Course Syllabus, Spring 2026 (CU Boulder)

ASEN 2401: Statics (Introduction to Mechanics)

Instructor: Dr. Vinodhini Comandur

Office hours: 1:30 - 2:30 PM, Monday & Friday

Location: AERO 217

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Lecture: Section **001**: 8:30 - 9:20 AM, MWF Section **002**: 11:45 - 12:35 PM, MWF

Classroom: Section **001**: AERO 111 Section **002**: AERO 111

Course Description and Learning Outcomes

This course covers elements of statics in two and three dimensions, free-body diagrams, distributed loads, centroids, and friction. By the end of this course, you should be able to:

- Use vector mechanics for the computation of forces and moments.
- Represent physical systems as free-body diagrams.
- Formulate static equations of equilibrium for particles and rigid bodies, including trusses, frames and machines.
- Determine internal forces in rigid bodies.
- Apply Coulomb's laws of dry friction to engineering problems.
- Compute geometric sectional properties of common composite shapes (I - beam, T-beam, channel), which include centroids of area and area moments of inertia.

In support of these goals, we will cover the following general topics:

- Vectors and Vector Algebra
- Forces and Moments
- Equilibrium in 2D and 3D
- Trusses, Frames and Machines
- Centroids and Moments of Inertia
- Distributed Forces and Shearing and Bending
- Friction

Enrollment

Prerequisite(s): APPM 1360 - Calculus 2 for Engineers (Minimum Grade C-) OR MATH 2300 - Calculus 2 (Minimum Grade C-) & PHYS 1110 - General Physics 1 (Minimum Grade C-) OR equivalent

If you have not completed the required prerequisites, please contact the instructor as soon as possible.

Readings

Recommended Texts (Optional)

Depending on which book you follow, we will be covering the following material:

- Engineering Mechanics: Statics (Meriam and Kriage)
    - A portion of the material in Chapter 1 (Scalars and Vectors; Accuracy, Limits, and Approximations; Problem Solving in Statics)
    - All the material in Chapters 2, 3 and 4 (Force Systems; Equilibrium; Structures)
    - A selection of the material in Chapters 5 and 6 (Distributed Loads; Shear and Bending; Friction)
- Statics and Mechanics of Materials (Hibbeler)
    - A portion of the material in Chapter 1 (Numerical Calculations; General Procedure for Analysis)
    - All the material in Chapters 2, 3, 4, 5 and 6 (Force Vectors; Force System Resultants; Equilibrium of a Rigid Body; Structural Analysis; Centre of Gravity, Centroid, and Moment of Inertia)
    - A selection of the material in Chapter 7 (Introduction; Internal Resultant Loadings)

In general, the first half of the term will be spent building key concepts and tools that will be applied in the second half to solve a range of statics problems.

Website and Announcements

Canvas will be used as the course website and as the primary means of communication for this course. Please check it regularly. You are expected to be aware of any information communicated via the website. Please make sure your Canvas is set up so that you receive announcements in your email.

Each Friday, there will be a weekly announcement that will summarise the plan for the week. Please make sure you read this carefully each week. Following the to-do lists laid out in each week's announcement will ensure that you do not miss any deadlines.

Any information that needs to be communicated outside of these weekly announcements will be communicated in class or via Canvas.

Course Delivery and Format

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

Lectures on Concepts (Synchronous):

For each topic (roughly every week), one or two class hours will be allocated to covering the fundamentals and underlying concepts. Skeleton notes will be provided on Canvas, but you are encouraged to supplement these with your own notes as you attend the lecture. This will help you to encode the material in your memory. For some topics, concept videos will be shared in advance, which need to be watched before coming to the class.

In-class Activities (Synchronous):

After the lecture session, class time will be allocated to in-class practice sessions, which involve a combination of demonstrations and in-class activities (**unannounced**). In these sessions, we will work through a series of example problems. You will be required to turn in your work as proof of your participation. More details are provided in the Assessment section.

Homework, Quizzes (Online, Asynchronous) and Exams (Synchronous):

Assessments are covered in more detail in the Assessment section of the syllabus. There will be a combination of individual homework, individual quizzes and exams. There will also be a final exam.

In general, I invite interaction as much as possible, and you are always welcome to ask questions and work together on example problems and homework assignments. Often, the best learning opportunities happen through interactions. However, this does not apply to Mini-Quizzes or Exams, which must be completed independently.

Course Schedule

📌 This course schedule provides a thorough list of weekly course topics, biweekly assignments, and the final exam activity. Click `All` to switch to week, lecture, assignment, exam, or calendar view. **Note that the course schedule is tentative and might be adjusted later.**

We reserve the right to make changes to the weekly course schedule and/or assignments (e.g., homework) based on events that require different dispositions. We will give sufficient advance notice through announcements in class and via Canvas.

