

Boston University ENG EK 301: Engineering Mechanics

INFORMATION SHEET FOR SPRING 2010

INSTRUCTOR

Prof. Caleb Farny

Section A1: TR 12 – 2 pm, PHO 203

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GRADUATE TEACHING FELLOW

Reimi Yonekura

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Tutoring center hours: WR 6 – 8 pm, ENG 202 (This may be subject to change)

TEXTBOOK AND REFERENCES

Required: Bedford and Fowler, Engineering Mechanics: Statics and Dynamics, 5th edition, Pearson Prentice Hall, 2007.

ISBN: 013-241871-1

ISBN for e-Book version (available from publisher's website): 013-604364-X

Additional references:

R.C. Hibbler, Engineering Mechanics: Statics and Dynamics, 12th edition, Pearson Prentice Hall, 2010.

S.D. Sheppard and B.H. Tongue, Statics. Analysis and design of systems in equilibrium. Update Edition, Wiley, 2006.

B.H. Tongue, Engineering Mechanics: Dynamics, 2nd edition, Wiley, 2009.

J.L. Meriam and L.G. Kraige, Engineering Mechanics: Statics, 6th edition, Wiley, 2006.

J.L. Meriam and L.G. Kraige, Engineering Mechanics: Dynamics, 5th edition, Wiley, 2001.

F.P. Beer and E.R. Johnston, Vector mechanics for engineers: statics and dynamics, 9th edition, McGraw Hill, 2010.

WEBSITES

The course website is on CourseInfo and is titled 'EK301 A1 Engineering Mechanics 1 (Spring 2010)'. The address is:

http://courseinfo.bu.edu/courses/10sprgengek301_a1/index.html

Electronic materials will be posted periodically throughout the semester, so check the website often for updates (I'll likely announce these 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.

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, I 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!

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.

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 with me, 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 Espresso Royale Café 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 2nd and the second exam will be on April 20th. **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, in May. Since the Registrar sets 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

I 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 I cover 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! I 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 I know from experience that paying attention 100% of the time can be a difficult task. However, I 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, is 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): 2/18/10

The last day to WITHDRAW (with a 'W' on your record): 4/5/10

INCOMPLETES

Incompletes will be permitted only for extenuating circumstances, and must be arranged with me 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.

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

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SYLLABUS FOR SPRING 2010

Week	Dates	Reading	Topics/Classroom Activities	Events
1	1/14	Ch 1, 2	Introduction, force vectors <i>No office hours on 1/14</i>	
2	1/19, 21	Ch 2, 3	Force vectors, point equilibrium	Ethics quiz on 1/21 HW 1 on 1/21
3	1/26, 28	Ch 2, 4	Projection, moments	Quiz 1 on 1/26 HW 2 on 1/28
4	2/2, 4	Ch 4, 5	Equivalent systems, rigid body equilibrium	Quiz 2 on 2/2 HW 3 on 2/4
5	2/9, 11	Ch 6	Trusses <i>Design project teams formed, design project assigned 2/9</i>	Quiz 3 on 2/9 HW 4 on 2/11 <i>Straw testing begins on 2/11</i>
6	2/18	Ch 6	Trusses (<i>no class on 2/16 due to 2/15 holiday and Mon. schedule</i>) <i>Last day to drop a course (no 'W')</i>	Quiz 4 on 2/18 HW 5 on 2/18 <i>Straw testing ends 2/18</i>
7	2/23, 25	Ch 9	Dry friction, Exam review	Quiz 5 on 2/23 HW 6 on 2/25
8	3/2, 4	Ch 13	Exam 1 (<i>covers through trusses</i>), Particle kinematics	Exam on 3/2
9	Spring Break			
10	3/16, 18	Ch 13, 14	Particle kinematics, particle kinetics	Quiz 6 on 3/16 HW 7 on 3/18 <i>Project peer evaluation forms, straw testing report due 3/18</i>
11	3/23, 25	Ch 14, 15	Particle kinetics, work and energy	Quiz 7 on 3/23 HW 8 on 3/25
12	3/30, 4/1	Ch 15	Work and energy <i>Last day to withdraw from course</i>	Quiz 8 on 3/30 HW 9 on 4/1
13	4/6, 8	Ch 15, 16	Work and energy, linear momentum	Quiz 9 on 4/6 HW 10 on 4/8 <i>Project progress report due 4/6</i>
14	4/13, 15	Ch 16	Linear momentum, exam review	Quiz 10 on 4/13 HW 11 on 4/15
15	4/20		Exam 2 (<i>covers through work and energy</i>) <i>4/19 holiday, no class 4/22 due to Monday schedule</i>	Exam on 4/20 <i>Project final report due 4/23</i> <i>Truss testing on 4/24 (Saturday)</i>
16	4/27, 29	Ch 16	Angular momentum, final exam review	Quiz 11 on 4/27 HW 12 on 4/29

Note: The reading assignment corresponds to the Bedford & Fowler text (Engineering Mechanics: Statics and Dynamics, 5th ed.), although not all of the material in the chapters listed will be covered. More detail will be presented in lecture.