



## COURSE OUTLINE

### 1. **Course:** PHYS 221, Mechanics - Fall 2021

Lecture 01: MWF 12:00 - 12:50 - Online

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Philip Langill	pplangil@ucalgary.ca	403 220-5402	SA 101B	Wed 13:00-15:30

Lecture 02: MWF 15:00 - 15:50 - Online

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Philip Langill	pplangil@ucalgary.ca	403 220-5402	SA 101B	Wed 13:00-15:30

### **Coordinator(s)**

<b>Name</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Andrew Yau	yau@ucalgary.ca	220-8825	SB 623	By Appointment

### **Laboratories**

Laboratory sessions will alternate between asynchronous and synchronous weeks, with the schedule of the synchronous sessions listed in Table 1. The sessions will be held during **the laboratory slot scheduled according to the timetable.**

During the **asynchronous** weeks, students are responsible for completing the individual portion (preliminary questions, designing, and completing an experiment according to the instructions in the laboratory manual). The individual laboratory reports are due at **23:59** on the day of the regularly scheduled laboratory session.

**Synchronous** sessions are designed for the completion of the group work in real-time - analysis of a selected video, discussion, answering questions posed in the write-up, and submission of the worksheet.

The schedule for all **Laboratory Activities** is shown in Table 2.

### **Synchronous Assessments**

There will be **3** synchronous assessments scheduled in the course. Each assessment is designed as a 30-minute quiz available during the Wednesday class slot. The test needs to be started during the first **15** minutes of class and will remain open for 50 minutes from the moment it is commenced. The detailed schedule of the synchronous quizzes is included in Table 1.

### **Course Site:**

D2L: PHYS 211 L01-L03/PHYS 221 L01-L02 (Fall 2021)-Mechanics

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

### **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

### Synchronous Components:

All PHYS 211/221 classes will meet virtually using the Zoom on Mondays during regularly scheduled classes for interactive lecture/question and answer sessions. This session will be recorded and will include as well real-time questions administered via an online classroom response system (Top Hat).

The remaining classes in the week will be asynchronous, i.e., they will be recorded and made available for viewing via D2L.

The locations and passwords of Zoom sessions for each section will be available on D2L. The session will be accessible through D2L. Students are required to use their actual names and access the sessions using the Zoom account associated with their @ucalgary e-mail address.

NOTE: There will be additional synchronous meetings on Wednesday, September 8 (first day of classes) and Wednesday, December 8 (last day of classes).

See Table 1 below for the detailed schedule of synchronous online components.

Week	Week of	Mon	Tue	Wed	Thu	Fri
1	9-6 - 9-10	9-6	9-7	9-8 L01 L02 L03	9-9	9-10
2	9-13 - 9-17	9-13 L01 L02 L03	9-14	9-15 A00 A01	9-16	9-17
3	9-20 - 9-24	9-20 L01 L02 L03	9-21	9-22 A02	9-23	9-24
4	9-27 - 10-1	9-27 L01 L02 L03 S1M	9-28 S1T	9-29 A03 Q1 S1W	9-30	10-1
5	10-4 - 10-8	10-4 L01 L02 L03	10-5	10-6 A04	10-7 S1R	10-8
6	10-11 - 10-15	10-11 L01 L02 L03	10-12 S2T	10-13 A05 S2W	10-14 S2R	10-15

7	10-18 - 10-22	10-18 L01 L02 L03 S2M	10-19	10-20 A06	10-21	10-22
8	10-25 - 10-29	10-25 L01 L02 L03 S3M	10-26 S3T	10-27 A07 Q2 S3W	10-28 S3R	10-29
9	11-1 - 11-5	11-1 L01 L02 L03	11-2	11-3 A08	11-4	11-5
10	11-8 - 11-12	11-8	11-9	11-10 A09	11-11	11-12
11	11-15 - 11-19	11-15 L01 L02 L03 S4M	11-16 S4T	11-17 S4W	11-18 S4R	11-19
12	11-22 - 11-26	11-22 L01 L02 L03	11-23	11-24 A10	11-25	11-26
13	11-29 - 12-3	11-29 L01 L02 L03 S5M	11-30 S5T	12-1 A11 Q3 S5W	12-2 S5R	12-3
14	12-6 - 12-10	12-6 L01 L02 L03	12-7	12-8 A12 L01 L02 L03	12-9	12-10

