AEROSPACE SYSTEMS ENGINEERING, BS

Bachelor of Science in Aerospace Systems Engineering (490005BS)

Completion of degree requirements for the Aerospace Systems Engineering program requires that students complete several required semester-long cooperative education assignments with corporations or governmental entities in the aerospace industry. Based on aerospace industry requirements for full-time and cooperative education placement, full admission to the Aerospace Systems Engineering program is limited to citizens or permanent resident aliens of the United States.

The Bachelor of Science in Aerospace Systems Engineering degree program is intended to produce engineers who possess both a broad, interdisciplinary knowledge of aerospace engineering fundamentals and who will be able to move quickly into the role of project managers, the precursor position to program managers and ultimately, senior managers. These engineers can lead multidisciplinary teams and bring about the integration of components in a variety of systems. The program includes basic engineering and aerospace courses and will also include specific non-engineering courses, selected to meet the goal of developing future senior technical leaders for our aerospace industries. The program features a mandatory co-op component that begins following the sophomore year. The co-op requirement is expected to fill out the student's technical background as well as provide a basis for broad personal growth that is part of the aim of the General Education requirement. Three fewer hours of General Education courses are required for Aerospace Systems Engineering due to the mandatory co-op.

Requirements for Admission

All students gain access to 300 and 400 level engineering classes once you:

- Have a cumulative GPA at UA of 3.0
- Complete Calculus 2 with a C- or higher
- Have a 2.3 grade point average in *at least* three of the following categories:
  - in all coursework
  - in all *required* mathematics coursework
  - in all *required* science coursework (Chemistry, Physics, Computer Science, Biology)
  - in all engineering coursework

The Aerospace Systems Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org/). The program educational objectives (PEOs) for the Aerospace Systems Engineering program are that, within a few years after graduation, our Aerospace Systems Engineering graduates:

- Practice the aerospace systems engineering disciplines successfully within community accepted standards
- Acquire teamwork and communications skills to develop a successful career in aerospace systems engineering
- Fulfill professional and ethical responsibilities in the practice of aerospace systems engineering, including social, environmental, and economical considerations
- Engage in professional service, such as participation in professional society and community service
- Engage in life-long learning activities, such as graduate studies or professional workshops
- Develop a professional career in the prevailing market that meets personal goals, objectives and desires

To meet those program educational objectives as well as the curricular requirements specified by the American Institute of Aeronautics and Astronautics, the Aerospace Systems Engineering program identifies student outcomes, which are what students to achieve by the time of graduation. They are:

(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

Accelerated BS/MS program

The department offers B.S. Aerospace Systems Engineering students at The University of Akron a BS/MS program that allows them to earn the Master of Science in Mechanical Engineering with one additional year of study. Applications are accepted in the Spring before the senior year.

The following information has official approval of the **Department of Mechanical Engineering** and **The College of Engineering and Polymer Science**, but is intended only as a supplemental guide. Official degree requirements are established at the time of transfer and admission to the degree-granting college. Students should refer to the Degree Progress Report (DPR) which is definitive for graduation requirements. *Completion of this degree within the identified time frame below is contingent upon many factors, including but not limited to: class availability, total number of required credits, work schedule, finances, family, course drops/withdrawals, successfully passing courses, prerequisites, among others.* The transfer process is completed through an appointment with your academic advisor.

Requirements

Summary

Code	Title	Hours
General Education Requirements (https://bulletin.uakron.edu/undergraduate/general-education/) *		21
Math and Science Requirements		27
Accounting and Economics Requirements		6
Tools and Project Management		3
Fundamental Engineering Courses		18
Upper Level Requirements		64
Co-op Courses		0
Total Hours		**139**

* Several courses required for the major also satisfy General Education requirements. The University minimum of 36 credits are required for General Education and credit for these courses will apply to multiple requirements.

General Education Courses

Code	Title	Hours
Students pursuing a bachelor's degree must complete the following General Education coursework. Diversity courses may also fulfill major or Breadth of Knowledge requirements. Integrated and Applied Learning courses may also fulfill requirements in the major.		
Academic Foundations		**12**
Mathematics, Statistics and Logic: 3 credit hours		
Speaking: 3 credit hours		
Writing: 6 credit hours		
Breadth of Knowledge		**22**
Arts/Humanities: 9 credit hours		
Natural Sciences: 7 credit hours		
Social Sciences: 6 credit hours		
Diversity		
Domestic Diversity		
Global Diversity		
Integrated and Applied Learning		**2**
Select one class from one of the following subcategories:		
Complex Issues Facing Society		
Capstone		
Review the General Education Requirements page for detailed course listings.		
Total Hours		**36**

Math and Science Requirements

Code	Title	Hours
CHEM:151	Principles of Chemistry I	3
CHEM:152	Principles of Chemistry I Laboratory	1
MATH:221	Analytic Geometry-Calculus I	4
MATH:222	Analytic Geometry-Calculus II	4
MATH:223	Analytic Geometry-Calculus III	4
MATH:335	Introduction to Ordinary Differential Equations	3
PHYS:291	Elementary Classical Physics I	4
PHYS:292	Elementary Classical Physics II	4
Total Hours		**27**

Accounting and Economics Requirements

Code	Title	Hours
ECON:244	Introduction to Economic Analysis	3
ACCT:201	Accounting Principles I	3
Total Hours		**6**

Tools and Project Management

Code	Title	Hours
AESE:165	Tools for Aerospace Systems Engineering	2
AESE:166	Aerospace Systems Project Management	1
Total Hours		**3**

