A POLYTECHNIC INSTITUTION

Course Outline

School of Manufacturing, Electronics & Industrial Processes
Program: Mechanical Engineering
Option:

MECH 2241
Engineering Mechanics 2

Start Date:	January 04, 2006				**End Date:**	May 26, 2006		
Total Hours:	80	**Total Weeks:**	20		**Term/Level:**	2	**Course Credits:**	3
Hours/Week:	4	**Lecture:**	2	**Tutorial:** 2	**Shop:**		**Seminar:**	**Other:**

Prerequisites

Course No.	Course Name
MECH 1141	Engineering Mechanics 1

MECH 2241 is a Prerequisite for:

Course No.	Course Name
MECH 4440	Machine Design 2
MECH 3445	Theory of Mechanisms

Course Description

Following the study of bodies in static equilibrium, this course introduces another aspect of engineering mechanics, namely dynamics. Dynamics consists of kinematics; a study of the geometry of motion, as well as kinetics; a study of the geometry of motion and associated forces. Kinetic analysis includes methods based on Newton's second law of motion, conservation of energy and conservation of momentum. For mechanical applications, the forces associated with motion are critical to the design of many types of structures and mechanical devices.

Detailed Course Description

Discuss:

- Kinematics: basic equation of motion, motion diagrams, trajectories; and
- Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies.

Introduce work, energy, power efficiency and mechanisms.

v Evaluation

Quizzes and Assignments	10%
Mid-term test 1	20%
Mid-term test 2	20%
Final Exam	50%
TOTAL	100%

Comments:

- Grading is based on six quizzes, two assignments, two mid-term tests and one final exam.
- Relative weighting is subject to adjustment to suit specific purposes. Notices will be given should any change occur.
- To pass the course a mark of 50% must be achieved.
- Quizzes are conducted during lecture time and will not be announced beforehand.
- Cheating and plagiarism penalties will be treated as per BCIT Student Regulation Policy 5002.

Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

- define acceleration, velocity and displacement;
- solve kinematic linear problems by calculations and graphical methods;
- solve kinematic rotational problems;
- apply kinematic principles to plane motion;
- solve linear kinetic problems by applying Newton's laws of motion;
- solve kinetic rotational problems;
- apply principles of work, energy and power to analyze engineering problems, and;
- solve problems using impulse and momentum principles.

Verification

I verify that the content of this course outline is current.

Authoring Instructor — JAN 06 / 2006 — Date

I verify that this course outline has been reviewed.

Program Head/Chief Instructor — JAN 06 / 2006 — Date

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean — 2006/01/09 — Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

Instructors

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Learning Resources

Required: Applied Mechanics for Engineering Technology, 7th edition, by Keith M. Walker
Handouts

Equipment: Scientific calculator Model Sharp EL 520W

v Information for Students

Note: Please refer to BCIT policy number 5002, Student Regulations Policy, for additional information. Policies are available at http://www.bcit.ca/about/administration/policies.shtml.

Ethics: BCIT assumes that all students attending the institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam or project for all parties involved and/or expulsion from the course.

Assignments: Assignments, lab reports or projects must be done on an individual basis unless otherwise specified by the instructor. Late assignments, lab reports or projects will be devalued 10% per day late to a maximum of 3 days late.

Makeup Tests, Exams or Quizzes: There will be **no** makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for **documented** medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor **immediately**.

Attendance: The attendance policy as outlined in BCIT Policy 5002 will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

Illness: If you miss an evaluation such as an assignment, quiz, exam, or project, or you miss 3 or more consecutive days of class, you must provide the department with a BCIT Student Medical Certificate (available at http://www.bcit.ca/admission/downloads.shtml). You may be asked to complete the work that you missed or the course evaluation may be adjusted to reflect the missed component(s).

Attempts: Students must successfully complete a course within a maximum of three attempts. Students with two attempts in a single course must get written permission from the Associate Dean to attempt the course for the third time. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the program.

Advancement: Students who fail three or more courses in a term cannot advance to the next term and may be asked to discontinue from the program.

Course Outline Changes: The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

Schedule

Week Number	Date	Outcome/Material Covered	Reference/ Reading	Assig nment	Due Date
1		No Engineering Mechanics 2 lectures			
2	Jan 09	Types of motion, displacement, velocity and acceleration	Sec. 10.1- 10.4		
	Jan 10	Rectilinear motion with uniform acceleration	Sec. 10.5		
3	Jan 16	Projectiles	Sec. 10.6		
	Jan 17	Projectiles (cont.)	Sec. 10.6		
4	Jan 23	Angular displacement, velocity, acceleration	Sec. 11.1-11.4		
	Jan 24	Angular motion with uniform acceleration	Sec. 11.5		
5	Jan 30	Rectangular/angular motion relationship	Sec. 11.6		
	Jan 31	Epicyclic motion	Handouts		
6	Feb 06	Normal and tangential acceleration	Sec. 11.7		
	Feb 07	Relative motion	Sec. 12.1		
7	Feb 13	Mechanisms	Sec. 12.1 & Handouts		
	Feb 14	Mechanisms (cont.)	Sec. 12.1 & Handouts	#1	Feb 21
8	Feb 20	Midterm Test 1 review			
	Feb 21	Midterm Test 1			
9	Feb 27	Mechanisms (cont.)	Sec. 12.1 & Handouts		
	Feb 28	Mechanisms (cont.)	Sec. 12.1 & Handouts		
10	Mar 06	Rolling wheel	Sec. 12.2		
	Mar 07	Linear inertia: Dynamic equilibrium	Sec 13.1 – 13.3		
		Spring Break			

11	Mar 20	Linear inertia: Dynamic equilibrium (cont.)	Sec 13.1 – 13.3		
	Mar 21	Angular inertia: Dynamic equilibrium	Sec. 13.4-13.5		
12	Mar 27	Angular inertia: Dynamic equilibrium	Sec. 13.4-13.5		
	Mar 28	Plane motion	Sec. 13.6		
13	Apr 03	Work	Sec. 14.1 – 14.3		
	Apr 04	Potential and kinetic energy: Translational & Angular	Sec. 14.4 & 14.6		
14	Apr 10	Potential and kinetic energy: Translational & Angular (cont.)	Sec. 14.4 & 14.6		
	Apr 11	Conservation of energy: Translational & Angular	Sec. 14. 5 & 14.7		
15	Apr 18	Conservation of energy: Translational & Angular (cont.)	Sec. 14. 5 & 14.7	#2	Apr 25
16	Apr 24	Midterm Test 2 review			
	Apr 25	Midterm Test 2			
17	May 01	Conservation of energy: Plane motion	Sec. 14.8		
	May 02	Power and efficiency	Sec. 14.9		
18	May 08	Impulse and moment: Linear and angular	Sec. 15.1 – 15.2		
	May 9	Conservation of momentum	Sec. 15.3		
19	May 11	Exam review			
	May 17	Exam review			
20		Final Exam			