



# ENGG\*1210 Engineering Mechanics I

01, 02

Winter 2020

Section(s): C01, C02

School of Engineering

Credit Weight: 0.50

Version 1.00 - January 05, 2020

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## 1 Course Details

### 1.1 Calendar Description

This course presents the fundamental principles of Newtonian mechanics; distributed loading; free body diagrams; rigid body equilibrium; structural analysis; internal loading of structural members; friction; dynamics of particles; linear and angular momentum of rigid bodies; conservation of energy; principles of impulse and momentum, and plane motion of rigid bodies.

**Pre-Requisites:** MATH\*1200, PHYS\*1130

### 1.2 Course Description

This course presents the fundamental principles of Newtonian mechanics; distributed loading; free body diagrams; rigid body equilibrium; structural analysis; internal loading of structural members; friction; dynamics of particles; linear and angular momentum of rigid bodies; conservation of energy; principles of impulse and momentum; and plane motion of rigid bodies.

Prerequisites: MATH\*1200, PHYS\*1130

### 1.3 Timetable

**Lectures:**

Section 01\*\*: LEC Tues, Thur, 11:30AM - 12:50PM, ROZH, Room 103

Section 02\*\*: LEC Tues, Thur, 08:30AM - 09:50AM, MACN, Room 105

**Tutorials:**

Section \*\*01: LAB Fri, 12:30PM - 01:20PM, MCKN, Room 309

Section \*\*02: LAB Fri, 03:30PM - 04:20PM, MCKN, Room 306

Section \*\*03: LAB Fri, 08:30AM - 09:20AM, MCKN, Room 307

Section \*\*04: LAB Fri, 10:30AM - 11:20AM, MCKN, Room 310

Section \*\*05: LAB Fri, 08:30AM - 09:20AM, MCKN, Room 235

Section \*\*06: LAB Wed, 10:30AM - 11:20AM, MCKN, Room 233

Section \*\*07: LAB Mon, 09:30AM - 10:20AM, MCKN, Room 234

Section \*\*08: LAB Thur, 01:30PM - 02:20PM, MCKN, Room 314

Section \*\*09: LAB Mon, 01:30PM - 02:20PM, MCKN, Room 238

Section \*\*10: LAB Mon, 08:30AM - 09:20AM, MCKN, Room 236

## 1.4 Final Exam

EXAM Wed, 08:30AM - 10:30AM (2020/04/15), Room TBA

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# 2 Instructional Support

## 2.1 Instructional Support Team

**Instructor:** Amir A. Aliabadi Ph.D., P.Eng.  
**Email:** aliabadi@uoguelph.ca  
**Telephone:** +1-519-824-4120 x.54862  
**Office:** RICH 2515  
**Office Hours:** To Be Announced In Class (TBAIC)

**Instructor:** Karen Gordon Ph.D., P.Eng.  
**Email:** kgordon@uoguelph.ca  
**Telephone:** +1-519-824-4120 x52435  
**Office:** RICH 2517  
**Office Hours:** To Be Announced In Class (TBAIC)

## 2.2 Teaching Assistants

**Teaching Assistant:** Mohamed Elhamahmy  
**Email:** malhamah@uoguelph.ca  
**Office Hours:** To Be Announced In Class (TBAIC)

**Teaching Assistant:** Yasser Al-Badrawi

<b>Email:</b>	yalbadra@uoguelph.ca
<b>Office Hours:</b>	To Be Announced In Class (TBAIC)
<b>Teaching Assistant:</b>	Rathna Priya Thangaraj Sundaramurthy
<b>Email:</b>	thangarr@uoguelph.ca
<b>Office Hours:</b>	To Be Announced In Class (TBAIC)
<b>Teaching Assistant:</b>	Sepideh Emami Tabrizi
<b>Email:</b>	semamita@uoguelph.ca
<b>Office Hours:</b>	To Be Announced In Class (TBAIC)
<b>Teaching Assistant:</b>	Mohsen Moradi
<b>Email:</b>	moradim@uoguelph.ca
<b>Office Hours:</b>	To Be Announced In Class (TBAIC)
<b>Teaching Assistant:</b>	Osama Elbanhawy
<b>Email:</b>	oelbanha@uoguelph.ca
<b>Office Hours:</b>	To Be Announced In Class (TBAIC)

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## 3 Learning Resources

### 3.1 Required Resources

#### Course Website (Website)

<http://courselink.uoguelph.ca>

Course material, news, announcements, and grades will be regularly posted to the ENGG\*1210 CourseLink site. You are responsible for checking the site regularly.

**Russell C. Hibbeler. 2016. Engineering Mechanics: Statics & Dynamics, 14th edition, Prentice Hall. (Textbook)**

### 3.2 Additional Resources

#### Lecture material (Notes)

Students are required to download and print lecture material according to the schedule given in this outline from CourseLink before every lecture and bring to class.

#### Assignments (Notes)

Students are required to download and print the assignments according to the schedule given in this outline from CourseLink before every tutorial and bring to tutorial. Students are expected to try these assignment before they are attempted in the tutorials. All the solutions will be posted as indicated.

