AEROSPACE ENGINEERING AND MECHANICS, MS

Admission Requirements
Admission requirements are outlined in the Admission Criteria section of this catalog. Specific admission information relating to the Department of Aerospace Engineering and Mechanics is listed on their departmental web page.

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

Degree Requirements
A list of current degree requirements and additional information can be found on the Department of Aerospace Engineering and Mechanics website. The following departmental requirements are in addition to those specified by the Graduate School (Degree Requirements) and the College of Engineering (MS Degree and PhD Degree requirements) detailed in earlier sections of this catalog.

MS in Aerospace Engineering and Mechanics

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.

• MSAEM – Thesis (Plan I) Option
• MSAEM – Non-Thesis (Plan II) Option

Thesis (Plan I) Option
Credit Hours
A total of 30 semester credit hours is required for a masters of science in aerospace engineering and mechanics degree. For the MSAEM Plan I option, these credit hours consist of:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Core coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics coursework, including GES 554</td>
<td>6</td>
</tr>
<tr>
<td>Elective coursework</td>
<td>12</td>
</tr>
<tr>
<td>AEM 599</td>
<td>Thesis Research</td>
</tr>
<tr>
<td>Total Hours</td>
<td>30</td>
</tr>
</tbody>
</table>

Elective coursework must be approved by the student’s advisor. Of the 12 Elective coursework credit hours, at least 6 must have an AEM designation.

Core Course Requirements
All students must complete a minimum of one (1) class from the Aerospace Core listing of classes and one (1) class from the Mechanics Core listing of classes.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Aerospace Core</th>
<th>Mechanics Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEM 569</td>
<td>Orbital Mechanics</td>
<td>AEM 500</td>
</tr>
<tr>
<td>AEM 582</td>
<td>Space Systems</td>
<td>AEM 530</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AEM 562</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AEM 637</td>
</tr>
</tbody>
</table>

Mathematics Requirement
A total of six credit hours of mathematics is required. GES 554 Partial Diff Equations, which is three credit hours, is required and counts toward the six-credit hour mathematics requirement. The remaining three credit hours of mathematics coursework must be approved by the advisor.

Elective Coursework Requirement
A student must complete at least 12 hours of elective coursework. These courses are typically AEM courses, but other approved courses are acceptable. The specific courses must be approved by the student’s advisor.

Thesis Requirement
The student is required to submit a written thesis and defend in front of a thesis committee for approval by the committee and the graduate school.

Test Pilot School
Students who seek credit for Test Pilot School completed through the United States Air Force may send official transcripts from the TPS to the UA Graduate School for transfer credit. The student must receive a grade of at least a “B” in TPS for the credit to transfer. Additionally, the transfer of credit from TPS is subject to the restrictions placed on the transfer of credit by the Graduate School and the AEM Department. A maximum of six hours may be transferred. For additional information, view the transfer credit policy at the UA Graduate School website.

Non-Thesis (Plan II) Option
Credit Hours
A total of 30 semester credit hours is required for a Master of Science in aerospace engineering and mechanics degree. For the MSAEM Plan II option, these credit hours consist of:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Core coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics coursework, including GES 554</td>
<td>6</td>
</tr>
<tr>
<td>Elective coursework</td>
<td>18</td>
</tr>
<tr>
<td>Total Hours</td>
<td>30</td>
</tr>
</tbody>
</table>

Elective coursework must be approved by the student’s adviser. Of the 18 Elective coursework credit hours, at least 12 must have an AEM designation.

Core Course Requirements
All students must complete at least one class from the Aerospace Core listing of classes and one class from the Mechanics Core listing of classes.

<table>
<thead>
<tr>
<th>Hours</th>
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</tr>
</thead>
<tbody>
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<td>AEM 569</td>
<td>Orbital Mechanics</td>
</tr>
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</table>
Two plans are offered for the master’s degree: independent investigation or to meet the goals of their professions. In most cases, degrees are designed to assist students either to continue their graduate studies or to meet the goals of their fields of study.

Master’s Degrees

The primary purpose of master’s degree programs is to provide students with subject matter at an advanced level in their fields of study. Master’s degrees are designed to assist students either to continue their graduate studies or to meet the goals of their professions. In most cases, master’s programs also help students become familiar with methods of independent investigation.

Program Requirements

Two plans are offered for the master’s degree:

**Plan I.** Candidates for the master’s degree under Plan I must earn a minimum of 24 semester hours of credit in coursework plus earn a minimum of 6 additional hours of thesis research hours, for a total of 30 hours.

