BS in Materials Science & Engineering (MS&E)

Information for Undergraduate Students

What is Materials Science and Engineering?

Materials Science &Engineering is one of the most rapidly growing and enabling areas in science and engineering. Success in engineering stronger, faster, lighter, smaller, and better materials is rooted asking and answering questions like:

- How are materials structured on the atomic, nanometer (one billionth of a meter), and micrometer (one millionth of a meter) scales?
- How does structure of a material determine its properties, characteristics, and performance?
- How can materials be grown, synthesized, and processed to have the structure and properties that are desired and,
- How can new materials be discovered or created?
- How can newly discovered materials and materials phenomena be exploited to create new technologies that serve our societies and environment?

What do MS&E Graduates Do?

The discovery of new materials and improvement of existing ones are crucial to bettering our quality of life and solving critical technological and societal problems. Making safe, fuel efficient vehicles requires light weight, strong materials. Improving the performance of jet engines requires new materials that can be used at high temperature. Increasing the computing capabilities of microprocessors requires improved materials for use in ever smaller integrated circuits. Developing new fuels and new sources of energy involve designing new materials for energy conversion and transmission. Integration of advanced capabilities in electronics with medicine or the environment requires the development of new materials systems with that exhibit high performance and stability in harsh environments. These challenges are among the many types that materials scientists and engineers take on in their

Who Are Materials Scientists and Engineering?

Students who both enjoy the sciences and are interested in applications in real world technologies should consider a curriculum and career in MS&E. Materials scientists and engineers approach problem solving much like their title suggests, sometimes seeking scientific understanding, sometimes seeing an engineering solution, and most of the time integrating both strategies. And they are active, creative, fun-loving contributors!

Left: UW-MS&E Materials Advantage Student Chapter members on a plant trip to Skana Aluminum in Manitowoc , WI . *Right:* Chapter members demonstrating at the 2013 UW Engineering Expo.

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Curriculum and Opportunities for Undergraduate Students

Flexible Curriculum

The MS&E curriculum is designed to provide comprehensive coverage of the fundamental principles of the materials discipline. The materials core courses build upon concepts learned in underpinning chemistry, physics and biology courses with modern treatments of materials structure, properties, processing, and design. With the guidance of a department advisor, students can design a set of seven elective technical courses to explore a specific area in which they have particular interest or extend their knowledge across the broad field of materials science and engineering.

Elective Emphasis Areas

Examples of areas in which students can focus their studies through coordinated sets of electives include, among others:

Materials for Energy Applications
Computation and Simulation
Structural Materials
Nanomaterials and Nanotechology
Polymer Materials
Biomaterials
Materials for Electronics and Communications
Broad-Based Materials Education

Scholarships

The Department of Materials Science and Engineering offers a broad range of scholarship support to students who have matriculated in the undergraduate degree programs. MS&E Department scholarships are based on merit, including GPA and contributions to the community. Applications are due at the end of each spring semester. Contact Cindy Rothwell at cynthia.rothwell@wisc.edu with questions regarding the application process.

Internships, Co-ops and Research

A great way to gain on-the-job and research experience is to participate in an internship, co-op or research opportunity. Up to 3 credits of MSAE 001 or research credit can count toward Emphasis Electives requirement. The experience gained is even more valuable. Contact **Engineering Career Services** for more information on co-op and internships.

Student Organizations

Many department students participate in the Materials Advantage student organization, which focuses on pre-professional activities for materials students. Materials students also have contributed materials expertise as partners in other campus student organizations, including Clean Snowmobile, Concrete Canoe, SWE (Society for Women Engineers) and the Hmong Association of Engineers, among others

Contact Us!

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For additional information, please reference to our website: https://www.engr.wisc.edu/department/materials-science-engineering/