

**TO:** The Faculty of the College of Engineering

**FROM:** School of Aeronautics and Astronautics of the College of Engineering

**RE:** Curriculum Change for the B.S. Degree in Aeronautical and Astronautical Engineering

The faculty of the School of Aeronautics and Astronautics has approved the following new changes in the curriculum for the B.S. degree in Aeronautical and Astronautical Engineering effective for students entering the School in the Fall Semester 2011. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**New Requirements:** First year requirements ENGR100 and ENGR 126 have been updated to the current ENGR 13100 and ENGR 13200. The undergraduate seminar AAE 39500, has been replaced by AAE 20000, 30000 and 40000. The senior seminar has been changed from 0 cr to 1 cr. The minimum total number of credits required for the degree is thereby increased from 129 to 130.

**Reason:** The changes in the first year requirements reflect current First Year Engineering requirements. The renumbering of the seminars increases clarity for the students and makes pre-requisites easier to implement in Banner. The credit assigned to the senior seminar is necessary to permit program level outcomes assessment.

<b>Current</b>		<b>Proposed</b>	
<b>Credit Hours Required for Graduation: 129</b>		<b>Credit Hours Required for Graduation: 130</b>	
<b>Basic Program</b>	<b>Credit Hours</b>	<b>Basic Program</b>	
		<b>Credit Hours</b>	
<i>The basic B.S.AAE degree program has a minimum of 129 credit hours, including 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 a 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:</i>			
<b>Mathematics</b>		<b>Mathematics</b>	
Calculus: MA 16500, 16600, 26100	12	Calculus: MA 16500, 16600, 26100	12
Linear Algebra: MA 26500	3	Linear Algebra: MA 26500	3
Differential Equations: MA 26600, 30400	6	Differential Equations: MA 26600, 30400	6
<b>Sciences</b>		<b>Sciences</b>	
Chemistry: CHM 11500	4	Chemistry: CHM 11500	4
Physics: PHYS 17200, 24100	7	Physics: PHYS 17200, 24100	7
<b>Communications, Humanities, and Social Sciences</b>		<b>Communications, Humanities, and Social Sciences</b>	
English Composition	3	English Composition	3
Communications	3	Communications	3
<i>Note: students must take at least 3 credits of coursework focused on written and/or spoken communications at the 300 level or higher.</i>			
<b>General Education Electives</b>	18	<b>General Education Electives</b>	18
<b>Computer Skills</b>		<b>Computer Skills</b>	
ENGR 12600	3	Programming: CS 15900, ENGR 13200	5
Programming: CS 15900	3	Graphics: CGT 16300	2
Graphics: CGT 16300	2		
<b>Professional Development: ENGR 1000</b>	1	<b>Professional Development</b>	
		Undergraduate Seminar: AAE 20000, 30000, 40000	1
		ENGR 13100	2
		<i>Note: AAE 20000 will be taken once in the sophomore year, AAE 30000 once in the junior year and AAE 40000 once in the senior year.</i>	

<b>Current</b>		<b>Proposed</b>	
<b>Aeronautics and Astronautics Program</b>		<b>Aeronautics and Astronautics Program</b>	
Structures and Materials: AAE 20400, 20400L, 35200	7	<b>Structures and Materials:</b> AAE 20400, 204 <b>01</b> , 35200	7
Aerodynamics: AAE 33300, 33300L, 33400	7	<b>Aerodynamics:</b> AAE 33300, 333 <b>01</b> , 33400	7
Lab Elective: AAE 35200L or 33400L	1	Lab Elective: AAE 352 <b>01</b> or 334 <b>01</b>	1
<i>Note: The selected lab should be taken with the corresponding course, if possible.</i>		<i>Note: The selected lab should be taken with the corresponding course, if possible.</i>	
<b>Propulsion</b>		<b>Propulsion</b>	
Thermodynamics: ME 20000	3	Thermodynamics: ME 20000	3
Jet Propulsion AAE 37200 or Rocket Propulsion AAE 43900	3	Jet Propulsion AAE 37200 or Rocket Propulsion AAE 43900	3
<i>Note: Students planning to specialize in aeronautics should take AAE 37200; those aimed at astronautics should take AAE 43900.</i>		<i>Note: Students planning to specialize in aeronautics should take AAE 37200; those aimed at astronautics should take AAE 43900.</i>	
<b>Dynamics and Control</b>		<b>Dynamics and Control</b>	
Statics and Dynamics: AAE 20300, 34000	6	Statics and Dynamics: AAE 20300, 34000	6
Controls: AAE 30100, 36400, 36400L	7	Controls: AAE 30100, 36400, 364 <b>01</b>	7
Vehicle Dynamics: AAE 42100 or 44000	3	Vehicle Dynamics: AAE 42100 or 44000	3
<i>Note: Students planning to specialize in aeronautics should take AAE 42100; those aimed at astronautics should take AAE 44000. AAE 36400L is to be taken following AAE 36400.</i>		<i>Note: Students planning to specialize in aeronautics should take AAE 42100; those aimed at astronautics should take AAE 44000. AAE 364<b>01</b> is to be taken following AAE 36400.</i>	
<b>Design</b>		<b>Design</b>	
Introduction: AAE 25100	3	Introduction: AAE 25100	3
Spacecraft: AAE 45000 or Aircraft: AAE 45100	3	Spacecraft: AAE 45000 or Aircraft: AAE 45100	3
<i>Note: Students planning to specialize in aeronautics should take AAE 45100; those aimed at astronautics should take 45000.</i>		<i>Note: Students planning to specialize in aeronautics should take AAE 45100; those aimed at astronautics should take 45000.</i>	
<b>Major Electives</b>	9	<b>Major Electives</b>	9
<b>Minor Electives</b>	6	<b>Minor Electives</b>	6
<i>Note: Major and minor electives are typically related specializations within aerospace engineering. They must be approved by the academic advisor.</i>		<i>Note: Major and minor electives are typically related specializations within aerospace engineering. They must be approved by the academic advisor.</i>	

