This course is available for student registration only after the approval process has been completed.

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>A</th>
<th>V</th>
<th>S</th>
<th>COURSE NO.*</th>
<th>4</th>
<th>2</th>
<th>0</th>
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<th>CREDIT HOURS</th>
<th>3</th>
<th>TERM TO BE ADDED TO THE FILE</th>
<th>Spring 2015</th>
</tr>
</thead>
</table>

*Justify level if 1000-levels and no co- or prerequisites.

| CLASS HOURS | 45 | LECTURE HOURS | 25 | LAB HOURS | 20 | CONTACT HOURS (CEU ONLY) | |||

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>Aeronautics/Academics</th>
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<td>(e.g., Computer Sciences)</td>
<td>(e.g., Lecture, Lab or Special Topics/Project)</td>
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- COLLEGE OF AERONAUTICS - 23
- NATHAN M. BISK COLLEGE OF BUSINESS - 24
- COLLEGE OF ENGINEERING - 1
- COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS - 25
- COLLEGE OF SCIENCE - 26
- EXTENDED STUDIES / NATHAN M. BISK COLLEGE OF BUSINESS - 90

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<th>COMPUTER TITLE</th>
<th>Restricted to 25 characters, including spaces</th>
<th>UAS Applications</th>
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<tbody>
<tr>
<td>CATALOG TITLE</td>
<td>Unmanned Aerial Systems 2</td>
<td></td>
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</table>

**CATALOG DESCRIPTION OF COURSE: Restricted to 250 characters, including spaces**

Provides a study of major subsystems common to most unmanned aerial systems. Includes introductory UAS flight training using commercially available quad-copters and payload-capable hexa-copters. Covers major subsystems common to most UAS, and concludes with a student-planned, -executed and -analyzed UAS mission.

This description has been approved by the catalog office. -Emily 4/2/2016 -

**In addition, please attach a course syllabus and/or more detailed description.**

<table>
<thead>
<tr>
<th>RESTRICTIONS</th>
<th>M</th>
<th>Prerequisite</th>
<th>AVS 4202</th>
<th>Corequisite</th>
<th>Course Number</th>
<th>and</th>
<th>or</th>
<th>GRADES TO BE ISSUED</th>
<th>A, B, C, D, F</th>
<th>A, B, C, D, F, CEU/Audit</th>
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</thead>
<tbody>
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<td>M</td>
<td>Prerequisite</td>
<td>Course Number</td>
<td>Corequisite</td>
<td>Course Number</td>
<td>and</td>
<td>or</td>
<td>CEU</td>
<td>S, U</td>
<td>P, F</td>
</tr>
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</table>

**ADDITIONAL RESTRICTION**

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

<table>
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<th>SUBJECT</th>
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<th>COURSE NO. (e.g., 1301)</th>
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**APPROVALS:** On completion of description and course number verification, affix appropriate signatures as indicated, and submit completed form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval.

<table>
<thead>
<tr>
<th>Originator</th>
<th>Date</th>
<th>Chair, Graduate Council</th>
<th>Date</th>
<th>OR</th>
<th></th>
</tr>
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<tbody>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Department Head/Program Chair</th>
<th>Date</th>
<th>Chair, Undergraduate Curriculum Committee</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

**Dean or Associate Dean**

**Vice President for Institutional Effectiveness**

**CATALOG DIRECTOR**

These changes/additions have been made for the University Catalog and entered into the BANNER term named above.

Catalog Director

**REGISTRAR'S USE ONLY**

<table>
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<tr>
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<th>SCADTEF</th>
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<th>SCABAS</th>
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<th>DISTRIBUTION</th>
<th>Florida Institute of Technology</th>
<th>Office of the Registrar</th>
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<tbody>
<tr>
<td>Original – Registrar</td>
<td>150 West University Boulevard, Melbourne, FL 32901-6975</td>
<td>(321) 674-8114</td>
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Proposed Unmanned Aerial Systems Course

AVS 4203 Commercial UAS Applications

Florida Institute of Technology
College of Aeronautics

COURSE OUTLINE

AVS 4203 Commercial UAS Applications

Instructor:

Course Objective (Catalog Course Description)

AVS 4203 Commercial Unmanned Aerial Systems Applications (3 credits).
This course provides a study of major subsystems common to most Unmanned Aircraft Systems and provides introductory level UAS flight training using commercially available quad-copters and payload-capable hexa-copters. The course covers UAS power systems, autopilot systems, user-interface software, sensors, aerodynamics, flight controls, airborne communication systems, modern materials, as well as mission design, planning, execution, and analysis. Prerequisites: AVS 4202 (Intro to UAS).

