

Mechanical Engineering

College of Engineering and Mines
 Department of Mechanical Engineering
 907-474-7136
www.uaf.edu/mechengr/

B.S. Degree

Minimum Requirements for Degree: 131 credits

The mission of the mechanical engineering department at UAF is to offer the highest quality contemporary education at undergraduate and graduate levels, and to perform research appropriate to the technical needs of the state of Alaska, the nation and the world.

Mechanical engineers conceive, plan, design and direct the manufacturing, distribution and operation of a wide variety of devices, machines and systems for energy conversion, environmental control, materials processing, transportation, materials handling and other purposes. Mechanical engineers are engaged in creative design, applied research, development and management. A degree in mechanical engineering also frequently forms the base for entering law, medical or business school, as well as for graduate work in engineering.

The objectives of the mechanical engineering program are to produce graduates who are able to compete successfully on the world stage at the professional level; deal with the significant local, regional, national and global issues facing humankind; continue to develop as engineers through lifelong learning; and serve as resources of technical knowledge for the state as well as the nation, especially with respect to northern issues. The Engineering Accreditation Commission of ABET has accredited the B.S. degree program in mechanical engineering since 1980.

Because engineering is based on mathematics, chemistry and physics, students are introduced to the basic principles in these areas during their first two years of study. The third year encompasses courses in the engineering science — extensions to the basic sciences forming the foundation to engineering synthesis and design. The design project course draws on much of the student's previous learning through a simulated industrial design project. Throughout the four-year program, courses in communication, humanities and social sciences are required because mechanical engineers must be able to communicate effectively in written, oral and graphical form.

Students may choose an emphasis in aerospace or petroleum engineering. Because of UAF's unique location, special emphasis is placed on cold regions engineering problems. This fact is highlighted in the technical elective, arctic engineering. Candidates for the B.S. degree in mechanical engineering are required to take the state of Alaska Fundamentals of Engineering examination in their general field.

Major — B.S. Degree

1. Complete the general university requirements. (See page 124. As part of the core curriculum requirements, complete MATH F200X, CHEM F105X and CHEM F106X.)
2. Complete the B.S. degree requirements. (See page 129. As part of the B.S. degree requirements, complete MATH F201X, PHYS F211X and PHYS F212X.)

3. Complete the following program (major) requirements:*

ES F101—Introduction to Engineering	3
ES F201—Computer Techniques	3
ES F209—Statics.....	3
ES F210—Dynamics.....	3
ES F301—Engineering Analysis.....	3
ES F307—Elements of Electrical Engineering	3
ES F331—Mechanics of Materials.....	3
ES F341—Fluid Mechanics	4
ES F346—Basic Thermodynamics.....	3
ESM F450W—Economic Analysis and Operations.....	3
MATH F202X—Calculus	4
MATH F302—Differential Equations	3
ME F302—Dynamics of Machinery	4
ME F308—Measurement and Instrumentation.....	3
ME F313—Mechanical Engineering Thermodynamics.....	3
ME F321—Industrial Processes.....	3
ME F334—Elements of Material Science/Engineering.....	3
ME F403—Machine Design.....	3
ME F408—Mechanical Vibrations.....	3
ME F415W—Thermal Systems Laboratory.....	3
ME F441—Heat and Mass Transfer	3
ME F487W,O—Design Project	3
ME electives**	6
Technical electives***	3
Electives.....	2
4. Minimum credits required.....131
 - * Student must earn a C grade or better in each of the program (major) requirements, with exception of ES F101.
 - ** Mechanical engineering course at F400-level or above.
 - *** Engineering course at F400-level or above.

Note: Students electing to complete an emphasis in aerospace engineering must complete the sequence of aerospace courses (ME F450, F451, F452 and F453) as part of their program requirements and complete a senior design project that is related to aerospace engineering.

Note: Students electing to complete an emphasis in petroleum engineering must complete the sequence of petroleum-related course (ME F409 and F416 or equivalent, plus two F400-level PETE courses) as part of their program requirements and complete a senior design project that is related to petroleum engineering.

Note: Students must plan their elective courses in consultation with their mechanical engineering faculty advisor, and obtain the advisor's approval for all elective courses.



Baccalaureate Core Requirements

All degrees (e.g. B.A., B.S., etc.) require additional courses.
Refer to specific degree and program requirements.

COMMUNICATION (9)

Complete the following:

ENGL F111X (3) _____
ENGL F190H may be substituted.

Complete one of the following:

ENGL F211X OR ENGL F213X (3) _____

Complete one of the following:

COMM F131X OR COMM F141X (3) _____

PERSPECTIVES ON THE HUMAN CONDITION (18)

Complete all of the following four courses:

ANTH F100X/SOC F100X (3) _____
ECON F100X OR PS F100X (3) _____
HIST F100X (3) _____
ENGL/FL F200X (3) _____

Complete one of the following three courses:

ART/MUS/THR F200X, HUM F201X OR ANS F202X (3) _____

Complete one of the following six courses:

BA F323X, COMM F300X, JUST F300X, NRM F303X,
PS F300X OR PHIL F322X (3) _____

OR complete 12 credits from the above courses PLUS

- two semester-length courses in a single Alaska Native language or other non-English language OR
- three semester-length courses (9 credits) in American Sign Language taken at the university level.

MATHEMATICS (3)

Complete one of the following:

MATH F103X, MATH F107X, MATH F161X OR
STAT F200X (3 – 4) _____
** No credit may be earned for more than one of MATH F107X or F161X.*

OR complete one of the following*:

MATH F200X, MATH F201X, MATH F202X,
MATH F262X OR MATH F272X (4) _____
**Or any math course having one of these as a prerequisite.*

NATURAL SCIENCES (8)

Complete any two (4-credit) courses:

ATM F101X (4) _____
BIOL F100X (4) _____
BIOL F103X (4) _____
BIOL F104X (4) _____
BIOL F111X (4) _____
BIOL F112X (4) _____
BIOL F115X (4) _____
BIOL F116X (4) _____
CHEM F100X (4) _____
CHEM F103X (4) _____
CHEM F104X (4) _____
CHEM F105X (4) _____
CHEM F106X (4) _____
GEOG F205X (4) _____
GEOS F100X (4) _____
GEOS F101X (4) _____
GEOS F112X (4) _____
GEOS F120X (4) _____
GEOS F125X (4) _____
MSL F111X (4) _____
PHYS F102X (4) _____
PHYS F103X (4) _____
PHYS F104X (4) _____
PHYS F115X (4) _____
PHYS F116X (4) _____
PHYS F175X (4) _____
PHYS F211X (4) _____
PHYS F212X (4) _____
PHYS F213X (4) _____

LIBRARY AND INFORMATION RESEARCH (0 – 1)

Successful completion of library skills competency test OR
LS F100X or F101X prior to junior standing (0 – 1) _____

UPPER-DIVISION WRITING AND ORAL COMMUNICATION (0)

Complete the following:

Two writing intensive courses designated (W) (0) _____
One oral communication intensive course designated (O) (0) _____
OR two oral communication intensive courses designated (O/2), at the upper-division level (see degree and/or major requirements) (0) _____

TOTAL CREDITS REQUIRED 38 – 39