

Master of Science in Mechanical Engineering

Admission Requirements

Satisfy the Admission Requirements for Graduate Degrees (<http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/graduate/>).

All students must hold a baccalaureate degree in an engineering or closely related discipline and submit to the UAA Office of Admissions:

1. Graduate Record Examination (GRE) results, taken within five years prior to the application date.
2. Three letters of recommendation from professors or other professionals particularly qualified to attest to the applicant's qualifications for graduate study.
3. A resume or curriculum vitae.
4. A one-page personal statement discussing the applicant's credentials and readiness for graduate studies. This is an opportunity for the applicant to share relevant information, qualifications and experience that would not be included with the UAA graduate application form or reflected on official transcripts. It is also the applicant's opportunity to describe their desire and commitment to pursue graduate study in mechanical engineering.

Current UAA baccalaureate students enrolled in engineering or a closely related discipline at the conclusion of their junior year may apply and be admitted to the MSME program. Students must complete their baccalaureate degree requirements before receiving the MSME.

Accelerated MS in Mechanical Engineering Option

BSME students interested in pursuing an MSME degree are encouraged to discuss the Accelerated MS in Mechanical Engineering Option with their academic advisor(s) and plan on applying for admission to the MS in Mechanical Engineering during their junior year. In addition to the Admission Requirements listed above (excluding the GRE requirement), the Accelerated MS in Mechanical Engineering Option applicant must:

1. Be a current student enrolled in the UAA BSME Program.
2. Have completed 60% of the credits toward the BSME Program Requirements.
3. Have a grade point average (GPA) of 3.25 or higher for all coursework completed at UAA.
4. Have completed at least 24 course credits at UAA.

Graduation Requirements, Thesis Option

- Satisfy the General University Requirements for Graduate Degrees. (<http://catalog.uaa.alaska.edu/graduateprograms/degreerequirements/>)
- Complete the program requirements below.

- Complete the thesis work approved in advance by the student's graduate committee.

| Code | Title | Credits |
|--|--------------------------------------|-----------|
| Complete 12 credits from the following: | | 12 |
| EE/ME A471 | Automatic Control | |
| ME A608 | Mechanical Vibrations | |
| ME A610 | Biomechanics | |
| ME A615 | Composite Materials | |
| ME A621 | Engineering Finite Element Analysis | |
| ME A630 | Advanced Mechanics of Materials | |
| ME A642 | Advanced Fluid Mechanics | |
| ME A651 | Aerodynamics | |
| ME A655 | HVAC Systems Optimization | |
| ME A656 | Renewable Energy Systems Engineering | |
| ME A659 | Fracture Mechanics | |
| ME A660 | Turbomachinery | |
| ME A664 | Corrosion Processes and Engineering | |
| ME A672 | Advanced Linear Systems | |
| Complete 12 credits of elective courses* (6 credits of 400- or 600-level mathematics or statistics courses are strongly encouraged). | | 12 |
| *Students admitted to the Accelerated MSME Option may apply up to nine (9) credits from the BSME. | | |
| Complete 6 credits of thesis coursework: | | 6 |
| ME A699 | Thesis | |
| Total | | 30 |

Candidacy Requirements

To advance to candidacy, the student must complete:

- All UAA requirements for Advancement to Candidacy (<http://catalog.uaa.alaska.edu/graduateprograms/degreerequirements/>).
- At least 9 credits of coursework from the approved GSP.
- A written thesis proposal, submitted to the student's graduate committee at least one semester prior to the thesis defense, presenting evidence that the thesis requirements will be satisfied. The proposal will consist of an explicit problem statement, a literature review, and one or more sections describing the research and analytical methods that will be applied. The proposal is subject to approval by the student's graduate committee following an oral presentation scheduled no sooner than two weeks after submission of the written proposal.

Thesis Requirements

The completed thesis must:

- Describe how the work is associated with the current state of the art in the candidate's graduate field of study.

- Contribute to the body of knowledge in the candidate's field of graduate study.
- Be publishable in either peer-reviewed technical conference proceedings or a peer-reviewed journal as judged by the candidate's graduate committee.
- Demonstrate command of knowledge and skills associated with the candidate's program of graduate study.
- Be defended by the student in an oral presentation to the candidate's graduate committee.

A total of 30 credits is required for the degree.

Graduation Requirements, Non-thesis Option

- Satisfy the General University Requirements for Graduate Degrees (<http://catalog.uaa.alaska.edu/graduateprograms/degreerequirements/>).
- Complete the program requirements, and complete one of the following:
 - A comprehensive written examination set by the student's graduate committee.
 - A project fulfilling the project requirements below and a comprehensive oral exam set by the student's graduate committee.

| Code | Title | Credits |
|--|--------------------------------------|---------|
| Complete 15 credits from the following: | | 15 |
| EE/ME A471 | Automatic Control | |
| ME A608 | Mechanical Vibrations | |
| ME A610 | Biomechanics | |
| ME A615 | Composite Materials | |
| ME A621 | Engineering Finite Element Analysis | |
| ME A630 | Advanced Mechanics of Materials | |
| ME A642 | Advanced Fluid Mechanics | |
| ME A651 | Aerodynamics | |
| ME A655 | HVAC Systems Optimization | |
| ME A656 | Renewable Energy Systems Engineering | |
| ME A659 | Fracture Mechanics | |
| ME A660 | Turbomachinery | |
| ME A664 | Corrosion Processes and Engineering | |
| ME A672 | Advanced Linear Systems | |
| Complete the following course: | | |
| PM A601 | Project Management Fundamentals | 3 |
| Choose one of the following: | | 15 |
| Complete 15 credits of elective coursework* | | |
| Complete 12 credits of elective coursework* and 3 credits of ME A686 | | |

*Students admitted to the Accelerated MSME Option may apply up to nine (9) credits from the BSME.

Total **33**

Project Requirements

The project must solve a practical engineering problem to the extent that original developments by the student are evident in the project report.

- The project problem and solution must be explained in the context of the current state of the art by means of a thorough review of pertinent literature.
- The project must include advanced technical components directly involving modern practice of mechanical engineering.
- The project must have sufficient scope to clearly demonstrate the student's advanced technical expertise in mechanical engineering.
- The project report must demonstrate command of knowledge and skills directly associated with the student's graduate program of study.
- The written project report, in the judgment of the student's graduate committee, must be publishable in the proceedings of a mechanical engineering specialty conference.
- The project proposal, submitted prior to enrolling in ME A686, must present evidence that the above requirements will be satisfied and will generally consist of an explicit problem statement, a literature review, and one or more sections describing the information and analytical methods to be applied.
- The project is to be orally presented to the student's graduate committee.

A total of 33 credits is required for the degree.

Licensure and/or Certification

Graduates of the Master of Science in Mechanical Engineering gain one year of education credit toward obtaining a Professional Engineer license in Alaska.

Please go to UAA's Authorization by State (<https://www.uaa.alaska.edu/academics/office-of-academic-affairs/uaa-state-authorization/authorization.cshhtml/>) website for information about licensure or certification in a state other than Alaska.

Program Student Learning Outcomes

In keeping with the program objectives, the expected student learning outcomes of the UAA MSME program include an ability to:

- Use in-depth methods of analysis.
- Demonstrate graduate-level mechanical engineering theory.
- Conduct advanced mechanical engineering research and applications.
- Apply graduate-level engineering theory to the design of mechanical engineering systems.
- Work effectively within the professional framework of organizations responsible for the practice of engineering.