ENGG*1210: ENGINEERING MECHANICS

Winter 2017

School of Engineering

(Revision 0: Dec. 08, 2016)
(Revision 1: Jan. 04, 2017)

1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor:	Amir A. Aliabadi, Ph.D., P.Eng.
Office:	RICH 2515, ext. 54862
Email:	aliabadi@uoguelph.ca
Website:	http://www.aaa-scientists.com
Office hour:	Mon./Wed./Fri., 04:00pm - 05:00pm

1.2 Teaching Assistant(s)

GTA	Email	Office Hours	Room
Kathleen Songin	ksongin@uoguelph.ca	Tue. 01:00pm - 02:00pm	THRN 2129
Dustin Brown	dbrown24@uoguelph.ca	Tue. 04:00pm - 05:00pm	THRN 2129
Terrance DeVries	terrance@mail.uoguelph.ca	Thu. 01:00pm - 02:00pm	THRN 2129
Mei Xiao	mxiao01@uoguelph.ca	Thu. 04:00pm - 05:00pm	THRN 2129

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

Text Book: Russell C. Hibbeler. 2016. *Engineering Mechanics: Statics & Dynamics*, 14th edition, Prentice Hall.

2.3 Additional Resources

Lecture material: 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: 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.

Review Problems: Students are required to download and print the review problems according to the schedule given in this outline. These review problems may be attempted in tutorials. Students are expected to try these review problems *before* they are attempted in the tutorials. All the solutions will be posted as indicated.

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

2.4 Communication & 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 if they are not of personal nature. If such matters are communicated by email, they may not be answered. Electronic communication can take place using email if they are of personal nature (e.g. remarking, accommodations, considerations, complaints, etc.).

All marking and problem solving questions should first be directed to GTAs as the point of contact. If the matter is not resolved or a meeting time between student and GTA cannot be agreed upon mutually, then the matter can be directed to the instructor: aliabadi@uoguelph.ca. Topics of a personal and confidential nature, such as special accommodations and considerations, should be emailed to the instructor: aliabadi@uoguelph.ca. Please note that **all email communication must be made through your University of Guelph email account** (i.e. *username*@mail.uoguelph.ca).

---

3 ASSESSMENT

3.1 Dates and Distribution

Assignments: (10, unmarked) 0%
Weeks of: Jan. 9, 16, 23, 30, Feb. 6, 13, 27, Mar. 6, 13, 20.

In-tutorial Quizzes: (5) 20%
Weeks of: Jan. 16, 30, Feb. 13, Mar. 6, 27.

In-class Tests: (2) 40%
Test 1: Tue., Feb. 7, ROZH, Room 101
Test 2: Thu., Mar. 14, ROZH, Room 101

Final Exam: 40%
Mon., Apr. 24, 07:00-09:00 pm, Room TBD 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 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. If you miss two or more quizzes due to grounds for granting academic consideration or religious accommodation, the weight of the second and higher missed quizzes 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 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	**Learn. Objective**	**Assessment**
1. Knowledge Base	GA 1: 1, 2, 3	Test 1, Test 2, Final Exam
2. Problem Analysis	GA 2: 4	Quizzes
3. Investigation	-	-
4. Design	-	-
5. Engineering Tools	-	-
6. Individual & Teamwork	-	-
7. Communication	-	-
8. Professionalism	-	-
9. Engineering Society and Environment	-	-
10. Ethics & Equity	-	-
11. Economics & 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:			
All	Tue.	11:30am - 12:50pm	ROZH Room 101
All	Thu.	11:30am - 12:50pm	ROZH Room 101
Tutorials:			
Sec 01	Mon.	11:30am - 12:20pm	CRSC Room 403
Sec 02	Tue.	02:30pm - 03:20pm	CRSC Room 403
Sec 03	Tue.	08:30am - 09:20am	CRSC Room 403
Sec 04	Mon.	12:30pm - 01:20pm	CRSC Room 403
Sec 05	Mon.	09:30am - 10:20am	CRSC Room 403
Sec 06	Tue.	03:30pm - 04:20pm	CRSC Room 403
Sec 07	Mon.	10:30am - 11:20am	CRSC Room 403
Sec 10	Mon.	10:30am - 11:20am	ROZH Room 107
Sec 11	Mon.	02:30pm - 03:20pm	ROZH, Room 109

5.2 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	-	-

5.3 Important Dates (Undergraduate Calendar)

Mon. Dec. 12: Add period for Winter semester 2017 begins
Mon. Jan. 9: Classes commence
Fri. Jan. 13: Add period ends
Tue. Feb. 7: Term test 1
Mon. Feb. 20: Winter break begins - no classes this week
Mon. Feb. 27: Classes resume
Fri. Mar. 10: 40th class day, last day to drop one semester course
Thu. Mar. 14: Term test 2
Fri. Apr. 7: Classes conclude
Mon. Apr. 24: Final Exam

---

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