

**School of Engineering  
University of Guelph**

**ENGG\*1210  
ENGINEERING MECHANICS I  
Fall 2012**

**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.

**TEXTBOOK**

**Choose one from the following 2 text book choices:**

**Engineering Mechanics by HIBBELER  
ISBN 9780132915489  
Pearson Education  
13th Ed**

**OR/**

**VECTOR MECHANICS FOR ENGINEERS PACKAGE (STATICS &  
DYNAMICS), Package ISBN  
9781259013270  
9th Edition**

You can purchase paper book in University bookstore. If you want to save dollars, you may use eBook from Course Smart. Beware, eBook cannot be returned.

**INSTRUCTOR**

Dr. Zoe Jing Yu Zhu  
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Telephone: (519)824-4120 Ext. 52972  
Office Hours: Wednesday 1:00:- 3:00 pm or by appointment  
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www: <http://www.uoguelph.ca/~jizhu/>

## LECTURE, LAB (TUTORIALS) TIMES & LOCATION

**Lectures:** All

Tuesday, Thursday, 11:30 – 12:50 (THRN 1200)

### Tutorial (Lab) (Tutorials start Sept 17<sup>th</sup>)

Section 0101: Wednesday, 9:30 – 10:20AM (Mack, Room 312) (Joe)

Section 0102: Friday, 9:30 – 10:20AM (Mack, Room 306) (Kishor)

Section 0103: Wednesday, 12:30 – 1:20PM (Mack, Room 306) (Joe)

Section 0104: Friday, 12:30 – 1:20PM (Mack, Room 305) (Kishor)

Section 0105: Tuesday, 1:30 – 2:20PM (Mack, Room 307) (Gerry)

Section 0106: Thursday, 1:30 – 2:20PM (Mack, Room 313) (Gerry)

Section 0107: Tuesday, 2:30 – 3:20PM (Mack, Room 315) (Lihui)

Section 0108: Thursday, 2:30 – 3:20PM (Mack, Room 304) (Gerry)

## TEACHING ASSISTANTS:

Lihui Wang - [lihui@uoguelph.ca](mailto:lihui@uoguelph.ca)

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Joseph McIntyre (0.5) - [jmcint03@uoguelph.ca](mailto:jmcint03@uoguelph.ca);

## MARK DISTRIBUTION:

Assignments	15%
Quizzes	15%
Midterm	30%
Final Examination:	40%
	100%

## COURSE OBJECTIVE:

This course is to introduce the basic principles of engineering mechanics with emphasis on their analysis and application to practical engineering problems. After learning this course, you should develop the ability to:

- 1). Solve for resultants of any force systems.
- 2). Determine equivalent force systems
- 3). Determine the internal forces in plane frames, simple span trusses and beams.
- 4). Solve the mechanics problems associated with friction forces
- 5). Obtain the centroid, first moment and second moment of an area
- 6). Describe the motion of a particle in terms of its position, velocity and acceleration in different frames of reference
- 7). Analyze the forces causing the motion of a particle.
- 8). Use the equation of motion to describe the accelerated motion of a particle
- 9). Apply work, energy, Impulse and momentum relationships for a particle in motion
- 10). Describe the motion of a rigid body in different frames of reference

## FINAL EXAMINATION:

Dec. 4th, 2012, 11:30am - 1:30pm, the location will be announced.

All the quizzes, midterm and final exams will be closed-book. The quizzes will be held during the regular lecturing classes.

## COURSE MATERIAL TO BE COVERED

Weeks	Date	Approximate # classes and contents	Chapter from Textbook
1	Sept 6.	<b>Introduction</b> Course orientation Units, definitions and basic principles	1
2	Sept 10 to Sept 14	<b>Force Vectors</b>	2

