ASEN 4018 Fall 2025

Aerospace Senior Projects

Course Overview

ASEN 4018/ASEN 4028 is the undergraduate capstone course sequence for the Ann and HJ Smead Department of Aerospace Engineering and Sciences (AES). ASEN 4018 provides an experiential learning environment in which students apply the technical skills acquired throughout the AES curriculum to design and model an aerospace system to meet a defined set of requirements. In the follow-on course (ASEN 4028), students will fabricate or simulate their systems, test their designs to verify requirements are met, validate the system can complete mission objectives, and close the loop between model predictions and actual system performance.

Course Meeting Times and Locations

Day	Topic	Time	Section	Location
Tuesday	Lecture	10:00 to 10:50	All	Zoom
Wednesday	Lab	10:40 to 12:30	11_Mah	AERO 141
			12_Hoke	AERO 141
			13_Knudsen	AERO 114
			14_Akos & Axelrad	AERO N240
			15_Rafi	AERO 114
			16_Wingate	AERO N100
Thursday	Workshops	10:00 to 10:50	All	See workshop schedule
Friday	Lab	10:40 to 12:30	11_Mah	AERO 120
			12_Hoke	AERO 120
			13_Knudsen	AERO 114
			14_Akos & Axelrad	AERO N240
			15_Rafi	AERO 141
			16_Wingate	AERO N100

Lecture Zoom Link:
https://cuboulder.zoom.us/j/91993698272
Meeting ID: 919 9369 8272
Passcode: 670291

Workshop schedule will be posted on main Canvas page.

Course Faculty

Section	Name	Email	Office
Lecture	Prof. Kathryn Wingate	kathryn.wingate@colorado.edu	AERO N201
11	Prof. John Mah	John.Mah@colorado.edu	AERO N207
12	Prof. Charlies Hoke	Charles.Hoke@colorado.edu	AERO 215
13	Prof. Erik Knudsen	Erik.Knudsen@colorado.edu	AERO 219
14	Prof. Penina Axelrad	penina.axelrad@colorado.edu	AERO 417
14	Prof. Dennis Akos	dma@colorado.edu	AERO 452
15	Prof. Melvin Rafi	Melvin.Rafi@colorado.edu	AERO 213
16	Prof. Kathryn Wingate	kathryn.wingate@colorado.edu	AERO N201
Electronics	Prof. Trudy Schwartz	Trudy.Schwartz@colorado.edu	AERO 150B
	Prof. Bobby Hodgkinson	hodgkinr@colorado.edu	AERO 150D

Coure Support:

Expertise	Name	Email	Office
Electronics and Software	Jack Snodgrass	Jackson.Snodgrass@colorado.edu	Electronics Shop
Manufacturing and Machining	Nate Coyle	Nathan.Coyle@Colorado.EDU	Machine Shop
Prototyping and Project Spaces	Gerald Yoho	Gerald.Yoho@Colorado.EDU	AERO 141E
Finance and Procurement	Jacqui Stang	aerofinance@colorado.edu	Main Office
TFs	Please refer to your course section Canvas page.		

Class Web Site:
log on to https://canvas.colorado.edu

Prerequisites:
ASEN 1022 and all core ASEN 3XXX courses.

Course Learning Objectives
1. Project based learning
Students shall apply knowledge learned in previous courses to design, model, simulate or fabricate,

integrate, and test an open-ended aerospace engineering design project.

2. Systems Engineering and Aerospace Architecture Frameworks
Students shall utilize systems engineering methods and aerospace architecture frameworks to design to requirements, verify requirements through modeling, integration and test, and present the results at technical reviews.

3. Modeling
Students shall develop engineering models that predict design performance and refine these models through testing.

4. Teamwork
Students shall work on complex aerospace projects that require cooperation and integration within large teams.

5. Program management
Students shall apply program management tools to break the design project into manageable tasks with clear milestones and deliverables.

6. Technical communication
Students shall gain experience in documenting and communicating their design progress according to professional engineering standards.

Course Delivery
Lecture:
Lectures will cover different aspects of the aerospace design process at a system level. Lectures are every Tuesday from 10:00 to 10:50 AM and will be delivered via zoom. Virtual attendance is required. Lectures will be recorded. Students should utilize recordings to review materials, or if they have an approved course conflict, job interview, or a family or medical emergency. Please note there is no need to alert the instructional team if you need to watch a recorded lecture due to a job interview or emergency.

Wednesday Lab
Wednesday lab periods are dedicated times for students to meet with design teams or sub-teams, work on design tasks, and attend office hours. Faculty advisors will give instructions on how their section's Wednesday lab period will be structured. In-person attendance is required. If you need to miss a lab due to a job interview or family/medical emergency, please reach out to your PM and sub-team lead and give a minimum of 24 hours' notice.

Thursday Workshops
Students are required to attend two workshops of their choice in the fall semester. The workshop schedule and sign-up links are on Canvas.

Friday Lab
Friday lab periods are dedicated times for the faculty advisor to meet with student teams, and for students to have a dedicated workspace to meet with their entire team. Faculty advisors will give instructions on how their section's Friday lab period will be structured. In-person attendance is required. If you need to miss a lab due to a job interview or family/medical emergency, please reach out to your PM and sub-team lead and give a minimum of 24 hour's notice.

