ASEN 2012 – Spring 2023

Experimental and Computational Methods in Aerospace Engineering Sciences
Section 001: Monday/Wednesday 11:45-12:35, Aero 114

Office Hours:
Instructor: Wednesdays at 4pm,
Hybrid format. AERO 232 and

TF support: Tuesdays and Thursdays at 5:30pm
Aerospace Study Hall (Room TBD)

Instructors:
Oscar Fuentes-Muñoz (GPTI)
oscar.fuentesmunoz@colorado.edu

Class Web Site: Canvas on canvas.colorado.edu)

Texts:
> *Recommended*
> 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:
> APPM 1360*, PHYS 1110, ASEN 1320**
> *Alternative math pre-req: MATH 2300
> **Alternative coding classes: CSCI 1300/ ECEN 1310

Corequisites (or Prerequisites):
> APPM 2360
> Alternative: MATH 3430 & MATH 2130

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	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. **Course Schedule**: 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. **Lecture preparation**: 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. **Communication channels**: 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. **Grading/No final exam**: In this class, we will not have a comprehensive exam during finals week. We will also not have traditional exams. Rather, this class will rely on short quizzes and computational challenges to perform intermittent assessment of your performance throughout the semester.
   a. This class will rely on assessment via online quizzes accessed through the Canvas website. Students will be given a window greater than 24 hours in which to complete the 40 min quiz.
   b. 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.

5. **Lateness policy and due dates**: The extension of the deadlines will only be given in case of unplanned emergencies or medical needs. These must be approved by the instructor and students must communicate with the instructional team before the deadline. In case they miss the deadline for these reasons, they must communicate with the instructional team within 24 hours of the missed deadline.

6. **Programming Language**: In this class, we will *exclusively* use the programming language MATLAB because it is extensively used in 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.

7. **Assignment and Exam Regrade Policy**: If you would like to submit a regrade request for any assignments or exams you must submit a regrade request via email to the instructor within 2 weeks of the graded assignment return date. All regrade requests will be reviewed and approved by a course instructor and not teaching assistants, teaching fellows, or lab assistants.

   a. The regrade request must clearly state the reason you are requesting the regrade, and what you believe the correct grade to be. Note that disagreement on the established rubric allocation of points is not a valid reason for regrade and will not be considered.

   b. Points can be added OR removed based on correctness. Therefore, if a mistake was made in grading and too few points were awarded, the regrade request may increase the final score, however if the professor finds a mistake was made in grading and too many points were awarded, then the regrade request may lower the final score.

   c. Regrades made in the final month of the course will only be entertained if the regrade alters the final letter grade.

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.

Course Alerts

This class participates in a campus initiative to notify students early in the term, if there are concerns about a student's grades, attendance, or other areas of academic performance in the course. The goal is to let students know where they stand in the class and to connect them to resources and support when there is plenty of time in the term to make positive change.

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 classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance.

Requirements for COVID-19

As a matter of public health and safety, 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. CU Boulder currently requires COVID-19 vaccination and boosters for all faculty, staff and students. Students, faculty and staff must upload proof of vaccination and boosters or file for an exemption based on medical, ethical or moral grounds through the MyCUHealth portal.

The CU Boulder campus is currently mask-optional. However, if public health conditions change and masks are again required in classrooms, students who fail to adhere to masking 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.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health Office (contacttracing@colorado.edu).

If you are experiencing symptoms of any respiratory sickness, it is preferred that you stay home to prevent the spread to the rest of the class, even if such disease is not a variant of COVID-19. If these are mild, the use of a mask is recommended. You do not need to alert the instructional team if you are missing class because of this event. However, if you are going to miss a submission deadline for this reason you must notify either the instructor or the TFs within 24h of such deadline, as per the course lateness policy.

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 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 Student Conduct & Conflict Resolution (honor@colorado.edu); 303-492-5550). Students found responsible for violating the Honor Code will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the Honor Code website.

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 sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, protected-class discrimination and harassment, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC) addresses these policies, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email cureport@colorado.edu. Information about university policies, reporting options, and support resources can be found on the OIEC website.

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit Don't Ignore It.

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.

See the campus policy regarding religious observances for full details.