ASEN 1030
Introduction to Computing for Aerospace Engineering

The material outlined in this syllabus is preliminary and subject to change.

Instructor:	Prof. Tomoko Matsuo	
Email[a]:	Tomoko.Matsuo@colorado.edu	
Lectures (010):	M/W 8:30-9:20am	AERO N240
Labs (011):	F 8:30-10:20am	AERO 141 (PILOT)
Instructor:	Prof. Torin Clark	
Email[a]:	Torin.Clark@colorado.edu	
Lectures (020):	M/W 2:30-3:20pm	ECCR 200
Labs (021):	Th 1:00-2:50pm	AERO 141 (PILOT)

Course WebSite:	https://canvas.colorado.edu/courses/[b]
Q&A:	Piazza[c]
In-class Quizzes:	https://oit.colorado.edu/tutorial/cuclickers-set-up-your-iclicker-student-account[d]
MATLAB:	https://cuservices.colorado.edu/matlab/download/student.html
MATLAB Academy:	https://matlabacademy.mathworks.com[e]
PILOT Course:	https://www.colorado.edu/aerospace/academics/manufacturing-shops/pilot-aero-141[f]

Any changes will be communicated with sufficient advance notice through in-class announcements and postings on the course website. The most current version of the syllabus will be available on the course website.

[a] Private inquiries can be made via email to the instructor. Otherwise, students are encouraged to ask questions on the course work and assignments during classes and labs, office hours, and via Piazza.
[b] Canvas is used to access lecture slides & recordings, lab documents, assignments, and supplemental readings, and submit assignments. Use the Canvas Calendar for scheduling code interviews.
[c] Piazza is used for class-wide Q&A and discussion, and can be accessed via Canvas.
[d] iClicker is used for in-class quizzes. Location information will be used to verify your in-class participation.
[e] MATLAB Academy's self-paced online courses available from the MathWorks are used as assignments.
[f] Labs are held in the PILOT Lab (AERO 141), and all students are required to complete a PILOT Course.

Course Description

The goal of this course is to develop a foundational understanding of computational thinking required to approach engineering challenges with systematic problem-solving skills. By the end of this class, students will be able to apply computational thinking principles to design, implement, and debug programs using a high-level programming language (MATLAB). Additionally, students will demonstrate proficiency in fundamental programming concepts, including variables, control structures, arrays, and functions, while also showcasing the ability to analyze problems, decompose them into smaller tasks, and devise algorithmic solutions.

Course Objectives

By the end of the course, students will be able to:

1. **Explain** and **apply** the core principles of computational thinking, including decomposition, pattern recognition, abstraction, and algorithm development.
2. **Implement** fundamental programming constructs such as variables, control structures, arrays, and functions.
3. **Develop**, **test**, and **debug** MATLAB programs required to solve basic Aerospace Engineering application problems.

Required Textbook, Software, and Hardware

- **Textbook:** No specific textbook is required. Students are expected to use materials provided through Canvas, including lab guides, tutorials, and supplemental readings.
- **Software:** MATLAB is required for assignments and lab activities. MATLAB is available for free download through the University of Colorado Boulder's license.
- **Hardware:** A device capable of accessing Canvas, MATLAB and submitting assignments in PDF format.
- **Optional Resources:** Supplemental MATLAB textbooks or online tutorials (e.g., "MATLAB for Engineers" by Holly Moore, ISBN: 978-0134589640).

Student Responsibilities and Class/Lab Expectations

- **Preparation:** Review materials and complete assigned tasks prior to the scheduled sessions.
- **Engagement:** Actively participate during in-person sessions.
- **Class Attendance** is expected and recorded. Missing class may negatively affect grades and make it difficult to keep up with the course material. Class attendance is recorded through iClicker quizzes conducted during lecture hours.
- **Lab Attendance** is expected. Students are expected to work on lab exercises with assistance from the instructional team and work in group settings.
- **Asynchronous Expectations:** Students should expect to dedicate a minimum of 100 minutes per week outside of class for reviewing materials and completing assignments. Deadlines will be clearly communicated through Canvas.

Lecture Recording Notice

Lectures are recorded for educational purposes. Students who do not wish to appear in recordings must notify the instructor at least 72 hours in advance and/or sit in a location that avoids being recorded.

Lab Policy

- All students are required to complete a PILOT Course.
- Safety is priority #1 in the in-person laboratory. Anyone violating rules of safe conduct may receive a zero for the laboratory exercise and may be restricted from the lab facilities. Use of lab facilities is a privilege, not a right, and students must conduct themself according to the lab rules and regulations. Those endangering themselves, others, or laboratory equipment by their unsafe conduct will not maintain their access privileges. Failure to wear appropriate safety gear will result in a 10% grade penalty for the lab for each infraction.
- Professional behavior and considerate communication practices are expected at all times. Any questions, comments or concerns students may have should be respectfully voiced to their peers or the instructor either in person or via email.
- Eating and drinking inside the PILOT laboratory is strictly prohibited.

