CE 3G04 - STRUCTURAL ANALYSIS

COURSE OUTLINE - FALL 2018 (TERM 1)

INSTRUCTOR Dr. Shehab Soliman (Shehab.Soliman@usherbrooke.ca; 905-745-7094)

TEACHING ASSISTANTS TBA

CLASSES

- Lectures: Thursday (19:00-22:00) HH-302
- Tutorials: Tuesday (14:30-15:20) HH-302
- Friday (14:30-15:20) HH-302
- Office Hours: Tuesday (15:20-16:20)

COURSE OBJECTIVE

The objective of the course is to introduce and provide opportunities to apply techniques of linear elastic structural analysis to truss, beam and frame systems. Emphasis will be placed on developing an understanding of methods of analysis that are applicable to both simple and complex structural systems.

Graduate Attributes and CEAB Indicators

Through this course, you will develop in the following attributes and indicators:

- Attribute: 1. Knowledge
  - Indicator: 1.3 - Competence in Engineering Fundamentals
- Attribute: 2. Analysis
  - Indicator: 2.2 - Able to identify a range of suitable engineering fundamentals (including mathematical techniques) that would be potentially useful for analyzing a technical problem
- Attribute: 3. Investigation
  - Indicator: 3.1 - Able to recognize and discuss applicable theory knowledge base

Learning Outcomes

When you have successfully completed this course, you will be able to:

- Understand and competently apply engineering fundamentals including equilibrium and compatibility [CEAB Indicator 1.3]
- Identify from a suite of structural analysis methods an appropriate method to calculate the forces and deflections in statically determinate and indeterminate trusses, beams, and frames under a variety of loading conditions [CEAB Indicator 2.2]
- Describe the fundamental assumptions employed in the derivation of various classical structural analysis methods [CEAB Indicator 3.1]

Course Content

To attain the learning outcomes stated above we will:

- examine the fundamental principles governing the behaviour of linear elastic structures.
- review construction of axial, shear, and bending moment diagrams.
- review the important distinctions between statically determinate and indeterminate structures.
- become familiar with modeling truss, beam and frame structures, as needed for analysis.
- investigate the use and merits of various classical techniques of structural analysis.
- develop and apply matrix techniques for structural analysis of planar trusses, beams and frames.
investigate the use of approximate methods for the analysis of indeterminate structures.

LECTURES AND TUTORIALS
The classes and tutorials are the primary means for delivering the course material and for regular communication between the instructor/TAs and the class. Therefore, attendance at all lectures and tutorials is mandatory. The lectures and tutorials will be used to present theoretical background and some illustrative examples. The tutorials will also be used to demonstrate additional examples, provide assistance with problem solving and complete a portion of the current assignment.

EVALUATION
Your final grade in the course will be computed as:
- Assignments 25%
- Term Tests 25%
- Final Exam 50%

The final percentage grade will be converted to a letter grade using the Registrar's scale.

Term Test Dates:
- Term Test 1 - Friday, October 12, 2018
- Term Test 2 - Friday, November 16, 2018

Assignments: The purpose of the assignment problems is to give you an opportunity to develop an in-depth understanding 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 each problem on your own (i.e., the way it will be during term tests, and the final exam). All work that you submit for grading must be your own work. Assignments are due at the time and date specified on the assignment sheet. Assignments are to be submitted to the CE3G04 box located outside JHE-301 (no regular submissions are to be made to any other location). Do not submit assignments by email and do not place them in the instructor's mailbox or slide them under the instructor's office door. Late assignments must be date stamped by a Department of Civil Engineering Administrative Assistant (located in JHE-301). Late assignments will be penalized 25% a day. Exceptions or extensions shall be negotiated with the course instructor, not the teaching assistants.

Term Tests and Final Exam: The term tests and final exam will be closed book. You may use only the McMaster Standard Calculator.

If you do not write a term test or submit an assignment at the scheduled time and you do not file a MSAF within the 48 hours you will receive a grade of zero on the missed work. Additional details can be found at http://mcmaster.ca/msaf/.

REQUIRED COURSE TEXT

WEB SITE
Assignment problems, solutions, and notices will be posted on Avenue to Learn (http://avenue.mcmaster.ca/). It is your responsibility to check the web site regularly for new postings.

CONDUCT
Students are expected to arrive at lectures on time, and conduct themselves during class in a professional and respectful manner that is not disruptive to others. Cellular telephones and other
electronic devices shall be turned off during lectures and tutorial periods. No audio, video or any other form of recording is permitted.

**ACADEMIC INTEGRITY**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that result or could result in unearned academic credit or advantage. This behaviour 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 types of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/academicintegrity

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.

**ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES**

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. 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 Policy for Academic Accommodation of Students with Disabilities.

**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.

Note: The instructor will notify students of modifications to course elements in class/tutorial and/or post changes to the course website.