



### COURSE OUTLINE

1. **Course:** PHYS 343, Classical Mechanics II - Winter 2021

Lecture 01: TR 12:30 - 13:45 - Online

Instructor	Email	Phone	Office	Hours
Dr. Jeroen Stil	jstil@ucalgary.ca	403 220-8015	SB 519	Wednesdays, 3pm - 4pm

**Online Delivery Details:**

This course is being offered online in real-time via scheduled meeting times, you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor’s permission.

This course has a registrar scheduled, synchronous final exam. The writing time is 2 hours + 50% buffer time.

Lectures will be delivered synchronously through Zoom, allowing students to ask questions during the lecture. Cloud recordings of the lectures will be posted on D2L. Lecture notes will be posted on D2L.

**Course Site:**

D2L: PHYS 343 L01-(Winter 2021)-Classical Mechanics II

**Note:** Students must use their U of C account for all course correspondence.

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

**Prerequisite(s):**

Physics 341.

3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %
Midterm exam take home exam due February 25, 23:59	25
Final exam Synchronous exam scheduled by the registrar	40
Assignments To be announced by email	35

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	93 %	85 %	80 %	75%	70%	65 %	60 %	55%	50%	45 %	40 %

Grading of individual course components depends in part on completeness, clarity and conciseness of the solution provided. Illegible responses or responses that are not offered in a logical, structured way will receive a lower or even a zero grade.

The percentage grades required to earn a particular letter grade for the course are strict minimum thresholds applied to the weighted mean percentage course grade. There is no rounding. For example, a mean percentage grade of 79.99% for the course translates into a letter grade B+.

This course will have a final exam that will be scheduled by the Registrar. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The final exam will be administered using an on-line platform. Per section [G.5](#) of the online Academic Calendar, timed final exams administered using an on-line platform, such as D2L, will be available on the platform. **Due to the scheduling of the final exams, the additional time will be added to the end of the registrar scheduled synchronous exam to support students. This way, your exam schedule accurately reflects the start time of the exam for any synchronous exams. E.g. If a synchronous exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the end time of the synchronous exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm. - updated April 6, 2021**

#### 4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

If you miss any component of the course, send an email to the instructor at the earliest possible opportunity in order to work out a suitable accommodation. Missed components of course work receive a zero grade by default.

Students are responsible for accurate and complete personal information in TopHat. This includes first name, last name, and UCID. Missing information can result in a missing (zero) grade for assignments.

#### 5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

#### 6. Course Materials:

Required Textbook(s):

John R. Taylor, *Classical Mechanics*: University Science Books ([www.uscibooks.com](http://www.uscibooks.com)).

The text book for PHYS 343 is the same as for PHYS 341. Scanned lecture notes will be posted on D2L.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

## 7. Examination Policy:

Exams may draw from all components of the course, including assignments, course notes, and set sections of the text book.

The midterm exam will be administered as a "take-home exam". Students will receive the exam 24 hours in advance and they must return their answers through their dropbox in D2L by the due date. Take home exams are open book exams. A formula sheet will not be provided. Students may be asked to discuss a topic related to the course in a few paragraphs as part of the exam. In that case, the marking will be based on the level of insight in the topic displayed in the text provided.

The final exam will be written in a fixed time frame scheduled by the registrar.

Students should understand that discussing a take home exam with other students is a form of academic misconduct.

PHYS 343 teaches methods to solve a broad class of physics problems. Exams can contain applications that were not explicitly covered for the purpose of testing your ability to apply the problem solving methodology taught in this course.

### **All exams are cumulative.**

Students should also read the Calendar, [Section G](#), on Examinations.

## 8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course

## 9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

Grading depends in part on clarity and conciseness of the answers provided. This includes the structure and logic progression of solutions. No points are awarded for unclear or illegible answers. No points will be subtracted for minor grammatical, style, or spelling errors.

## 10. Human Studies Statement:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

## 11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

## 12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU

Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).

- b. **SU Wellness Services:** For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>)
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)  
Student Academic Misconduct [Policy](#) and [Procedure](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Physics & Astronomy, Dr. David Feder by email [phas.ahugrd@ucalgary.ca](mailto:phas.ahugrd@ucalgary.ca) or phone 403-220-8127. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](#), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

### 1. If you need help.

The challenges that students face taking on-line courses are widely recognized in the university. Adaptations are made as we become aware of the impact of certain aspects of course design. Students who find that this course

has an unintended negative impact because of their situation, are encouraged to contact the instructor to explore possible solutions.

Part of the challenge of PHYS 343 is amount of material that must be covered in a single term. Time to practice problems during lectures is extremely limited. If you need clarification on something, come see the instructor immediately. Do not wait until the last moment.

Detailed course information will be posted on D2L. Check D2L for important dates like due dates for assignments, midterm information, etc.

**Email to the instructor is strictly for issues related to the organization of the course, or to book an appointment. Questions about course material cannot be effectively answered by email. Do not send scanned notes by email.**

Questions about course material can be asked immediately after class, during office hours, or by appointment. The instructor will make an effort to stay after lectures until all questions have been answered.

## **2. TopHat.**

We will use TopHat in this course for assignments. TopHat is available free of charge for registered students. The instructor will assume that you are familiar with TopHat. If you have any questions or problems, please ask the instructor.

**The course ID for TopHat is PHYS343W2021. The join code is 224863.**

**You must have registered for the course in TopHat by Friday, January 22**

## **4. Syllabus**

Topics to be covered in this course include:

### Chapter 9. Noninertial reference systems (not including: tides)

1. Accelerated coordinate systems
2. Angular velocity vector
3. Time derivatives in a rotating frame
4. Newton's second law in a rotating frame
5. Centrifugal force
6. Coriolis force

### Chapter 6. Calculus of variations

1. Euler-Lagrange equation
2. Generalized coordinates
3. Lagrangian defined in generalized coordinates

### Chapter 7. Lagrange's equations

1. Lagrange's Equations for unconstrained motion
2. Constrained systems
3. Degrees of freedom
4. Lagrange's equations with constraints
5. Examples of Lagrange's equations

### Chapter 8. Two-body Central-Force problems

1. Centre of mass and relative coordinates
2. Reduced mass
3. Equations of motion for two-body central force problem
4. Orbital motion
5. Kepler orbits, Kepler's laws
6. Unbound Kepler orbits
7. Changes of orbit

### Chapter 10. Rotational Motion of Rigid Bodies

1. Total angular momentum
2. Rotation about a fixed axis
3. Products of inertia
4. The inertia tensor
5. Principal axes of inertia
6. Euler's equations

### Chapter 13. Hamilton's Equations (time permitting)

1. Hamiltonian function
2. Hamilton's equations
3. Ignorable Coordinates

### **Course Outcomes:**

- know how to compute mechanical properties of multi-particle systems
- able to analyze collisions in lab and centre-of mass frames
- recognize the concept of a rigid body and its properties
- able to calculate moments of inertia
- apply Newton's 2nd law for rotating systems
- understand general methods in calculus of variations
- understand and use Lagrangian methods to derive equations of motion
- understand and use Hamiltonian methods to derive equations of motion

Electronically Approved - Apr 08 2021 09:15

---

**Department Approval**