ASEN 2001 – Spring 2022

Introduction to Statics, Structures and Materials

Instructors: Brian Argrow (Lecture, Statics)
He/him
Email: brian.argrow@colorado.edu
Office: AERO 224N

Jelliffe Jackson (Lecture, Mechanics of Materials)
He/him
Email: jelliffe.jackson@colorado.edu
Office: AERO N205

Sara Swenson (Lab)
She/her
Email: sara.swenson@colorado.edu
Office: TBA

Lab Coordinator: Trudy Schwartz
She/her
Email: trudy.schwartz@colorado.edu

Teaching Assistant: Esther Villagra: esther.revengavillagra@colorado.edu

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

Homework Site: Mastering Engineering, linked through Canvas!

Discussion Site: In Canvas!

Lab Submission Site: 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.

Required Equipment

- A way to submit written work into a PDF. This could be a tablet computer on which you write electronically, or a scanner smartphone app (such as Camscanner or Scannable) to scan in handwritten work on paper.

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. MATLAB programming will be required for some laboratory assignments.

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 moment diagrams.
8. Moments of inertia.
9. Beam deflection
10. Torsion.

Grading Guidelines

Group work:	3 Open-ended Modeling Problems (Labs)	30% (10% each)
	Homework	10%
Individual:	6 Quizzes	60% (10% each)
		100%

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

On 4 Jan, Chancellor DiStefano announced that all courses must be delivered in fully remote mode during the first two weeks of the semester 10 Jan – 21 Jan. Unless campus instructional guidelines change, we will return to in-person mode starting on 24 Jan.

Quiz Times and Policies

Instead of exams, students will take 6 quizzes roughly every other Thursday throughout the semester. Each quiz will consist of a few multiple-choice questions and 1 work-out problem. Quizzes are 30 minutes long and will be given during lecture time.

- Statics Quizzes
  - Quiz 1: 27 Jan
  - Quiz 2: 10 Feb
  - Quiz 3: 24 Feb

- Mechanics of Materials Quizzes
  - Quiz 4: 17 Mar
  - Quiz 5: 11 Apr
  - Quiz 6: 19 Apr (TUESDAY)

As students may use the final exam to replace up to 3 quizzes, no make-up quizzes will be granted.

Final Exam
The final exam is optional: students are not required to take the final exam and the final exam will not be counted towards your grade on its own. The final exam will be used to replace up to 3 quiz grades. The final exam will consist of 6 questions, each one covering material from a different quiz. You will choose up to 3 questions to answer. If your score on a given final exam question is higher than your score for the corresponding quiz, your quiz score will be replaced with your score on that final exam question. If your score on a given final exam question is lower than your score for that quiz, your quiz score will remain unchanged.

The final exam will take place during the university-scheduled final exam time, which is:

- Optional Final Exam: Sunday 1 May, 4:30 – 7:00 PM MDT

Lecture: Lecture will be in synchronous remote-learning mode for the first 2 weeks of the semester. In-person lectures are currently scheduled to begin 25 Jan. Lectures will be taped and can be viewed on Canvas.

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 participate in office hours, even if they don't have specific questions about the material or the homework. Online Canvas discussion boards may also be used for any questions at any time and will be moderated by the instructional team.

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. Questions regarding quizzes, course policies, lecture material, homework, and labs 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.
2. Emails directly 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. Students are encouraged to attend office hours in lieu of emails as it enables clarity and learning.
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. Both are dated in the footnote.
5. 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.
6. Why have homework, lab exercises, and quizzes?
    - 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.
    - You are responsible for concepts introduced in labs on quizzes.
    - The labs this year are Open-Ended Modeling Problems (OEMPs). These OEMPs help you learn how to model real-world systems—such as a ski lift, playground slide, or wing spar beam—with the formulas and techniques taught in class. Like the name suggests, OEMPs have no single correct answer and focus more on making and justifying assumptions. Each OEMP will have an individual portion to start you thinking about the problem and a group portion where you will discuss the problem and gain experience in working and cooperating in groups. Group members must inform the instructional team early on if a teammate is not participating. Each lab grade will consist of points from 1) a "Lab Check" assessment on Canvas that covers material from the individual portion, 2) the submitted group assignment, and 3) an anonymous peer evaluation of the team members.
7. 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.

- At the end of the semester your lowest homework grade will be dropped.
- All homework questions must be submitted to the Canvas discussion page under the appropriate homework assignment/question. No homework questions should be emailed to the instructional team—all questions should be asked at office hours or posted on the Canvas discussion board. The instructional team will not respond to posts that are posted after 5:00 pm the day before the homework is due.
- 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 quizzes.
- Homework solutions are posted shortly after the submission deadline.

8. Quizzes:
   - Makeup quizzes will not be granted for any reason. The final exam will be used for replacing up to 3 quiz grades per the policy stated above.
   - 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 quiz 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.
9. Labs:
   - The course schedule will provide a summary of lab topics, duration of the lab, and lab deliverables.
   - Students will work in groups on lab assignments outside of class time in at the discretion of and organization by the lab group. Resources and tools to help facilitate group efforts will be provided on the course Canvas page. Group formation will be defined prior to the lab introduction.
   - Many assignments will require access to a computer and basic programming skills. Computer programming skills are a prerequisite for this class, e.g., ASEN 1320 or CSCI 1300. We will not teach computer programming, although we will try to formulate the assignments to emphasize proper computing skills. In this class, we will exclusively use the programming language MATLAB. You can download a free MATLAB license for your personal computer from CU at https://oit.colorado.edu/software-hardware/software-downloads-and-licensing/matlab. You can also use MATLAB Online for this course at https://matlab.mathworks.com/.
   - 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.

- Students are encouraged to submit lab questions to the Canvas discussion page under the appropriate lab number and check/participate in the ongoing discussions. As with the homework, you may discuss the means and methods for formulating and solving problems, but you cannot compare answers on Canvas nor post your exact work or computer code.

10. 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.
- To receive a course grade of C or better (which is required to fulfill the prerequisite for ASEN2003 and other courses), students must receive a C or better in the individual coursework portion of the class. Stated differently, the students who receive an individual grade of C- or lower will not receive any group grades.

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 policies on classroom behavior and the Student Conduct & Conflict Resolution policies.

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. 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.

CU Boulder currently requires masks in classrooms and laboratories regardless of vaccination status. This requirement is a precaution 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.

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).

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.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation
CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. The university 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 university policies, reporting options, and the 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 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. 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. In this class, excused absences for labs on religious holidays need to be communicated to the instructor via email 2 weeks ahead of the expected absence. See the campus policy regarding religious observances for full details.