UCONN
UNIVERSITY OF CONNECTICUT

CE2110-001
Applied Mechanic I (Statics)
School of Engineering

Syllabus – Spring 2018

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: MWF 11:15AM – 12:05PM in LH 201

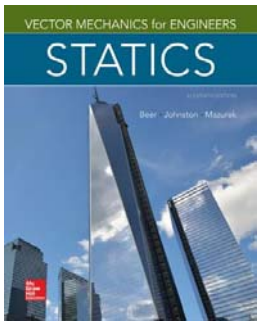
Professor: Shinae Jang, Ph.D.
Email: shinae.jang@uconn.edu
Telephone: 860-486-0540
Other: Office location: Engineering II building, 309
Office Hours/Availability: MW 2:15 – 3:15 PM

Teaching Assistants: Suvash Dhakal (suvash.dahkal@uconn.edu)
Office Hours/Availiability: Tuesday 2-3PM and Thursday 1-2PM in Castleman 123

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.

Required Materials:
Text book: Vector Mechanics for Engineers: STATICS or STATICS and DYNAMICS
Ferdinand P. Beer, E. Russell Johnston Jr., & David F. Mazurek
McGraw -Hill, 11th Ed.,2013
ISBN: 9780077687304

i>clicker 2: The mobile application, REEF Polling is NOT allowed. You must register your i>clicker on HuskyCT by the add/drop deadline, **1/29**. 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 after 1/29, 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 class is a flipped. It means that the lectures will be delivered online and students will come to the class for recitation (if needed), problem solving and to address their questions on assignments.

Class includes total of 14 week, 38 Lectures, [01/16/2018 to 4/27/2018]
Each lecture usually includes one lecture video and one sample solving video.

For each lecture

1. Watch a video (approximately 10 min.) lecturing concepts and background information.
2. Watch a video (approximately 10-20 min.) solving sample problems (If applicable).
3. Study your text book (page numbers will be provided for each module).
4. Solve weekly problems and submit them online.
5. Attend the class to practice problem solving skill
6. Take online quizzes every other week [total of 6 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 or later the file will be uploaded to HuskyCT.

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	Textbook Sections	Online lectures and problem solving	Topics and activities	Homework Due date
1	1/17	1.1-1.2	L-1	Introduction	
	1/19	1.3-1.4	L-2	System of Unit - Numerical Accuracy	
2	1/22	2.1-2.2	L-3, S-1	Vector-force Resultant, Part I	
	1/24	2.3	L-4, S-2	Vector-force Resultant, Part II	
	1/26	2.4	L-5, S-3	Equilibrium of Particle	
3	1/29	2.5	L-6, S-4	Rectangular Components of Force in Space	HW1
	1/31	2.5	L-7, S-5	Equilibrium Forces in Space	
	2/2	3.1A-B	L-8, S-6	External/Internal Forces-transmissibility	
4	2/5	3.1C-E	L-9, S-7	Vector Product Moment	HW2
	2/7	3.1F, 3.2	L-10, S-8	Rectangular Component of Moment-Scalar Product	
	2/9	3.2	L-11, S-9	Moment of a force about a point-Scalar product	
5	2/12	3.3	L-12, S-10	Equivalent Couple-Addition of Couple-Moment about an axis	HW3
	2/14	3.4	L-13, S-11	Reduction of Force-Equivalent System of Vectors	
	2/16			Midterm 1 review	
6	2/19	**Midterm Exam 1**			
	2/21	4.1	L-14, S-12	Equilibrium in 2D-Support Reaction	HW4
	2/23	4.1C	L-15, S-13	Equilibrium Rigid Body-Statically Indeterminate	
7	2/26	4.2-3	L-16, S-14	Equilibrium 3D Reactions/Support	
	2/28	5.1	L-17, S-15	Centroid of Gravity/Area/Line	HW5
	3/2	5.1F, 5.2	L-18, S-16	First Moment of Area	
8	3/5	5.3A	L-19, S-17	Distributed Load on Beam	
	3/7	5.4	L-21, S-19	Centroid of Volume / Gravity	HW6
	3/9	6.1	L-22, S-20	Truss/ Method of Joint	
	3/11-17	**Spring Break**			
9	3/19	6.2	L-23, S-21	Truss/ Method of Section	
	3/21	6.3	L-24, S-22	Analysis of Frames	HW7
	3/23	6.4	L-25, S-23	Analysis of Machines	
10	3/26	**Midterm Exam 2**			
	3/28	7.1-2A	L-26, S-24	Beam / Various Type of Loading	HW8

	3/30	7.2B	L-27, S-25	Shear Diagram	
11	4/2	7.2C	L-28, S-26	Bending Moment Diagram	
	4/4	7.3	L-29, S-27	Relation Between Shear and Bending	HW9
	4/6	7.4	L-30, S-28	Cables	
12	4/9	8.1	L-31, S-29	Law of Friction	
	4/11	8.2A	L-32, S-30	Wedges	HW10
	4/13	8.2B	L-33, S-31	Square Threaded Screw	
13	4/16	8.4	L-34, S-32	Belt Friction	
	4/18	9.1A	L-35, S-33	Moment of Inertia Introduction	HW11
	4/20	9.1B	L-36, S-34	Moment of Inertia by Integration	
14	4/23	9.1C-D	L-37, S-35	Moment of Inertia of Composite Section	
	4/25			Make-up or review session	
	4/27			Final review	HW12
	TBD	**Final Exam**			

**There is no classroom lecture; the lecture is replaced by online learning module.

Course Requirements and Grading

Summary of Course Grading:

Course Components	Weight
Midterm exams	45%
Final exam	30%
Quizzes	10%
Homework	10%
Class Participation	5%

Home work

- There are 12 sets of Home works 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 syllabus **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.**

DO NOT EMAIL YOUR LATE HOMEWORK TO INSTRUCTOR OR TAs.

