CE2110-001

 Applied Mechanics I: Statics

Civil and Environmental Engineering

School of Engineering

Syllabus – Spring 2021

**Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.**

Course and Instructor Information

**Course Title: Applied Mechanics I: Statics**

**Credits:** #3

**Format:** Distance Learning Flex

**Prerequisites:**  MATH 1132Q

**Class meets on ‘Virtual Classroom’ tab (HuskyCT)**

Lecture: Tuesdays 11:00 AM – 12:15 PM

Discussion Sections:

001D Thursdays 11:00AM – 12:15PM (instructor: Thomas Funk)

002D Thursdays 12:30PM – 1:45PM (instructor: Pierre Fils)

003D Thursdays 2:00PM – 3:15PM (instructor: Saki Rezwana)

004D Thursdays 3:30PM – 4:45PM (instructor: Saki Rezwana)

005D Thursdays 5:00PM – 6:15PM (instructor: Thomas Funk)

**Professor:** Shinae Jang, PhD, PE

**Email:** [**shinae.jang@uconn.edu**](mailto:shinae.jang@uconn.edu)

**Telephone:** (860) 486-0540

**Office Location**: Castleman 320

**Office Hours/Availability: Mondays 2:00PM – 3:00PM, Wednesdays 1-2PM, and by appointment**

Office hour link: <https://uconn-cmr.webex.com/meet/shj10001> (can be found in ‘Office Hour’ tab in HuskyCT)

I will check your email between business hours, and respond your questions within 1-2 business days. Office hours are scheduled between business hours (10AM – 5PM) as well.

Professor Jang is a member of the INCLUDE program team, a neurodiversity initiative that aspires to create an inclusive learning environment in which *all* students can thrive. Emphasis is given to providing a strengths-based approach to education that encourages students to identify, develop, and leverage their unique abilities to address complex engineering problems. This course was designed to address the diverse thinking and learning styles that neurodiverse students possess. Several pedagogical innovations will be implemented in this course including, but not limited to peer-learning, alternative examination modalities, project-based learning, etc.

Course Materials

**Required course materials should be obtained before the first day of class**. Required textbooks are available for purchase through the [UConn Bookstore](http://uconn.bncollege.com/webapp/wcs/stores/servlet/TBWizardView?catalogId=10001&langId=-1&storeId=88191) or online bookstore/vendors.

Required Materials:

**1. Technology ensuring your online learning environment is required:** internet service, computer, microphone and webcam.

**2. Textbook**: Vector Mechanics for Engineers: Statics or Statics and Dynamics

Beer, F.P., Johnston, E.R., Mazurek, D.F., Cornwell, P.J., Self, B.P. (2019)

McGraw Hill, 12th Ed. **Smartbook with CONNECT access**, **ISBN:**[**9781264178827**](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fmh.lightning.force.com%2Flightning%2Fr%2F00k0y00000rOELFAA4%2Fview&data=02%7C01%7Cshinae.jang%40uconn.edu%7C3e981ff33eac4e6e1ea008d8187a8f50%7C17f1a87e2a254eaab9df9d439034b080%7C0%7C0%7C637286262111411330&sdata=ftkxFq89NRMNL8wenVIq8tTHJvkeAwUMacRfe5shub0%3D&reserved=0)

Required course components will be done on CONNECT site, therefore, exact edition is required.

**3. i>clicker**: The mobile application, REEF Polling is required. Download REEF Student Apps from <https://www.iclicker.com/students/apps-and-remotes/apps>, find this course, and register by the add/drop deadline, **2/1**. It is your responsibility to check whether your i>clicker is properly working without technical issues – wifi, battery of your phone, etc. If the i>clicker site is down, that session will not be included in the grade. Check the HuskyCT Grade center for the clicker points.

*Additional course readings and media are available within HuskyCT, through either an Internet link or Library Resources*

Course Description

Fundamentals of statics using vector methods. Resolution and composition of forces; equilibrium of force systems; analysis of forces acting on structures and machines; centroids; moment of inertia.

