PHYS141

Principles of Physics I

Summer 2024

Lecture PHY 1201 - MW 5:30 - 7:20pm - TTh 5:30 - 7:00pm
Discussion MW 7:30 - 8:20pm
Lab TTh 7-9pm

Dr. Matt Severson
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Office hours
M Th 4:00 - 5:00 pm

TA TBD
TBD
Office hours
TBD

NOTE: Details in this syllabus should be taken as tentative. I will notify you when changes are made.

Course Description

The 141-142 course sequence gives a calculus-based introduction to the concepts of classical and modern physics intended for students studying sciences of intermediate mathematical rigor like biochemistry, chemistry, or pre-med students who need or want a more intensive approach.

This first course in the sequence will begin with a brief introduction to measurement, units, and the scientific process before covering Newtonian mechanics, rotation, conservation laws, energy and thermodynamics.

In this intensive, 1-term summer course, we will cover a large amount of material in a relatively short time, often completing an entire chapter or more in one lecture session; Hence, you will have both the advantage and misfortune of working on physics every day of the week.

Prerequisite or corequisite: MATH141 or MATH221 (or equivalent credit)

Recommended Textbook:
S&Z's UNIVERSITY PHYSICS, 15th ed. H. Young and R. Freedman (Pearson, 2023). Electronic version is available.

The **lab manual** for the course exists only inside the **Expert TA** system (see below).

Lab and Discussion

You will have a 1-hr discussion and a 2-hr lab for your section twice a week each (see schedule above). In the lab sessions, you will perform experiments that further demonstrate select topics from the course material. The lab manual and the **required pre-lab exercises** are available only through **Expert TA** online (see more below).

It is administrative policy that you must *complete every lab experiment* and *pass the lab portion* of the course (independently) in order to pass the course as a whole. Make-up sessions will be perhaps be available to deal with legit absences, but they will be difficult to handle. **Please notify me ASAP, and preferably *in advance*, if you need to miss a lab.**

Discussion sessions will consist of time to work with the TA on any problem or difficulty you have come across in the homework assignments; the weekly quizzes will take place in the last 10-15 mins of the session.

Assignments

Homework: I will assign homework roughly every week; most problems will come from the book and will be designed to develop your **ability** to *set up and solve* problems pertaining to the mathematical physical laws studied in each chapter; required exercises will be completed in **Expert TA** online (see more below). I will also assign a few recommended exercises from the book to be worked out on paper. These problems will serve as your study guide for quizzes and exams. Solutions for these will be provided after the fact.

A late assignment may incur a penalty, depending on the extent and circumstances. I will drop your lowest assignment score before computing your average.

Quizzes: You will have 6-7 quizzes, which will take place at the end of most discussion sessions; each quiz will last about 10-15 mins. Quizzes will be closed book, but all formulae will be provided for you. The quiz problems will be largely straightforward and are intended to check your competency in topics from recent homework assignments. *I will drop your lowest quiz score before computing your average.*

Lab Reports: The results of each experiment will need to be compiled and addressed thoroughly in a lab report. The reports are due at the start of the next lab unless otherwise specified.

Reports are submitted individually, although you should work with your lab partner to write them. Details of an adequate report can be found in the lab manual introduction.

Pre-lab Exercises: Pre-lab assignments are due before the start of each lab. They are in the **Expert TA** lab system and will be completed and submitted within that online system. The consist of several questions pertaining to the theory or experiment details corresponding to each lab and should usually require only the Experiment Introduction from the lab manual as a resource.

Exams: You will have 2.5 exams, consisting of a couple short-answer questions about basic concepts and several homework-like problems to solve. Exams will be pseudo-cumulative but will not explicitly test on material covered on previous exams. See the course schedule at the end of this document for tentative dates.

Expert TA

You will need to obtain an Expert account and purchase ***Expert TA*** *access* in order to complete the required homework assignment, and a **second access** in order to access the lab manual and complete the required pre-lab exercises through their online system (the latter replaces the cost of buying a hard copy lab manual).

