2006 Winter Semester

ENGG*1210: ENGINEERING MECHANICS I

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Office Hours: Wednesday 11:00AM – noon.

GTAs: Lindsay LaFleur: Room 313, Ext. 53588, email: llafleur@uoguelph.ca
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Lectures: Room: MACN 113
Time: Tuesday and Thursday 10:00AM to 11:20AM

Tutorials:	Section 101:	Monday	02:30PM - 03:20PM,	MACK 304
	Section 102:	Wednesday	12:30PM - 01:20PM,	MACK 309
	Section 103:	Tuesday	08:30AM - 09:20AM,	MACK 311
	Section 104:	Thursday	08:30AM - 09:20AM,	MACK 311

TEXTBOOK

Hibbeler, R.C. (2007). *Engineering Mechanics: Statics and Dynamics*. 11th Edition, Pearson Prentice Hall, Upper Saddle River, NJ.

Notes on pertinent material will be posted on the university WebCT throughout the semester. A number of standard engineering mechanics books are also available in the library which may be consulted.

COURSE OBJECTIVES

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

1) Solve for the 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

TENTATIVE COURSE OUTLINE

Date	Lectures	Topic	Chapters
Jan. 9	1	**Introduction** Course orientation Units, definitions and basic principles	1
Jan. 11	1	**Force Vectors** Basic vector calculations Force resolution and combination	2
Jan. 16	1	**Equilibrium of a Particles** Free body and force diagrams Equilibrium of a particle	3
Jan. 18 - 23	2	**Rigid Body Force Systems** Moment of a force about a point Moment of a force about an axis Couples Reduction of force and couple systems	4
Jan. 25	1	**Equilibrium of a Rigid Body** Internal and external forces Equilibrium of a rigid body	5 7.1
Jan. 30 - Feb. 1	2	**First Moments and Centroids** Determination by integration Centroids of a composite lines or areas Fluid pressure	9.1 to 9.3 9.6
Feb. 6 - 8	2	**Analysis of Structures** Trusses: method of joints Trusses: method of sections Forces in frames and beams	6
Feb. 13	1	**Friction** Law of friction Angles of friction Wedges	8.1 to 8.5
Feb. 15	1	**Moments of Inertia** Moments of inertia by integration Polar moment of inertia Radius of gyration	10.1 to 10.3
Feb 27		**MIDTERM**	
March 1	1	**Moments of Inertia (continued)** Parallel axis theorem Composite areas	10.4 to 10.5
Mar. 6 - 8	1.5	**Review of Particle Dynamics** Kinematics of a Particle Kinetics of a Particle	12 to 15
Mar. 8 - 13	1.5	**Planar Kinematics of a Rigid Body** Translation and rotation	16.1 to 16.3

		Relative motion analysis	16.5 to 16.8
Mar. 15 - 20	2	**Kinetics of a Rigid Body: Force & Acceleration** Moment of inertia Equations of motion	17
Mar. 22 - 27	2	**Kinetics of a Rigid Body: Work & Energy** Principles of work and energy Power and efficiency Conservation of energy	18
Mar. 29 – Apr. 3	2	**Kinetics of a Rigid Body: Impulse & Momentum** Impulse-momentum relation Momentum conservation Impact	19
Apr. 5	1	**Review**	
April13		**FINAL EXAM (**07:00PM - 09:00PM)	

1. Course topics will be covered by both lectures and tutorials. The main purposes of the tutorials are twofold: 1) provide additional discussion and sample problems compatible with the lecture materials, and 2) have a more informal opportunity to explore issues and ask questions about lectures, texts and previously assigned materials which require clarification.

2. The most effective way of learning the principles of engineering mechanics to solve problems. It is thus important that you work out each assignment problem by yourself without looking at the solution. Do not deny yourself the joy of self-discovery!

MARK DISTRIBUTION

Quizzes:	20 %
Midterm:	40 %
Final Exam:	40 %

The quizzes will be held on Weeks 3, 4, 5, 6, 9, 10 and 11 prior to the end of the tutorials. Each of the quizzes will typically last 15 to 20 minutes. Only the best five of the seven quizzes will be used to calculate your final quiz mark.

All the quizzes, midterm and final tests will be closed-book. The solutions must be presented in an orderly, neat fashion. All equations used must be written in general symbol form before the specific numerical values are substituted. In some cases, a sketch should be given as part of the solutions. The answers must be underlined clearly with the appropriate units.

Please note that other university policies specified in University Undergraduate Calendar 2006/07 will be followed **strictly**.