CURRICULUM GUIDE

AERONAUTICAL SCIENCES
Professional Flight Officer
Aviation & Aerospace Management
Air Traffic Control
Airport Management
Unmanned Aeronautical Systems
Air Force ROTC

SPACE SCIENCES
Aerospace Systems Engineering Technology
Aerospace Operations
Aerospace Physics
Space Commercialization
Aerospace Tech-Comm & Systems Analysis

Aviation & Aerospace Science Department
Metropolitan State University of Denver
2019 - 2020

April 2020
NEW Student Checklist – Aviation & Aerospace Science (AVS)

1. **Apply to the University:** Prospective students should apply for admission by walk-in at the Student Success Building (SSB), Room 180, or by filling out an application form online at [www.msudenver.edu/admissions/](http://www.msudenver.edu/admissions/), or by phone at 303-556-3058.

2. **Have Transcripts sent to MSU Denver:** Contact all high schools and colleges attended and request that an official transcript be sent to MSU Denver. Request MSU Denver evaluation of all college transcripts. If you are transferring academic credit, visit MSU Denver Transfer Services at [https://msudenver.edu/admissions/student-types/transfer/](https://msudenver.edu/admissions/student-types/transfer/).

3. **Schedule both an MSU Denver Orientation and a General Advising Session:** For new or transfer student orientation, contact the Office of New Student Orientation at 303-615-0770 or visit [https://msudenver.edu/roadways/orientation/](https://msudenver.edu/roadways/orientation/). To request a general advising session, contact the College of Professional Studies advising office at 303-615-1099 or visit [https://msudenver.edu/cps/advising/](https://msudenver.edu/cps/advising/).

4. **Schedule an appointment with a faculty member of the Aviation & Aerospace Science Department (AVS) for academic advising:** Contact the AVS Department at 303-605-5287 to establish an appointment for advising in your major, or go to Seventh Street Building, Room 102 and schedule an appointment in-person.

5. **Declare your AVS Major:** New students should declare a major (and a minor or certificate program if applicable) as soon as possible. Declare your Major along with a specific concentration during your first advising session with any full-time Aviation & Aerospace Science professor.

6. **Register for Classes:** For registration, follow the Register tab of StudentHub [http://www.msudenver.edu/studenthub/](http://www.msudenver.edu/studenthub/) for procedures and dates.

7. **Establish an Email Account:** Students are provided free email access. All AVS Majors must establish and monitor their MSU Denver email account. Go to [https://www.msudenver.edu/email/](https://www.msudenver.edu/email/). You may retrieve or send email, monitor university information, and access your personal records through your StudentHub account at: [https://www.msudenver.edu/studenthub/](https://www.msudenver.edu/studenthub/)

8. **Review MSU Denver Catalog:** Students should access and review the MSU Denver Catalog in effect at the time they enter MSU Denver. Please see: [http://catalog.msudenver.edu/index.php](http://catalog.msudenver.edu/index.php)

9. **Acquire Degree Progress Reports:** All AES majors must have a current Degree Progress Report for advising with any full-time faculty. Degree Progress Reports may be obtained by the student through StudentHub under the ‘Degree Progress Report’ link. Also see [https://www.msudenver.edu/registrar/facultystaffservices/degreeprogressreport/](https://www.msudenver.edu/registrar/facultystaffservices/degreeprogressreport/)

10. **Obtain FAA Medical Certificate:** Before enrolling in the ASC2 concentration, and before initiating flight training, students should ensure that they can obtain the appropriate FAA medical certificate. See [www.faa.gov/pilots/amelocator/](http://www.faa.gov/pilots/amelocator/). Consult a faculty advisor for details.

11. **Individualized Degree Program (IDP):** If you are seeking any of the IDP degree programs listed in this guide, visit [http://www.msudenver.edu/cil/](http://www.msudenver.edu/cil/) for further information.

12. **Registration for Certificate in Airport Management or Space Commercialization:** You must register with the AVS Department prior to graduation.


( Some images contained within courtesy of NASA unless otherwise noted.)
MSU Denver’s Role and Mission

MSU Denver is a comprehensive, baccalaureate- and master's-degree granting urban university that offers arts and sciences, professional and business courses and programs to a diverse student population in an atmosphere of mutual respect. Excellence in teaching and learning is MSU Denver's primary objective.

MSU Denver's mission is to provide a high-quality, accessible, enriching education that prepares students for successful careers, post-graduate education and lifelong learning in a multicultural, global and technological society. To fulfill its mission, MSU Denver’s diverse university community engages the community at large in scholarly inquiry, creative activity and the application of knowledge.
Welcome to Aviation and Aerospace Science at MSU Denver!

Founded in 1965, Metropolitan State University of Denver is Colorado’s urban land grant university, located on the historic Auraria Campus in downtown Denver. Offering individualized, relevant bachelor degrees as well as select bachelor and graduate level degrees, MSU Denver educates more undergraduate Coloradans than any other collegiate institution in the state. With an enrollment of over 20,000 students, MSU Denver is consistently featured on Forbes’ list of America’s Top Colleges.

The Aviation & Aerospace Science Department (AVS) at MSU Denver is one of the largest and most advanced collegiate aviation programs in the country and offers access to many valuable resources instrumental to the success of our students. The Department’s Aeronautics and Aerospace Systems Laboratories, located on campus, features ultra-modern FAA-approved single and multi-engine flight training devices, aerospace computer-based training systems, live space-based satellite operations and simulations, UAV/UAS operations, full-featured advanced flight labs, and Air Traffic Control training simulation. The Denver area, long a national epicenter of aviation and aerospace commerce, offers numerous area airports, flight schools, and aerospace operational centers – along with great opportunity for employment after graduation!

MSU Denver’s Precision Flight Team has been recognized as one of the top competitive aviation programs in the United States through NIFA national competitions. Our Aerobatics Team ranked first place in the 2017 IAC national competition. Of great significance is that our Aviation & Aerospace Science Department has been honored by the City of Denver and has also been recognized by the State of Colorado Legislature as a State of Colorado recorded Educational Asset, established on strong academics, community involvement, aviation and aerospace skills, safety and an ability to advance the profession and the success of our students!

Department Mission

The mission of the Aviation & Aerospace Science Department is to provide high-quality & relevant education, preparing graduates for success in aviation & aerospace science, technology, and commerce. The AVS Department is dedicated to developing graduates with the intellectual and practical skills needed to compete and succeed in their chosen professions.
Aviation and Aerospace in Colorado

For over 70 years, Colorado’s aviation and aerospace industry has grown and continues to thrive – especially in the professions of the professional flight officer, aviation and airline operations, airport management, commercial space systems, military space operations, and government space systems and space vehicle mission operations!

Today, Colorado boasts the nation’s first entrepreneurial-based aerospace economy, with well over 400 employers either classified as aerospace companies or serving as suppliers to the aviation and aerospace industries. Metro Denver is ranked second among the largest metropolitan areas for aerospace industry cluster employment concentration, and first in the nation for private aerospace employment. In all, over 163,000 professionals are working in aerospace related Colorado jobs!

Several of the nation’s top aerospace contractors have a large presence in Colorado, including Lockheed Martin, Ball Aerospace, Raytheon, Northrup Grumman, Jeppesen-Boeing, and ITT Industries. These companies provide valuable military assets to the Department of Defense, as well as supplying instrumentation, spacecraft, and ground control services to the National Aeronautics and Space Administration (NASA) and many for-profit entities. Private companies in the Denver Front Range area enjoy the benefits of being central to aviation and aerospace commerce. Companies such as York Aerospace, Ball Aerospace, DigitalGlobe, Bye Aerospace, Oakman Aerospace, Sierra Nevada Corporation, and United Launch Alliance are also based or have a significant presence in the state!

Home to one of the healthiest and most highly-educated adult populations in the U.S. and surrounded by the natural beauty of the Rocky Mountains, it is no surprise that Colorado continues to be a hub for the industry, acting as a magnet for big-name aviation and aerospace companies and high-caliber talent.

Colorado is a center for innovation in aviation and aerospace, in particular, the development of new types of aircraft-spacecraft and in the development of commercial space applications. Ongoing close contacts with the many aviation and aerospace businesses and entities in Colorado provide employment, cooperative education, research, and internship opportunities for students and graduates.
AVS Department Directory

FACULTY

Jeffrey Forrest, Ph.D. - Professor & Department Chair - Aerospace Technology, Internships & Individualized Degree Program
303-615-1194 | forrestj@msudenver.edu | BA Geography, University of North Carolina Charlotte; BS Aviation Technology, MSU Denver; MA Space Systems, Webster University; MAS Management, Embry-Riddle Aeronautical University; Ph.D., Information Science, Nova Southeastern University. COM, SEL, SES, MEL, Glider, IA, AGI-IGI, Type HS-125 & CL-600. Specializes in: space science, space commercialization, research methods, aviation & aerospace information policy, and human-computer interaction.

Kevin Kuhlmann, M.A.S. - Professor & Associate Chair - Airline Careers & Bridge Programs, FAA ATCTI (ATC), CNCC, Military & ROTC, & Transfer Student Advisor
303-615-1196 | kuhlmank@msudenver.edu | BS, Southern Illinois; MAS Embry-Riddle Aeronautical University. ATP, CFI-IA, MEI, AGI-IGI, Type: B-1900D. Specializes in: safety & human factors, flight training, Technologically Advanced Aircraft systems, and airline and military aircraft operations.

Tyler Bachelder, M.S. – Assistant Professor - General Aviation & Flight Training Advisor & Transfer Student Advisor
303-615-1218 | bacheldt@msudenver.edu | BS Aeronautics, University of North Dakota; MS Aviation, University of North Dakota; COM SEL, MEL, CFI, CFI-I, MEI. Specializes in technologically advanced aircraft, flight training, simulator and ground school instruction.

Thomas “T.J.” De Cino, Ph.D. – Assistant Professor - Director - Aeronautics and Aerospace Systems Laboratories
303-615-1217 | decinot@msudenver.edu | BS Aviation Technology, MSU Denver; BS Business/Computer Science, University of Colorado; MS, Ed.S., & Ph.D. Computing Technology-Education, Nova Southeastern University; PVT-SEL. Specializes in educational technology research, human factors and usability analysis, online education, simulation, computer systems engineering.

