Duluth Campus

Mechanical Engineering B.S.M.E.

UMD Mechanical/Industrial Engineering

Swenson College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2012
- Required credits to graduate with this degree: 127
- Required credits within the major: 112
- Degree: Bachelor of Science in Mechanical Engineering

The mission of the bachelor of science in mechanical engineering program is to deliver a laboratory-intensive, undergraduate mechanical engineering education that provides students with the tools and skills to excel in the engineering profession, as they pursue lifelong learning and make positive contributions to society. The student learning experience offers unique opportunities for study abroad, undergraduate research, and electives outside of mechanical engineering to develop an enhanced global perspective.

Mechanical engineering program educational objectives:
B.S.M.E. graduates will

1. Solve mechanical engineering problems by applying contemporary engineering tools to propose and implement effective solutions.

2. Design, develop, implement and improve thermal and mechanical systems.

3. Contribute as informed, ethical, and responsible members of the engineering profession and society as a whole.

4. Continue lifelong professional development throughout their career.

5. Collaborate and communicate effectively with others as a member or leader of an engineering or multidisciplinary team in an international setting.

The B.S.M.E. program integrates topics from chemistry, physics, advanced mathematics and statistics, and core engineering science to prepare graduates to work professionally in both thermal and mechanical systems, from design, development, manufacture, and use of products involving mechanical and thermal elements.

The program emphasizes the production engineering approach to mechanical and thermal systems design and development. Upper division courses provide students with a strong understanding of mechanical and thermal systems, and the skills to design, develop, and implement these systems. The mechanical engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: 410-347-7700.

Mechanical engineering graduates are qualified for employment in a wide variety of industries including design, manufacturing, materials, aerospace, transportation, natural resources, and energy. Graduates may pursue assignments in design, development, manufacturing, operations, project engineering, or sales, and frequently move into engineering management. They are also well qualified to continue with graduate education.

Students in the B.S.M.E. program have the opportunity to put their design and entrepreneurial skills to use in ASME design competitions, projects sponsored by regional companies, and research projects in the Undergraduate Research Opportunities Program.

Honors Requirements: To graduate with department honors, a student must have a 3.40 GPA, be an active member of Tau Beta Pi or a professional engineering society (ASME, ASSE, IIE, or MSPE), and be nominated by a department faculty member.

Program Delivery

This program is available:

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

Admission Requirements

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

Freshman, sophomores, and transfer students may declare a ME major and be admitted to lower division status. Admission to the upper division B.S.M.E. program is competitive and based on performance in lower division courses and space availability. To be considered students must complete the MIE Application to upper division. The following requirements must be met:

* Completion of the following courses or their transfer equivalents:

-WRIT 1120
-CS 1121 or 1511 or 2121
-IE 1225
-CE 2017
-ME 2105
-MATH 3280

* A cumulative UMD GPA of 2.50 or above.

* Successful completion with grades of C- or better of all required program courses taken at UMD or within the University of Minnesota system.

* Successful completion with grades of C or better of all required program courses transferred from outside the University of Minnesota system.

Applicants not meeting these requirements may be admitted to the upper division B.S.M.E. program on a space-available basis.

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

General Requirements

The Board of Regents, on recommendation of the faculty, grants degrees from the University of Minnesota. Requirements for an undergraduate degree from University of Minnesota Duluth include the following:

1. Students must meet all course and credit requirements of the departments and colleges or schools in which they are enrolled including an advanced writing course. Students seeking two degrees must fulfill the requirements of both degrees. However, two degrees cannot be awarded for the same major.
2. Students must complete all requirements of the Liberal Education Program.
3. Students must complete a minimum of 120 semester credits.
4. At least 30 of the last 60 degree credits earned immediately before graduation must be awarded by UMD.
5. Students must complete at least half of their courses at the 3xxx-level and higher at UMD. Study-abroad credits earned through courses taught by UM faculty and at institutions with which UMD has international exchange programs may be used to fulfill this requirement.
6. If a minor is required, students must take at least three upper division credits in their minor field from UMD.
7. The minimum cumulative UM GPA required for graduation will be 2.00 and will include only University of Minnesota coursework. A minimum UM GPA of 2.00 is required in each UMD undergraduate major and minor. No academic unit may impose higher grade point standards to graduate.
8. Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

Requirements for the B.S.M.E. include:

* Successful completion, with grades of C- or better or S, in all required program courses taken at UMD or within the University of Minnesota system.

