

Mechanical Engineering



College of Science, Engineering and Mathematics
Department of Mechanical Engineering
(907) 474-7136

www.uaf.edu/mecheng/

Degrees: B.S., M.S.

Requirements for Degrees: B.S.: 130 credits; M.S.: 30 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 goals and objectives of the mechanical engineering program are to: offer a mechanical engineering program designed to prepare its graduates for careers at the professional level; to maintain, as a base, ABET accreditation of the undergraduate program; provide continuing educational opportunities for graduate engineers; serve as a resource of technical knowledge for the state as well as the nation; conduct research in all areas of mechanical engineering including cold regions mechanical engineering; and offer a graduate program in mechanical engineering at the M.S. and Ph.D. levels. The Engineering Accreditation Commission of ABET has accredited the B.S. degree program in mechanical engineering since 1980.

The educational objectives of the department are that graduates from the mechanical engineering program must: be able to apply the knowledge of mathematics, science and engineering; be able to design and conduct experiments, as well as to analyze and interpret data; be able to design a system, component, or process to meet desired needs, be able to function on multi-interdisciplinary teams; be able to identify, formulate, and solve engineering problems; understand professional and ethical responsibility; be able to communicate effectively; have the broad education necessary to understand the impact of engineering solutions in a global and societal context; recognize the need for, and be able to engage in, life-long learning; understand contemporary issues; be able to use the techniques, skills, and modern engineering tools necessary for engineering practice. The department insures that each course in the curriculum plays a meaningful role in satisfying one or more of these objectives.

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 petroleum or aerospace 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.

UNDERGRADUATE PROGRAM

MAJOR

Mechanical Engineering—B.S. Degree

1. Complete the general university requirements (page 28). (As part of the core curriculum requirements, complete: MATH 200X; CHEM 105X and CHEM 106X.)
2. Complete the B.S. degree requirements (page 34). (As part of the B.S. degree requirements, complete: MATH 201X, PHYS 211X and PHYS 212X.)
3. Complete the following: program (major) requirements:

ME 302—Mechanical Design I	4
ME 313—Mechanical Engineering Thermodynamics	3
ME 321—Industrial Processes	3
ME 334—Elements of Material Science/Engineering	3
ME 403—Mechanical Design II	3
ME 408—Dynamics of Systems	3
ME 415W—Thermal Systems Laboratory	3
ME 441—Heat and Mass Transfer	3
ME 487W,O—Design Project	3
ME electives**	6
Technical electives***	3
4. Complete the following program (major) requirements:

ES 101—Introduction to Engineering	2
ES 201—Computer Techniques	3
ES 209—Statics	3
ES 210—Dynamics	3
ES 301—Engineering Analysis	3
ES 307—Elements of Electrical Engineering	3
ES/ME 308—Instrumentation and Measurement*	3
ES 331—Mechanics of Materials*	3
ES 341—Fluid Mechanics*	4
ES 346—Basic Thermodynamics*	3
ESM 450W—Economic Analysis and Operations	3
MATH 202X—Calculus	4
MATH 302—Differential Equations	3
Electives	2



University of Alaska Fairbanks

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The University of Alaska Fairbanks is accredited by the Commission on Colleges and Universities of the Northwest Association of Schools and Colleges. UAF is an affirmative action/equal opportunity employer and educational institution. 4/03

5. Minimum credits required 130

* Student must earn a C grade or better in each mechanical engineering, technical electrical, ES/ME 308, ES 331, ES 341 and ES 346 course.

** Mechanical engineering course at 400-level or above.

*** Engineering course at 400-level or above.

Note: Students electing to complete an emphasis in petroleum or aerospace engineering must complete 12 credits (six of these credits can be used to fulfill the elective credit requirement in the mechanical engineering curriculum).

Note: Students must plan their elective courses in consultation with their mechanical engineering faculty advisor, and all elective courses must be approved by their mechanical engineering faculty advisor.

GRADUATE PROGRAM

Mechanical Engineering—M.S. Degree

1. Complete the following admission requirement:
 - a. Submit GRE scores.
 2. Complete the general university requirements (page 43).
 3. Complete the M.S. degree requirements (page 46).
 4. Complete the following:

ME 631—Advanced Mechanics of Materials	3
ME 634—Advanced Materials Engineering	3
ME 641—Advanced Fluid Mechanics	3
ME 642—Advanced Heat Transfer	3
ME 608—Advanced Dynamics	3
 5. Complete the thesis or non-thesis requirements:

Thesis

- a. Complete the following:

ME 699—Thesis	6
Electives*	9
- b. Minimum credits required 30

Non-Thesis

- a. Complete the following:

Electives*	12
ME 698—Project	3
- b. Minimum credits required 30

*ME or other engineering, science, or mathematics courses approved by the student's advisory committee.

See Engineering for Ph.D. degree program.

