

To: The Faculty of the College of Engineering
From: The Faculty of the School of Aeronautics & Astronautics
Subject: Curriculum Change for the B.S. Degree in Aeronautical and Astronautical Engineering

The Faculty of the School of Aeronautics & Astronautics has approved the following changes in the curriculum for the B.S. degree in Aeronautical and Astronautical Engineering effective for students entering the School in the Fall Semester 2006. This action is now submitted to the Engineering Faculty with a recommendation for approval.

The updated curriculum proposed by the Faculty of the School of Aeronautics and Astronautics is attached. This document includes the AAE Curriculum Requirements and the Suggested Plan of Study. In each case, the current version (as it appears in the 2004-2006 Catalog) is followed by the proposed version.

The substantial changes are summarized here:

Change 1: Number of Credit Hours required reduced from 131 to [129](#)

Reason: This is due to changes in the 1st year program. There has been no change in the number of credits in the Sophomore through Senior Years

Change 2: ECE 201 is replaced with AAE 301

Reason: The AAE faculty believes that the signal analysis material in AAE 301 is critically important to aerospace engineers.

Change 3: AAE recommends that students take a C programming language course in the first year to fulfill the Science Selective.

Reason: This is due to changes in the 1st year program, which replaced CHEM 116 with a menu of possible science courses, including CS.

Change 4: Students must take at least 3cr of course work focused on written and/or spoken communications (in addition to the required First Year composition course).

Reason: This is in response to the deletion of COM 114 as a requirement in the first year. We believe that writing skills need reinforcement as much or more than speaking skills.

Change 5: Students must take at least 3 cr of course work focused on Economics, Business, or Entrepreneurship.

Reason: We believe the economic context of engineering is a necessary part of a BSAAE degree.

Change 6: Students must register for AAE 395 once a year.

Reason: This requirement allows the school to keep track of our students progress through the curriculum and its requirements, as well as providing a forum for seminars by guest speakers on matters of interest to undergraduate professional development.

CURRENT: (from the 2004–2006 Engineering Catalog)

Bachelor of Science Curriculum in Aeronautics & Astronautics

The basic B.S.AAE degree program has a minimum of 131 credit hours, including the First-Year Engineering requirements. The required courses and the major and minor area courses cannot be taken on a pass/not-pass basis. Students must have 2.0 GPA in the major, as well as overall, to graduate with a B.S.AAE degree. Divided into topical areas, the required curriculum is:

Credit Hours Required for Graduation: 131

<i>Basic Program</i>	<i>Credit Hours</i>
Mathematics	
Calculus: MA 165, 166, 261	12
Linear Algebra: MA 265	3
Differential Equations: MA 266, 304	6
Sciences	
Chemistry: CHM 115, 116	8
Physics: PHYS 152, 241	7
Communications, Humanities and Social Sciences	
Composition: ENGL 106	4
Speech: COM 114	3
ENGR 100	1
General Education Electives	18
Computer Skills	
ENGR 106	2
Programming: CS 152 or 156	2
Graphics: CGT 163	2
Aeronautics and Astronautics Program	
Structures: AAE 204, 204L, 352	7
Aerodynamics: AAE 333, 333L, 334	7

Lab Elective: AAE 352L or 334L **1**

Note: The selected lab should be taken with the corresponding course, if possible.

Propulsion

Thermodynamics: ME 200 **3**

Jet Propulsion: AAE 372 **or** **3**

Rocket Propulsion: AAE 439

Note: Students planning to specialize in aeronautics should take AAE 372; those aimed at astronautics should take AAE 439.

Dynamics and Control

Statics and Dynamics: AAE 203, 340 **6**

Controls: AAE 301 or ECE 201, AAE 364, AAE 364L **7**

Vehicle Dynamics: AAE 421, or 440 **3**

Note: Students planning to specialize in aeronautics should take AAE 421; those aimed at astronautics should take AAE 440. AAE 364L is to be taken following AAE 364.

Design

Introduction: AAE 251 **3**

Spacecraft: AAE 450 **or** **3**

Aircraft: AAE 451

Note: Students planning to specialize in aeronautics should take AAE 451; those aimed at astronautics should take AAE 450.

