

Submit originals and one copy to the Faculty Senate Office  
 Email electronic copy (with scanned signatures) to jbharvie@alaska.edu

**REQUEST FOR A NEW MINOR**

**SUBMITTED BY:**

Department	<b>Electrical &amp; Computer Engineering</b>	College/School	<b>College of Engineering &amp; Mines</b>
Prepared by	<b>Dr Michael Hatfield</b>	Phone	<b>474.6098</b>
Email Contact	<b>mchatfield@alaska.edu</b>	Faculty Contact	<b>Dr Michael Hatfield</b>

See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

**PROGRAM IDENTIFICATION:**

<b>TITLE OF MINOR:</b>	<b>Aerospace Engineering</b>		
	<b>*Number of credits required for completion (minimum is 15):</b>	<b>15</b>	
<p>***Unless otherwise specified by the appropriate academic unit, a course may be used more than once toward fulfilling degree, certificate, major and minor requirements. Credit hours for these courses count only once toward total credits required for the degree or certificate. Certifying that [the student has] met all major and minor requirements is the responsibility of [the student's] department faculty, who notify the Registrar's Office." From the General University Requirements section of "How to Earn a Bachelor's Degree" in the UAF Catalog.</p>			
			<b>Do all the required courses currently exist?</b>
			<b>yes</b>
<i>If not, list the corresponding New Course paperwork associated with this request:</i>			

**A. DESCRIPTION OF THE PROPOSED MINOR. Include reasons justifying its creation; objectives of the minor and relationship of the required courses to those objectives.**

Formalizing a minor in Aerospace Engineering leverages the interest by students and the community in aeronautics and space systems engineering, including very popular unmanned aircraft systems (UAS) efforts seen in the news. In addition, this program leverages the new UAS joint position between CEM and the GI's Remote Sensing Directorate/Alaska Center for UAS Integration (ACUASI), Dr Michael Hatfield/ECE. This minor will provide increased ability for UAF engineers to highlight their work in a critical engineering field, and will elevate the status of UAF by the aerospace community and potential students. The program will ensure a constant and growing stream of students for academics and research affiliated with UAF aerospace efforts, such as Alaska Space Grant Program (ASGP) and ACUASI.

As a point of reference, this semester, a graduate course in UAS design was offered in ECE (EE493/693), which already has 10 students enrolled—a very solid turnout given the size of the ECE graduate program.

**B. PROPOSED MINOR REQUIREMENTS AS THEY WILL APPEAR IN THE CATALOG:**

See samples provided on page 3 of this form.

1. Complete the following:\*
  - ME451, Aerodynamics—3 credits
  - ME452, Introduction to Astrodynamics—3 credits
  2. Complete three of the following:\*
  - ME450, Theory of Flight—3 credits
  - ME453, Propulsion Systems—3 credits
  - ME408, Mechanical Vibrations—3 credits
  - EE434, Instrumentation Systems—4 credits
  - EE444, Embedded Systems Design—4 credits
  - EE471, Fundamentals of Automatic Control or ME409, Controls—3 credits
  - GEOS422, Remote Sensing—3 credits
  3. Minimum credits required—15 credits
- Note: 400-level courses require junior standing or instructor permission.  
 \* Students must earn a C grade or better in each course.

**\*\*These courses have prerequisites that need to be taken into consideration.  
(See page 178 of UAF Catalog 2014-2015 for example of Leadership minor)**

**C. ESTIMATED IMPACT**

*WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.*

**No impact, no new courses involved.**

**D. IMPACTS ON PROGRAMS/DEPTS:**

*What programs/departments will be affected by this proposed action?  
Include information on the Programs/Departments contacted (e.g., email, memo)*

**No impact, no new courses involved.**

**F. PERSONNEL DIRECTLY INVOLVED WITH THE MINOR:**

*List faculty currently teaching the required and elective (if any) courses, with a brief statement of duties and qualifications.*

