UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Physics & Astronomy
Science B 605
403 220-5385
phasoffice@ucalgary.ca

COURSE OUTLINE

1. **Course:** PHYS 221, Mechanics - Fall 2019

Lecture 01: MWF 12:00 - 12:50 in EDC 179

Instructor	Email	Phone	Office	Hours
Dr. Anna Harlick	anna.harlick@ucalgary.ca	403 220-8648	SB 533	MWF 1:00 pm - 2:00 pm

Lecture 02: MWF 15:00 - 15:50 in ENG 60

Instructor	Email	Phone	Office	Hours
Dr. Sean Stotyn	sean.stotyn@ucalgary.ca	403 210-7594	SA 101B	Mon & Wed 1:00-2:00

Lecture 03: TR 12:30 - 13:45 in ST 027A

Instructor	Email	Phone	Office	Hours
Dr Rachid Ouyed	rouyed@ucalgary.ca	403 220-8418	SB 515	Tuesdays and Thursdays: 14:00-15:00 (Room: SB 512)

Coordinator(s)

Name	Email	Phone	Office	Hours
Dr. Marzena Kastyak-Ibrahim	phascrscoord@ucalgary.ca	403 220-8073	SB 527A	Fridays 10:00-11:00

When communicating with the instructors and course coordinator please allow 2 work days for a response to messages and e-mail inquires.

Please note: PHYS 221 L03 is offered in French and is subject to a different (French) course outline than this one. If you are enrolled in the French section please see its D2L page (PHYS 221 L03/ B34 (Automne 2019) – Mécanique) for further details.

Course Site:

D2L: Lecture site: PHYS 211 L01-L03/ PHYS 221 L01-L02 - (Fall 2019) - Mechanics

Lab site: PHYS 211/221 B01-B46 - (Fall 2019) – Laboratorials

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):
A grade of 70 per cent or higher in Physics 30; 50 per cent or higher in Mathematics 31; and 70 per cent or higher in Mathematics 30-1 or a grade of "B-" or 70 per cent or better in Mathematics 2 (offered by Continuing Education).

Antirequisite(s):
Credit for Physics 221 and 211 will not be allowed. Students may not register in, or have credit for, Physics 221 if they have previous credit for Physics 227 or are concurrently enrolled in Physics 227.

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 %	Date
Assignments (12)	10	Due on Wednesdays at 11:59 pm
Labatorials	15	Start the week of Sep 16th, 2019
Pre-reading Quizzes	3	Due on Sundays at 11:59 pm
In-class TopHat	2	
In-class Quiz	5	Sep 23th, 2019 during regular class time
Midterms (2)	30	15% each (Mon Oct 7th & Mon Nov 4th, 2019, 7:00-9:00 pm, rooms to be posted on D2L)
Final examination	35	To be scheduled by the registrar office

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	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

This course has a registrar scheduled final exam.

As your term work items (labs, assignments and exams) accumulate, the marks for students will be posted on D2L. The marks that appear on this website are the marks that will be used to determine each student's overall course grade. Check your marks frequently. **Missing or incorrectly posted term work marks should be reported to your TA (lab marks) or the course coordinator as soon as they are noticed.** You should be prepared to produce the original work to verify the requested correction.

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

In the event that a student misses the midterm or any course work due to illness, supporting documentation, such as a medical note or a statutory declaration will be required (see Section M.1; for more information regarding the use of statuary declaration/medical notes, see FAQ). Absences must be reported within 48 hrs.

The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in Section 3.6. It is the student's responsibility to familiarize themselves with these regulations. See also Section E.3 of the University Calendar.

Missed In-class Quiz

Students who miss the In-class quiz because of ill health, or for other valid reasons, will be granted an excused absence by the Course Coordinator provided that alleged problems are supported in writing e.g. statutory declaration, note from a physician, counselor, etc. In the case of a missed In-class quiz due to illness, students must notify the Course Coordinator by submitting the form: Missed quiz (Folder: Missed course components) to the D2L Dropbox: Missed quiz the day after the In-class quiz, at the latest. Once the claim is substantiated, the weight of the In-class quiz will be shifted to the final exam.

Missed Midterm

Students who miss the Midterm because of ill health, or for other valid reasons, will be granted an excused absence by the Course Coordinator provided that alleged problems are supported in writing e.g. statutory declaration, note from a physician, counselor, etc. In the case of a missed Midterm due to illness, students must notify the Course Coordinator by submitting the form: Missed midterm (Folder: Missed course components) to the D2L Dropbox: Missed midterm the day after the In-class quiz, at the latest. Once the claim is substantiated, the weight of the Midterm will be shifted to the final exam.

Missed Labatorials

Please fill in the Make-up lab request form (should be saved as an Excel file) posted on D2L (Folder: Missed course components) and submit it to the Dropbox: Missed Labs. Priority for scheduling a make-up lab will be given to students who missed a lab for a legitimate reason and provided supporting documents (e.g. statutory declaration, note from a physician, counselor, etc.). Requests submitted more than **7 days** after the date of the missed lab will not be considered. Students are NOT allowed to come to a lab section different than their own. Make-ups for all labs will be scheduled during the 13th week of classes (on Friday Dec 6, 2019). You can make up one lab. In case of special circumstances, please contact the Course Coordinator (preferably come for office hours to discuss the issue).

