Engineering Faculty Document No. 8-05
January 20, 2006

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.

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE COMMITTEE ON
FACULTY RELATIONS

CFR Minutes #2

Date 9/8/06

Chairman CFR Michael Stanuski

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

Basic Program	*Credit Hours*
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*
Mathematics	
Calculus: MA 165, 166, 261	**12**
Linear Algebra: MA 265	**3**
Differential Equations: MA 266, 304	**6**
Sciences	
Chemistry: CHM 115	**4**
Physics: PHYS 172, 241	**7**
Communications, Humanities and Social Sciences	
English Composition	**3**
Communications	**3**
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**
Computer Skills	
ENGR 126 or 126H	**3**
Programming: CS 158, 159, or ENGR 117	**3**
Graphics: CGT 163	**2**
Professional Development: ENGR 100	**1**
Aeronautics and Astronautics Program	
Professional Development: AAE 395	**0**
Structures and Materials	
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, 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.	
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				*Fourth Semester*			
(3)	AAE	203	Aeromechanics I	(3)	AAE	204	Aeromechanics II
(4)	MA	261	Multivariate Calc.	(1)	AAE	204L	Aeromechanics II Lab
(3)	MA	266	Ordinary Differential Eq.	(3)	AAE	251	Intro. to Aerospace Design
(3)	PHYS	241	Electricity and Optics	(3)	ECE	201	Linear Circuit Analysis I
(3)	General Ed. Elective			(3)	MA	265	Linear Algebra
(16)				(3)	General Ed. Elective		
				(16)			

Junior Year

Fifth Semester				*Sixth Semester*			
(3)	AAE	333	Fluid Mechanics	(3)	AAE	334	Aerodynamics
(1)	AAE	333L	Fluid Mechanics Lab.	(1)	AAE	334L	Aerodynamics Lab **or**
(3)	AAE	352	Structural Analysis		AAE	352L	Structural Analysis Lab
(3)	MA	304	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)	(3)	AAE	340	Dynamics and Vibrations
				(3)	AAE	364	Control Systems Analysis
				(3)	AAE	372	Jet Propulsion Power Plants
(3)	ME	200	Thermodynamics I	(3)	General Ed. Elective		
(3)	General Ed. Elective			(16)			
(16)							

Senior Year

Seventh Semester				*Eighth Semester*			
(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)							

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				*Fourth Semester*			
(3)	AAE	203	Aeromechanics I	(3)	AAE	204	Aeromechanics II
(4)	MA	261	Multivariate Calc.	(1)	AAE	204L	Aeromechanics II Lab
(3)	MA	266	Ordinary Differential Eq.	(3)	AAE	251	Intro. to Aerospace Design
(3)	PHYS	241	Electricity and Optics	(3)	ECE	201	Linear Circuit Analysis I
(3)	General Ed. Elective			(3)	MA	265	Linear Algebra
(16)				(3)	General Ed. Elective		
				(16)			

Junior Year

Fifth Semester				*Sixth Semester*			
(3)	AAE	333	Fluid Mechanics	(3)	AAE	334	Aerodynamics
(1)	AAE	333L	Fluid Mechanics Lab.	(1)	AAE	334L	Aerodynamics Lab **or**
(3)	AAE	352	Structural Analysis		AAE	352L	Structural Analysis Lab
(3)	MA	304	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)	(3)	AAE	340	Dynamics and Vibrations
				(3)	AAE	364	Control Systems Analysis
				(3)	Technical Elective		
(3)	ME	200	Thermodynamics I	(3)	General Ed. Elective		
(3)	General Ed. Elective			(16)			
(16)							

Senior Year

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

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

Third Semester				*Fourth Semester*			
(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

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 **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
				(3)	AAE	372	Jet Propulsion Power Plants
				(3)	General Ed. Elective		
(0)	AAE	395	Undergraduate Seminar	(16)			
(3)	General Ed. Elective						
(16)							

Senior Year

Seventh Semester				*Eighth Semester*			
(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

Third Semester				*Fourth Semester*			
(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

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 **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
				(3)	Technical Elective		
				(3)	General Ed. Elective		
(0)	AAE	395	Undergraduate Seminar	(16)			
(3)	General Ed. Elective						
(16)							

Senior Year

Seventh Semester				*Eighth Semester*			
(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)							