

Syllabus – Fall 2019
Course and Instructor Information

Course Title: Applied Mechanics I (Statics)

Credits: #3

Format: (Flipped)

Prerequisites: Math 2110 or 2130 which may be taken concurrently

Class meets:

Lecture: Tuesdays 11:00 AM – 12:15 PM in Castleman 212

Discussion Sections:

001D Tuesdays 2:00PM – 3:15PM in ATWR A001 (Instructor: Jeffrey Steiner)

002D Tuesdays 2:00PM – 3:15PM in ITE 336 (Instructor: Saki Rezwana)

003D Tuesdays 3:30PM – 4:45PM in E2 323 (Instructor: Jeffrey Steiner)

004D Tuesdays 3:30PM – 4:45PM in ITE 125 (Instructor: Saki Rezwana)

013D Thursdays 6:30PM – 7:45PM in ITE 125 (Instructor: Brendan Sodergren)

Instructor: Shinae Jang, PhD, PE

Email: shinae.jang@uconn.edu

Telephone: 860-486-0540

Other: Office location: Engineering II building, 309

Office Hours/Availability: MW 2:00 – 3:00 PM

TA Office Hour (Ge Shi) Mondays 2-3PM and Fridays 5-6PM in Castleman 123

UTA Office Hour (Olivia Harris) Tuesdays 9:30AM – 11AM in Castleman 123

Required Materials:

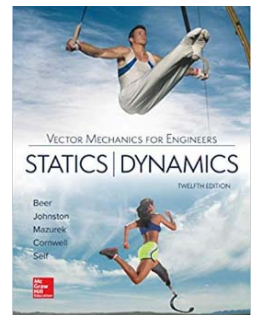
Required course materials should be obtained before the first week of class. Textbook and i>clickers are available through UConn Bookstore or online bookstore/vendors.

Text book: Vector Mechanics for Engineers: STATICS or STATICS and DYNAMICS

Ferdinand P. Beer, E. Russell Johnston Jr., & David F. Mazurek

McGraw -Hill, 12th Ed., 2019, ISBN: [9780077687304](https://www.mhhe.com/beerjohnston/9780077687304)

i>clicker: The mobile application, REEF Polling is NOT allowed. You must register your i>clicker on HuskyCT by the add/drop deadline, **9/9**. I consider bringing a fellow student's i>clicker to class to be cheating and a violation of the University Code of Conduct. If you are caught with a remote other than your own or have votes in a class that you did not attend, you will forfeit all clicker points and may face additional disciplinary action. In case you didn't bring your i>clicker although you attended, you will receive full participation grade upon in-person request right after the class for only **one time** basis. It is your responsibility to check whether your i>clicker is properly working without technical issues – battery, wrong channel, etc. Check the HuskyCT Grade center for the clicker points.



Course Organization:

The course consists of a 75-minute lecture section, and a 75-minute discussion section. **The attendance of the discussion section is required.**

This class is a flipped. It means that the lectures will be delivered online and students will come to both classes for recitation, problem solving, and to address their questions on assignments. Each lecture usually includes three lecture videos and three sample solving videos. Please refer the course schedule for the corresponding videos.

For each week

1. Watch 3 videos (approximately 10 min. for each) lecturing concepts and background information.
2. Watch 3 videos (approximately 10-20 min. for each) solving sample problems (If applicable).
3. Study your text book
4. Solve homework and submit them online.
5. Attend the class to practice problem solving skill
6. Take online quizzes
7. Take 2 midterm exams and 1 final exam [in class].

In Class Activities

Active learning method is utilized in this class. The class sessions involve with problem solving (by students) individually and in teamwork. Instructors and TAs will guide you during problem solving. The solution to the problems will be presented either in class.

To effectively use the class sessions, please follow the instruction below.

1. Having **calculator/pencil/eraser** in class session is mandatory.
2. You are supposed to watch the lecture video and sample solving video before attending the class. You can find lecture numbers from Course Schedule below.
3. Send your questions on the watched videos to instructor or TA at least 2 hours before your class session. Instructor will have a recitation on that topic if it is necessary.
4. Work closely with your classmates to get help from peers too.
5. Some problem needs to be studied in a group. Students' seat may be rotated for learning purposes.