**Current**

**Technical Electives**

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

*Note: Students must take 3 credits 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 graduate.*

*Total*

**Proposed**

**Technical Electives**

6 *Note: Technical electives may be chosen from a broad range of science, engineering, or technology courses, subject to approval from the academic advisor.* 6

*Note: Students must take 3 credits 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 graduate.*

129 *Total*

**130**

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Tom I-P. Shih, Professor and Head  
School of Aeronautics and Astronautics

*Current*

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

**Credit Hours Required for Graduation: 129**

**Freshman Year**, see First-Year Engineering: 32  
**CGT 16300** 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**

(3)	AAE	20300	Aeromechanics
(0)	AAE	39500	Undergraduate Seminar
(4)	MA	26100	Multivariate Calc.
(3)	MA	26500	Linear Algebra
(3)	PHYS	24100	Electricity and Optics <b>or</b>
	AAE	25100	Intro. to Aerospace Design
(3)	General Education Elective		
(16)	Total		

**Fourth Semester**

(3)	AAE	20400	Aeromechanics II
(1)	AAE	20401	Aeromechanics II Lab
(3)	PHYS	24100	Electricity and Optics <b>or</b>
	AAE	25100	Intro. to Aerospace Design
(3)	ME	20000	Thermodynamics I
(3)	MA	26600	Ordinary Differential Eq.
(3)	General Education Elective		
(16)	Total		

*Proposed*

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

**Credit Hours Required for Graduation: 130**

**Freshman Year**, see First-Year Engineering: 31  
**CGT 16300** 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 Semester  
Third Semester**

(3)	AAE	20300	Aeromechanics
<b>(0)</b>	<b>AAE</b>	<b>20000</b>	<b>Undergraduate Sophomore Seminar</b>
(4)	MA	26100	Multivariate Calc.
(3)	MA	26500	Linear Algebra
(3)	PHYS	24100	Electricity and Optics <b>or</b>
	AAE	25100	Intro. to Aerospace Design
(3)	General Education Elective		
(16)	Total		

**Fourth Semester**

(3)	AAE	20400	Aeromechanics II
(1)	AAE	20401	Aeromechanics II Lab
(3)	PHYS	24100	Electricity and Optics <b>or</b>
	AAE	25100	Intro. to Aerospace Design
(3)	ME	20000	Thermodynamics I
(3)	MA	26600	Ordinary Differential Eq.
(3)	General Education Elective		
(16)	Total		

<i>Current</i>				<i>Proposed</i>			
<b>Aeronautics Concentration</b>				<b>Aeronautics Concentration</b>			
<b>Junior Year</b>				<b>Junior Year</b>			
<b>Fifth Semester</b>				<b>Fifth Semester</b>			
(3)	AAE	30100	Signals Analysis in Aerospace Engineering	(3)	AAE	30100	Signals Analysis in Aerospace Engineering
(3)	AAE	33300	Fluid Mechanics	(3)	AAE	33300	Fluid Mechanics
(1)	AAE	33301	Fluid Mechanics Lab.	(1)	AAE	33301	Fluid Mechanics Lab.
(3)	AAE	35200	Structural Analysis	(3)	AAE	35200	Structural Analysis
(0)	AAE	39500	Undergraduate Seminar	<b>(0)</b>	<b>AAE</b>	<b>30000</b>	<b>Undergraduate Junior Seminar</b>
(3)	MA	30400	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)	(3)	MA	30400	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)
(3)	General Education Elective			(3)	General Education Elective		
(16)	Total			(16)	Total		

<b>Aeronautics Concentration</b>				<b>Aeronautics Concentration</b>			
<b>Junior Year</b>				<b>Junior Year</b>			
<b>Sixth Semester</b>				<b>Sixth Semester</b>			
(3)	AAE	33400	Aerodynamics	(3)	AAE	33400	Aerodynamics
(1)	AAE	33401	Aerodynamics Lab	(1)	AAE	33401	Aerodynamics Lab <b>or</b>
	AAE	35201	Structural Analysis Lab		AAE	35201	Structural Analysis Lab
(3)	AAE	34000	Dynamics and Vibrations	(3)	AAE	34000	Dynamics and Vibrations
(3)	AAE	36400	Control Systems Analysis	(3)	AAE	36400	Control Systems Analysis
(3)	AAE	37200	Jet Propulsion Power Plants	(3)	AAE	37200	Jet Propulsion Power Plants
(3)	General Education Elective			(3)	General Education Elective		
(16)	Total			(16)	Total		

