University of Victoria

Department of Mechanical Engineering

COURSE OUTLINE

Mech 220 - Mechanics of Solids I

Summer 2015

Course Web Site http://moodle.uvic.ca

Instructor

Ramtin Rakhsha
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Office Hours

Days: Tuesday
Time: 12:30-13:20
Location: ELW A238

Teaching Assistants

Majid Soleimani-nia
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Time:
Location: ELW A248

Mana Norouzpouor
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Days: Monday
Time: 12:00-13:00
Location: EOW 241

Saad Akram
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Days: Tuesday
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Location: ELW A240

Shahab Yeylaghi
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Days: By appointment
Time:
Location: EOW 333

Required Text

Title: Mechanics of Materials, 7th Edition
Author: Beer, F. P., Johnston, E. R, DeWolf, J. T. and Mazurek
Publisher: McGraw-Hill
Year: 2015

Lectures

A – Section(s)	**Days**	**Time**	**Bldg/Rm**
A01	Tues/Wed/Fri	10:30-11:20	ECS 123

Lecture time will be spent introducing, reviewing and discussing the course material, following (non-sequentially) the content of the required textbook. It is the responsibility of the student to attend classes and keep up-to-date with the progress of the course.

Tutorials

T – Section(s)	**Days**	**Time**	**Bldg/Rm**
T01	Wednesday	14:30-15:20	CLE A212
T02	Thursday	17:30-18:20	ECS 116

Labs

B – Section(s)	**Days**	**Time**	**Bldg/Rm**
B01	Mon	14:30-17:30	ELW A135*
B02	Tuesday	13:00-16:00	ELW A135*
B03	Tuesday	16:00-19:00	ELW A135*
B04	Thursday	14:30-17:30	ELW A135*
B05	Friday	14:30-17:30	ELW A135*

* NOTE: Lab 4* is done in ELW B111 or ELW A229

The primary purpose of the lab is to reinforce the material presented in the lectures. There is also an emphasis on proper technical communication methods in the write-up, utilizing the automation features and styles of either MS Word or LaTex. The labs will be done in assigned groups of three. Consult the online lab schedule to identify your lab partner.

Within the official time blocks, the time is divided into multiple sessions. Consult the lab schedule for the time of your lab group. *You must attend your scheduled time*; no allowance will be made for missed sessions except under extreme circumstances; attendance will be recorded. At the beginning of term, the MTS part of lab 4 will be done as a demonstration for all groups; check your group's time carefully, as the times are different than the rest of term.

Lab write-ups are due one week following the lab time, at 16:30. A paper copy should be placed in the Mech 220 drop-box. The source electronic copy (.doc, .tex, etc.) should also be e-mailed to the TA who supervised that lab, with the subject line "Mech 220 Lab Lab_# Grp_#" where Lab_# is the lab number and Grp_# your group number. Extensions will only be granted in exceptional circumstances. Marking guidelines are available in the lab manual. Graded reports will be handed back starting on the Friday following the last group to complete the lab. This can delay feedback; if you are worried about this, consult with your TA for individual feedback prior the allowed hand-back date.

Assessment

Assignments	20	%		
Labs	10	%		
Mid-Term	20	%		
Final	50	%	Mid-Term Date:	June 26, 10:30-11:30 ECS 123
	100	%		

All evaluation will be two double-sided letter-sized formula sheet created by the student. Missed midterms, without a valid excuse, will receive a zero grade; with a valid excuse the percentage of that component will be transferred to the final.

The material eligible for inclusion in the mid-term and final exams will include that covered in the lectures, assignments and tutorials, and referenced to the corresponding sections of the text. The final must be passed to pass the course. Scheduling will be announced later in the term.

Hints for Success

- Attend all lectures and tutorials.
- Ask questions any time you are unsure about something.

- Practise, practise, practice lots of examples; this is the only way to master the course content.
- Do not allow yourself to fall behind. The course is cumulative and final problems will involve all aspects of the course.

Assignments

The assignment questions are selected to give students a chance to practise the material covered in the lectures. Students may work in groups to solve the problems, but should attempt each problem on their own and ultimately understand the content individually. Students should ensure they are comfortable with the other example problems in the textbook, beyond those in the assignment problems.

Assignment #	Handout Date	DUE DATE
1	May 8	May 22
2	May 22	June 5
3	June 5	June 19
4	June 19	July 10
5	July 10	July 24

Syllabus

The underlying objective of this course is to learn methods to relate externally applied forces to the stresses that are developed internally in the material of the object that the forces are applied to. The stress may then be related to the straining of the material, and hence used to determine the overall deformation of solids. This course is fundamental to any future solid mechanics (e.g. MECH 320) and design (e.g. MECH 360) courses you will take. Take the time in this course to master the material, as it will pay dividends in future courses and throughout your career.

The concepts of stress and strain are introduced first, including transformations with Mohr's circle. Buckling and failure theories are then used to define structural design constraints. Bending moment and shear diagrams for beams are reviewed and extended to define section loadings. Fundamental loading cases are then introduced, including axial, torsion, pure bending and transverse loading. Deflection analysis, including the use of energy methods, is used to examine statically indeterminate situations. A revisit of buckling theory from the perspective of beam bending concludes the course. This following list of topics may be altered over the course of the term.

Topic	Book §
Introduction: stress, factor of safety	1.1-1.5,
Stress & Strain: Axial Loading	2.1-.8, 2.10-2.11
Torsion	3.1-.5, 3.10
Pure Bending	4.1-.3, 4.5
Beam Analysis	5.1-.4
Beam Shearing	6.1-.4
Transformations of Stress and Strain	7.1-7.4, 7.6-7.7,7.9
Stresses under combined loads	8.3
Deflection of Beams	9.1-.4
Energy Methods	11.1-.2, 11.5
Buckling of Columns	10.1

Guidelines on Religious Observances

1. Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations.
2. Instructors will provide reasonable opportunities for such students to make up work or missed examinations.
3. Students will cooperate by accepting the provision of reasonable opportunities for making up work or missed examinations.
4. The University Secretary's Office will distribute a multi-faith calendar to each academic unit annually.

Commitment to Inclusivity and Diversity

The University of Victoria is committed to promoting, providing and protecting a positive, supportive and safe learning and working environment for all its members.

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour at http://www.engr.uvic.ca/policy/professional-behaviour.php which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult

http://web.uvic.ca/calendar2009/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic integrity. *"The University reserves the right to use plagiarism detection software programs to detect plagiarism in essays, term papers and other assignments." Pg 32, University Calendar*

Late Assignments: No late assignments will be accepted unless prior arrangements have been made with the instructor at least 48 hours before the assignment due date.

Coursework Mark Appeals: All marks must be appealed within 7 days of the mark being posted.

Attendance: We expect students attend all lectures and labs. It is entirely the students' responsibility to recover any information or announcements presented in lectures from which they were absent.

Electronic Devices: No unauthorized *audio* or video recording of lectures is permitted. Calculators are only permitted for examinations and tests if explicitly authorized and the type of calculator permitted may be restricted. No other electronic devices (e.g. cell phones, pagers, PDA, etc.) may be used during examinations or tests *unless explicitly authorized*.