**Ann** Assignment  $mn = 00$  to  $12$   
nn

**Lnn** Lecture: Section Lnn  $Lnn\ mn = 01$  to  $03$

**Qn** Quiz n  $n = 1$  to  $3$

**SnW** Sync. Lab n (Weekday W)  $n = 1$  to  $5$ ;

W = M, T, W, R for Lab Sections B01-B12, B13-B22, B23-B33, and B34-B45, respectively

Asynchronous Components:

Recording of all lecture materials for the given week will be released by 12:00 pm on Wednesdays under normal circumstances. Each instructor will record their own lectures, which will be placed on D2L in the respective folders. All course materials are available for all students in PHYS 211/221.

**Course Site:**

**D2L: PHYS 211 L01-L03/PHYS 221 L01-L02 (Fall 2021)-Mechanics**

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

**LABORATORIES**

There will be two types of laboratory sessions - asynchronous ones dedicated to individual work and synchronous ones dedicated to group work.

The detailed laboratory schedule with due dates for individual and group components is listed in Table 2.

Table 2. Laboratory Schedule

Week		Lab #	Lab Topic	Due Date* B01- B12	Due Date* B13- B22	Due Date* B23- B33	Due Date* B34-B45
1	9-6 - 9-10						
2	9-13 - 9-17	1A	Introduction to Measurement and Video Analysis	9-13	9-14	9-15	9-16
3	9-20 - 9-24	1S		9-20	9-21	9-22	9-23
4	9-27 - 10-1	2A	Projectile Motion	9-27	9-28	9-29	9-30
5	10-4 - 10-8	2S		10-4	10-5	10-6	10-7
6	10-11 - 10-15						
7	10-18 - 10-22	3A	Atwood Machine	10-18	10-19	10-20	10-21
8	10-25 - 10-29	3S		10-25	10-26	10-27	10-28
9	11-1 - 11-5	4A	Torque	11-1	11-2	11-3	11-4
10	11-8 - 11-12						
11	11-15 - 11-19	4S		11-15	11-16	11-17	11-18
12	11-22 - 11-26	5A	Work and Energy	11-22	11-23	11-24	11-25
13	11-29 - 12-3	5S		11-29	11-30	12-1	12-2
14	12-6 - 12-10						

\* Asynchronous Lab Sessions: due 21:59; Synchronous Lab Sessions: due at end of sessions; Dropbox: LAB 1 - GROUP for Lab 1S, etc.

\* Asynchronous Lab Sessions: due 23:59; Synchronous Lab Sessions: due at end of sessions and submission via Group Dropbox  
Synchronous Lab 1S for Lab Sections B34-B45 will be held on 10/7/2021 due to National Holiday on 9/30/2021  
Synchronous Lab 2S for Lab Sections B01-B12 will be held on 10/18/2021 due to Thanksgiving Holiday on 10/11/2022

## 1. Requisites:

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

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

Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

### **Antirequisite(s):**

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

### **Note(s):**

- a. Physics 211 and 221 differ in their prerequisites, but cover the same material and have the same examinations and tutorial quizzes. Physics 211 has an extra lecture hour per week to deal with certain topics from High School Physics and Mathematics 31. Mathematics 31 is recommended.

## 2. 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:

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	[%]	Notes
Quizzes [3]	30	3 quizzes worth 10% each. Administered on D2L, during the Wednesday class, according to the schedule provided in Table 1.
Laboratories [5]	20	5 labs; each consisting of an individual and a group component, due in alternating weeks.
Assignments [12]	15	Completed on MyLab Pearson platform, due on Wednesday of most weeks
Activities	5	In-class and asynchronous Top Hat questions
Final Exam	30	Cumulative, synchronous 2h exam scheduled by the Registrar (3h writing time including Internet connection margin)

Each piece of work (reports, assignments, quizzes, 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.

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 %

The course grade expressed as a percentage is calculated from the percentage grades of the separate course components with the weights indicated above. A table for the conversion of percentage grades for the course to letter grades is provided above. The percentage grade for the course must be **equal to** or **larger** than the stated value to obtain a certain letter grade, without rounding.

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.

#### HOMEWORK

Homework will be administered using the online Mastering Physics course **PHYS211221\_F21**. (The Instructor's Course ID for this course is **yau45865**.) To register for and access this course, go to <https://www.pearson.com/mastering>. Detailed information is posted in the Course Information folder on D2L.

