

# Aeronautical & Astronautical Engineering

**A**eronautical and astronautical engineering (AAE) focuses upon the challenges of flight. The proper aerodynamic shape, the correct engine for clean propulsion, the best materials for lightweight structures, and the safest control systems must be integrated to produce an efficient and economical flying machine. In addition, these challenges must be met across the broad spectrum of flight, from the low-speed, near-earth hovering of helicopters to the supersonic flight of our present-day aircraft, to the extreme speeds and ranges of our future aircraft and spacecraft. Our faculty brings their expertise in the varied disciplines of aerospace engineering to the classroom and laboratory and use extensive research activities to enhance their lectures.

A fascination with flight and an interest in airplanes or spacecraft is often the primary motivation for starting a career in aeronautical and astronautical engineering. By the time a student graduates, they had developed a technical interest in aerodynamics, structures, dynamics, propulsion, controls, design, or systems. Those going on to obtain graduate degrees do so because they are interested in specific technical areas in which they wanted to develop more expertise.

## Pursuing Aeronautical and Astronautical Engineering at Ohio State

Students interested in aeronautical and astronautical engineering as a major should have a good high school background in math, chemistry, physics, and written and verbal communication. They should have scientific curiosity and be both imaginative and analytical in their thinking. Experience with computers is helpful.

Students who come to Ohio State to study engineering that have a minimum ACT Math score of 24 or SAT Math score of 560 will be directly enrolled as pre-engineering students in the College of Engineering. Those students not eligible to directly enroll in engineering may enroll in the Science and Technology Exploration Program that is part of our Exploration Program described further at [exploration.osu.edu](http://exploration.osu.edu).

To be admitted into the first AAE core courses, students must first complete a sequence of math, physics, chemistry, and engineering graphics courses.

Students are required to meet certain criteria in order to be accepted into the aeronautical and astronautical engineering major. These requirements include:

- Chemistry 121
- Math 151, 152, 153, and 254
- Physics 131, 132, and 133
- Engineering Graphics 167
- Engineering 181 and 183

- English 110
- Mechanical Engineering 410
- Aeronautical Engineering 200

Students are required to submit an application to major in AAE at the end of autumn quarter during which they take Aeronautical Engineering 200. All students applying to the major will be evaluated on their secondary point-hour ratio (SPHR). The SPHR is based on the required courses listed above. Acceptance is limited to 75 students per year. This is necessary to ensure the best possible quality of the undergraduate programs.

Once a student has been accepted into the AAE major, a point-hour ratio of 2.0 must be maintained for all aeronautical engineering classes. This aeronautical engineering point-hour ratio begins with Aeronautical Engineering 200 and includes all classes taken from the Department of Aeronautical and Astronautical Engineering.

## Program Educational Objectives

- Our students will develop strong physical insight on the fundamentals of present and future air and space transportation systems.
- Our students will learn to use analytical and computational methods for applying their knowledge in the fundamentals of the discipline to the solution of engineering problems, including the use of current experimental and data analysis techniques.
- Our students will learn to work collaboratively and creatively, and to communicate effectively, in applying discipline-specific knowledge in basic sciences and aerospace engineering.
- Our students will understand the need for life-long learning and the responsibility of the engineer to behave professionally and ethically in the solution of societal problems.

## Honors & Scholars Opportunities

Ohio State offers the Honors & Scholars programs to create an environment of intellectual support and stimulation within a close-knit community of high-ability undergraduate students. Through these programs, students have access to smaller classes, undergraduate research opportunities, close working relationships with faculty, priority scheduling, and unique housing options.

