ASEN 2012 – Fall 2021

Experimental and Computational Methods in Aerospace Engineering Sciences

Section 001: Tuesday/Thursday 11:40-12:55, Aero 120

Section 002: Tuesday/Thursday 1:15-2:30, Aero 120

Instructor:
Dr. Allison Anderson
Aero N303
apanders@colorado.edu
Office Hour: Tuesday 3-4pm, Wednesday 4-5pm

Class Web Site: canvas.colorado.edu

Zoom Information:

Texts:
>   *Required*
>   Taylor, John R. "An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements", 1996, 2nd edition, University Science Books, ISBN-13: 978-0935702750
>
>   *Recommended*
>   Pratap, Rudra: "Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers", 2010,Oxford University Press, ISBN-13: 978-0199731244

Prerequisites:
>   GEEN 1300 or equivalent

Corequisites:
>   ASEN 2001 and ASEN 2002

Course Objectives: Enable students to understand and apply the computational methods needed to model, solve, and analyze data from problems in aerospace engineering sciences.

Major Course Topics:
1. Structured MATLAB Programming to Solve Aerospace Engineering Problems.
2. Uncertainty and Error Analysis.
3. Technical Writing and Data Presentation
4. Advanced Computational Methods
5. Ethics in Engineering

Grading Guidelines:

Projects (2 projects)	40%
Coding Challenges/Participation	30%

Quizzes (3 quizzes)	30%

Your letter grades will be assigned based on expectations of performance. A letter grade of 'A' represents superior/excellent performance, a grade of 'B' represents good/better than average performance, while a grade of 'C' represents competent/average performance (which is in accordance with CU grading policy). Typically, a performance of 70% would earn you a grade of 'C', however, we reserve the right to normalize the class grades based on the expected minimum level of competency.

Important Notes

1. We reserve the right to make changes to the weekly course schedule based on occurring events that require different dispositions. We will give sufficient advance notice through announcements in class and posting on the website. Changes to this syllabus and schedule may be announced at any time during class periods. We will post the current syllabus and schedule on the course website.

2. Reading assignments and viewing the posted lectures are to be completed *before* the course period. Many of our lectures are flipped, so coming prepared to work on problems and to ask questions is critical. Your active participation is key to the success of the class, and thus will factor heavily into your overall course grade.

3. The primary means for general course communication will be via course-wide Canvas announcement. Please ensure you have enabled notifications. Informal questions and discussions will be handled via the Canvas discussion boards. Questions regarding quizzes, course policies, coding challenges, or lecture material must be directed to the appropriate Canvas discussion board. If we receive an email regarding one of these topics we will refer you to the Canvas discussion board. The Instructor, TAs, and TFs will all monitor the discussion board for questions. Emails to the directly instructor should occur if you experience a medical/family emergency, or if you are struggling in the course and need to discuss success strategies. Emails will be responded to during business hours, i.e. Monday through Friday, 8:00 am – 5:00 pm. Students are encouraged to attend office hours in lieu of emails as it enables clarity and learning.

4. In this class, we will not have a comprehensive exam during finals week nor traditional exams. Rather, this class will rely on assessment via online quizzes accessed through the Canvas website on the Gradescope tab. Students will be given a 48-hour window in which to complete the 40 min quiz. Students will complete 4 quizzes and the lowest grade will be dropped (i.e., the top 3 quizzes will be used for final assessment). As such, there will be no make-up quizzes offered for any reason. After receiving your grade, regrade requests must be submitted via Gradescope within 2 weeks of the grade posting to Gradescope. Please describe clearly the grading issue in your submission.

5. Attendance is required in this class and will be assessed with iClicker. Students will be given two "grace" class where missed attendance will be automatically excused, and you do not need to request my permission or get clearance. You should use these grace classes for medical or family emergencies, since you will not be allowed to make up missed classes beyond these two instances during the semester, regardless of the reason. Make-up work will not be required, but you are STRONGLY encouraged to perform the in-class activities on your own time to ensure you have prepared the material for other graded components of the class. In-person attendance is strongly encouraged since we will be doing a lot of hands-on learning. However, if you are not able to attend in person (e.g., you were exposed to COVID-19), you may attend the class virtually using the Zoom information provided above.

6. Any long term medical or studies-related needs of absence you know of prior to class must be communicated and approved by the instructor at least 2 weeks ahead of the date of occurrence.

7. In this class, we will *exclusively* use the programming language MATLAB because it is the programming language of the aerospace industry. Students who do not have a background in MATLAB are strongly encouraged to use the supplementary textbook and attend the TA's programming help sessions and office hours. MATLAB is available for a free download to your computer from the University. You also have access to the PILOT computer lab during periods for which no other class is using them.

Evaluated Outcomes

This is one of the first courses in the ASEN curriculum where you will begin to acquire the following skills and abilities, which are the expected outcomes from our program at graduation:

O1	Professional context and expectations (ethics, economics, etc.)
O4	Written, oral, graphical communication ability
O5	Knowledge of key scientific/engineering concepts
O6	Ability to define and conduct experiments, use instrumentation
O7	Ability to learn independently, find information
O9	Ability to design systems
O10	Ability to formulate and solve problems
O11	Ability to use and program computers

Evaluation of these outcomes allows an assessment of your performance and provides a major portion of the process we (i.e., the Faculty) use for continuous assessment and improvement of the entire AES undergraduate curriculum. The model for these outcomes derives from several sources including the "Desired Attributes of an Engineer" as defined by The Boeing Company, and "curriculum reviews" from major aerospace corporations including The Boeing Co., Lockheed Martin Corp., and Ball Aerospace Corp. These inputs were combined with the AES faculty vision of the desired attributes of an aerospace engineer and the requirements of the Accreditation Board for Engineering and Technology (ABET) to produce this list of evaluated outcomes.

Additional Guidelines

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 Conduct & Conflict Resolution policies.

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 all public health orders in place to reduce the risk of spreading infectious disease. Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus.

As of Aug. 13, 2021, CU Boulder has returned to requiring masks in classrooms and laboratories regardless of vaccination status. This requirement is a temporary precaution during the delta surge to supplement CU Boulder's COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home. In this class, if you are sick or quarantined. The class attendance policies are designed to enable approximately 1 week (i.e., two classes) of medical accommodation of automatically excused absence in the event of a medical illness. Students exposed to COVID-19 and under quarantine may still attend class virtually using the Zoom information provided above.

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 academic integrity policy. Violations of the Honor Code may include, but are not limited to: 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 on the Honor Code website. Further, any suspected Honor Code violation will also be reported to the department's ethics coordinator.

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 or against 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 email cureport@colorado.edu.

Information about OIEC, university policies, reporting options, and the campus resources can be found on the OIEC website.

Please know that faculty and graduate 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 their rights, support resources, and reporting options.

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, please provide at least 2 weeks advanced notice for any needed accommodations. See the campus policy regarding religious observances for full details.