Missed assignments

Please note that the assignments are open for two weeks and you should plan to complete a given assignment before another one opens (a week later). The extended time the assignments are open is to accommodate for any other circumstances or time conflicts you might have. If you have special circumstances please contact the Course Coordinator.

Missed TopHat questions

The final TopHat grade is adjusted at the end of the term in order to accommodate for any TopHat questions you might occasionally miss due to different circumstances (including connectivity issues). Each grade is divided by 0.8 and capped at 100%. For example, if your grade is 85%, your adjusted grade will be 100% (85%/0.8 = 106%, capped at 100%). If your final grade is 76%, your adjusted final grade will be 95% (76%/0.8 = 95%).

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

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm Exam	Will be posted in D2L the week before the Midterm Exam.	Monday, October 7, 2019 at 7:00 pm	2 Hours
Midterm Exam	Will be posted in D2L the week before the Midterm Exam.	Monday, November 4, 2019 at 7:00 pm	2 Hours

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

6. **Course Materials:**

Recommended Textbook(s):

R.D. Knight, *Physics for Scientists and Engineers: A Strategic Approach, 4th Edition,* : Addison-Wesley.

- Mastering Physics license (see information about on-line Assignments below).
- A TopHat license (free for UC students at tophat.com) and a response device such as a phone, laptop or tablet.
- Lecture will be posted on D2L (free of charge).

7. **Examination Policy:**

No aids are allowed on tests or examinations. Closed book tests with formula sheet provided; calculator 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 **10 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 immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will

arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. 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 Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see www.ucalgary.ca/wellnesscentre or call 403-210-9355.

c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. 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) or phone at 403-220-2208 .

d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples**.

e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.

f. **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 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.

g. **Safewalk:** Campus Security will escort individuals day or night (See the Campus Safewalk website). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

h. **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.

i. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: 403-220-3913 Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: ombuds@ucalgary.ca.

j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.

k. **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.

l. **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.

LABATORIALS

Labatorials begin on Monday Sep 16, 2019. They take place in ST 030 and 032, and students will have been assigned to a particular room by the Registrar's Office when enrolling in Physics 211/221. In general, the format of the labatorials is as follows: working in groups, students make their way through a carefully written workbook crafted to help students ponder, discuss, and learn concepts being covered in their lectures. TAs offer assistance and guidance, and check student understanding periodically throughout the session. Labatorials typically involve a class demonstration, computer simulations, or some apparatus, and the tasks presented to students vary accordingly.

The Labatorials workbook documents will be available on D2L. Students are to print out their own copies and take them to their Labatorials section to do their work. Marking rubric for the Labatorials is posted on the D2L lab site.

PHYS 211/221 Labatorial schedule

Week	Dates	Labatorial
1	Sep 5 - Sep 6	NO LABATORIALS
2	Sep 9 - Sep 13	NO LABATORIALS
3	Sep 16-20	Labatorial 1
4	Sep 23-27	Labatorial 2
5	Sep 30-Oct 4	Labatorial 3
6	Oct 7 - Oct 11	Labatorial 4
7	Oct 14 - Oct 18	NO LABATORIALS
8	Oct 21 - Oct 25	NO LABATORIALS
9	Oct 28 - Nov 1	Labatorial 5
10	Nov 4 - Nov 8	Labatorial 6
11	Nov 18 - Nov 22	Labatorial 7
12	Nov 25 - Nov 29	Labatorial 8
13	Dec 2 - Dec 6	Labatorial 9

Labatorial 1 Introduction to the Equipment
Labatorial 2 Motion on an Inclined Plane
Labatorial 3 Projectile Motion
Labatorial 4 Circular Motion
Labatorial 5 Newton’s Second Law
Labatorial 6 Static Equilibrium
Labatorial 7 Work-Kinetic Energy Theorem
Labatorial 8 Conservation of Energy
Labatorial 9 Exploring Concepts of Momentum

MASTERING PHYSICS On-line ASSIGNMENTS

How to register/ access MasteringPhysics:

1. Go to www.PearsonMastering.com .
2. Under Register, select **Student**.
3. Confirm you have the information needed, then select **OK! Register now**.
4. Enter your instructor's course ID: **kastyak-ibrahim10307** , and **Continue**.
5. a) You have an account if you have ever used a MyLab or Mastering product, Enter your existing Pearson account username and password to Sign In **OR** b) If you don't have an account, select Create and complete the required fields.
6. Select an access option.

OPTION 1: If you have purchased the textbook package or Mastering Physics access code separately in the bookstore: Enter the access code that came with your textbook or that you purchased separately from the bookstore.

OPTION 2: If you would like to Request 14-day Free Trial: Choose the option: Get temporary access without payment for 14 days *

7. From the You're Done! page, select Go to **My Courses** .
8. On the My Courses page, select the course name **PHYS 211/221 (Fall 2019)** to start your work.

