

ENGG*1210 Engineering Mechanics

Winter 2015



(Revision 0: December 21, 2014)

1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: Graham Taylor, Ph.D.
Office: THRN 2413
Email: gwtaylor@uoguelph.ca
Office hours: Monday 10:00 - 11:00

1.2 Teaching Assistants

GTA	Email	Office Hours	Room
Bryan Mathers	bmathers@uoguelph.ca	TBD	TBD
Daniel Jiwoong Im	imj@uoguelph.ca	TBD	TBD
Kushan Gandhi	kgandhi@uoguelph.ca@uoguelph.ca	TBD	TBD
Subhash Paul	subhash@uoguelph.ca	TBD	TBD
Xinqiao (Mike) Cai	caix@uoguelph.ca	TBD	TBD

2 LEARNING RESOURCES

2.1 Course Website

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

2.2 Required Resources

1. Russell C. Hibbeler, *Engineering Mechanics: Statics & Dynamics*, 13th edition, Prentice Hall, 2012.
A copy of this book is on reserve at the library.

2.3 Additional Resources

Lecture Information: Notes to accompany lectures will be posted on the course website (CourseLink) throughout the semester. You will be granted access to the website when you register for the course. These lecture notes are not complete and it is still highly recommended that you print the notes prior to lectures and fill in the blank sections.

Assignments: Download the assignments according to the schedule given in this handout. All the solutions will be posted as indicated.

Exams: Some midterms and finals of previous years are posted as samples of exams. The solutions are also posted for your convenience.

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

2.4 Communication and Email Policy

Please use lectures and tutorials as your main opportunity to ask questions about the course. Major announcements and/or changes will be posted to the course website. **It is your responsibility to check the course website regularly.**

Electronic communication should be limited to the course forum, however topics of a personal and confidential nature (e.g. marks) should be emailed to the instructor: gwtaylor@uoguelph.ca. Please note that **all email communication must be made through your University of Guelph email account** (i.e. *username@uoguelph.ca*).

3 ASSESSMENT

3.1 Dates and Distribution

Assignments: (10, unmarked) 0%

Weeks of: Jan 5, 12, 19, 26, Feb 2, 9, 24, Mar 2, 9, 16.

In-tutorial Quizzes: (8, best 7) 15%

Weeks of: Jan 12, 19, 26, Feb 2, 24, Mar 2, 9, 16.

In-class Tests: 15%

Test 1: Tuesday January 27, MACN 105

Test 2: Thursday, March 19, MACN 105

In-class Midterm: 30%

Thursday February 12, MACN 105

Final Exam: 40%

Tuesday April 15, 19:00-21:00, Room TBA on Webadvisor

3.2 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, Tests, or Midterms: If you miss a test or midterm due to grounds for granting academic consideration or religious accommodation, the weight of any missed assessment will be added to the final exam weight. If you miss three or more quizzes due to grounds for granting academic consideration or religious accommodation, the weight of the third and higher missed quizzes will be added to the final exam weight. There will be no makeup quizzes, tests, or midterm.

Questions Concerning Grades: If you have questions about the grade your quiz or test received, please ask your TA within one week of the document being returned. However, all requests for re-marking must be made to the instructor and **accompanied by a completed re-marking request form** (found on CourseLink). 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.

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 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.

4.2 Course Aims

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.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability 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.

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning Objectives	Assessment
1. Knowledge Base for Engineering	1, 2, 4, 5	Quizzes, Tests, Exams
2. Problem Analysis	3	Quizzes, Tests, Exams
3. Investigation	-	-
4. Design	-	-
5. Use of Engineering Tools	-	-
6. Communication	-	-
7. Individual and Teamwork	-	-
8. Professionalism	-	-
9. Impact of Engineering on Society and the Environment	-	-
10. Ethics and Equity	-	-
11. Environment, Society, Business, & Project Management	-	-
12. Life-Long Learning	-	-

4.5 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/D2L but these are not intended to be stand-alone course notes. 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 assessments.

4.6 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. 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.

4.7 Relationships with other Courses & Labs

Previous and/or Current Courses:

MATH*1200 & MATH*1210: Differentiation, integration

Follow-on Courses:

ENGG*2160: Mechanics of deformable solids

ENGG*2230: Mechanics of gases and fluids, material that cannot take a shear stress

ENGG*2400: Engineering systems analysis in general – deeper understanding of force, deflection, energy, and work

ENGG*2340: Three-dimensional analysis of forces and motion

ENGG*3150: Engineering Biomechanics properties

ENGG*3280: Applications of engineering mechanics in the design of mechanical elements

5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures:

Tuesday 08:30 - 10:00 MACN 105

Thursday 08:30 - 10:00 MACN 105

Tutorials:

TBA

5.2 Lecture Schedule

Lectures	Lecture Topics	References	Learning Objectives
1	Introduction to Engineering Mechanics	Chapter 1	1, 2, 3
2-3	Force Vectors	Chapter 2	1, 2
4	Equilibrium of a Particle	Chapter 3	1, 2
5-7	Rigid Body Force Systems	Chapter 4	1, 2
8-9	Equilibrium of a Rigid Body	Chapter 5	1, 2
10-11	Analysis of Structures	Chapter 6	1, 4
12	Midterm	-	-
13-14	Forces in Beams	Chapter 7	1, 2, 4
15	Friction	Chapter 8	1
16-17	First Moments & Centroids	Chapter 9	1
18-19	Particle Kinematics	Chapter 12	1, 2, 5
20	Kinetics of a Particle: Force & Acceleration	Chapter 13	1, 2, 5
21-22	Kinetics of a Particle: Work & Energy	Chapter 14	1, 2, 5
23	Kinetics of a Particle: Impulse & Momentum	Chapter 15	1, 2, 5
24	Course Review	-	-

5.3 Other Important Dates

Monday, January 5 2015: First day of class

Monday, February 16 - Friday, February 20 2015: Winter Break

Friday, March 6 2015: drop date - 40th class

Friday, April 3 2015: last day of class

6 ACADEMIC MISCONDUCT

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 discourages misconduct. 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.

6.1 Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:

<http://www.academicintegrity.uoguelph.ca/>

Please also review the section on Academic Misconduct in your [Engineering Program Guide](#).

The School of Engineering has adopted a Code of Ethics that can be found at:

<http://www.uoguelph.ca/engineering/undergrad-counselling-ethics>

7 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: <http://www.uoguelph.ca/csd/>

8 RECORDING OF MATERIALS

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

9 RESOURCES

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

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>