

## ASEN 2701 – Spring 2023

### Introduction to Statics, Structures and Materials

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**Class Website:** log on to <https://canvas.colorado.edu>

**Homework Site:** Mastering Engineering, linked through Canvas!

**Graded Exams Uploaded to:** Gradescope, <https://gradescope.com>

**Class Email List:** This is automatically done through Canvas.

**Texts:** R.C. Hibbeler, *Statics and Mechanics of Materials* (5th ed.), Pearson, including Mastering Engineering site.

**Prerequisites:** APPM 1360 & PHYS 1110 or equivalent; CSCI 1300 or equivalent.

**Corequisites:** ASEN 2012; APPM 2350 or equivalent.

**Course Objectives:** Introduce the fundamental analytical tools for statics and structural analysis in the context of the physics of aerospace materials. Topics include force/moment equilibrium, truss analysis, beam theory, stress and strain, stiffness and strength of material, and aerospace structural design.

#### Major Course Topics

1. Introduction to basic concepts of structures and materials
2. Forces, moments, equilibrium
3. Internal loads, distributed loads
4. Stress and strain
5. Stiffness, strength, and failure of materials
6. Truss analysis, method of sections, method of joints
7. Beam analysis, shear force and bending moment diagrams
8. Centroids and moments of inertia

- 9. Deformation in bending, bending stress
- 10. Shear stress in beams
- 11. Beam deflection
- 12. Torsion

### Grading Guidelines

Homework	10%
Unit quizzes	5%
3 midterm exams	20% each
Comprehensive final exam	25%
	100%

- Please verify all your scores and grades on Canvas within 2 weeks after they are posted; requests to change a score need to be made within this period. All regrade requests should be submitted to Canvas folder as outlined in ‘Important Notes’ below.
- We reserve the right to make minor changes to this distribution of weights based on variations in assignments.

### Course Delivery

The course will be in person unless campus instructional guidelines change.

### Exam Policies

Students will take 3 exams during the semester. The exams may consist of work out, or computational problems, and/or conceptual questions (T/F, multiple choice, short answer). The final exam is comprehensive.

- Tentative exam dates are as follows
  - Exam 1 (2/16/2023)
  - Exam 2 (3/23/2023)
  - Exam 3 (4/27/2023)

### Makeup exam policy

If a student has a conflict due to an official, university-related, activity (e.g., student conference that requires travel), a request for a makeup must be made in writing 2 weeks before the exam. In your email to the instructor, please include:

- Reason for missing the exam, or assessment
- Name of conference, meeting, or event
- Location and date(s) of the meeting or event

**No makeup exams will be given due to illness.** However, the comprehensive final can replace the lowest midterm exam score. Please see the section pertaining to the final exam.

### **Final Exam**

Since many of the topics covered in the first half of the course (statics) are directly applicable to what is covered in the second half (solid mechanics), the final exam shall be comprehensive. As we near the end of the semester, more details on specific exam topics shall be given.

**No makeup exams are given in this class due to illness.** However, since the final exam is comprehensive, it can replace the lowest midterm exam grade. For example:

- A student is not feeling well and does not take midterm exam #2 (grade of 0 shall be recorded), but this student earns an 80% on the final. The new grade for the second midterm is now 80%.
- A student does poorly on midterm exam #2 and earns a grade of 40%. This same student earns an 80% on the final exam. The new grade for midterm exam #2 is now 80%.

The final exam will take place during the university-scheduled final exam time, which is Tuesday, May 9<sup>th</sup> 2023 from 4:30 – 7:00 pm.

**Lecture:** Lecture will be in person in AERO 114.

**Office Hours:** Students can ask questions about concepts, example problems, and homework assignments during office hours. The office hour schedule will be posted to Canvas within a week of the course starting. Students are strongly encouraged to attend office hours if they have questions about the material or the homework.

