Boston University ENG EK 301: Engineering Mechanics I

INFORMATION SHEET FOR SPRING 2011

INSTRUCTOR

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GRADUATE TEACHING FELLOW

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TUTORING CENTER/DISCUSSION SECTION

EK301 instruction consists of your biweekly 2-hour lecture section and an open-door tutoring center. Your course registration asked you to sign up for a specific discussion section, but attendance is purely voluntary and you are not required to attend the section that you registered for. The Tutoring Center is held in room 202 (110 Cummington St) and is run by the Graduate Teaching Fellows (GTFs). The GTF will be present to answer any questions you may have on the lecture material, as well as to provide basic homework assistance. Note that their job is not to do the homework for you! The best way to use the Center's resources is to first try the homework on your own, and then seek out further help from the GTFs if you get stuck or have specific questions. The Tutoring Center hours are: T 4 – 8 pm, W 6 – 8 pm.

TEXTBOOK AND REFERENCES

Required: Beer and Johnston, Statics and Mechanics of Materials, 1st edition, McGraw-Hill, 2010.
ISBN: 978-0-07-338015-5
ISBN for e-Book version (available from publisher's website): 013-604364-X

Additional references:
R.C. Hibbeler, Statics and Mechanics of Materials, 2nd edition, Pearson Prentice Hall, 2010.
Bedford, Fowler, and Liechti, Statics and Mechanics of Materials, Pearson Prentice Hall, 2003.

WEBSITES

The course website is on BlackBoard (go to blackboard.bu.edu) and is titled 'EK301 Engineering Mechanics 1 (Spring 2011)'. Electronic materials will be posted periodically throughout the semester, so check the website often for updates (these will likely be announced in class). These will include the course information sheet, syllabus, solutions for the homeworks, quizzes, and exams, and information sheet for the truss project.

GRADING
Your progress and evaluation for the course material will consist of weekly problem sets, weekly in-class quizzes, two in-class exams, a design project, and a final exam. The two lowest quiz grades will be dropped. The breakdown for the grade weighting is:

Homework	5%
Weekly quizzes	20%
Design project	25%
In-class exam 1	15%
In-class exam 2	15%
Final exam	20%

Due to the importance of the design project, failure to participate in the project will result in a failing grade for the course. Nominally, the mean of the overall score in a section will set the dividing line between a B- and a C+.

PROBLEM SETS AND QUIZZES
One of the best methods to learn the material is to read the text *before* the material is presented in class, attend and pay attention in class, and work through the assigned problem sets. The course is structured to give you ample feedback regarding your understanding of the material through the problem sets and quizzes. By working through the problem sets, you will prepare yourself for the in-class quiz, which in turn will prepare you for the in-class exams. Assistance will be provided in the GTF Tutoring Center, so please seek out help if you need it!

Another helpful practice is to alternate teaching the problems to your classmates, which will force you to think about how to tackle and solve a problem. It is common for engineers to work in groups, so keeping in mind the Ethics Code, we encourage you to form groups to work out (but not copy) the problem sets. The quizzes and exams are solo efforts, however, so it is in your best interest to make sure you understand the problem set and not rely too heavily on your classmates or the TF.

A perfect homework solution (this applies to quizzes and exams as well) should be:
(a) legible and well organized, with labeled Free Body Diagrams
(b) demonstrate a thought process and worked-out steps
(c) correct!

Each problem will be graded on a 10/7/0 scale. A high score of 10 indicates that you worked through the entire problem and came to a correct or mostly correct solution. A score of 7 indicates that you made a valiant effort and a 0 will be given for a minimal attempt or lack thereof. Partial credit will be given for all forms of evaluation, so steps (a) and (b) are in your best interest! If you are short on time (particularly for the quizzes and exams), please at least attempt to set up and show your steps for how to solve the problem. Please keep the following rules in mind when writing up your solution:
(a) Your name, section number, and problem set number must appear at the top of every sheet.
(b) Do not submit work that has ragged edges.

(c) Start each problem on a new page.
(d) Indicate the final solution by drawing a solid box around it.

Problem sets will be based on lecture material, and will be due at the beginning of the Thursday lecture. The Tutoring Center will be one of your best resources for assistance with questions on the homework. Since solutions to the problem sets will be posted following the Thursday lecture, **late problem sets are not permitted** and will receive a zero.

Quizzes (~15 mins) will be based on the homework problems, and will be given on the lecture *following* the homework due date (typically on a Tuesday). Your problem sets will likely not be graded and returned to you before the quiz, so please study the posted solutions to the problem sets in order to prepare for the quiz. The two lowest scores will be dropped, but if you miss a quiz without prior arrangement, you will be given a zero.

PROJECT

A chief activity of an Engineer is to apply their skills to design and build, not just study. The goal of an engineering education is to develop the ability to apply your course work to recognize, define, and solve real problems in creative but practical ways. There are many aspects of engineering practice which are as important as writing and solving equations. In EK301 we will introduce you to some of these aspects through an exciting design contest.

The contest will involve designing, building, and testing a truss made from soda straws and straight pins. The truss will have to bridge a pre-specified distance and support a minimum load. You will have to experimentally determine certain physical properties of the soda straws, and use your measurements to analyze and optimize your design to support as much weight as possible. The project will culminate in a contest in which your truss will be loaded until it collapses. Your grade will depend, in part, on how close the results of your failure analysis come to the actual failure results during testing. In addition, the team with the highest successfully-held load will receive a prize (in the past this has been a $10 gift certificate to Amazon.com for each team member).
Further details will be presented later in the semester.