* Successful completion with grades of C or better of all required program course transferred from outside the University of Minnesota system.

* Acceptance to the upper division BSME program.

Maintenance Standards: Continuation of upper division status required students to be in good academic standing. BSME upper division students placed on academic probation or who have been academically dismissed by the Swenson College of Science and Engineering will also be removed from upper division BSME status.

B.S.M.E Core Courses (51 cr)

Courses include fundamental material in engineering management, engineering science, industrial engineering, and mechanical engineering. Concepts are delivered in lecture and reinforced in lab experiences.
EMGT 4110 - Engineering Professionalism and Practice (2.0 cr)
IE 1225 *{Inactive}*(4.0 cr)
IE 3122 - Materials Engineering Laboratory (2.0 cr)
IE 3125 - Engineering Economic Analysis [SOC SCI] (3.0 cr)

IE 3130 - Materials Processing Engineering (3.0 cr)
IE 4993 - Industrial Engineering Seminar (1.0 cr)
ME 2105 - Introduction to Material Science for Engineers (3.0 cr)
ME 2226 - Dynamics (3.0 cr)
ME 3140 - System Dynamics and Control (3.0 cr)
ME 2211 - Thermodynamics [SUSTAIN] (3.0 cr)
ME 3222 - Controls and Kinematics Laboratory (2.0 cr)
ME 3230 - Kinematics and Mechatronics (3.0 cr)
ME 4112 - Heat and Mass Transfer (3.0 cr)
ME 4122 - Heat Transfer, Thermodynamics and Fluid Mechanics Laboratory (2.0 cr)
ME 4145 - CAD/CAM (4.0 cr)
ME 4175 - Machine Design (3.0 cr)
ME 4255 - Multidisciplinary Senior Design (4.0 cr)
ME 3111 - Fluid Mechanics (3.0 cr)
or CHE 3111 - Fluid Mechanics (3.0 cr)

Courses From Other Programs (49 cr)
These courses help engineers develop a foundation of mathematics, sciences, economics, statistics, and communication skills.
CE 2017 - Engineering Mechanics: Statics and Mechanics of Materials (5.0 cr)
EE 2006 - Electrical Circuit Analysis (4.0 cr)
MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)
MATH 1297 - Calculus II [LOGIC & QR] (5.0 cr)
MATH 3280 - Differential Equations with Linear Algebra (4.0 cr)
MATH 3298 - Calculus III (4.0 cr)
PHYS 2011 *{Inactive}*[LE CAT4, NAT SCI] (4.0 cr)
PHYS 2012 *{Inactive}*(4.0 cr)
STAT 3411 - Engineering Statistics (3.0 cr)
CHEM 1153 - General Chemistry I [LE CAT, NAT SCI] (4.0 cr)
CHEM 1154 - General Chemistry Lab I [LE CAT, NAT SCI] (1.0 cr)
ECON 1022 - Principles of Economics: Macro [LE CAT, SOC SCI] (3.0 cr)
or ECON 1023 - Principles of Economics: Micro [LE CAT, SOC SCI] (3.0 cr)
Advanced Writing Requirement
WRIT 3130 is preferred
Take 1 or more course(s) from the following:
•WRIT 3130 - Advanced Writing: Engineering (3.0 cr)
•WRIT 3150 - Advanced Writing: Science (3.0 cr)
•WRIT 3180 - Honors: Advanced Writing (3.0 cr)

