

# AEROSPACE ENGINEERING, BS

The successful Aerospace Engineering student and professional is skilled in mathematics, physics, and computer programming and usage.

## Student Outcomes

The Bachelor of Science in Aerospace Engineering (BSAE) degree program at The University of Alabama can demonstrate that its graduates have:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

## Program Educational Objectives

Graduates of the Bachelor of Science in Aerospace Engineering (BSAE) program are expected within a few years after graduation to have:

1. Established themselves as practicing professionals or pursued advanced study in aerospace engineering (or other professional fields of interest)
2. Demonstrated their ability to work successfully as a member of a professional team and function effectively as responsible professionals
3. Engaged in professional service (professional societies and/or community service)

### Aerospace Engineering Curriculum

The College of Engineering enforces a C- or higher requirement for any course that is a prerequisite for another required course. Click here for the details regarding the College of Engineering policy on repeating courses and residency.

#### Freshman

Fall	Hours	Spring	Hours
MATH 125	0 or 4	MATH 126	4
CH 101 <sup>1</sup>	0 or 4	PH 105	0 or 4
Humanities (HU), Literature (L), or Fine Arts (FA) <sup>2</sup>	3	ENGR 103 or 123	3
AEM 121	1	EN 102	3

EN 101	3	AEM 249 <sup>4</sup>	3
<b>7-15</b>		<b>13-17</b>	

#### Sophomore

Fall	Hours	Spring	Hours
MATH 227	4	MATH 238 <sup>6</sup>	3
PH 106	0 or 4	AEM 250	0 or 3
AEM 201	3	AEM 251	1
ENGR 161 <sup>5</sup>	1	AEM 264	0 or 3
MATH 237 <sup>6</sup>	3	AEM 311	0 or 3
		History (HI) or Social and Behavioral Sciences (SB) <sup>2</sup>	3
<b>11-15</b>		<b>7-16</b>	

#### Junior

Fall	Hours	Spring	Hours
AEM 313	3	AEM 368	3
AEM 341	3	AEM 413	3
AEM 351	1	ME 349	3
ME 215	3	History (HI) or Social and Behavioral Sciences (SB) <sup>2</sup>	3
AEM 395	3	Humanities (HU), Literature (L), or Fine Arts (FA) <sup>2</sup>	3
Humanities (HU), Literature (L), or Fine Arts (FA) <sup>2</sup>	3		
<b>16</b>		<b>15</b>	

#### Senior

Fall	Hours	Spring	Hours
AEM 402	3	AEM 404	3
AEM 408	3	AEM 451	3
AEM 468	3	Aerospace Engineering Elective <sup>8</sup>	3
Aerospace Engineering Computational Elective <sup>7</sup>	3	Engineering Elective <sup>9</sup>	3
Aerospace Engineering Elective <sup>8</sup>	3	History (HI) or Social and Behavioral Sciences (SB) <sup>2</sup>	3
<b>15</b>		<b>15</b>	

#### Total Hours: 99-124

Electives	Hours
AEM 414 Experimental Aerodynamics	3
AEM 416 Helicopter Theory	3
AEM 417 Aircraft Systems	3
AEM 420 Computational Fluid Dynamics	3
AEM 425 Spacecraft Dynamics & Control	3
AEM 428 Space Propulsion	3
AEM 446 Intermediate Solid Mechanics	3
AEM 448 Stochastic Mechanics	3
AEM 452 Composite Materials	3
AEM 453 Multiscale Adv. Composites	3
AEM 461 Computation Method Aero Struct	3
AEM 469 Orbital Mechanics	3
AEM 470 Mechanical Vibrations	3

AEM 474	Structural Dynamics	3
AEM 475	Fundamentals of Aeroelasticity	3
AEM 482	Space Systems	3
AEM 484	Space Environment	3
AEM 488	Adv. Space Propulsion & Power	3
AEM 489	Space Law	3

Students may enroll in corresponding 500 level versions of the above courses if they have been admitted to AMP or other applicable programs. The AEM department also offers elective courses of special topics organized by individual faculty advisor, upon approval by the department.

#### Footnotes

- <sup>1</sup> CH 100 will satisfy CH 101 requirement.
- <sup>2</sup> All students must complete a sequence of two of the HI/SB or HU/L/FA elective courses from the same department.
- <sup>3</sup> AEM 121 Intr. to Aerospace Eng. is recommended, but can be satisfied by taking ENGR 111 Engineering for the Future or other engineering introductory courses.
- <sup>4</sup> A student may substitute CS 100 CS I for Majors (4 semester hours), CS 110 Honors CS I for Majors (4 semester hours), or RRS 101 and RRS 102 for AEM 249
- <sup>5</sup> ENGR 161 Small-Scale Eng. Graphics is recommended, but can be satisfied by taking ENGR 171 Large-Scale Eng. Graphics.
- <sup>6</sup> MATH 237 Introduction to Linear Algebra and MATH 238 Appld Diff Equations I may require a course that uses computers as a prerequisite such as AEM 249 Algorithm Devl Implementation; check with your advisor for a list of additional suitable courses.
- <sup>7</sup> Students may satisfy this requirement by successfully completing either AEM 420 Computational Fluid Dynamics or AEM 461 Computation Method Aero Struct. Consult here for pre/co-requisites.
- <sup>8</sup> Specific aerospace engineering and mechanics electives are offered regularly, but not necessarily every year. Undergraduate students with the required academic credentials may qualify to enroll in 500-level courses.
- <sup>9</sup> Any 400-level, 3-hour AEM elective, any 300- or 400- level, 3-hour College of Engineering course, or MTE 271 Engr Matls: Struc Prop. Any honors section of a course accepted toward an engineering degree may be applied in place of the non-honors section.

A BSAE degree is an entry-level requirement for various careers such as design, development, testing, and research in both the public and private aerospace industries. This degree would also provide an excellent background for students wishing to attend graduate school in other areas of engineering, sciences, medicine, law, or business. The program has successful graduates in all of these areas.

## Types of Jobs Accepted

Aerospace Engineer, Structural Design Engineer, Flight Test Engineer, Graduate Research Assistant, GNC Engineer, System Engineer.

## Jobs of Experienced Alumni

Senior Analyst, Director of Aviation and Missile Research, Systems Engineer, Chief Scientist, Senior Engineer.

Learn more about opportunities in this field at the Career Center