

MATERIALS SCIENCE AND ENGINEERING, MINOR

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Spring 2025 Curricular Update: *The program description, entrance requirements, and program requirements detailed on this page are effective beginning Spring 2025. To learn more about what approved curricular changes take effect in Spring 2025, please visit the Changes to the UG Bulletin page (<https://bulletins.psu.edu/undergraduate/general-information/using-this-bulletin/#changestotheugbulletintext>). To view the requirements in effect for Fall 2024, please visit the 2024-25 Undergraduate Bulletin PDF (<https://bulletins.psu.edu/pdf/undergraduate.pdf>).*

Program Description

The minor in Materials Science and Engineering prepares students to understand the materials properties, materials processing techniques, characterization methods, and selection criteria in implementing engineering solutions. The materials selection and use for cutting edge technology requires precise and definite knowledge of choice of materials, processing route, and material response in service conditions. A wide variety of industries such as aerospace, automotive, energy, biomedical, chemical, industrial, and electrical to name a few, have a demand for engineers with a strong background in materials engineering.

The materials minor includes an introductory course on materials science to provide a foundation on properties and processing of materials, materials thermodynamics and kinetics, and characterization of mechanical, microstructural and electrical properties of materials. Students then have the freedom and flexibility to enhance their knowledge on the processing, structure, and properties of materials such as metals, ceramics, polymers, electronics, biomaterials, composites, nanomaterials, and materials for energy. The minor can easily complement most engineering, chemistry, and physics studies.

This minor is intended for students in other engineering or science majors who have the necessary foundational knowledge in math, physics, and chemistry [even if the courses taken are not exactly the same as the listed prerequisites for MATSE courses (i.e., MATH 250 and MATH 252 vs. MATH 251, CHEM 210 vs. CHEM 202, etc.)]. Therefore, we recommend students reach out to the MATSE department or the faculty member teaching a specific MATSE course if they have questions about meeting prerequisites.

What is Materials Science and Engineering?

Materials are ubiquitous. Materials play a role in every industry and facet of life. Materials science and engineering is an interdisciplinary study of the properties of matter and the exploration for new and creative uses of ceramics, metals, polymers and composites. Materials scientists and engineers study the entire life cycle of materials (production, synthesis and processing, manufacturing, use, recycling and reclamation) by employing science to solve engineering problems. This engineering discipline is unique in that our studies begin with understanding materials at the atomic scale, allowing for prediction and measurement of material properties, and creation of materials by design. What do you

want to do with your career? Make alternative energy more economical? Improve human health, cure cancer? Provide clean drinking water to the world? Make transportation more efficient and environmentally friendly? Make everyday materials more sustainable? All these outcomes and more are possible by studying materials.

You Might Like This Program If...

- You enjoy problem-solving, math, and the physical sciences.
- You like understanding why materials react the way they do to various stimuli.
- You are interested in creating tools and materials for the aerospace, automotive, energy, biomedical, or electronics industries.