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.

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 moments / force couples
4. Calculate centroids of lines, 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. Explain the laws of friction and its application

Course Schedule

Wk	Date	Online videos	Topics	Quiz range
1	8/27	L1, L2, L3 S1	<ul style="list-style-type: none"> ▪ Introduction ▪ System of Unit – Numerical Accuracy ▪ Vector-force Resultant, Part I 	Quiz1
2	9/3	L4, L5, L6 S2, S3, S4	<ul style="list-style-type: none"> ▪ Vector-force Resultant, Part II ▪ Equilibrium of Particle ▪ Rectangular Components of Force in Space 	
3	9/10	L7, L8, L9 S5, S6, S7	<ul style="list-style-type: none"> ▪ Equilibrium Forces in Space ▪ External/Internal Forces-transmissibility ▪ Vector Product Moment 	Quiz2
4	9/17	L10, L11, L12, L13 S8, S9, S10, S11	<ul style="list-style-type: none"> ▪ 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	9/24	Midterm 1 (No discussion sections scheduled during the exam week)		
6	10/1	L14, L15, L16 S12, S13, S14	<ul style="list-style-type: none"> ▪ Equilibrium in 2D-Support Reaction ▪ Equilibrium Rigid Body-Statically Indeterminate ▪ Equilibrium 3D Reactions/Support 	Quiz4
7	10/8	L17, L18, L19 S15, S16, S17	<ul style="list-style-type: none"> ▪ Centroid of Gravity/Area/Line ▪ First Moment of Area ▪ Distributed Load on Beam 	Quiz5
8	10/15	L21, L22, L23 S19, S20, S21	<ul style="list-style-type: none"> ▪ Centroid of Volume / Gravity ▪ Truss/ Method of Joint ▪ Truss/ Method of Section 	Quiz6
9	10/22	L24, L25 S22, S23	<ul style="list-style-type: none"> ▪ Analysis of Frames ▪ Analysis of Machines 	Quiz7
10	10/29	Midterm 2 (No discussion sections scheduled during the exam week)		
11	11/5	L26, L27, L28, L29 S24, S25, S26, S27	<ul style="list-style-type: none"> ▪ Beam / Various Type of Loading ▪ Shear and Bending Moment Diagram ▪ Relation Between Shear and Bending 	Quiz8
12	11/12	L30, L31, L32 S28, S29, S30	<ul style="list-style-type: none"> ▪ Cables ▪ Law of Friction ▪ Wedges 	Quiz9
13	11/18	L35, L36, L37 S33, S34, S35	<ul style="list-style-type: none"> ▪ Moment of Inertia Introduction ▪ Moment of Inertia by Integration ▪ Moment of Inertia of Composite Section 	Quiz10
14	11/25- 29	Thanksgiving Recess		
15	12/3	Final Review		
16	TBD	Final Exam		

* Class schedule is subject to change due to inclement weather, student progress, and other activities.

Course Requirements and Grading

Summary of Course Grading:

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

Homework

- There are 10 sets of Homework during the semester. You will upload HWs to HuskyCT under “Assignments” and will get feedback online. You need to upload your assignments before the due date to HuskyCT. The due is the date listed on the calendar **at 11:59PM**. The due dates are also available on calendar. The calendar file is located in HuskyCT under Syllabus & Calendar. Expect technical problems such as scanner, wifi, or huskyCT, therefore, submit your homework ahead of time (not in the last minute). The homework solution will be released right after the deadline, therefore, **No late HWs will be accepted.** You need to expect technical issues (internet, scanner, HuskyCT, etc) and address them ahead of time. **To come up with emergency situation, the lowest homework grade will be waived.**
- Strictly follow the **homework template** to receive full credit.
- You need to scan your home works and save as **a single PDF file** using the scanner located in Homer library or your smartphone device. The scanners in library are free to use, available 8AM-midnight, and are located in Plaza level by the i-desk and second level by the commons desk.

DO NOT EMAIL YOUR LATE HOMEWORK TO INSTRUCTOR OR TAs.