The main objective of this course is to develop in the engineering students the ability to analyze any problem in a simple and logical manner and to apply to its solution a few, well understood, basic principles. Vector analysis is first introduced and will be used later in the presentation and discussion of the fundamental principle of mechanics. This course introduces the concepts of engineering based on forces in equilibrium. Topics include concentrated forces, distributed forces, forces due to friction, and inertia as they apply to machines, structures, and systems. Upon completion, students should be able to solve problems which require the ability to analyze systems of forces in static equilibrium.

This course will be prerequisite for CE 3110 Mechanics of Materials and CE3610 Basic Structural Analysis.

The lecture will be online using ‘Virtual Classroom’ tab on HuskyCT. Here are the virtual classroom policy:

* Mute yourself to avoid unnecessary background noise
* You are welcome to share your video. If you feel uncomfortable, do not share your video.
* Use the chatbox for your questions before, during, and after class
* During the concept explanation part in the lecture, TAs will monitor the chatbox and answer the questions
* During the problem solving part in the lecture, the instructor will monitor the chatbox and answer the questions.
* The chatbox is open to your questions related to course subjects only. Inflammatory language, emotional remarks, slangs, acronyms, and other inappropriate language are prohibited. Please use polite and professional language only. TAs will monitor the chatbox and anyone who uses inappropriate language will be first warned and next removed from the online lecture for the day. They need to watch the recorded video, and can join the next lecture. However, anyone who reported for 3 times will need to make an appointment with the instructor to address this behavior.

Course Objectives

By the end of the semester, students should be able to:

1. Draw free body diagrams of objects with applied external forces
2. Calculate components of forces and solve equation of equilibrium in 2D and 3D
3. Calculate the moment of a structure under a point load or a couple of forces
4. Calculate centroids of areas and volumes
5. Analyze trusses, frames, and machines by finding the internal forces and reactions
6. Analyze beams and cables
7. Calculate moment of inertia
8. Determine internal forces of systems with friction

Course Calendar

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Wk** | **Date** | **Textbook Sections** | **Online videos** | **Topics** | **Quiz range** |
| 1 | 1/19 | 1.1-1.4, 1.6  2.1 | L1, L2, L3  S1 | * Introduction * System of Unit – Numerical Accuracy * Vector-force Resultant, Part I | Quiz1 |
| 2 | 1/26 | 2.2-2.4 | L4, L5, L6  S2, S3, S4 | * Vector-force Resultant, Part II * Equilibrium of Particle * Rectangular Components of Force in Space |
| 3 | 2/2 | 2.5,3.1 | L7, L8, L9  S5, S6, S7 | * Equilibrium Forces in Space * External/Internal Forces-transmissibility * Vector Product Moment | Quiz2 |
| 4 | 2/9 | 3.1-3.4 | L10, L11, L12, L13  S8, S9, S10, S11 | * Rectangular Component of Moment-Scalar Product * Moment of a force about a point-Scalar product * Equivalent Couple-Addition of Couple-Moment about an axis * Reduction of Force-Equivalent System of Vectors | Quiz3 |
| 5 | 2/16 | **Midterm 1** (No discussion sections scheduled during the exam week) | | | |
| 6 | 2/23 | 4.1-4.3 | L14, L15, L16  S12, S13, S14 | * Equilibrium in 2D-Support Reaction * Equilibrium Rigid Body-Statically Indeterminate * Equilibrium 3D Reactions/Support | Quiz4 |
| 7 | 3/2 | 5.1-5.3 | L17, L18, L19  S15, S16, S17 | * Centroid of Gravity/Area * First Moment of Area * Distributed Load on Beam | Quiz5 |
| 8 | 3/9 | 5.4  6.1-6.2 | L21, L22, L23  S19, S20, S21 | * Centroid of Volume / Gravity * Truss/ Method of Joint * Truss/ Method of Section | Quiz6 |
| 9 | 3/16 | 6.3-6.4  7.1 | L24, L25  S22, S23 | * Analysis of Frames * Analysis of Machines | Quiz7 |
| 10 | 3/23 | **Midterm 2** (No discussion sections scheduled during the exam week) | | | |
| 11 | 3/30 | 7.2-7.3 | L26, L27, L28, L29  S24, S25, S26, S27 | * Beam / Various Type of Loading * Shear and Bending Moment Diagram * Relation Between Shear and Bending | Quiz8 |
| 12 | 4/6 | 7.4, 8.1-8.2 | L30, L31, L32  S28, S29, S30 | * Cables * Law of Friction * Wedges | Quiz9 |
| 13 | 4/12-16 |  |  | Spring Recess |  |
| 14 | 4/20 | 9.1-9.2 | L35, L36, L37  S33, S34, S35 | * Moment of Inertia Introduction * Moment of Inertia by Integration * Moment of Inertia of Composite Section | Quiz10 |
| 15 | 4/27 |  | Final Review | |  |
| 16 | TBD |  | **Final Exam** | |  |

