Faculty of Engineering

GNG 1105 H - Engineering Mechanics (3 credits)

Fall 2017

Instructor:	Christian Viau
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Office:	CBY C406
Office hours:	Monday, 10:30-11:30 Thursday, 8:30-9:30 (for other times, please e-mail to get an appointment)

1 - COURSE DESCRIPTION

Introduction to concepts of engineering mechanics. Statics of particles and rigid bodies will be studied. Notions covered in this course will allow you to analyze structures such as trusses, frames and machines. An introduction to particles dynamics such as the study of rectilinear and curvilinear motion will be given.

2 - COURSE OBJECTIVES

There are three main objectives of this course:

1. To be able to **calculate forces** on objects and in simple structures;
2. To be able to **draw a free-body diagram** of a structure or part of a structure (this is actually a pre-requisite to calculating forces, and an essential skill to learn);'
3. To be able to **calculate the motion** of a simple object under an applied force.

Two further, secondary objectives can be added to these:

4. To understand **how structures support loads**;
5. To **develop an organized approach to problem-solving**. You will be introduced to a general strategy for problem-solving which will be applied to problems throughout the course.

3 - REQUIRED TEXTBOOK

Beer, F.P., et al. (2015). *Vector Mechanics for Engineers: Statics and Dynamics*, 11th Ed., McGraw-Hill Ryerson, Whitby, ON.

4 - COURSE OUTLINE

1. Introduction	1.1-1.5
2. Statics of Particles	
2.1 Addition of Forces	2.1-2.8
2.2 Equilibrium of a Particle	2.9-2.11
2.3 Forces in Three Dimensions	2.12-2.15
3. Statics of Rigid Bodies	
3.1 Principle of Transmissibility of a Force	3.1-3.3
3.2 Moment of a Force	3.4-3.8
3.3 Moment of a Couple	3.12-3.18, 3.20
3.4 Equilibrium of a Rigid Body	4.1-4.4, 4.6, 4.8-4.9
3.5 Centre of Gravity	5.1-5.5
4. Structures	
4.1 Trusses	6.1-6.5, 6.7
4.2 Frames and Machines	6.9-6.12
5. Friction	
5.1 Static Friction	8.1-8.5
6. Dynamics of Particles	
6.1 Rectilinear Motion	11.1-11.6
6.2 Curvilinear Motion	11.9-11.14
6.3 Forces, Momentum and Angular Momentum	12.1-12.5, 12.7-12.9

5 - TEACHING ASSISTANTS

- Arpit Ainchwar (aainchwa@uottawa.ca)
- Vinay Singh (vsing103@uottawa.ca)

For any questions or concerns regarding quizzes, assignments, and tutorials, please contact the TA responsible for your section. For TA office hours, please e-mail to get an appointment.

6 - COURSE SCHEDULE

Lectures:	Monday, 8:30-10:00 (MRT 212)
	Thursday, 10:00-11:30 (FSS 1007)
Tutorials:	Tutorial 1 - Wednesday, 16:00-17:30 (STE J0106)
	Tutorial 2 - Wednesday, 16:00-17:30 (STE C0136)

7 - TUTORIALS AND QUIZZES

The "tutorials" (TUT) listed in the timetable for this course are problem-solving tutorials, and will be run by the teaching assistants. In each tutorial you will work through problems on the material currently being covered in class. **Many tutorials will include a quiz** (15 - 20 minutes) on material from recent classes. No advance notice will be given of these quizzes.

You have been assigned to a tutorial section. Because of limits on the capacities of the rooms and the need to keep the work load of the teaching assistants balanced, it will not be possible to change sections.

8 - ONLINE ASSIGNMENTS

Weekly assignments will be assigned and graded through the online interface provided by the publisher of your textbook, *McGraw-Hill Education - Connect*. These will consist of problems similar to those found in the textbook and will allow yourself to assess your familiarity with the course material. You will require an access code to login to *Connect*, which can be obtained at the UOttawa bookstore.