**Plan II.** Candidates for the master’s degree under Plan II must earn a minimum of 30 semester hours of coursework credit and pass the comprehensive examination or complete a culminating or “capstone experience” as described under the Comprehensive Examinations section below.

Both plans require a minimum of 18 semester hours in the major subject. With the approval of the major department, the remainder of the coursework may be completed in either the major or a related field.

In some divisions and in many departments of the University, candidates are required to do their work under Plan I. Candidates working under Plan II may be required to participate successfully in seminar or problem courses that will give them an acquaintance with the methods of research and an appreciation of the place and function of original investigation in the field.

Residency Requirements

A student’s program at the master’s level must provide sufficient association with the resident faculty to permit individual evaluation of the student’s capabilities and achievements.

Graduate Credit

A student must be admitted to the Graduate School and must register as a graduate student in order to receive graduate credit. Approval for graduate registration must be obtained from program advisors prior to registration.

Graduate Credit for Noncredit Experiences

All course credit used toward a UA graduate degree must be taught at the graduate level. No graduate credit may be earned by correspondence study or for experiential learning not conducted under the direct supervision of graduate faculty of The University of Alabama. The UA does not offer graduate credit for noncredit workshops, seminars, continuing education experiences, professional development, internships, work/life experience, and so forth.

Transfer of Credit

Courses of full graduate-level credit earned in a regionally accredited institution where a student was enrolled in the graduate school may be submitted for review for inclusion in a master’s degree program. Evaluation of credit for transfer will not be made until after the student has enrolled in the Graduate School of The University of Alabama. Acceptance of credit requires the approval of the student’s advisory committee and the dean of the Graduate School. Credit will not be accepted for transfer from any institution at which the student failed to achieve a “B” average on all graduate work attempted. Only courses in which a student earned a “B” grade or better may be transferred.

In some cases, foreign educational credentials may not meet the Graduate School’s criteria for transfer of credit. It may be necessary for students in this situation to secure an evaluation of their credentials from World Education Services Inc. (WES), an external foreign credential evaluation service. Additional information on their services can be found at their website.

A student initiates at the Graduate School’s website a Request for Transfer of Graduate Credit earned at another institution. It is also the student’s responsibility to assure that the Graduate School receives an
official transcript of the credit requested for transfer, well in advance of the final semester.

With the approval of the student's department and the dean of the Graduate School, the greater of 12 hours or 25 percent of the required coursework for a master's degree may be transferred from another institution. All credit toward the master's degree, including transfer credit, must have been earned during the six years (18 fall, spring, and summer semesters) immediately preceding the date on which the master's degree is to be awarded. Revalidation (recertification) of graduate credits that will be more than 18 semesters old at the time of UA master's program completion is not an option.

Please note that some departments allow fewer than 12 hours of graduate transfer credit. Be sure to check with your department’s graduate coordinator regarding your department's transfer policy.

400-Level Courses
A maximum of 6 semester hours of 400-level course credit may be accepted for a master's degree program, but only if a form for Approval of 400-Level Course Work for Master's Credit is approved by the Graduate School prior to the semester in which the 400-level coursework will be taken.

Time Limit
All requirements for the master's degree must be completed during the six years (18 fall, spring, and summer semesters) immediately preceding the date on which the degree is to be awarded. There is no provision for an extension of the time limit beyond 6 years for master's students.

Admission to Candidacy
During the 2013-2014 academic year, the Graduate Council eliminated the master's candidacy requirement. Departments may monitor master's candidacy if they wish, but the Graduate School does not monitor it and will not accept master's candidacy forms. Doctoral candidacy is not affected and remains an important doctoral program requirement.

Thesis
A thesis evidencing research capacity, independent thought, and the ability to interpret materials is required of all master's degree candidates who pursue Plan I. The subject chosen must be in the major field and must be approved by the graduate committee of the major department or school and by the head of the student's major department or division.

The final oral thesis defense is the culminating experience in the master's program. As such, all members of the thesis committee are expected to attend and participate in real time. Virtual attendance via interactive video or teleconference is permitted for off-campus external committee members, but Tuscaloosa campus faculty should attend in person unless extraordinary circumstances dictate the need for virtual attendance.

Article Style vs. Journal Format

Article Style.
At the doctoral level, "article-style dissertations" are unified works that include several distinct but related studies of research or creative activity, each of which is of publishable quality. The University does not permit an "article-style thesis" to be presented for a master's degree.