Assessments

The concepts covered in this course require practice to master, and the grading system is set up to make sure your final grade reflects the level of mastery you achieve by the end of the term. Please make sure you read this section thoroughly.

Quizzes

There will be **6 individual quizzes during the semester, administered via Canvas**. These quizzes will be timed (open for 24 hours), although you will have some flexibility on when you choose to start the quiz. Each quiz will have 4-8 conceptual questions (T/F, MCQ, Multiple Answers, Fill-in-the-Blanks and Matching), which you must answer based on what you learnt in the lectures. This will help to identify any misconceptions early on, which will benefit your learning and the remaining assessments in the long run. You may refer to the lecture notes while attempting the quiz if required (**optional, not mandatory**), but **collaboration/discussion with peers or accessing other Internet resources is not allowed**. The conceptual questions given in these quizzes will be similar to those that might be encountered on an exam.

There are no makeups offered for quizzes since these are low-stakes assessments meant to identify misconceptions.

NOTE: The **lowest quiz grade will be dropped**.

Homework

Practice is key to understanding and learning to apply the concepts in this course, and homework allows you to practice with more complex problems than can reasonably be given in an exam. Before beginning any homework assignment, you should review the lecture notes, examples, etc.

There will be around **6 individual homework assignments during the semester, so you will have ~2 weeks to submit each assignment**. These assignments will focus on **short-answer and free-response problems** to be solved. Most will have between **6 and 10 questions**. It is **highly recommended that you start working on your homework assignments early**! While you are encouraged to discuss your approach and collaborate with a study group to complete these, the work you submit must be your original work. The problems given in these homework assignments will be similar to those that might be encountered on an exam.

Partial homework solutions will be posted for a subset of problems. If you are struggling with homework, you are strongly advised to come to office hours!

Homework is required, and midterm exam grades may not be used to replace homework grades. This is because the homework assignments will include more challenging problems than the midterm exams and are part of the overall assessment of your understanding of the material.

We will use **Gradescope for submitting and grading homework**. No hard copies of homework will be accepted. You should have been added to Gradescope. If not, find our class signup link at: TBD.

Only **1-3 problems will be completely graded** (randomly selected but consistent across all students), while the remaining problems will only be evaluated for completeness (not accuracy), so you must still make a reasonable attempt on all problems.

There are no makeups offered for homework since you may submit the homework as many times as you want within the allocated time of ~2 weeks.

NOTE: The **lowest individual homework grade will be dropped if you submit all homework assignments**. If you fail to submit an assignment, then your lowest homework grade will not be dropped.

In-class Activities

These activities are **unannounced**, and for each topic, 1-3 problems will be given. These will typically be more challenging problems, and you will work to solve the problem(s) in groups of two or three with your peers. This will be done during class time. At the end of the session, you will submit the attempts you made during the class period.

To receive credit, you must attend the lecture. There are no makeups offered for these activities. These activities are graded mainly on completion rather than accuracy. If you attend the class and are actively participating, full credit will be awarded.

NOTE: The **lowest in-class activity grade will be dropped**.

Mid-term Exams

There will be **2 mid-term exams**, with each exam containing **2-3 questions** which would be **a combination of conceptual questions (T/F, MCQ, fill-in-the-blanks, short answer) and free response problems, administered during the semester at the usual class meeting time and classroom**. Note that while they are single questions, the question may have multiple parts. These will be timed at around **40-45 mins**. An equation sheet will be provided to you for your use during the exams. In addition, the following materials are allowed during the exams:

- Basic, 4-function calculator
- Scientific calculator
- Stationery

The use of lecture notes, books, the Internet, mobile phones, tablets and computers will not be permitted.

NOTE: **If the Final Exam grade is greater than the lowest mid-term exam score** (the minimum of Exam 1 and 2), the **lowest mid-term exam score will be replaced by the average of the final exam grade and the original lowest (Exam 1 or 2) score**. **You must attempt both midterms to be eligible for this provision.**

Final Exam

This course will have a final exam on the university-scheduled final exam slot, which is on **Monday, April 27, between 7.30 and 10 pm (Section 001)** and **Tuesday, April 28, between 1.30 pm and 4 pm (Section 002)** at the usual (respective) classroom for this course. This exam will involve the comprehensive material covered in the course and may involve a combination of conceptual and numerical. An equation sheet will be provided to you for your use during the exams, and the following materials are allowed during the exam activity:

- Basic, 4-function calculator
- Scientific calculator
- Stationery

The use of lecture notes, books, the Internet, mobile phones, tablets and computers will not be permitted.

