Grande Prairie Regional College

Department of Science

INFORMATION FOR COURSE PC 1310: MECHANICS
WINTER 1998

Instructor:	Tola Adeodu,	Room J209,	Ext. 2865
Lecture:	TR	9:30 - 10:50 a.m.	J229
Laboratory:	M	3:00 - 5:50 p.m.	J107
Seminar:	TR	1:30 - 2:20 p.m.	TBA

Text: "Engineering Mechanics: Statics and Dynamics", R.C. Hibbeler, Prentice Hall, 7th Ed., 1995

Grading (%)		
Assignments	10	
Labs	10	
Mid-term Exam (#1)	20	(Scheduled for end of 2nd week in February)
Mid-term Exam (#2)	25	(Scheduled for end of 2nd week in March)
Final Exam	35	
Total	100	

Detailed Course Outline

1. Introductory material (1 week).
This is a review of the material in Chapter 1 of the main text. The review covers topics like classification, definitions, fundamental quantities and units.

2. Kinematics of rectilinear motion of a particle (2 weeks).
Sections 12.1 - 12.2 of Hibbeler.
Definitions and calculations of position, displacement, velocity, acceleration, distance and speed. Average and instantaneous values. Cases of constant and variable acceleration. Graphical methods.

3. Kinematics of planar motion of a particle (2 weeks).
Sections 12.3 - 12.6; 12.8 - 12.9.
Rectangular Cartesian components, projectiles. Normal and tangential componets treated in general and for circular motion. Connected particles, pulley systems. Relative motion.

4. Dynamics of a particle (2 weeks).
Sections 13.1 - 13.2; 13.4 - 13.5
Newton's laws, inertial frame of reference, Gravitation, mass and weight. FBD. Rectangular Cartesian components, normal and tangential components, friction. Circular motion and central force motion.

5. Application of Newton's 2nd law to a system of particles (1 week).
Section 13.3.
Internal and external forces. centres of mass and gravity. centroid.

6. Work and energy (2 weeks)
Sections 14.1 - 14.6.
Calculation of work in various settings - spring, gravity, friction etc. Principle of work and energy for a particle and a system of particles. Power and mechanical efficiency. Potential energy, energy conservation, conservative forces.

7. Linear momentum and impulse (2 weeks)
Sections 15.1 - 15.4.
Definition of linear momentum.
impulse. Application to a system of particles. Collisions, coefficient of restitution, impacts for which $0 \leq e \leq 1$.
Plastic, elastic and oblique impacts.

8. Dynamics of a rigid body (1 week)
Sections 16.1 - 16.3; 17.1 - 17.4
Angular velocity, kinetic energy. Moment of inertia. Moment of force and angular acceleration. Equations for planar motion, FBD. Work, energy and power for rigid body rotation.

9. Angular momentum (1 week)
Sections 15.5 - 15.7
Definitions of angular momentum, angular impulse. Principle of angular momentum and impulse for a system of particles. Conservation of angular momentum. Rigid bodies.