

PHYS 2310 Mechanics

University of Guelph

Department of Physics

Winter 2018

Class Schedule

Monday, Wednesday and Friday from 8:30 a.m to 9:20 a.m

Lecture Room

[CRSC](#), Room 117

Tutorials

Thursdays 07:00PM - 09:50PM

[MCKN](#), Room 228

Instructor

Liliana Caballero

email: ocaballe@uoguelph.ca

Office: MacN 433D

Office hours

Monday from 10:00 a.m to 12:00 p.m (or by appointment).

Teaching Assistant

Brent Wilhelm, office hours: Thursdays 6:00 to 7:00 pm in MacN 318.

email: wilhelmb@uoguelph.ca

Pre-requisites:

The course also relies on a working knowledge of basic mechanics concepts such as 2-D kinematics, forces, Newton's laws, circular motion, energy, conservation of energy, momentum, collisions, rotational motion, rotational energy, moment of inertia, torque, angular momentum, and simple harmonic motion. I will also assume that students have mastered mathematical concepts such as derivatives, integrals, differential equations, and have been introduced to complex numbers.

Textbook

Classical Mechanics, John R. Taylor, University Science Books, 2005.

Recommended texts

T. Thornton and J. Marion, Classical Dynamics of Particles and Systems, Cengage Learning, 2003.

The University of Guelph Library has a wonderful resource of e-books at [Scholars Portal books](#).

You can login in with your University credentials and have access to countless books with problems to practice. As an example, you will find:

Greiner, Walter, Classical Mechanics: systems of particles and Hamiltonian dynamics, New York: Springer, 2010.

Strauch, Dieter, Classical Mechanics: an introduction, Berlin: Springer, 2008.

Course description

This course will place the concepts of introductory mechanics in a formal setting, as well as expanding on topics of classical mechanics. Some of the topics will cover are: two and three dimensional motion, damped and forced harmonic oscillator, gravitation and orbital motion, special relativity, noninertial reference frames, and rigid body dynamics.

Lecture Content

- **Review of Newton's Laws.** Reference frame, multi-particle systems, coordinate systems.
- **Air resistance.** Linear air resistance, trajectory.
- **Conservation laws.** Momentum, angular momentum, center of mass, torque, moment of inertia, energy.
- **Oscillations.** Harmonic motion, damped oscillations.
- **Central forces.** Relative coordinates, equation of motion, Kepler's laws.
- **Noninertial frames.** Angular velocity, centrifugal force, Coriolis force.
- **Rigid bodies.** Rotation about a fixed axis, inertia tensor, Euler's equations.
- **Special relativity.** Galilean relativity, postulates of special relativity, time dilation, length contraction, Lorentz transformation, four-vectors, four-momentum, energy.

Grading

There will be two midterms and one final exam. They will be closed-book exams.

We will also have weekly homework. The assignments should be returned a week after they are posted. Later assignments will not be accepted unless special arrangements are made ahead of time. The Teaching Assistant will be responsible for marking the homework assignments. Note that although you are permitted to discuss the homework problems with your classmates, you must to

write up the solutions yourself. At this stage of your career you should develop your answers independently of anyone else. Copying will not be tolerated. The homework problems are exercises that give you practice, and keep you up-to-date with the course material. However, you need to work on more problems on your own in order to master the content of the course.

The final mark of the course will be calculated with the following scheme. No other marking schemes will be considered.

	Tutorial work	Assignments	First midterm	Second midterm	Final exam
Scheme	5%	10%	25 %	30 %	30 %

First midterm date and time: Thursday February 8th 2018 from 7:00 p.m to 9:00 p.m, place MCKN Room 228.

Second midterm date and time: Thursday March 15th 2018 from 7:00 p.m to 9:00 p.m, place MCKN Room 228.

Final exam date and time: Wednesday April 18th from 14:30 a.m to 16:30 a.m. Place TBA.

During the tutorials, our TA will answer questions and work with you on problems brought by you to the session. He will hand out one problem for you to work in group during the tutorial. Groups can be of 4 students maximum. One copy of the solution should be signed by all members of the group and handed in at the end of the tutorial.

Assignments are due every Friday at the beginning of the lecture.

Drop date

The last date to drop one-semester courses, without academic penalty, is March 9, 2018. For regulations and procedures for Dropping Courses, see the [Academic Calendar](#).

Course Policy regarding use of electronic devices and recording of lectures

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the academic calendar for information on regulations and procedures for

[Academic Consideration](#)

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 or faculty advisor.

The Academic Misconduct Policy is detailed in the [Undergraduate Calendar](#)

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 or 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 university website on [Accessibility](#).

Course Evaluation Information

Please refer to the [Course and Instructor Evaluation Website](#)