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# Physics 2210 - Physics for Scientists and Engineers I

## Lecture Sections 001 and 011

### (Subject to Revision)

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## Course Canvas Pages

Most of the course information is accessible from the PHYS 2210 course [canvas page](https://utah.instructure.com/courses/475908/) (<https://utah.instructure.com/courses/475908/>). From the home page you will find links to the course material described below. Lecture slides and notes, homework and exam solutions and other information to aid your study of Classical Mechanics will be hosted on the course canvas pages.

## Course Introduction

[PHYS 2210](#) is an introductory course in Classical Mechanics intended for Scientists and Engineers. It introduces the basic concepts and theory of kinematics (motion), energy, momentum, rotational motion, gravitation and rotation and oscillatory motion. You are expected to learn to solve physics problems using calculus. Most students will find this to be a very demanding course that requires a significant amount of work and study time. A well prepared student (e.g. scored a 4 or 5 on AP Physics C (Mech/E&M)) planning for graduate studies in Physics should consider enrolling in **Physics for Scientists I (Honors) PHYS 3210**. Less prepared students should consider enrolling in either [PHYS 1500](#), [PHYS 2010](#) or [PHYS 2110](#). Consult with an academic advisor from your major department to ensure that the chosen course satisfies your academic program requirements.

### Prerequisites

**MATH 1210, Calculus I, is a prerequisite** for this course.

## Course Objectives

Many of you are in programs in engineering and other disciplines. You may question whether physics will be helpful to you. The answer is "yes!" The course will help you to understand and solve problems that occur in a broad range of disciplines. The primary subject is Mechanics. Mechanics includes motion in multiple dimensions, forces and the laws of motion, energy, momentum, rotational motion, motion of rigid objects, gravitation, oscillations, and waves. Elements of this subject material are found in all parts of nature. The three most important objectives of this course are to: (1) learn the fundamental principles of physics; (2) learn how to describe real world phenomena quantitatively; (3) learn problem-solving skills that can be applied to other areas of science, engineering and life. The achievement of these goals will require a conceptual understanding of the physical principles, an ability to use equations to describe a particular phenomenon, and a methodical approach to problem solving. This understanding is achieved by a combination of reading the texts, doing the prelectures and checkpoint exercises before class, listening to lectures, working through examples, discussing questions with your TAs and other students, and doing problems. The assigned homework problems are **ABSOLUTELY NECESSARY** to develop this understanding. They are your practice "sessions."

## Required Course Material

1. Video pre-lectures, checkpoint questions and exercises are available in the online access to *"FlipItPhysics, Classical Mechanics"*, by Gladding, Selen and Seltzer ([www.flipitphysics.com](http://www.flipitphysics.com)). This material is **required**. There is a grace period of 21 days before payment of \$42.73 must be made. Detailed instructions for signing up for flipitphysics will be made available on the first day of class and on the course Canvas website. A specific **access key** for our course, will be provided. **Remember to use your UNID to enroll.**

2. Homework assignments are available online through WebAssign (<https://www.webassign.net/utah/login.html>). The problems are from the textbook *"Physics for Scientists and Engineers"*, 6th edition, by Serway and Jewett. This material is **required** for the semester. There is a grace period of 14 days before payment of \$29.95 must be made. Students are responsible for their own WebAssign access on-line through their university login.

## Optional Course Material

1. Although it is not required, it is *strongly recommended* that students rent or purchase either an electronic version of Serway and Jewett's "*Physics for Scientists and Engineers*" or a hard copy. Inexpensive used copies of the 6th, 7th, or even 8th edition can be bought from Amazon.com or eBay. Electronic versions of various editions are available from the publisher. More information is available at:

[http://www.webassign.net/manual/student\\_guide/t\\_s\\_purchasing\\_access\\_ebooks\\_online.htm](http://www.webassign.net/manual/student_guide/t_s_purchasing_access_ebooks_online.htm).

2. There is a paperback copy textbook of the pre-lecture material that is essentially a verbatim transcript of the online pre-lecture videos from flipitphysics. It is **not** necessary to purchase the paperback copy. The publisher does provide various options of purchasing the paperback textbook in a bundle or separately from the required online access code. Used copies of the paperback textbook are also available at online retailers at widely varying prices (\$1.99 up to \$40+).

