2009 Winter Semester

ENGG*1210: ENGINEERING MECHANICS I

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Lectures: Room: MCLN 102
Time: Tuesday and Thursday 11:30AM to 12:50 PM

Tutorials: Section 102: Tuesday 1:30PM - 2:20PM, MACK 314
Section 103: Wednesday 9:30AM - 10:20AM, MACK 304
Section 104: Thursday 1:30PM - 2:20PM, MACK 314
Section 105: Friday 9:30AM - 10:20AM, MACK 304

TEXTBOOK

Hibbeler, R.C. (2007). *Engineering Mechanics: Statics and Dynamics*. 11th Edition, Pearson Prentice Hall, Upper Saddle River, NJ.
Notes to accompany lectures will be posted on the web course link BlackBoard 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 their analysis and application to practical engineering problems. After learning this course, you should have 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
10) Describe the motion of a rigid body in different frames of reference

TENTATIVE SYLLABUS

Date	Lectures	Topic	Chapters
Jan. 6	1	**Introduction** Course orientation Units, definitions and basic principles	1
Jan. 8-13	2	**Force Vectors** Basic vector calculations; Force resolution and combination	2
Jan. 15	1	**Equilibrium of a Particles** Free body and force diagrams; Equilibrium of a particle	3
Jan. 20-22	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. 27	1	**Equilibrium of a Rigid Body** Internal and external forces Equilibrium of a rigid body	5 7.1
Jan. 29 - Feb. 3	2	**First Moments and Centroids** Determination by integration Centroids of a composite line or area	9.1 to 9.3 9.6
Feb. 5 - 10	2	**Analysis of Structures** Trusses: method of joints Trusses: method of sections Forces in frames and beams	6
Feb. 12 - 24	2	**Friction** Law of friction; Angles of friction; Wedges	8.1 to 8.5
Feb. 26		**MIDTERM**	
Mar. 3 - 5	1.5	**Moments of Inertia** Moments of inertia by integration Polar moment of inertia; Radius of gyration; Parallel axis theorem; Composite areas	10.1 to 10.5
Mar. 10-12	1.5	**Particle Kinematics** Review: rectilinear motion Curvilinear motions; Relative motion; Absolute dependent motion	12
Mar. 17	1	**Kinetics of a Particle: Force & Acceleration** Newton's second law: General Rectangular coordinates	13
Mar. 19-24	1.5	**Kinetics of a Particle: Work & Energy** Work of a force Principles of work and energy Conservative forces and potential energy	14

		Power and efficiency	
Mar. 24-26	1.5	**Kinetics of a Particle: Impulse & Momentum** Principle of linear impulse and momentum Impact Angular momentum	15
Mar. 31-Apr.2	2	**Planar Kinematics of a Rigid Body** Translation and rotation Relative motion analysis	16.1 to 16.3 16.5 to 16.8
April 7		**FINAL EXAM (8:30-10:30 AM)**	

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.

MARK DISTRIBUTION

Assignments (8, best 7): 20 %
Quizzes (4, best 3): 20 %
Midterm: 25 %
Final Exam: 35 %

All tests will be closed-book. The quizzes will be held during lecture period, and will be announced one week in advance. The solutions to all the assignments, quizzes, midterm and final questions must be presented in an **orderly, neat** fashion. You may appeal any mark **within one week** after it has been returned to you. Late submission of an assignment will be devalued by 10% per day. If you miss an assignment or a quiz or the midterm and have an acceptable, properly written excuse, the weight of the missed component will be added to the weight of the final exam.

You must achieve a passing grade in combined assignments and quizzes to pass the course. If you don't, your final grade will equal that failing percentage.

Please note that other university policies specified in University Undergraduate Calendar apply.