Boston University ENG EK 301: Engineering Mechanics I

INFORMATION SHEET FOR FALL 2013

INSTRUCTORS

Prof. J. Scott Bunch
Sections A1, A5
E-mail: bunch@bu.edu
Phone: (617) 353-7706
Office: ENG 404
Office hrs: Monday 2-4pm, and by appt.

Prof. J. Gregory McDaniel
Section A6
E-mail: jgm@bu.edu
Phone: (617) 353-4847
Office: ENG 406
Office hrs: Monday 1-3pm

Prof. Aaron Schmidt
Section A3
E-mail: schmidt@bu.edu
Phone: (617) 353-2814
Office: ENG 305
Office hrs: Monday 10:30-12pm

Prof. Victor Yakhot
Sections A2, A4
E-mail: farny@bu.edu
Phone: (617) 353-8664
Office: ENA 219
Office hrs: Thursday 3-4:30pm

SECTIONS

A1: TR 10 – 12 pm, PHO 211
A2: TR 12 – 2 pm, PHO 211
A3: MW 4 – 6 pm, PHO 210
A4: TR 6 – 8 pm, PHO 201
A5: TR 12 – 12 pm, ENG 202
A6: TR 6 – 8 pm, ENG 245

GRADUATE TEACHING FELLOWS (GTFs)

A1: Joe Angelo (jangelo4@bu.edu)
A2, A4: Ozgur Ozsun(ozgur@bu.edu)
A3: Shamit Shrivastava (shamits@bu.edu)
A5, A6: Shahrooz Zarbafian (szarbaf@bu.edu)

UNDERGRADUATE LEARNING ASSISTANTS (LAs)

A1: Nicole Black (nlblack@bu.edu) & Tom Ransegnola (transegn@bu.edu)
A2: Betsy Bartlett (betsyb@bu.edu) & Rebecca Rucks (rrucks@bu.edu)
A3: Pantelis Gkaliamoutsas (pgk@bu.edu) & Nate Hepler (nhep23@bu.edu)
A4: Alexandros Oratis (aoratis@bu.edu)
A5: GTF only
A6: GTF only

EK301 Fall 2013 Semester Schedule						
L #	**Date**	**Reading**	**Agenda**	**Quiz**	**HW**	**HW on…**
1	9/3, 9/4	C2:1-7	Introduction, vector review			
2	9/5, 9/9	C3:1-4	Multiple forces, static equilibrium	Quiz 0		
3	9/10, 9/11	C3:1-4	Internal tensions		#1 due	L1-2
4	9/12, 9/16	C2:8-9	Dot product, projections	Quiz 1		
5	9/17, 9/18	C4:1-4	Moments; Cross product		#2 due	L3-4
6	9/19, 9/23	C4:5-8	Moment projections; couples; equivalent systems	Quiz 2		
7	9/24, 9/25	C5:1-3	2-D static equilbrium; supports, reaction forces		#3 due	L5-6
8	9/26, 9/30	C5:1-3	Reaction forces	Quiz 3		
9	10/1, 10/2		Project introduction; *guest speaker*		#4 due	L7-8
	10/3, 10/4		**STRAW TESTING**			
10	10/3, 10/7	C5:4,7	Static indeterminancy; 2-3 force members	Quiz 4		
11	10/8, 10/9	C5:5	3-D supports and static equilibrium		#5 due	L9-10
12	10/10, 10/15	C5:5, C6:1-3	Truss analysis: Method of joints	Quiz 5		
13	10/16, 10/17	C6:4	Truss analysis: Method of sections		#6 due	L11-12
	10/16, 10/17		**STRAW TEST REPORT DUE**			
14	10/21, 10/22	C6:6	Frames 1	Quiz 6		
15	10/23, 10/24	C6:6	Frames 2		#7 due	L13-14
16	10/28, 10/29		**MIDTERM EXAM (Up to Frames)**			
17	10/30, 10/31	C6:6	Frames 3/Frames module			
18	11/4, 11/5	C8:1-3	Dry Friction (structures, wedges)		#8 due	L15, L17
19	11/6, 11/7	C9:1-2	Distributed forces: centroids	Quiz 7		
20	11/11, 11/12	C4:9, C9:4	Centroids & COM continued; distributed forces		#9 due	L18-19
21	11/13, 11/14	C11:1-3	Virtual work	Quiz 8		
22	11/18, 11/19	C11:1-3	Virtual work		#10 due	L20-21
	11/18, 11/19		**PRELIMINARY DESIGN REPORT DUE**			
23	11/20, 11/21	C11:4-7	Virtual work	Quiz 9		
24	11/25, 11/26	C7:1-3	Shear/bending		#11 due	L22-23
25	12/2, 12/3	C7:1-3	Shear/bending moment eqns & diagrams	Quiz 10		
26	12/4, 12/5		Stess and strain			
	12/4, 12/5		**FINAL DESIGN REPORT DUE**			
	12/7		**TRUSS TESTING**			
27	12/9, 12/10		Stress and strain		#12 due	L24-26

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 (GTF). The GTFs will be present to answer any questions you may have on the lecture material, as well as to provide basic homework assistance. 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 GTF if you get stuck or have specific questions.

The Tutoring Center hours are:

Mon 6 - 10 pm, Tues 4 – 10 pm, Weds 4 – 10 pm

(these hours are subject to change; check the Google calendar for the latest hours).

TEXTBOOK AND REFERENCES

Required: R.C. Hibbeler, Engineering Mechanics: Statics, 13th ed., Pearson Prentice Hall, 2012 (editions 10 – 12th are ok as well)
ISBN**:** 1256-34403-6

Additional references:
Beer and Johnston, Statics and Mechanics of Materials, 1st edition, McGraw-Hill, 2010.
Bedford, Fowler, and Liechti, Statics and Mechanics of Materials, Pearson Prentice Hall, 2003.

WEBSITES

The course website is on BlackBoard (blackboard.bu.edu). Materials will be posted periodically throughout the semester.

The latest course schedule and tutoring center hours are kept on the course Google calendar and can be found here:
https://www.google.com/calendar/embed?src=en6lnmt5lnovr0sfk0aba6mj34%40group.calendar.google.com&ctz=America/New_York

GRADING

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

Homework	10%
Weekly quizzes	20%
Design project	20%
Mid-term exam	20%
Final exam	30%

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

Students are expected 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 GTF.

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.

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. The two lowest scores will be dropped.

PROJECT

The design project 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. Further details will be presented later in the semester.

EXAMS

There will be one mid-term exam and one final exam. Dates are indicated in the course schedule. **DO NOT MAKE TRAVEL PLANS FOR THESE DATES.** Make-up exams will be given only in extreme circumstances and must be arranged well in advance of the scheduled dates.

ATTENDANCE 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 everything that is covered in class. Texting, email, web surfing, and cell phone during class is forbidden.

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 shorter questions, see your instructor or the GTF outside of class.

ETHICAL RESPONSIBILITIES

Cheating on any form of assignment is considered a form of plagiarism. Plagiarism is a serious academic offense with severe consequences. 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): October 7
The last day to WITHDRAW (with a 'W' on your record): November 8

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