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 2018. This action is now submitted to the Engineering Faculty with a recommendation for approval.

New Requirements: The requirement for nine credit hours of "Major Electives" has been changed to nine credit hours in an "Area of Concentration." The requirement for six credit hours in "Minor Electives" has been changed to six credit hours in "AAE Selective."

Reason:

Currently, AAE students must take courses in "Major Electives" and "Minor Electives," and must choose a concentration in either Aeronautics or Astronautics. The present terminology is confusing and the requirements are unnecessarily burdensome; furthermore all students earn the exact same degree regardless of how they fulfill these requirements. The change to a nine hour requirement in an Area of Concentration and the elimination of the terms "Major" and "Minor" is a change in terminology that will eliminate confusion related to Major and Minor degree requirements. The change from "Minor Elective" to "AAE Selective" will allow students to have increased exposure to the growing breadth of topics in aerospace engineering. To further eliminate complications in the AAE curriculum, the distinction between an aeronautics track and an astronautics track is removed in the Plan of Study.

> Approved for the faculty of the Schools of Engineering by the Engineering Curriculum Committee

ECC Minutes Chairman ECC

Current

40000 once in the senior year.

Proposed **Credit Hours Required for Graduation: 130 Credit Hours Required for Graduation: 130**

Graduation: 130		Graduation: 130	
Basic Program	Credit Hours	Basic Program	Credit Hours
The basic B.S.AAE degree program has a minimum of 130 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:		The basic B.S.AAE degree program has a minimum of 130 credit hours, including First-Year Engineering requirements. The required courses, the Major concentration area, and AAE selective 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:	
Mathematics		Mathematics	
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
Sciences		Sciences	
Chemistry: CHM 11500	4	Chemistry: CHM 11500	4
Physics: PHYS 17200, 24100	7	Physics: PHYS 17200, 24100	7
Communications, Humanities, and Social Sciences		Communications, Humanities, and Social Sciences	
English Composition	3	English Composition	3
Communications	3	Communications	3
Note: students must take at least 3 credits of coursework focused on written and/or spoken communications at the 300 level or higher.			
General Education Electives	18	General Education Electives	18
Computer Skills		Note: students must take at least 3 credits of coursework focused on written and/or spoken communications at the 300 level or higher. Computer Skills	
Programming: CS 15900, ENGR 13200	5	Programming: CS 15900, ENGR 13200	5
Graphics: CGT 16300	2	Graphics: CGT 16300	2
Professional Development		Professional Development	
Undergraduate Seminar: AAE 20000, 30000, 40000	1	Undergraduate Seminar: AAE 20000, 30000, 40000	1
ENGR 13100	2	ENGR 13100	2
Note: AAE 20000 will be taken once in the sophomore year, AAE 30000 once in the junior year and AAE		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.