Fundamental Engineering Courses

Code	Title	Hours
CIVE:201	Statics	3
CIVE:202	Introduction to Mechanics of Solids	3
MECE:203	Dynamics	3
MECE:260	Engineering Analysis I	2
MECE:300	Thermodynamics I	3
ELEN:307	Basic Electrical Engineering	4
Total Hours		**18**

Upper Level Requirements

Code	Title	Hours
MECE:310	Fluid Mechanics I	2
MECE:360	Engineering Analysis II	2
MECE:402	Senior Seminar	1
MECE:315	Heat Transfer	3
MECE:337	Design of Mechanical Components	3
MECE:400	Thermal System Components	3
MECE:411	Compressible Fluid Mechanics	3
MECE:413	Introduction to Aerodynamics	3
MECE:412	Fundamentals of Flight	3
MECE:414	Introduction to Aerospace Propulsion	3
MECE:460	Concepts of Design	3
MECE:483	Measurements Laboratory	2
AESE:240	Aerospace Systems Engineering I	3
AESE:336	Aerospace Structures	3
AESE:340	Avionics I	3
AESE:380	Aerospace Materials	3
AESE:320	Aerospace Systems Engineering II	3
AESE:420	Object Oriented Design & Management	3
AESE:440	Avionics II	3
AESE:450	Aerospace Computations	3
AESE:460	Aerospace Systems Manufacturing	3
AESE:491	Aerospace Design Project I	1
AESE:492	Aerospace Design Project II	2

BMEN:470	Human Factors Engineering	3
Total Hours		**64**

Co-op Courses

Code	Title	Hours
GNEN:301	Cooperative Education Work Period	0
GNEN:302	Cooperative Education Work Period	0
GNEN:403	Cooperative Education Work Period	0

Recommended Sequence

1st Year		
Fall Semester		**Hours**
CHEM:151	Principles of Chemistry I [1]	3
CHEM:152	Principles of Chemistry I Laboratory	1
ENGL:111	English Composition I [1,2]	3
MATH:221	Analytic Geometry-Calculus I [1]	4
AESE:165	Tools for Aerospace Systems Engineering	2
	General Education or Honors Distribution [4]	3
	Hours	**16**
Spring Semester		
MATH:222	Analytic Geometry-Calculus II [1]	4
PHYS:291	Elementary Classical Physics I [1]	4
AESE:166	Aerospace Systems Project Management	1
	Second Writing Course [1,3]	3
	General Education or Honors Distribution [4]	3
	Hours	**15**
2nd Year		
Fall Semester		
ECON:244	Introduction to Economic Analysis	3
MATH:223	Analytic Geometry-Calculus III [1]	4
PHYS:292	Elementary Classical Physics II [1]	4
CIVE:201	Statics [1]	3
	General Education or Honors Distribution [4]	3
	Hours	**17**
Spring Semester		
MATH:335	Introduction to Ordinary Differential Equations	3
CIVE:202	Introduction to Mechanics of Solids	3
ELEN:307	Basic Electrical Engineering	4
MECE:203	Dynamics [1]	3
MECE:260	Engineering Analysis I	2
	Hours	**15**
3rd Year		
Fall Semester		
MECE:300	Thermodynamics I	3
MECE:310	Fluid Mechanics I	2
MECE:360	Engineering Analysis II	2
AESE:240	Aerospace Systems Engineering I	3
AESE:336	Aerospace Structures	3
ACCT:201	Accounting Principles I	3
	Hours	**16**
Spring Semester		
GNEN:301	Cooperative Education Work Period	0
	Hours	**0**
Summer Semester		
MECE:337	Design of Mechanical Components	3
AESE:340	Avionics I	3
AESE:380	Aerospace Materials	3
	Hours	**9**
4th Year		
Fall Semester		
GNEN:302	Cooperative Education Work Period	0
	Hours	**0**
Spring Semester		
MECE:315	Heat Transfer	3
MECE:411	Compressible Fluid Mechanics	3
MECE:483	Measurements Laboratory	2
BMEN:470	Human Factors Engineering	3
AESE:460	Aerospace Systems Manufacturing	3
	General Education or Honors Distribution [4]	3
	Hours	**17**
Summer Semester		
GNEN:403	Cooperative Education Work Period	0
	Hours	**0**
5th Year		
Fall Semester		
MECE:402	Senior Seminar	1
MECE:413	Introduction to Aerodynamics	3
MECE:414	Introduction to Aerospace Propulsion	3
MECE:460	Concepts of Design	3
AESE:320	Aerospace Systems Engineering II	3
AESE:491	Aerospace Design Project I	1
	General Education or Honors Distribution [4]	3
	Hours	**17**
Spring Semester		
MECE:412	Fundamentals of Flight	3
MECE:400	Thermal System Components	3
AESE:420	Object Oriented Design & Management	3
AESE:440	Avionics II	3
AESE:450	Aerospace Computations	3
AESE:492	Aerospace Design Project II	2
	Hours	**17**
	Total Hours	**139**

1 Honors sections may be available; check the schedule of classes.

2 The Mechanical Engineering Department recommends that English Composition I be used to satisfy writing course requirement but other choices are available. See the General Education Program for details.

3 Check General Education Program or Honors Distribution to find courses that satisfy the second writing course requirement.

[4] Credit hours shown for General Education or Honors Distribution are general guidelines only. These courses should be chosen in accordance with the appropriate General Education curriculum guide (for non-honors students) or Honors Distribution (for honors students). Honors students must also ensure that their course selections meet additional requirements not shown on this curriculum guide.