



## COURSE OUTLINE

### 1. **Course:** PHYS 221, Mechanics - Spring 2023

Lecture 01 : MF 12:00 - 13:50 in ENG 60 and W 12:00 - 13:50 in ENG 60 and 14:00 - 15:50 in ENG 60

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr. Ziad Abusara	zabusara@ucalgary.ca	Contact Via Email	SB 646	Friday 3:00 PM - 5:00 PM

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

#### **In Person Delivery Details:**

Lectures, labs, and exams for PHYS 221 will be in-person. Attendance at lectures is highly recommended. Attendance at labs and exams is required.

Questions about course logistics should be emailed to the course instructor. Please start your email subject with the tag [PHYS 221] and allow 48 hours for a response.

#### **Re-Entry Protocol for Labs and Classrooms:**

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

#### **Course Site:**

D2L: PHYS 211/221 L01 - (Spring 2023) - Mechanics

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

Technical solutions to homework questions will not be provided by email. Students are expected to ask these types of questions in person.

#### **Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Physics and Astronomy EDI Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Associate Head EDI, Claudia Gomes da Rocha ([claudia.gomesdarocho@ucalgary.ca](mailto:claudia.gomesdarocho@ucalgary.ca))

### 2. **Requisites:**

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

#### **Prerequisite(s):**

Physics 30; and Mathematics 30-1 or Mathematics 2 (offered by Continuing Education); and Mathematics 31.

**Antirequisite(s):**

Credit for more than one of Physics 211, 221, or 227 will not be allowed.

**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:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Quizzes [5] <sup>1</sup>	30%	Ongoing		
Laboratories [9] <sup>2</sup>	20%	Ongoing		
Assignments [5] <sup>3</sup>	10%	Ongoing		
In class participation (TOPHAT) <sup>4</sup>	10%	Ongoing		
Registrar Scheduled Final Exam <sup>5</sup>	30%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

<sup>1</sup> 5 quizzes will be conducted IN-PERSON and in your regular Lecture Section On Wednesdays, May 10, May 17, May 24, May 31, and June 7. **\*\*\*THE LOWEST QUIZ GRADE WILL BE DROPPED\*\*\***

<sup>2</sup> 9 Labs. **\*\*\*THE LOWEST LAB GRADE WILL BE DROPPED\*\*\***

<sup>3</sup> 5 assignments are due on Mondays at 11:59 pm.

<sup>4</sup> Top Hat percentage grades will be multiplied by 1.25 and capped at 100%, so any score at or above 80% will result in a 100% grade on this component.

<sup>5</sup> IN-PERSON 2 hrs. closed-book exam. Final exam is scheduled by the Office of the Registrar. Information about date/time of the final exam will be given to students by the last week of classes. Students MUST BRING a non-communicating CALCULATOR, of any kind, including graphing or programmable calculators. See the EXAM POLICY section for further details about the final exam.

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
<b>Minimum % Required</b>	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [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 University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

**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 or in-person 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, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

**Missed Labs**

Should technical issues, illness, or similar circumstances arise, the lowest lab grade will be eliminated automatically to make allowances for such situations. There will be no further accommodations or exceptions granted beyond this.

### **Missed Quiz**

In case of technical issues, illness, or any similar circumstances, the lowest quiz grade will be automatically excluded as a way of accommodating such situations. No additional accommodations or exceptions will be provided beyond this.

### **Missed/Late Homework**

Homework solutions will be released immediately after the homework is due; consequently, no extensions will be granted.

### **Missed Top Hat Questions**

The Top Hat component scores will be multiplied by 1.25 to account for any technical problems, sickness, etc. No further accommodations or exceptions will be made.

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

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

## **6. Course Materials:**

Required Textbook(s):

Randall D. Knight, *Physics for Scientists and Engineers: A Strategic Approach, (4th or 5th ed.)*: Pearson.

A TopHat license (free for UCalgary students at [tophat.com](http://tophat.com)) and a response device such as a phone, laptop or tablet is required. Lectures 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 are closed-book with a formula sheet provided. Calculators are allowed, but must not be able to connect to the internet or other devices. Cell phones, music players, and other electronic devices are not allowed.

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.

## **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 their [website](#) or call [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 ([syva@ucalgary.ca](mailto:syva@ucalgary.ca)) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.
- e. **Student Union Information:** [SU contact](#), Email your SU Science Reps: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca), [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca),
- f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Dr. David Feder by email [phas.ahugrd@ucalgary.ca](mailto:phas.ahugrd@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- g. **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](#)  
[Faculty of Science Academic Misconduct Process](#)  
[Research Integrity Policy](#)

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

- h. **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.
- i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). 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.
- j. **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.