Course-level Student Learning Objectives or Outcomes (SLO)

Upon completion of this course, students should have a solid applicable knowledge in UA systems, software, design and engineering and be able to understand and operate a basic rotorcraft UAS.

1. Demonstrate flight proficiency in a small rotorcraft UAS
2. Explain the capabilities and limitations of current UAS power systems
3. Demonstrate competence in autopilot programming and execution
4. Demonstrate competence in UAS software, autopilot, and user-interface integration
5. Explain the integration and application of various UAS sensors
6. Demonstrate an understanding of UAS aerodynamics and flight controls
7. Operate airborne communication systems
8. Describe the application of modern materials to UAS
9. Design, plan, execute, and analyze a UAS mission
Program-level Learning Objectives or Outcomes (PLO):

Within the context of the above course-level student learning objectives, students will be formally assessed on the following two aviation program-level learning objectives or outcomes:

Aviation programs MUST demonstrate that graduates are able to:

a. Apply knowledge, basic engineering, and applied sciences to aviation-related disciplines
b. Analyze and interpret telemetry data and computer software messages.

On-line Component: Angel: https://courses.fit.edu/default.asp
Software training program (Realflight G6) www.realflight.com

Required Texts:
1. FAA FAR/AIM supplements
2. LiPo knowledge of operation, charging and storage

Additional References:
1. Arduino Programming for APM 2.5+
2. Introduction to circuit boards
3. LiPo Battery safety
4. Introduction to Remote Control operation

Grading

<table>
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<tr>
<th>Class participation</th>
<th>5 points</th>
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<tr>
<td>Examination #1</td>
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<tr>
<td>Examination #2</td>
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<tr>
<td>Lab work</td>
<td>15</td>
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<td>Lab evaluation</td>
<td>20</td>
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<tr>
<td>Final Project Presentation</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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</table>
AVS 4203 Commercial UAS Applications
*Small UAS refers to the Nano QX Quadcopter
*Large UAS refers to the Black Locust Hexacopter

Week | Topics
--- | ---
1 | Course introduction / UAS Basics
   LAB Introduction to Small UAS Flight
2 | UA Systems Overview
   LAB Small UAS Flight
3 | UAS Power systems and operation
   LAB Advanced Small UAS Flight
4 | Intro to APM (autopilot) software and user interface (Spektrum DX6i)
   LAB APM 2.5 Programming
5 | Program errors and solutions
   LAB Live programming of APM 2.5
6 | Advanced APM 2.5 Programming
   LAB Sample APM 2.5 build
7 | Introduction to Real Flight Simulator
   LAB Introduction to Real Flight G6 Simulator
8 | UAS Sensor Integration and Applications
   Modern Materials
9 | UAS flight aerodynamics
   Airborne communications
10 | Introduction to UAS Mission Planning
    LAB Real Flight G6 Simulator
11 | Flight controls / Introduction to Large UAS
    LAB Real Flight G6 Simulator / Introduction to Large UAS Flight
12 | UAS Mission Planning
    LAB Real Flight G6 Simulator / Large UAS upset attitude and failsafe testing
13 | LAB UAS Mission Dry Run
<table>
<thead>
<tr>
<th>Page</th>
<th>Content</th>
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</thead>
<tbody>
<tr>
<td>14</td>
<td>LAB UAS Mission Wrap Up</td>
</tr>
<tr>
<td></td>
<td>LAB UAS Mission Wrap Up</td>
</tr>
<tr>
<td>15</td>
<td>Course Review</td>
</tr>
<tr>
<td>16</td>
<td>Final Project Presentation Due</td>
</tr>
</tbody>
</table>
Florida Institute of Technology

ADDING A NEW MAJOR OR MINOR TO THE CURRICULUM

Please provide the following information when requesting a new major or minor (program or option) to be added to the curriculum. Only new majors, minors and options are assigned a new code and print on the diploma. The code will be assigned by the Office of the Registrar and information emailed to all appropriate personnel.

COLLEGE: Aeronautics

DEPARTMENT: Aeronautics

DELIVERY MODE(S): Classroom

CAMPUS/SITES(S): Melbourne

PROGRAM TO BE ADDED: □ Major □ Minor □ Option for ____________________________ (existing degree program)

NOTE: Only Majors, Minors and Options receive new codes and print on the diploma; use Option for new program name to appear with existing degree name.

□ Associate of Arts (A.A.) □ Master of Business Administration (M.B.A.) □ Educational Specialist (Ed.S.)

