# COURSE OUTLINE

Please save a copy onto your computer before filling in the form

**Course Name:** Mechanics 1

**Department Head/Coordinator:** Andy Sellwood  
**Effective Date:** Sept 2015

<table>
<thead>
<tr>
<th>School or Centre:</th>
<th>Department:</th>
</tr>
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<tbody>
<tr>
<td>School of Arts and Science</td>
<td>Science</td>
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**Course History:**  
New Course  
Name of Replacing Course (if applicable):

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>Number of Credits:</th>
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<tbody>
<tr>
<td>PHYS 1170</td>
<td>3.0</td>
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**Course Pre-requisites (if applicable):**

Physics 1 (PHYS 1100) and Calculus 1 (MATH 1100), both with a C-

**Course Co-requisites (if applicable):**

**PLAR (Prior Learning Assessment & Recognition)**

☑ No ☐ Yes (details below):

**Course Description:**

This course covers Newton's laws, kinematics, statics, and dynamics for particles and systems of particles, static and rotational equilibrium, analysis of structures, planar motion of rigid bodies, energy and momentum conservation. It is designed for engineering students. The emphasis of this course will be on solving problems.
Course Learning Outcomes:

At the end of the course the student will be able to:
- Add forces and resolve them into components using the Parallelogram Law.
- Express force and position in Cartesian vector form and determine the vector’s magnitude and direction.
- Apply the dot product.
- Solve particle equilibrium problems using the equations of equilibrium.
- Calculate the moment of a force in two and three dimensions and the moment of a force about a specified axis.
- Determine the resultants of nonconcurrent force systems.
- Reduce a simple distributed loading to a resultant force having a specified location.
- Solve rigid body equilibrium problems using the equations of equilibrium.
- Analyze the equilibrium of rigid bodies subjected to this force.
- Apply frictional force analysis on wedges, screws, belts, and bearings.
- Represent particle motion in 1D graphically.
- Investigate particle motion along a curved path using different coordinate systems.
- Analyze the dependent motion of two particles and the accelerated motion of a particle using the equation of motion with different coordinate systems.
- Apply central-force motion to problems in space mechanics.
- Apply work and energy to solving problems involving force, velocity, and displacement.
- Solve problems using the concepts of power, energy conservation, impulse, conservation of linear momentum, angular impulse and the conservation of angular momentum.

Program Learning Outcomes:

If this course is taken as a requirement or an elective in the following first year, University Transfer Certificate programs, the learning outcomes are found in the Program Content Guides available at the Counselling and Advising Service areas:

University Transfer Engineering Certificate
Evaluation/Grading System: (Click on drop down box arrows to see list of options)

<table>
<thead>
<tr>
<th>Grading System</th>
<th>Specify if 'Other':</th>
<th>Specify Passing Grade:</th>
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<tbody>
<tr>
<td>Letter Grades</td>
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<td>D</td>
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Components and Weighting of the Assessment/Evaluation Plan: (Click on drop down box arrows to see list of options)

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
<th>Evaluation Plan</th>
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<tbody>
<tr>
<td>Assignments</td>
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<tr>
<td>Quizzes/Tests</td>
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<tr>
<td>Midterm Exam</td>
<td>50</td>
<td>2-3 midterm exams</td>
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<tr>
<td>Final Exam</td>
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Total 100

Learning Environment/Type: (Select all that are used within the course)

<table>
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<tr>
<th>Instruction Type</th>
<th>Hours Per Instruction Type</th>
<th>Comments</th>
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<tbody>
<tr>
<td>L - Classroom</td>
<td>60</td>
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Enter Total Hours 60

Resource Material(s):

Resources are items in addition to tuition that the student is responsible for purchasing. Course resource information will be supplied by the department/instructor.
Course Topics and Sequence Covered:

Force Vectors (vector algebra, components)
Point Equilibrium (free-body-diagram, 3 equations & variables)
Moments (torque, cross-product, force-couples)
Rigid Body Equilibrium (force+moment-balance, 6 equations)
Friction (sliding, static)
Kinematics (v, a, t-, x-dependent, cylindrical coordinates)
Kinetics (F=ma problems in various coordinates)
Work & Energy (trick for some x-dependent force problems)
Momentum (conservation, collisions)
Rotational motion, fixed axis or limited to plane

VCC Education and Education Support Policies

There are a number of Education and Education Support policies that govern your educational experience at VCC, please familiarize yourself with them.

The policies are located on the VCC web site at:

http://www.vcc.ca/about/governance--policies/policies/

To find out how this course transfers, visit the BC Transfer Guide at www.bctransferguide.ca.

FOR COMMITTEE USE ONLY

<table>
<thead>
<tr>
<th>Date Approved by Education Council:</th>
<th>Date Approved by VCC Board (if applicable):</th>
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<tr>
<td>CC: March 17, 2015</td>
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