ASEN 2803 – Summer 2024

Dynamics and Controls Lab

Meeting Location: Tues/Thurs 2:00 PM - 3:50 PM in AERO 141 (PILOT)

Instructor:
Bobby Hodgkinson
Office: AERO 150D

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Class Website:

Prerequisite courses of ASEN 2701 and ASEN 2012 and APPM 2350 or MATH 2400 (all minimum grade C). Prerequisite or corequisite course of APPM 2360. Coreq of ASEN 2703. Restricted to Aerospace Engineering (ASEN) majors only.

Required Equipment: A way to submit work as a PDF. Recommended software: MATLAB.

Course Description: Introduces the principles of particle and planar rigid body dynamics, systems, and controls. Topics include kinematics, kinetics, momentum and energy methods, system modeling, and simple feedback control. Class includes experimental and design laboratory exercises for aerospace applications of dynamic principles.
Primary Objectives: Explore the fundamental concepts, principles, and analytical tools of aerospace engineering, and reinforce concepts from ASEN 2703 through a variety of experiential learning activities. This laboratory course provides an exploration of: dynamical systems, experimental data collection, and interpretation of experimental data using theoretical principles and analysis. The above topics are explored in the context of particle and planar rigid body dynamics, systems and feedback control.

Grading Guidelines:

Group Work:	Lab Assignments* (3 assignments)	30% (10% each)
	Weekly group deliverables	20%
Individual Work:	Individual Contributions	30% (10% each)
	Peer Engagement & weekly timesheets	20%
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		100%

*Individual grades for lab assignments may be adjusted by instructor(s) based on peer evaluations. Exemplary peer evaluations may result in an increased individual lab assignment grade whereas

poor peer evaluations will result in a lower assigned grade. Individuals whose name does not appear on a group submission will not receive credit for the assignment. Groups are encouraged to leave off the names of individuals who did not contribute to the lab assignment.

AES department policy: group work grade only counts towards final grade if the total individual grade is C or better.

Grading Philosophy: 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.

3 (three) Lab Assignments: The submission of lab assignments will be a combination of short answer responses, condensed lab reports, and/or presentations. Details will be provided during the lab experience.

Weekly group deliverables: Groups will be assigned pass/fail grades each week based on the delivery of specific aspects of the assignment(s). These deliverables may include items such as completed derivations, functioning MATLAB code, technical writing feedback of a peer submission, etc.

3 (three) Individual Contributions: Individual grades will be awarded based on a combination of the correctness, completeness, and the relative weighting of sections an individual is listed as the primary and/or secondary contributors on the lab assignments and the peer evaluations.

See the course schedule for important dates related to lab assignment submissions and assessments.

Important notes and class policies:

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. The primary means for general course announcements will be via course-wide Canvas announcement. Please ensure you have enabled notifications. Private student questions or coordination can be handled via email to the instructor. Emails to the 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.

3. Please note in case of a medical/family emergency, you should contact the office of Student Support and Case Management here: <https://www.colorado.edu/studentaffairs/sscm>. They

will help you coordinate across ALL of your courses and can put you in touch with a number of campus resources.

4. 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 web. Changes to this syllabus and assignments-table may be announced at any time during class periods. We will post the current syllabus and assignments-table on the web.

5. Experimental lab reports should be completed using a digital word processing program (Word, LaTeX, PDF, etc). All group member names with relevant assignment information must appear on the cover page. Bottom line - submit all work with a professional appearance. Neatness, clarity, and completeness really do count in the work world! Detailed guidelines for laboratory reports and presentations will be distributed and reviewed separately. Labs are written up and presented in groups, and initially graded as a group effort. Final individual grades for each lab assignment, however, will reflect an anonymous peer evaluation of the group members and professor assessment. The peer assessment is a multiplying factor that can significantly alter your individual grade relative to the group grade. This is done to promote fairness in assigning group grades where individual contributions to the group's work may be unequal, but also to promote equal contribution from all group members. Use of MATLAB is required unless otherwise stated for labs.

6. Attendance at all scheduled lab times is recommended. Participation in lab activities is required. Participation will be determined based on peer evaluations and in lab observations by the instructional team. To aid with participation, this course may receive a Teaching Integration Knowledge Officer (T.I.K.O.).