□ Associate of Science (A.S.) □ Master of Education (M.Ed.) □ Doctor of Business Administration (DBA)

□ Bachelor of Arts (B.A.) □ Master of Public Administration (M.P.A.) □ Doctor of Philosophy (Ph.D.)

□ Bachelor of Science (B.S.) □ Master of Science (M.S.) □ Doctor of Psychology (Psy.D.)

□ Master of Arts (M.A.) □ Master of Science in Aviation (M.S.A.) □ Graduate Certificate

□ Master of Arts in Teaching (M.A.T.)

OTHER ADDITION TO THE CURRICULUM (NOTE: Only Majors, Minors and Options receive new codes and print on the diploma; use Concentration or Specialization if the new program represents less than a full degree curriculum.)

□ Concentration or □ Specialization for ____________________________ (existing degree program)

PROGRAM TITLE: Restricted to 30 characters, including spaces

Aviation Safety

TERM TO BE INITIATED: Fall 2014

ADVISOR FOR NEW PROGRAM: Scott R. Winter

(Date program to be initiated must be no sooner than the next term for which registration has not begun)

ROUTING APPROVALS: 1) Department head/program chair and college dean approve and sign form. 2) The vice president for institutional effectiveness reviews and signs form. 3) The executive vice president or his designee approves business plan of the program in terms of financial viability and impact on the university mission and signs form. 4) Graduate Council or Undergraduate Curriculum Committee approves academics and signs form. 5) The vice president for academic affairs reviews and signs form. 6) The executive vice president or his designee gives final approval of program, signs form and forwards to Office of the Registrar.

1) Department Head/Program Chair
   Date: 3/31/2014

2) Vice President for Institutional Effectiveness
   Date: 4/4/2014

3) Executive Vice President
   Date: 5/1/2014

4) Chair, Graduate Council
   Date: 3/31/2014

5) Chair, Undergraduate Curriculum Committee
   Date: 4/4/2014

6) Vice President for Academic Affairs
   Date: 5/1/2014

   Executive Vice President
   Date: 5/1/2014

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STVMAIR: ____________________________  SOXCURR: ____________________________

GWVSAEX: ____________________________  CIP Code: ____________________________

Operator Initials/Date: ____________________________

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RGR-889/214
PROGRAM OVERVIEW (attachment 1)

Proposed Aviation Safety Minor

Educational objective: provide the student with academic preparation to become professionals in the Aviation Safety Management consulting field.

This minor will provide knowledge with respect to aviation safety related issues. Topics covered will include basic fundamentals of aviation operations and procedures, human factor’s impacts on aviation safety, influences of culture, airport safety, operations safety, and safety management systems.

Aviation Safety (18 credit hours)
Age Restriction: N
Delivery mode/s: classroom only
Degree Awarded: none
Admission Status: undergraduate
Location/s: main campus

Core Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVT 1001 or AVM 1000</td>
<td>Aeronautics 1 or Introduction to Aviation</td>
<td>3</td>
</tr>
<tr>
<td>AHF 3101</td>
<td>Introduction to Human Factors</td>
<td>3</td>
</tr>
<tr>
<td>AVT 4301</td>
<td>Aviation Safety</td>
<td>3</td>
</tr>
<tr>
<td>AVS 4302</td>
<td>Fundamentals of Aviation Safety Systems</td>
<td>3</td>
</tr>
</tbody>
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Elective(s) from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CHE 4284</td>
<td>Industrial Safety (junior in Sci or Eng only)</td>
<td>3</td>
</tr>
<tr>
<td>AVS 1201</td>
<td>Aviation Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>AVS 2402</td>
<td>Introduction to Aviation Environmental Science</td>
<td>3</td>
</tr>
<tr>
<td>AVT 2201</td>
<td>National Airspace System</td>
<td>3</td>
</tr>
<tr>
<td>TECH Elec.</td>
<td>(as approved by program chair)</td>
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<tr>
<td>TECH Elec.</td>
<td>(as approved by program chair)</td>
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</tbody>
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Note: This proposal allows all CoA students to earn an AS minor as 9 extra credits are required outside of the major requirements for all CoA programs
Minors
Florida Tech offers minor degrees in several areas of study. Colleges/departments may designate minors that require **18-21 credit hours** of selected course work, excluding the core courses COM 1011, COM 1102, HUM 2051 and HUM 2052. The intent of the minor is to encourage and recognize focused study in a field outside the student's major. Therefore, **no more than nine credit hours applied to the minor may be named courses in the major.** At least nine credit hours of the minor must be taken at Florida Tech. A minor program GPA of at least 2.0 is required in order to receive recognition for the minor on the student’s diploma, and the minor is only awarded at the same time as the major. Additional restrictions may be placed by the college/department offering the minor.