Policy on Makeup Exams and Regrade Request

At the **instructor's discretion**, makeup exams **may be** given when an emergency or unavoidable conflict causes a student to miss the exam.

- Please be sure that your travel plans (e.g., Summer Break) do not conflict with the Final Exam.
- All makeup exams must be completed within 1-2 business days from the original exam date.

Following an exam, a **regrade request** (optional assignment) will be made available on Canvas. Submit a single pdf document to the 'regrade request' assignment on Canvas with the exam problem, your original work, your hand-written CORRECT solution to the problem in question, and a page stating the problem number, grading issue, and what you believe the correct grade should be.

Assessment Accommodations

- Students should expect to receive accommodations for a timed assessment (e.g., exam) only if their faculty instructor(s) receive the student's accommodations letter at least 5 business days before the assessment, as a departmental policy, in order to facilitate administering the assessment.
- If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member 2 weeks before

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. If you are waiting for the paperwork and it is delayed for some reason, please let us know via email.

Grading

The grading breakdown and scale are as follows:

Breakdown

Quizzes: **5%** *(lowest grade dropped)* ****In-class Activities: **7.5%** *(lowest grade dropped)*
Individual Homework: **10%** *(lowest grade dropped if all homework assignments are completed)*
Mid-term Exams: **45%** *(lowest exam grade replaced with the average of the final exam grade and the lowest exam grade if the final exam grade is higher and both midterms were attempted)*
Exam 1: **22.5%** Exam 2: **22.5%** Comprehensive Final Exam: **32.5%**

NOTE:

- You must verify all scores and grades on Canvas within 1 week after they are posted. Any requests to change the score must be made within this period.
- We reserve the right to make minor changes to this distribution of weights based on variations in assignments.

Scale

Letter Grade	Percent Score
A	93.00 - 100%
A-	90.00 - 92.99%
B+	87.00 - 89.99%
B	83.00 - 86.99%
B-	80.00 - 82.99%
C+	77.00 - 79.99%
C	73.00 - 76.99%
C-	70.00 - 72.99%
D	60.00 - 69.99%
F	Below 60.00%

NOTE: If necessary, minor adjustments may be made in the grade cutoffs and in the determination of final letter grades. However, there is no “curving” of grades in this course.

Attendance Policy

This is designated as a residential class. You are expected to be present for the class. Your grade will benefit from your regular attendance in class.

If you ever find yourself in any situation where extenuating circumstances are preventing you from attending classes and performing your best in the course, please schedule a personal meeting via email with your professor so that we can come up with a plan for you.

If you have a more complex situation or one that you wish to keep private (including family/medical emergencies), you should work with the Office of Student Support and Case Management. They will help you coordinate across ALL of your courses and can put you in touch with a number of campus resources. You can get more information on this process here: https://www.colorado.edu/studentaffairs/sscm.

Questions outside class

Office hours and Canvas discussions will be the primary resources for students to clarify course-related queries.

Office Hours:

In addition to class hours, the instructor and TAs will hold regular office hours. You are encouraged to come to ask about anything related to Statics, including lectures, in-class problems, homework, or any other questions you may have. It has been my observation in the past that students who regularly start their homework early enough, attend office hours and ask questions perform much better on exams!

Canvas Discussion:

This term, we will be using Canvas Discussion for discussions and clarifying course-related queries. Please utilise this platform to ensure that you receive help fast and efficiently from classmates, the TAs, and the instructor. I highly encourage you to post your questions on Canvas Discussion, even anonymously. Before posting a new question, please make sure you read and search existing questions.

Emails:

Send emails (during working hours) if you need to schedule a personal meeting, e.g. in case of a family/medical emergency, or if you are struggling in the course and would like to discuss success strategies. If you send an email, please **include ASEN 2401 in the subject line of any emails** so that it is easier for us to find your emails. In addition, I recommend using your CU Boulder e-mail for communication, as external e-mail addresses are sometimes flagged as spam. We will do our very best to answer all emails within 24 hours. If you have not heard back within

this time frame, please do not be afraid to reach out a second time in case your email was misfiled or undelivered.

Course Ethics

All students enrolled in a University of Colorado Boulder course are expected to be familiar with and adhere to the Honor Code (which can be found at https://www.colorado.edu/sccr/students/honor-code-and-student-code-conduct) and are bound by its requirements. Students are expected to uphold high ethical standards, including adherence to the CU Boulder Honor Code, Academic Regulations and Student Regulations. I expect you to observe the Honor Code with respect to homework assignments, quizzes, examinations, and all other aspects of this course.

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, unauthorised access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, use of homework help sites (i.e. Chegg, Course Hero, etc.), and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code.

