UNIVERSITY AT BUFFALO

EAS 207 Statics (Sections C & D)

Fall 2015

Lectures:	Section C: M W F 11:00 -11:50 AM @ Hoch 114 Section D: M W F 12:00 -12:50 PM @ NSC 210
Recitations or labs:	As per the UB Schedule
Instructor:	Professor S. Epackachi, 232 Ketter Hall, Email: siamakep@buffalo.edu
Office hours:	M W F 2:00 – 2:50 PM & W F 10:00 – 10:50 AM at 232 Ketter Hall
Teaching assistant(s):	Names and Office hours (Check the schedule at Ublearns)
Prerequisite(s):	PHY 107 or PHY 117 and MTH 142
Corequisite:	MTH 241 (recommended)
Course web site:	Ublearns
Textbook:	1. Engineering Mechanics -Statics, By Hibbeler, 14th Edition 2. MasteringEngineering, Hibbeler 14E (Online resource and tutorials)

Course description: Application of mechanics to the study of static equilibrium of rigid and elastic bodies. Topics include composition and resolution of forces; moments and couples; equivalent force systems; free-body diagrams; equilibrium of particles and rigid bodies; forces in trusses and beams; frictional forces; first and second moments of area; moments and products of inertia; methods of virtual work and total potential energy.

Course Goals/Objectives: Mechanics, concerned with the study of static and dynamic equilibrium of particles and rigid bodies, is regarded as essential to the basic education of an engineer. Since the problems confronted by today's engineers are seldom restricted to one's own specialization, it is imperative that the engineering students become thoroughly grounded in the fundamental principles of mechanics so necessary for the solution of many problems. The major goal of this course is to present, in a coherent and systematic fashion and by emphasizing the useful application, a fundamental treatment of the principle of statics (mechanics). Problems solving in the subject area of statics familiarize the student with real-life problems and develop in them an appreciation for their own powers of analysis and the effective use of mathematical modeling.
Emphasis is on understanding concepts and applying them to solve engineering problems.

Course Learning Outcomes: Upon successful completion of the course, students will be able to:

Course Learning Outcomes	SO	Assessment Tools
1. Calculate the resultant forces and moments in 2D and 3D systems.	a,e	HW and Exams
2. Draw free-body diagrams for particles and rigid bodies.	a,e, g	HW and Exams
3. Solve particle and rigid body problems using the principle of static equilibrium.	a,e, g	HW and Exams
4. Analyze 2D and 3D trusses using methods of joints and sections.	a,e, g	HW and Exams
5. Calculate internal forces in a beam and plot shear-force and bending-moment diagrams.	a,e, g	HW and Exams
6. Solve problems related to sliding objects using Coulomb's dry friction theory.	a,e, g	HW and Exams
7. Locate the center of gravity and the centroid of a given shape/volume.	a,e	HW and Exams
8. Calculate moment of inertia for an area/volume	a,e	HW and Exams

Contribution of EAS 207 towards fulfillment of ABET Student Outcomes (SO):

(a) Apply knowledge of mathematics, science, and engineering

EAS 207 is an engineering problem solving course that builds upon the students' background in mathematics and physics to form a linkage between abstract concepts and physical problems common to engineering practice.

(e) An ability to identify, formulate, and solve engineering problems

The problems demonstrated in class and the homework assignments encourage students to consider ill-defined "real-world" problems in a disciplined and structured fashion so that they may apply their engineering knowledge and judgment to the meaningful solution of the problem. These exercises are designed to develop the students' confidence so they will be competent to make the next transition, from problem solving to design.

(g) Communicate effectively

Because engineers frequently communicate via engineering calculations, a premium is placed on the quality, order, neatness, and correctness of all solution of problems performed as part of EAS 207. The students are continually reminded that the quality of their engineering calculations is a statement of their regard for their profession.

