AEROSPACE ENGINEERING AND MECHANICS, MS

The Department of Aerospace Engineering and Mechanics offers a Master of Science in aerospace engineering and mechanics degree via an on-campus program and an off-campus (distance learning) program through the College of Continuing Studies. An MSAEM can be earned by coursework only or by a combination of coursework and an approved thesis. Most distance learning students elect to complete the coursework only degree option. On-campus students supported by assistantships are expected to complete an approved thesis.

Admissions

In addition to the minimum Graduate School admission requirements, to be considered for regular admission an application must include:

- Three letters of recommendation (only two letters for Accelerated Masters Program applicants)
- GRE (optional)

Aerospace Engineering and Mechanics standards are higher than the graduate school minimums, and all application materials are carefully considered. Meeting minimum graduate school requirements does not guarantee admission into the Aerospace Engineering and Mechanics MSAEM program.

Students applying to the Aerospace Engineering and Mechanics MSAEM program without a bachelor's degree in aerospace, mechanical, or civil engineering are required to complete the following coursework from an accredited university (if not already completed) prior to applying:

- Calculus (12 credit hours)
- Ordinary Differential Equations
- 12 credit hours of calculus-based engineering mechanics - Statics, Dynamics, Mechanics of Materials and Fluid Mechanics.

Students have the opportunity to enroll in the mechanics courses through the UA College of Continuing Studies as a non-degree seeking (NDS) applicant.

Aerospace and Mechanics MSAEM distance program is open to US students as well as international students residing in the US with appropriate visas.

See the Admission Criteria section of this catalog for more information.

Curricular Requirements

The MSAEM degree can be earned by 30 hours of coursework (non-thesis option) or by a combination of 24 hours of coursework, 6 hours of thesis research, and a committee approved thesis that includes an oral defense and written document (thesis option). A 3.0 GPA for coursework is required. Most distance learning students elect to complete the coursework only degree option. On-campus students supported by assistantships are expected to complete an approved thesis.

For both degree options, students must complete two core courses, one from each core designation.

**AEM Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEM 569</td>
<td>Orbital Mechanics</td>
</tr>
<tr>
<td>AEM 582</td>
<td>Space Systems</td>
</tr>
<tr>
<td>AEM 614</td>
<td>Airfoil And Wing Theory</td>
</tr>
<tr>
<td>AEM 668</td>
<td>Adv. Flight Dynamics &amp; Control</td>
</tr>
</tbody>
</table>

**Mechanics Core**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEM 500</td>
<td>Intermediate Fluid Mechanics</td>
</tr>
<tr>
<td>AEM 530</td>
<td>Continuum Mechanics</td>
</tr>
<tr>
<td>AEM 562</td>
<td>Intermediate Dynamics</td>
</tr>
<tr>
<td>AEM 637</td>
<td>Theory Of Elasticity</td>
</tr>
</tbody>
</table>

Students must also complete six hours of mathematics coursework. Consult with your Research Advisor or the Graduate Program Coordinator regarding approved math courses. Four commonly taken and approved courses are listed in the table.

**Common Mathematics Course Options**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GES 551</td>
<td>Matrix And Vector Analysis</td>
</tr>
<tr>
<td>GES 554</td>
<td>Partial Diff Equations</td>
</tr>
<tr>
<td>ME 501</td>
<td>Mech Engr Analysis I</td>
</tr>
<tr>
<td>ST 560</td>
<td>Statistical Methods</td>
</tr>
</tbody>
</table>

Elective, thesis and culminating experience requirements are outlined in the Thesis and Non-Thesis links. At least 18 hours must be AEM designation.

**Plan I: Thesis Option Curriculum**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Coursework</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics Coursework</td>
<td>6</td>
</tr>
<tr>
<td>Elective Coursework</td>
<td>12</td>
</tr>
<tr>
<td>AEM 599</td>
<td>Thesis Research</td>
</tr>
</tbody>
</table>

**Total Hours**

30

**Plan II: Non-Thesis Option Curriculum**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Coursework</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics Coursework</td>
<td>6</td>
</tr>
<tr>
<td>Elective Coursework</td>
<td>18</td>
</tr>
</tbody>
</table>

**Total Hours**

30

Transfer Credit

Transfer credit requests are evaluated by the Graduate School and the AEM department and follow Graduate School policy.