Registration for the homework system will commence automatically when you start the first assignment in ELMS. Payment can be made by credit card during the process, or a payment code can be purchased bundled with your textbook at the bookstore (or elsewhere).

The financial obligation involved here is an unfortunate aspect of extreme class sizes, but (a) the system is more affordable than corporate alternatives and (b) it provides state of the art (not just saying that) assignment feedback to make up for the low cost.

Information about registration for the Lab manual system will be forthcoming.

Grading Scheme

Lab	20%
Homework	20%
Quizzes	20%
Exams (2 @ 16% each + Exam 0 @ 8%)	40%

ELMS Posts and Communicating with Me

I will clearly post all announcements, assignments, due dates, and other important information on the course ELMS page. I will also use ELMS to send course-wide emails when necessary. *It is **your responsibility** to find such information on ELMS.* Please check the page regularly for updates. I will be rather inflexible in dealing with problems that arise due to your failure to know things that have been said on ELMS.

That said, the TA or I will be happy to answer any other questions about course material, trouble with assignments, etc as they arise. Please feel free to send me email at any time for such reasons.

Attendance, Religious Observances, and University Closures

Your TA and I will be paying attention to who is attending, who is participating, who comes to office hours, etc. Playing along in these ways will be quite beneficial to you, especially in the event of borderline performance in the course. For instance, if you wind up at the cutoff between two letter grades at the end of the semester, the effort you put forth throughout the course will be pivotal in my decision as to where to draw the line.

All that said, if you already know this material well, and you're only taking the course because your department is making you, I will not be offended by your regular absence in lecture, and you will not be penalized for it, as long as you're present for exams, experiments, and quizzes, all of your assignments are turned in promptly, and your performance is satisfactory.

If you need to miss an experiment, a deadline, or an exam *for a religious observance or other legitimate reason,* ***please notify me in advance****, and preferably ASAP.* If you miss a lab or exam due to illness or emergency, please get in touch ASAP after the fact. In all cases, a makeup exam will be arranged accordingly.

Academic Integrity

Learning to solve problems in physics can be a difficult and tedious process; often students find it beneficial to work with a partner on such problems. This sort of behavior is encouraged, although you should avoid larger groups to discourage stragglers.

That said, it is crucial that all students create and submit *their own* assignments. It will often be easy to tell your assignments apart, and so also easy to see if you have submitted someone else's work. Furthermore, I will be Googling the problems I assign, so it will likely be clear to me if you've turned in work pulled straight from the internet. Such behavior will not be tolerated and may result in an XF grade for the course and/or further action taken by the Student Honor Council.

Students with Disabilities

Accommodations will be provided to enable students with disabilities to participate fully in the course. Please discuss any needs with me at the beginning of the semester, so that appropriate arrangements can be made. Students who are registered with DSS and plan to take exams at their facilities should provide the pertinent authorization forms (electronic format is fine) *at least* one week prior to each exam date.

PHYS 141
Tentative Schedule Outline
Summer 2024

Wk	*Week of*	*Ch(s)*	*Content*
1	May 28	1,2	intro, units, vectors*, displacement, velocity, acceleration, kinematics *No Class Monday - Memorial Day*
2	Jun 3	3,4	projectile motion, circular motion, forces, weight, Newton's 1st & 2nd laws
3	Jun 10	5,13	3rd law, friction, circular motion, drag force
4	Jun 17	8, 6	momentum & conservation, kinetic energy, collisions, work, springs, power *No Class Tuesday - Juneteenth* **Exam 1 - Fri, Jun 21**
5	Jun 24	7	potential energy & E conservation, rotational motion, center of mass, moment of inertia
6	Jul 6	18,19,20	rolling KE, torque & 2nd law, angular momentum *"Reading day" Thursday - Independence Day* **Exam 2 - Fri, Jul 5**