Course Assignment & Accommodation Policy

- **Submission Platform:** Assignments must be submitted via Canvas unless otherwise stated. Submissions must include the names of all contributing members. Individuals whose name does not appear on a submission will not receive credit for the assignment.
- **File Format:** It is important to follow file format requirements. Submissions that do not follow the required format may not be accepted.
- **Late Work:** Late submissions will not be accepted without prior approval or a documented emergency. Extensions must be requested at least 24 hours before the due date.
- **Assignment Regrade:** If you would like to submit a regrade request for any assignment you must submit a regrade request via email to the instructor within one week 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.
  - 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.
  - The regrade request must include in a single combined .pdf: an introductory statement addressing the above, a pdf copy of the original submission with portions highlighted that pertain to the regrade request, and any additional information.
  - 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 instructor finds a mistake was made in grading and too many points were awarded, then the regrade request may lower the final score.
  - Regrades made in the final two weeks of the course will only be entertained if the regrade alters the individual's final letter grade.
- **Accommodations:** Students will receive accommodations for timed assessments (e.g., exams) only if the faculty instructor receives the student's accommodation letter at least five business days before the exam, in accordance with departmental policy and to allow time to arrange the assessment.

Course Grading

This course uses a **tiered grading system** based on your level of coursework completion, understanding, and engagement, which mimics real-world performance reviews. For example, to remain employed you must meet the minimum expectations set by your employer, and you will be rewarded for effort that goes above and beyond those minimum expectations).

Tiered Grading System

Requirements	C-	B	A
Complete all lab exercises/assignments & Pass code interviews 1-2	✔	✔	✔
Pass in-class iClicker quizzes	✔	✔	✔
Pass midterm exams (or the final exam)	✔	✔	✔
Complete *three* required MATLAB trainings	✔	✔	✔
Complete *three* B-level MATLAB trainings (OR *two* B-level trainings + Final Project)		✔	✔
Complete *one* A-level MATLAB training (in addition to *three* B-level)			✔
Complete Final Project & Pass code interview 3			✔

Lab Exercises and Assignments

There will be a total of six sets of lab exercises and assignments. Lab documents will be provided in advance of the labs, which provide a detailed description of various steps and milestones for each lab. Students are expected to carefully study the lab documents before the beginning of each lab section. These lab assignment documents will also include guidelines for the work that needs to be submitted to Canvas for each lab.

- **Labs 1–3:** Exercises based on programming fundamentals.
- **Labs 4–6:** Aerospace engineering specific exercises using programming fundamental.

Lab Assignment Policy: Lab assignments must be submitted by the weekly deadline. Resubmissions of corrected and updated lab assignments (to complete passing the lab) are permitted only when an initial submission of respective lab assignments is made the weekly due date. (An exception to this policy may be granted one time for Lab 1 according to the announcement on Canvas.)

Code Interviews

There will be a total of up to three code interviews administered during lab hours. Students are expected to explain code and respond to the follow-up questions during one-on-one interviews. The interviews are conducted with closed-book, closed-notes, and closed-internet. Each interview will last about 10 minutes. It is advisable to show up for the scheduled interview 15 minutes early to check in and study the code.

- **Interview 1** will be based on Labs 1-3.
- **Interview 2** will be based on Labs 4-6.
- **Interview 3** will be based on the final project code.

Interview Policy: Not showing up for the scheduled interview will result in a score of zero. Students are responsible for scheduling their code interviews as instructed using the Calendar on Canvas. Rescheduling request must be requested at least 24 hours before the scheduled interview. There will be no make-up interviews for no-shows unless extenuating circumstances caused the student to miss the interview without a notice. An exception to this policy will be considered on a case-by-case basis and is at the sole discretion of the instructor.

In-class iClicker Quizzes

There will be a total of about 15 iClicker Quizzes administered during lecture hours to assess students' understanding of concept. Each quiz focuses on one or two key ideas, small, digestible topics that build a much larger understanding over time. Feedback on iClicker quizzes will be provided during lecture hours.

Quiz Policy: Class attendance is required to participate in iClicker quizzes. Students who are not present in class will automatically receive a score of zero for those quizzes. A score of more than 50% correct is required to pass each quiz (if there are deviations to this passing criteria, they will be clarified at the time of the quiz). Up to five quizzes with the lowest scores will be dropped when calculating the final grade. There will be no make-up quizzes.

MATLAB Academy Trainings

Following MATLAB Academy's self-paced online courses are used for required and optional (opt-in) assignments as described in **the tiered grading system**.