Chad Kendall, M.B.A. - Associate Professor- Airline Careers, Ground Training, Flight Simulation Training, FAA
303-605-7224 | ckendal4@msudenver.edu | BS Aviation Management & Flight Operations, Jacksonville University; MBA, Jacksonville University. ATP-MEL COM-SEL, CFI-IA, AGI-IGI, SIC Type: CL-65, EMB-145. Specializes in: flight/ground training, advanced systems, jet transition training, aviation curriculum, psychophysiology, NIFA precision flight team

Derren Duburguet, M.A. - Associate Professor - Airline Careers, Meteorology, & Flight Training / Airline Advisor
303-615-1205 | duburgue@msudenver.edu | AS Aviation, Mesa College; BA & MA Physical Geography, San Diego State; ATP, CFI-IA, MEI, PIC Type Bombardier Dash 8 Q-400, SIC Type Ratings SAAB 340 & Embraer 145. Specializes in: regional airline operations, flight training, aircraft performance, remote sensing, computer systems engineering, and career planning.

George G. King, M.S. – Professor - Chief Ground Instructor Flight Training, FAA, & TSA Advisor
303-615-1207 | kingge@msudenver.edu | BS & MS Engineering Systems Analysis, Rensselaer Polytechnic Institute. COM CFI-IA, AGI-IGI, SEL, MEL, Glider. Specializes in: aerodynamics, technically advanced aircraft, aviation weather, and ground school instruction.

Jeffrey C. Price, M.A. – Professor - Aviation Management, Career Planning, Internships, AAAE
303-615-1210 | pricej@msudenver.edu | BS Prof. Pilot, MSU Denver; MA Education, Colorado Christian; COM SEL, IA, AGI-IGI. Specializes in: airport planning & security management, career planning, and AAAE Certified Member program.

James L. Simmons, Ph.D., J.D. – Professor - Aviation Safety, Aviation Management, Aviation Law, & Scholarships Advisor
303-615-1206 | simmonsj@msudenver.edu | BA, MA, & Ph.D. Sociology, University of Colorado; J.D., University of Denver. COM, IA, SEL, AGI-IGI. Specializes in: ground training, aviation safety, airline management, and aviation & space law.
LECTURESHP FACULTY

Laura Braunschmidt, B.S. – Lecturer - General Aviation & Flight Training
303-605-7223 | lbraunsc@msudenver.edu | AS, Arapahoe Community College, BS Aviation Science – Professional Flight Officer, Utah Valley University; ATP, SEL, MEL, IA, AGI-IGI, PIC Type: CL-65. Specializes in: flight training, simulator and ground school instruction.

Dagmar Kress, M.B.A. – Lecturer – Faculty Coach: Precision Flight Team and the Aerobatics and Glider Team | 303-605-5123 | dkress3@msudenver.edu | MBA, University of New Mexico, École Hôtelière de Genève, Geneva, Switzerland, Diplôme. ATP, CFI-IA, MEI. Specializes in: competitive flight operations and training – IAC and NIFA coach, general aviation flight training, airshow demonstrations.

Jose M. Lopez, M.S. – Lecturer - STK, Astronautical/Aeronautical Engineering Advisor
303-605-5287 | jlopez93@msudenver.edu | BS Aerospace Engineering, St. Louis University, MS Aerospace Engineering, University of Tennessee; Raytheon – engineering manager (ret), USAF Colonel (ret), Master Space Badge. AGI STK certified. Specializes in: astrodynamics, energy systems, space science & systems, space operations, and AGI Systems Tool Kit (STK).

Randy Owen, M.S., M. Eng. – Lecturer - STK, Astronautical/Aeronautical Engineering Advisor
303-615-1220 | rowenii3@msudenver.edu | BS Electrical Engineering, Cornell University; MS Electrical Engineering, Air Force Institute of Technology; MEng Engineering Management, University of Colorado. Specializes in: Space Science, Spacecraft Engineering and Operations, Electrical Engineering.

George Nolly, D.B.A. – Lecturer - General Aviation & Flight Training Advisor
303-605-5126 | gnolly@msudenver.edu | BS Electrical Engineering, United States Air Force Academy; MS Systems Management, University of Southern California; D.B.A. Business Administration, Northcentral University. ATP Certificate: B-727, B-737, B-777, B-787, Learjet, CE-680, BGI, AGI, IGI. Specializing in: Simulator instruction, Aviation Weather, and ground school instruction.

AERONAUTICS AND AEROSPACE SYSTEMS LABORATORIES

Thomas “T.J.” De Cino, Ph.D. – Director / Assistant Professor - Aeronautics and Aerospace Systems Laboratories
303-615-1217 | decinot@msudenver.edu | BS Aviation Technology, MSU Denver; BS Business/Computer Science, University of Colorado; MS, Ed.S., & Ph.D. Computing Technology-Education, Nova Southeastern University; PVT, SEL. Specializes in: educational technology research, human factors & usability analysis, online education, simulation, computer systems engineering.

AVS OFFICE MANAGEMENT

Academic Advisors - College of Professional Studies
General Studies (GS) requirements and College of Professional Studies Degree Requirements. Available by appointment or inquire about walk-in office hours in Seventh Street Classroom Building (7S) 126F, or by phone:

Emily Dolezal
Aviation and Aerospace Academic Advisor, College of Professional Studies
303-615-1099 | edolezal@msudenver.edu
Overview & General Information

Department Policies Students should first fill out a Declaration of Major/Minor form, available in the AVS Office or from Central Advising, indicating their major and concentration. With the help from the AVS office staff, establish an initial appointment with a faculty advisor. Meet with a faculty advisor each semester for general advising; staff and faculty advisors will be available to assist you throughout your university career. Become acquainted with all AVS faculty and staff and do not hesitate to ask questions or seek guidance if problems arise.

Certain FAA pilot certificates and ratings are required for the completion of the Professional Flight Officer concentration (ASC2) and some minors. University credit for flight courses may be used if transferred from an accredited college aviation program. Flight training is completed independently. Flight courses (graded as Satisfactory or Unsatisfactory) may be taken to obtain additional financial aid to be applied to the cost of flight training. Flight courses do not count as part of the degree program. Consult your advisor and the financial aid office for details.

Any MSU Denver catalog in effect since initial enrollment may be used, provided enrollment is not interrupted by an absence of three consecutive semesters, including summer. Consult the AVS bulletin boards and website at www.msudenver.edu/aviation/ for other AVS student-related information.

Student Issues Committee Requests for issues as related to AVS program requirements must be made in writing. Include a current Degree Progress Report and written rationale for the requested consideration. The rationale must be sufficiently complete for faculty to clearly understand the circumstances. Requests are submitted to the AVS Student Issues Committee. Please email Professor Kevin Kuhlmann regarding any related issues (kuhlmank@msudenver.edu).

Aeronautics and Aerospace Systems Laboratories (AAS)

The Aviation & Aerospace Science Department hosts an extensive array of laboratories for simulation and hands-on training. Our Aeronautics and Aerospace Systems Laboratories (AAS Labs) consist of nine state-of-the-art technology facilities for enhanced academic and applied knowledge mastery as related to the student’s chosen field of study. The AAS Labs support all aspects of our academic and technology programs – including flight simulation training, advanced avionics functions, air traffic control operations, space satellite mission operations and systems engineering, aerospace physics, UAV/UAS, and aeronautics and aerospace data analysis.

The AAS Labs include aeronautics and aerospace technologies focused on providing students real-time / real-life simulation experiences integrated with traditional classroom learning. The laboratories include the general aviation Robert K. Mock Flight Simulation Lab, the Astronautics Simulation Lab, the Satellite Engineering Lab, the Air Traffic Control Lab, the Jet Lab, the
UAS/UAV Lab, the Aeronautics Simulation Lab, the Balloon Sat Lab, and the Aerospace Operations Lab.

**Robert K. Mock Flight Simulation Laboratory**

The WIA is comprised of individual flight training devices (FTDs) and simulation systems for general aviation aircraft and avionics. The WIA includes 10 single engine Cessna 172s, five Cessna 172XP G1000 simulation systems, five Piper Seminole light-twin simulation systems, and two Beech 1900D turboprop simulation systems.

All the single engine, light-twin, and turboprop FTDs are configured with modern GPS units. Specific FTDs include Garmin 1000 GPS and Avidyne Entegra “glass cockpit” advanced technology. The WIA also supports advanced weather planning and forecasting technologies, flight plan filing and IFR chart services, and a variety of other supporting flight planning resources. In particular, the AAS Labs proudly hosts the Jeppesen-Boeing Flight Planning area, providing resources for preparation and filing flight plans, printing of navigation charts, maps, approach plates, and other planning materials for student use.

**Air Traffic Control Laboratory (ATC)**

The AAS Labs include an 18-controller position Air Traffic Control (ATC) system providing simulation of an operational air traffic control radar facility. The ATC Laboratory is recognized as an FAA Collegiate Training Initiative (AT-CTI) school, a specialized training designation given by the FAA only to select higher education institutions.

**Corporate & Commercial Jet Laboratory (Jet)**

The AAS Lab also features corporate and commercial jet simulation and training systems. The Cessna Mustang business jet is featured with a full 220-degree wrap-around theater-style visual system. Built to the exact Cessna C510 configuration, the corporate jet also includes the full Garmin 1000 multifunction glass flight deck.

The Bombardier Canadair 700 Regional Jet (CRJ700) is also featured, simulating the entire CRJ 700 model aircraft. It is additionally equipped with advanced training features covering all the aircraft’s systems with live touch screens for in-depth training on all aspects of the aircraft’s subsystems. A full CRJ 700 flight model is complemented by the entire suite of the aircraft’s avionics and flight controls. Also included are four FMS tactile units that interface with CRJ training software in the Jet Lab.
Aeronautics Simulation Lab
As part of the AAS Labs, the Aeronautics Simulation Lab provides an advanced technology platform for training and simulation of advanced avionics and navigation systems, glass flight deck systems, and Flight Management Systems (FMS) found on technically advanced aircraft. Glass flight deck training platforms include the Garmin 430/530 GPS systems, Garmin 1000 systems, Avidyne Entegra systems found on many general aviation aircraft, and Flight Management Systems (FMS) found in common commercial jet aircraft.

Aerospace Operations Lab
The Aerospace Operations Lab is a fully functioning Satellite Mission Operations Center (MOC) and provides students real-world hands-on training for monitoring, controlling, and tracking of satellites. A custom technology platform for both simulated and actual operational satellite control, and a satellite data analytics network are unique resources available to students in the MOC.