Current		Proposed	
Aeronautics and Astronautics Program		Aeronautics and Astronautics Program	
Structures and Materials: AAE 20400, 20401, 35200	7	Structures and Materials: AAE 20400, 20401, 35200	7
Aerodynamics: AAE 33300, 33301, 33400	7	Aerodynamics: AAE 33300, 33301, 33400	7
Lab Elective: AAE 35201 or 33401	1	Lab Elective: AAE 35201 or 33401	1
Note: The selected lab should be taken with the corresponding course, if possible. Propulsion		Note: The selected lab should be taken with the corresponding course, if possible. Propulsion	
Thermodynamics: ME 20000	3	Thermodynamics: ME 20000	3
Aerospace Propulsion: AAE 33900 or	3	Aerospace Propulsion: AAE 33900 or	3
Thermal Sciences: AAE 33800		Thermal Sciences: AAE 33800	
Note: Students planning to specialize in propulsion will take AAE 33800 Thermal Sciences.		Note: Students planning to specialize in propulsion will take AAE 33800 Thermal Sciences.	
Dynamics and Control		Dynamics and Control	
Statics and Dynamics: AAE 20300, 34000	6	Statics and Dynamics: AAE 20300, 34000	6
Controls: AAE 30100, 36400, 36401	7	Controls: AAE 30100, 36400, 36401	7
Vehicle Dynamics: AAE 42100 or 44000 Note: Students planning to specialize in aeronautics should take AAE 42100; those aimed at astronautics should take AAE 44000. AAE 364001 is to be taken	3	Vehicle Dynamics: AAE 42100 or 44000 Note: Students planning to specialize in aeronautics should take AAE 42100; those aimed at astronautics should take AAE 44000. AAE 36401 is to be taken	3
following AAE 36400.		following AAE 36400.	
Design Introduction: AAE 25100	3	Design Introduction: AAE 25100	3
Spacecraft: AAE 45000 or Aircraft: AAE 45100	3	Spacecraft: AAE 45000 or Aircraft: AAE 45100	3
Note: Students planning to specialize in aeronautics should take AAE 45100; those aimed at astronautics should take 45000.		Note: Students planning to specialize in aeronautics should take AAE 45100; those aimed at astronautics should take 45000.	
Major Electives	9	Major Concentration Area	9
Minor Electives	6	AAE Selective	6
Note: Major and minor electives are typically related specializations within aerospace engineering. They must be approved by the academic advisor.		Note: Major concentration courses are typically related specializations within aerospace engineering. AAE Selective courses are typically electives within AAE. Major concentration areas and AAE Selective must be approved by the academic advisor.	

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130

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.

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.

130 Total

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: 130

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

Proposed

Suggested Plan of Study for Aeronautical and Astronautical Engineering:

Credit Hours Required for Graduation: 130

Freshman Year, see First-Year Engineering.
Students planning to enter AAE are encouraged to take CGT 16300 and CS 15900 in the freshman year. CS 15900 is recommended as the Science Selective.

Thir	omore Y d Semest	ter		Thir	omore S d Semest	er		
(3)	AAE	20300	Aeromechanics	(3)	AAE	20300	Aeromechanics	
(0)	AAE	20000	Undergraduate	(0)	AAE	20000	Undergraduate	
			Sophomore Seminar				Sophomore Seminar	
(4)	MA	26100	Multivariate Calc.	(4)	MA	26100	Multivariate Calc.	
(3)	MA	26500	Linear Algebra	(3)	MA	26500	Linear Algebra	
(3)	PHYS	24100	Electricity and Optics or	(3)	PHYS	24100	Electricity and Optics	
` /			•				or	
	AAE	25100	Intro. to Aerospace		AAE	25100	Intro. to Aerospace	
			Design				Design	
(3)	Genera	l Educatio	n Elective	(3)	General	Educatio	on Elective	
(16)	Total			(16)	Total			
` /				` /				
	al C			Fourth Semester				
Four	th Seme	ester		rour	th Schie			
$\frac{\mathbf{Four}}{(3)}$	AAE	20400	Aeromechanics II	(3)	AAE	20400	Aeromechanics II	
			Aeromechanics II Aeromechanics II Lab	100000000000000000000000000000000000000			Aeromechanics II Aeromechanics II Lab	
(3)	AAE	20400	Aeromechanics II Lab	(3)	AAE	20400		
(3)	AAE AAE	20400 20401		(3) (1)	AAE AAE	20400 20401	Aeromechanics II Lab	
(3)	AAE AAE	20400 20401	Aeromechanics II Lab Electricity and Optics or	(3) (1)	AAE AAE	20400 20401	Aeromechanics II Lab Electricity and Optics	
(3)	AAE AAE PHYS	20400 20401 24100	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace	(3) (1)	AAE AAE PHYS	20400 20401 24100	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace	
(3) (1) (3)	AAE AAE PHYS	20400 20401 24100 25100	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design	(3) (1) (3)	AAE AAE PHYS	20400 20401 24100	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design	
(3) (1) (3)	AAE AAE PHYS AAE ME	20400 20401 24100	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I	(3) (1) (3)	AAE AAE PHYS AAE	20400 20401 24100 25100	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I	
(3) (1) (3)	AAE AAE PHYS AAE	20400 20401 24100 25100 20000	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I Ordinary Differential	(3) (1) (3)	AAE AAE PHYS AAE ME	20400 20401 24100 25100 20000	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I Ordinary Differential	
(3) (1) (3) (3) (3)	AAE AAE PHYS AAE ME MA	20400 20401 24100 25100 20000 26600	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I Ordinary Differential Eq.	(3) (1) (3) (3) (3)	AAE AAE PHYS AAE ME MA	20400 20401 24100 25100 20000 26600	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I Ordinary Differential Eq.	
(3) (1) (3)	AAE AAE PHYS AAE ME MA	20400 20401 24100 25100 20000 26600	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I Ordinary Differential	(3) (1) (3)	AAE AAE PHYS AAE ME MA	20400 20401 24100 25100 20000 26600	Aeromechanics II Lab Electricity and Optics or Intro. to Aerospace Design Thermodynamics I Ordinary Differential	