Relationship of Course to ABET Student Outcomes (Course Assessment Matrix):

a	b	c	d	e	f	g	h	i	j	k
3				3		1				

Contribution Level: 3 = Substantial, 2 = Moderate, and 1 = Limited

Academic integrity: The University at Buffalo takes very seriously its commitment to principles of academic integrity. Please review the UB policies regarding academic integrity regularly (http://academicintegrity.buffalo.edu/policies/index.php).

As an engineer, you have special ethical obligations. As per the NSPE Code of Ethics, "engineers shall avoid deceptive acts" and "shall conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession."

UB Engineering Code of Ethic:

- Act with honesty, integrity and fairness
- Show respect for others
- Accept responsibility
- Give credit where credit is due
- Serve the larger community
- Take pride in being a part of UB Engineering

Accessibility Resources: If you require classroom or testing accommodations due to a disability, please contact Accessibility Resources, located at 25 Capen Hall. Accessibility Resources can be reached by phone at (716) 645-2608 or by email at stu-accessibility@buffalo.edu. Please inform me as soon as possible about your needs so that we can coordinate your accommodations. For additional information see http://www.buffalo.edu/accessibility/index.php

Course Requirements:

Homework assignments: About 35 homework assignments are assigned during the semester exploring ideas and concepts presented in the classroom. At the end of each lecture two problems (posted on Ublearns) will be assigned as homework and the HW will be due at the next lecture.

1. Homework must be turned in at **beginning** of class (within first 5 minutes) on the day it is due. **No homework extensions will be given, and late HW will not be accepted.**

2. Assignments must be done neatly on ENGINEERING paper, in pencil, and written on one side of the paper. Homework submissions are expected to be thorough and logically organized. A cover sheet should accompany each assignment. Pages MUST be stapled together. When you perform engineering calculations you must explain your work such that an uninformed reader can follow how and why each step was performed. Sloppy work, even if technically correct, is unprofessional and will lose points. Figures should be drawn roughly to scale using a straight edge. Final answers must be **boxed** and must include **units** where applicable and be given using 4 **significant figures**.

3. Homework **must** follow this format:

   Given: (statement of problem)

   Find: (what are you after)

   Solution: (analysis leading to result)

   The answer must be **boxed.**

4. Each homework assignment is a professional, original document prepared by you treat it as such. You should be proud of the way it looks while knowing that the calculations that you have prepared are as accurate as possible. Remember that practicing engineers must maintain very high standards in the quality of their work because all engineering calculations must be independently checked during the design review process. Students are expected to do all homework **individually** although general discussion of concepts amongst peers is encouraged. Use of on-line help sites that provide the solution is strictly forbidden. In practice, there is no solution manual; you must get used to solving the problems on your own.

5. **Homework solutions will be posted in a glass cabinet** near the elevator on first floor of Ketter Hall for **48 hours** following due date.

6. Each homework problem will be graded 5, 4, 3, 2, 1 or 0. The basis for grading will be as follows:

   5 = correct format, correct solution; 4 = correct format, a few errors;
   3 = correct format, some errors; 2 = correct format, many errors;
   1 = incorrect format or little effort; 0 = no effort

Tests and Final Exam: Two 2-hour tests and a final exam. **NO MAKEUP TESTS OR EXAMS.** Students cannot miss a test without a legitimate excuse (such as being hospitalized). The instructor needs to be informed prior to the exam. Student who misses a 2-hour test without a legitimate excuse and/or prior approval of the instructor will receive zero for that test. Students with legitimate excuse and prior approval of the instructor will have the weight of the missed test distributed proportionally be- tween the final and the other 2-hour exam. Student missing Final exam with legitimate excuse will receive an incomplete grade provided he/she had passing scores in tests and homework.

ME Tutorials: Assigned Mastering Engineering online tutorial problems. 2 per week (due on Mondays and Thursdays; **Course ID: MEEPACKACHI01088**).

