

<b>Student ID:</b> _____	<b>Catalog:</b> _____
<b>Student Name:</b> _____	<b>Program: Individualized Degree, B.S.</b>
<b>Advisor Name: Sara Jackson Shumate</b>	<b>Minimum Credits Required: 60</b>
<b>Individualized Degree in Uncrewed Aerospace Systems, B.S.</b>	
<p>The Uncrewed Aerospace Systems (UAS) IDP will provide students with a wide spectrum of topics, forming a strong foundation to compete in the civilian sector in positions related to UAS, with additional opportunities in the military sector. There continues to be a strong demand for UAS professionals given the incorporation of these systems not only in the defense sector, but there is increased use commercially in law enforcement, agriculture, and retail. Studies have shown the need for over 50,000 new jobs in the sector over the last several years and with technology continuing to evolve, this demand is projected to remain. This IDP degree provides knowledge and skills for flight operations and airmanship, mission planning, weather, remote sensing, GIS, and systems integration. This IDP offers four tracks (specializations) that build upon the core courses, which are (1) UAS Advanced Manufacturing, (2) UAS Operations, (3) UAS Science, and (4) UAS Digital Security.</p>	
<p><b>All IDP students are required to submit an IDP proposal for approval. If you have not done so already, please schedule an appointment with an IDP advisor for more information and for access to the Canvas IDP Student Center.</b></p>	
<b>Degree/Graduation Requirements</b>	
<ul style="list-style-type: none"> <li>• <b>Ethnic Studies and Social Justice Course: 3 credits</b> <ul style="list-style-type: none"> <li>○ Students may fulfill the multicultural requirement by taking approved courses within one of the following categories: Arts and Humanities; Historical; Natural and Physical Sciences; Or Social and Behavioral Sciences</li> </ul> </li> <li>• <b>Senior Experience: 3 credits</b> <ul style="list-style-type: none"> <li>○ AES 4603 or AES 3980 (3+) as needed</li> </ul> </li> </ul>	
<b>General Requirements</b>	
<b>General Studies <i>Suggested</i> Coursework</b>	
<ul style="list-style-type: none"> <li>• <u>Written Communication</u>: 6 credits <ul style="list-style-type: none"> <li>○ Recommended: ENG 1010: Composing Arguments (3), and ENG 1020: Research &amp; Argument Writing (3)</li> </ul> </li> <li>• <u>Oral Communications</u>: 3 credits <ul style="list-style-type: none"> <li>○ Recommended: COMM 1010: Presentational Speaking (3)</li> </ul> </li> <li>• <u>Quantitative Literacy</u>: 3 credits <ul style="list-style-type: none"> <li>○ Recommended: MTH 1110: College Algebra (4)</li> </ul> </li> <li>• <u>Historical</u>: 3 credits</li> <li>• <u>Arts and Humanities</u>: 6 credits <ul style="list-style-type: none"> <li>○ Recommended: PHI 3360 Business Ethics (3) and PHI 3670 Computers, Ethics, and Society (3)</li> </ul> </li> <li>• <u>Social and Behavioral Sciences</u>: 6 credits <ul style="list-style-type: none"> <li>○ Recommended: CET 3120 Engineering Economy (3) and IND 2810 Technology and Design: Global Perspectives (3)</li> </ul> </li> <li>• <u>Natural &amp; Physical Sciences</u>: 6 credits <ul style="list-style-type: none"> <li>○ Recommended: CHE 1800 General Chemistry I (4) and PHY 2311 General Physics I (4)</li> </ul> </li> <li>• <u>Global Diversity</u>: 0-3 credits <ul style="list-style-type: none"> <li>○ Recommended: IND 2810 Technology and Design: Global Perspectives (0) (Credits counted towards SBS)</li> </ul> </li> </ul> <p>Students may fulfill the Global Diversity requirement by taking approved courses within one of the following categories: Arts and Humanities, Physical and Natural Sciences, Historical, Social and Behavioral Sciences.</p>	
<b>Total of required credits for General Studies: 33</b>	

## Overview of Major Requirements

- Core classes (34 credits)
- UAS track classes (26-36 credits)

## Major Requirements

### Core Courses

#### *Highly Recommended Core Courses*

- AES 1040 Intro to UAS (3)
- AES 1050 Intro to Space (3)
- AES 1100 Aviation Fundamentals (4)
- AES 1400 Aviation Weather (3)
- AES 2050 Aviation History (3)
- AES 2607 Intro to Aerospace Systems Sim (3)
- AES 2040 UAS Flight & Control (3)
- AES 3040 UAS Data Collection & Analysis (3)
- AES 3600 Space Flight Ops I (3)
- AES 3607 Orbital Mechanics & Aerospace Systems Sim (3) OR AES 3620 Aerospace Systems Project and Mission Scheduling
- AES 3220 Aviation & Aerospace Law (3)

Beyond the highly recommended core courses, the student can choose from one of four tracks that allow for specialization within the UAS domain. The UAS sector is broad, with many potential careers in application-based pathways such as law enforcement, remote sensing, etc.

