SYLLABUS

Instructor: Prof. Matt Rhode Aerospace Engineering and Sciences
AERO 155a rhodem@colorado.edu

Office Hours:

TAs:

Hannah Priddy
Daniil "Danik" Baskakov

Meeting Times: Lectures: Mondays & Wednesdays 3:00 – 4:15 p.m.
All classes meet in room AERO N100

AERO N200 Projects space accessible after hours by Buff OneCard

Course Description:
The purpose of this course is to provide you an introduction to engineering through two projects, one individual and one done in teams, culminating in a stratospheric payload flight on a high-altitude balloon. You will learn in a hands-on way valuable engineering skills including communication skills, how to function in teams, and a variety of computer tools as appropriate to your projects, such as programming microcontrollers, dynamic modeling software, and computer-aided design (CAD). Specific learning objectives for the course include:

1) Open-ended Hands-on Design Experience: apply iterative design process to improve design; define functional requirements and specifications; generate alternative design concepts; work within constraints; and appreciate and practice *engineering habits of mind* (see below).
2) Teamwork Skills: learn and practice effective teamwork skills; learn how to rely on other team members to give and receive help; demonstrate increased understanding of diversity; and practice conflict resolution.
3) Communication Skills: develop a professional relationship with an engineering faculty member; develop technical writing and oral presentation skills.
4) Engineering Methodology: build set of hands-on engineering skills for prototyping and manufacturing, understand the role of analysis in the design process; solve engineering problems with appropriate tools; and effectively apply technical skills to produce prototypes and design artifacts.
5) Engineering Ethics: understand the importance of an ethical code for the practice of engineering; appreciate that difficult, 'gray' situations arise in engineering practice; and develop an ethical process that will yield appropriate decisions when needed.
6) Engineering modelling: learn how to logically generate models that predict the behavior of a system. Use computational tools to develop fundamental models.

Project Budget:
The budget for your main design projects will come from the College of Engineering. Students are expected to purchase a hard copy or e-reader version of one of four course companion books. In addition, hardware kits are to be purchased for hands-on activities, students keep their kits. Each kit is $50 and sold through a paypal payment system and distributed in class. Team project budgets for flight hardware are covered by the department. There may be incidental costs for materials to complete your projects, students are expected to contribute up to $75 each total (book, hardware kit, dry ice, batteries) for the course in accordance with GEEN 1400 courses.

Grading:
The course grade will be based on a combination of group work and individual accomplishment:

ASEN 1400/ASTR 2500 grades are based on a 100-point scale (1 point = 1% of total grade) and there is no curve. 50% of the points are based on individual contributions and 50% are based on team contributions. Grades are available on CANVAS. Your grade is earned not deserved. Points are divided as follows:

Individual Points/Grade Percentage			Team Points/Grade Percentage	
05%	1 Minute Reports (18) & Class Survey		2.5%	Design Document Draft
25%	Homework 1-3, 6-7, 9-10, 12, 19-20		10%	Design Document Final 5%, Return Team Hardware 5%
05%	ITLL Expo Attendance & Report		2.5%	Team Presentation PDR
05%	Final Exam		10%	Team Presentation Final
10%	Individual Contributions & Participation on Team		25%	Homework 4-5, 8, 11, 13, 14, 15-18
50%	Subtotal (You)		50%	Subtotal (Team)
50% + 50% = 100%				

Letter Grading Scheme:
The final letter grade for the course will be calculated at the end of the semester using the following scheme: (Final grades shown in canvas will be rounded to the next whole number using traditional rounding, ex: 89.52 = A-, 89.47 = B+)

Letter	Percent Grade
A	93.00-100.00
A-	90.00-92.99
B+	87.00-89.99
B	83.00-86.99
B-	80.00-82.99
C+	77.00-79.99
C	73.00-76.99
C-	70.00-72.99
D+	67.00-69.00
D	63.00-66.99
F	Below 63.00

Late Work: Late homework will be accepted for a deduction of ONE letter grade PER DAY (24 hour period starting immediately after the due date). This does not apply to timed assignments such as 1-minute reports, which will not be accepted late.