Astronautics Simulation Laboratory (ASL)
The ASL provides commercial space simulation technology and is an official training center for AGI Corp. Systems Toolkit (STK). The lab features 18 student computer stations with dual displays as well as dual projection of the displays from the instructor station. The space commercialization simulation technology provides a programming platform for developing “what-if?” scenarios for a variety of earth- and space-based projects and is an industry standard application for large and small aerospace companies globally.

Balloon Satellite Laboratory (BSAT)
Additional AAS-L resources provide technology for building and flying “balloon satellites” for field data collection and subsequent analysis. High altitude balloon payloads are designed and built by students for launch each semester. Research papers and presentations are a product of the design/build/launch/retrieval/analysis process. This provides the opportunity for students to fly independent study research projects.
**Satellite Engineering Laboratory (SEL)**

The SEL Lab provides students a laboratory environment to work with the local aerospace community on company-driven specific projects, including new design specifications, satellite programming and operations activities, and a variety of subsystems projects. Students typically shadow aerospace engineers in completing design work, script/program writing, simulation analysis, and launch planning and logistics.

**Unmanned Aircraft Systems Laboratory (UAS)**

The UAS Flight Training Laboratory provides students access to UAV/UAS flight simulation technology for introductory flight skills development. Additional UAS Lab resources include an inhouse flight cage, ground control station operations, and extensive data collection/analysis toolsets and applications. A formal structure of coursework is offered to interested students for acquiring a certificate in UAS Operations.

**Financial Aid & Flight Courses** You may be eligible for additional financial aid by enrolling in any of the following flight courses: AES 1500, AES 2500, AES 3520, AES 4500, AES 4510, AES 4520, or AES 4530.* Consult Prof. George King kingge@msudenver.edu and the Financial Aid Office for more information. These courses may not be applied toward electives in the aviation major or minor. For more information, visit www.msudenver.edu/financialaid/

(* note: subject to requirements and approval of U.S. Student Federal loans – see MSU Denver Financial Aid office for details)
**FAA Advanced Ground Instructor & Instrument Ground Instructor Certificate** To obtain the FAA Advanced Ground Instructor and Instrument Ground Instructor certificate for ASC2 (if the CFI is not obtained), present to the FAA Flight Standards District Office (FSDO) satisfactory results of the FAA Knowledge exams: Fundamentals of Instructing (FOI), Advanced Ground Instructor (AGI), and the Instrument Ground Instructor (IGI). The Denver FSDO is at 26805 E. 68th Ave, Suite 200, Denver, CO 80249, phone #800-847-3808, [http://www.faa.gov/about/office_org/field_offices/fsdo/den/contact/](http://www.faa.gov/about/office_org/field_offices/fsdo/den/contact/)

Student flight or ground instructors may obtain instructional experience by enrolling in two practicum classes (AES 3570 & AES 4590*). Flight simulator courses offered in the WIA include AES 1710 Instrument Flight Simulation I; AES 2710 Instrument Flight Simulation II; AES 3710 Multiengine Flight Simulation; and AES 4710 Turboprop Flight Simulation.

*(Note: See professor George King kingge@msudenver.edu for details regarding practicum opportunities)*

**TSA Requirements for FTD (Simulator) Training**

The Transportation Security Administration (TSA) requires that all MSU Denver students enrolling in AES 2710, Instrument Flight Simulation II, must present AES with proof of US citizenship or, if a non-citizen, proof of registration with TSA and other documentation. Please obtain the documents that apply to you, and be prepared to show them to AES personnel when your simulator class begins.

**Proof of US citizenship:** An entry in your flight logbook will be your proof of compliance. Students will need to show one of the following:

1. Original or government-issued certificated birth certificate (US) AND a government-issued photo ID, such as driver’s license;
2. Current, valid (not expired) US Passport (contains photo);
3. Original US Nationalization Certificate with raised seal, & a government-issued photo ID;
4. Original US Citizenship & Immigration Services (USCIS) or Immigration & Naturalization Service (INS) form N-550 (or N-570, Certificate of Naturalization), plus a government-issued photo ID;
5. Original certification of birth abroad with raised seal or US Department of State Form FS-545 (or Form DS-1350), plus a government-issued photo ID;
6. Original certificate of US citizenship with raised seal, USCIS or INS Form N-560 (or Form N-561 or Form N-581), and a government-issued photo ID;
7. DOD or Federal Agency written certification attesting to the Federal employee’s US citizenship or nationality, plus their government-issued photo ID.

**Non–United States Citizen Students:** The following must have been done for or by the student BEFORE simulator training:

1. Photo taken before the beginning of first simulator course, submitted to TSA by MSU Denver;
2. The student must submit to TSA required background check information on a form available online at [www.flightschoolcandidates.gov/](http://www.flightschoolcandidates.gov/). This may be submitted from overseas before entering the US for training;
3. The fingerprinting process should be initiated ONLY after the candidate has paid for the AFSP training request, had the training request and documents accepted, and received the “Fingerprint Instruction” email. Fingerprinted collected prior to receiving the email notification will result in fingerprint submission rejection and cancellation of the associated training request;
4. The MSU Denver AVS Department has a web access code from the local Flight Standards District Office (FSDO), and is to submit to the TSA all related information regarding the pilot or student who wants to start flight training as well as the type of training requested;
5. The pilot or student pilot must provide the MSU Denver AVS Department with a current and valid passport and visa, if appropriate.
Frequently asked questions, found at www.flightschoolcandidates.gov/student_faq.htm/, give students detailed information on the application procedure. Flight simulator training may not begin until the TSA has notified MSU Denver that all the student’s information has been reviewed and he/she has been cleared by the TSA. If the TSA notifies MSU Denver to cease training, flight training will be immediately terminated. Flight training not started within 180 days after submission of the above required items to TSA and AAAE voids all submitted information; students will be required to resubmit all information.

Credit for FAA Certificates & Ratings or Prior Aviation / Aerospace Experience  Students enrolling in AVS programs who already have flight certificates and ratings or other aviation experience should seek advising with Prof. Kevin Kuhlmann kuhlmanK@msudenver.edu to evaluate any available options for course substitution or transfer credit.

Precision Flight Team  MSU Denver’s Precision Flight Team has been recognized as one of the top collegiate aviation programs in the United States, being awarded the 2011 Loening Trophy, the oldest and most prestigious award in collegiate aviation. The Precision Flight Team competes in annual regional and national meets with other members of the National Intercollegiate Flying Association (NIFA). Competition includes ground and flight events. Some expenses are met through various fundraising activities. The team also participates in community service activities. Any MSU Denver students interested in enhancing their aviation skills or knowledge are encouraged to become involved by enrolling in AES 2330, Precision Flight and Navigation. For more information, consult the following website: http://msudenver.edu/aviation/flightteam/

The MSU Denver Precision Flight Team is advancing education while encouraging and fostering safety excellence in aviation. While promoting communication and cooperation between students, educators and institutions in the aviation community, the MSU Denver Precision Flight Team goes beyond aviation competition. The team challenges one another and holds accountable all associated parties to the highest of standards to ensure technical skills and knowledge. The team also created and honors a rigid set of Core Competencies to support each graduate for a lifelong career in aviation supporting all those dependent on safe and purposeful pilots. For more information, contact Faculty Head Coach Dagmar Kress dkress3@msudenver.edu for more information.
Aerobatic & Glider Team The Aerobatic and Glider Club provides an opportunity for students to explore aviation outside the standard flight training curriculum required for certification. Students interested in aerobatics can take an orientation flight, performing rolls, loops, Cuban eight type maneuvers, inverted flight, stalls and spins, hands on, with assistance of an experienced aerobatic instructor. The formal aerobatic training syllabus then expands into stall/spin recognition and recovery training, exploring accelerated stalls, right side up as well as inverted flat, accelerated, switch over, crossover spins, and inadvertent spin and unusual attitude recoveries. After completion of spin training the aerobatic students will receive the opportunity to apply their newly acquired knowledge, while learning to master the maneuvers of the Sportsman aerobatic competition category, including Immelmann, Hammerhead, Humpty Bump, etc. The MSU Denver Collegiate Aerobatic Team participates in International Aerobatic Club (IAC) sanctioned aerobatic contests around the country. (See www.IAC.org, collegiate program. Students usually compete in the Primary or Sportsman aerobatic category. Contact Faculty Head Coach Dagmar Kress dkress3@msudenver.edu for more information.

American Association of Airport Executives (AAAE) The MSU Denver student chapter of the AAAE invites all aviation students to become members of AAAE. The goal of the AAAE student chapter is to promote professional development and instill professional attitudes in students engaged in the study of airport development, administration, management and operation, and related fields of aviation. AAAE is the world's largest professional organization for airport executives, representing thousands of management personnel at public-use airports nationwide. The primary goal of the AAAE is to assist airport executives in fulfilling their responsibilities to the airports and the communities they serve. Please contact Professor Jeffrey Price pricej@msudenver.edu for details.

Airport Security Coordinator - Training School Certificate Students who complete either AES 3880 or CJC 405M, with a grade of C or higher, may receive the Airport Security Coordinator Certificate.* Request the certificate by presenting proof of passing the course to the AVS Program Coordinator (see front AVS front office for details). (*This is a department certificate and is not noted on official transcripts.)