Quizzes

- There are 10 online quizzes during the semester. Each quiz contains 5-7 multiple choice questions. You have 30 minutes for each quiz attempt.
- Online quizzes will be available to you 4 days before due date. The latest quiz attempt should start before 11:59PM of the due dates. You can have 2 attempts. After each attempt, you can see your wrong answers. **No make-up quiz will be offered to students.** 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.
- Quiz solution will be available to you in HuskyCT under Course Resources/Quiz Solutions after due dates. **No late quiz will be allowed.**
- Online** quizzes (total of 10 quizzes):

Deadline for Quiz

	Quiz1	Quiz2	Quiz3	Quiz4	Quiz5
Deadline	9/10	9/17	9/24	10/8	10/15
Range	L1-6	L7-9	L10-13	L14-16	L17-19
	Quiz6	Quiz7	Quiz8	Quiz9	Quiz10
Deadline	10/22	10/29	11/12	11/19	12/4
Range	L21-23	L24-25	L26-29	L30-32	L35-37

Midterm exams

- **In-Class** Midterm exams (2 Midterm exams):

Midterm exam 1: 9/24/2019 (60 minutes) [Week 1 – Week 4]

Midterm exam 2: 10/29/2019 (60 minutes) [Week 6 – Week 9]

Midterm exams contain 4 - 8 questions. You have 60 minutes to answer questions.

- Exams are NOT open book/open notes. You can only have your calculator, pencil and eraser. Please DO NOT use Pen to answer questions. There is no restriction on the calculator model for the exam
- There are review sessions in the class before midterm exams. You can send your questions to instructor in advance to be addressed in the review sessions.
- Solution to midterm exams will be available in HuskyCT under Course Resources/Exam Solutions.
- **Make up exams** will be offered to students only in following cases.
 - a) Students with disability can contact CSD to schedule exam in a private room with extended time.
 - b) Athletic team members also can reschedule exam with a letter from their coach (in case of conflict between exams and their tournaments).
 - c) Other case (Medical emergency, family emergency,...): The missed exam will be taken on **Friday, November 15th 11:00 AM- 12:00 PM in Castleman 306.**

Final Exam

- A cumulative final exam will be given at the end of the semester during Finals Week. The date will be assigned by registrar's office. The final exam can be rescheduled because of bunched exam or other reasons. This should be allowed by the registrar's office, and once you are allowed, you need to schedule the date with the instructor ahead of time.
- Students with disability can contact CSD to schedule the final exam with necessary accommodations. If you need to use the rescheduled exam date, you must discuss the date and get approved by the instructor ahead of time.

Class Participation

- Lecture participation (5%) is from the iclicker or 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.

Grading Scale: (Subject to change)

Grade	Letter Grade	GPA
93-100	A	4.0
90-92.99	A-	3.7

Grade	Letter Grade	GPA
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 online feedbacks on your assignments and quizzes. Midterm exams and final exams results will be available to you in a week after the exam date. In addition solutions to all home works, quizzes, midterm exams, and final exams will be available in huskyCT under Course Resources.

Homework Template

This format is used for most professional engineering work. You do not need to use engineering paper, but to follow the format below to receive full credit. An example homework template is shown in Fig. 1.

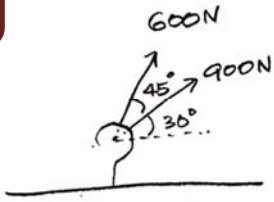
- Header: Print your full name, course and section number, date, and page number
- Writing mechanics: all homework should be carefully printed and not written in cursive, printed in pencil and not in ink, neat and clean with no smudges or cross-outs
- Calculations: all homework calculations should include all necessary equations, and intermediate steps, units, and clearly indicate the final solution by boxing it in with a rectangle
- Problem order: problems should be presented in the order assigned with exact problem number
- Problem essentials: problem solutions should include the following items in order
 - Problem number
 - The given information – problem statement
 - The required information for solution
 - Diagrams that clearly illustrate the problem
 - The solution of the problem including all required steps and calculations
- Submission: the scanned homework should be submitted to the correct file.
 - The homework will not be graded and the grade will be zero, for the following cases.
 - Late homework submission after 11:59PM on the deadline
 - Wrong homework submission to wrong folder
 - When only a part of homework was submitted, only submitted portion will be graded.