**ME408, Mechanical Vibrations—Dr. Lin Chuen-Sen, Professor  
ME409, Controls—Dr. Chen Cheng-fu, Professor  
ME450, Theory of Flight—Dr. Ed Bargar, Assistant Professor  
ME451, Aerodynamics—Dr. Ed Bargar, Assistant Professor  
ME452, Introduction to Astrodynamics—Dr. Chen Cheng-fu, Professor  
ME453, Propulsion Systems—Dr. Deben Das, Professor  
EE434, Instrumentation Systems—Mr. Steve Stevens, Instructor  
EE444, Embedded Systems Design—Dr. Dejan Raskovic, Associate Professor  
EE471, Fundamentals of Automatic Controls—Dr. Seta Bogosyan, Professor  
GEOS422, Geoscience Applications of Remote Sensing—Dr. Anupma Prakash, Professor**

**G. RELATIONSHIP OF THE PROPOSED MINOR'S OBJECTIVES TO THE "PURPOSES OF THE UNIVERSITY".**

*Include additional justifying information to support creation of the minor such as projected and present enrollments; need or public demand for the minor; support of other programs by the minor's creation, etc.*

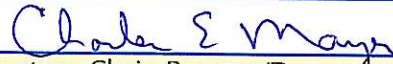
**This minor will provide increased ability for UAF engineers to highlight their work in a critical engineering field, and will elevate the status of UAF by the aerospace community and potential students. The program will ensure a constant and growing stream of students for academics and research affiliated with UAF aerospace efforts, such as Alaska Space Grant Program (ASGP) and the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI).**

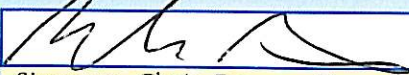
**This effort leverages desire of UA President Gamble in making Alaska an aerospace state. Complementary efforts include the ACUASI program, ASGP, Kenai Space Launch Facility, Poker Flat Research Range (PFRR), and the proposed Alaska UAS Technical Park being coordinated through the state & borough.**


**This minor program is seen as an essential (and no-cost) step in gauging student interest and potentially developing an aerospace major and degree granting program in the future.**


**Minor program will be overseen by the College of Engineering & Mines. Dr. Michael Hatfield will act as minor coordinator. Dr Hatfield has previous experience in administering space systems engineering degree at the US Air Force Academy.**

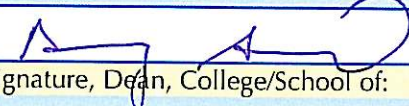
**APPROVALS:**

	Date	9/12/14
Signature, Chair, Program/Department of: <u>Electrical and Computer Engineering</u>		

	Date	9/12/14
Signature, Chair, Program/Department of: <u>Mechanical Engineering</u>		

	Date	9/12/14
Signature, Chair, Program/Department of: <u>Geophysics Geosciences</u>		

	Date	9-25-14
Signature, Chair, College/School Curriculum Council for: <u>CEM</u>		

	Date	10/3/14
Signature, Dean, College/School of: <u>College of Engineering and Mines</u>		

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

Final approval will be at the level of the Chancellor or Chancellor's Designee, following vote of approval by the Faculty Senate.

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## Course Prerequisites/Co-requisites

ME408, Mechanical Vibrations

ES201  
ES210  
ES301

ME209, Controls

ES201  
ES301

ME450, Theory of Flight

ES346

ME451, Aerodynamics

ES301  
ES341  
ES346  
ME313(c)

ME452, Introduction to Astrodynamics

ES208 or ES210  
Math302

ME453, Propulsion Systems

ES341  
ME313(c)

EE434, Instrumentation Systems

COMM131X or COMM141X  
EE334  
EE343  
EE354  
ENGL111X  
ENG211X or ENGL 213X

EE444, Embedded Systems Design

COMM131X or COMM141X  
EE343 or EE341  
EE354  
EE443  
ENGL111X  
ENG211X or ENGL 213X

EE471, Fundamentals of Automatic Controls

EE353  
Math302

GEOS422, Geoscience Application of Remote Sensing

GEOS/GEOG422