# ENGG*1210 Engineering Mechanics I

Winter 2019
Section(s): C01

School of Engineering
Credit Weight: 0.50
Version 1.00 - January 03, 2019

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# 1 Course Details

## 1.1 Calendar Description

The fundamental principles of Newtonian mechanics; statics of particles in 2-D space; equilibrium of rigid bodies in 2-D; distributed forces; friction, linear and angular momentum of rigid bodies; conservation of energy; principles of impulse and momentum; and, plane motion of rigid bodies.

## 1.2 Timetable

**Lectures:**

| | | | |
|---|---|---|---|
| All | Mon | 03:30PM - 04:20PM | MACN-105 |
| All | Wed | 03:30PM - 04:20PM | MACN-105 |
| All | Fri | 03:30PM - 04:20PM | MACN-105 |

**Tutorials:**

| | | | |
|---|---|---|---|
| Sec 01 | Mon. | 09:30AM - 10:20AM | CRSC, Room-403 |
| Sec 02 | Thu. | 01:30PM - 02:20PM | ROZH, Room 107 |
| Sec 03 | Wed. | 02:30PM - 03:20PM | ROZH, Room 107 |
| Sec 04 | Mon. | 02:30PM - 03:20PM | MCKN, Room 307 |

Sec 05 Wed. 09:30AM - 10:20AM MCKN, Room 304

Sec 06 Tue. 11:30AM - 12:20PM MCKN, Room 308

Sec 07 Wed. 04:30PM-05:20PM ROZH, Room 107

Sec 08 Tue. 01:30PM-02:20PM CRSC, Room 403

### 1.3 Final Exam

April 13, 2019 from 11:30 AM to 1:30 PM.

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# 2 Instructional Support

## 2.1 Instructional Support Team

**Instructor:** Syeda Tasnim Ph.D., EIT
**Email:** stasnim@uoguelph.ca
**Telephone:** +1-519-824-4120 x54013
**Office:** THRN-2413
**Office Hours:** To Be Announced In Class (TBAIC)

## 2.2 Teaching Assistant(s)

**Teaching Assistant:** Taylor Livingston
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**Office:** THRN 2129
**Office Hours:** To Be Announced In Class (TBAIC)

**Teaching Assistant:** Amin Azarkhish
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**Teaching Assistant:** Osama Elbanhawy
**Email:** oelbanha@uoguelph.ca
**Office Hours:** To Be Announced In Class (TBAIC)

**Teaching Assistant:** Arash Yoosefdoost

**Email:** arashyd@uoguelph.ca
**Office Hours:** To Be Announced In Class (TBAIC)

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# 3 Learning Resources

## 3.1 Required Resource(s)

**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 Resource(s)

**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(s) |
|---|---|---|
| 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 |
| 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 | Introduction, Force Vectors | Ch. 1,2 | 1,2,3 |
| 1 | Equilibrium of a Particle | Ch. 3 | 1,2 |
| 2 | Rigid Body Force Systems | Ch. 4 | 1,2 |
| 3 | Equilibrium of a Rigid Body | Ch. 5 | 1,2 |
| 4 | Analysis of Structures | Ch. 6 | 1,4 |
| 5 | Forces in Beams | Ch. 7 | 1,2,4 |
| 6 | Friction | Ch. 8 | 1 |
| 7 | First Moments & Centroids | Ch. 9 | 1 |
| 8 | Particle Kinematics | Ch. 12 | 1,2,5 |
| 9 | Kinetics of a Particle: Force & Acceleration | Ch. 13 | 1,2,5 |
| 10 | Kinetics of a Particle: Work & Energy | Ch. 14 | 1,2,5 |
| 11 | Kinetics of a Particle: Impulse & Momentum | Ch. 15 | 1,2,5 |
| 12 | Course Review | - | - |

## 5.2 Important Dates (Undergraduate Calendar)

***Monday*, January 7**: Classes commence

***Monday*, February 18:** Winter Break begins- NO CLASSES SCHEDULED THIS WEEK

***Friday*, February 22** :Winter Break ends

***Monday*, February 25:** Classes resume

***Friday*, March 8**: Fortieth class day--Last day to drop one semester courses

***Friday*, April 5**: Classes conclude

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# 6 Assessments

## 6.1 Assessment Details

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

**In-tutorial Quizzes (6) (15%)**
**Learning Outcome(s):** 1,2,3,4,5

**Cooperative Learning Exercises in Tutorial:**

**Tutorial Exercise Schedule:**

**Week of Jan. 21- Problem Solving Activity 1**
**Week of Jan. 28- Problem Solving Activity 2**
**Week of Feb. 4- Problem Solving Activity 3**
**Week of Mar. 4- Problem Solving Activity 4**
**Week of Mar. 25- Problem Solving Activity 5**
**Week of Apr. 1- Problem Solving Activity 6**

During the cooperative learning exercise, each tutorial is divided into two parts. In the first part, your GTA
will solve multiple problems and discuss. In the second part of your tutorial, you will be asked to solve
problems. You need to make a group of three students (including yourself) for solving the problems in the
second part of the tutorial. At the end of tutorial you must submit your solutions to your GTA for marking.
A total 15% mark is allocated for such problem solving activities. You are strongly encouraged to attend
your registered section of tutorial regularly. **5 out of 6 exercises will be considered for marking.**

**Test 1 (20%)**
**Date:** Fri, Feb 15, In Class
**Learning Outcome(s):** 1,2,3,4,5

**Test 2 (20%)**
**Date:** Fri, Mar 15, In Class
**Learning Outcome(s):** 1,2,3,4,5

**Final Exam (45%)**
**Date:** TBD
**Learning Outcome(s):** 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.

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# 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.

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# 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

## 9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate 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

## 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.

More information can be found on the SAS website
https://www.uoguelph.ca/sas

## 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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