AEROSPACE ENGINEERING - BS

This program blends rigorous theoretical study with practical application of modern engineering tools, culminating in advanced design projects that prepare students for aerospace careers.

Coursework in aerodynamics, materials and structures, propulsion, and dynamics and control of aircraft and spacecraft provide a strong fundamental basis for advanced study and specialization, while senior technical electives offer a concentration of study in fields of special interest. Design is emphasized particularly in senior design electives and a senior-level two-semester design sequence involving specific goals, objectives, and constraints, which integrates analysis and design tools and requires students working in teams to design, and in some cases build, test, and deploy an aerospace system, such as an aircraft, rotorcraft, flight simulator, morphing air or space structure, space suit, space habitat, or a mission to Mars. Application of modern engineering and computational tools is required and emphasized in most courses.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, architectural engineering, civil engineering, computer engineering, computer science, data engineering, electrical engineering, electronic systems engineering technology, environmental engineering, industrial distribution, industrial engineering, interdisciplinary engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering, biomedical engineering and materials science and engineering degrees in that students take CHEM 119 or CHEM 107/CHEM 117 and CHEM 120. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

Fall		Semester Credit Hours
CHEM 107	General Chemistry for Engineering Students [1,4]	3
CHEM 117	General Chemistry for Engineering Students Laboratory [1,4]	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition [1] or Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation [1]	2
MATH 151	Engineering Mathematics I [1,2]	4
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**16**

Spring		
ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics [1]	2
MATH 152	Engineering Mathematics II [1]	4
PHYS 206	Newtonian Mechanics for Engineering and Science [1]	3
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II [1,4]	
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3,5]		
	Semester Credit Hours	**15-16**
	Total Semester Credit Hours	**31-32**

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 21 hours shown as University Core Curriculum electives, 3 must be from creative arts (see AREN curriculum for more information), 3 from social and behavioral sciences (see DAEN and IDIS curriculum for more information), 3 from language, philosophy and culture (see CVEN, EVEN and PETE curriculum for more information), 6 from American history and 6 from government/political science. The required 3 hours of international and cultural diversity and 3 hours of cultural discourse may be met by courses satisfying the creative arts, social and behavioral sciences, language, philosophy and culture, and American history requirements if they are also on the approved list of international and cultural diversity (https://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/) courses and cultural discourse (https://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/) courses.
4. BMEN, CHEN and MSEN require 8 hours of fundamentals of chemistry which are satisfied with CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Students with an interest in BMEN, CHEN and MSEN can take CHEM 120 second semester freshman year. CHEM 120 will substitute for CHEM 107/CHEM 117.
5. For BS-PETE, allocate 3 hours to core communications course (ENGL 210, COMM 203, COMM 205, or COMM 243) and/or 3 hours to UCC elective. For BS-MEEN, allocate 3 hours to core communications course (ENGL 203, ENGL 210, COMM 203 or COMM 205) and/or 3 hours to UCC elective.

Second Year

Fall		Semester Credit Hours
AERO 201	Introduction to Flight [1]	3
AERO 211	Aerospace Engineering Mechanics [1]	3
AERO 212	Introduction to Aerothermodynamics [1]	3
AERO 221	Analytical Methods for Aerospace Engineering [1]	3
MATH 251 or MATH 253	Engineering Mathematics III [1] or Engineering Mathematics III	3
	Semester Credit Hours	**15**

Spring		
AERO 214	Introduction to Aerospace Mechanics of Materials [1]	3
AERO 222	Introduction to Aerospace Computation [1]	3
AERO 301	Theoretical Aerodynamics [1]	3
MATH 308	Differential Equations [1]	3
PHYS 207	Electricity and Magnetism for Engineering and Science [1]	3
PHYS 217/ ENGR 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism [1]	2
High Impact Experience [6]		0
AERO 299	Mid-Curriculum Professional Development	
	Semester Credit Hours	**17**
Third Year		
Fall		
AERO 303	High Speed Aerodynamics [1]	3
AERO 304	Aerospace Structural Analysis I [1]	3
AERO 310	Aerospace Dynamics [1]	3
ECEN 215	Principles of Electrical Engineering [1]	3
Select one of the following: [1]		3
ENGL 210	Technical and Professional Writing	
COMM 203	Public Speaking	
COMM 205	Communication for Technical Professions	
COMM 243	Argumentation and Debate	
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**18**
Spring		
AERO 306	Aerospace Structural Analysis II [1]	3
AERO 307	Aerospace Engineering Laboratory [1]	3
AERO 321	Dynamics of Aerospace Vehicles [1]	3
AERO 351	Aerothermodynamics and Propulsion [1]	3
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**15**
Fourth Year		
Fall		
AERO 401	Aerospace Design Principles [1,7]	3
AERO 413	Aerospace Materials Science [1]	3
AERO 423	Orbital Mechanics [1]	3
Select one of the following: [1]		3
AERO 404	Mechanics of Advanced Aerospace Structures	
AERO 405	Aerospace Structural Design	
AERO 417	Aerospace Propulsion	
AERO 419	Chemical Rocket Propulsion	
AERO 426	Space System Design	
AERO 428	Electromagnetic Sensing for Space-Borne Imaging	
AERO 472	Airfoil and Wing Design	
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**15**
Spring		
AERO 402	Aerospace Systems Design [1,7]	2
AERO 422	Active Controls for Aerospace Vehicles [1]	3
AERO 452	Heat Transfer and Viscous Flows [1]	3
Select two of the following: [1]		6
AERO 404	Mechanics of Advanced Aerospace Structures	
AERO 405	Aerospace Structural Design	
AERO 411	Applications of Fracture Mechanics to Aerospace Structures	
AERO 414	Human Performance in Aerospace Environments	
AERO 415	Computational Fluid Dynamics for Aerospace Applications	
AERO 417	Aerospace Propulsion	
AERO 419	Chemical Rocket Propulsion	
AERO 420	Aeroelasticity	
AERO 424	Spacecraft Attitude Dynamics and Control	
AERO 425	Flight Test Engineering	
AERO 426	Space System Design	
AERO 428	Electromagnetic Sensing for Space-Borne Imaging	
AERO 430	Numerical Simulation	
AERO 435	Aerothermochemistry	
AERO 436/ ISEN 432	Human Factors Engineering for Aerospace Designs	
AERO 440	Cockpit Systems and Displays	
AERO 445	Vehicle Management Systems	
AERO 451	Human Spaceflight Operations	
AERO 455	Helicopter Aerodynamics	
AERO 472	Airfoil and Wing Design	
AERO 478	Low Temperature Plasma - Theory, Modeling, Applications	
AERO 489	Special Topics in...	
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**17**
	Total Semester Credit Hours	**97**

[6] All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the AERO advising office.

[7] A two-semester sequence is required.

Total Program Hours 128