## Additional Online Resources

1. The [PHYS 2210 course web page](#) on the physics department server will contain general course information such as this Syllabus.

2. A course canvas page will serve as a portal to your other online course materials and grades. Remember that homework assignments will be accessed, turned in and graded electronically through the course WebAssign website (<https://www.webassign.net/utah/login.html>).

Exam solutions, old exams, important notices, and other information will be posted on the 2210 course Canvas web page. It is important that you check the course Canvas website and the FlipItPhysics and WebAssign sites regularly, because essential course information will be posted and updated there from time to time.

## Course Contacts

(faster response: [uuphys2210@gmail.com](mailto:uuphys2210@gmail.com) or via webassign)

### Instructor

Wayne Springer  
Office: 216 South Physics  
Email: [email wayne](mailto:email_wayne)  
Office Hours: W F, 3:10 – 4:30 pm.

### Course Coordinator

Mary Ann Woolf, 205 JFB, 581-4246, [email Mary Ann](mailto:email_Mary_Ann)

### Webassign Expert

Doug Baird ([email Doug](mailto:email_Doug))

### Teaching Assistants

Marshal/TA: Rachael Morris ([email rachael](mailto:email_rachael))  
TA: Devon Fischer ([email devon](mailto:email_devon))  
TA: Ash Ashok ([email Ash](mailto:email_Ash))  
TA: Vijith Poovelil ([email Vijith](mailto:email_Vijith))  
TA: Anthony Garcia ([email Anthony](mailto:email_Anthony))  
SI leader: Tyler Buckway [email Tyler](mailto:email_Tyler)

# Course Content

We will study the material in units **1- 24 of FlipItPhysics**. Any excluded sections will be announced ahead of time. Unless specifically announced, you are responsible for all material in these chapters, whether it is covered in lecture or not, as well as any supplemental material actually covered in the lectures. This is the standard curriculum for an introductory semester-long course in Mechanics. Please see the Course Schedule for details. **The due dates of the prelectures and checkpoints of FlipItPhysics can be found on the FlipItPhysics Calendar, and the due dates for the WebAssign Homeworks will be in WebAssign.**

## How you can do well in this class

1. Be sure to schedule enough study time. Typically, one should expect to spend no less than 3 hours on homework and review for every hour spent in lecture. In addition you are required to watch the FlipItPhysics prelectures and answer the questions and checkpoints prior to the due date: **12:30 PM** of the day of the lecture.

2. **Practice, practice, practice!** The only way to understand physics concepts well enough to use them is to practice on problems. Do the assigned discussion exercises and homework problems, review problems (before exams), and other related problems in the textbook. Practice problems by mimicking the exam situation: start with a blank sheet of paper and work the problem through as far as possible without looking for help from the text, notes, or solutions until absolutely necessary. **Doing the homework the RIGHT way is the most important factor for doing well in this course.**

## Discussion Sections

To be in this course, you must register for a particular discussion section. **Discussion sections meet twice a week**, on Tuesdays and Thursdays. There will also be a **help lab** with posted hours that is manned by the TA's. The purpose of the discussion sections is to help you learn how to do problems, like those in the assigned homework. FlipItPhysics Discussion Exercises will be worked out in detail as well as brief quizzes will be administered during discussion sections, The "help lab" is to help you with the current homework assignment, discuss results and solutions of exams, and give you a chance to ask questions about the course material.

### Discussion Sections Schedule (Note T H means Tuesday and Thursday)

TA	SECTION	TIME	ROOM
Rachael	2210-002/012	T H / 7:30AM-08:20AM	WEB L112
Devon	2210-003/013	T H / 7:30AM-08:20AM	WEB L114
Aishwarya	2210-004/014	T H / 8:35-9:25AM	WEB L112
Devon	2210-005/015	T H / 9:40AM-10:30AM	FASB 295
Vijith	2210-006/016	T H / 10:45AM-11:35AM	HEB 2006
Vijith	2210-007/017	T H / 12:55PM-01:45PM	NS 203
Anthony	2210-008/018	T H / 12:55PM-01:45PM	SW 133
Anthony	2210-009/019	T H / 2:00PM-02:50PM	BEH S 112
Aishwarya	2210-010/020	T H / 2:00PM-02:50PM	WEB L114

## Lectures

The class meets **three times a week** for lectures (M, W, F) at 12:55 – 1:45 pm (section-001) and at 2:00 – 2:50 pm (section-011). We will also discuss most of the FlipItPhysics checkpoint questions during the lecture. Approximately every three weeks there is a **50-minute midterm** exam during regular class hours. All exam dates and times are set in advance, before the semester starts.