- 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.

Quizzes

- **Online** quizzes (total of 6 quizzes):

Deadline for Quiz

	Quiz1	Quiz2	Quiz3	Quiz4	Quiz5	Quiz6
Deadline	1/30	2/13	3/1	3/20	4/3	4/17
Range	L1-5	L6-11	L12-16	L17-22	L23-27	L28-33

- Each quiz contains 10 questions. Questions are multiple choices. 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 no 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.**

Midterm exams

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

Midterm exam 1: Monday, 2/19/2018 (50 minutes) [Week 1 – Week 5]
Midterm exam 2: Monday, 3/26/2018 (50 minutes) [Week 6 – Week 9]

Midterm exams contain 4-6 questions. You have 50 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,...): **Friday, April 6th 11:15 AM-12:05 PM Materials include Week 1-Week 9**

Final Exam

Final Exam in class: Comprehensive exam, Date and Time to be announced (2 hours)

Class Participation

In-class active learning activities using i>clicker is included in this score. Participation score is not based on correct or wrong, but based on participation.

Grading Scale: (Subjected 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 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.

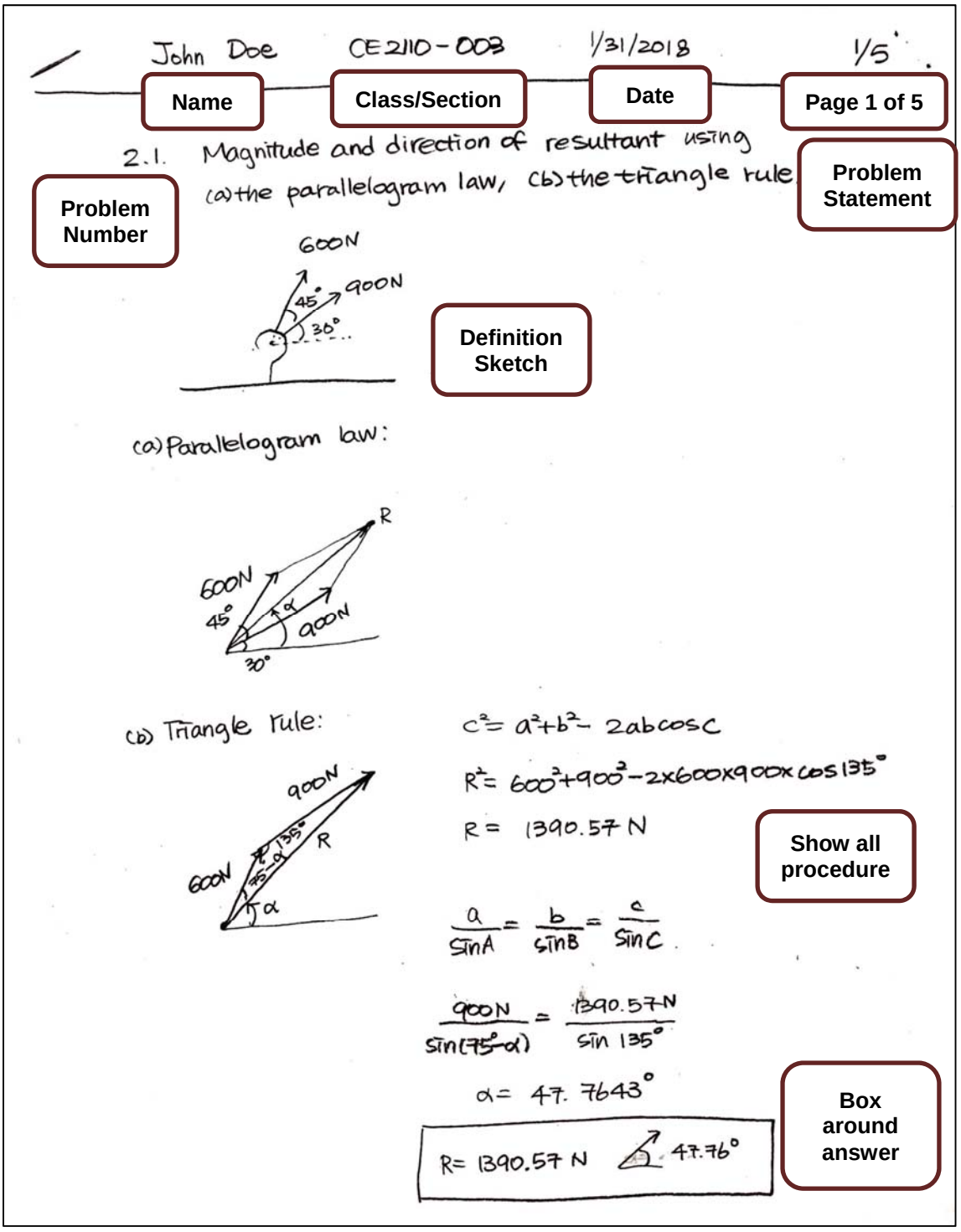


Figure 1. Sample homework in proper format

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.