

MATERIALS SCIENCE AND ENGINEERING

The master's degree in materials science and engineering is a 30-credit-hour program designed to prepare students in an area of rapid growth and profound impact on society. The curriculum consists of courses designed to provide a comprehensive background in fundamentals of materials science and advanced engineering applications, including applications to automotive technology. The courses are 3 credit hours and most are offered in the evening from 6:00 to 8:45 p.m. and available in the remote-access mode. A thesis option is available.

The program can be completed entirely on campus, entirely online, or as a combination of on-campus, online and hybrid courses.

Requirements

To maintain satisfactory academic standing, students must earn a C or better in every graduate course to be credited toward the degree requirements. In addition, students must maintain a cumulative GPA of 3.0 or higher.

Code	Title	Credit Hours
Required Core Courses:		
MTSE 501 or ME 566	Materials Thermodynamics and Kinetics Materials Thermodynamics and Kinetics	3
MTSE 502 or ME 569	Introduction to Materials Characterization Introduction to Materials Characterization	3
ME 518	Advanced Engineering Analysis	3
Material Science and Engineering Elective Courses:		
Select 15-18 credits from the following:		
ME 556	Stress and Strength Considerations in Design	3
ME 558	Fracture and Fatigue Considerations in Design	3
ME 568	Computational Materials Design	3
ME 580	Advanced Engineering Materials	3
ME 583	Mechanical Behavior of Materials	3
ME 585	Cast Metals in Engineering Design	3
ME 586	Materials Consideration in Manufacturing	3
ME 589	Composite Materials	3
ME 591	Degradation of Materials	3
ME 593	Powder Materials & Processing	3
ME 595	Digital Manufacturing	3
ME 611	Modeling of Engineering Materials	3
BENG 521	Biomaterials and Biochem Interface	3
BENG 560	Nanobiosystems Engineering	3
BENG 575	Regenerative Engineering	3
AENG 581	Materials Selection in Auto Design	3
AENG 584	Lightweight Automotive Alloys	3
AENG 650	Analysis & Design for Vehicle Crashworthiness	3
ECE 502	Electromagnetic Theory & Simulation	3
ECE 539	Production of Electrical Products	3
IMSE 504	Metal Forming Processes	3

MTSE 600	Study or Research in Selected Materials Engineering Topics	1-3
MTSE 699	Master's Thesis	1-6

Cognate Elective Courses (3 to 6 credit hours):

- **Required:** One graduate level course from CECS (not from the list of MTSE required core or MTSE elective courses), CASL, CEHHS, or COB
- **Optional:** One graduate-level course from CECS (not from the list of MTSE required core or MTSE elective courses) or natural sciences (BIOL, CHEM, ESCI, ENST, MICR, PHYS)

The thesis option may be elected with the approval of the Materials Science and Engineering graduate program committee. It will count for six (6) credit hours of coursework, replacing two courses in the Materials Science and Engineering electives area.

Learning Goals

1. A strong background in fundamentals of engineering and materials science, and a comprehensive knowledge of the latest technologies in the Materials Science and Engineering field, which extends beyond the undergraduate experience.
2. The ability to formulate, analyze and solve advanced multidisciplinary Materials Science and Engineering problems.
3. The ability to apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools in their professional endeavors.