*Current*

**Aeronautics Concentration**  
**Senior Year**  
**Seventh Semester**

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(1)	AAE	36401	Control Systems Lab
(3)	AAE	42100	Flight Dynamics and Control
(0)	AAE	39500	Undergraduate Seminar
(6)			Major or minor area electives
(3)			Technical Elective
(3)			General Education Elective
(16)			Total

*Proposed*

**Aeronautics Concentration**  
**Senior Semester**  
**Seventh Semester**

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(1)	AAE	36401	Control Systems Lab
(3)	AAE	42100	Flight Dynamics and Control
<b>(1)</b>	<b>AAE</b>	<b>40000</b>	<b>Undergraduate Senior Seminar</b>
(6)			Major or Minor area electives
(3)			Technical Elective
(3)			General Education Elective
<b>(17)</b>			Total

**Aeronautics Concentration**  
**Senior Year**  
**Eighth Semester**

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(3)	AAE	45100	Aircraft Design
(9)			Major or Minor Area Electives
(3)			Technical Elective
(3)			General Education Elective
(18)			Total

**Aeronautics Concentration**  
**Senior Semester**  
**Eighth Semester**

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(3)	AAE	45100	Aircraft Design
(9)			Major or Minor area electives
(3)			Technical Elective
(3)			General Education Elective
(18)			Total

<i>Current</i>				<i>Proposed</i>			
<b>Astronautics Concentration</b>				<b>Astronautics Concentration</b>			
<b>Junior Semester</b>				<b>Junior Semester</b>			
<b>Fifth Semester</b>				<b>Fifth Semester</b>			
(3)	AAE	30100	Signals Analysis in Aerospace Engineering	(3)	AAE	30100	Signals Analysis in Aerospace Engineering
(3)	AAE	33300	Fluid Mechanics	(3)	AAE	33300	Fluid Mechanics
(1)	AAE	33301	Fluid Mechanics Lab.	(1)	AAE	33301	Fluid Mechanics Lab.
(3)	AAE	35200	Structural Analysis	(3)	AAE	35200	Structural Analysis
(3)	MA	30400	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)s	(3)	MA	30400	Differential Equations for Eng. and the Sciences (with Analysis of Nonlinear Systems)s
(0)	AAE	39500	Undergraduate Seminar	<b>(0)</b>	<b>AAE</b>	<b>30000</b>	<b>Undergraduate Junior Seminar</b>
(3)	General Education Elective			(3)	General Education Elective		
(16)	Total			(16)	Total		
<b>Astronautics Concentration</b>				<b>Astronautics Concentration</b>			
<b>Junior Semester</b>				<b>Junior Semester</b>			
<b>Sixth Semester</b>				<b>Sixth Semester</b>			
(3)	AAE	33400	Aerodynamics	(3)	AAE	33400	Aerodynamics
(1)	AAE	33401	Aerodynamics Lab <b>or</b>	(1)	AAE	33401	Aerodynamics Lab <b>or</b>
	AAE	35201	Structural Analysis Lab		AAE	35201	Structural Analysis Lab
(3)	AAE	34000	Dynamics and Vibrations	(3)	AAE	34000	Dynamics and Vibrations
(3)	AAE	36400	Control Systems Analysis	(3)	AAE	36400	Control Systems Analysis
(3)	Technical Elective			(3)	Technical Elective		
(3)	General Education Elective			(3)	General Education Elective		
(16)	Total			(16)	Total		



*Current*

**Astronautics Concentration  
Senior Semester  
Seventh Semester**

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(1)	AAE	36401	Control Systems Lab
(3)	AAE	43900	Rocket Propulsion
(0)	AAE	39500	Undergraduate Seminar
(6)			Major or minor area electives
(3)			Technical Elective
(3)			General Education Elective
(16)			Total

**Astronautics Concentration  
Senior Semester  
Eighth Semester**

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(3)	AAE	44000	Spacecraft Attitude Dynamics
(3)	AAE	45000	Spacecraft Design
(9)			Major or Minor Area Electives
(3)			General Education Elective
(18)			Total

*Proposed*

**Astronautics Concentration  
Senior Semester  
Seventh Semester**

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(1)	AAE	36401	Control Systems Lab
(3)	AAE	43900	Rocket Propulsion
<b>(1)</b>	<b>AAE</b>	<b>40000</b>	<b>Undergraduate Senior Seminar</b>
(6)			Major or Minor Area Elective
(3)			Technical Elective
(3)			General Education Elective
<b>(17)</b>			Total

**Astronautics Concentration  
Senior Semester  
Eighth Semester**

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(3)	AAE	44000	Spacecraft Attitude Dynamics
(3)	AAE	45000	Spacecraft Design
(9)			Major or Minor Area Elective
(3)			General Education Elective
(18)			Total