



Twin Cities Campus

Mechanical Engineering B.M.E.

Mechanical Engineering

College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2018
- Required credits to graduate with this degree: 124
- Required credits within the major: 108 to 110
- The co-operative work training option to the program requires two or three semesters of supervised work at a corporate host site.
- Degree: Bachelor of Mechanical Engineering

The Department of Mechanical Engineering is committed to offering undergraduate and graduate education of the highest quality in mechanical engineering, to conducting significant basic and applied research in selected areas, and to providing professional service to the appropriate constituencies of a major land grant university.

Mechanical engineering is involved in most technological activities of society and dominates many, including automotive, transportation, materials handling, environmental and pollution control systems, refrigeration and cryogenics, power systems design, automation, system dynamics and control, computer-aided design and manufacturing, capital equipment design, and consumer products production. A mechanical engineer may be engaged in design, development, research, testing, manufacturing, administration, marketing, consulting, or education.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

Students must complete 8 courses before admission to the program.

Freshman and transfer students are usually admitted to pre-major status before admission to this major

For information about University of Minnesota admission requirements, visit the [Office of Admissions website](#).

Required prerequisites

Mathematics

Honors math (MATH 1571H, 1572H, 2573H, 2574H) may be taken in place of the listed courses.

- [MATH 1271](#) - Calculus I [MATH] (4.0 cr)
or [MATH 1371](#) - CSE Calculus I [MATH] (4.0 cr)
- [MATH 1272](#) - Calculus II (4.0 cr)
or [MATH 1372](#) - CSE Calculus II (4.0 cr)
- [MATH 2263](#) - Multivariable Calculus (4.0 cr)
or [MATH 2374](#) - CSE Multivariable Calculus and Vector Analysis (4.0 cr)

Physical Sciences

- [CHEM 1061](#) - Chemical Principles I [PHYS] (3.0 cr)
or [CHEM 1071H](#) - Honors Chemistry I [PHYS] (3.0 cr)
- [CHEM 1065](#) - Chemical Principles I Laboratory [PHYS] (1.0 cr)
or [CHEM 1075H](#) - Honors Chemistry I Laboratory [PHYS] (1.0 cr)
- [PHYS 1301W](#) - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)
or [PHYS 1401V](#) - Honors Physics I [PHYS, WI] (4.0 cr)
- [PHYS 1302W](#) - Introductory Physics for Science and Engineering II [PHYS, WI] (4.0 cr)
or [PHYS 1402V](#) - Honors Physics II [PHYS, WI] (4.0 cr)

Statics and Dynamics

- [AEM 2021](#) - Statics and Dynamics (4.0 cr)
or take the following course pair
- [AEM 2011](#) - Statics (3.0 cr)
- [AEM 2012](#) - Dynamics (3.0 cr)

Material or Thermal Science

- [MATS 2001](#) - Introduction to the Science of Engineering Materials (3.0 cr)
or [ME 3331](#) - Thermodynamics (3.0 cr)



General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the [liberal education requirements](#). Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

Program Requirements

Linear Algebra & Differential Equations

[MATH 2373](#) - CSE Linear Algebra and Differential Equations (4.0 cr)
or [MATH 2243](#) - Linear Algebra and Differential Equations (4.0 cr)

Major Courses

[CSCI 1113](#) - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)
[MATS 2002](#) - Introduction to the Science of Engineering Materials Laboratory (1.0 cr)
[AEM 3031](#) - Deformable Body Mechanics (3.0 cr)
[EE 3005](#) - Fundamentals of Electrical Engineering (4.0 cr)
[EE 3006](#) - Fundamentals of Electrical Engineering Laboratory (1.0 cr)
[IE 3521](#) - Statistics, Quality, and Reliability (4.0 cr)
[ME 2011](#) - Introduction to Engineering (4.0 cr)
[ME 3221](#) - Fundamentals of Design & Manufacturing (4.0 cr)
[ME 3222](#) - Mechanisms & Machine Design (4.0 cr)
[ME 3281](#) - System Dynamics and Control (4.0 cr)
[ME 3331](#) - Thermodynamics (3.0 cr)
[ME 3332](#) - Fluid Mechanics (3.0 cr)
[ME 3333](#) - Heat Transfer (3.0 cr)
[ME 4031W](#) - Basic Mechanical Measurements Laboratory [WI] (4.0 cr)
[ME 4054W](#) - Design Projects [WI] (4.0 cr)

Electives

[ME 4131W](#) - Indoor Environment & Energy Laboratory [WI] (4.0 cr)
or [ME 4231](#) - Motion Control Laboratory (4.0 cr)
or [ME 4232](#) - Fluid Power Control Lab (4.0 cr)
or [ME 4331](#) - Thermal Energy Engineering Laboratory (4.0 cr)
or [ME 4431W](#) - Energy Conversion Systems Laboratory [WI] (4.0 cr)

Technical Electives

Complete 15 credits of upper division technical electives, with at least 8 credits in ME. Students may choose options in power and propulsion, design and manufacturing, thermodynamics and heat transfer, environment, or select electives in consultation with their adviser.

