



A POLYTECHNIC INSTITUTION

School of Manufacturing, Electronics & Industrial Processes

Program: Mechanical Engineering

Options: Design, Design Computing

MECH 3445
Theory of Mechanisms

Start Date: January 04, 2006

End Date: March 10, 2006

Total Hours: 40 **Total Weeks:** 10

Term/Level: 4 **Course Credits:** 2.5

Hours/Week: 4 **Lecture:** 2 **Tutorial:** 2

Shop: **Seminar:** **Other:**

Prerequisites

MECH 3445 is not a prerequisite for any other courses

Course No.	Course Name
MECH 2241	Engineering Mechanics 2

v Course Description

The analysis of mechanisms aims at understanding the kinematics of machine parts. The course covers the topics of motion of mechanisms such as cams, rollers, linkages and quick-return mechanisms. Relationships among displacements, velocities and various components of acceleration are described and illustrated using vector polygons. Also included are graphical procedures to determine the location of the instantaneous centres of rotation as well as the motion analysis of linkages by the use of CAD software.

v Evaluation

Assignments	10%	Comments: • Relative weighting is subject to adjustment to suit specific purposes. Notice will be given should any change occur. • To pass the course a final exam mark of 40% and an overall mark of 50% must be achieved. • Cheating and plagiarism penalties will be treated as per BCIT Student Regulation Policy 5002. • Attendance of lectures and labs and completion of assignments is a requirement for attaining a grade in this course. • Scheduling of final examination is dependent on lab availability.
Mid-term test	40%	
Final Exam	50%	
TOTAL	100%	

v **Course Learning Outcomes/Competencies**

Upon successful completion, the student will be able to:

- explain the relationships among mechanism displacements, velocities and accelerations;
- explain the concepts of relative displacements, velocities and accelerations of mechanisms;
- solve vector polygons by graphical techniques;
- explain instantaneous centres of rotation, and;
- analyze motions of 4-bar linkages and quick-return mechanisms.

v **Verification**

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



Authoring Instructor

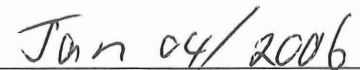


Date

I verify that this course outline has been reviewed.



Program Head/Chief Instructor

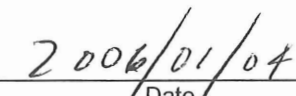


Date

I verify that this course outline complies with BCIT policy.



Dean/Associate Dean



Date

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

Instructors

Johan Fourie	Office Location: SW9 - 202	Office Phone: 604.453.4013
	Office Hrs.: Mon. 1:30-3:30	E-mail Address: jfourie@bcit.ca
	Wed. 1:30-4:30	
Kamal Tatley	Office Location: SW9 - 202	Office Phone: 604.432.8906
	Office Hrs.: By appointment	E-mail Address: ktatley@bcit.ca

v Learning Resources

Text: Lecture notes provided in class

Equipment: Scientific calculator

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	Date	Outcome/Material Covered
1	Jan 5	Section 1: Review
2	Jan 10	Section 2: Fundamentals
	Jan 12	Section 3: Mobility.
3	Jan 17	Section 4: Displacement analysis.
	Jan 19	Section 5: Velocity analysis: Location of instantaneous centres of rotation.
4	Jan 24	Section 5: Velocity analysis: Location of instantaneous centres of rotation (cont.)
	Jan 26	Section 5: Velocity analysis: Instantaneous centres of rotation method.
5	Jan 31	Section 5: Velocity analysis: Instantaneous centres of rotation method (cont.).
	Feb 2	Section 6: Acceleration analysis.
		There will be no lab sessions this week. The midterm test will be conducted on Wed., Feb. 1 at 14:30
6	Feb 7	Section 6: Acceleration analysis (cont.)
	Feb 9	Section 6: Acceleration analysis (cont.)
7	Feb 14	Section 6: Acceleration analysis (cont.)
	Feb 16	Section 7: Fixed joint four-bar mechanisms.
8	Feb 21	Section 7: Fixed joint four-bar mechanisms (cont.).
	Feb 23	Section 8: Cam and roller profile design.
9	Feb 28	Section 8: Cam and roller profile design (cont.).
	Mar 2	Review for final exam
10	Mar 7	Review for final exam
		There will be no lab sessions this week. The final exam will be conducted on Wed., Mar. 8 at 14:30