

Materials Science (ESM)

Minor in Materials Science

Department of Materials Science and Engineering, College of Engineering and Applied Sciences

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The development of new materials and research into the engineering applications of materials are critical to a wide variety of industries including aerospace, automotive, energy, electronics, environmental, medical instrumentation, advanced computing, and defense-related companies. Without a clear understanding of the relationship between material structure, properties, and processing, achieving the performance necessary to meet the needs of current and future high technology applications would be impossible. For this reason, industrial and research laboratories value graduates with an understanding of materials science and engineering issues in addition to their other engineering or physical science knowledge.

Requirements for the Minor in Materials Science (ESM)

The sequence of courses included in the minor in Materials Science provides a firm background for students seeking employment in materials-related industries or those who will pursue graduate study in related fields. There are two versions of the minor: one for students enrolled in B.S. degree programs (e.g., physics and chemistry) and one for those enrolled in B.E. degree programs. (B.E. students should see the faculty advisor in their engineering major for approval before declaring the materials science minor.)

All courses offered for the minor must be passed with a letter grade of C or higher.

For students with majors leading to the B.S. degree

Six courses are required:

1. ESG 100 Introduction to Engineering Science
2. Two of the following:
 - ESG 332 Materials Science I: Structure and Properties of Materials
 - ESG 333 Materials Science II: Electronic Properties
 - ESG 339 Thin Film Processing of Advanced Materials
3. Two of the following:
 - ESM 325 Diffraction Techniques and Structure of Solids
 - ESM 334 Materials Engineering
 - ESM 335 Strength of Materials
 - ESM 353 Biomaterials: Manufacture, Properties, and Applications
 - ESM 355 Materials and Processes in Manufacturing Design

The course not completed for Requirement 2 (ESG 332, 333, 339)
4. One of the following:
 - ESG 487 Cooperative Research in Technological Solutions
 - ESM 488 Cooperative Industrial Practice
 - ESM 499 Research in Materials Science
 - ESM 475 Undergraduate Teaching Practicum

For students with majors leading to the B.E. degree

Five courses are required:

1. Four of the following:
 - ESM 325 Diffraction Techniques and Structure of Solids
 - ESM 334 Materials Engineering
 - ESM 353 Biomaterials: Manufacture, Properties, and Applications
 - ESM 369 **Polymer Engineering**
 - CHE 301 Physical Chemistry I
 - CHE 302 Physical Chemistry II
 - CHE 351 Quantum Chemistry
2. One of the following:
 - ESM 475 Undergraduate Teaching Practicum
 - ESG 487 Cooperative Research in Technological Solutions
 - ESM 488 Cooperative Industrial Practice
 - ESM 499 Research in Materials Science

No more than two non-ESM courses may count toward the minor. ESG core courses cannot be used to meet requirements for both the ESG major and the ESM minor.