

PHYS121

Fundamentals of Physics I

Fall 2019

Dr. Matt Severson

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PHY 1330 - Toll Phys Bldg

Tentative Office hours: M 1:30-2:30, Th 2-3

Lecture: MWF 12:00 - 12:50 PHY 1412

<i>Sec</i>	<i>Meeting Time</i>	<i>TAs</i>	<i>email</i>	<i>Office hours</i>
0201	M 9-9:50 PHY 0405 M 10-11:50 PHY 3306	dis Deniz Kurdak lab Dr. Negar Boroujeni	dkurdak@umd.edu nheidari@umd.edu	TBD
0202	M 1-1:50 MTH 0104 M 2-3:50 PHY 3306	dis Jarryd Horn lab Onat Arisoy	jahorn@umd.edu oarisoy@umd.edu	TBD by appt
0203	T 8-8:50 PHY 1402 T 9-10:50 PHY 3306	dis Jorge Ramirez Ortiz lab Dedi Wang	jorger99@umd.edu dwang97@umd.edu	TBD by appt
0204	T 2-2:50 MTH 0403 T 3-4:50 PHY 3306	dis Deniz Kurdak lab Srilekha Gandari	↑ gandhari@umd.edu	↑ by appt
0205	W 4-4:50 MTH 0302 W 5-6:50 PHY 3306	dis Ela Rockafellow lab Onat Arisoy	erock22@umd.edu ↑	TBD ↑
0206	W 2-2:50 MTH 0403 W 3-4:50 PHY 3306	dis Jorge Ramirez Ortiz lab Yao-Chieh Hu	↑ ycjhu@umd.edu	↑ by appt

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

Course Description

The 121-122 course sequence gives an introduction to the basic concepts of classical and modern physics intended for students studying biology, biochemistry, or other life sciences subjects, including pre-med track.

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, solids and fluids.

Prerequisites: PHYS121 and MATH112 or MATH115, or equivalent

Recommended Textbook:

College Physics, 4th ed. R. Knight, B. Jones, S. Field (Pearson, 2019).
No Mastering Physics.

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 once a week (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 available to deal with legit absences. **Please notify me ASAP, and preferably *in advance*, if you need to miss a lab.**

Discussion sessions will consist of (usually) the short quizzes discussed below followed by about 40 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; 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 7-8 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. *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. They 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 also have 3 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 (3)	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 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, 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.

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 garbage 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 121
Tentative Schedule Outline
Fall 2019

<i>Wk</i>	<i>Week of</i>	<i>Ch(s)</i>	<i>Content</i>
1	Aug 26	1,3*	Intro, units, vectors*
2	Sep 3	2	Displacement, velocity, acceleration, 1D kinematics. <i>No class Monday - Labor Day</i>
3	Sep 9	3	2D kinematics, projectile and circular motion,
4	Sep 16	3,4	Relative velocity, forces, weight, Newton's laws
5	Sep 23	5,6	More 2nd law, friction, centripetal force, gravitation
6	Sep 30	7	Rotational motion, torque, moment of inertia Exam 1 - Fri, Oct 4
7	Oct 7	7	Center of gravity, rotational dynamics
8	Oct 14	8	Static equilibrium, balance, springs
9	Oct 21	9	Momentum, conservation, impulse, collisions
10	Oct 28	9,10	Angular momentum, Energy, work
11	Nov 4	10	Kinetic and potential energy, conservation, power
12	Nov 11	11	Thermodynamics, bio energy, heat, 1st law Exam 2 - Fri, Nov 15
13	Nov 18	11,12	Entropy, 2nd law, atoms, gases
14	Nov 25	12	Calorimetry <i>No class Wed, Fri - Thanksgiving</i>
15	Dec 2	13	Density, pressure, buoyancy, fluid dynamics
16	Dec 9	13	Bernoulli's principle Exam 3 - Mon, Dec 16, 8:00am

* - indicates non-sequential jump in the textbook.