John Doe CE 2110-003 1/31/2018 1/5

Name **Class/Section** **Date** **Page 1 of 5**

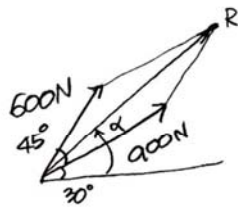
2.1. Magnitude and direction of resultant using
 (a) the parallelogram law, (b) the triangle rule

Problem Number **Problem Statement**

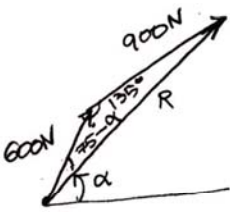


Definition Sketch

(a) Parallelogram law:



(b) Triangle rule:



$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$R^2 = 600^2 + 900^2 - 2 \times 600 \times 900 \times \cos 135^\circ$$

$$R = 1390.57 \text{ N}$$

Show all procedure

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{900 \text{ N}}{\sin(75^\circ - \alpha)} = \frac{1390.57 \text{ N}}{\sin 135^\circ}$$

$$\alpha = 47.7643^\circ$$

Box around answer

$R = 1390.57 \text{ N}$ $\nearrow 47.76^\circ$

Figure 1. Sample homework in proper format

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. This section provides a brief overview to important standards, policies and resources.

Student Code

You are responsible for acting in accordance with the [University of Connecticut's Student Code](#). Review and become familiar with these expectations. In particular, make sure you have read the section that applies to you on Academic Integrity:

- [Academic Integrity in Undergraduate Education and Research](#)
- [Academic Integrity in Graduate Education and Research](#)

Cheating and plagiarism are taken very seriously at the University of Connecticut. As a student, it is your responsibility to avoid plagiarism. If you need more information about the subject of plagiarism, use the following resources:

- [Plagiarism: How to Recognize it and How to Avoid It](#)
- [Instructional Module about Plagiarism](#)
- [University of Connecticut Libraries' Student Instruction](#) (includes research, citing and writing resources)

Copyright

Copyrighted materials within the course are only for the use of students enrolled in the course for purposes associated with this course and may not be retained or further disseminated.

Etiquette and Communication

At all times, course communication with fellow students and the instructor are to be professional and courteous. It is expected that you proofread all your written communication, including discussion posts, assignment submissions, and mail messages. If you are new to online learning or need a netiquette refresher, please look at this guide titled, [The Core Rules of Netiquette](#).

Adding or Dropping a Course

If you should decide to add or drop a course, there are official procedures to follow:

- Matriculated students should add or drop a course through the [Student Administration System](#).
- Non-degree students should refer to [Non-Degree Add/Drop Information](#) located on the registrar's website.

You must officially drop a course to avoid receiving an "F" on your permanent transcript. Simply discontinuing class or informing the instructor you want to drop does not constitute an official drop of the course. For more information, refer to the:

- [Undergraduate Catalog](#)
- [Graduate Catalog](#)

Academic Calendar

The University's [Academic Calendar](#) contains important semester dates.

Academic Support Resources

[Technology and Academic Help](#) provides a guide to technical and academic assistance.

Students with Disabilities

Students needing special accommodations should work with the University's [Center for Students with Disabilities \(CSD\)](#). You may contact CSD by calling (860) 486-2020 or by emailing csd@uconn.edu. If your request for accommodation is approved, CSD will send an accommodation letter directly to your instructor(s) so that special arrangements can be made. (Note: Student requests for accommodation must be filed each semester.)

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 <http://www.blackboard.com/platforms/learn/resources/accessibility.aspx>)

Software Requirements and Technical Help

- Word processing software
- [Adobe Acrobat Reader](#)
- Internet access

(add additional items as needed and link to <http://ecampus.uconn.edu/plug-ins.html>)

This course is completely facilitated online using the learning management platform, [HuskyCT](#). If you have difficulty accessing HuskyCT, online students have access to the in person/live person support options available during regular business hours in the Digital Learning Center (www.dlc.uconn.edu). Students also have 24x7 access to live chat, phone and support documents through www.ecampus24x7.uconn.edu.

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.

(add additional items as needed and link to <http://ecampus.uconn.edu/plug-ins.html>)

University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](#) 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 \(OIRE\)](#).

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