Major Electives **9**

Minor Electives **6**

Note: Major and Minor Electives are topically related specializations within aerospace engineering. They must be approved by the academic advisor.

Technical Electives **6**

Note: Technical electives may be chosen from a broad range of science, engineering, or technology courses, subject to the approval of the academic advisor.

PROPOSED

Bachelor of Science Curriculum in Aeronautics & Astronautics

The basic B.S.AAE degree program has a minimum of 129 credit hours, including the First-Year Engineering requirements. The required courses and the major and minor area courses cannot be taken on a pass/not-pass basis. Students must have 2.0 GPA in the major, as well as overall, to graduate with a B.S.AAE degree. Divided into topical areas, the required curriculum is:

Credit Hours Required for Graduation: 129

Basic Program	Credit Hours
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Mathematics

Calculus: MA 165, 166, 261	12
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Linear Algebra: MA 265	3
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Differential Equations: MA 266, 304	6
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Sciences

Chemistry: CHM 115	4
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Physics: PHYS 172, 241	7
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Communications, Humanities and Social Sciences

English Composition	3
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Communications	3
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Note: Students must take at least 3cr of course work focused on written and/or spoken communications, in addition to the required First-Year composition course.

General Education Electives	18
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Computer Skills

ENGR 126 or 126H	3
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Programming: CS 158, 159, or ENGR 117	3
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Graphics: CGT 163	2
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Professional Development: ENGR 100	1
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Aeronautics and Astronautics Program

Professional Development: AAE 395	0
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Structures and Materials

AAE 204, 204L, 352	7
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Aerodynamics

AAE 333, 333L, 334	7
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Lab Elective: AAE 352L or 334L	1
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Note: The selected lab should be taken with the corresponding course, if possible.

Propulsion

Thermodynamics: ME 200	3
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Jet Propulsion: AAE 372 or	3
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Rocket Propulsion: AAE 439	
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Note: Students planning to specialize in aeronautics should take AAE 372; those aimed at astronautics should take AAE 439.

Dynamics and Control

Statics and Dynamics: AAE 203, 340	6
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Controls: AAE 301, AAE 364, AAE 364L	7
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Vehicle Dynamics: AAE 421, or 440	3
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Note: Students planning to specialize in aeronautics should take AAE 421; those aimed at astronautics should take AAE 440. AAE 364L is to be taken following AAE 364.

Design

Introduction: AAE 251	3
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Spacecraft: AAE 450 or	3
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Aircraft: AAE 451	
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Note: Students planning to specialize in aeronautics should take AAE 451; those aimed at astronautics should take AAE 450.

Major Electives

9

Minor Electives

6

Note: Major and Minor Electives are topically related specializations within aerospace engineering. They must be approved by the academic advisor.

Technical Electives

6

Note: Technical electives may be chosen from a broad range of science, engineering, or technology courses, subject to the approval of the academic advisor.

Economics

Note: Students must take at least 3cr of coursework focused on Economics, Business, or Entrepreneurship, subject to approval by the academic Advisor. This may be covered either in the General Education or Technical Electives and therefore need not increase the credits to graduation

CURRENT: (from the 2004–2006 Engineering Catalog)

**Suggested Plan of Study for Aeronautical and Astronautical Engineering:
Aeronautics Concentration**

Credit Hours Required for Graduation: 131

Freshman Year, see First-Year Engineering

CGT 163 is required in the aeronautical and astronautical engineering curriculum.