* Quiz = pre-lecture quiz

Course Requirements and Grading

Summary of Course Grading:

| Course Components | Weight |
| --- | --- |
| Midterm exams | 40% |
| Final exam / project | 30% |
| Pre-lecture Quizzes | 10% |
| Homework | 10% |
| Class Participation | 5% (lecture) +5% (discussion) |

Homework

* There are 10 sets of homework during the semester. The homework is assigned through McGraw Hill’s **CONNECT**, and it will be automatically graded.
* You can try unlimited attempts by the homework deadline.
* The homework deadlines are marked in the course calendar. The time of submission is 11:59PM.
* Because the homework is administered in automatic CONNECT platform, late access will not be allowed.
* Homework solutions will be available to you after the due date. To come up with emergency situation, the lowest homework grade will be dropped.

Midterm exams

* There are 2 online exams (60 minutes). Each exam contain 4-8 questions. The exams require a webcam and will use Respondus monitor and Lockdown Browser. The exam schedule is given below:
* **2/16** 11:00AM – 12:00PM EST (60 minutes) Weeks 1-4
* **3/23** 11:00AM – 12:00PM EST (60 minutes) Weeks 6-9
* Exams are NOT open book/open notes. You can only have your calculator, paper, pencil and eraser. There is no restriction on the calculator model for exams.
* All equations will be given as a part of the exam.
* Students with disability can contact CSD to get the accommodation letter sent to me prior to the exam date. Also, they are encouraged to speak with me in person to discuss accommodations for course components.
* Make up exams will be offered to students only in following cases:

1. Athletic team members also can reschedule exam with a letter from their coach (in case of conflict between exams and their tournaments).
2. Other case (Medical emergency, family emergency,...): The missed exam will be taken on **Friday, April 9th 11:00 AM- 12:00 PM using CONNECT.**

Final exam or Final project

* Students can choose either an exam or a project for this component. Students who select the **project option** **must notify the instructor by the date of Midterm Exam 2**. Other students are assumed to choose the exam option by default.
* ***Exam:*** A cumulative final exam will be given at the end of the session online via HuskyCT. The time and the details will be communicated with students ahead of time.
* The exam requires a webcam and will use Respondus LockDown Browser with Monitor.
* Students will follow all University regulations concerning final exams.
* ***Project***: A final project will be given after Midterm Exam 2 so that the students can work on the final project between Midterm Exam 2 and the end of semester. The scope, format, deadline, and other details will be posted on HuskyCT.
* **Students with disability** are strongly encouraged to **contact the instructor** directly to schedule the final exam with necessary accommodation.
* **Students who need accommodations** are strongly encouraged to **contact the instructor** directly to discuss what can be done to promote their learning outcome.

Pre-lecture Quizzes along with reading assignment

* Before each week’s lecture session, you are required to review textbook on CONNECT, and finish pre-lecture quizzes.
* There are 10 quizzes during the semester. The range of each quiz is listed in Course Schedule above (in the syllabus), and the deadline of each quiz is 11:59PM of the deadline (marked in Course Calendar – separate document). Setting your electronic calendar (e.g. Google Calendar) on these dates are strongly recommended. Do not rely on HuskyCT’s automated calendar, it is your responsibility to keep the deadline for the quizzes.
* You can work on the quiz as far as you can pass the quiz – unlimited trial, however, you should pass the quiz before the set deadline to get full credit.