Air Force ROTC Detachment 105 is located on the CU Boulder campus where AFROTC classes are held each week during the academic year. We are the seventh largest (of 145) detachments nationwide and hosts the widest range of satellite schools to include Metropolitan State University of Denver. Please review the information provided at the following link http://www.colorado.edu/afrotc/ and contact Professor Kevin Kuhlmann for details – kuhlmank@msudenver.edu.
Air Traffic Collegiate Training Initiative (AT-CTI)

MSU Denver’s Aviation & Aerospace Science Department is an FAA-designated AT-CTI Program. The AT-CTI program serves as part of the FAA Collegiate Training Initiative, providing a foundation to a potential career as an FAA air traffic controller. AT-CTI graduates are not guaranteed employment with the FAA. FAA hiring requirements include:

1. Holding U.S. citizenship;
2. Being less than 31 years of age upon application to the FAA;
3. A recommendation from an authorized AT-CTI school official;
4. Completion of all required concentration courses with a “B” (3.0 GPA or higher) average;
5. Pass final exam in AES 4100 with 70% or better;
6. Meeting FAA medical, security, and suitability requirements;
7. Able to speak English clearly enough to be understood over radios, intercoms, and similar communications equipment

Please email Professor Kevin Kuhlmann at kuhlmank@msudenver.edu with any questions or requests regarding these requirements. Completing MSU Denver’s AT-CTI Program, or passing the AT-SAT test battery does not guarantee an employment offer from the FAA. For the courses required by the AT-CTI program see AT-CTI program requirements described in this document. All students seeking enrollment in the AT-CTI degree option must seek a mandatory advising session with Professor Kuhlmann – email for an appointment kuhlmank@msudenver.edu

Honors Program

All Aviation and Aerospace Science students are encouraged to consider pursuing options within the Honors Program. The Metropolitan State University of Denver Honors Program is a community of highly motivated and academically adventurous students and faculty members dedicated to working together to attain new levels of achievement. This is an innovative program that allows students to achieve the Honors Program credential by completing an individually tailored combination of both academic courses and co-curricular honors options. The Honors Program is designed to develop in our students the ability to apply critical and creative thinking as well as conduct high-quality research and creative work. Honors students also learn to integrate a variety of disciplines in their approach to a given project, demonstrate civic and intercultural knowledge and engagement, and reflect critically upon their values and the learning process. Students who enroll in Honors should expect a challenge that stimulates curiosity and research while broadening perspectives in unexpected ways. For further information, please see https://msudenver.edu/honors/

Internship Program

Aviation and aerospace internships are usually available each term. You may enroll for up to 12 semester hours of university credit in AES 3980 Internship in Aviation, 6 semester hours of which may apply as electives in your degree. Contact the Applied Learning Center, 303-615-1333 or visit their website at www.msudenver.edu/internship/. For further questions regarding internships, please contact Dr. Forrest at forrestj@msudenver.edu. NOTE: Internships are rapidly becoming a standard for employment qualifications – all students are strongly encouraged to seek Internship opportunities!
Concurrent Enrollment Program

Metropolitan State University of Denver (MSU Denver) and Colorado Northwestern Community College (CNCC) offer a comprehensive, integrated dual-degree program for students seeking career options as professional pilots.

Through combined course work and a guaranteed institutional transfer, students earn an Associate of Applied Science (AAS) in Aviation Technology with a Flight Concentration from CNCC while also earning their Bachelor of Science (BS) in Aviation and Aerospace Science at MSU Denver:

- Earn both degrees in only 120 credit hours (CNCC residency requirements apply).
- Gain experience flying in various settings, including high-altitude mountain ranges.
- Qualify for a flight-hour reduction toward a Restricted Airline Transport Pilot certificate.
- Take advantage of flexible, affordable Part 141 flight and ground training at CNCC.
- Learn from experienced flight instructors who are dedicated to helping you succeed.
- Train in our internationally recognized, state-of-the-art Robert K. Mock Flight Simulation laboratories.
- Participate in NIFA Precision Flight Team activities for training and academic credit.
- Choose to graduate with several additional certificate options via MSU Denver.
**Part 141 Restricted Airline Transport Pilot – CNCC Partnership**

The Federal Aviation Administration (FAA) has changed scheduled commercial air carrier hiring rules and now requires all flight crew members to hold an Airline Transport Pilot (ATP) Certificate. CNCC’s aviation program was granted FAA authorization to offer graduates of CNCC the ability to receive a Restricted ATP with a 250-hour reduction in total flight hours.

Eligibility of reduced required hours for the ATP Certificate is also available to MSU Denver students who have declared and are currently pursuing the Professional Flight Officer Concentration under the Aviation & Aerospace Science B.S. degree.

An MSU Denver student has two dual-enrollment tracks to take advantage of the CNCC Restricted ATP:

**Option #1:**

This track allows a student to enroll in and attend at CNCC (in Rangely, CO) to pursue the A.S. Aviation Technology Degree in residence. After completion and the award of an A.S. degree, the student is eligible to complete a B.S. in Aviation and Aerospace Science at MSU Denver in the Aviation and Aerospace Science Department. All required courses and credit hours completed under the A.S. Aviation Technology at CNCC would guarantee transfer into and complete applicable requirements of the B.S. at MSU Denver.

Either option will result in an A.S. degree from CNCC and a B.S. degree from MSU Denver.

**Option #2:**

This option always allows a student to dual enroll with CNCC while remaining at MSU Denver in the AVS department. Flight training would be conducted by CNCC at Colorado Air and Space Port (formerly Front Range Airport) in Watkins, CO (near Denver International Airport). Academic courses would be conducted at MSU Denver. Specific FAA, academic, and financial aid rules must be followed, so please consult with Professor Kuhlmann before choosing this option.

**Track #1**

Enroll & complete A.S. in Aviation Technology at CNCC Rangely, including all required flight training  

After completion, transfer A.S. into MSU Denver’s Aviation and Aerospace Science Department’s Aviation and Aerospace Science B.S.  

Graduate with both A.S. Aviation Technology from CNCC & B.S. Aviation and Aerospace Science from MSU Denver, including earning commercial FAA Pilot Certifications

**Track #2**

Dual enroll at CNCC & MSU Denver  

*student admission application required for both institutions and programs  

Attend MSU Denver for all CNCC A.S. & MSU Denver B.S. coursework while conducting flight training through CNCC at remote location at Colorado Air and Spaceport in Watkins, CO  

Graduate with both A.S. Aviation Technology from CNCC & B.S. Aviation and Aerospace Science from MSU Denver, including earning commercial FAA Pilot Certifications
# CNCC | MSU Denver Student Checklist

## Track #1 Checklist

- **Apply to CNCC:**
  - Prospective students should apply for admission by submitting their admission application before any required deadlines at the following link: [https://www.cncc.edu/apply/](https://www.cncc.edu/apply/), or by phone at (800) 562-1105 (press 0).

- **Have Transcripts sent to CNCC:** Contact all high schools and colleges attended and request that an official transcript be sent to CNCC. Request CNCC evaluation of all college transcripts.

- **Schedule both an CNCC New Student Orientation and a General Advising Session:**
  - New Student Orientation:
  - Degree Advising:
    - David Boles; 
      - [David.Boles@cncc.edu](mailto:David.Boles@cncc.edu); 970-485-0841

- **Schedule an appointment the MSU Denver/CNCC advisor, Kevin Kuhlmann, of the Aviation & Aerospace Science Department (AVS) for academic advising:**
  - Kevin Kuhlmann;  
    - [kuhlmank@msudenver.edu](mailto:kuhlmank@msudenver.edu); 303-615-1196

- **Register for Classes:**
  - For registration, contact your CNCC advisor

- **Establish an Email Account:** Students are provided free email access. All students must establish and monitor their CNCC email account. Go to [https://www.cncc.edu/students](https://www.cncc.edu/students). You may retrieve or send email, monitor institutional information, and access your personal records through the Student Resources webpage.

## Track #2 Checklist

- **Apply to MSU Denver:**
  - Prospective students should apply for admission by walk-in at the Student Success Building (SSB), Room 180, or by filling out an application form online at [www.msudenver.edu/admissions/](http://www.msudenver.edu/admissions/), or by phone at 303-556-3058.

- **Apply to CNCC:**
  - Prospective students may submit their admission application the required deadlines at the following link: [https://www.cncc.edu/apply/](https://www.cncc.edu/apply/), or by phone at (800) 562-1105 (press 0).

- **Have Transcripts sent to both MSU Denver and CNCC:**
  - MSU Denver: Transfer Services at [https://msudenver.edu/admissions/student-types/transfer/](https://msudenver.edu/admissions/student-types/transfer/)
  - CNCC: [https://www.cncc.edu/submit-your-credentials](https://www.cncc.edu/submit-your-credentials)

- **Schedule both a New Student Orientation and an Advising Session for MSU Denver courses and CNCC Flight Training:**
  - MSU Denver:
    - New Student Orientation: [https://www.msudenver.edu/roadways/orientation/](https://www.msudenver.edu/roadways/orientation/)
Review CNCC Catalog: Students should access and review the CNCC Catalog in effect at the time they enter CNCC and the dual-enrollment program. Please see: https://www.cncc.edu/academics/course-catalogs

Acquire a Degree Plan: Acquire Degree Plan from your CNCC Advisor, and MSU Denver advisor, Kevin Kuhlmann

Obtain FAA Medical Certificate: Before enrolling in the dual-enrollment program with CNCC and MSU Denver, and before initiating flight training with CNCC, students should ensure that they can obtain the appropriate FAA medical certificate. See www.faa.gov/pilots/amelocator/.

Schedule a Visit at CNCC:
  - Recruiter/Admissions Representative
  - Phone: (970) 675-3214

Registration for appropriate flight training:
  - CNCC has 20 available positions and they will be granted to the first 20 students who have applied as an Aviation Technology student and submitted the flight account deposit ($500.00) by the deadline of June 1.

Verify with your advisor and flight instructor all TSA Security Requirements have been met.

Declare your Major at MSU Denver & CNCC

Register for Classes:
  - MSU Denver: http://www.msudenver.edu/studenthub/
  - CNCC: Contact your CNCC advisor

Establish an Email Account:
  - MSU Denver: https://www.msudenver.edu/studenthub/
  - CNCC: https://www.cncc.edu/students

Review MSU Denver & CNCC Catalog:
  - MSU Denver: http://catalog.msudenver.edu/index.php
  - CNCC: https://www.cncc.edu/academics/course-catalogs

Acquire Degree Plan from MSU Denver/CNCC advisor, Kevin Kuhlmann

Obtain FAA Medical Certificate before enrolling in the ASC2 concentration at MSU Denver, and before initiating flight training with CNCC. See: www.faa.gov/pilots/amelocator/

You must register with the AVS Department prior to graduation.
Please initiate your interest in the CNCC | MSU Denver Partnership by emailing or calling Professor Kuhlmann or Professor Kendall or a CNCC representative below.

**Kevin Kuhlmann**  
Associate Chair  
AVS Dept. | MSU Denver  
kuhlmank@msudenver.edu  
303-615-1196

**Chad Kendall**  
Associate Professor  
AVS Dept. | MSU Denver  
ckendal4@msudenver.edu  
303-605-7224

**David Boles**  
Director - Aviation Technology | CNCC  
David.Boles@cncc.edu  
970-485-0841

**Meghan Davis**  
Dean of CTE Rangely/Agriculture Faculty  
Meghan.Davis@cncc.edu  
970-675-3340
DEGREE PROGRAMS

Miles Above the Rest
DEGREE PROGRAMS OVERVIEW

Metropolitan State University of Denver’s Aviation & Aerospace Science students have several program options leading to careers in aviation or aerospace (including the rapidly expanding commercial aerospace industry and unmanned aeronautical vehicle industry).

