ENGG*1210 Engineering Mechanics
Fall 2014

UNIVERSITY of GUELPH

School of Engineering

(Revision 0: September 4, 2014)

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1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: Jonathan VanderSteen, Ph.D., P.Eng.
Office: THRN 2333, ext. 52040
Email: vandersj@uoguelph.ca
Office hours: Monday 5:30-6:30 (THRN 1425) or by appointment

1.2 Lab Technician

Technician: N.A.

1.3 Teaching Assistants

GTA	Email	Assignment
Andrew Kozyn	akozyn@uoguelph.ca	Section 2 & 7
Emmanuel Ogunsona	eogunson@uoguelph.ca	Section 3 & 4
Subhash Paul	subhash@uoguelph.ca	Section 1 & 8
Xiaochuan Wang	xwang17@uoguelph.ca	Section 6
Wanzhi Zhuang	wzhuang@uoguelph.ca	Marking

TA Office Hours are held in THRN 1425 on Tuesday (11:30-12:30) and on Wednesday (1:00-2:00).

2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*1210 Courselink site: http://courselink.uoguelph.ca. You are responsible for checking the site regularly.

2.2 Required Resources

1. R.C. Hibbeler *Engineering Mechanics: Statics & Dynamics* 13th Edition Pearson, 2013.

   An electronic version of this book can be rented at http://www.coursesmart.com

   A copy of this book is on reserve at the library.

2. iClicker

2.3 Recommended Resources: Engineering Peer Helpers (Voluntary)

The peer helper program, staffed by upper year engineering students, offers regular workshops aimed at developing problem solving skills and new learning tools specific to core engineering courses such as Engineering Mechanics. Your peer helpers for Mechanics are Megan Kamachi, Danette Chan-Lee, and Kay Harvey.

The Engineering Mechanics Focused Engineering Problem Solving (FEPS) sessions will be run in THRN 1427 every week on Mondays (5:30-6:30), Tuesday (11:30-12:30) and Wednesdays (1:30-2:30).

Contact engpeers@uoguelph.ca or http://www.uoguelph.ca/engineering/peer_helper for more information.

2.4 Additional Resources

Lecture Information: Notes to accompany lectures will be posted on the course website (Courselink) throughout the semester. It is recommended that you come to the lectures with the printed notes.

Lab Manual: Not Applicable.

Assignments: There will be 10 marked assignments posted in Courselink during the term. There will also be a number of recommended, unmarked assigned questions. It is recommended that you do as many practice problems as possible as this is the only way to master the course material. All the solutions will be posted.

Miscellaneous Information: Other information related to Engineering Mechanics is also posted on the web page.

2.5 Communication and Email Policy

Please use lectures, tutorial, and lab sessions as your main opportunity to ask questions about the course. Major announcements 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 should be emailed to the instructor. As per university regulations, all

students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

3 ASSESSMENT

3.1 Dates and Distribution

Assignments: 15% (Best 8 out of 10)
(Due: Sept 17, 24, Oct 1, 8, 22, 29, Nov 5, 12, 19, 26 at 10:00pm in Courselink Dropbox)

Clicker Quizzes: 10% (In-class, best 5 out of 6)
(Dates: Sept 11, 25, Oct 9, 30, Nov 13, 27)

Tutorial Activities: 0% (In-seminar, 11 different activities)

Midterm*: 15-40% (Closed book, Covers material up to last lecture prior to exam)
Thursday, Oct 16, In-class.

Final Exam*: 40-60% (Closed book, Covers entire course)
Monday, Dec 8, 8:30-10:30 am, Room TBA

*All exams will be closed book tests. Necessary equations and information will be provided or announced prior to each exam. Calculators are permitted, but must be non-communicating devices.

	Scheme 1	Scheme 2	Scheme 3	Scheme 4
Assignments	15%	15%	15%	0
Clicker Quizzes	10%	10%	10%	0
Tutorial Activity	0	0	0	0
Midterm	30%	15%	35%	40%
Final	45%	60%	40%	60%

Scheme 4 will be applied if it gives you a mark below 50%. (In other words, you must achieve a passing score on your tests to pass the course.)

If you complete at least 9 of 11 tutorial activities, your grade will be calculated using Scheme 1, 2, or 3, which ever gives you the best mark.

Otherwise, Scheme 1 will be used to calculate your mark.

