials, Properties & Applications
MSE 3015 (3-0-3) - 3hrs
MSE 4325 (3-0-3) - 3hrs
MSE 4754 (1-6-3) - 3hrs

Course Descriptions

MSE 2001 - Principles and Applications of Engineering. The structure-property-processing-performance relationships of engineering materials are described. Materials selection is treated as a part of engineering design. *Prerequisites: CHEM 1310 or CHEM 1211K Note: MSE 2001 can only be counted as a course for the MSE Minor if it is not required by number in the student's major degree*

MSE 2021 Materials Characterization. The fundamentals of basic microstructural and compositional materials characterization techniques are presented with an emphasis on tools using electromagnetic radiation and electrons as stimuli. *Prerequisite: MSE 2001*

MSE 4010 Environmental Degradation. Theory of environmental degradation of metals, ceramics, polymers and biomaterials. Emphasis on the scientific principles of corrosion and physical degradation. *(Offered Spring Term Only) Prerequisite: MSE 2001*

MSE 3001 Chemical Thermodynamics of Materials. Principles that govern the important structural transformations that occur in engineering materials. *(Fall Term Only) Prerequisite(s): MSE 2001 and (MATH 2403 or MATH 2413 or MATH 24X3 or MATH 2602)*

MSE 3005 Mechanical Behavior of Materials. The correlation of mechanical properties with atomic bonding, microstructure, and micromechanics, for applications relevant to materials selection and design, mechanical forming, and failure of materials. *(Fall Term Only) Prerequisite(s): MSE 2001 and COE 3001*

MSE 3021 Materials Lab I. Fundamental principles of materials demonstrated in hands-on and demonstration experiments. Instruction on basic laboratory skills, safety, and proper technical report writing. *(Spring Term Only) Prerequisite: MSE 2001*

MSE 4022 Materials Lab II. Processing, structure, properties relationships are explored through a series of hands-on experiments. Instruction on basic laboratory skills, safety, statistical analysis of data, use of laboratory notebooks and technical report writing. *(Spring Term Only) Prerequisite(s): MSE 2001 and MSE 3021*

MSE 3015 Electrical, Optical and Magnetic Properties. Band theory of solids, semiconductor physics, dielectric, optical and magnetic phenomena. Superconductivity in various classes of materials. *(Fall Term Only) Prerequisite: MSE 2001*

MSE 4325 Thin Film Materials Science. Introduction to principal vapor deposition processes and vacuum technology. The fundamentals of the formation, characterization, and properties of a variety of thin films. *(Fall Term Only) Prerequisite: MSE2001*

MSE 4754 (1-6-3) Electronic Packaging Assembly, Reliability, Thermal Management, and Test. The course provides hands-on instruction in electronics packaging, including assembly, reliability, thermal management, and test of next-generation microsystems. *(Spring Term Only) Prerequisite: ECE 3040 or ECE 3710*

MSE 4791 Mechanical Behavior of Composites. Introduction to properties and structures of common matrix and reinforcing materials, mechanics of fiber-reinforced composites, lamina and laminate analysis, and mechanical performance. Cross listed with AE, CEE, CHE, ME and PTFE 4793. (Fall Term Only) Prerequisite: MSE 3005

MSE 4793 Composite Materials and Processing. Basic principles of selecting component materials and manufacturing composites are presented. Polymeric, metallic, and ceramic systems are considered. *Cross listed with AE, CEE, CHE, ME and PTFE 4793. (Spring Term Only) Prerequisite(s): CHEM 1310 and PHYS 2212*