



# 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 a materials focused approach to problem solving that is different than that provided by their major. Non-MSE undergraduate majors are encouraged to participate in this program provided they have the appropriate prerequisites and approval of their major program academic advisor.

### REQUIREMENTS

The requirement 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
2. Seek out Advisement for proposed schedule if necessary
3. [Complete Minor form](#)
4. Upload completed Minor form in MSE Canvas platform (via Assignment Tab) for MSE Advisor Signature and processing
5. Complete a Minor Program of Study form prior to Graduation

### 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.

**2021 INFORMATION SESSIONS**    February 9    March 9    April 6 11:00 - 11:45 am EST  
Bluejeans Session Link: <https://bluejeans.com/4519687036>

### 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 (Fall, Spring and Summer) *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. *Prerequisite:* MSE 2001 (Spring only)

**MSE 3001 Chemical Thermodynamics of Materials.** Principles that govern the important structural transformations that occur in engineering materials. *Prerequisite(s):* MSE 2001 and (MATH 2403 or MATH 2413 or MATH 24X3 or MATH 2602 or MATH 2552) (Fall and Spring)

**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. *Prerequisite(s):* MSE 2001 and COE 3001 (Fall and Spring)

**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. *Prerequisite:* MSE 2021 (Spring only)

**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. *Prerequisite:* MSE 2021 (Fall only)

**MSE 3015 Electrical, Optical and Magnetic Properties.** Band theory of solids, semiconductor physics, dielectric, optical and magnetic phenomena. Superconductivity in various classes of materials. *Prerequisite(s):* MSE 2001 and PHYS 2212 (Fall and Spring)

**MSE 4754 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. Crosslisted with ECE and ME 4754. *Prerequisite:* ECE 3040 or ECE 3710 (Spring only)

**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. Crosslisted with AE, CEE, CHBE, and ME 4791. *Prerequisite:* MSE 3005 (Fall only)

**MSE 4793 Composite Materials and Processing -** Basic principles of selecting component materials and manufacturing composites are presented. Polymeric, metallic, and ceramic systems are considered. Crosslisted with AE, CHBE, and ME 4793. *Prerequisite(s):* CHEM 1310 or CHEM 1211K and PHYS 2212 (Spring only)