MATERIALS, MECHATRONICS AND MANUFACTURING ENGINEERING

The School of Materials, Mechatronics and Manufacturing Engineering (MMME) houses four programs: Materials Science and Engineering, Mechatronics and Robotics, Mechanical Engineering Technology, and Electrical Engineering Technology. In each program, we focus on rigorous preparation of students for practical application of science, mathematics and engineering principles to produce superior professionals for industry and academia.

Materials Science and Engineering (MSE)

Materials Science and Engineering is a graduate-only program focused on the close connection between structure, processing and property relationship inherent in ceramics, metals, polymers, electronic materials and composites. Most other fields of engineering eventually experience materials limitations such as high-temperature strength in engines, corrosion resistance in structures, vehicles and energy exploration infrastructure, miniaturization of electronics and photonics devices, biocompatibility, strength and corrosion resistance of medical implants, reliability of advanced composites for aerospace structures, etc. Materials scientists and engineers use a knowledge of physics, chemistry and mathematics to both understand molecular structure and how processing affects this structure to impact macroscopic performance. MSE students receive an education focused on foundational sciences of thermodynamics, kinetics, characterization and processing. The field of materials science and engineering is expanding into a period of unprecedented intellectual challenges, opportunities and growth. Products created using materials science and engineering research contribute to the economic strength and security of not only the state, but also the country.

MSE is located at OSU-Tulsa campus at the Helmerich Research Center (HRC), a premier facility in the historic Greenwood district. The HRC is home to electron microscopy, x-ray diffraction, destructive and non-destructive evaluation tools, spectroscopy and thermal analysis tools, a class-100 clean room, and other world-class facilities for materials fabrication and processing.

MSE Program Educational Objectives

The MSE program features both research-intensive and course-intensive paths for graduate degrees. In either path, students study advanced thermodynamics of materials, kinetic processes in materials, advanced materials processing, and materials characterization as core courses. Students typically select specialty elective courses from MSE, Chemistry, Physics, Mechanical and Aerospace Engineering, Civil Engineering, Chemical Engineering and Electrical and Computer Engineering to round out their curriculum. Students holding Bachelor of Science degrees in any of these fields can succeed in MSE. Graduates of the MSE program find employment throughout industry, in government labs and in academia. A hallmark of either the MS or PhD graduate is the publication of peer-reviewed academic articles related to their research. Likewise, during the course of study, students attend national and international conferences to present their work to other materials scientists and engineers.

MSE Degrees

Master of Science: Two options exist to receive an MS degree: (1) a 30 credit hour, thesis-based program where the student conducts research and submits a thesis for examination, and (2) a 32 credit hour, non-thesis-based program (MEN) where the students complete a creative project and submit a report for examination.

Doctor of Philosophy: The PhD is a research-intensive program consisting of 42-60 credit hours beyond the MS degree where the candidate is expected to formulate an original research proposal, conduct research and write an authoritative dissertation to be submitted for examination.

Mechatronics and Robotics (MERO) Engineering

Mechatronics and Robotics is an integrated engineering program comprised of mechanical engineering, electrical/electronic engineering, control systems, and computer science principles. MERO systems are pervasive throughout our modern society (e.g, advanced manufacturing, transportation, healthcare, automation, service robots, military and police services, etc.) with demand for qualified engineers growing at a rapid pace. MERO is an excellent choice for students with an aptitude toward mechanical, electrical and computer engineering who like to build smart systems.

The MERO undergraduate curriculum emphasizes application of mathematics, science and engineering principles to solve practical problems. A hallmark of the program is significant laboratory experience led by expert faculty in: mechatronics, industrial robots, Programmable logic controller (PLC), DC/AC circuits, fluid power, materials, basic instrumentation, 3D printing, computer-aided design, manufacturing, and engineering (CAD/CAM/CAE). The latest computer software is provided and supported for the courses that MERO students take. Where appropriate, laboratories with modern computer data acquisition systems and on-screen displays are available.

Senior capstone design integrates the knowledge and skills learned during this course of study. MERO graduates are prepared to enter the workforce either as employees of major companies or small businesses, entrepreneurs, or to continue to pursue graduate studies. Multiple MERO major courses are popular among engineering undergraduate and graduate students from other disciplines who want to augment their resume for their job search or improve the impact of thesis/dissertation research.

In addition to the required mechatronics and robotics courses, students are provided with a solid foundation in calculus, physics, linear algebra, differential equations, statistics, chemistry, and computer science.

MERO Degrees

The MERO program offers Bachelor of Science in Engineering Technology (BSET) and Master of Science degrees. Additionally, Minors can be obtained by students in the Electrical Engineering Technology and Mechanical Engineering Technology programs.

MERO Program Educational Objectives

MERO at Oklahoma State University focuses on preparing students for a dynamic, rapidly growing workforce. OSU MERO graduates should be able to:

1. Integrate new technologies and methods into their workplace to maximize value to their employer.

2. Employ the latest design, analysis and simulation tools in the mechatronics and robotics discipline.
3. Work independently and collaboratively with professionalism and high ethical standards.
4. Communicate effectively and professionally across all mediums, from written reports to electronic communications.
5. Be a life-long learner through participation and membership in professional organizations, a continuation of professional/graduate studies, and/or self-study.