## Homework

Most large classes in Physics use the web-based homework assignments and grading system provided by **WebAssign**. You will **complete all homework assignments over the web and get immediate feedback (grading)** For most problems, you will be given up to **FIVE opportunities to enter the correct answer**. This means that you will only be entering answers to the homework. There is a great danger in this. In contrast, on examinations, you will be required to present full

solutions (showing all work) and will only have 1 try. Hence, I strongly recommend that you work out all homework problems on a clean sheet of paper (even though you will not turn these in) and compare these to the solutions provided by the TAs, which will be available after the problem set due date through WebAssign.

Please note that WebAssign also provides on-line forums for homework that you may use to discuss problems with fellow students. These forums will also be regularly monitored by the TAs at times to be determined. You are encouraged to participate actively in the forums, to seek help and to offer advice to your classmates on how to approach problems. However, the forums are not to be used for the purpose of posting explicit solutions to the assigned problems in any form.

Please note that in order to be marked correct for the problems that require numerical answers, **you must pay close attention to the rules for handling significant figures**, enter the correct number of significant figures (three is the typical value), and be within 3% of the answer (the actual numerical values used in each problem are randomized). You must also **pay close attention to the units** (provided in the question) in which the numerical answer must be given. **WebAssign provides hints for formatting any answers that must be expressed using variables (symbolic formatting) and for cases where you have the right answer but an insufficient number of significant figures.** (Here is a [tutorial](#) on the use of significant figures.) **Please be advised: You are likely to believe at various times that WebAssign has mistakenly marked your problem in error with "the big red X."** Look again! Check your analysis, check units, check significant figures! WebAssign is by no means perfect, but experience has shown that it (and not you) will be right in 99% of these cases.

**All homework should be completed on Tuesday and Thursday nights. Usually the precise due time is 11:59 pm on the following Wednesday or Friday.** Each problem in the assignment is worth 2 points, whether the problem has 1 part or 7 parts. (You will notice, for example, that WebAssign will make a five-part problem worth 0.4 points per part.) **At the end of the term, your five (5) lowest homework scores will be automatically dropped.** No re-grades will be allowed, and **NO LATE HOMEWORK WILL BE ACCEPTED.** Please don't even ask. Homework is due so often and for so many students that there is no time to handle it. Solutions will be posted right away: a PDF file will be attached to the assignment on WebAssign. **Due dates and times, point values for each problem, and maximum number of submissions are clearly indicated on WebAssign for each assignment.** Barring some long-term server catastrophe at WebAssign, you are responsible for understanding and meeting these terms.

## Getting Started with WebAssign

**At the WebAssign Login Page, enter your UNID number (starting with "u" and followed by the rest of your ID number with the first digit removed) and password (the same login and password you use for the Campus Information System).** Your first assignment is entitled "Intro to WebAssign." It will help you become familiar with WebAssign and the procedure for completing online homework assignments. However, it is not an exhaustive exercise which tests you on all you need to know about WebAssign. Questions about WebAssign are best addressed to Doug Baird (email: [doug.baird@utah.edu](mailto:doug.baird@utah.edu)), the TA who has the most expertise with WebAssign and handling WebAssign is a primary responsibility.

## Prelectures, Checkpoints and Discussion Exercises (using FlipItPhysics)

After registering for FlipItPhysics (use the access key code, UU2210RWS2018) you should look at the "Calendar" There you will see various entries, some in blue (prelectures), some in green (checkpoints). These are all due by **12:30 PM** on the date specified. Also, you should be prepared to discuss the checkpoints in the corresponding lecture. If you watch all the prelecture slides and answer the prelecture quizzes prior to the due time/date, you will receive full credit for that particular prelecture. **You must watch the whole prelecture (about 20 minutes) to receive full credit.** Similarly, if you do the checkpoint questions prior to the due date/time, you will receive full credit for that particular checkpoint assignment. Full credit will be given for attempting the quizzes and checkpoint problems, even if you do not provide the correct answer. The purpose here is not to penalize you, but rather to reward you for becoming acquainted with a lecture topic **ahead of time**. Discussion exercises (indicated in red on the FlipItPhysics calendar) must be attempted prior to 7:30 AM the morning of the relevant discussion section.