3.2 Course Grading Policies

Missed Assessments: 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 Accommodation of Religious Obligations: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Mark Adjustments: If you have questions about any grade, please inquire within one week of the mark being received. Re-marking requests will not be honoured more than one week after the document has been returned.

Passing Grade: In order to pass the course, you must obtain a final grade of 50% or higher. (See 3.1)

Missed midterm tests: If you miss the midterm due to grounds for granting academic consideration or religious accommodation, the weight of the missed test will be added to the final exam. There will be no makeup midterm tests.

Late Assignments: Late submissions of assignments will not be marked.

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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

Engineers must understand how forces impact the objects to which they are applied and in turn how to design structural, mechanical, or even electrical components. This course is to introduce the basic principals of engineering statics and dynamics with an emphasis on the analysis and application to practical engineering problems. The main goals of the course are (1) to teach students the fundamental concepts in classical engineering mechanics and (2) to prepare the students for intermediate and advanced engineering courses that build on mechanics.

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	Assignments, Quizzes, Exams
2. Problem Analysis	3	Assignments, Quizzes, 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 tests.

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 Courses:

No prerequisites to this course

Follow-on Courses:

ENGG*1500: Solving systems of linear equations

CHEM*1040: Chemical and material properties

PHYS*1130: Force, motion, and momentum

ENGG*2160: Mechanics of deformable solids

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

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

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

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

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5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures:

Tuesday		8:30 – 9:50	THRN 1200	
Thursday		8:30 – 9:50	THRN 1200	
Seminars:				
Monday	Sec 01	10:30 – 11:20	MCKN 305	Subhash
Monday	Sec 02	11:30 – 12:20	MCKN 304	Andrew
Monday	Sec 03	2:30 – 3:20	MCKN 315	Emmanuel
Monday	Sec 04	1:30 – 2:20	MCKN 315	Emmanuel
Wednesday	Sec 06	10:30 – 11:20	MCKN 304	Xiaochuan
Monday	Sec 07	10:30 – 11:20	MCKN 304	Andrew
Monday	Sec 08	8:30 – 9:20	MCKN 304	Subhash

Students are responsible for all information presented in the class and seminars, and student participation is highly encouraged. The dynamics of each learning activity should be based on professionalism and mutual respect. Cell phones are to be turned off during the class, ear phones must be put away, and the use of laptops and tablets in class is restricted to taking class notes.

Everyone in the classroom has the right to participate and contribute. If there is anything that may prevent your full contribution, let the instructor know as soon as possible. The learning environment must be free from harassment.

5.2 Lecture Schedule and Details

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

5.3 Seminar Schedule and Details

The seminar will include activities to reinforce material covered in lectures and will introduce problem sets not covered in lectures. The GTA will present concepts and tips related to the week's material. It is essential that you attend your scheduled seminar.

Week	Topic
1 (Sept 8-12)	Activity 1: Tutorial Introduction
2 (Sept 15-19)	Activity 2: Force Vectors
3 (Sept 22-26)	Activity 3: Particle Equilibrium
4 (Sept 29-Oct 3)	Activity 4: Force Moments
5 (Oct 6-10)	Activity 5: Rigid Body Equilibrium
6 (Oct 13-17)	Thanksgiving Break – Open Tutorial Time
7 (Oct 20-24)	Activity 6: Structures

8 (Oct 27-31)	Activity 7: Friction
9 (Nov 3-7)	Activity 8: Centroids / Internal Forces
10(Nov 10-14)	Activity 9: Kinematics
11(Nov 17-21)	Activity 10: Force and Acceleration
12(Nov 24-28)	Activity 11: Work, Power and Energy

5.4 Other Important Dates

Thursday, September 4, 2014: First day of class
Monday, October 13, 2014 Holiday: no classes scheduled
Tuesday, October 14, 2014: Fall Study Break Day – no classes scheduled
Friday, October 31, 2014: 40th class day, last day to drop
Friday, November 28, 2014: Last day of class

6 LAB SAFETY

6.1 SOE Statement

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.

If the laboratory rules are not followed, consequences will include removing student's access to the lab. If this results in lab work not being completed, the student will receive a grade of 0.

6.2 Engineering Mechanics I Lab

There is no lab component to this course.

7 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.

7.1 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

8 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.csd.uoguelph.ca/csd/

9 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.

10 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