Grande Prairie Regional College
Department of Science and Technology

PC 1310 – Mechanics

Winter Session, 2003
4.3(3-1.5-3)UT
U of A Equivalent – EN PH 131

Course Outline

This course includes: kinematics and dynamics of particles; gravitation; work and energy; linear momentum; angular momentum; systems of particles; introduction to dynamics of rigid bodies are covered in the course.

Prerequisite: MA 1000, EG 2300
Corequisite: MA 1010 Pre- or Corequisite: PC 1300
Note: Restricted to engineering students only.

Instructor	Jaime P. Santiago J209 539-2865 santiago@gprc.ab.ca
Lecture	TRF 9:00 – 9:50 J229
Laboratory	F 10:00 – 12:50 J103
Seminar	M 13:00 – 13:50 J229
Textbook	Engineering Mechanics, Statics and Dynamics, 9th Edition R. C. Hibbeler Prentice Hall Fundamentals of Physics, 6th Edition Richard Resnick, David Halliday and Jearl Walker John Wiley and Sons
Laboratory Manual	Physics 130, En Ph 131 Laboratory Manual Department of Physics University of Alberta
Marks Distribution	Problem Sets 5% Seminars 5% Laboratory Work 20% (Students must pass the lab to pass the course.) Midterm Exam 20% (Thursday, February 20, 2003) Final Exam 50% (U of A Common Final Exam, date TBA) **Note that satisfactory performance on the exams is required in order to pass this course. "Satisfactory performance" is defined by U of A every year.**

Lecture Topics

Topic	Lectures/ Days	Concepts to be Learned
Introductory Material	1	Fundamental quantities, dimensional analysis, idealizations
Kinematics of Rectilinear Motion	5	Absolute motion along a line; position, speed, displacement, velocity and acceleration; constant and variable acceleration; erratic motion
Kinematics of Planar Motion	5	Position, displacement, velocity and acceleration in 2 dimensions; Cartesian components; projectile motion; normal and tangential components; absolute dependent motion; relative motion
Dynamics of a Particle	5	Newton's Laws of Motion for a single particle, inertial frames of reference; Newton's Law of Universal Gravitation; friction, Cartesian components; normal and tangential components, circular motion; central force motion
Systems of Particles	2	Internal and external forces; center of mass and gravity; Newton's laws of motion for systems of particles
Work and Energy	6	Work done by a force; kinetic energy; Principle of Work and Energy for a particle, systems of particles; power and mechanical efficiency; conservative and non-conservative forces, potential energy, Law of Conservation of Energy
Linear Momentum and Impulse	4	Definition of linear momentum; Principle of Impulse and Momentum; systems of particles; conservation of linear momentum for a system of particles, collisions
Introduction to Dynamics of a Rigid Body	5	Rigid bodies; angular displacement, velocity and acceleration; kinetic energy; moment of inertia; torque (moment of force); Newton's laws for rotational motion
Angular Impulse and Momentum	3	Definition of angular momentum (moment of momentum) and impulse; angular momentum of a rigid body; Principle of Angular Impulse and Momentum; Conservation of Angular Momentum

Assignments

Problem Set	Due Date	Problems
1	January 17	Hibbeler: TBA Look at U of A ENPH 131 course website.
2	January 24	Hibbeler: TBA
3	January 31	Hibbeler: TBA
4	February 7	Hibbeler: TBA
5	February 14	Hibbeler: TBA
6	March 7	Hibbeler: TBA
7	March 14	Hibbeler: TBA
8	March 21	Hibbeler: TBA
9	March 28	Hibbeler: TBA HRW: TBA
10	April 4	HRW: TBA

Note: Assignments are due at the start of the class on the dates indicated above. No late assignments will be accepted.

Laboratory Work

Expt. No.	Date	Title
6	January 10	Acceleration Due to Gravity
7	January 24	Non-Uniform Motion
8	February 7	Atwood's Pulley
9	March 7	Conservation of Mechanical Energy
10	March 21	Collision: Ramp
11	April 4	Moment of Inertia

Note: Lab reports are due at 1:00 p.m. one week after the lab is performed. No late reports will be accepted.