

**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.

An updated curriculum proposed by the Faculty of the School of Aeronautics and Astronautics is attached. Specifically, the AAE Curriculum Requirements and the Suggested Plan of Study are both included. In each case, the current version, as it appears in the 2004-06 Catalog, and the proposed version are given in that sequence.

The substantial changes are summarized here:

- Change 1:** Number of Credit Hours required reduced from 131 to 128  
**Reason:** This is due to changes in the 1<sup>st</sup> 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 AAE301  
**Reason:** The AAE faculty believes that the signal analysis material in AAE301 is critically important to aerospace engineers.
- Change 3:** AAE recommends that students take a computer programming language in the first year to fulfill the Science Selective.  
**Reason:** This is due to changes in the 1<sup>st</sup> 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 business/economic context of engineering is a necessary part of a BSAAE degree.
- Change 6:** Students must register for AAE395 at least once each year, as specified by the academic advisor  
**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.

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Thomas N. Farris, Professor and Head  
School of Aeronautics & Astronautics

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

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 128 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: 128**

<b>Basic Program</b>	<b>Credit Hours</b>
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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 152, 241	7
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#### **Communications, Humanities and Social Sciences**

Composition: ENGL 106 or equivalent	3
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Communications	3
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ENGR 100	1
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General Education Electives	18
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*Note: Composition is required in the First-Year program. 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.*

#### **Computer Skills**

ENGR 126 or 116	3
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Programming: CS 158, 190E or ENGR 117	2
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Graphics: CGT 163	2
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#### **Aeronautics and Astronautics Program**

Structures: 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 <b>or</b>	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 <b>or</b>	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**

#### **Minor Electives**

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

#### **Technical Electives**

*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**

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**Credit Hours Required for Graduation: 131**

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**Freshman Year, see First-Year Engineering**

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

**Sophomore year**

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***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  

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(16)

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***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  

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(16)

**Junior Year**

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***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)s  
(3) ME 200 Thermodynamics I  
(3) General Ed. Elective  

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(16)

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***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  

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(16)

**Senior Year**

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***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  

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(16)

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***Eighth Semester***

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

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(18)

***CURRENT: (from the 2004–2006 Engineering Catalog)***

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

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**Credit Hours Required for Graduation: 131**

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**Freshman Year**, see First-Year Engineering

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

**Sophomore year**

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***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  

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(16)

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***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  

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(16)

**Junior Year**

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***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)s  
(3) ME 200 Thermodynamics I  
(3) General Ed. Elective  

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(16)

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***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  

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(16)

**Senior Year**

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***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  

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(16)

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***Eighth Semester***

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

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(18)

## ***PROPOSED***

### **Suggested Plan of Study for Aeronautical and Astronautical Engineering:**

**Credit Hours Required for Graduation: 128**

**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 <b>or</b>
(3)	PHYS	241	Electricity and Optics <b>or</b>		AAE	251	Intro. to Aerospace Design
	AAE	251	Intro. to Aerospace Design	(3)	ME	200	Thermodynamics I
(3)	General Ed. Elective			(3)	MA	266	Ordinary Differential Eq.
(16)				(3)	General Ed. Elective		
				(16)			

### ***Aeronautics Concentration***

### **Junior Year**

Fifth Semester				Sixth Semester			
(3)	AAE	301	Signals Analysis in Aerospace Engineering	(3)	AAE	334	Aerodynamics
(3)	AAE	333	Fluid Mechanics	(1)	AAE	334L	Aerodynamics Lab <b>or</b>
(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
				(3)	AAE	372	Jet Propulsion Power Plants
				(3)	General Ed. Elective		
				(16)			
(3)	General Ed. Elective						
(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		
(6)	Major or minor area electives			(3)	Technical Elective		
(3)	Technical Elective			(3)	General Ed. Elective		
(3)	General Ed. Elective			(18)			
(16)							

*Astronautics Concentration*

**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 <b>or</b>
(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)s	(3)	AAE	364	Control Systems Analysis
				(3)			Technical Elective
				(3)			General Ed. Elective
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(3)			General Ed. Elective				
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(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	Spacecraft Design
(6)			Major or minor area electives	(9)			Major or Minor Area Electives
(3)			Technical Elective	(3)			General Ed. Elective
(3)			General Ed. Elective	<hr/>			
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(16)							