Individual and Group tutoring: The Instructor and teaching assistants provide individual tutoring during office hours to assist students to understand the concepts involved and to apply these concepts for solving engineering problems.

Grading policy:

Students' grades will be based on her/his performance in the several parts of the course with the following weights:

Test 1 = 22.5% of total grade; Test 2 = 22.5% of total grade
Final = 37.5% of total grade; Homework = 12% of total grade
ME Tutorials = 5.5% of total grade

At the end of the semester, the total points earned (out of a maximum of 100 points) will be used to determine the grade as follows:

Points	Letter Grades	Points	Letter Grades
> 86	A	66 to 69.9	C+
82 to 85.9	A -	62 to 65.9	C
78 to 81.9	B+	58 to 61.9	C -
74 to 77.9	B	54 to 57.9	D+
70 to 73.9	B -	50 to 53.9	D
		< 50	F

Grade 'I' will be strictly limited to the circumstances for which the incomplete is intended; namely, satisfactory work to date and legitimate inability to complete the work within the semester.
http://undergrad-catalog.buffalo.edu/policies/grading/explanation.shtml#incomplete .

Classroom "etiquette"

- Attend classes and pay attention.
- Come to class on time. If you must enter a class late, do so quietly and do not disrupt the class by walking between the class and the instructor. Do not leave class unless it is an absolute necessity.
- Do not talk with other classmates while the instructor or another student is speaking. If you have a question or a comment, please raise your hand, rather than starting a conversation about it with your neighbor.
- Turn off the electronics: cell phones, pagers, laptops, and beeper watches.
- Avoid audible and visible signs of restlessness. These are both rude and disruptive to the rest of the class.
- Focus on class material during class time. Sleeping, talking to others, doing work for another class, reading the newspaper, checking email, and exploring the internet are unacceptable and can be disruptive.
- Do not pack bookbags or backpacks to leave until the instructor has dismissed class.

How to pass and do well in this course:

1. Read appropriate section from the textbook and course notes BEFORE class
2. Attend the lectures and recitations regularly and pay attention.
3. Take good notes, and ask questions if you do not understand the material.
4. Before you attempt to solve your homework problems, re-read the appropriate section from the text and your notes; try to understand the concepts and solved problems.
5. Before you attempt to solve your tutorial problems, if necessary (re)read the appropriate section(s) from the text and your notes; try to understand the concepts and solved problems.
6. Do ALL the assigned work (both homework and MasteringEngineering online tutorials).
7. Use all resources available for additional assistance if you need it (e.g. recitation, office hours, MasteringEngineering)
8. Start preparing for each exam at least one week before, allowing time to work out practice exams.

Tentative Lecture Schedule:

Chapter 1	Introduction	Aug. 31
Chapter 2	Force Vectors	Sep. 2, 4, 9
Chapter 3	Equilibrium of a Particle	Sep. 11, 14, 16
Chapter 4	System of Forces & Moments	Sep. 18, 21, 23, 25
Chapter 5	Equilibrium of a Rigid Body	Sep. 28, 30, Oct. 2, 5
Review for Test 1		Oct. 7
TEST 1	**October 9th , Friday**	**5:00 pm – 7:00 pm**
Chapter 6	Trusses & Frames	Oct. 9, 12, 14, 16
Chapter 7	Internal forces & moments, Cables	Oct. 19, 21, 23, 26, 28
Chapter 8	Friction	Oct. 30, Nov. 2, 4, 6
Review for Test 2		Nov. 9
TEST 2	**November 14th , Saturday**	**10:00 am – 12 noon**
Chapter 9	Centroid and C.G.	Nov. 11, 13, 16, 18
Chapter 10	Moments of Inertia	Nov. 20, 30, Dec. 2, 4
Chapter 11	Virtual Work	Dec. 7
Review		Dec. 9, 11
FINAL EXAM	**December 16, Wednesday, 3:30 – 6:30 pm**	