Sophomore year

Third Semester

(3) AAE 203 Aeromechanics I
(4) MA 261 Multivariate Calc.
(3) MA 266 Ordinary Differential Eq.
(3) PHYS 241 Electricity and Optics
(3) General Ed. Elective

(16)

Fourth Semester

(3) AAE 204 Aeromechanics II
(1) AAE 204L Aeromechanics II Lab
(3) AAE 251 Intro. to Aerospace Design
(3) ECE 201 Linear Circuit Analysis I
(3) MA 265 Linear Algebra
(3) General Ed. Elective

(16)

Junior Year

Fifth Semester

(3) AAE 333 Fluid Mechanics
(1) AAE 333L Fluid Mechanics Lab.
(3) AAE 352 Structural Analysis
(3) MA 304 Differential Equations for Eng.
and the Sciences (with
Analysis of Nonlinear
Systems)
(3) ME 200 Thermodynamics I
(3) General Ed. Elective

(16)

Sixth Semester

(3) AAE 334 Aerodynamics
(1) AAE 334L Aerodynamics Lab **or**
AAE 352L Structural Analysis Lab
(3) AAE 340 Dynamics and Vibrations
(3) AAE 364 Control Systems Analysis
(3) AAE 372 Jet Propulsion Power Plants
(3) General Ed. Elective

(16)

Senior Year

Seventh Semester

(1) AAE 364L Control Systems Lab
(3) AAE 421 Flight Dynamics and Control
(6) Major or minor area electives
(3) Technical Elective
(3) General Ed. Elective

(16)

Eighth Semester

(3) AAE 451 Aircraft Design
(9) Major or Minor Area Electives
(3) Technical Elective
(3) General Ed. Elective

(18)

**Suggested Plan of Study for Aeronautical and Astronautical Engineering:
Astronautics Concentration**

Credit Hours Required for Graduation: 131

Freshman Year, see First-Year Engineering

CGT 163 is required in the aeronautical and astronautical engineering curriculum.

Sophomore year

Third Semester

(3)	AAE	203	Aeromechanics I
(4)	MA	261	Multivariate Calc.
(3)	MA	266	Ordinary Differential Eq.
(3)	PHYS	241	Electricity and Optics
(3)	General Ed. Elective		
(16)			

Fourth Semester

(3)	AAE	204	Aeromechanics II
(1)	AAE	204L	Aeromechanics II Lab
(3)	AAE	251	Intro. to Aerospace Design
(3)	ECE	201	Linear Circuit Analysis I
(3)	MA	265	Linear Algebra
(3)	General Ed. Elective		
(16)			

Junior Year

Fifth Semester

(3)	AAE	333	Fluid Mechanics
(1)	AAE	333L	Fluid Mechanics Lab.
(3)	AAE	352	Structural Analysis
(3)	MA	304	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)
(3)	ME	200	Thermodynamics I
(3)	General Ed. Elective		
(16)			

Sixth Semester

(3)	AAE	334	Aerodynamics
(1)	AAE	334L	Aerodynamics Lab or
	AAE	352L	Structural Analysis Lab
(3)	AAE	340	Dynamics and Vibrations
(3)	AAE	364	Control Systems Analysis
(3)	Technical Elective		
(3)	General Ed. Elective		
(16)			

Senior Year

Seventh Semester

(1)	AAE	364L	Control Systems Lab
(3)	AAE	439	Rocket Propulsion
(6)	Major or minor area electives		
(3)	Technical Elective		
(3)	General Ed. Elective		
(16)			

Eighth Semester

(3)	AAE	440	Spacecraft Attitude Dynamics
(3)	AAE	450	Aircraft Design
(9)	Major or Minor Area Electives		
(3)	General Ed. Elective		
(18)			

PROPOSED

Suggested Plan of Study for Aeronautical and Astronautical Engineering: Aeronautics Concentration

Credit Hours Required for Graduation: 129

Freshman Year, see First-Year Engineering

CGT 163 is required in the aeronautical and astronautical engineering curriculum.

Students planning to enter AAE are encouraged to take computer programming as the Science Selective

Sophomore year

<i>Third Semester</i>				<i>Fourth Semester</i>			
(3)	AAE	203	Aeromechanics I	(3)	AAE	204	Aeromechanics II
(4)	MA	261	Multivariate Calc.	(1)	AAE	204L	Aeromechanics II Lab
(3)	MA	265	Linear Algebra	(3)	PHYS	241	Electricity and Optics or
(3)	PHYS	241	Electricity and Optics or		AAE	251	Intro. to Aerospace Design
	AAE	251	Intro. to Aerospace Design	(3)	ME	200	Thermodynamics I
(0)	AAE	395	Undergraduate Seminar	(3)	MA	266	Ordinary Differential Eq.
(3)	General Ed. Elective			(3)	General Ed. Elective		
(16)				(16)			