Minors may be chosen from **within or outside the student's major college.** Minors will be indicated on the student’s transcript and resulting diploma. Requests to pursue a minor will require approval of the minor program plan by both the major and minor program chairs. The request for a minor must be made prior to filing the petition to graduate and must be indicated on the petition.

**Analysis of minor availability for CoA students**

Minors require students to complete at least 9 credit hours outside named courses in their major.

<table>
<thead>
<tr>
<th>Required Courses in Minor</th>
<th>Credit hours from minor courses not named in CoA majors</th>
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<tbody>
<tr>
<td><strong>AVT 1001 or AVM 1000:</strong> Aeronautics 1 or Intro to Aviation</td>
<td>0</td>
</tr>
<tr>
<td><strong>AHF 3101:</strong> Intro to Human Factors</td>
<td>0</td>
</tr>
<tr>
<td><strong>AVT 4301:</strong> Aviation Safety</td>
<td>0</td>
</tr>
<tr>
<td><strong>AVS 4302:</strong> Fund. of Av. Safety Sys.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Elective as:</strong> TBD</td>
<td>3</td>
</tr>
<tr>
<td><strong>Elective as:</strong> TBD</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total hours outside major (9 minimum)</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

**Notes:**
1. This program allows 7113, 7114, 7102, 7103, 7104, 7105 and 7106 majors to earn an AS Minor
Florida Institute of Technology

ADDITIONAL MAJOR OR MINOR TO THE CURRICULUM

Please provide the following information when requesting a new major or minor (program or option) to be added to the curriculum. Only new majors, minors and options are assigned a new code and print on the diploma. The code will be assigned by the Office of the Registrar and information emailed to all appropriate personnel.

COLLEGE: Aeronautics
DELIVERY MODE(S): Classroom/Laboratory
DEPARTMENT: Aeronautics
CAMPUS/SITE(S): Melbourne Campus

PROGRAM TO BE ADDED: ☐ Major ☐ Minor ☐ Option for __________________________ (existing degree program)

NOTE: Only Majors, Minors and Options receive new codes and print on the diploma; use Concentration or Specialization if the new program represents less than a full degree curriculum.

☐ Concentration or ☐ Specialization for __________________________ (existing degree program)

PROGRAM TITLE Restricted to 30 characters, including spaces
Unmanned Aerial Systems

TERM TO BE INITIATED: Fall 2014
ADVISOR FOR NEW PROGRAM: Julie Moore

(Date program to be initiated must be no sooner than the next term for which registration has not begun)

ROUTING APPROVALS: 1) Department head/program chair and college dean approve and sign form. 2) The vice president for institutional effectiveness reviews and signs form. 3) The executive vice president or his designee approves business plan of the program in terms of financial viability and impact on the university mission and signs form. 4) Graduate Council or Undergraduate Curriculum Committee approves academic and signs form. 5) The vice president for academic affairs reviews and signs form. 6) The executive vice president or his designee gives final approval of program, signs form and forwards to Office of the Registrar.

1) Department Head/Program Chair
   Victor DuBose
   Date 4/8/14

2) Dean or Associate Dean
   Lynn May
   Date 4/8/14

3) Vice President for Institutional Effectiveness
   Date 4/10/14

4) Chair, Graduate Council
   Date
   OR
   Chair, Undergraduate Curriculum Committee
   Date

5) Vice President for Academic Affairs
   Date

6) Executive Vice President
   Date

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ROR-1019-214
PROGRAM OVERVIEW (attachment 1)

Proposed Unmanned Aerial Systems (UAS) Minor

Educational Objective: Provide any Florida Tech undergraduate student with the academic preparation and baseline flight training to become professionals in the UAS field.

The minor will provide knowledge with respect to UAS history, FAA and NAS regulatory issues, operations, applications, and subsystems, to include, payloads, sensors, electronics, software, autopilots, and platforms.

Minor Curriculum (18 Credits Total)

AVT 1001 Aeronautics 1 or AVM 1000
AVT 2001 Aeronautics 3 or AVT 2201 NAS
AVS 4202 Unmanned Aerial Systems
AVS 4xxx UAS Applications

3 credit hours (existing course)
3 credit hours (existing course)
3 credit hours (existing course)
3 credit hours (new course to be developed)

The remaining credits (6) may be fulfilled through approved, restricted (or technical) electives.

Note: This proposal allows all CoA students to earn an UAS minor with 9 extra credits required outside of the major requirements for all CoA programs. Additionally, it allows any Florida Tech undergraduate student from the Science or Engineering Colleges to earn an UAS minor with 12 additionally required credits.