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		Cur	rent			Prop	osed
Aero	nautics (Concentra	tion	Aero	nautical	and Astr	onautical Engineering
Junio	or Year			Junio	r Year		
Fifth	Semeste	er		Fifth	Semeste	r	
(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	33300	Fluid Mechanics Lab.	(1)	AAE	33301	Fluid Mechanics Lab.
(3)	AAE	35200	Structural Analysis	(3)	AAE	35200	Structural Analysis
(0)	AAE	30000	Undergraduate Junior Seminar	(0)	AAE	30000	Undergraduate Junior Seminar
(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)	Ganaral	Education		(3)	Genera	ıl Educati	on Elective
(16)		Education	I Elective	, ,		n Laucan	on Elective
	Total			(16)	Total		
Aero Junio	nautics (or Year	Concentra	tion	Aero Junio	nautical or Year		ronautical Engineering
Aero Junio Sixth	nautics (or Year Semesto	er		Aero Junio Sixth	nautical or Year Semeste	r	
Aero Junio	nautics (or Year		Aerodynamics Aerodynamics Lab	Aero Junio	nautical or Year		Aerodynamics Aerodynamics Lab or
Aero Junio Sixth	nautics (or Year Semesto AAE	er 33400	Aerodynamics	Aero Junio Sixth	nautical or Year Semeste AAE	r 33400	Aerodynamics
Aero Junio Sixth	onautics (or Year a Semesto AAE AAE	33400 33401	Aerodynamics Aerodynamics Lab or Structural Analysis	Aero Junio Sixth	nautical or Year Semeste AAE AAE	33400 33401	Aerodynamics Aerodynamics Lab or
Aero Junio Sixth (3) (1)	nautics (or Year Semesto AAE AAE AAE	33400 33401 35201	Aerodynamics Aerodynamics Lab or Structural Analysis Lab Dynamics and Vibrations Control Systems	Aero Junio Sixth (3) (1)	nautical or Year Semeste AAE AAE AAE	33400 33401 35201	Aerodynamics Aerodynamics Lab or Structural Analysis Lab Dynamics and Vibrations Control Systems
Aero Junio Sixth (3) (1)	AAE AAE AAE AAE AAE AAE	33400 33401 35201 34000	Aerodynamics Aerodynamics Lab or Structural Analysis Lab Dynamics and Vibrations	Aero Junio Sixth (3) (1)	nautical or Year Semeste AAE AAE AAE AAE	33400 33401 35201 34000	Aerodynamics Aerodynamics Lab or Structural Analysis Lab Dynamics and Vibrations
Aero Junio Sixth (3) (1) (3)	nautics (or Year AAE AAE AAE AAE	33400 33401 35201 34000 36400	Aerodynamics Aerodynamics Lab or Structural Analysis Lab Dynamics and Vibrations Control Systems Analysis	Aero Junie Sixth (3) (1) (3) (3)	nautical or Year Semeste AAE AAE AAE AAE	33400 33401 35201 34000 36400	Aerodynamics Aerodynamics Lab or Structural Analysis Lab Dynamics and Vibrations Control Systems Analysis

