

MECHANICAL ENGINEERING

B.S., B.S./M.S., M.S., Ph.D. Degrees, Graduate Certificate, Minor

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.

College of Engineering and Mines

Department of Mechanical Engineering (<https://www.uaf.edu/cem/programs/mechanical-engineering/>)
907-474-7136

B.S., B.S./M.S., MECHANICAL 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 engineering science – extensions to the basic sciences forming the foundation for 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 a concentration in mechanical, aerospace or petroleum engineering. Because of UAF's unique location, special emphasis is placed on cold regions' engineering problems. The program offers a range of Arctic-related elective courses. 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 students who plan to pursue graduate studies in engineering may also choose an accelerated degree for a master's in mechanical engineering. This program speeds the process and allows qualified mechanical engineering students to complete both a Bachelor of Science and a Master of Science degree in five years.

Minimum Requirements for Mechanical Engineering Degree: B.S.: 127 credits; B.S./M.S.: 148 credits

Learn more about the bachelor's degree in mechanical engineering (<https://uaf.edu/academics/programs/bachelors/mechanical-engineering.php>), including an overview of the program, career opportunities and more.

Learn more about the combined bachelor's/master's degree in mechanical engineering (<https://www.uaf.edu/academics/programs/bachelors/mechanical-engineering-bs-ms.php>), including an overview of the program, career opportunities and more.

M.S., MECHANICAL ENGINEERING

The mechanical engineering program prepares its graduates for careers at the professional level; maintains, as a base, ABET accreditation of the undergraduate program; provides continuing educational opportunities for graduate engineers; is a resource of technical knowledge for the state and nation; conducts research in all areas of mechanical engineering including cold regions mechanical engineering; and offers a graduate program in mechanical engineering at the M.S. level.

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 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; and be able to use the techniques, skills and modern engineering tools necessary for engineering practice. The department ensures that each course in the curriculum plays a meaningful role in satisfying one or more of these objectives.

Minimum Requirements for Mechanical Engineering Master's Degree: 30 credits

Learn more about the master's degree in mechanical engineering (<https://www.uaf.edu/academics/programs/masters/mechanical-engineering.php>), including an overview of the program, career opportunities and more.

PH.D., ENGINEERING

Engineers use knowledge of the mathematical and natural sciences to develop economical uses of materials and forces of nature for human benefit. The professional practice of engineering requires sophisticated skills, the use of judgment and the exercise of discretion. The basic education necessary for the professional practice of engineering is provided by the engineering bachelor's and master's degrees. Doctoral-level education requires independent research that generates fundamental advances in technology and discovers new knowledge for the benefit of society. Engineering Ph.D. degrees provide leadership in scientific research, academia and industrial research and development. The Ph.D. degree in engineering draws on the combined strength of the College of Engineering and Mines and offers opportunities for engineers at other UA campuses to participate.

Minimum Requirements for Engineering Doctorate Degree: 36 credits

GRADUATE CERTIFICATE, AEROSPACE ENGINEERING

This program provides graduate students the opportunity to focus a portion of their studies on the discipline of aerospace engineering and to highlight this specialization on their academic transcripts. The topics within aerospace engineering may vary according to student desires and course topic availability but may include unmanned aircraft systems (UAS), as well as aeronautical systems, rocketry and space systems.

Minimum Requirements for Aerospace Engineering Graduate Certificate: 12 credits

MINOR, AEROSPACE ENGINEERING

UAF offers an aerospace engineering minor for students interested in a career in the aerospace industry or in expanding their knowledge of applied interdisciplinary engineering. The minor includes capstone courses in aeronautics and astronautics, with tracks emphasizing either aerodynamics or space systems. Several electives allow the program to be tailored to students' desires and schedules.

Aerospace Club

UAF hosts a local student chapter of the American Institute of Aeronautics and Astronautics. The club participates in AIAA's annual Design Build Fly competition, with the flight demonstration occurring in April and rotating between Wichita, Kansas, and Tucson, Arizona. UAF's team has done very well in this international competition, being within the top 100 schools to be invited for each of the past four years and placing 23rd in the 2019 competition. For more information visit UAF's Aerospace Club's website (<http://uafaiaa.weebly.com/>).

Minimum Requirements for Aerospace Engineering Minor: 15 credits

Programs

Degrees

- B.S., Aerospace Engineering (<https://catalog.uaf.edu/bachelors/aerospace-engineering-bs/>)
- B.S., Mechanical Engineering (<https://catalog.uaf.edu/bachelors/mechanical-engineering-bs/>)
- Accelerated B.S./M.S., Mechanical Engineering (<https://catalog.uaf.edu/accelerated-programs/mechanical-engineering-bs-ms/>)
- M.S., Mechanical Engineering (<https://catalog.uaf.edu/masters/mechanical-engineering/>)
- Ph.D. Engineering (<https://catalog.uaf.edu/phd/engineering/>)

Graduate Certificates

- Graduate Certificate, Aerospace Engineering (<https://nextcatalog.uaf.edu/graduate-certificates/aerospace-engineering/>)

Minor

- Minor, Aerospace Engineering (<https://catalog.uaf.edu/minors/aerospace-engineering/>)