7. Lab documents will be provided in advance of the labs, which provide a detailed description of various steps and milestones in each lab. You are required to carefully study the lab documents before the beginning of each lab section. These lab documents will also include guidelines for the individual and group work that needs to be submitted for each lab.

8. The university expects a minimum of 100 minutes of out-of-class work per week for a 1 credit lab course (~25 hours total over the semester). Students will be expected to review posted material prior to lab and work on lab related assignments outside of the normal meeting times. <https://www.colorado.edu/registrar/faculty-staff/curriculum/courses/contact-hours#lecture_lec_-2101>

9. Any 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.

10. 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.

11. Assignment Regrade Policy: If you would like to submit a regrade request for any assignments you must submit a regrade request via email to the instructor within 1 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. 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.

c. 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.

d. Regrades made in the final two weeks of the course will only be entertained if the regrade alters the individual's final letter grade.

12. *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 you must conduct yourself 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.

13. **Professional behavior and considerate communication practices are expected at all times.** Any questions, comments or concerns you may have should be respectfully voiced to your peers or the professor either in person or via email.

14. **Eating and drinking inside the laboratory is strictly prohibited.**

15. A.I. Policy

a. (Adopted from: Ethan Mollick: < https://www.oneusefulthing.org/p/my-class-required-ai-heres-what-ive >) I expect and encourage you to use AI (ChatGPT, image generation, etc.) in this class. Learning to use AI is an emerging skill. I will provide some suggestions and perhaps tutorials on Canvas and in-class about how to use A.I. I am also happy to meet, help, and explore these tools in class or after class. This policy is strictly for this class only and you should not expect a similar policy in any of your other classes. Neither the College nor University have an overarching A.I. policy. The easy use of A.I. is changing what we view as 'plagiarism'. In this course, you are responsible for your work. I will not consider using a chatbot to improve clarity and conciseness of your writing as plagiarism, but I will consider simply copy/pasting the output of ChatGPT to an assignment prompt as unethical. You should view A.I. as an 'assistant' to your learning.

b. Be aware of the limits of A.I. chatbots:
   a. If you provide minimum effort prompts, you will get low quality results. You will improve the outcome when you provide higher quality prompts.
   b. Don't trust anything the chatbot says. You should always confirm any number or 'fact' with your own independent work or from another source. Chatbots are built

for language and are notoriously bad at arithmetic and making up 'facts'. You are responsible for your work and this includes the 'work' you use from a chatbot.

    c. AI is a tool, but you must acknowledge you've use it. Include a paragraph at the end of any assignment in which you used AI explaining what you used the AI for, how you used it (the prompts or a summary of the prompts) and what you learned about how to better use AI as a result. Failure to do may be considered a violation of academic honesty policies.

Evaluated Outcomes: The Department of Aerospace Engineering Sciences has adopted a policy of assigning grades according to "evaluated outcomes" in each course:

O1	Professional context and expectations (ethics, economics, etc.)
O3	Multidisciplinary, systems perspective
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
O8	Ability to work in teams
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 (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

From:

https://www.colorado.edu/academicaffairs/policies-customs-guidelines/required-syllabus-statements

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, 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 Infectious Disease

Members of the CU Boulder community and visitors to campus must follow university, department, and building health and safety requirements and all applicable campus policies and public health guidelines to reduce the risk of spreading infectious diseases. If public health conditions require, the university may also invoke related requirements for student conduct and disability accommodation that will apply to this class.

If you feel ill and think you might have COVID-19 or if you have tested positive for COVID-19, please stay home and follow the guidance of the Centers for Disease Control and Prevention (CDC) for isolation and testing. If you have been in close contact with someone who has COVID-19 but do not have any symptoms and have not tested positive for COVID-19, you do not need to stay home but should follow the guidance of the CDC for masking and testing.

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 required medical isolation for which you require adjustment, communicate with course instructor and group members as soon as possible.

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 (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.

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. Visit Honor Code for more information on the academic integrity policy.

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 violence (dating or domestic violence), stalking, 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 concerns, and individuals who 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 must inform OIEC when they are made aware of incidents related to these policies regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about resolution options and support resources. To learn more about reporting and support for a variety of concerns, visit the Don't Ignore It page.

Religious Accommodations

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.

See the campus policy regarding religious observances for full details.