Aviation & Aerospace Science (ASC) degree concentrations

- Aerospace Operations (ASC1) – aviation or aerospace operations management or logistics
- Professional Flight Officer (ASC2) – career airline or commercial flight officer
- Air Traffic Collegiate Training Initiative - AT-CTI (ASC3) – FAA Air Traffic Control careers

Aviation and Aerospace Management (AAM) degree concentration (requires any minor offered by the College of Business)

- Aviation and Aerospace Management (AAM) – airport management, airline management, safety/security management, commerce, entrepreneurship, graduate school preparation

Aerospace (IDP) programs and degree concentrations

- Aerospace Physics (IDP) space science, space exploration, physics, graduate school preparation
- Aerospace Systems Engineering Technology (AST) (IDP) aerospace systems technology, engineering technology management, graduate school preparation
- Aerospace Technical Communications and Systems Analysis (IDP) media production, technical writing, script writing, digital documents, interactive media, usability testing and analysis

ASC students may minor in Space Commercialization (IDP) or any other university minor program. AAM students are required to take a minor within the College of Business. Other degree seeking students (non-AVS) may minor in Aviation Management, Aviation Technology, and Space Commercialization (IDP).

Catalog – Selection for Requirements

All graduation requirements must follow the guidelines and requirements specified within a single MSU Denver Catalog edition (your declared academic year). You must use the catalog in effect when you first enrolled at MSU Denver, or a subsequent catalog year in effect while still enrolled as a student at MSU Denver, to meet your general studies, major, and minor requirements. If you are transferring from a regionally accredited Colorado community college, you may complete degree requirements using an MSU Denver Catalog in effect while enrolled at the community college, provided that the degree catalog selected does not predate the current MSU Denver catalog by more than 3 years. Consult a departmental advisor or a College of Professional Studies Academic Advisor (303-556-3304) for more information on previous catalog years and related specifics.

Note about AVS Electives

All notations to “AVS Electives” in this guide refer to any AVS course (AES prefix) other than AVS courses listed as part of your major/concentration and with the exception of the financial aid related “flight” courses of: AES 1500, AES 2500, AES 3520, AES 4500, AES 4510, AES 4520, AES 4530, and AES 4550. (These flight courses may not be used for elective credit.)

Program Requirements for Each Major

Aviation & Aerospace Science degree programs, including Individualized Degree Programs and the General Studies courses for AVS majors are listed on the following pages. With each program is a suggested sequence of courses for the eight semesters needed for the Bachelor of Science degree.

A grade of at least C- is required in all upper division courses listed as part of the major, whether they are AES courses or other prefix courses, including electives. This requirement does not apply to the minor or to General Studies. NOTE: Students must complete each course used in an AVS certificate program with a grade of “C” or better.
General Studies Requirements

Students seeking a Bachelor of Science degree through the Aviation & Aerospace Science Department at MSU Denver must complete the General Studies Requirements as listed in the General Studies Requirements table. Note: Written Communication (first 3-credits of coursework), Oral Communication, and Quantitative Literacy must be completed within the first 30-credits at MSU Denver. The remaining 3-credits of Written Communication must be completed within 45-credits.

Written Communication (6 credit hours)

Select one:

- ENG 1009 – Introduction to Composition, Part 2 OR ENG 1010 – Composing Arguments
- ENG 1020 – Freshman Composition: Analysis, Research, and Documentation OR ENG 1021 – Honors Freshman Composition: Analysis, Research, and Documentation

Oral Communication (3 credit hours)

Select one:

- CAS 1010 – Public Speaking OR CAS 1710 – Interpersonal Communication

Quantitative Literacy (4 credit hours)

Select one:

- MTH 1110 - College Algebra OR MTH 1112 - College Algebra Through Modeling OR MTH 1310 - Finite Mathematics for the Management and Social Sciences

Arts and Humanities (6 credit hours)

Select one required as appropriate to declared major and one option:

- PHI 1030 - Introduction to Ethics (ASC Majors only) OR PHI 3360 - Business Ethics (AAM Majors only) - AND any approved General Studies Arts and Humanities course

Historical (3 credit hours)

- Any approved General Studies Historical course

Natural and Physical Sciences (6 credit hours)

For ASC Majors:

- Any approved General Studies Natural and Physical Sciences course
  
  Note: Some biology and chemistry courses require both a lecture and a laboratory to satisfy general studies requirements. Please see course notes for corequisite requirements.

For AAM Majors:

- Any approved General Studies Natural and Physical Sciences course
  
  Note: Some biology and chemistry courses require both a lecture and a laboratory to satisfy general studies requirements. Please see course notes for corequisite requirements.

Social and Behavioral Sciences I (3 credit hours)

- Any approved General Studies Social and Behavioral Science I course

Social and Behavioral Sciences II (3 credit hours)

- Any approved General Studies Social and Behavioral Science II course

Note: Students may satisfy the Global Diversity General Studies and Multicultural graduation requirements by completing any course designated as Global Diversity or Multicultural within one of the Arts and Humanities, Historical, or Social and Behavioral Sciences General Studies course categories. To complete the General Studies Program, students must take approved courses that fulfill the following distribution and credit requirements:

**CATEGORY (credits):**

- Written Communication (6); Oral Communication (3); Quantitative Literacy (4); Arts & Humanities (6); Historical (3); Natural & Physical Sciences (6); Social & Behavioral Sciences I (3); Social & Behavioral Sciences II (3); Global Diversity (0-3)* -- **TOTAL:** 33-36

*The Global Diversity requirement may be fulfilled by taking an approved course within one of the following categories: Arts and Humanities; Historical; Natural and Physical Sciences; Social and Behavioral Sciences I; or Social and Behavioral Sciences II. The following course categories must be completed within the first 30 college-level credits (including credits completed at MSU Denver and those transferred from other institutions): Written Communication (first 3 credits of coursework); Oral Communication (3 credits of coursework); Quantitative Literacy (3 credits of coursework). The following course category must be completed within the first 45 college-level credits (including credits completed at MSU Denver and those transferred from other institutions): Written Communication (remaining 3 credits of coursework)

The following course categories must be completed within the first 90 college-level credits (including credits completed at MSU Denver and those transferred from other institutions): Arts & Humanities (6); Historical (3); Natural & Physical Sciences (6); Social & Behavioral Sciences I (3); Social & Behavioral Sciences II (3); Global Diversity (one course designated "global" from any category will fulfill both the global diversity requirement and the appropriate credits in that category). The Multicultural requirement is a graduation requirement. A course that fulfills the Multicultural requirement may also fulfill a General Studies requirement OR a major requirement OR a minor requirement OR it may be used in free electives (see https://www.msudenver.edu/advising/resourcesforfacultystaff/generalstudiesrequirements/ ).
Aerospace Operations (ASC1)

B.S. Aviation & Aerospace Science (ASC)

Designed for those seeking career opportunities in aviation or aerospace operations, systems integration, or logistical planning. This degree supports careers that integrate commercial venues of aerospace with aviation.

REQUIRED CORE (ASC1)

AES 1040 - Introduction to Unmanned Aircraft Systems (3) - or - AES 1050 - Introduction to Space (3)
AES 1100 - Aviation Fundamentals (6)
AES 1400 - Aviation Weather (3)
AES 1710 - Instrument Flight Simulation I (3)
AES 2050 - Aviation Hist & Aero Develop (3)
AES 2200 - Fundamentals of Air Traffic Control (4)
AES 2220 - Flight Dispatcher & Load Planning (3)
AES 2607 - Intro to Aerospace Syst. Sim (3)
AES 3000 - Aircraft Systems & Propulsion (3)
AES 3600 - Space Flight Operations I (3)
AES 3607 - Orbital Mech. & Aerospace Syst. Sim (3) - or - AES 3610 - Elements of Spacecraft Design I (3)
AES 3850 - Human Factors & Physiology of Flight (3)
AES 3880 - Aviation Security (3)
AES 4200 - Airport Planning & Management I (3)

AES 4601 - Space Flight Operations II (3)
AES 4602 - Aerospace Commercialized Operations (3) - or - AES 4620 - Elements of Spacecraft Design II (3)
AES 3620 - Aerospace Syst. Prj/ & Miss. Sched. (3) - or - AES 4603 - Aerospace Ops Syst. Anal & Design (3)
AES 4860 - Aviation Safety - or - AES 4870 - Aviation Safety Program Management (3)
AES 4910 - Aviation & Aerospace Strat. Plan. (Sr. Exp.) (3)
JMP 2610 - Introduction to Technical Writing - or - BUS 1950 - Business Communication (3)
AES 4930 - Professional Flight Standards Seminar (Sr. Exp.) - or - AES 4210 - Airport Planning & Management II (Sr. Exp.) - or - JMP 4790 - Senior Seminar in Technical Communication (Sr. Exp.) (3)

Core Subtotal: 67 credit hours

REQUIREMENTS SUMMARY:
Major Core (67) + General Studies (34) + Minor or Unrestricted Electives (19) = Aerospace Operations Total: 120 credit hours. Total program hours must equal at least 120 credit hours. Be sure to plan all your electives or minor accordingly. (*ASC1 students may still seek a minor, although by doing so, student will exceed the required 120 credit hours required for this degree.)
Professional Flight Officer (ASC2)

B.S. Aviation & Aerospace Science (ASC) This concentration is designed for those planning a career as a professional pilot. A student choosing this concentration must have an FAA Commercial Pilot Certificate with an Instrument Rating and either the FAA Flight Instructor Certificate (CFI) or the FAA Advanced Ground Instructor (AGI) and Instrument Instructor Certificates (IGI) before graduation. (For the Lighter- than-Air category, a student must have the Advanced Ground Instructor Certificate.) Before enrolling in this concentration, ensure that you can obtain the appropriate FAA medical certificate. For a list of FAA medical examiners, see http://www.faa.gov/pilots/amelocator/.