- **The three required MATLAB trainings:**
  - MATLAB Onramp.
  - Core MATLAB Skills.
  - Programming in MATLAB.
- **B-level MATLAB trainings**:
  - Build MATLAB Proficiency.
  - Visualization in MATLAB.
  - Data Analysis in MATLAB.
- **A-level MATLAB trainings**:
  - MathWorks Certified Associate Exam Prep.
  - Advanced MATLAB Programming Skills.

Midterm and Final Exams

There will be two midterm exams scheduled during regular lecture hours during the semester. The questions are designed to assess the student's understanding, and similar to the in-class iClicker quizzes. The exams are closed-book, closed-notes, and closed-internet. Students who did not pass the midterm exam(s) are required to take the final exam scheduled during the official final exam period.

Exam Policy: Students who access unauthorized materials during the in-class exams will receive an immediate failure on the entire exam assessment and will be found in violation of CU Honor Code. There will be no make-up exams unless extenuating circumstances caused the student to miss the exam. An exception to this policy will be considered on a case-by-case basis and is at the sole discretion of the instructor.

Additional Grading Notice

- 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).
- Intermediate letter grades (e.g., C, C+, B–, B+, A-) will be assigned based on partial completion of the next grade tier's requirements at the discretion of the instructor.

Generative Artificial Intelligence (AI) Course Policy

The following AI policy applies only for this course. It should not be viewed as department, college, or university policy. Students are encouraged to explore the use of generative AI tools (e.g., ChatGPT, NotebookLM, and other platforms) as part of their learning experience. AI is an emerging technology, and learning to use it effectively is a valuable skill. However, the use of AI must align with the following guidelines:

- **Purpose:** AI tools should serve as an **assistant** to your learning, not a replacement for your own critical thinking or effort.
- **Transparency:** If you use AI to assist with an assignment, you must include a brief disclosure statement at the end of the submission. This statement should:
  - Specify which AI tool(s) you used.
  - Describe how you used the tool (e.g., "used ChatGPT to refine the clarity of my writing").
  - Reflect on what you learned about the AI's capabilities and limitations.
  - Your AI disclosure should appear as a final paragraph or appendix to your submission, clearly labeled.
- **Examples of Acceptable Use:**
  - Generating ideas or brainstorming for assignments.
  - Refining the clarity and conciseness of written work.
  - Drafting code snippets or debugging assistance.
  - Enhancing visual aids, such as charts or illustrations, where applicable.
- **Prohibited Use:**
  - Copying and pasting AI-generated content as your complete submission without modification or critical engagement.
  - Using AI to fabricate data, solutions, or analysis for any assignment.
  - Submitting AI-generated responses without proper attribution, as this may be considered plagiarism.
- **Limitations of AI:**
  - AI-generated content is often prone to inaccuracies or biases. Always verify any outputs from AI tools against reliable sources.
  - Low-effort prompts will result in subpar outcomes. Invest effort in crafting detailed and specific prompts to get useful responses.
  - AI tools are supplements, not substitutes, for genuine engagement with the course material.

Students are responsible for the integrity and originality of their work. Any use of AI that violates the guidelines above may be treated as a breach of academic integrity under CU Boulder's Honor Code. Failure to disclose AI use, or use of AI in ways that violate these guidelines, may result in academic penalties, including a report to the Honor Code Council, a failing grade on an assignment and/or the entire course. Resources and optional tutorials may be provided via Canvas. Students are highly encouraged to reach out to the instructor with questions or for help in learning to use AI responsibly. The instructional team may use various forms of AI to aid in content creation, to gain insight into the progress of individuals, to aid in the assessment process, generate AI-augmented feedback, etc. The instructional team will never use AI to produce a numerical score on a summative assignment but AI may be used to help in the creation of helpful feedback and expedite the grading process for the benefit of the students.

Online Communication Guidelines

It's important to create a respectful and supportive online learning environment for everyone. Here are some simple tips to keep in mind:

- **Think Before You Post and Treat Others with Respect:** Messages online don't include tone or body language, so they can be misunderstood. Take a moment to review your words before hitting "submit". If you aren't willing to say it to someone in person it should not be said online.
- **Stay On Topic:** Discussions are an opportunity to connect with classmates and discuss the course material in a meaningful way. Stay focused on the course material and don't use the discussion space for casual chats or unrelated topics.
- **Avoid Using ALL CAPS:** Writing in all caps seems like you are virtually yelling. It can come across as rude. Use capital letters only when needed.
- **Use Clear and Respectful Language:** Avoid abbreviations and written slang. Educational discussions are not text conversations. If you are going to use emojis make sure they are in context and appropriately placed.

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, contact the instructor as soon as possible.

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. Whenever

possible, you should notify the instructor at least two weeks in advance to request special accommodations. 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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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.