Honors & Scholars programs represent great opportunities to

**For more information, check these web sites:**

**Aerospace:** <http://aerospace.ohio-state.edu>

**College of Engineering:** [www.engineering.osu.edu](http://www.engineering.osu.edu)

**Ohio State:** [www.osu.edu](http://www.osu.edu)

**Admissions:** [www.undergrad.osu.edu](http://www.undergrad.osu.edu)

**Multicultural Center:** [www.multiculturalcenter.osu.edu](http://www.multiculturalcenter.osu.edu)

**First Year Experience Program:** [www.fye.osu.edu](http://www.fye.osu.edu)

## Curriculum Sample

This is a sample list of classes a student will take to pursue a degree in Aeronautical and Astronautical Engineering. Since university students need more than specific education in a narrow field, they also will take classes to complete the General Education Curriculum (GEC). The GEC will allow students to develop the fundamental skills essential to collegiate success across major programs. Course work options satisfying the GEC often come from a variety of academic areas of study allowing students to tailor their GEC toward their interests. Note: This sample represents one of several possible paths to a degree in Aeronautical and Astronautical Engineering. Consult the departmental web site, <http://aerospace.ohio-state.edu>, for details on each specific track.

### Freshman Year:

Engineering Survey	1
Calculus and Analytic Geometry	15
Chemistry	5
Engineering Graphics	4
Introduction to Engineering	6
Physics	10
GEC (English composition)	5
<b>Total hours</b>	<b>46</b>

### Sophomore Year:

Calculus and Analytic Geometry	5
Introduction to Aerospace Engineering	10
Engineering Mechanics	9
Introduction to Materials Science and Engineering	3
Introductory Linear Algebra	3
Ordinary and Partial Differential Equations	5
Thermodynamics	4
Physics	5
GEC (English II)	5
GEC courses	4
<b>Total hours</b>	<b>53</b>

### Junior Year:

Flight Vehicle Structures I & II	8
One-Dimensional Gasdynamics	4
Fundamentals of Aerodynamics	4
Flight Vehicle Dynamics	4
Linear Systems Engineering	4
Viscous Flow and Heat Transfer	4
Propulsion	4
Systems Integration I, II & III	3
Engineering Economic Analysis	3
Electrical Circuits and Laboratory	4
Un. Methods	3
GEC courses	5
<b>Total hours</b>	<b>50</b>

### Senior Year:

Aerospace Laboratory	6
Preliminary Design of Flight/Space Vehicles and Structural Design of Flight/Space Vehicle Components	8
Technical electives	9
GEC courses	19
<b>Total hours</b>	<b>42</b>

be part of a smaller community within a large university. Good candidates for these programs will receive additional information after admission to the university. Learn more about the Honors & Scholars program at [honors-scholars.osu.edu](http://honors-scholars.osu.edu).

## Career Prospects in Aeronautical and Astronautical Engineering

More than likely an AAE student's initial employment following graduation will be in the aerospace industry. Students can join a large aerospace company, a general aviation manufacturer, an airline, or a government aerospace laboratory or research center. In a large aerospace company, the initial assignment will probably be with a large design team. The assignment will likely be a technical one dealing with a problem related to an airplane, missile, or spacecraft being designed. As experience is gained, more complex problems and responsibilities will be assigned. Depending on interests and competence, graduates can progress through the technical part of the company or through management. Students will also gain the same type of experience if they join a general aviation company. However, the design team will not be as large and assignments will cover broader problems associated with the design of aircraft.

Students who choose to join an airline company as an engineer may work on technical problems associated with the operation and maintenance of a fleet of aircraft. In addition, graduates can participate in evaluating the needs of the airline for new airplanes as well as the different types of airplanes available that could meet these requirements.

Students who choose to join a government aerospace laboratory or research center may be assigned to a laboratory and be involved in basic research in a technical area. As graduates progress, they can become more involved in research or progress through the government and monitor technical programs that have been funded to the private sector of the aerospace industry.

The average yearly starting salary accepted by students with a Bachelor of Science in Aeronautical and Astronautical Engineering is \$53,000. Aeronautical and astronautical engineering students with a master's degree start at up to \$60,000 annually. Beginning salaries for AAE graduates who have professional work experience are usually higher, based on the amount and type of professional work experience.

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## Contact information:

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