		Basic vector calculations Force resolution and combination	Assignment 1 start
3	Sept 17 to Sept 21 Quiz1 ( Sept 27)	<b>Equilibrium of a Particles</b> Free body and force diagrams Equilibrium of a particle <b>Force Systems Resultants</b> Moment of a force about a point Moment of a force about an axis Couples Reduction of force and couple systems	3 +4 Assignment 1 due on Sept. 20
4	Sept 24 to Sept 28	<b>Equilibrium of a Rigid Body</b> Internal and external forces Equilibrium of a rigid body Free body diagrams  Quiz 1 On Thursday, Sept 27 <sup>th</sup> .	5 7.1  Assignment 2 start
5	Oct 1 to Oct 5	<b>First Moments and Centroids</b> Determination by integration Centroids of a composite lines or area Fluid pressure	9.1 to 9.3 9.6 Assignment2 due on Oct 4 <sup>th</sup>
6	Oct 8 to Oct 12 Midterm (Oct 18)	<b>Analysis of Structures</b> Trusses: method of joints Trusses: method of sections Force in frames and beams	6 Assignment 3 start
7	Oct 15 to Oct 19	<b>Friction</b> Law of friction Angles of friction Wedges  <b>Midterm on Oct 18</b>	8.1 to 8.5  Assignment 3 due on Oct. 18 <sup>th</sup>
8	Oct 22 to Oct 26 Quiz2 (Nov. 1)	<b>Moments of Inertia</b> Moments of inertia by integration Polar moment of inertia Radius of gyration Parallel axis theorem	10.1 to 10.5  Assignment 4 start

		Composite area	
9	Oct 29 to Nov. 2	<b>Particle Kinematics</b> Review: rectilinear motion Curvilinear motions Relative motion Absolute dependent motion  Quiz 2 On Thursday, Nov. 1 <sup>st</sup>	12 Assignment 4 due On Nov. 1 <sup>st</sup>
10	Nov 5 to Nov 9	<b>Kinetics of a Particle: Force and Acceleration</b> Newton's second law: General Rectangular coordinates Normal and Tangential coordinates Cylindrical coordinates	13 Assignment 5 start
11	Nov. 12 to Nov. 16 Quiz 3 on Nov. 22	<b>Kinetics of a Particle: Work and Energy</b> Work of a force Principle of work and energy Conservative forces and potential energy Power and efficiency	14 Assignment 5 due, Nov. 15
12	Nov. 19 to Nov. 23	<b>Kinetics of Particle: Impulse &amp; Momentum</b> Principle of linear impulse and momentum Impact Angular momentum Quiz 3 On Thursday, Nov. 22 <sup>nd</sup>	15
13	Nov. 26 to Nov. 29	<b>Planar Kinematics of a Rigid Body</b> Translation and rotation Relative motion analysis  Review	16.1 to 16.3 16.5 to 16.8
Final Exam	Dec. 4 <sup>th</sup> Tuesday	<b>11:30 to 1:30pm</b>	

#### QUIZZES:

In total, three in class quizzes will be given according to the schedule shown in the following table. Each quiz is valued 5% of the total marks and the 3 quizzes combined are valued 15% of the total marks.

Week	Date	Quizzes
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Week 4	Thursday, Sept. 27	Quiz 1
Week 8	Thursday, Nov. 1	Quiz 2
Week 11	Thursday, Nov. 22	Quiz 3

The solutions to all the assignments, quizzes, midterm will be posted in the course link. You may appeal any mark **within one week** after it has been reported to you with the written reason for remarking.

## **UNIVERSITY POLICY ON ACADEMIC MISCONDUCT**

Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph. Please consult the Undergraduate Calendar and School of Engineering programs guide, for offences, penalties and procedures relating to academic misconduct.

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

### **POLICIES:**

1) Missed Quizzes:

No supplemental quizzes are available. A student with extended and accepted medical or compassionate grounds will have an increased final exam weighting.

2) Attending Alternative Tutorials:

You may only attend alternative tutorials with permission from the instructor beforehand.

3) Late Submissions:

Late submissions (without instructor permission based on suitable grounds and documentation) will be penalized. The penalty will depend on how late: 10% for 0.5-12 hours; 25% for 12-48 hours; 50% for 48-96 hours and 100% after 96 hours.

### **DISCLAIMER**

The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to University of Guelph Academic Regulations