#### Miscellaneous Information (Other)

Other information related to Engineering Mechanics will be posted on the course website.

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## 4 Learning Outcomes

This course is to introduce the basic principles of engineering mechanics with emphasis on their analysis and application to practical engineering problems.

This course will focus on the most basic branch of mechanics: rigid-body mechanics. It is essential for the design and analysis of many types of structural members, mechanical components, or electrical devices encountered in engineering. It also forms the basis for future studies in mechanics, including deformable-body mechanics and fluid mechanics. Hopefully, by the end of the semester, you will have a better understanding of what mechanics means, and how this branch of science is useful for engineers.

### 4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Describe the motions and forces associated with the static and dynamic behaviour of point objects and rigid bodies
2. Clearly articulate and differentiate the main concepts of Newtonian mechanics including forces, moments, distributed forces, friction, linear and angular momentum, impulse, energy, power, efficiency and equilibrium.
3. Model and solve engineering mechanics problems with stated assumptions, using clearly communicated solutions complete with Free Body Diagrams, dimensional homogeneity, and correct use of significant digits.
4. Describe the force and moment distribution throughout structures and mechanisms.
5. Describe the motion of a particle or rigid body in terms of its position, velocity, and acceleration in different frames of reference.

### 4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
1	Knowledge Base	1, 2, 3, 4, 5
1.1	Recall, describe and apply fundamental mathematical principles and concepts	3
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2, 3, 4, 5
2	Problem Analysis	3

#	Outcome	Learning Outcome
2.1	Formulate a problem statement in engineering and non-engineering terminology	3
2.2	Identify, organize and justify appropriate information, including assumptions	3
2.3	Construct a conceptual framework and select an appropriate solution approach	3
2.4	Execute an engineering solution	3

## 5 Teaching and Learning Activities

### 5.1 Lecture Schedule (Approximate)

Week	Topic	Reference	Learning Objective
0	Self study: Introduction, Force Vectors	Ch. 1,2,3	1,2,3
1	Equilibrium of Particle, Rigid Body Force Systems	Ch. 4	1,2
2	Equilibrium of a Rigid Body	Ch. 5	1,2
3	Analysis of Structures	Ch. 6	1,4
4	Forces in Beams	Ch. 7	1,2,4
5	Review for Test 1	-	-
6	Friction	Ch. 8	1
7	First Moments & Centroids	Ch. 9	1
8	Particle Kinematics	Ch. 12	1,2,5
9	Review for Test 2	-	-

10	Kinetics of a Particle: Force & Acceleration	Ch. 13	1,2,5
11	Kinetics of a Particle: Work & Energy	Ch. 14	1,2,5
12	Kinetics of a Particle: Impulse & Momentum	Ch. 15	1,2,5

## 5.2 Important Dates (Undergraduate Calendar)

**Monday, January 6:** Classes commence

**Monday, February 17:** Winter Break begins- NO CLASSES SCHEDULED THIS WEEK

**Friday, February 21 :**Winter Break ends

**Monday, February 24:** Classes resume

**Friday, April 3:** Classes conclude

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## 6 Assessments

### 6.1 Assessment Details

**Assignments (10 unmarked) (0%)**

Weekly.

**In-tutorial Quizzes (4) (20%)**

**Learning Outcome:** 3

Weeks of January 27, February 10, March 2, 16

**Test 1 (20%)**

**Date:** Tue, Feb 4, In Class

**Learning Outcome:** 1, 2, 3, 4, 5

**Test 2 (20%)**

**Date:** Tue, Mar 10, In Class

**Learning Outcome:** 3

**Final Exam (40%)**

**Date:** TBD

**Learning Outcome:** 1, 2, 3, 4, 5

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## 7 Course Statements

## 7.1 Course Grading Policies

**Academic Consideration:** If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

**Accommodation of Religious Obligations:** If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Consideration of Religious Obligations: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

**Passing Grade:** The passing grade is 50%.

**Missed Quizzes and Term Tests:** If you miss a quiz or term test due to grounds for granting academic consideration or religious accommodation, the weight of any missed assessment will be added to the final exam weight. There will be no makeup quizzes or tests.

**Questions Concerning Grades:** All requests for re-marking must be made to the person who marked the quiz or test. Any item that is re-marked will be re-marked entirely. Therefore, it is strongly suggested that you thoroughly review your entire document before making a re-marking request. Pencil-written works will not be re-marked. Re-marking requests will not be honoured more than one week after the document has been returned to the students in the first place. You must use the re-mark request form, sign it, and submit it along with our original document.

## 8 School of Engineering Statements

### 8.1 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and labs.

### 8.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely

manner and/or provide consideration if appropriate.

### **8.3 Lab Safety**

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

## **9 University Statements**

### **9.1 Email Communication**

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### **9.2 When You Cannot Meet a Course Requirement**

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### **9.3 Drop Date**

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>



Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

## 9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

## 9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website

<https://www.ridgetownc.com/services/accessibilityservices.cfm>

## 9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08->

amisconduct.shtml

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## **9.7 Recording of Materials**

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## **9.8 Resources**

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

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