

ENGG*2340: KINEMATICS AND DYNAMICS
Winter 2018



1. INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: Alexander Bardelcik
Office: Richards 2501
Email: abardelc@uoguelph.ca
Office Hours: Thursday 2:00PM – 3:00PM

1.2 Teaching Assistants

GTA	Email	Office Hours
Caryn Vowles	cvowles@uoguelph.ca	
Claire Bourque	cbourque@uoguelph.ca	
Siyu Wu	swu09@uoguelph.ca	
Shaker Bukari	shaker@uoguelph.ca	
Tejas Mavani	tmavani@uoguelph.ca	

1.3 Lab Technicians

Technician	Email	Phone
SOE IT Help	soeithelp@uoguelph.ca	Ex. 54113

2. LEARNING RESOURCES

2.1 Course website

Course material, news, announcements, and grades will be regularly posted to the ENGG*2340 CourseLink site. You are responsible for checking the site regularly.

2.2 Required Resources

- W. L. Cleghorn, N. Dechev, (2nd ed) . Mechanics of Machines; OXFORD UNIVERSITY PRESS; New York;

2.3 Recommended Resources

- John J. Uicker, JR., Gordon R. Pennock, and Joseph E., Shigley (2010). Theory of machines and mechanisms, 4ed, OXFORD UNIVERSITY PRESS, New York.

2.4 Additional Resources

Lecture Information: Some of the lecture notes will be posted on the course website (CourseLink) throughout the semester. You will be granted access to the website when you register for the course.

Assignments: The assignments will be posted on CourseLink. The solutions will be posted after the due date of the assignment.

Lecture Information: Lectures are the main source of material which includes important discussions and worked examples that might not be found elsewhere. Other information related to this course will also be posted on CourseLink. Partially completed lecture notes will be made available and completed in lectures. You are responsible to either (1) print out a hard copy prior to lecture or (2) use the electronic copy to annotated in lecture using a laptop or tablet.

2.5 Communication and Email Policy

Please use lectures and tutorials as your main opportunity to ask questions about the course. Electronic communication should be limited to the course forum, however topics of a personal and confidential nature (e.g. marks) should be emailed to the instructor: abardelc@uoguelph.ca . Please note that all email communication must be made through your University of Guelph email account.

3. ASSESSMENT

3.1 Dates and Distribution

Assignments: 20%, 4 Marked Assignments

Midterm Exam: 40%, **Part 1/2:** Wed. Feb 14, regular lecture time and location
Part 2/2: Friday Feb. 16, regular lecture time and location

Final Exam: 40%, Friday April 20, 7-9 PM, Room TBA

3.2 Course Grading Policies

Academic Consideration: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Consideration of Religious Obligations:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

Passing Grade: Students must obtain a grade of 50% to pass this course

4. AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

The course will cover kinematic and dynamic analysis including graphical and analytical methods for kinematic analysis of space, mechanisms and elementary body motion in space, static and dynamic force analyses of mechanisms, gyroscopic forces, dynamics of reciprocating and rotating machinery, cam and gear mechanisms. Prerequisite(s): ENGG*2160

4.2 Course Aims

The course is aimed at introducing students the fundamentals of kinematics and dynamics analysis of mechanism.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Understand motion generated by different types mechanisms
2. Construct displacement, velocity and acceleration vector diagrams and solve them graphically and analytically
3. Apply the concepts of displacement, velocity, and acceleration to solve mechanical problems
4. Analyse both static and dynamic forces on machine components
5. Analyze the Design of cams
6. Understand the fundamentals of gears and gear trains

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning objectives	Assessment
1. Knowledge Base for Engineering	1	Assignment, Exams
2. Problem Analysis	2, 3, 4	Assignment, Exams
3. Investigation	3	Assignment, Exams
4. Design	5, 6	Assignment, Exams
5. Use of Engineering Tools	-	-
6. Individual and Teamwork	-	-
7. Communication	-	-
8. Professionalism	-	-
9. Impact of Engineering on Society and the Environment	-	-
10. Ethics and Equity	-	-
11. Environment, Society, Business, & Project Management	-	-
12. Life-Long Learning	-	-

4.5 Instructor’s Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on CourseLink but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for assessments.

4.6 Students’ Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

4.7 Relationships with other Courses & Labs

Previous and/or Current Courses:

ENGG*1210 (Engineering Mechanics I): The fundamental principles of Newtonian mechanics covered in ENGG*1210 are the basis for the various topics to be covered in ENGG*2340

Follow-on Courses:

ENGG*3280 (Machine Design): The design of various mechanical elements requires the knowledge of the kinematics and dynamics of the mechanisms in which these mechanical elements are used.

5. TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures:

Day	Time	Location
Monday	1:30PM – 2:20PM	ROZH 103
Wednesday	1:30PM – 2:20PM	ROZH 103
Friday	1:30PM – 2:20PM	ROZH 103

Labs:

Day	Time	Location	Section(s)
Tuesday	8:30AM – 11:20AM	THRN 1313	01
Friday	8:30AM – 11:20AM	THRN 1313	02
Thursday	8:30AM – 11:20AM	THRN 1313	03
Monday	8:30AM – 11:20AM	THRN 1313	04
Wednesday	8:30AM – 11:20AM	THRN 1313	05
Wednesday	2:30PM – 5:20PM	THRN 1313	06

5.2 Lecture Schedule

Lecture Topics	References	Learning Objectives
Introduction	Chapter 1	1, 2
Mechanics of Rigid Bodies & Planar Mechanisms	Chapter 2	1, 2, 3, 7
Graphical Kinematic Analysis of Planar Mechanisms	Chapter 3	2, 3, 7
Analytical Kinematic Analysis of Planar Mechanisms	Chapter 4	2, 3, 5, 7
Gears & Gear Trains	Chapter 5/6	3, 6
Cams	Chapter 7	3, 5
Force Analysis of Planar Mechanisms	Chapter 8/9	3, 4, 5

5.3 Lab Schedule

Week #	Topic
1	No Labs
2	Chapter 2 Tutorial
3	Chapter 2 Tutorial
4	Chapter 3 Tutorial
5	Chapter 3 Tutorial
6	No Labs
7	No Labs (Winter Break)
8	Chapter 4 Tutorial
9	Chapter 4 Tutorial
10	Chapter 8/9 Tutorial
11	Chapter 5/6 Tutorial
12	Chapter 7 Tutorial
13	Make-up Tutorial

5.4 Important Dates

Monday, January 8: First day of classes
 Monday February 19: Winter Break (no classes)
 Friday, March 9: drop date - 40th class
 Monday, April 6: last day of class
 Monday, April 20: Final exam for this course

6. LAB SAFETY

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

7. ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

7.1 Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:

<http://www.academicintegrity.uoguelph.ca>

Please also review the section on Academic Misconduct in your [Engineering Program Guide](#).

The School of Engineering has adopted a Code of Ethics that can be found at:

<http://www.uoguelph.ca/engineering/undergrad-counselling-ethics>

8. ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: <http://www.uoguelph.ca/csd/>

9. RECORDING OF MATERIALS

Presentations which are made in relation to course work-including lectures-cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

10. RESOURCES

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>