If you are found in violation of these policies, it will be reported directly to Student Conduct & Conflict Resolution (StudentConduct@colorado.edu), with no exceptions!

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.

NOTE: Students are permitted and encouraged to work collaboratively on homework assignments and seek help from one another, but the work that is turned in must be the student's own work. **Copying another student's work is not permitted.**

Artificial Intelligence (AI) Policy

Generative artificial intelligence tools—software that reproduces text, images, computer code, audio, video, and other content—have become widely available. Well-known examples include ChatGPT for text and DALL•E for images. This statement governs all such tools, including those released during our semester together. Keep in mind that the goal of gen AI tools is to reproduce content that seems to have been produced by a human, not to produce accurate or reliable content; therefore, relying on a gen AI tool may result in your submission of inaccurate content. It is your responsibility—not the tool's—to assure the quality, integrity, and accuracy of work you submit in any college course. **If the use of a gen AI tool is suspected in completing assignments for this course in ways not explicitly authorised, we will follow up with you. I may contact the Office of Student Conduct & Conflict Resolution to report suspected Honor Code violations.** In addition, you must be wary of unintentional plagiarism or data

fabrication. Please act with integrity, for the sake of both your personal character and your academic record.

Limited Gen AI Use: You may use gen AI tools for specific functions in this course that will augment your learning, but their use is limited to the following particular tasks:

- Grammar checks, but not for rewriting the text of the assignment.
- Generating a new problem for your practice, but not for solving a given course problem, checking your solution to a given course problem and not for rectifying your course submission.

You are not permitted to use Gen AI for problem-solving on your homework or exams, and you are not permitted to use Gen AI to generate text for any written assignment.

Should you use gen AI tools on an assignment in this class, document your usage with the Chicago Manual of Style (link below) or appropriate citation guidelines as specified in the problem assignment.

https://www.chicagomanualofstyle.org/qanda/data/faq/topics/Documentation/faq0422.html

Tips for Success

Successful learning requires significant effort from both the instructor and the student. I will do everything in my power to make this course a success and provide you with the resources you need to learn. However, being successful will require you to do your part as well. Here are a few tips to help you be successful in this course.

- **Come to class in person and on time!**
- **Engage with the material.** Understanding the concepts in statics comes from working through example problems and stretching your understanding. Do not be tempted to shortcut your learning process by looking up solutions online or copying from a friend. If you are stuck, ask for help, but do not be tempted to just copy the answer. Your learning will come through the (sometimes painful) process of working through the connections.
- **Practice on your own.** You cannot become proficient in statics/mechanics by watching the instructor solve problems, by watching tutorial videos or by simply reviewing solved problems. You must repeatedly solve a variety of problems for each topic (old and new problems) on your own without any disruptions or distractions. Set aside 1 hour every week only for practising statics problems and validating your conceptual understanding.
- **Ask for help when you need it.** Office hours are a great time to get help with homework, ask questions about the material covered in class, discuss your own performance in the course, or just come and chat. These are a resource for you, and I encourage you to use them!
- **Your peers are a resource**. Talking out a problem with a classmate can be a fantastic tool to enhance learning for all parties. Explaining your thought process to someone else

is often all it takes to get unstuck. Plus, your current peers are the start of your professional network.
- **Focus on your problem-solving process.** Rather than focusing on simply learning the equations or memorising a set of problems, focus on learning an approach to use when faced with a new problem. This skill will serve you well in all your courses and beyond.
- **Inform in a timely manner.** Communicating with the course instructor promptly in case of any issue would avoid last-minute stress or confusion for both of us. We are here to help you learn, navigate and succeed, but it would not be possible for us to assist you in time unless you reach out to us and provide some clarity or insight into the problem. All requests and issues must be raised at least 48 hours before any impending deadlines.

Information for Students with Disabilities or In Need of Special Accommodations

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 require medical isolation for which you require adjustment, please contact the instructor as early as possible.** 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.

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 Counselling and Psychiatric Services (CAPS), located in C4C, or call (303) 492-2277, 24/7

Preferred Student Names and Pronouns

CU Boulder recognises 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 Behaviour

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 behavioural standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, colour, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

NOTE: Use of electronic gadgets such as phones, laptops, tablets, etc. are **ONLY permitted for Statics course-related activities**. You are NOT supposed to work on other courses, browse the internet, be on social media or play games. Refrain from activities that can be distracting and disengaging from the ongoing class!

Additional classroom behaviour information

- Student Classroom and Course-Related Behaviour Policy
- Student Code of Conduct
- Office of Institutional Equity and Compliance

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 supporting a variety of concerns, visit the Don't Ignore It page.

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