## Midterms and Final Exam

For detailed rules please refer to the [Exam Procedures page](#). **There are four (4) midterm exams and a final exam. YOU MUST TAKE THE FINAL EXAM TO PASS THIS COURSE.** All exams are closed book. You may not bring any materials to the exams but a single 8.5" x 11" sheet (both sides may be used), with helpful equations and relationships on it,

and a calculator. The tests will not be easy. **Normal scientific and graphing calculators are allowed during exams. We do not allow laptop PCs, palm pilots or other devices with significant text (alphanumeric) storage capability, or those with wireless communications devices.** If there is any doubt as to whether an item is allowed, ask your TA. The TA's decision is final.

**All midterms, as well as the Final Exam are comprehensive. Before each midterm a review containing problems from previous exams will be posted on the main website.** They are a good measure of what this semester's exams will be like. **Other old midterm exams** from previous versions of this course are available. I do not guarantee that they will be completely relevant to the present exams, as the course content and emphasis has changed over the years.

Midterm Exam Schedule (Check the Flipit Physics calendar for any updates!)

Midterm 1: Friday February 2 in [FMAB Auditorium](#)

Midterm 2: Friday February 23 in [FMAB Auditorium](#)

Midterm 3: Friday March 16 in [FMAB Auditorium](#)

Midterm 4: Friday April 13 in [FMAB Auditorium](#)

**Midterm exams last 50 minutes.** Please arrive **10-15 minutes early on exam days** so that we may get you seated, get the exams distributed, and allow you the full 50 minutes to complete the exam.

**There will be NO make-up exams. The only exceptions to this rule are (a) absence due to a University sponsored activity or to military duty, and (b) serious medical emergencies.** In either case the student must provide complete documentation. All requests for exam accommodations are handled exclusively by Professor Springer. In the case of exception (a) the request for a make-up exam must be filed with Professor Springer **at least one week in advance** of the anticipated absence. **Please note that all exam dates and times have already been determined; mark your calendars now! Resolve any conflicts as soon as possible!**

### **Final Exam Schedule**

The final exam is **Friday April 27 3:30-5:30 PM**. This is a special departmental University scheduled exam time. **THERE WILL BE NO EARLY FINAL EXAMS!**

### **Determination of Course Grade (Tentative)**

**Your grade for the course will be based on the FlipitPhysics prelectures and checkpoints, webassign homework, midterm and final exam scores. The FlipitPhysics prelectures and checkpoints count 10%, webassign homework counts 30%, the midterms exams 40%, and the final 20%. The lowest five (5) homework scores will automatically be dropped. The lowest midterm exam score will be automatically dropped. Attendance and participation in discussion sections (at least 80% of sessions) will earn a bonus of up to an additional 5% points to your final grade. Completion of FlipitPhysics Exercises will earn a bonus of up to an additional 5% points to your final grade.**

**Any request for re-grading of a problem on an exam must be made before the following exam.** You must fill out a re-grade form (found on this web site) and attach it to the entire problem (not just one part) to be re-graded. (Do NOT submit problems that you are not asking to be re-graded.) You must use a separate re-grade form for each problem. These sheets should be given to Professor Springer in class before the next midterm exam. In the case of Midterm #4 (last midterm), you must submit a request for re-grading before the end of the last course lecture on August 5. Problems will NOT be re-graded after the next exam occurs. **Exams MUST be done in black or blue pen (NOT red), to be eligible for a re-grade. No exam done in pencil will be re-graded.** When you submit a request for the re-grading of a problem, the entire problem will be re-graded, not just the parts that you are disputing. It is **usually** the case that you will not lose points by submitting a re-grade, but this is not guaranteed. Submitted problems for re-grade will be evaluated and returned with the following exam.

You may ask for re-grades on the final exam. This request will only be considered in the case that you are near a course grade boundary, and there are some additional special rules. The request must be made by 5 pm on May 4, 2017. You must turn in a re-grade form for each problem, just as with the midterms. However, you must turn in the entire final exam for a re-grade. **The entire exam will be re-graded** (not just the problems you submit for a re-grade).