Class Participation

* Lecture participation (5%) is from the i>clicker, orientation syllabus quiz, self reflection surveys, and other active learning activity participation, no rollcall is scheduled. Participation is NOT based on correct or wrong, BUT based on participation. If there are multiple activities/questions in one class, only 1 participation point will be counted.
* Discussion section participation (5%) is from the attendance as well as learning activities. The attendance of your own discussion section required even though you didn’t attend the lecture section. In the discussion section, students will also participate in active learning activities. There are 11 discussion sections are scheduled, and you will get full credit if you attend 10 sections.

Grading Scale (subject to change):

| Grade | Letter Grade | GPA |
| --- | --- | --- |
| 93-100 | A | 4.0 |
| 90-92.99 | A- | 3.7 |
| 87-89.99 | B+ | 3.3 |
| 83-86.99 | B | 3.0 |
| 80-82.99 | B- | 2.7 |
| 77-79.99 | C+ | 2.3 |
| 73-76.99 | C | 2.0 |
| 70-72.99 | C- | 1.7 |
| 67-69.99 | D+ | 1.3 |
| 63-66.99 | D | 1.0 |
| 60-62.99 | D- | 0.7 |
| <60.99 | F | 0.0 |

Due Dates and Late Policy

All course due dates are identified in the calendar available in HuskyCT under Syllabus& Calendars. Deadlines are based on Eastern Standard Time; if you are in a different time zone, please adjust your submittal times accordingly. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.* **No late assignments will be accepted. No makeup quiz will be offered.**

Feedback and Grades

You will receive automated online feedback and get solutions from CONNECT on your homework. Midterm exams results will be available to you in a week after the exam date. The solutions of the midterm exams will be posted. To keep track of your performance in the course, refer to My Grades in HuskyCT.

Weekly Time Commitment

You should expect to dedicate **9 hours a week** to this course. This expectation is based on the various course activities, assignments, and assessments and the University of Connecticut’s policy regarding credit hours. More information related to hours per week per credit can be accessed at the [Online Student website](https://onlinestudent.uconn.edu/learn-more/#collapsepanel-269-1-0-07).

Student Authentication and Verification

The University of Connecticut is required to verify the identity of students who participate in online courses and to establish that students who register in an online course are the same students who participate in and complete the course activities and assessments and receive academic credit. Verification and authentication of student identity in this course will include:

1. Secure access to the learning management system using your unique UConn NetID and password.
2. Proctoring with Respondus Monitor, ID check, and exam with Lockdown Browser

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important [standards, policies and resources](https://onlinestudent.uconn.edu/learn--more/#POL), which include:

* The Student Code
  + Academic Integrity
  + Resources on Avoiding Cheating and Plagiarism
* Copyrighted Materials
* Credit Hours and Workload
* Netiquette and Communication
* Adding or Dropping a Course
* Academic Calendar
* Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
* Sexual Assault Reporting Policy

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible.  If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or<http://csd.uconn.edu/>.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.” (Retrieved March 24, 2013 from [Blackboard's website](http://www.blackboard.com/platforms/learn/resources/accessibility.aspx))

Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:

* HuskyCT/Blackboard ([HuskyCT/ Blackboard Accessibility Statement](http://www.blackboard.com/Platforms/Learn/Resources/Accessibility.aspx), [HuskyCT/ Blackboard Privacy Policy](http://www.blackboard.com/footer/privacy-policy.aspx))
* [Adobe Acrobat Reader](http://www.adobe.com/products/acrobat/readstep2.html) ([Adobe Reader Accessibility Statement](http://www.adobe.com/accessibility/products/reader.html), [Adobe Reader Privacy Policy](http://www.adobe.com/privacy.html))
* Google Apps ([Google Apps Accessibility](https://www.google.com/accessibility/), [Google for Education Privacy Policy](https://www.google.com/edu/trust/))
* Microsoft Office (free to UConn students through [uconn.onthehub.com](https://uconn.onthehub.com)) ([Microsoft Accessibility Statement](http://www.microsoft.com/enable/microsoft/mission.aspx), [Microsoft Privacy Statement](https://privacy.microsoft.com/en-us/privacystatement/))
* Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
* Webcam
* Respondus Lockdown Browser with Monitor ([Respondus Lockdown Browser and Monitor Accessibility Statement](https://www.respondus.com/products/accessibility-lockdown.shtml), [Respondus Privacy Policy](http://www.respondus.com/about/privacy.shtml))
* Refer [the UConn accessibility policies](https://accessibility.uconn.edu/policies/).