**TABLE 1: LECTURE SCHEDULE**

Week	Dates	Topics
1	May 3 - 5	Intro classes
		1.8 Units and significant figures
		3.1 Scalars and vectors
		3.2 Using vectors
		3.3 Coordinate systems and vector components
		3.4 Unit vectors and vector algebra (dot and cross product)
		1.1 Motion diagrams
		1.2 Models and modelling
		1.3 Position, Time, and displacement
		1.4 Velocity
		1.5. Linear acceleration
		1.6 Motion in One Dimension
		1.7 Solving Problems in Physics
		2.1 Uniform motion
		2.2 Instantaneous velocity
		2.3 Finding position from velocity
		2.4 Motion with constant acceleration
		2.5 Free fall
2	May 8 - 12	2.6 Motion on an inclined plane
		2.7 Instantaneous acceleration
		4.1 Motion in two dimensions
		We do not cover 4.3 Relative motion
<b>***Quiz 1 Wednesday, May 10<sup>th</sup>, at lecture time***</b>		
		4.2 Projectile Motion
		4.4 Uniform circular motion
		4.5 Centripetal acceleration
		4.6 Non-uniform circular motion
		5.1 Force
		5.2 A short catalog of forces
		5.3 Identifying forces
		5.4 What do forces do?
3	May 15 - 19	5.5 Newton's Second Law
		5.6 Newton's First Law
		5.7 Free-Body Diagrams
		Problem-solving

<b>***Quiz 2 Wednesday, May 17<sup>th</sup>, at lecture time***</b>		
		6.1 Equilibrium model
		6.2 Using Newton's Second Law
		6.3 Mass, weight, and Gravity
		6.4 Friction
		6.5 Drag
		6.6 More examples of Newton's 2nd Law
		7.1 Interacting Objects
		7.2 Analyzing Interacting Objects
		7.3 Newton's Third Law
May 22 <sup>nd</sup> Victoria Day. No lectures. University is closed		
<b>***Quiz 3 Wednesday, May 24<sup>th</sup>, at lecture time***</b>		
4	May 24 - 26	7.4 Ropes and pulleys
		7.5 Examples of interacting-object problems
		8.2 Uniform circular motion
		8.3 Circular orbits
		8.4 "Why does Water Stay in the Bucket" subsection
		8.5 Nonuniform circular motion
		12.1 Rotational motion
5	May 29 June 2	12.5 Torque
		12.10 The vector description of rotational motion
		12.8 Static equilibrium
		9.1 Energy overview
<b>***Quiz 4 Wednesday, May 31<sup>st</sup>, at lecture time***</b>		
		9.2 Work and kinetic energy for a single particle
		9.3 Calculating the work done
		9.4 Restoring forces and the work done by a spring
		9.5 Dissipative forces and thermal energy
		9.6 Power
		10.1 Potential energy
		10.2 Gravitational potential energy
6	June 5 - 9	10.3 Elastic potential energy
		10.4 Conservation of energy
		10.5 Energy diagrams
		10.6 Force and potential energy
<b>***Quiz 5 Wednesday, June 7<sup>th</sup>, at lecture time***</b>		
		10.7. Conservative and non-conservative forces
		10.8 The energy principle revisited
		11.1 Momentum and Impulse
		11.2 Conservation of momentum
7	June 12 - 14	11.3 Collisions
		11.4 Explosions
		Review and Problem-Solving

**TABLE 2: LABORATORY SCHEDULE**

Dates	Labatorial	LAB TOPIC
May 4	--	NO LABATORIAL
May 9	Labatorial 1	Motion Diagrams
May 11	Labatorial 2	Motion on an Inclined Plane
May 16	Labatorial 3	Projectile Motion
May 18	Labatorial 4	Circular Motion
May 23	--	NO LABATORIAL
May 25	--	NO LABATORIAL
May 30	Labatorial 5	Newton's Second Law (Atwood Machine)
June 1	Labatorial 6	Static Equilibrium
June 6	Labatorial 7	Work-Kinetic Energy Theorem
June 8	Labatorial 8	Conservation of Energy
June 13	Labatorial 9	Exploring Concepts of Momentum
June 15		NO LABATORIAL

**TABLE 3: ASSIGNMENT SCHEDULE**

<b>Assignment</b>	<b>Available</b>	<b>Due Date</b>
Assignment 1	Wednesday, May 3, 2023	Monday, May 8, 2023
Assignment 1	Monday, May 8, 2023	Monday, May 15, 2023
Assignment 3	Monday, May 15, 2023	Monday, May 22, 2023
Assignment 4	Monday, May 22, 2023	Monday, May 29, 2023
Assignment 5	Monday, June 5, 2023	Monday, June 12, 2023

**Course Outcomes:**

- Upon completion of the course students should be able to: apply vector notation and algebra in kinematics and dynamics problems in one and two dimensions;
- Develop mathematical models of physical situations;
- Exploit and use principle of conservation of energy and momentum;
- Carry out calculations symbolically (in terms of physical variables) and numerically (using appropriate values and their units);
- Obtain and analyze experimental data, and relate them to physical laws governing kinematics and dynamics;
- Communicate and collaborate effectively within a team environment.

Electronically Approved - May 01 2023 16:35

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**Department Approval**