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		Cur	rent	Proposed				
Aero	nautics Con	centra	ation	Aeronautical and Astronautical Engineering				
Senio	or Year			Senio	or Semes	ster		
Seve	nth Semeste	r		Sevei	nth Sem	ester		
(1)	AAE 3	6401	Control Systems Lab	(1)	AAE	36401	Control Systems Lab	
(3)	AAE 4	2100	Flight Dynamics and Control	(1)	AAE	40000	Undergraduate Senior Seminar	
(1)	AAE 4	0000	Undergraduate Senior Seminar	(6)	Major area el		ration or AAE Selective	
(6)	Major or m	inor a	rea electives	(6)	Technic	cal Electiv	ve	
(3)	Technical I	Electiv	e	(3)	Genera	l Education	on Elective	
(3)	General Ed	lucatio	n Elective					
(17)	Total			(17)	Total			
A		4			4			
	nautics Con	icentra	ation				ronautical Engineering	
Senio	or Year		ation	Senio	or Semes	ster	ronautical Engineering	
Senio Eigh	or Year th Semester	•		Senio Eigh	or Semes th Seme	ster ster		
Senio	or Year th Semester	•	Aircraft Design	Senio	or Semes	ster ster 45100	Aircraft Design OR	
Senio Eigh (3)	or Year th Semester AAE	45100	Aircraft Design	Senio Eigh (3)	or Semes th Seme AAE	ster ster 45100 45000	Aircraft Design OR Spacecraft Design	
Senio Eigh	or Year th Semester AAE	45100		Senio Eigh	or Semes th Seme	ster ster 45100	Aircraft Design OR Spacecraft Design Flight Dynamics and	
Senio Eigh (3)	or Year th Semester AAE	45100	Aircraft Design	Senio Eigh (3)	or Semes th Seme AAE	ster ster 45100 45000 42100	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR	
Senio Eigh (3)	or Year th Semester AAE	45100	Aircraft Design	Senio Eigh (3)	or Semes th Seme AAE	ster ster 45100 45000	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude	
Senio Eigh (3)	or Year th Semester AAE Major or M	45100 Iinor <i>A</i>	Aircraft Design Area Electives	Senic Eigh (3) (3)	or Semesth Semental AAE	45100 45000 42100 44000	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude Dynamics*	
Senio Eigh (3)	or Year th Semester AAE	45100 Iinor <i>A</i>	Aircraft Design Area Electives	Senio Eigh (3)	or Semesth Semental AAE AAE Major	ster ster 45100 45000 42100 44000	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude	
Senic Eigh (3) (9)	or Year th Semester AAE Major or M Technical I	45100 Ainor A Elective	Aircraft Design Area Electives	Senic Eigh (3) (3) (9)	AAE Major area e	45100 45000 42100 44000 Concent	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude Dynamics* cration or AAE Selective	
Senic Eigh (3) (9)	or Year th Semester AAE Major or M	45100 Ainor A Elective	Aircraft Design Area Electives	Senic Eigh (3) (3) (9) (3)	AAE Major area e	45100 45000 42100 44000 Concent	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude Dynamics*	
Senic Eigh (3) (9)	or Year th Semester AAE Major or M Technical I	45100 Ainor A Elective	Aircraft Design Area Electives	Senic Eigh (3) (3) (9)	AAE Major area e Genera	45100 45000 42100 44000 Concent lectives al Educati	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude Dynamics* cration or AAE Selective on Elective	
Senic Eigh (3) (9) (3) (3)	or Year th Semester AAE Major or M Technical I	45100 Ainor A Elective	Aircraft Design Area Electives	Senic Eigh (3) (3) (9) (3)	AAE Major area el Genera Total *AAE 44	45100 45000 42100 44000 Concent lectives al Educati	Aircraft Design OR Spacecraft Design Flight Dynamics and Control OR Spacecraft Attitude Dynamics* cration or AAE Selective	