MATERIALS SCIENCE AND ENGINEERING

The Materials Science and Engineering Program offers tracks of study in electronic, magnetic and photonics materials, soft materials, structural materials, materials for energy, biomaterials and computational materials science.

Materials science and engineering (MSE) is an interdisciplinary program aimed at providing rigorous education in materials science and engineering and the fundamental physics, engineering, chemistry and biology that underlie this discipline. Educational goals are achieved through both course work and training in cross-disciplinary research supervised by one or more science and engineering faculty members.

The program offers six unique tracks of study:

- electronic, magnetic, and photonics materials
- soft materials
- structural materials
- materials for energy
- biomaterials
- computational materials science

The MSE program is directed by Professor Bob McLeod of the Department of Electrical, Computer and Energy Engineering. For more information, see the Materials Science & Engineering Program (https://www.colorado.edu/mse) website.

Master's Degree

- Materials Science and Engineering - Master of Science (MS) (catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/materials-science-engineering/materials-science-engineering-master-science-ms)

Doctoral Degree

- Materials Science and Engineering - Doctor of Philosophy (PhD) (catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/materials-science-engineering/materials-science-engineering-doctor-philosophy-phd)

Courses

MSEN 5000 (1-3) Fundamentals of Materials Science and Engineering

Discusses fundamental topics in materials science and engineering.

**Requisites:** Restricted to graduate students only.

**Grading Basis:** Letter Grade

MSEN 5064 (3) Soft Machines

Introduces soft machines as a new paradigm of engineering that starts to impact healthcare, consumer electronics, renewable energy and collaborative robotics. Prepares students to participate in research on soft machines by starting with fundamentals of soft materials and by covering soft robotics, stretchable electronics, energy harvesting and functional polymers. Includes guest lectures, a literature review and a hands-on lab project.

**Equivalent - Duplicate Degree Credit Not Granted:** MCEN 4046 and MCEN 5046

**Requisites:** Restricted to students with 87-180 credits (Senior, Fifth Year Senior) Mechanical (MCEN) majors or College of Engineering graduate students only.

**Grading Basis:** Letter Grade

MSEN 5370 (3) Materials Thermodynamics

Reviews thermodynamics fundamentals and applies them to understand the chemical, thermal and mechanical behavior of materials. Examines equations of state, solution theory, equilibrium diagrams and phase changes.

**Requisites:** Restricted to graduate students only.

**Grading Basis:** Letter Grade

MSEN 5840 (1-6) Independent Study

Offers an opportunity for students to do independent work. Subject arranged to fit the needs of the student.

**Repeatable:** Repeatable for up to 30.00 total credit hours.

**Requisites:** Restricted to MS and PhD students in the Materials Science and Engineering program (MTEN) only.

MSEN 5919 (1-5) Special Topics in MSE

Offers an opportunity for special topics in MSE. Subject arrangement to fit the needs of the program.

**Repeatable:** Repeatable for up to 10.00 total credit hours. Allows multiple enrollment in term.

**Requisites:** Restricted to graduate students only.

MSEN 6950 (1-6) Master's Thesis

**Repeatable:** Repeatable for up to 6.00 total credit hours.

**Requisites:** Restricted to MS students in the Materials Science and Engineering program (MTEN) only.

MSEN 8990 (1-10) Doctoral Dissertation

**Repeatable:** Repeatable for up to 30.00 total credit hours.

**Requisites:** Restricted to PhD students in the Materials Science and Engineering program (MTEN) only.