Douglas College

EFFECTIVE: JANUARY 2004
CURRICULUM GUIDELINES

A. Division: Instructional

Effective Date: January 2004

B. Department / Program Area: Science and Technology

Revision [X] New Course [ ]

If Revision, Section(s) Revised: N,P,Q

Date of Previous Revision: May 27, 1997

Date of Current Revision:

C: PHYS 170 **D**: Mechanics of Applied Science **E:** 3

Subject & Course No.	Descriptive Title	Semester Credits

F: Calendar Description:
This course is intended for students proceeding to studies in Applied Science/Engineering. Topics include statics of particles, rigid body forces and equilibrium, friction, particle kinematics and dynamics, systems of particles.

G: Allocation of Contact Hours to Type of Instruction / Learning Settings

Primary Methods of Instructional Delivery and/or Learning Settings:

Lecture / Problem Session

Number of Contact Hours: (per week / semester for each descriptor)

2/2

Number of Weeks per Semester:
15

H: Course Prerequisites:
BC Physics 12 (C or higher) or PHYS 107

I: Course Corequisites:
Math 120 must precede or be taken concurrently.

J: Course for which this Course is a Prerequisite
None

K: Maximum Class Size:
36

L: PLEASE INDICATE:

[ ] Non-Credit

[ ] College Credit Non-Transfer

[X] College Credit Transfer: Requested Granted

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS (www.bccat.bc.ca)

M: Course Objectives / Learning Outcomes

Upon completion of the course the student will be able to:

1. analyze two and three dimension concurrent force systems acting upon particles in equilibrium
2. analyze the equilibrium rigid bodies in two and three dimensions and determine equivalent systems of forces
3. apply the concepts of friction to practical problems
4. analyze motion of particles and particle-like objects and systems using displacement, velocity, acceleration, force, Newton's second law, energy, momentum, conservation principles.

N: Course Content

1. Force Vectors
   - Vectors
   - Vector components
   - Cartesian unit vectors
   - Vector addition and subtraction
   - Position vectors
   - Force vector along a line
   - Dot product

2. Particle Equilibrium
   - Condition for particle equilibrium
   - Free-body diagram
   - Two and three dimensional force systems

3. Force system Resultants
   - Moment of a force
   - Cross product
   - Principle of moments
   - Moment about an axis
   - Moment of a couple
   - Equivalent system
   - Resultants of a force and couple system

4. Equilibrium of Rigid Bodies
   - Conditions for rigid body equilibrium
   - Equilibrium in two dimensions
   - Equilibrium in three dimensions
   - Constraints for a rigid body

5. Friction
   - Characteristics of dry friction
   - Coefficients of friction
   - Angles of friction
   - Problems involving dry friction
   - Wedges
   - Frictional forces on screws, belts and bearings

6. Particle Kinematics
   - Position, velocity, acceleration
   - Rectilinear motion
   - Curvilinear motion
   - Normal and tangential components
   - Cylindrical components
   - Relative motion

7. Particle Kinematics
   - Force and acceleration
   - Newton's three laws of motion
   - Law of gravitation
   - Application of equations of motion in rectangular coordinates, normal and tangential coordinates, cylindrical coordinates

8. Work and Energy
   - Work done by constant and variable forces
   - Principle of work and energy/kinetic energy
   - Power and efficiency
   - Conservative forces and potential energy

9. Impulse and Momentum
   - Principle of linear impulse
   - Principle for a system of particles
   - Conservation of momentum
   - Impact/collisions

O: Methods of Instruction

Class time is devoted to lectures and problem solving.

P: Textbooks and Materials to be Purchased by Students

Hibbeler, R.C., Engineering Mechanics: Statics and Dynamics 9th Edition, McMillan, 2001

Q: Means of Assessment

The final grade for the course will be based upon the following components:

a) final examination – minimum of 30%/maximum of 40%
b) two tests administered during the semester – minimum of 45% each/maximum of 60% each
c) project – minimum of 10% / maximum of 15%

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

Not open for PLAR

Course Designer(s)	Education Council / Curriculum Committee Representative
Dean / Director	Registrar