Assignments are available for approximately two weeks from the time they open. However, they are designed to be completed within the first week for them to serve as the most beneficial formative assessment tool. To get full credit students are required to submit their work by 23:59 of the due date. Submissions made between the due date and the closing date will be penalized. The size of the penalty increases with the number of days between the due date and the day the submission is made. Details of this deduction will be explained in class and in D2L.

Table 3. Assignment Schedule

Week	Dates	Assignment	Topic covered	Available	Due Date	Closing Date
1	9/6 - 9/10	Assignment 0 Assignment 1	Intro to MyLab Week 1	9/6/2021	9/15/2021	9/22/2021
2	9/13 - 9/17	Assignment 2	Week 2	9/13/2021	9/22/2021	9/29/2021
3	9/20 - 9/24	Assignment 3	Week 3	9/20/2021	9/29/2021	10/6/2021
4	9/27 - 10/1	Assignment 4	Week 4	9/27/2021	10/6/2021	10/13/2021
5	10/4 - 10/8	Assignment 5	Week 5	10/4/2021	10/13/2021	10/20/2021

6	10/11 - 10/15	Assignment 6	Week 6	10/11/2021	10/20/2021	10/27/2021
7	10/18 - 10/22	Assignment 7	Week 7	10/18/2021	10/27/2021	11/3/2021
8	10/25 - 10/29	Assignment 8	Week 8	10/25/2021	11/3/2021	11/10/2021
9	11/1 - 11/5	Assignment 9	Week 9	11/1/2021	11/10/2021	11/17/2021
10	11/8 - 11/12					
11	11/15 - 11/19	Assignment 10	Week 11	11/15/2021	11/24/2021	12/1/2021
12	11/22 - 11/26	Assignment 11	Week 12	11/22/2021	12/1/2021	12/8/2021
13	11/29 - 12/3	Assignment 12	Week 13	11/29/2021	12/8/2021	12/8/2021
14	12/6 - 12/10	Final Exam Practice	Review	12/6/2021	N/A	N/A

#### ACTIVITIES

There will be two types of activities in this course using Top Hat.

- i. **Asynchronous Top Hat Questions** designed to provide feedback and to permit multiple attempts, and designed for completion at a student's own pace while following the recorded asynchronous lectures.
- ii. **Synchronous Top Hat Questions** administered by each instructor and related to the material covered in the synchronous class.



## ASSESSMENTS

**a. Quizzes.** Three (3) monthly synchronous quizzes will be administered during the Wednesday lecture slot, according to the schedule in Table 1. The quizzes will be administered on "Quizzes" on D2L. Each quiz will consist of 6 questions of various formats (written problems, multiple-choice, matching), including both conceptual and numerical problems. Each quiz will be designed to be completed in 30 minutes, but it will be accessible for 50 minutes from the time it is opened. The quizzes are open-resource exams and will not be proctored, but they are designed to be completed individually, without any collaboration with fellow classmates or aid from others.

Each quiz is to be accessed during the first 15 minutes of class. Failure to start the quiz during that time interval will result in a zero for the quiz. The weight of the missed quiz will be automatically added to the Final Exam.

**b.** The **Final Exam** will be administered during the exam time slot scheduled by the Registrar's Office. The exam will be designed for 2 hours but will be accessible for 3 hours from the time it is opened.

The University of Calgary offers a [flexible grade option](https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade), 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>

## 2. 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, 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.

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 case of a missed or late submission of an online assessment or absence from a synchronous course component (quizzes, group laboratories), a student may request possible accommodation by email to the Course Coordinator within 48 hours of the date and time of the missed course component or late submission.

Absences or late submissions 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.

For reported and validated absences, the following accommodations will be implemented: The weight of a missed Quiz (10%) will be added to the Final Exam.

Missed Group Laboratories need to be submitted individually by 23:59 on the Sunday immediately following the missed lab, to the "Missed Laboratory" Dropbox. The submitted files need to clearly indicate the Lab, section, and group number.

Questions administered during synchronous activities will be done using an online platform (TopHat) and can be accessed from any location. These questions will be graded 50% for participation and 50% for correctness. Only 80% of the questions need to be completed for 100% of the grade (the grade will be prorated by taking the score, dividing it by 0.8 and capping the result at 100%), accommodating for missing approximately two synchronous classes.