REQUIRED CORE (ASC2)
- AES 1040 - Intro to Unmanned Aircraft Sys (3)  
- AES 2050 - Aviation Hist & Aero Develop (3)
- AES 1100 - Aviation Fundamentals (6)
- AES 1400 - Aviation Weather (3)
- AES 1710 - Instrument Flight Simulation I (3)
- AES 2120 - Instrument Fundamentals (4)
- AES 2130 - Commercial Flight Operations (3)
- AES 2200 - Fundamentals of Air Traffic Control (4)
- AES 2220 - Flight Dispatcher & Load Planning (3)
- AES 2710 - Instrument Flight Simulation II (3)
- AES 3000 - Aircraft Systems & Propulsion (3)
- AES 3530 - Aerodynamics (3)
- AES 3550 - FAA Instructor Certification - Ground (4)

Core Subtotal: 78 credit hours

REQUIREMENTS SUMMARY:
Professional FAA Pilot Documentation (0) + Major Core (78) + General Studies for AVS majors (34) + Unrestricted Electives* (8). Professional Flight Officer Total: must equal at least 120 credit hours. Be sure to plan all of your electives accordingly. (*ASC2 students may still seek a minor, although by doing so, student will exceed the required 120 credit hours required for this degree.)

Degree Plan for Professional Flight Officer (ASC2)

**Semester 1**
- AES 1100 - Aviation Fundamentals
- AES 1400 - Aviation Weather
- ENG 1010 - Composing Arguments
- MTH 1110 - College Algebra -or- MTH 1112 - College Algebra thru Modeling -or- MTH 1310 - Finite Math - Mgmt. & Soc Scncs

Total: 15 - 16 Sem. Hrs.

**Semester 2**
- AES 1710 - Instrument Flight Simulation I
- CAS 1010 - Public Speaking -or- CAS 1710 - Interpersonal Communication
- ENG 1020 or 1021 - Fresh. Comp. or Honors
- Nat. & Phy. Science GS
- PHI 1030 - Introduction to Ethics

Total: 15 Sem. Hrs.

**Semester 3**
- AES 2120 - Instrument Fundamentals
- AES 2200 - Fundamentals of Air Traffic Control
- Arts & Humanities GS (MC or GD)
- Nat. & Phy. Science GS
- Soc. & Beh. I GS (MC or GD if needed)

Total: 17 Sem. Hrs.

**Semester 4**
- AES 2130 - Commercial Flight Operations
- AES 2710 - Instrument Flight Simulation II
- AES 3000 - Aircraft Systems & Propulsion
- History GS (MC or GD)
- Soc. & Beh. II GS (MC or GD if needed)

Total: 15 Sem. Hrs.

**Semester 5**
- AES 3530 - Aerodynamics
- AES 3650 - Advanced Flight Technologies
- AES 3710 - Multiengine Flight Simulation I (3)
- AES 3880 - Aviation Security
- AES 4040 - Aircraft Performance
- AES 4910 - Aviation & Aerospace Strat. Planning (Sr. Exp.) (3)
- AES 4930 - Professional Flight Standards Som. (Sr. Exp.) (3)
- AES 4935 - Advanced Commercial Aircraft Systems (4)

Total: 16 Sem. Hrs.

**Semester 6**
- AES 3710 - Multiengine Flight Simulation
- AES 3850 - Advanced Flight Technologies
- AES 3880 - Aviation Security
- AES 2220 - Flight Dispatcher & Load Planning
- AES 2050 - Intro to Unmanned Aircraft Sys or AES 1040 - Intro to UAS Systems

Total: 15 Sem. Hrs.

**Semester 7**
- AES 3950 - FAA Instructor Certification - Ground
- AES 4710 - Turboprop Flight Simulation
- AES 4910 - Aviation & Aerospace Strat. Planning (Sr. Exp.) (3)
- Minor or Unrestricted Elective

Total: 14 Sem. Hrs.

**Semester 8**
- AES 4860 - Aviation Safety
- AES 4930 - Professional Flight Standards Seminar
- AES 4935 - Advanced Commercial Aircraft Systems
- Minor or Unrestricted Elective (may not be needed if prior electives taken equal 11 credits)

Total: 13 Sem. Hrs.
Air Traffic Collegiate Training Initiative
(FAA AT-CTI) (ASC3)

Major: B.S. Aviation & Aerospace Science (ASC) The Air Traffic Collegiate Training Initiative concentration (ASC3), also known as the AT-CTI program, has been designed through a partnership with the Federal Aviation Administration (FAA) in order to provide a foundation for students interested in becoming FAA air traffic control specialists. MSU Denver is one of only 36 higher education institutions across the country designated by the FAA as part of its Collegiate Training Initiative and is an FAA-approved AT-CTI program. Weather, airspace, teamwork in aviation, navigation, and search and rescue are among the fundamentals covered in this course of study. For more information on the AT-CTI concentration contact Professor K. Kuhlmann kuhlmank@msudenver.edu

Required Core (ASC3)

- AES 1100 - Aviation Fundamentals (6)
- AES 1400 - Aviation Weather (3)
- AES 1710 - Instrument Flight Simulation I (3)
- AES 2120 - Instrument Fundamentals (4)
- AES 2130 - Commercial Flight Operations (3)
- AES 2200 - Fundamentals of Air Traffic Control (4)
- AES 2710 - Instrument Flight Simulation II (3)
- AES 3880 - Aviation Security (3)
- AES 4100 - Advanced Air Traffic Control (3)
- AES 4370 - Advanced Navigation Systems (3)
- AES 4860 - Aviation Safety or AES 4870 - Aviation Safety Program Management (3)
- AES 4910 - Aviation & Aerospace Strategic Planning (Sr. Exp.) (3)
- AES 4930 - Professional Flight Standards Seminar (Sr. Exp.) -or- AES 4210 - Airport Planning & Management II* (Sr. Exp.) -or- JMP 4790 - Senior Seminar in Technical Communication (Sr. Exp.) (3)

(*Requires completion of AES 4200 - Airport Planning and Management I)

Core Subtotal: 44 credit hours

REQUIREMENTS SUMMARY:
Major Core (44) + AES Electives (24) + Minor or additional Unrestricted Electives (18) AVS General Studies (34) = Air Traffic Collegiate Training Initiative Total: 120 credit hours. Total program hours must equal at least 120 credit hours. Be sure to plan all of your electives or minor accordingly.

Note: See your advisor for suggestions on selecting a non-AVS minor or Unrestricted Electives for this major. Actual number of elective credits necessary will vary based on individual program specifics.

Degree Plan for AT-CTI Air Traffic Collegiate Training Initiative (ASC3)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1</td>
<td>AES 1100 - Aviation Fundamentals AES 1400 - Aviation Weather ENG 1010 - Composing Arguments MTH 1110 - College Algebra or MTH 1112 - College Algebra thru Modeling or MTH 1210 - Finite Math or Mgmt. &amp; Soc. Sci.</td>
<td>6+</td>
</tr>
<tr>
<td>Semester 2</td>
<td>AES 1710 - Instrument Flight Simulation I CAS 1010 or 1710 - Public Speaking or Interc. Comm. ENG 1020 or 1021 - Fresh Comp. or Honors PHI 1030 - Introduction to Ethics</td>
<td>3+</td>
</tr>
<tr>
<td>Semester 4</td>
<td>AES 2310 - Commercial Flight Operations AES 2710 - Instrument Flight Simulation II AES Elective AES Elective Soc. &amp; Beh. II GS (MC or GD)</td>
<td>3+</td>
</tr>
<tr>
<td>Semester 5</td>
<td>AES 3880 - Aviation Security AES Elective AES Elective History GS (MC or GD if needed)</td>
<td>3+</td>
</tr>
<tr>
<td>Semester 6</td>
<td>AES 4370 - Advanced Navigation AES Elective AES Elective AES Elective Arts &amp; Humanities GS (MC or GD if needed)</td>
<td>3+</td>
</tr>
<tr>
<td>Semester 7</td>
<td>AES 4860 - Aviation Safety or AES 4870 - Aviation Safety Program Management AES 4910 - Aviation &amp; Aerospace Str Planning (Sr. Exp.) Unrestricted Elective or Minor Unrestricted Elective or Minor Unrestricted Elective or Minor</td>
<td>3+</td>
</tr>
<tr>
<td>Semester 8</td>
<td>AES 4100 - Advanced Air Traffic Control AES 4930 - Professional Flight Standards Seminar or AES 4210 - Airport Planning &amp; Mgmt. II or or JMP 4790 - Senior Seminar in Technical Comm. Unrestricted Elective or Minor Unrestricted Elective or Minor Unrestricted Elective or Minor</td>
<td>3+</td>
</tr>
</tbody>
</table>
B.S. AVIATION AND AEROSPACE MANAGEMENT (AAM)

Major: B.S. Aviation & Aerospace Science (AAM) The AAM program is designed for those seeking career opportunities in airport management, airline management, corporate aviation, or general aviation. This degree also supports careers that integrate the business venues of aerospace and space commercialization with many areas of management in aeronautics.

REQUIRED CORE (AAM)

AES 1040 – Introduction to Unmanned A/C Syst. (3) -or- AES 1050 - Introduction to Space (3)
AES 1100 - Aviation Fundamentals (6)
AES 1400 - Aviation Weather (3)
AES 2050 – Aviation Hist & Aero Develop (3) -or- AES 2607 - Intro to Aerospace Syst. Sim (3)
AES 2220 - Flight Dispatcher & Load Planning
AES 3220 - Aviation Law & Risk Management (3)
AES 3230 - Airline Management (3)
AES 3240 - Airline Planning (3)
AES 3600 - Space Flight Operations I (3)
AES 3850 - Human Factors & Physiology of Flight (3)
AES 3880 - Aviation Security (3)
AES 4200 - Airport Planning & Management I (3)
AES 4210 - Airport Planning & Mgt. II (Sr. Exp.) (3)
AES 4230 - General & Business Aviation Ops. (3)
AES 4240 - Air Cargo Industry (3)
AES 4601 - Space Flight Operations II (3)
AES 4602 - Aerospace Commercialized Operations (3)
AES 4603 - Aerospace Ops. Syst. Anal. & Design (3) -or- AES 3620 - Aeros Syst. Prj. & Miss. Sched. (3)
AES 4870 - Aviation Safety Program Management (3)
AES 4910 - Aviation & Aerospace Strat. Plan. (Sr. Exp.) (3)

Core Subtotal: 63 credit hours

REQUIREMENTS SUMMARY:
Major Core (63) + Additional Required Courses (11) + Minor selected from the College of Business offerings (18-24) AVS General Studies (34) = Aviation and Aerospace Management Total: 120-126 credit hours. Total program hours must equal at least 120-126 credit hours. Be sure to plan all of your electives accordingly. (*AAM students may still seek a minor, although by doing so, student will exceed the required 120 credit hours required for this degree.)