Final Exam: The final exam will be held remotely on TBD, from 1:30-4:00 p.m. It will consist of one comprehensive problem that ties together everything you have learned in the course. It will be open note, book, internet, and will be held as a Canvas quiz with an uploadable document (your solutions). You are expected to complete this assignment without the help of others. NO COLLABORATION.

Miscellaneous:

- There is no **textbook** for this course, but outside reading of selected titles is required as a homework. You may purchase hard copies, utilize a library, or e-reader options. The three titles this semester are:
  - Rocket Boys — Homer H. Hickam Jr.
  - From the Earth to the Moon — Jules Verne
  - Seven Eves — Neal Stephenson
  - The Wild Black Yonder — Jared Leidich

- In addition, each student will be **expected to pay up to a total of $75 (inclusive of the individual kits, i.e., no more than $25 after kit) TOTAL towards supplies and expenses** for the projects, inclusive of the fiction/biography book. Almost all costs are covered by the College of Engineering and the Ann & H.J. Smead Aerospace Engineering Sciences Department.
- Each student will be required to purchase an individual hardware kit (cost $50).
- Each team will be provided multiple **kits** containing electronics and sensors needed for the two major projects. Students may keep their "shields", but reusable items such as sensors, microcontrollers, cameras, and tools need to be returned on the final lecture. If hardware is not returned, the student will receive a "0%" for their "individual contributions" grade, representing 5% of their grade.
- The First Year Projects spaces serve ASEN 1400/ASTR 2500, ASEN 1403 & senior and graduate projects spaces. They are excellent facilities and you are expected to maintain them in excellent condition. This means it is YOUR responsibility to ensure that the classroom and your work area in particular are **cleaner** than when you arrived. It does not matter whether you made the mess, you should clean it up and take pride in your workspace. A full class schedule is posted on the classroom doors. If a group is found interrupting other classes, their grade will be adversely affected. The two main projects spaces will be the classroom: CO-PILOT N100 (computer software & clean integration activities), and the 2nd-floor projects space N200 (dirty manufacturing, gluing, etc.). N200 will contain the ASEN 1400 "Store", which contains a locked cabinet with useful tools & community materials like soldering irons, wires, tape, glue, etc. Students MUST lock all materials up when finished, and keep the area clean.
- Painting and other messy activities should be done in the 'Wood and Composites Shop', AERO 152. A tour is necessary to obtain access.

A **Design Expo** will be held on ***TBD***, 2025, you are not expected to be an exhibitor, but you will need to attend and there will be an assignment to write about projects you witnessed. **Your attendance at this event is *mandatory*.**

Several other **workshops** throughout the semester will introduce you to some of the hands-on skills you will need to work on your projects, such as CAD, basic electrical circuits and safety and use of tools. Out of class skill-building workshops might also be required.

Some resources that may be helpful in your projects:

What	Who	Where
PILOT First stop for finding things 3D printers/ laser cutters, test equipment, lockers, hand tools	Gerald Yoho	AERO 141E
Machine Shop & Wood & Composites Shop General machine tools Metal, plastic and wood. Saws, drills, mills, lathes. Hand tools.	Matt Rhode and Nate Coyle	AERO 155

Writing Resources

Written communication is an important skill for all engineers, and will be emphasized in this course in various ways, including individual writing assignments and a team report. There are resources available to help you with your writing skills:

- The Writing Center, located in Norlin Library, offers free assistance: https://www.colorado.edu/libraries/services/writing-center

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail 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, political affiliation or political philosophy. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Requirements for COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:
In this class, if you are sick or quarantined**, *please continue the course online only, through zoom. You will not be penalized.***

Accommodation for Disabilities

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.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

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 policy may include: plagiarism, 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. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website.
Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, **if you have religious obligations, please notify me by email during the first week of class. We will work on a plan to accommodate those obligations together.**
See the campus policy regarding religious observances for full details.