Take 15 or more credit(s) from the following:

Environmental

Take 0 or more credit(s) from the following:

- [ME 5101](#) - Vapor Power Cycles (4.0 cr)
- [ME 5103](#) - Thermal Environmental Engineering (4.0 cr)
- [ME 5105](#) (*Inactive*) (4.0 cr)
- [ME 5113](#) - Aerosol/Particle Engineering (4.0 cr)
- [ME 5116](#) (*Inactive*) (4.0 cr)
- [ME 5133](#) - Aerosol Measurement Laboratory (4.0 cr)
- [ME 5312](#) - Solar Thermal Technologies (4.0 cr)

Design & Manufacturing

Take 0 or more credit(s) from the following:

- [ME 5221](#) - Computer-Assisted Product Realization (4.0 cr)
- [ME 5223](#) - Materials in Design (4.0 cr)
- [ME 5228](#) - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- [ME 5241](#) - Computer-Aided Engineering (4.0 cr)
- [ME 5243](#) - Advanced Mechanism Design (4.0 cr)
- [ME 5247](#) - Applied Stress Analysis (4.0 cr)
- [ME 5248](#) - Vibration Engineering (4.0 cr)
- [ME 5281](#) - Feedback Control Systems (4.0 cr)
- [ME 5286](#) - Robotics (4.0 cr)

Thermal Sciences

(Power & Propulsion, Thermodynamics, Heat Transfer, Fluid Mechanics)



Take 0 or more credit(s) from the following:

- ME 5101 - Vapor Power Cycles (4.0 cr)
- ME 5312 - Solar Thermal Technologies (4.0 cr)
- ME 5332 - Intermediate Fluid Mechanics (4.0 cr)
- ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)
- ME 5344 - Thermodynamics of Fluid Flow With Applications (4.0 cr)
- ME 5351 - Computational Heat Transfer (4.0 cr)
- ME 5446 - Introduction to Combustion (4.0 cr)
- ME 5461 - Internal Combustion Engines (4.0 cr)
- ME 5462 - Gas Turbines (4.0 cr)
- ME 5465 (*Inactive*) (4.0 cr)
- ME 5666 - Modern Thermodynamics (4.0 cr)

•ME EIP

Students in the ME EIP program are required to include the following courses in their technical electives:

- ME 3041 - Industrial Assignment I (2.0 cr)
- ME 4043W - Industrial Assignment II [WI] (4.0 cr)
- ME 4044 - Industrial Assignment III (2.0 cr)

Biology

BIOL 1009 - General Biology [BIOL] (4.0 cr)

or BIOL 1001 - Introductory Biology: Evolutionary and Ecological Perspectives [BIOL] (4.0 cr)

Upper Division Writing Intensive within the major

Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other major requirements.

Take 0 - 1 course(s) from the following:

- ME 4031W - Basic Mechanical Measurements Laboratory [WI] (4.0 cr)
- ME 4043W - Industrial Assignment II [WI] (4.0 cr)
- ME 4054W - Design Projects [WI] (4.0 cr)
- ME 4131W - Indoor Environment & Energy Laboratory [WI] (4.0 cr)
- ME 4431W - Energy Conversion Systems Laboratory [WI] (4.0 cr)

Program Sub-plans

A sub-plan is not required for this program.

EIP

ME EIP program (engineering intern program or co-op program) is available during the last two years of study. Upper division status and a satisfactory GPA are required for admission. The co-op program provides applied engineering training in selected established industries during semesters of supervised assignments that alternate with semesters of University studies.

Students in the ME EIP program (engineering intern program or co-op program) register for three industrial assignment courses. ME 3041 (2 credits), ME 4043W (4 credits), and ME 4044 (2 credits) for a total of 8 credits. These courses count toward the technical elective credit requirement.

Students register for industrial assignments as they would for regular classes. Requirements for the course include writing a summary of an article in a technical journal, attending a workshop (ME 3041, ME 4043W), submitting a report draft, and writing a final report. The course grade is based on writing; work performance cannot be considered in assigning a grade. The second industrial assignment, ME 4043W, is oriented toward solving a design problem and fulfills a 4-credit intensive writing course requirement. Cooperation from company personnel is required in accomplishing most reports, particularly the ME 4043W reports.

Internship

- ME 3041 - Industrial Assignment I (2.0 cr)
- ME 4043W - Industrial Assignment II [WI] (4.0 cr)
- ME 4044 - Industrial Assignment III (2.0 cr)