Assignments and Grading
Section 013 students should refer to the syllabus for their section for their grade breakdown/assignments.
Section 011, 012, 014, 015, and 016 grade breakdowns can be found below. Assignment details and due dates can be found on Canvas.

Assignment	Percent Total Grade
Design Review 1 (Team Grade)	20%
Design Review 2 (Team Grade)	25%
Final Report (Team Grade)	25%
Professionalism (Individual Grade)	20%
Team Charter	P/F , 5%
Workshop Attendance	5%

To be successful in this class, students are expected to professionally engage in team meetings and discussions, contribute high quality technical work towards the project, complete deliverables on time, and assist and support their team members. Students must shift from a "school" mindset, where homework is submitted for grading, to an "professional" mindset where deliverables are thoroughly reviewed, carefully edited, and submitted in final form. Only students who participate and contribute to team success will receive the team grades above.

Assignment details can be found on Canvas.

Professionalism grades will be determined by peer evals, participation in team meetings, and interactions with AES staff and faculty, industry mentors, and university faculty. Peer evaluations will be administered after design review 1 and design review 2.

Design reviews are oral presentations to a review board consisting of AES faculty, staff, and various industry mentors. While the section's faculty advisor will assign the team grade for the design review, other reviewers may assign action items or provide feedback.

Students are required to attend and actively participate in two workshops.

Professionalism

Students are expected to act professionally toward their teammates, industry mentors, university staff and faculty, and fellow students. They must use building spaces and resources appropriately and respectfully. Failure to treat others professionally or to properly use shared spaces may result in a reduction of the 'Professionalism' grade. Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings—whether in person, remote, or online. Individuals who fail to meet these behavioral standards may be subject to disciplinary action.

Safety
Safety shall be a primary concern for all students, faculty, and staff. Students must take the required training if they plan to use shops, and some projects may require environmental health and safety training workshops. Any work conducted in senior projects must be done in accordance with all university safety policies which can be found at https://www.colorado.edu/ehs/. Any activity on the project that has a potential safety impact, as solely determined by the faculty advisor or design review board, must be cleared by a safety board before any testing, fabrication, or prototyping. Flight testing must go through appropriate CU Flight Operations channels.

Resources
Senior Project Labs
Each team will be assigned space in the senior projects labs for prototyping, fabrication, assembly, and testing of their projects. Please respect your peers and do not disturb any items that do not belong to your team. Each team will also have a storage cabinet where they can put any supplies or sensitive equipment. Remember this is a shared space and you should return tools and clean up any messes when finished. Use of paints, thinners, epoxies or other potentially hazardous materials is not permitted in this space without prior approval of Gerald Yoho. **All work conducted in these spaces must be in accordance with all pertinent department and university safety policies**.

AES Machine Shop
The AES machine shop is typically accessible daily when Nate Coyle or a designated assistant is available, and after completing the required safety training and machining workshop. Please ensure Nate Coyle is involved early in the design of components for manufacturing.

AES Electronics Shop
The AES electronics shop can provide limited space for electronics fabrication, integration and test. Access must be requested through Prof. Trudy Schwartz or Prof. Bobby Hodgkinson and space will be provided after completing the required training and workshops.

AES Woodworking and Composites Lab
The AES department has developed a woodworking and composite fabrication lab to be used for both teaching and research. Contact Nate Coyle to request access, and space will be provided after completing the required training and workshops.

AES 3D Printing and Prototyping Tools
The AES department has a number of 3D printers and prototyping tools. Contact Gerald Yoho to request access, and space will be provided after completing the required training and workshops.

University of Colorado Syllabus Policies

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation
If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, please reach out to the faculty advisor for your section.

Accommodation for Religious Obligations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. In this class, please discuss your religious accomodation needs with the faculty advisor for your section. Accomodations needs should be communicated within the first two weeks of the class. See the campus policy regarding religious observances for full details.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns

appear on your instructors' class rosters and in Canvas, visit the [Registrar's website](#) for instructions on how to change your personal information in university systems.

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

Additional classroom behavior information
- [Student Classroom and Course-Related Behavior Policy](#).
- [Student Code of Conduct](#).
- [Office of Institutional Equity and Compliance](#).
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- [Office of Institutional Equity and Compliance](#).

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email OIEC@colorado.edu. Information about university policies, [reporting options](#), and [OIEC support resources](#) including confidential services can be found on the [OIEC website](#).

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support a variety of concerns, visit the [Don't Ignore It page](#).

Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily

life, please contact [Counseling and Psychiatric Services (CAPS)](#), located in C4C, or call (303) 492-2277, 24/7.

Acceptable Use of AI in This Class

You may not utilize AI to generate assignments in this course. However, if you wish to use AI to edit or revise assignments, please discuss this with your faculty advisor. They will give you guidance on acceptable use of AI in their section. If AI is allowed in an assignment, please include a paragraph at the end of assignment documenting how AI was utilized.