### **Evaluated Outcomes**

The Department of Aerospace Engineering Sciences has adopted a policy of assigning grades according to evaluated outcomes (Ox) in each course. Each assignment designed and graded to assess some combination of several or a few of the following outcomes:

- O1** Professional context and expectations (ethics, economics, etc.)
- O2** Historical perspective and vision
- O3** Multidisciplinary, system 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

### **Important Notes**

1. You should email your professor to schedule personal meetings. For example, if you experience a medical/family emergency, or you are struggling in the course and need to discuss success strategies, or maybe to discuss your career goals. Emails will be responded to during business hours, i.e., Monday

through Friday, 8:00 am – 5:00 pm. Any emails must include “ASEN 2701” on the Subject line. With respect to questions about the lecture material, homework problems, etc. students are encouraged to attend office hours in lieu of emails as it enables clarity and learning.

2. 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.
3. 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. Both are dated in the footnote.
4. Canvas will be used to send out announcements, to provide comments to you daily on class activities, and to provide general information about course assignments.
5. Why is homework important?
  - Homework assignments are to lead you through important applications of current material. Like learning a musical instrument or sport, you cannot become proficient in statics/mechanics by watching us solve problems - you must practice on your own. Homework enforces the mental processes that help you to become proficient in a subject. Before beginning any homework assignment, you should review the book, lectures, and lecture examples.
6. Homework
  - All homework assignments must be submitted through Mastering Engineering on Canvas. No hard copy submissions of the homework will be accepted.
  - No late homework assignments will be accepted. You will have 1 week to complete each homework assignment. Please plan accordingly.
  - Homework is due on Wednesdays (see the course schedule on Canvas) at 5 pm.
  - At the end of the semester your lowest homework grade will be dropped.
  - Our preference is to avoid emailing the instructional team with questions about the homework and instead attend office hours in person as it is much easier to explain a concept or comment on your analysis.
  - Collaboration is permitted on homework. However, we strongly recommend to first work on your own on the homework before comparing your results with your homework team members. You may discuss the means and methods for formulating and solving problems and even compare answers, but you are not free to copy someone's assignment. Copying material from any resource (including solutions manuals) and submitting it as one's own is considered plagiarism and is an Honor Code violation. Remember, the less you think about the problems yourself, the less you actually learn, and the more difficult it will be to succeed on the graded assessments.
  - Homework solutions are posted shortly after the submission deadline.

## 7. Exams

- **Makeup exams will not be granted due to illness.** The final exam will be used for replacing the lowest midterm exam score.
- Regrade requests must be submitted to the professors in writing within 2 weeks of the grade posting to Canvas. Submit a single pdf document to the ‘regrade request’ folder on canvas with: the exam problem with your original work, your hand-written CORRECT solution to the quiz problem in question, and a page stating the problem number, grading issue, and what you believe the correct grade should be.
- If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member 2 weeks prior to the exams so that your needs can be addressed. If we have your paperwork already and you have received an email with accommodations instructions, there is no need to email us. We will receive the notifications automatically.

## 8. Unit quizzes

- 5% of the course grade is devoted to these exercises.
- Unit quizzes are based on the reading assignments and shall be posted in Canvas. The quizzes taken in Canvas are an individual effort.
- The same unit quiz shall be given during class. However, this unit quiz will be done in a group, or collaborative setting. You must attend class to submit the in-class unit quiz to receive credit for the in-class submission.
- Each unit quiz total score will be the average between the Canvas quiz score and the in-class score.

## 9. Grading

- Minor adjustments may be made in the determination of final letter grades and with grade cut lines, but there is no “curving” in this course.

## CU Campus-Wide Syllabus Policies

### 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](mailto: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](mailto:contacttracing@colorado.edu)). {Faculty: insert your procedure here for students to alert you about absence due to illness or quarantine. Because of FERPA student privacy laws, do not require students to state the nature of their illness when alerting you. Do not require "doctor's notes" for classes missed due to illness; campus health services no longer provide "doctor's notes" or appointment verifications. }

### **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](mailto: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](mailto: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 concerns, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email [cureport@colorado.edu](mailto: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.