

Carleton University Physics Department

PHYS 3802 - Advanced Dynamics

Fall 2023 Course Outline

Instructor: Prof. Daniel Stolarski (he/him)

Email: stolar@physics.carleton.ca

Office: HP3320

Schedule: Tuesday & Thursday, 11:35 A.M. - 12:55 P.M.

Course delivery: The course will consist of synchronous meetings that will follow an in person model where we will gather in our classroom. I will lead a discussion of the course material in a lecture style following the chalk-and-talk. Students are encouraged to ask questions and engage with the material during the lecture. These sessions are intended to be the primary method of course delivery and it is highly recommended that you attend these sessions except in the case of an emergency.

Lecture recording: I will be recording the lectures in order to accommodate emergencies, illness, or other reasons that students may have to miss a lecture. However, recorded lectures will not be posted for general use. Throughout the term, each student can request access to a recorded lecture up to two times without giving any reason. This accommodation is intended to give flexibility to students who cannot attend lecture for reasons beyond their control. It is not intended to act as a substitute for primary instruction. If further accommodation is required, please make an appointment with Professor Stolarski.

Calendar Description: Equations of motion for a single particle. Oscillatory Motion. Lagrangian and Hamiltonian formulations of mechanics. Central force motion. Motion of systems of particles and of rigid bodies.

Prerequisites: PHYS 2202, PHYS 2604, and MATH 2004, or permission of the Department.

Course webpage: See Brightspace

Teaching Assistant: Mohamed Elbeltagi (he/him), MohamedElbeltagi@cmail.carleton.ca.

Student Hours¹: Prof. Stolarski will have student hours on **Thursdays 3 – 4 PM** in HP 3320. He is also available at other times by email appointment.

Mohamed will have student hours on **Wednesdays 6 – 7 PM** on zoom in meeting 945 7045 3522. Note that you must be logged in to a Carleton zoom account to access this room. If you would like an in person meeting with Mohamed, please contact him by email.

You can ask either Mohamed or Prof. Stolarski questions about the material or assignment problems, but for questions about assignment marking please contact Mohamed.

Required Textbook: Classical Dynamics of Particles and Systems [Fifth Edition] S. T. Thornton and J. B. Marion, Brooks/Cole, Cengage Learning - 2008.

¹Formerly called office hours.

Inclusive teaching statement:

Science is for everyone. I am committed to fostering an environment for learning that is inclusive for everyone regardless of gender identity, gender expression, sex, sexual orientation, race, ethnicity, ability, age, class, etc. All students in the class, the instructor, and any guests should be treated with respect during all interactions. It is my hope that our class will support diversity of experience, thought, and perspective. I will continually strive to create inclusive learning environments and would therefore appreciate your support and feedback. I welcome emails or in-person communications to let me know your preferred name or pronoun. Please see the Faculty of Science Equity, Diversity, and Inclusion (EDI) statement.

Evaluation:

The marks for this course will be assigned as:

- Assignments - 40%
- Midterm - 25%
- Final - 35%

Assignments:

Assignments will be given weekly. They will be posted on and submitted to Brightspace. Students can hand write their solutions and scan or photograph them to upload to the website. **Please upload a single pdf file.**

Working through problems is an essential part of developing a deep understanding of the subject as this material is heavily math based. **Students are permitted to discuss concepts and strategies related to solving the homework assignments; however, the work handed in must be their own.** Solutions showing significant overlap may have the mark divided by the number of people who provide that solution.

Viewing or searching for solutions in any form before your assignment is submitted is forbidden and will be considered an academic offence. This includes solution manuals, worked problems on the internet, solutions written by other students, and solutions provided by course instructors in previous years.

Late assignments will not be accepted without a legitimate reason, such as illness.

Students that are having significant difficulties with the material are encouraged schedule an appointment for student hours. Please email me with sufficient notice as last minute requests will not be accommodated.

Midterm Exam:

There will be an 80-minute midterm administered in class on **October 19**. You will be given a formula sheet which will be posted on Brightspace in advance. You may not use a calculator during the exam. In the case of an exam deferral for legitimate reasons, please inform me within 24 hours

of the regularly scheduled midterm to arrange a time to write the deferred exam.

Final Exam:

The final exam will be held in person during the final exam period in December, and will be 3 hours long. As with the midterm, a formula sheet will be provided and posted in advance, and you may not use a calculator.

In the event that a deferred exam is necessary, that exam will replace only the final exam component of the course mark, and will only be granted if adequate term work has been completed. Inadequate term work constitutes earning less than 15 of the 65 possible term marks.

Course Schedule

Below is a rough schedule of the course, but it may change to fit the pace needed.

Dates	Textbook	Topic Description
Sep 7, 12	Chap. 1 (not 1.17)	Introduction and Math Preliminaries
Sep 14, 19, 21	Chap. 2	Newtonian Mechanics – Single Particle
Sep 26, 28	Chap. 6	Calculus of Variations
Oct 3, 5, 10, 12, 17	Chap. 7 (not 7.12-13)	Hamilton's Principle
Oct 19		Midterm
Oct 24 & 26	Fall Break	No classes
Oct 31, Nov 2	Chap. 8	Central Force Motion
Nov 7, 9	Chap. 3	Oscillations
Nov 14, 16	Chap. 12	Coupled Oscillations
Nov 21, 23, 28	Chap. 9	System of Particles
Nov 30, Dec 5	Chap. 11	Rigid Bodies
Dec 7	Final class	Review

Mental Health:

Taking classes at university can be difficult and stressful. If you are struggling with your mental health, please do not hesitate to reach out. I can direct you to resources that might help. Remember that Carleton also offers an array of mental health and well-being resources, which can be found here.

Grade Definition:

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	A = 85-89	A- = 80-84
B+ = 77-79	B = 73-76	B- = 70-72
C+ = 67-69	C = 63-66	C- = 60-62
D+ = 57-59	D = 53-56	D- = 50-52
F < 50	WDN = Withdrawn from the course	
ABS = Student absent from final exam	DEF = Deferred	

Academic Accommodations, Regulations, Plagiarism, Etc.

Carleton University is committed to providing access to the educational experience in order to promote academic accessibility for all individuals. Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University. More information can be found here.

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here.

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre website.

Addressing Human Rights Concerns

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the Department of Equity and Inclusive Communities at equity@carleton.ca.

Religious Obligations

Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the Student Guide to Academic Accommodation.

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support/>

Accommodations for Missed Work

Carleton recognizes that these are unprecedented times during the COVID-19 pandemic, and that students may be experiencing greater stress and other life factors that are not in their control. As a result, Carleton has put into place a protocol for students to apply for accommodations using a self-declaration form in the event of missed work. The form can be found at: <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>

For Pregnancy

Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the Student Guide to Academic Accommodation.

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the Senate Policy on Accommodation for Student Activities.

Academic Integrity

Academic misconduct undermines the values of honesty, trust, respect, fairness, and responsibility that we expect in this class. Carleton University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university's collective commitments to fairness, equity, and integrity. (adapted from Carleton University's Academic Integrity Policy, 2021). Examples of actions that do not adhere to Carleton's Academic Integrity Policy include:

- Plagiarism
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignment and exams

Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy. The Policy is strictly enforced and is binding on all students. For more information, please see Carleton's academic integrity page.

Course Copyright

Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copyright protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s). Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

Assistance for Students

Academic and Career Development Services

Writing Services

Peer Assisted Study Sessions (PASS)

Science Student Success Centre

Important Dates:

<https://calendar.carleton.ca/academicyear/>

<https://carleton.ca/registrar/registration/dates/academic-dates/>