If an extension is needed on an asynchronous component (assignments, individual labs), it needs to be requested by e-mail (to [phys211221@ucalgary.ca](mailto:phys211221@ucalgary.ca)) 24 hours before the due date. The requests will be considered, and extensions granted on a case-by-case basis.

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

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

#### 4. Course Materials:

Recommended Textbook(s):

Randall A. Knight, *Physics of Scientists and Engineers, 5th Edition*: Pearson.

##### Online Course Components:

**Mastering Physics** (<https://www.pearson.com/mastering>)- used for additional practice materials. Sets of questions related to each chapter are set up for practice only.

Students must register in <https://www.pearson.com/mastering> portal to access the additional resources. Access is included with the purchase of a new textbook. You may already have access if you used the portal within last year. Please check this before proceeding.

Students must register using their University of Calgary ([ucalgary.ca](http://ucalgary.ca)) email address, in order to ensure that the grades for their Assignments can be correctly transferred to D2L and the Course Grade Book.

**Top Hat** ([www.tophat.com](http://www.tophat.com)) - used for collecting responses in synchronous and asynchronous components of the formative assessment in the course.

All lecture recordings and supplementary materials will be available on D2L under the appropriate lecture section.

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:

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

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

#### 5. Examination Policy:

Exams are open-resource exams and students can use any and all available resources that will help them to complete the exams **INDIVIDUALLY**.

Collaboration on the weekly quizzes and exams is not permitted. Any suspicious activities will be reported and investigated according to Section K, "Integrity and Conduct" of the "Academic Regulations" section of the University of Calgary Calendar.

<https://www.ucalgary.ca/pubs/calendar/current/k.html>

By taking the exam student declares that they are completing their work by themselves, with the aid of notes, textbooks, lectures, and other course approved online resources, with no third party involved in their evaluation. This includes no use of file sharing websites and services that are not affiliated with the University of Calgary.

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

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

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

#### 7. 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.

#### 8. Human Studies Statement:

Students will not participate as subjects or researchers in human studies. See also [Section E.5](#) of the University Calendar.

#### 9. 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.

#### 10. 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 ([MentalHealth](#)).
- 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 ([syva@ucalgary.ca](mailto:syva@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/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-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:

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.

- 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](#) Email: [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca). SU Faculty Rep., Phone: [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.

PHYS 211/221 Tentative Weekly Schedule

Week	Module	Dates	Topics
1	1	9-6 - 9-10	Introductory Class 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
2	2	9-13 - 9-17	Dot and Cross Products 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
3	3	9-20 - 9-24	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
4	4	9-27 - 10-1	2.5 Free fall 2.6 Motion on an inclined plane 4.1 Motion in two dimensions 4.2 Projectile Motion
5	5	10-4 - 10-8	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?
6	6	10-11 - 10-15	5.5 Using Newton's Second Law 5.6 Newton's First Law 5.7 Free-Body Diagrams 6.1 The Equilibrium model
7	7	10-18 - 10-22	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
8	8	10-25 - 10-29	7.4 Ropes and pulleys 7.5 Examples of interacting-object problems 8.1 Dynamics in 2D 8.2 Uniform circular motion 8.3 Circular orbits
9	9	11-1 - 11-5	8.4 Reasoning about circular motion 8.5 Nonuniform circular motion 12.1 Rotational motion 12.5 Torque 12.10 The vector description of rotational motion

			12.8 Static equilibrium
10		11-8 - 11-12	[Reading Break]
11	10	11-15 - 11-19	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
12	11	11-22 - 11-26	10.1 Potential energy 10.2 Gravitational potential energy 10.2 Gravitational Potential Energy 10.3 Elastic potential energy 10.4 Conservation of energy
13	12	11-29 -	10.5 Energy diagrams 10.6 Force and potential energy 10.6 Force and potential energy 10.7. Conservative and non-conservative forces 10.8 The energy principle revisited
14	13	12-6 - 12-10	11.1 Momentum and Impulse 11.2 Conservation of momentum 11.3 Collisions 11.4 Explosions Review

Course Incomes:

Students coming into Physics 221 should be able to:

- Demonstrate the ability to solve linear and quadratic equations and sets of equations Use
- trigonometry and basic geometry to solve problems
- Employ basic algebraic manipulations and understand basic calculus
- Perform derivatives of simple functions
- Recognize the 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.

Electronically Approved - Sep 07 2021 09:22

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**Department Approval**