CE 2C04 - STRUCTURAL MECHANICS
COURSE OUTLINE - WINTER TERM 2019

It is the responsibility of each student to read this course outline completely and to ensure that they understand its entire contents.

INSTRUCTOR: Paul Heerema (ADL-108; heeremp@mcmaster.ca)
Office hours: To be announced.

TEACHING ASSISTANTS:
- Nathan Buccella (bucelnj@mcmaster.ca)
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Office Hours will be announced.

SCHEDULE
Attendance at all course activities (classes, labs, tutorial sessions, exams) is mandatory. Phones may not be used during classes, tutorials, labs, or exams. Turn them off beforehand and put them away.

Class:
- Monday, Wednesday 2:30-3:20 KTH B135
- Fridays 4:30-5:20 KTH B135

The classes will be used to present theoretical background, approaches to analysis, and applications to a variety of problems.

Tutorial:
- Mondays 9:30-11:20 T13-125
- Fridays 8:30-10:20 JHE 326H

The tutorials will be used for additional examples and question and answer sessions. Grades for tutorial attendance and participation will assigned by the TA.

Lab:
- L1: Wednesday 8:30-11:20 JHE-121
- L2: Tuesdays 8:30-11:20 JHE-121

You will only be required to attend one one-hour laboratory. The lab times may also be used for additional course activities such as lectures.

TEXTBOOK
The recommended textbook for the course is “Mechanics of Materials”, by Beer, Johnson and DeWolf. The textbook that we will attempt to use is R.C. Hibbeler, “Mechanics of Materials” since this was purchased for CE 2P04.
ONLINE
Problems, solutions, lab information and notices will be posted on avenue. It is your responsibility to check the website for new postings.

EMAIL
All email communication with the instructor and TAs must be sent from your @mcmaster.ca address and sent to the @mcmaster.ca addresses listed above. DO NOT send email through the Avenue email system as this system is not monitored. Questions on course material (i.e. how do I solve this problem?) are best explained in person and will not be answered via email; please visit office hours.

COURSE CONTENT
This is a second course in structural mechanics within McMaster’s civil engineering program (the first course is 2P04). The focus of this course is on further developing your understanding of basic skills in structural mechanics (also referred to as mechanics of materials, or strength of materials). These skills are fundamental to subsequent courses in structural engineering. This course mainly deals with concepts of stress, strain and energy applied to civil engineering structures. In this course we will cover (time permitting) aspects related to the following topics:

- Shear force and bending moment diagrams
- Bending of beams for linear and nonlinear material behaviour
- Shearing of beams for linear behaviour
- Torsion of beams for linear and nonlinear behaviour
- Combined loading
- Transformation of stress and material failure criteria
- Deflections of structures and energy methods
- Column buckling and elastic stability

LEARNING OUTCOMES

1. Ability to assess integral properties of problems including: boundary conditions, loading conditions, determinant vs. indeterminate, and linear vs. non-linear.
   a. CEAB attribute 1.3 “Competence in Engineering Fundamentals”
   b. CEAB attribute 3.2 “Capable of selecting appropriate model and methods and identify assumptions and constraints.”

2. Use the knowledge from (1) to select appropriate methods to solve desired quantities.
   a. CEAB attribute 3.1 “Able to recognize and discuss applicable theory knowledge base”

3. Verify solutions from (2) using additional knowledge and/or engineering judgement.
   a. CEAB attribute 2.3 “Ability to obtain substantiated conclusions as a result of a problem solution including recognizing the limitations of the solutions.”

4. Evaluate laboratory data against theoretical solutions and use engineering judgement to discuss discrepancies.
   a. CEAB attribute 3.3 “Can estimate outcomes, uncertainties and determine appropriate data to collect.”
EVALUATION AND GRADING

Your final grade will be based on:

- Three midterms (13.333% Each)
- Three assignments (5% each - 15% total)
- Lab (15% total) – to pass the course you must participate in the lab and submit a lab report
- Final exam (30%)

Additional important information and special conditions on calculating your final grade are given in the following sections. The final percentage grade will be converted to a letter grade using the Registrar's scale.

MIDTERM EXAMS

There will be three midterm exams. The midterms will be closed book; I will provide necessary equations. During exams you may use only the McMaster Standard Calculator.

Tests not claimed when midterms are returned may be claimed from the instructor during regular office hours only. If you wish to appeal the grading of a test this must be done within one week of the date on which the tests were officially returned.

LAB

You are required to participate only once in a one-hour laboratory session. Details on the laboratory sections, including scheduling and requirements will be provided throughout the course.

PRACTICE PROBLEMS

Weekly practice problems will be assigned and discussed in the tutorials; they will not be handed in or graded. Many additional problems can be found in the textbook and you are strongly encouraged to use these for practice. The purpose of the practice problems is to give you an opportunity to develop an understanding of the application of the course material. While discussion with other students of the background and approach to solution of problems is often beneficial, you need to ensure that you can actually solve the problems on your own without notes or textbook examples to guide you (i.e., the way it will be during the tests and exam).

UNIVERSITY STATEMENT ON CHANGES TO THE COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites at least weekly during the term and to note any changes.
ADVERSE DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem that cannot be resolved by discussion among the persons involved, individuals are reminded that they should contact their Department Chair, the Sexual Harassment Office or the Human Rights Consultant, as soon as possible.

ETHICS

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located in: http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

LABORATORY SAFETY

The Faculty of Engineering is committed to McMaster University’s Workplace and Environmental Health and Safety Policy which states: "Students are required by University policy to comply with all University health, safety and environmental programs". It is your responsibility to understand McMaster University Workplace and Environmental Health and Safety programs and policies. For information on these programs and policies please refer to McMaster University Environmental and Health Support Services Occupational Safety Risk Management Manual at: http://www.workingatmcmaster.ca/med/document/Lab-Safety-Handbook-1-36.pdf. It is also your responsibility to follow any specific Standard Operating Procedures (SOPs) provided for some of the experiments and the laboratory equipment.

Laboratory Instructions specific to the CIV ENG 2C04 laboratory work are as follows:

- No one will create a situation that could compromise or jeopardize the safety of themselves or anyone else in the lab
- Obey all instructions given to you by the Teaching Assistant and / or lab technical staff

Failure to comply with safety rules, will result in the individual student being denied access to the lab and given a ‘did not complete’ grade for the lab session
Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.