**NOTE:** **This course has NOT been designed for use with mobile devices**. The software/technical requirements for this course include:

Help

[Technical and Academic Help](https://onlinestudent.uconn.edu/frequently-asked-questions/) provides a guide to technical and academic assistance.

This course is completely facilitated online using the learning management platform, [HuskyCT](http://huskyct.uconn.edu/). If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the [Help Center](http://helpcenter.uconn.edu/). You also have [24x7 Course Support](http://www.ecampus24x7.uconn.edu/) including access to live chat, phone, and support documents.

**Resources for Students Experiencing Distress**

The University of Connecticut is committed to supporting students in their mental health, their psychological and social well-being, and their connection to their academic experience and overall wellness. The university believes that academic, personal, and professional development can flourish only when each member of our community is assured equitable access to mental health services. The university aims to make access to mental health attainable while fostering a community reflecting equity and diversity and understands that good mental health may lead to personal and professional growth, greater self-awareness, increased social engagement, enhanced academic success, and campus and community involvement.

Students who feel they may benefit from speaking with a mental health professional can find support and resources through the[**Student Health and Wellness-Mental Health**](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fcounseling.uconn.edu%2F&data=02%7C01%7Cshinae.jang%40uconn.edu%7Cf3ace147d8d548b8245608d84522df47%7C17f1a87e2a254eaab9df9d439034b080%7C0%7C0%7C637335363356993423&sdata=L%2F4z54dAzaB2RG9Ah4XPmiJOh%2BZwRgf3O%2Bec8wrpVTc%3D&reserved=0) (SHaW-MH) office. Through SHaW-MH, students can make an appointment with a mental health professional and engage in confidential conversations or seek recommendations or referrals for any mental health or psychological concern.

Mental health services are included as part of the university’s student health insurance plan and also partially funded through university fees. If you do not have UConn’s student health insurance plan, most major insurance plans are also accepted. Students can visit the **Student Health and Wellness-Mental Health located in Storrs on the main campus in the Arjona Building, 4th Floor,**or contact the office at **(860) 486-4705, or**[**https://studenthealth.uconn.edu/**](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fcounseling.uconn.edu%2F&data=02%7C01%7Cshinae.jang%40uconn.edu%7Cf3ace147d8d548b8245608d84522df47%7C17f1a87e2a254eaab9df9d439034b080%7C0%7C0%7C637335363356998421&sdata=oD7GrF%2BbLDqRhrWpJD9nbltmIjovFr5Zo8wWhKLGydE%3D&reserved=0)for services or questions**.**

**Accommodations for Illness or Extended Absences**

Please stay home if you are feeling ill and please go home if you are in class and start to feel ill.  If illness prevents you from attending class, it is your responsibility to notify your instructor as soon as possible. You do not need to disclose the nature of your illness, however, you will need to work with your instructor to determine how you will complete coursework during your absence.

If life circumstances are affecting your ability to focus on courses and your UConn experience, students can email the Dean of Students at dos@uconn.edu to request support.  Regional campus students should email the Student Services staff at their home campus to request support and faculty notification.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

* Use electronic mail with attachments.
* Save files in commonly used word processing program formats.
* Copy and paste text, graphics or hyperlinks.
* Work within two or more browser windows simultaneously.
* Open and access PDF files.
* Scan work and upload files.

University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](http://geoc.uconn.edu/computer-technology-competency/) page for more information.

Evaluation of the Course

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the[Office of Institutional Research and Effectiveness](http://www.oire.uconn.edu/) (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.