

PHYS121

Mechanics and Particle Dynamics

Summer 2023

Dr Matt Severson – mseverso@umd.edu – PHY3124C – Office Hrs T-Th 3-4pm

TA Xiao Xiao - xiaoxiao@umd.edu - PHY2221
Office hrs - Tu 12:30-1:30pm, F 1:30-2:30pm

Lecture PHY 1219

MW 2:00 - 3:50pm

TTh 2:30 - 3:50pm

(no class Fridays, except for midterm and final exam)

Discussion PHY1219

TTh 1:30 - 2:20pm

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

Course Description

The 161-260-270 course sequence gives an introduction to the concepts of classical and modern physics intended for students studying engineering or other similarly mathematical sciences. This first course in the sequence will begin with a brief introduction to measurement, units, and the scientific process before covering Newtonian mechanics, conservation laws, rotation, and fluids.

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.

Required Prerequisite or Co-requisite: MATH141 or MATH221 (or equivalent/ AP test credit)

Recommended Textbook: [Open Stax Physics](#) (new to the course) **No Mastering Physics.*

Discussion

You will have a 1-hr discussion for the course twice each week (see schedule). Sessions will consist of (usually) the short quizzes discussed below followed by about 45 minutes of time to work with the TA on any problem or difficulty you have come across in the homework assignments.

Assignments

Homework: I will assign homework roughly every week; the homework 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. 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 about 6 quizzes, which will take place in the first ~10 minutes of most discussion sections. 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.

Makeup quizzes will be difficult or impossible to schedule given our summer pace. I will drop your lowest quiz score before computing your average, I will have VERY little sympathy in dealing with makeups beyond that.

Exams: You will also have 2 exams + 1 short pre-test, 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 in previous exams. **See Schedule for dates.**

Expert TA

You will need to purchase access to the course in Expert TA in order to complete the required portion of the homework exercises through their online system.

Registration for the homework 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) for a surcharge.

Grading Scheme

| | |
|-------------------------------|-----|
| Homework | 33% |
| Quizzes | 27% |
| Exams | 40% |
| (2 @ ~16% each + Exam 0 @ 8%) | |

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, or know how to find the info in email.

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 here, 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 the classroom, and you will not be penalized for it, as long as you're present for exams, and quizzes, all of your assignments are turned in promptly, and your performance is satisfactory.

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

If the university is closed due to inclement weather or some emergency situation on or near an exam day or other important date, I will contact you on ELMS with further instructions.

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 ADS 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.

Tentative Lecture Schedule Outline

| Wk | Week of | Lecture Content (click for notes) | Chapters | Assignments |
|----|---------|--|-----------------------------|---|
| 1 | May 29 | No class Monday - Memorial Day intro, dimensions & units, vectors, motion | 1, 3.2-3.3, 2 | |
| 2 | Jun 5 | kinematics, freefall, 2D motion, projectile motion, <i>relative velocity</i> , forces, Newton's 1st & 2nd laws, weight | 2, 3, 4 | HW1 - due 6/5 Quiz 1 - in discussion T 6/6 Quiz 2 - in discussion Th 6/8 |
| 3 | Jun 12 | More 2nd law, 3rd law, friction, <i>drag force</i> , circular motion | 4, 5, 6 | HW2 - due 6/12 Quiz 2 - T 6/13 Exam 0 - Thu, Jun 15 -Ch 1-3 |
| 4 | Jun 19 | No class Monday - Juneteenth momentum & its conservation, kinetic energy, work, springs, power | 8, 7 | HW3 - due 6/19 Quiz 3 - T 6/20 Exam 1 - Fri, Jun 23 - Ch 1-6 |
| 5 | Jun 26 | potential energy, conservation of energy, center of mass, rotational motion and energy, moment of inertia | 7, 10.1-10.4 | HW4 - due 6/26 Quiz 4 - T 6/27 Quiz 5 - Th 6/29 |
| 6 | Jul 3 | No class Tuesday - 4th of July torque 2nd law, equilibrium, angular momentum and its conservation, <i>oscillations, fluids</i> | 9.1 - 9.4, 10.5, 11, 12, 16 | HW5 - due 7/3 Quiz 6 - Th 7/6 Exam 2 - Fri, Jul 7 - Ch 7-10 HW6 - not for credit (but content is on exam!) |