## UAS TRACKS

### **Option 1: Advanced Manufacturing/ Industrial Design- 120 credits**

This UAS pathway is tailored towards the student that would like to be involved in hands-on production of UAS systems. This can include helping repair fielded systems or assisting with developing new systems on the production line.

- **Career paths: UAS Logistics/ Technician/ Manufacturing**
- Track Specialization Courses (34 credits)
  - MET 1010 Manufacturing Processes (3)
  - CET 1215 Engineering Graphics (3)
  - MET 2200 Materials of Engineering (3)
  - MET 1310 Principles of Quality Assurance (3)
  - MET 1210 3D Modeling (3)
  - MET 3000 Manufacturing Analysis (4)
  - IND 3660 Computer Aided Modeling (3)
  - MET 3410 Geometric Dimensioning & Tolerance (3)
  - MET 3215 Composites Manufacturing (3)
  - AMS 1010 Survey of Advanced Manufacturing & Workplace Preparation (3)
  - AMS 3010 Additive Manufacturing Stratasys Certification (3)

**Option 2: UAS Operations- 120 credits** (includes coursework for the GIS certificate)

This UAS pathway is tailored towards the student that would like to be involved with the operation of UAS systems and geospatial analysis. This can include flying fielded systems, which encompasses supplemental functions of planning, data collection, and analysis.

- **Career paths: UAS Operator/ Planner, System Analyst**

- Track Specialization Courses (36 credits)
  - GIS 1220 Digital Earth: Geospatial Technology (3)
  - GEG 1300 Introduction to Human Geography (3)
  - GIS 2250 Geographic Information Systems (4)
  - GIS 3250 Cartography (3)
  - GIS 4840 Remote Sensing (3)
  - GIS 4850 Spatial Modeling in Raster (4)
  - BUS 1850 Introduction to Business (3)
  - GIS 4810 GIS Programming (3)
  - GIS 4860 GIS Applications (4)
  - IND 3000 Design Thinking (3)
  - AES 4601 Space Flight Operations II (3)

**Option 3: UAS Science- 120 credits**

This UAS pathway is tailored towards the student that would like to be involved with the design of UAS systems. Emphasis will be placed on theory and hard sciences such that the student can be prepared to make design decisions leveraging scientific principles.

- **Career paths: UAS Engineer/ Designer**

- Track Specialization Courses (34 credits)
  - MTH 2540 Scientific Computing with Python (4)
  - CET 1215 Engineering Graphics (3)
  - MTH 2410 Calculus II (4)
  - CIS 2010 Foundations of Information Systems (3)
  - MTH 2420 Calculus III (4)
  - PHY 2331 General Physics II (4)
  - PHY 2341 General Physics II Laboratory (1)
  - MTH 3210 Probability & Statistics (4)
  - PHY 2811 Modern Physics I (4)
  - AES 3530 Aerodynamics (3)

**Option 4: UAS Digital Security- 120 credits**

This UAS pathway is tailored towards the student that would like to apply UAS systems to real-world applications, such as law enforcement. Emphasis will be placed on cybersecurity and information systems to enable the student to integrate best practices in real-world scenarios.

- **Career paths: UAS Security/ Law Enforcement**

- Track Specialization Courses (36 credits)
  - CJC 1010 Introduction to Criminal Justice (3)
  - CYB 2001 Cyber Laws and Regulations (3)
  - CS 1030 Computer Science Principles (3)
  - CSS 2751 Principles of Cybersecurity (3)
  - CYB 2500 Criminal Investigation (3)
  - CIS 2010 Foundation of Information Systems (3)
  - CIS 2110 Structured Problem Solving (3)
  - CIS 3230 Telecommunication Systems and Networking (3)
  - CJC 405M Aviation Security (3)
  - CIS 3050 Fundamentals of System Analysis and Design (3)
  - CIS 3500 Information System Security (3)
  - CJC 3460 Crime Mapping and Analysis (3)

**Space Commercialization Certificate**

Students completing AES 2607, 3600, 4601, 4602, and 4603 will also earn an MSU Denver certificate in Space Commercialization. This certificate will provide the student with the knowledge to seek opportunities in an important and expanding part of the Colorado and national economy, as well as expand opportunities for those currently employed in the industry.

**Total IDP Major Credits: 60-70 credit hours, 30+ upper division**

**Total Credits to graduate: 120+ credit hours, 39 upper division**

**Faculty Liaison(s) from Key Departments: Dr. Michael Botyarov**

**IDP Contact: Dr. Sara Jackson Shumate**

Contact the Center for Individualized Learning here: [CIL Website](#) and [CIL Contact Form](#)