Accelerated Master's Program

The Accelerated Masters Program (AMP) is designed specifically for outstanding UA students to complete the requirements for both their bachelor's degree and a master's degree in aerospace engineering in an accelerated five year period. A BSAE student in the AEM AMP can earn up to 12 hours of dual-credit toward their bachelor's and master's degrees. Following successful completion of all requirements for their BSAE, students in AMP are awarded their undergraduate degree. Students then continue taking graduate courses until the requirements for the master's degree are met. In addition to the BSAE/MSAEM AMP, there is a BSME/MSAEM AMP that allows 9 hours of dual credit and a BSAE/MSME AMP that allows 6 hours of dual credit.

Students in AMP are classified as undergraduates until they complete all of the requirements for the undergraduate degree. They cannot hold graduate assistantships until they are classified as graduate students; however, in some cases can use remaining UG scholarship funds for graduate coursework (consult with the Undergraduate Scholarship office).
Students interested in these programs should contact the AEM Graduate Program Coordinator, Dr. James P. Hubner (phubner@eng.ua.edu).

**Eligibility**

Students normally apply to the AMP at the end of their junior year prior to the start of their senior year of the BSAE flow chart. To be considered for admission, BSAE or BSME students must:

1. have at least a 3.3 GPA;
2. have completed 90 hours toward their BSAE or BSME degree including at least two AEM or ME 300-level courses in the junior year of the flow chart; and
3. complete an on-line application to the graduate school (two letters of recommendation and a statement of purpose are required by the department).

Students apply for the program online. Applications are evaluated by the Graduate School and the AEM department. Meeting minimum eligibility requirements does not guarantee admission.

**Comprehensive Examination/Capstone**

Students pursuing the MSAEM Plan II degree option have the choice of completing one of the following options to satisfy the requirement of a culminating experience:

1. Complete a capstone project and receive faculty advisor approval for the written report detailing the culminating experience: The research project is an in-depth study of a topic that must be approved by the student’s research advisor, an AEM faculty member in which the student selects based on mutual research interests. The project is not as comprehensive as a thesis. The project must integrate knowledge and concepts from more than one of the program courses. MSAEM Plan II students may, but are not required to, enroll in three hours of AEM 594 Special Projects and submit the written reports detailing the culminating experience as part of the AEM 594 course requirements. The approved written report for the culminating experience must be submitted to their advisor providing sufficient time to evaluate and potentially require edits prior to the end of the semester, usually two to three weeks before final exam week.
2. Pass the PhD qualifying examination: The qualifying exam is offered each fall and spring during the middle of the semester. The exam is three hours, written, and covers topics related to your core AEM courses and your research area. If the student fails the qualifying exam, then they may pursue option 1.

The student must complete at least 18 hours prior to starting the culminating experience.

**Plan I: Thesis Option**

The MSAEM Thesis option degree requires 24 hours of coursework (6 hours of thesis research AEM 599), and an approved thesis. Additional requirements to those outlined under Curricular Requirements include:

- 18 hours of the 30 required must have AEM designation or transferred under AEM designation
- Non AEM electives must be approved by the student’s Research Advisor or the Graduate Program Coordinator
- Thesis committee requirements follow Graduate School policy. The thesis committee should be formed at least the semester prior to the thesis defense.
- Thesis submission deadlines, document formatting, and graduating semester enrollment requirements follow the Graduate School calendar and policy.

**Plan II: Non-Thesis Option**

The MSAEM Non-Thesis option degree requires 30 hours of coursework and the completion of a Capstone Project or Comprehensive Exam. Additional requirements to those outlined under Curricular Requirements include:

- 18 hours of the 30 required must have AEM designation or transferred under AEM designation
- Non AEM electives must be approved by the student’s Research Advisor or the Graduate Program Coordinator

**Time Limits for Degree Completion Requirements**

Graduate School Policy

**Student Progress Requirement**

Students are expected to progress through their degree program in a timely manner and with consultation with their advisor.

**Academic Misconduct Information**

Graduate School Policy

**Withdrawals and Leave of Absence Information**

Graduate School Policy

**Academic Grievances Information**

Graduate School Information

**Scholastic Requirements**

Graduate School Policy

**Graduate School Deadlines Information**

Graduate School Information

**Application for Graduation Information**

Graduate School Policy