Degree Plan for Aviation and Aerospace Management (AAM1)

Semester 1
AES 1100 - Aviation Fundamentals
ENG 1010 - Composing Arguments
MTH 1110 - College Algebra -or-MTH 1112 - College Algebra thru Modeling -or-MTH 1310 - Finite Math – Mgmt. & Soc. Scncs.
CAS 1010 - Public Speaking

Total: 16 Sem. Hrs.

Semester 2
AES 1400 - Aviation Weather
ENG 1020 or 1021 - Fresh. Comp. or Honors
AES 1040 - Intro to Unmanned Aircraft Systems or AES 1050 - Intro to Space
Natural & Physical Sciences GS (6 SH)

Total: 15 Sem. Hrs.

Semester 3
AES 2220 - Flight Dispatcher & Load Planning
AES 2050 - Aviation Hist & Aero Develop or AES 2607 - Intro to Aerospace Systems Simulation
Soc. & Beh. I GS (GS approved elective; MC or GD)*
History GS (GS approved elective; MC or GD if needed)*
Arts & Humanities (GS approved elective MC or GD if needed)*

Total: 15 Sem. Hrs.

Semester 4
PHI 3360 - Business Ethics
Soc & Beh. II (GS approved elective)*
Unrestricted Elective
Unrestricted Elective
Business Minor

Total: 15 Sem. Hrs.

Semester 5
AES 3220 - Aviation Law & Risk Management
AES 3230 - Airline Management
AES 3600 - Space Flight Operations I
AES 3880 - Aviation Security
Business Minor

Total: 15 Sem. Hrs.

Semester 6
AES 3240 - Airline Planning
AES 3850 - Human Factors & Physiology of Flight
AES 4240 - Air Cargo
AES 4601 - Space Flight Operations II
Business Minor

Total: 15 Sem. Hrs.

Semester 7
AES 4200 - Airport Planning & Management I
AES 4603 - Aerospace Ops Sys Analysis & Design or AES 3620 - Aerospace Systems Prj. & Miss. Sched.
AES 4870 - Aviation Safety Program Management
AES 4910 - Aviation & Aerospace Str Planning (Sr. Exp.)
Business Minor

Total: 15 Sem. Hrs.

Semester 8
AES 4210 - Airport Planning & Management II
AES 4230 - General & Business Aviation Operations
AES 4602 - Aerospace Commercialized Operations
Business Minor
Business Minor

Total: 15 Sem. Hrs.

(*Global Diversity and/or Multicultural as needed; GS = general studies)
INDIVIDUALIZED DEGREE PROGRAMS (IDP)

The Individualized Degree Program (IDP) offers you the opportunity to seek unique degree programs that combine coursework from a variety of disciplines. The following IDP degree programs are routinely offered – other options are available as well:

- B.S. Aerospace Physics
- B.S. Aerospace Systems
- Engineering Technology
- Minor in Space Commercialization

**Attend an information session.**
Information sessions are held on a regular basis throughout the year, and are structured to give you the basic information needed to begin developing your degree proposal. A schedule of sessions is available from the Center for Individualized Learning, located in Administrative Building, room 360 (third floor). This schedule is also posted on their website at [https://www.msudenver.edu/cil/](https://www.msudenver.edu/cil/), or you may contact the Center directly at 303-615-0525.

**Meet with an advisor in the Center for Individualized Learning to discuss your proposal.** Bringing a tentative list of courses you wish to consider for your program, or emailing it to the advisor in advance of your scheduled appointment will make the session more useful to you. An unofficial transcript is also helpful. Advising appointments may be scheduled by calling the Center at 303-615-0525.

**Develop your degree plan in consultation with your Center Advisor and a Faculty Mentor.** Visit [www.msudenver.edu/cil/](http://www.msudenver.edu/cil/) for further details about Individualized Degree Programs. For related AVS advising and specific questions about aerospace and aviation IDPs, contact Dr. Jeffrey Forrest at forrestj@msudenver.edu
B.S. AEROSPACE PHYSICS

Individualized Degree Program (IDP) - Major: B.S. Aerospace Physics

The Aerospace Physics (IDP) major is designed to provide a solid academic foundation for those students interested in careers in aerospace or planetary sciences, and prepares the student for entrance to graduate school and career opportunities in research. This program provides students with a strong background in space science, planetary science, and other fields related to astronautics and space research, all of which are invaluable for aerospace industry employment.

These suggested courses comprise an extended major which requires no minor; note that the General Studies courses differ from those required in ASC and AAM programs. Students must work with the Center for Individualized Learning (www.msudenver.edu/cil/) as well as Dr. Jeff Forrest, Chair of the AVS Department, to ensure that the proposed Individualized Degree Program meets the needs of the individual student as well as those of the industry. Please contact Dr. Forrest forrestj@msudenver.edu regarding questions or applying to this program

RECOMMENDED CORE

<table>
<thead>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<td>AES 1050</td>
<td>Introduction to Space</td>
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<td>AES 3530</td>
<td>Aerodynamics (3) -or- AES 3610 - Elements of Spacecraft Design I (3)</td>
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<tr>
<td>AES 3600</td>
<td>Space Flight Operations I (3)</td>
<td>3</td>
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<td>AES 2607</td>
<td>Intro to Aerospace Syst. Sim (3)²</td>
<td>3</td>
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<td>AES 3607</td>
<td>Orbital Mech. &amp; Aerospace Syst. Sim (3)²</td>
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<td>AES 4601</td>
<td>Space Flight Operations II (3)</td>
<td>3</td>
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<td>Aerospace Commercialized Ops. (3) -or- AES 4620 - Elements of Spacecraft Design II (3)</td>
<td>3</td>
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<td>AES 4603</td>
<td>Aerospace Ops. Systems Analysis &amp; Design (3)</td>
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See Individualized Degree Program to develop Core

ADDITIONAL RECOMMENDED COURSES³

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<td>Introduction to Technical Writing (3)</td>
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<td>MTH 1210</td>
<td>Introduction to Statistics (4)</td>
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<tr>
<td>MTH 1410</td>
<td>Calculus I (4)</td>
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<td>MTH 2410</td>
<td>Calculus II (4)</td>
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<td>MTH 2420</td>
<td>Calculus III (4)</td>
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<td>MTH 3420</td>
<td>Differential Equations (4)</td>
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<td>PHY 2311/2321</td>
<td>General Physics I + Lab (5)</td>
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<td>PHY 2331/2341</td>
<td>General Physics II + Lab (5)</td>
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<td>PHY 2711</td>
<td>Waves and Vibrations (4)</td>
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<td>PHY 2811</td>
<td>Modern Physics I (4)</td>
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<td>PHY 3011</td>
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<td>PHY 3211</td>
<td>Analytical Mechanics (4)</td>
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<td>PHY 3711</td>
<td>Physical Laboratory I (2)</td>
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<tr>
<td>PHY 4611</td>
<td>Computational Physics (2)</td>
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Additional Courses Subtotal: 59 credit hours

ELECTIVES

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<th>Course Title</th>
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<tr>
<td>PHY 4921</td>
<td>Physics Senior Seminar (1)</td>
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<tr>
<td>PHY 4990</td>
<td>General Relativity (3)</td>
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<tr>
<td>PHY 4560</td>
<td>Planetary Physics (3)</td>
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</table>

Electives Subtotal: 3 credit hours

General Studies for AVS majors (33-37)

Aerospace Physics Total: 122-126 credit hours

¹ Consult your program advisor for details on Independent Study, departmental internships, or courses approved for elective credit in this course of study.
² AGI Corp. Systems Toolkit Lab (STK Lab).
³ These courses may have prerequisites within their respective departments.
B.S. AEROSPACE SYSTEMS ENGINEERING TECHNOLOGY Individualized Degree Program (IDP)

Major: B.S. Aerospace Systems Engineering Technology

The Aerospace Systems Engineering Technology (IDP) major is designed for those seeking careers in aerospace or aviation, and prepares students for positions requiring a strong background in engineering technology, technology management, project management, and systems integration. MSU Denver is working in collaboration with industry, academic institutions, and government agencies such as the FAA and NASA to prepare students with the varied skills needed to be successful in this field.

These suggested courses comprise an extended major which requires no minor; note that the General Studies courses differ from those required of ASC and AAM programs. Students must work with the Center for Individualized Learning (www.msudenver.edu/cil) as well as Dr. Jeff Forrest, Chair of the AVS Department, to ensure that the proposed Individualized Degree Program meets the needs of the individual student as well as those of the industry. Please contact Dr. Forrest forrestj@msudenver.edu regarding questions or applying to this program. NOTE: some recommended courses may vary depending on student interest and career goals.

RECOMMENDED CORE

AES 2050 - Aviation History & Aerospace Development - or- AES 1040 - Introduction to Unmanned Aircraft Systems (3)
AES 1050 - Introduction to Space (3)
AES 2607 - Intro to Aerospace Syst. Sim (3)
AES 3600 - Space Flight Operations I (3)
AES 3607 - Orbital Mechanics & Aerospace Systems Simulations (3)
AES 3610 - Elements of Spacecraft Design I (3)
AES 3620 - Aerospace Syst. Prj/ Miss. Sched. (3)
AES 4601 - Space Flight Operations II (3)
AES 4602 - Aerospace Commercialized Operations (3)
AES 4603 - Aerospace Operations Systems Analysis & Design (3)
AES 4620 - Elements of Spacecraft Design II (3)

See Individualized Degree Program to develop Core

ADDITIONAL RECOMMENDED COURSES

CHE 1800 - General Chemistry I (4)
JMP 2610 - Introduction to Technical Writing (3)
EET 2000 - Electric Circuits and Machines (3)
MET 1010 - Manufacturing Processes (3)
MET 1200 - Technical Drawing I (3)
MET 1310 - Principles of Quality Assurance (3)
MET 2150 - Mechanics I – Statics (3)
MET 2200 - Materials of Engineering (3)
MET 3110 - Thermodynamics (3)
MET 3130/3135 - Mechanics of Materials + Lab (4)
MET 3160 - Mechanics II – Dynamics (3)
MET 3180 - Fluid Mechanics (3)
MET 3210 - Introduction to Computer-Aided Engineering (4)
MTH 1120 - College Trigonometry (3)
MTH 1410 - Calculus I (4)
MTH 3410 - Geometric Dimensioning and Tolerancing (3)
MET 4000 - Project Engineering (3)
MTH 2410 - Calculus II (4)
PHY 2331/2341 - General Physics II + Lab (5)

Additional Courses Subtotal: 64 credit hours

General Studies for AVS majors (33-37)

Aerospace Systems Engineering Technology Total: 127-131 credit hours

1 Consult your program advisor for details on Independent Study, departmental internships, or courses approved for elective credit in this course of study.
2 AGI Corp. Systems Toolkit Lab (STK Lab)
3 These courses may have prerequisites within their respective departments.
DEPARTMENT MINORS AND CERTIFICATES

Minors: Aviation Technology | Aviation Management
Certificates: Airport Management | Space Commercialization | Unmanned Aerial Systems | Airport Security Coordinator

These minors and certificates are designed to afford majors in other disciplines the opportunity to develop an understanding of the aviation and aerospace industries. AVS majors may not elect the Aviation Management or Aviation Technology minors. ASC Aviation & Aerospace Science majors (only) may develop an IDP minor. All AAM students must select a minor within the School of Business. NOTE: Students must complete each course used in a certificate program with a grade of “C” or better.