Get the app! Your eText is also available to use on your mobile device. Search "Pearson eText" in the App Store or Google Play or follow the links below. Make sure that you have register for Mastering first by following the instructions above. Once you have registered, go to your Course and make sure that you have opened your eText at least once on your computer. Once you have done this you can use the same Mastering Physics login information for the Pearson eText app and continue reading in your device.

***If you choose to access your MasteringPhysics assignments only access:**

At least three days BEFORE your subscription has expired(past 14 days) please email Pearson at **ucphysics.mastering@gmail.com** and you will be provided with an access code that will extend your access to assignment material only (no Study Area or eText).

If you would like continued access to the eText (computer and app) and Study Area material, purchase a Mastering Physics access code from the bookstore. If you choose to just access the Mastering Physics assignments without purchasing access to the eText .

PHYS 211/221 Assignment Schedule

PHYS 211/221 Assignment schedule

Week	Assignment	Available	Due Date
1	Assignment 0	September 5, 2019	September 18, 2019
1	Assignment 1	September 5, 2019	September 18, 2019
2	Assignment 2	September 11, 2019	September 25, 2019
3	Assignment 3	September 18, 2019	October 2, 2019
4	Assignment 4	September 25, 2019	October 9, 2019
5	Assignment 5	October 2, 2019	October 16, 2019
6	Assignment 6	October 9, 2019	October 23, 2019
7	Assignment 7	October 16, 2019	October 30, 2019
8	Assignment 8	October 23, 2019	November 6, 2019
9	Assignment 9	October 30, 2019	November 20, 2019
10	Assignment 10	November 6, 2019	November 20, 2019
11	Assignment 11	November 20, 2019	December 4, 2019
12	Assignment 12	November 27, 2019	December 6, 2019
13	Practice Final	December 4, 2019	No due date

ACTIVITIES

In order to help students to better understand and learn course material there will be additional activities.

- 3% for pre-reading quizzes (due on Sundays, 11:59 pm). Quizzes will be available on Mondays at 8:00 am.
- 2% for TopHat questions and other activities that will take place in-class (details will be provided by the Instructor in each section).

The TopHat system is an on-line tool used as a vehicle to encourage class participation and student interaction as well as providing instructors with rapid, in-class feedback. A demonstration of this system could happen in your lecture section in the first week of classes.

Each lecture section will have one TopHat course name which will be given to you by your instructor. The type and number of response questions you will encounter over the semester is at the sole discretion of your instructor.

PHYS 211/221 DETAILED LECTURE SCHEDULE

PHYS 211/221 Lecture schedule part 1

Week	Dates	Topic
1	Sep 5-Sep 6	Intro class
2	Sep 9-Sep 13	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
3	Sep 16-Sep 20	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 2.6 Motion on an Inclined Plane 2.7 Instantaneous Acceleration
4	Sep 23-Sep 27	4.1 Motion in Two Dimensions We do not cover 4.3 Relative Motion 4.2 Projectile Motion
5	Sep 30-Oct 4	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?
Midterm 1 - Monday October 7th, 7:00-9:00 pm		
6	Oct 7-Oct 11	5.5 Newton's Second Law 5.6 Newton's First Law 5.7 Free-Body Diagrams 6.1 Equilibrium model 6.2 Using Newton's Second Law 6.3 Mass, Weight, and Gravity 6.4 Friction 6.5 Drag

PHYS 211/221 Lecture schedule part 2

Week	Dates	Topic
Oct 14th Thanksgiving Day. No lectures. University is closed		
7	Oct 14-Oct 18	6.6 More Examples of Newton's 2nd Law 7.1 Interacting Objects 7.2 Analyzing Interacting Objects 7.3 Newton's Third Law
8	Oct 21 - Oct 25	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
9	Oct 28 - Nov 1	12.1 Rotational motion 12.5 Torque 12.10 The Vector Description of Rotational Motion 12.8 Static equilibrium
Midterm 2 - Monday November 4th, 7:00-9:00 pm		
10	Nov 4 - Nov 8	9.1 Energy Overview 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
Nov 11 - Nov 15 is the Reading Week, no lectures		
11	Nov 18 - Nov 22	10.1 Potential Energy 10.2 Gravitational Potential Energy 10.3 Elastic Potential Energy 10.4 Conservation of Energy
12	Nov 25 - Nov 29	10.5 Energy diagrams 10.6 Force and Potential Energy 10.7. Conservative and Non-conservative Forces 10.8 The Energy Principle Revisited
13	Dec 2 - Dec 6	11.1 Momentum and Impulse 11.2 Conservation of Momentum 11.3 Collisions 11.4 Explosions

COURSE INCOMES:

Students coming into PHYS 221 should be able to:

- Demonstrate ability to solve the quadratic formula
- Use trigonometry and basic geometry to solve problems
- Employ basic algebraic manipulations
- Perform derivatives of simple functions
- Recognize elementary principles of kinematics and dynamics

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.

Department Approval:	Electronically Approved	Date: 2019-09-04 13:34
Associate Dean's Approval for out of regular class-time activity:	Electronically Approved	Date: 2019-09-04 15:16