Accelerated Program in Aerospace Engineering

Bachelor of Science

Master of Aerospace Engineering

The accelerated program allows students with strong academic backgrounds to complete both B.S. and M.A.E. degrees in Aerospace Engineering. The goal of the program is to produce graduates who are prepared for careers in the aerospace industry and in research and development. The program augments the student's undergraduate background with graduate-level study and with course offerings in the areas of aerodynamics, structures, propulsion, and astronautics.

Degree Requirements

Students enrolled in the Bachelor of Science program in Aerospace Engineering may apply for entry into the accelerated program when they have completed about 90 hours of coursework. Students should have a CGPA of 3.20 (out of a possible 4.00) in AE/ES courses, at a minimum, for selection. For continued enrollment, a CGPA of 3.00 must be maintained. Each student is required to conduct an independent study in a topic of current interest in aerospace engineering under the guidance of an advisor, with a formal report due at the end. Three graduate credits are earned through this work.

FRESHMAN YEAR

See the common Freshman Year outline on page 160.

Total Credits	**32**

SOPHOMORE YEAR

Course		Title	Credits
COM	221	Technical Report Writing	3
COM	219	Speech -OR-	
EGR	120	Graphical Communications	3
ES	201	Statics	3
ES	202	Solid Mechanics	3
ES	204	Dynamics	3
ES	206	Fluid Mechanics	3
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	105	General Chemistry I	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
Total Credits			**34**

JUNIOR YEAR (AERONAUTICS AND PROPULSION OPTIONS)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	313	Space Mechanics	3
AE	314	Experimental Dynamics I	1
AE	315	Experimental Dynamics I Laboratory	1
AE	316	Aerospace Engineering Materials	3
AE	318	Aerospace Structures I	3
AE	413	Airplane Stability and Control	3
AE	418	Aerospace Structures II	3
ES	305	Thermodynamics	3
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
MA	441	Mathematical Methods for Engineering & Physics I	3
Total Credits			**32**

JUNIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	313	Space Mechanics	3
AE	314	Experimental Dynamics I	1
AE	315	Experimental Dynamics I Laboratory	1
AE	316	Aerospace Engineering Materials	3
AE	318	Aerospace Structures I	3

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AE	418	Aerospace Structures II	3
ES	305	Thermodynamics	3
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
MA	441	Mathematical Methods for Engineering & Physics I	3
		Technical Elective	3
Total Credits			**32**

SENIOR YEAR (AERONAUTICS OPTION)

Course		Title	Credits
HU/SS		Lower-Level Elective	3
HU/SS		Upper-Level Elective	3
		Technical Electives †	6
AE	408	Turbine and Rocket Engines	3
AE	420	Aircraft Preliminary Design	4
AE	421	Aircraft Detail Design	4
AE	430	Control Systems Analysis and Design	3
ES	405	Electrical Engineering II.	3
AE	416	Aerospace Structures and Instrumentation Lab	1
AE	417	Aerospace Structures and Instrumentation Lab	1
Total Credits			**31**

SENIOR YEAR (PROPULSION OPTION)

Course		Title	Credits
HU/SS		Lower-Level Elective	3
HU/SS		Upper-Level Elective	3
		Technical Electives†	6
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation.	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	430	Control Systems Analysis and Design.	3
AE	435	Air-Breathing Propulsion Preliminary Design.	4
AE	440	Air-Breathing Propulsion Component Design.	4
ES	405	Electrical Engineering II.	3
Total Credits			**31**

SENIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation.	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	426	Spacecraft Attitude Dynamics and Control	3
AE	427	Spacecraft Preliminary Design	4
AE	430	Control Systems Analysis and Design.	3
AE	445	Spacecraft Detail Design	4
ES	405	Electrical Engineering II.	3
HU/SS		Lower-Level Elective	3
HU/SS		Upper-Level Elective	3
		Technical Elective†	3
Total Credits			**31**
TOTAL UNDERGRADUATE CREDITS			**129**

GRADUATE-LEVEL STUDY

Course		Title	Credits
MA	502	Boundary Value Problems (or equivalent)	3
AE	699	Special Topics in Aerospace Engineering	3
		Core Courses	6
		Electives†	9
Total Credits (at least nine hours 600-level)			**21**
TOTAL DEGREE CREDITS			**150**

†Technical Electives: Students may satisfy this requirement by selecting from the 500-level graduate courses listed in this section.

‡Electives: The following should be selected as electives at the graduate level. The elective list has been grouped into areas of concentration.

Areas of Concentration

Structures

This area includes Structural Analysis, Vibration, Nondestructive Testing, Composite Materials, Elasticity, Flight Dynamics, Controls, and Design Optimization.

Core Course for Structures Concentration

Course		Title	Credits
AE	502	Strength and Fatigue of Materials	3

Electives for Structures Concentration

AE	506	Airplane Dynamic Stability.	3
AE	514	Introduction to the Finite Element Method	3
AE	518	Acoustic Emission Nondestructive Testing.	3
AE	520	Perturbation Methods in Engineering	3
AE	522	Analysis of Aircraft Composite Materials.	3
AE	612	Analysis of Aircraft Plate and Shell Structures	3
AE	616	Advanced Aircraft Structural Dynamics	3
AE	699	Special Topics in Aerospace Engineering	3

Aerodynamics and Propulsion

This area includes Aerodynamics, Propulsion, Computational Aero and Fluid Dynamics, Transition and Turbulence, Aeroacoustics, Heat Transfer, and Combustion.

Core Course for Aerodynamics and Propulsion Concentration

Course	Title	Credits
AE 504	Advanced Compressible Flow	3

Electives for Aerodynamics and Propulsion Concentration

AE	508	Heat Transfer . . . 3
AE	512	Combustion I . . . 3
AE	516	Computational Aeronautical Fluid Dynamics . . . 3
AE	528	Advanced Incompressible Aerodynamics . . . 3
AE	530	Aeroacoustics . . . 3
AE	610	Advanced Computational Fluid Dynamics . . . 3
AE	620	Boundary Layer Theory . . . 3
AE	640	Turbine Engine Propulsion Systems . . . 3
AE	648	Thermal Stresses in Aerospace Engineering . . . 3
AE	699	Special Topics in Aerospace Engineering . . . 3
AE	652	Turbulent Flows . . . 3

Astronautics and Control

This area includes Space Vehicles, Space Power, and Systems Control.

Electives for Astronautics Concentration

AE	508	Heat Transfer
AE	524	Rocket Engine Propulsion Systems
AE	526	Engineering Optimization
AE	606	Finite Element Aerospace Applications
AE	620	Boundary Layer Theory
AE	646	Nonlinear Dynamical Systems and Chaos

A 3 credit hour graduate internship, AE 695, may be taken as an elective course.