Computer Science Elective (3 cr)
Take 3 or more credit(s) from the following:
•CS 1121 - Introduction to Programming in Visual BASIC.NET [LE CAT, LOGIC & QR] (3.0 cr)
•CS 1511 - Computer Science I [LE CAT] (5.0 cr)
•CS 2121 *{Inactive}*[LE CAT, LOGIC & QR] (3.0 cr)

Mechanical Engineering Advanced Electives (3 cr)
These courses help a mechanical engineer develop skills in a particular technical area.
Take 3 or more credit(s) from the following:
•ME 4135 - Robotics and Controls (3.0 cr)
•ME 4245 *{Inactive}*(4.0 cr)
•ME 4495 - Special Topics: (Various Titles to be Assigned) (1.0 - 4.0 cr)
•ME 5305 - Computational Fluid Dynamics (3.0 cr)
•ME 5315 - Nondestructive Evaluation of Engineering Materials (3.0 cr)
•ME 5325 - Sustainable Energy System (3.0 cr)
•ME 5335 - Introduction to Finite Element Analysis (3.0 cr)
•ME 5345 - Smart Materials and Structures (3.0 cr)
•ME 5355 - Gas Turbines (3.0 cr)

Mechanical Engineering Technical Electives (6 cr)
Take 2 or more course(s) totaling 6 or more credit(s) from the following:
•CHE 4301 - Chemical Reaction Engineering (3.0 cr)
•CHE 4621 *{Inactive}*(3.0 cr)
•CHE 5022 *{Inactive}*(3.0 cr)
•EE 2111 - Linear Systems and Signal Analysis (4.0 cr)
•EE 2212 - Electronics I (4.0 cr)
•EE 3151 - Control Systems (4.0 cr)
•EE 3235 - Electronics II (4.0 cr)

- EE 3445 - Electromagnetic Fields (3.0 cr)
- EE 4611 - Introduction to Solid-State Semiconductors (3.0 cr)
- EE 4501 - Power Systems (4.0 cr)
- EE 5995 - Special Topics: (Various Titles to be Assigned) (1.0 - 3.0 cr)
- IE 3115 - Operations Research (4.0 cr)
- IE 4010 - Six Sigma Quality Control (3.0 cr)
- IE 4020 - Lean Production Management (3.0 cr)
- IE 4495 - Special Topics: (Various Titles to be Assigned) (1.0 - 4.0 cr)
- IE 4993 - Industrial Engineering Seminar (1.0 cr)
- IE 5315 *{Inactive}*(3.0 cr)
- IE 5325 - Advanced Engineering Economics (3.0 cr)
- ME 4135 - Robotics and Controls (3.0 cr)
- ME 4196 - Cooperative Education I (1.0 cr)
- ME 4245 *{Inactive}*(4.0 cr)
- ME 4491 - Independent Study in Mechanical Engineering (1.0 - 4.0 cr)
- ME 4495 - Special Topics: (Various Titles to be Assigned) (1.0 - 4.0 cr)
- ME 5305 - Computational Fluid Dynamics (3.0 cr)
- ME 5315 - Nondestructive Evaluation of Engineering Materials (3.0 cr)
- ME 5325 - Sustainable Energy System (3.0 cr)
- ME 5335 - Introduction to Finite Element Analysis (3.0 cr)
- ME 5345 - Smart Materials and Structures (3.0 cr)
- ME 5355 - Gas Turbines (3.0 cr)
- ME 5991 - Independent Study in Mechanical Engineering (1.0 - 4.0 cr)
- MGTS 4472 - Entrepreneurship (3.0 cr)
- PHYS 2021 - Relativity and Quantum Physics (4.0 cr)
- PHYS 4021 - Quantum Physics II (4.0 cr)
- PHYS 4031 - Thermal and Statistical Physics (4.0 cr)

Information current as of March 29, 2024