Junior Year

<i>Fifth Semester</i>				<i>Sixth Semester</i>			
(3)	AAE	301	Signals Analysis in Aerospace Engineering	(3)	AAE	334	Aerodynamics
(3)	AAE	333	Fluid Mechanics	(1)	AAE	334L	Aerodynamics Lab or
(1)	AAE	333L	Fluid Mechanics Lab.		AAE	352L	Structural Analysis Lab
(3)	AAE	352	Structural Analysis	(3)	AAE	340	Dynamics and Vibrations
(3)	MA	304	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)	(3)	AAE	364	Control Systems Analysis
(0)	AAE	395	Undergraduate Seminar	(3)	AAE	372	Jet Propulsion Power Plants
(3)	General Ed. Elective			(3)	General Ed. Elective		
(16)				(16)			

Senior Year

<i>Seventh Semester</i>				<i>Eighth Semester</i>			
(1)	AAE	364L	Control Systems Lab	(3)	AAE	451	Aircraft Design
(3)	AAE	421	Flight Dynamics and Control	(9)	Major or Minor Area Electives		
(0)	AAE	395	Undergraduate Seminar	(3)	Technical Elective		
(6)	Major or minor area electives			(3)	General Ed. Elective		
(3)	Technical Elective			(18)			
(3)	General Ed. Elective						
(16)							

**Suggested Plan of Study for Aeronautical and Astronautical Engineering:
Astronautics Concentration**

Credit Hours Required for Graduation: 129

Freshman Year, see First-Year Engineering

CGT 163 is required in the aeronautical and astronautical engineering curriculum.

Students planning to enter AAE are encouraged to take computer programming as the Science Selective

Sophomore year

<i>Third Semester</i>				<i>Fourth Semester</i>			
(3)	AAE	203	Aeromechanics I	(3)	AAE	204	Aeromechanics II
(4)	MA	261	Multivariate Calc.	(1)	AAE	204L	Aeromechanics II Lab
(3)	MA	265	Linear Algebra	(3)	PHYS	241	Electricity and Optics or
(3)	PHYS	241	Electricity and Optics or	AAE	251	Intro. to Aerospace Design	
	AAE	251	Intro. to Aerospace Design	(3)	ME	200	Thermodynamics I
(0)	AAE	395	Undergraduate Seminar	(3)	MA	266	Ordinary Differential Eq.
(3)	General Ed. Elective			(3)	General Ed. Elective		
(16)				(16)			

Junior Year

<i>Fifth Semester</i>				<i>Sixth Semester</i>			
(3)	AAE	301	Signals Analysis in Aerospace Engineering	(3)	AAE	334	Aerodynamics
(3)	AAE	333	Fluid Mechanics	(1)	AAE	334L	Aerodynamics Lab or
(1)	AAE	333L	Fluid Mechanics Lab.	AAE	352L	Structural Analysis Lab	
(3)	AAE	352	Structural Analysis	(3)	AAE	340	Dynamics and Vibrations
(3)	MA	304	Differential Equations for	(3)	AAE	364	Control Systems Analysis
			Eng. and the Sciences (with	(3)	Technical Elective		
			Analysis of Nonlinear	(3)	General Ed. Elective		
			Systems)	(16)			
(0)	AAE	395	Undergraduate Seminar				
(3)	General Ed. Elective						
(16)							

Senior Year

<i>Seventh Semester</i>				<i>Eighth Semester</i>			
(1)	AAE	364L	Control Systems Lab	(3)	AAE	440	Spacecraft Attitude Dynamics
(3)	AAE	439	Rocket Propulsion	(3)	AAE	450	Aircraft Design
(0)	AAE	395	Undergraduate Seminar	(9)	Major or Minor Area Electives		
(6)	Major or minor area electives			(3)	General Ed. Elective		
(3)	Technical Elective			(18)			
(3)	General Ed. Elective						
(16)							