

ASEN 4067/5067 Microavionics for Aerospace

Fall 2026 Syllabus

Course Information

- **Lecture:** AERO N100 (Classroom), Mon/Wed 9:35 AM – 10:25 AM
- **Lab:** AERO 141 (PILOT Laboratory), Thursday 3:05 PM – 4:55 PM
Note: Strict no food or open drink policy in PILOT Lab will be enforced. See the required PILOT lab access Canvas quiz link below.

Instructor

Trudy Schwartz, Teaching Professor
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Office Hours: TBD and during all lab hours.
By appointment if needed for personal course issues.

Teaching Fellows

Name: Nathan Cohen
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Internet Information & Communication

Class website on [Canvas](#) will be used to post official announcements and submit some assignments. Most assignments will be submitted through Gradescope. Communication will occur through lectures, Canvas Announcements and Discussions. Make sure you enable Canvas notifications.

Prerequisites

- Basic Computing Course such as ASEN 1320: Aerospace Computing, CSCI 1300 (C programming), CHEN 1310 or equivalent

- ASEN 3300: Electronics and Communications (digital/analog electronics, sensors, measurements) or equivalent
- Programming experience required; C programming beneficial. A C tutorial will be provided for self study.

Text Resources

There is no single required textbook that is available in print or digital form.

Reading assignments will be posted on Canvas from (but not limited to) the following:

- Mazidi, Causey, McKinlay, *PIC Microcontroller and Embedded Systems*, 2nd ed. (2016).
- Gaonkar, *Fundamentals of Microcontrollers and Applications in Embedded Systems*, 1st ed. (2007).
- PIC18F87K22 [Data Sheet](#) and [Errata](#).
- [MPLAB XC8 PIC Assembler User's Guide](#).
- Additional references: Peatman, Wilshurst, Horowitz & Hill.

Learning Goals

- Microcontroller architecture and memory
- Binary/hex/decimal conversions
- Assembly(primary) and C programming(secondary)
- Interfacing with sensors, servos, LCD
- Onboard peripherals (timers, ADC, DAC, USART, SPI, I2C)
- Interrupt service routines
- Debugging hardware/software systems
- Aerospace applications of embedded systems

Course Calendar

Refer to Canvas for the full schedule. Key dates are below:

(Note: The Final EXPO requires in-person attendance.)

Event	Date/Time
Final Presentation Slides and Video due electronically	Wednesday, Dec. 9, 2026 @ 6:30 PM
Final Project EXPO (AERO 141 in-person)	Wednesday, Dec. 9, 2026 7:30 PM – 10:00 PM
Final Peer Reviews due electronically	Thursday, Dec 10, 2026 @ 5:00 PM

Required Hardware

The course uses the following provided required hardware:

- EasyPIC PRO V7 development board (PIC18F87K22)
- PicKit In-Circuit Debugger
- Analog Discovery 2 (USB oscilloscope, logic analyzer, function generator)
- Electronic sensors, accessories, static strap, and padded protective case

This equipment is AES department property and loaned to you. You are responsible for proper use and replacement if damaged. Always store hardware in the padded anti-static bag and case when not in use. Do not expose to heat (e.g., leaving in cars).

Checkout Policy: Students must sign the [Hardware Kit and Honor Code Contract](#) and certify their CU identikey through the self-enroll link to the [PILOT Lab Canvas course](#) before receiving equipment.

Course Overview

This course develops skills in microcontroller hardware/software for aerospace applications. It emphasizes interfacing with sensors and actuators, precise timing, and control for flight systems. Students will learn to program the PIC18F87K22 in assembly and C using MPLAB X, through labs and a semester project. The course follows a “learn by doing” model.

Class Format

- Two lectures and one lab weekly
- Labs require substantial work outside lab hours
- Students are expected to attempt labs prior to lab sessions
- Graduate (5000-level) students complete advanced tasks and projects

Logistics & Policies

- Lecture slides posted at least 24 hrs before class
- Canvas Discussions is your first stop for lab assistance; email inquiries about course content will be redirected to Discussions.
- Lab attendance is expected unless arrangements made
- INDIVIDUAL lab reports due by 11:59 PM; late penalty per day, not accepted after 4 days
- Labs graded on functionality, coding style/documentation and knowledge of the code through highly weighted code interviews
- Students must work independently; code similarity checks will be enforced; AI policy strictly enforced.
- Illness/absence: contact instructor ASAP for guidance

Assessment

Component	Weight
6 Lab Assignments (10% each)	60%
Quizzes (1 dropped)	20%
Final Project	20%
Total	100%

Grading Meetings & Disputes

You must sign up for meetings with the TF after Labs 3–6 to demo your code works on the hardware and explain your work. Regrade requests must be filed on Gradescope within 1 week; full reassessment may raise or lower the grade.

Required CU Boulder Statements

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 email the instructor as soon as possible to alert them of your absence. Because of FERPA student privacy laws, you do not need to state the nature of your illness. Doctor's notes are not required and will not be accepted, in line with campus health policies.**

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. Please communicate the need for a religious accommodation in a timely manner. In this class, **please email the instructor with as much advance notice as possible if you have a conflict due to a religious obligation.** See the campus policy regarding religious observances for full details: [Religious Observances Policy](#).

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](#)

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 [Don't Ignore It](#).

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

As a matter of academic freedom, CU Boulder faculty may allow AI to be used in a range of different ways, including not allowing it at all. In this course, you are limited on how you use AI for any portion of your coding assignments or quizzes. You must understand the fundamentals first and learn to write your own code. AI should only be used as a tutorial for debugging code snippets that you have written yourself or generating small portions of the final project with prior instructor approval. Any use of AI must be clearly documented in any graded submission or is considered an honor code violation. AI *is allowed* to format, spell check or even write portions of written documents - such as for the final project proposals, presentation, etc.