EXAMS

There will be two in-class exams given during the semester. The first exam will be administered on March 3rd and the second exam will be on April 19th. **DO NOT MAKE TRAVEL PLANS FOR THESE DATES.** In-class reviews will precede the dates of the exam.
The final exam will be given during the final exam period, and is tentatively scheduled for May 13th, 9 – 11 AM in PHO 203. Since the Registrar may change the date later during the semester, **DO NOT MAKE TRAVEL PLANS BEFORE THE END OF THE EXAM PERIOD**.
Make-up exams will be given only in extreme circumstances, and should be arranged well in-advance of the scheduled dates.

CLASS POLICY
We expect that if you are registered for EK301, you should attend class. Most of the course material can be found in a textbook, but not everything, and you will be tested on what is covered in class, not what is simply covered in the textbook. Tuition at B.U. is expensive, so make the most of your money by taking advantage of all the resources you are paying for! We also expect that you will do your best to pay attention during lecture. You will have a busy schedule with many academic (and social) demands, so we know from experience that paying attention 100% of the time can be a difficult task. However, we do ask that you not distract your peers if your attention starts to wander. Please ignore all forms of electronic communication temptation (texting, email, web surfing, etc) and turn off your cell phone during class.

If you find that I am going over material too quickly or you do not understand something crucial, don't hesitate to ask questions during lecture. For smaller questions, see me or the TF outside of class.

ETHICAL RESPONSIBILITIES
Cheating on homework, quizzes, exams, project reports, or any form of assignment, may be a form of plagiarism and is an infringement of every code of engineering ethics. Plagiarism is a serious academic offense and should not be taken lightly. Understanding your ethical responsibilities is an integral part of becoming a professional. A copy of the Code of Ethics of engineers, promulgated by the Accreditation Board for Engineering and Technology (ABET) and the National Society of Professional Engineers can be found on the main course web site.

Please recall that when you enrolled at Boston University, you agreed to an Academic Honesty Pledge. A copy of this pledge can be found in your student handbook. It details your responsibilities as well as the results of code violations.

DROP AND WITHDRAWAL DATES
The last day to DROP (with no 'W' on your record): 3/03/11
The last day to WITHDRAW (with a 'W' on your record): 4/19/11

INCOMPLETES
Incompletes will be permitted only for extenuating circumstances, and must be arranged with your instructor before the final exam.

COURSE EVALUATIONS
There will be a standard course evaluation near the end of the semester, include a written evaluation on how well you believe the course accomplished its stated learning outcomes. These outcomes are described on the ABET course syllabus, which is posted on the ME course webpage.

We would be happy to discuss any comments and concerns that may arise during the semester during our office hours.

EK301 Semester Schedule and Syllabus					
L #	**Dates**	**Reading**	**Topics/Classroom Activities**	**Quiz**	**HW**
1	1/18	2.1-2.8	Introduction, vector review		
2	1/20	2.9-2.15	Multiple forces, static equilibrium		
3	1/25	3.1-3.5	Ethics quiz; Internal tensions; Principle of transmissibility	Ethics quiz	
4	1/27	3.9	Dot product, projections		#1 due
5	2/1	3.6-3.8	Moments; Cross product	Quiz 1	
6	2/3	3.10-3.20	Moment projections; couples; equivalent systems		#2 due
7	2/8	4.1-4.4	2-D static equilbrium; supports, reaction forces	Quiz 2	
8	2/10		Reaction forces continued; Project intro		#3 due
9	2/15	4.5-4.7	Static indeterminancy; 2-3 force members	Quiz 3	
10	2/17	4.7-4.8	3-D static equilibrium		#4 due
	2/22		**Last day to drop without a 'W'**		
11	2/24	4.9, 6.1-6.5	3-D supports; Trusses: Method of joints	Quiz 4	#5 due
12	3/1	6.6	Zero-force members; Method of sections	Quiz 5	
13	3/3		**Exam 1** *(covers through 3-D static equilibrium)*		#6 due
	3/4		**Straw testing**		
14	3/8	6.8-6.11	Frames 1	Quiz 6	
15	3/10		Frames 2		#7 due
	3/10		**Straw testing**		
16	3/22		Frames 3	Quiz 7	
17	3/24	4.10-4.13	Dry Friction		#8 due
			Straw testing report due		
18	3/29	5.1-5.4	Dry friction: threads & belts; Distributed forces: centroids	Quiz 8	
19	3/31	5.5-5.7	Centroids & COM continued		#9 due
	4/1		**Last day to drop**		
20	4/5	7.1-7.7	Moments of inertia	Quiz 9	
21	4/7	5.8	Moments of inertia cont'd; Distributed forces: cables & beams		#10 due
22	4/12	12.1-12.2	Shear/bending	Quiz 10	
			Preliminary design report due		
23	4/14		Exam 2 review		#11 due
24	4/19		**Exam 2** *(covers through First Moment of Inertia)*		
25	4/26	12.3	Shear/bending moment eqns & diagrams	Quiz 11	
	4/29		**Final design report due**		
	4/30		**Truss testing**		
26	4/28	8.1-8.3	Uni-axial stress		#12 due
27	5/3	9.1-9.3	Uni-axial strain	Quiz 12	
28	5/5		Final exam review		#13 due