GNG1105 H connect page: http://connect.mheducation.com/class/c-viau-fall-2017

9 - PROBLEM SETS

As the course progresses, you will be given problem sets to practice and apply the theories learnt in class. **These will not be graded**; however, solutions will be available on *Brightspace* the following week.

These problems represent the minimum amount of work that you should be doing for this course, and it is **strongly recommended** that you solve additional problems to gain practice. Short answers for many problems are given at the back of the textbook.

10 - EXAMS

The midterm exam will be held tentatively on *October 19th* based on the material covered in class. This will be a 1h 20m closed book exam.

The final exam will be held on a date between *December 8th and 21st*, as scheduled by the Faculty of Engineering. This will be a 2h 50m closed book exam.

11 - GRADING SCHEME

Quizzes	10 %
Online Assignments	10 %
Midterm Exam	25 %
Final Exam	55 %

The passing grade for this course is 50%.

12 - CLASSROOM ETIQUETTES

- Class attendance is **mandatory**. As per academic regulations, students who do not attend **80% of the lectures** will not be allowed to write the final examinations.

- Cell-phones should be turned to silent.

12 - ABSENCE FROM EVALUATIONS

As a result of a medical concern, students must submit by email an official medical certificate within five working days of the examination date. If the student does so:

1) **For a quiz/assignment**: the weight of a justified missed quiz/assignment will be transferred on the remaining quizzes/assignments.
2) **For the midterm exam**: the weight of the midterm will be transferred on the quizzes.
3) **For the final exam**: the students will have to consult the academic secretariat of the faculty for the procedure to follow (for the justification and the deferred final exam).

In addition, students who write an examination during the period of disability specified on the certificate cannot later plead psychological or medical problems to appeal their examination results. Also, other reasons such as travel, work and misreading of examination schedules are not accepted, except in exceptional and properly documented circumstances. In any case, if you believe that there is a schedule conflict or that you have an issue with writing an exam, please advise the professor as soon as possible. Special cases and issues will only be considered if brought to my attention before the examination date. Refer to Academic Regulation #9.

13 - REMINDERS

- All components of the course (quizzes, assignments, midterm, and final) must be fulfilled; otherwise, students may receive an EIN as a final mark (equivalent to an F). This is also valid for a student who is taking the course for the second time.

- The subject of copying, cheating and plagiarism are taken very seriously by the University of Ottawa. **The students are expected to submit their own work.** Students are expected to familiarize themselves with the University of Ottawa's policy on plagiarism (http://www.uottawa.ca/plagiarism.pdf). This policy will be strictly enforced in this course.

- Important dates and deadlines for the academic year can be found at the following link: http://www.registrar.uottawa.ca/Default.aspx?tabid=2671.

- As necessary, the instructor will contact students through their official University of Ottawa's e-mail address (username@uottawa.ca). You are responsible for ensuring you are receiving official course information in an efficient and timely manner.

- E-mails will normally be answered within two (2) working days. They will not be answered during the weekends.

The following table indicates approximately what topics and sections of the textbook will be covered during each week.

Week number	**Week Starting**	**Topics**	**Text Sections**
1	Sept 4th	Introduction	1.1 - 1.5
2	Sept 11th	Forces at a point, 2D	2.1-2.11
3	Sept 18th	Forces at a point, 3D Moments	2.12-2.15 3.1-3.8
4	Sept 25th	Moments & couples Equilibrium in 2D	3.12-3.18 3.20, 4.1-4.2
5	Oct. 2nd	Equilibrium in 2D	4.2-4.4, 4.6
6	Oct 9th	Equilibrium in 3D Centroids	4.8-4.9 5.1-5.5
7	Oct 16th	Trusses	6.1-6.5
8	Oct 23rd	*Reading week!*	None
9	Oct 30th	Trusses Frames	6.7 6.9-6.11
10	Nov 6th	Machines Friction	6.12 8.1-8.4
11	Nov 13th	Friction Kinematics	8.5 11.1-11.6
12	Nov 20th	Kinematics Dynamics	11.9-11.14 12.1-12.5
13	Nov 27th	Dynamics	12.7-12.10
14	Dec 4th	Review for Final Exam	