Registration for Certificate in Airport Management or Space Commercialization: You must register with the AVS Department prior to graduation for these certificate programs. Please see the AVS front office for details. Registration is without additional cost. No more than one course substitution is allowed in the AVS certificate programs. These certificates do appear on official transcripts, once completed.

Minor: Aviation Technology

Note: A student must possess at least an FAA Private Pilot Certificate (any category of aircraft) before graduation with this minor.

REQUIRED CORE
AES 1100 - Aviation Fundamentals (6) AES 1710 - Instrument Flight Simulation I (3)
AES 1400 - Aviation Weather (3)

Core Subtotal: 12 credit hours

AVS Approved AVS Electives1 (9)

ADDITIONAL REQUIREMENTS
Professional Pilot Documentation - FAA Private Pilot Certificate (any aircraft category)

Aviation Technology Minor Total: 21

1See advisor for elective options or FAA documentation requirements.

Minor: Aviation Management

REQUIRED CORE
AES 1100 - Aviation Fundamentals (6)
AES 3220 - Aviation and Aerospace Law (3)

Core Subtotal: 9 credit hours

ELECTIVES (Choose four (4) of the following courses for a total of twelve (12) credit hours)
AES 3230 - Airline Management (3) AES 4230 - General Business Aviation Ops. (3)
AES 3240 - Airline Planning (3) AES 4240 - Air Cargo (3)
AES 3850 - Human Factors Physiology of Flight (3) AES 4870 - Aviation Safety Program Mgt. (3)
AES 4200 - Airport Planning & Management I (3) AES 4910 - Aviation & Aerospace Str. Planning (3)
AES 4210 - Airport Planning & Management II (3)

Electives Subtotal: 12 credit hours

Aviation Management Minor Total: 21

1 See your advisor for help selecting appropriate elective courses for your course of study. A total of 12 credit hours in approved aerospace electives are required for this minor.
Certificate: Airport Management  This certificate prepares the student for the American Association of Airport Executives (AAAE) Certified Member examination (see https://www.aaae.org/), often required for airport management positions. Documentation of this certification must be provided by the student to the AVS Department.

REQUIRED CORE
AES 3220 - Aviation and Aerospace Law  or  AES 3230 - Airline Management  or  AES 3240 - Airline Planning (3)  
AES 3880 - Aviation Security (3)  
AES 4200 - Airport Planning & Management I (3)

Aviation Management Certificate Total: 18
(Nota: The AVS Department Aviation Security Coordinator Certificate requires a grade of C or better for AES 3880. Please see a faculty advisor for details.)

Certificate: Space Commercialization  This certificate prepares the student with a strong foundation for career development in the commercial space industry - an important and expanding part of the Colorado and national economy! It also expands opportunities for those currently employed in the industry seeking a better understanding of how to leverage space-based resources for enhancing commerce and exploring new entrepreneurial opportunities.

REQUIRED CORE
AES 2607 - Introduction to Aerospace Systems Simulation1 (3)  
AES 3600 - Space Flight Operations I (3)  
AES 4601 - Space Flight Operations II (3)  
AES 4602 - Aerospace Commercialized Ops. (3)  
AES 4603 - Aerospace Ops. Systems Analysis & Design (3)  
AES 3620 - Aerospace Systems Project & Mission Scheduling (3)

Space Commercialization Certificate Total: 15
1 AGI Corp. Systems Toolkit Lab (STK Lab).

Certificate: Unmanned Aircraft Systems (UAS)  This certificate prepares the student with a strong foundation for career development in the commercial unmanned aircraft systems industry as a 14 CFR Part 107 Remote Pilot. It also expands opportunities for those currently employed in the industry seeking a better understanding of how to leverage and manage UAS-based resources for enhancing commerce and exploring new entrepreneurial opportunities. A student must possess the FAA Part 107 Remote Pilot Certificate before graduation with this certificate. Students seeking the Certificate in Unmanned Aircraft Systems must earn a grade of C or better for each class required in the program.

REQUIRED CORE
AES - 1040 - Introduction to Unmanned Aircraft Systems (3)  
AES - 2040 - Unmanned Aircraft Systems Flight and Control (3)  
AES - 3040 - Unmanned Aircraft Systems Data Collections and Analysis (3)  
AES - 3980 - Internship in Aviation and Aerospace Science (3 - 6)  
AES - Approved - Elective (3)

ADDITIONAL REQUIREMENTS
Professional Pilot Documentation - FAA Part 107 Remote Pilot Certification

Unmanned Aerial Systems (UAS) Certificate Total: 15 – 18
Individualized Degree Program (IDP) Minors
Minors: Space Commercialization | Air Force Reserve Officer Training Corps

**IDP Minor: Space Commercialization** The Space Commercialization minor (IDP), will prepare the student for opportunities and better understanding of commercialized (for-profit) operations in near-Earth or space environments. Space Commercialization is open to all Aviation Technology majors as well as students majoring in other disciplines outside of the AVS Department. This multi-disciplinary minor program blends coursework grounded in basic systems-engineering, space systems integration, and space commercialization (for-profit operations in the space environment). As Colorado is a leader in U.S. space commerce and gross dollars spent in the national aerospace industry, this program is especially viable for MSU Denver's student population. Students taking this minor will also have the opportunity to gain experience in the industry standard AGI Corp. Systems Toolkit (STK) orbital dynamics and mission planning simulation system.

**REQUIRED-Core**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tr>
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<td>Introduction to Space</td>
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<tr>
<td>AES 2607</td>
<td>Intro to Aerospace Syst. Sim</td>
<td>(3)</td>
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<tr>
<td>AES 3600</td>
<td>Space Flight Operations I</td>
<td>(3)</td>
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<tr>
<td>AES 3607</td>
<td>Orbital Mechanics &amp; Aerospace Sys. Simulations²</td>
<td>(3) or</td>
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<tr>
<td></td>
<td>- AES 3620 - Aerospace Syst. Prj/ &amp; Miss. Sched</td>
<td>(3)</td>
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</table>

**Space Commercialization Minor Total: 21**

²AGI Corp. Systems Toolkit Lab (STK Lab)

**IDP Minor: Air Force Reserve Officer Training Corps**

The Air Force Reserve Officer Training Corps (AFROTC) minor is open to all students. For more information about this minor, please contact the Center for Individualized Learning at 303-556-8342 or visit [www.msudenver.edu/cil/](http://www.msudenver.edu/cil/). Students interested in joining the AFROTC may do so through the University of Colorado AFROTC Program. Typically, this involves weekly attendance for training in Boulder. For more information about AFROTC, contact 303-492-3128 or 303-492-3128 or visit [www.colorado.edu/AFROTC/](http://www.colorado.edu/AFROTC/)

Returning for landing after competition flight in the box, High Plains Hotflavia Fest, Fort Morgan, CO, KFMM.
(Photographed by Steve Nelson)
### Course Term Rotational Schedule & Prerequisites

*(Note: Courses are subject to change - check current schedule)*

<table>
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<th>Course Name</th>
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<td>Flight Dispatch &amp; Load Planning</td>
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*Note: AES 3980 - Internship in Aviation/Aerospace is offered every Spring, Summer, & Fall - email Dr. Jeffrey Forrest forrestj@msudenver.edu for details*

**Note: All upper division classes (3000 prefix level and higher) require, at minimum, Junior Class Standing (60 credit hours or more)
2019-2020 Aerospace Budget Adjustment Form

Name: __________________________________________

Date of Birth: ____________________________ 900#: __________________________

E-mail: ____________________________ Phone Number: __________________________

I affirm that I have read, understood, and agreed to this form in its entirety and that the information supplied is true and complete.

Signature: ____________________________ Date: __________________________

The purpose of this form is to request an increase to your current budget/cost-of-attendance (COA) for the associated semester based on the approved course allowance(s) listed below.

Please note:
• This is a request to increase your budget/COA ONLY.
• Although your account will reflect the increased cost, this action will in no way effect the annual or aggregate student borrowing limits set by the Federal Government.
• If your budget is increased and you are seeking additional funding, you must request that funding separately. Information on applying for Federal Direct Loans, or regarding private Alternative loans, is available on our website at: https://msudenver.edu/financialaid/undergraduate/typesofaid/

This form MUST be received by our office at least 3 weeks prior to the end of the semester that you are requesting financial aid consideration for. Incomplete documents will not be accepted.

Please check the appropriate box below:

☐ Fall Semester ☐ Spring Semester ☐ Summer Semester

BUDGET INCREASE REQUIREMENTS

Requirements for the increase:

1. An application consultation with the Aviation and Aerospace Office Manager is required prior to registering for any courses listed. Please schedule a meeting at 303-605-5287.
2. The budget increase will only be applicable for the semester you are enrolled in the approved course(s) and the increase can be applied once to each course.
3. You must be enrolled in one of the courses listed below in order for the budget increase request to be processed.

☐ AES 1500 $8,500 Private
☐ AES 2500 $7,800 Instrument
### 2018-2019 Aerospace Budget Adjustment Form

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<th>Cost</th>
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**OFFICE USE:**  
- SFAREQG
- RBAPBUD
- RRAAREQ
- RHACOMM - Term Eligibility

**TERM:**  
- FALL
- SPRING
- SUMMER

**APPROVED BY:** _______________  
**DATE:** _______________
Campus Map

Metropolitan State University of Denver
Aviation and Aerospace Science Department
Seventh Street Classroom
1250 7th Street, Room 102, Campus Box 30, P.O. Box 173362
Denver, Colorado 80217-3362
(303) 605-5287 phone
http://www.msudenver.edu/aviation/