Journal Format.
A "journal-format thesis" is acceptable. Such a thesis follows the format of a particular journal in which the student and advisor want the thesis to be published. To prepare a journal-format thesis, the student uses the journal's "information for authors" or similarly titled guidelines in conjunction with the Graduate School's Student Guide to Preparing Electronic Theses and Dissertations.

A thesis committee must consist of at least three members appointed by the dean of the Graduate School. A form for Appointment or Change of Master's Thesis Committee is used to request that the graduate dean appoint a thesis committee. The request normally is made as soon as the successful defense of the thesis proposal has been completed. All members of a thesis committee must be members of the Graduate Faculty. The Committee Chair must be a full or associate member of the Graduate Faculty. One member must be from outside the student’s major department.

If the outside member is not a full or associate member of the UA Graduate Faculty (e.g., a highly qualified person from another university, a business or industry), the graduate dean needs to appoint that member by approving Temporary Graduate Faculty status for the specific purpose of serving on the student's thesis committee. Unless there are extraordinary circumstances meriting approval by the graduate dean before the final oral defense of the thesis, all members of the thesis committee must attend the defense.

The candidate must give members of the examining committee a minimum of two weeks to read the thesis before the date of the final oral examination. A final oral examination is required of all students completing a thesis. All members of the thesis committee must be members of the UA graduate faculty and must attend the final oral examination unless there are extraordinary circumstances warranting the graduate dean's approval of the absence prior to the defense meeting.

As of August 15, 2009, all theses are submitted electronically rather than on paper. See the graduate school's homepage for a link to information on Electronic Theses and Dissertations (ETD) for details.

Theses must comply with the regulations set out in A Student Guide to Preparing Electronic Theses and Dissertations, available on the Graduate School's website. Approval of the thesis by the graduate dean is necessary before graduation.

The thesis should be completed, if possible, while the student is in residence at the University. To request permission to complete a thesis in absentia, the student must, before leaving the University, submit a satisfactory outline of the thesis, as well as evidence that adequate facilities are available where the work will be done, to the head of the student's major department.

Protection of Human Subjects for Research
Scientific research involving human subjects has produced substantial benefits for society, but it also can pose troubling ethical questions. The mission of the University's Institutional Review Board (IRB) for Protection of Human Subjects is to ensure that research involving human subjects is conducted ethically. University and federal policies require that review and approval to use human subjects in research precede the research. In the case of thesis research that involves the use of human subjects in any way, the principal investigator is responsible for contacting the college Human Research Review Committee to obtain approval for the planned research.

Comprehensive Examinations
In addition to the regular course examinations, a final comprehensive examination representing a "culminating" or "capstone" experience for a degree is required of all candidates for the master's degree (except for those candidates pursuing the master of accountancy, the master of business administration, the master of library and information studies, the master of social work, and the master of tax accounting). The comprehensive examination is a culminating experience in which the student is expected to integrate prior learning. Each department, with
approval of the Graduate Council, determines the most appropriate format. The various exams may consist of one or more of the following:

- a written and/or oral examination based on the content of the degree program;
- a thesis and final oral defense;
- a course requiring interpretation and integration of information from previous courses;
- a research paper, a "policy and practice" paper, or equivalent experience;
- a public performance or exhibition along with a contextualizing paper; and/or
- a practicum or internship.

If the comprehensive exam requirement is met with option 1 and/or 2 above, then the examining committee for comprehensive examinations must consist of at least three members of the graduate faculty from that department and appointed by the dean of the Graduate School. The examination must be given at least six weeks before the date of graduation (two weeks before for Plan II) and reported promptly to the dean of the Graduate School on appropriate forms. A final report, on the Master's/EdS Examination Form is on the Graduate School website. The form should be submitted when all examinations are completed. A student may take the final oral or written examination only twice. Failing the examination twice results in dismissal from the degree program and the Graduate School.

**Application for Graduation**

Each candidate for a master's degree must apply for graduation through myBama no later than the registration period for the semester or the first session of the summer term in which requirements for the degree are to be completed.

**Second Master's Degree**

Six (6) semester hours of eligible credit from one master's degree at The University of Alabama may be applied to the requirements for a second master's degree, but only if the department of the second master's agrees to the courses in the plan of study. Any hours from the previous master's degree must have been earned during the six years (18 fall, spring, and summer semesters) immediately preceding the date on which the second degree is to be awarded. **Please note that if a student double counts six hours between two master's degrees, no hours may double count toward any additional master’s degrees.**