### **Students Must Check Course Grades**

It is the **student's responsibility to ensure the accuracy of all recorded homework, prelecture/checkpoints, and exam grades** (which will reflect what is in our database). The homework and exam scores will be kept in your WebAssign

account, and the checkpoint and prelecture scores will be in your FlipItPhysics account. At the end of the Semester, we will combine the appropriately weighted WebAssign scores with the FlipItPhysics scores to obtain a final score to determine your course grade. These are all accessible from the WebAssign website. Please check your scores regularly, keep all your returned tests (handed out during discussion sections), and contact your discussion TA in case of an error.

### Important Dates

Deadline for submitting re-grades: By next exam - Midterms 1-3, TBD - Midterm 4

Deadline for notification of recording errors, clerical errors, or arithmetic errors on any midterms or homework. – TBD (Final Exam). Unless you point out any scoring or recording error by this date, the scores as recorded will stand.

TBD -Final Exam

TBD – Graded Final Exams available from Mary Ann Woolf in JFB 205

TBD– Deadline for all requests for re-grading of Final Exam

### Drop/Add/Withdrawal (see University Academic Calendar)

### Office Hours

**The instructor has posted office hours: 3:10 – 4:30 pm on Wednesdays and Fridays.** Please allow a few extra minutes occasionally for the instructor to reach his office. Outside of these you can meet with Prof. Springer by appointment. These may be granted very promptly, but Prof. Springer cannot guarantee specific times to meet with you outside of the posted hours. **He is best reached by e-mail**, not by phone. He checks e-mail most days and will respond promptly. Faster response may be available by sending email to

The TAs will also be available during the **help lab hours**. This is an **important resource for students**, which is often under-utilized. If you have questions that you have not been able to get answered in the discussion sections or during the lectures be sure to attend the help lab. **Doing something about getting your questions answered is your responsibility.**

## Additional help

**Help Lab.** The help lab is specialized to the course with the course TAs and is held in the **JFB Lecture Halls Rotunda behind Lecture Room JFB 102.**

### PHYS 2210 Help Lab Schedule (JFB Rotunda)

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:35		Rachael			
9:40		Rachael	Devon		
10:45		Aishwarya		Aishwarya	
11:50		Vijith		Vijith	
12:55					
2:00					
3:05	Devon	Anthony		Anthony	
4:10					

## Supplemental Instruction

SI leader: Tyler Buckway [email Tyler](#). Schedule to become available on Canvas.

### Honesty

**Cheating of any kind on an exam is a very serious violation of University rules and is unethical.** Students caught cheating will receive a failing grade for the course and will be sent on to the University Disciplinary Committee for further action. All teaching assistants, including the course Marshal and the administrative assistant for the course are to be considered proxies for Dr Springer when you are dealing with them regarding this course. They are to be listened to and treated with respect always.

All students and faculty need to be aware of important changes in the Student Code that went into effect in the last couple of years. Students now have only 20 business days to appeal grades and other "academic actions" (e.g., results of comprehensive exams). The date that grades are posted on the web is considered the date of notification. A "business day" is every day the university is open for business, excluding weekends and University-recognized holidays. If the student cannot get a response from the faculty member after ten days of reasonable efforts to contact him or her, the student may appeal to the Department Chair if done within 40 days of being notified of the academic action. Students should document their efforts to contact a faculty member. Similarly, faculty members who discover or receive a complaint of academic misconduct (e.g., cheating, plagiarism) have 20 business days to "make reasonable efforts" to contact the student and discuss the alleged misconduct. Within 10 more business days the faculty member must give the student written notice of the sanction, if any, and the student's right to appeal to the college Academic Appeals Committee.

All students and faculty members are urged to consult the exact text of the Student Code if a relevant situation arises. The code is on the University web site at <http://www.admin.utah.edu/ppmanual/8/8-10.html>.

### Students with Disabilities

The University of Utah Department of Physics and Astronomy seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in this course, reasonable prior notice must be given to the instructor and to the Center for Disability Services, 162 Olpin Union Bldg, 581-5020 (V/TDD) to make arrangements for accommodations. You are strongly encouraged to come and talk to the instructor about your disability and necessary accommodations within the first two weeks of the semester.