MERO Student Outcomes
Students graduating from the MERO program are expected to achieve the following:

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments, and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

MERO Accreditation
The Mechatronics and Robotics Engineering Technology program is applying for accreditation by the Engineering Technology Accreditation Commission of ABET (www.abet.org (http://www.abet.org/)) in 2026.

Mechanical Engineering Technology (MET)
The Mechanical Engineering Technology (MET) program prepares students for practical, hands-on engineering careers in fields such as mechanical design, manufacturing, automation, fluid power, materials, and thermal systems. Students receive extensive laboratory training in areas including mechatronics, fluid mechanics, thermal science, instrumentation, CAD/CAM/CAE, and 3D printing—using modern, industry-relevant tools under the guidance of expert faculty.

Backed by rigorous classroom instruction, the MET curriculum equips students with strong foundations in mathematics, physics, chemistry, and computer programming, while building applied skills in mechanical engineering principles. Students also gain essential experience in communication, ethics, and teamwork, ensuring they are well-rounded professionals ready for the workplace. Our ABET-accredited MET program encourages the Fundamentals of Engineering (FE) exam before graduation and Professional Engineer (PE) licensure – credentials that support success in engineering careers across a wide range of roles, including field engineer, project manager and entrepreneur.

Students earn a Bachelor of Science in Engineering Technology with a major in Mechanical Engineering Technology. Options include a minor in Mechatronics or Entrepreneurship, and a senior capstone experience that features industry-sponsored, team-based design projects integrating skills acquired throughout the program.

MET Educational Objectives
A few years after graduation, OSU MET graduates will:

- Seek Professional Engineer (PE) licensure as their career assumes greater responsibility and leadership roles.
- Apply the latest tools and methods in engineering and manufacturing design.
- Integrate new technologies and innovations to add value in their organizations.
- Work effectively in collaborative, interdisciplinary team settings.
- Demonstrate professionalism, ethics, and personal integrity in the workplace.
- Engage in life-long learning through professional societies, graduate studies, and independent development.

MET Student Outcomes
Graduates of the program will have:

1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems.
2. An ability to design systems, components, or processes that meet specified needs in mechanical engineering contexts.
3. Proficiency in written, oral, and graphical communication in technical and non-technical environments, and the ability to use relevant technical literature.
4. An ability to conduct standard tests and experiments, analyze data, and use results to improve processes.
5. An ability to function effectively as a team member or leader on technical teams.

MET Career Relevance and Industry Demand
Graduates of the MET program are prepared for immediate contribution in a wide variety of industries. These include:

- Manufacturing (e.g., aerospace, automotive, industrial machinery)
- Energy (e.g., oil & gas, power generation)
- Engineering services (e.g., HVAC, design firms, transportation)

Graduates possess both the technical depth and applied skills to design, analyze, test, and implement mechanical systems and processes with minimal additional training.

MET Degree
Students earn a Bachelor of Science in Engineering Technology (BSET) with a major in Mechanical Engineering Technology. Program options include a Computer emphasis or a minor in Mechatronics and Robotics (MERO).

MET Accreditation
The Mechanical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET (www.abet.org (http://www.abet.org/)).

Electrical Engineering Technology (EET)
The Electrical Engineering Technology (EET) program prepares students for practical engineering careers in electronics control, power systems, communications, and computation. Our ABET-accredited program emphasizes hands-on learning, with laboratory-intensive coursework guided by expert faculty using modern industrial tools. Rigorous classroom instruction complements this experience by reinforcing fundamental concepts in mathematics, science, and engineering.

The program encourages students to take the Fundamentals of Engineering (FE) exam before graduation and pursue Professional Engineer (PE) licensure, supporting diverse career paths as field engineers, project managers, or entrepreneurs.

EET Program Educational Objectives

A few years after graduation, OSU EET graduates will:

- Stay current with evolving industry standards through continuing education or graduate studies and apply this knowledge to their professional practice.
- Demonstrate professionalism and ethical standards through both independent and collaborative work.
- Show continuous career improvement, evidenced by assumption of greater responsibility or leadership, promotion, participation in continuing education or graduate studies, or transition into other technical or professional careers.

EET Program Outcomes

Graduates of the program will have:

(1) An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline;

(2) An ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the discipline;

(3) An ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;

(4) An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and

(5) An ability to function effectively as a member as well as a leader on technical teams.

EET Career Relevance and Industry Demand

EET graduates are equipped to enter a wide array of dynamic and growing fields within electrical engineering and applied technology. Demand remains strong for professionals skilled in both electrical and electronic system design and application. The Computer option equips graduates for careers in computer hardware and software engineering, aligning with rising demand in automation, robotics, and artificial intelligence.

EET Degree

Students earn a Bachelor of Science in Engineering Technology (BSET) with a major in Electrical Engineering Technology. Program options include a Computer emphasis or a minor in Mechatronics and Robotics (MERO).

EET Accreditation

The Electrical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org (http://www.abet.org/).