

Peter W. Stephens
Michael Wilking

peter.stephens@stonybrook.edu
Michael.wilking@stonybrook.edu

This course is taught online. Much of the material will be presented in pre-recorded lecture modules that students can view at their convenience. The class will meet online Tuesdays and Thursdays from 8:00 to 9:20. Students are required to take an online quiz every Thursday from 8:40 to 9:20 AM.

I. Course description from the Stony Brook University Undergraduate Bulletin: Physics for the Life Sciences I. First part of an introduction to physics with applications to biology, primarily for students majoring in biological sciences or pre-clinical programs. Topics include mechanics, fluid mechanics, and thermodynamics. Strong algebra skills and knowledge of the ideas of calculus are required. Three lecture hours and two laboratory hours per week. PHY 121 may not be taken for credit in addition to PHY 125, 131, or 141. This course has been designated as a High Demand/Controlled Access (HD/CA) course. Students registering for HD/CA courses for the first time will have priority to do so. *Prerequisite:* MAT 125 or MAT 131 or MAT 141 or AMS 151

II. Learning Outcomes:

- A. Students will demonstrate mastery of classical physics concepts related to motion, mechanics, conservation principles (energy, momentum, angular momentum), fluids, mechanical waves, the kinetic theory of matter, and elementary thermodynamics.
- B. Students will be able to think critically and apply appropriate physics concepts in analyzing qualitative problems in classical physics.
- C. Students will demonstrate the ability to apply trigonometry and algebraic and calculus-based mathematical reasoning in solving quantitative physics problems.
- D. Students will demonstrate proficiency in science process skills by performing experiments to measure physical phenomena and understand experimental error.
- E. Students will demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and dissemination of experimental results.

III. Course Organization:

- A. **Lectures** will be pre-recorded as several short modules per week, and available online well in advance of the time that the material is discussed in class. Each module will include one or more brief survey questions, which you will answer while you are viewing the module. It is critical that you work seriously on the surveys, both to give yourself the opportunity to learn by doing, and for the instructors to gauge areas that should be discussed further.

Scheduled Class Meetings, Tuesday and Thursday from 8:00 to 9:20, will have two functions.

1. Review: Brief presentations of material in response to survey questions in the recorded modules, answering questions on class material, worked solutions of prior homework problems, hints to currently assigned homework problems. Students are encouraged to submit questions for discussion in advance of these meetings.
2. Quizzes: There will be a 40 minute quiz on an earlier chapter, per the schedule listed below. These will occur Thursdays, 8:40 to 9:20, with time added at the end for students with SASC-approved accommodations. These quizzes will take the place of midterm exams in the course. Note that these will only occur during the class time, and so your personal schedule must allow your participation. During the quizzes, you may consult your notes, the assigned texts, and any other resources you may find on-line, but you may not receive assistance from, or give assistance to, any other person. You will be well prepared to take the quiz questions if you have done the assigned homework and studied the survey questions. There will be a time limit for the quiz questions.

There are no recitations. The class meeting functions as a recitation, insofar as you are guided toward learning how to solve problems on the material in the lecture notes (posted to Blackboard in advance) and in the homework problems.

An Echo recording of the class periods will be available via the Blackboard course page shortly after the conclusion of each class.

- B. There are ten **labs** associated with the course, in which you perform measurements that reinforce the course material. These are available in two formats:
1. Lab sections 01 through ?? will take place in the Physics Building, with appropriate social distancing and cleaning protocols consistent with University guidelines for small classes. Everyone participating in an in-person lab must wear a mask/face covering at all times. Any student not in compliance with this will be asked to leave the class.
 2. Lab section 69 will be performed individually by each student at their place of residence, using equipment rented or purchased from Macmillan Learning, as described in the Blackboard page for PHY 121.L69. For this course, you do not need to purchase the iOLab Components Kit, which consists of electrical breadboard and other items needed for PHY 122 labs. But you do need to rent (or buy) the iOLab device.

Further details of the labs are given at the following website:

<http://phylabs1.physics.sunysb.edu/introlabs/Fall2020/PHY121.html>

If you have a valid (as judged by your TA) excuse for missing your regularly scheduled lab session, contact your TA immediately by email. Make-up periods are scheduled for groups of labs; you may make up a lab you missed for a valid reason

only during the particular makeup period that includes that lab! This is because there is specific equipment for each lab, which will only be set up during the scheduled makeup periods.

There is a rigorous enrollment cap in each lab that will not be exceeded. If you cannot get the lab you want, you should register for an open lab and try to rearrange with a section switch once classes start; there is often opportunity to switch once classes start. But you must attend the lab for which you are registered until you have made such a switch.

- C. **Homework** problems will be assigned using an online system called Mastering Physics. Instructions to register for Mastering Physics and the online edition of the texts are in the Documents section of the course page in the learning management system, Blackboard. Once registered, you get there via Blackboard, through a tab labeled “Mastering Physics” followed by “MyLab and Mastering Course Home.” (Do not try to use the MasteringPhysics.com website.) Once there, you should see the assignments. Assignments will generally be due at 11:59 PM Friday, typically covering the material from the previous Tuesday and Thursday class meetings. The first one is due on August 30th. In addition, to reward students who study the material before course meetings, a bonus (on the homework score) is given for all problems submitted before the corresponding class meeting, starting in the second week of classes.

There will generally be two homework half-assignments each week, both due on Friday. One will have a title like “Homework due Sept. 4, bonus for work submitted before class Sept. 1” and the other, “Homework due Sept. 3, bonus for work submitted before class Sept. 3.” The deadline for bonus points will be 6:00 AM on the date of the class meeting. This is a true bonus, applied at the end of the term after the letter grade thresholds are fixed.

The homework grading policy is as follows: In short answer (calculation) problems, you have ten attempts to answer the question, without any penalty for incorrect answers. For multiple choice questions, credit is reduced in proportion to the number of incorrect guesses. That is, if there are five choices, you would lose 25% credit for each incorrect answer. Some questions offer hints, and there is no penalty for viewing them.

Many of the problems assigned will be of a tutorial nature, which means that you can answer them before you have mastered all of the material in the chapter. Indeed, you can probably answer some of them “cold,” before you even look at the chapter.

- D. The instructors will hold **office hours** on-line, Tuesday and Wednesday, from 1:00 to 2:30, at a videoconferencing site to be announced on Blackboard. You are also welcome to contact us at any time by email. Please start the subject line with “Physics 121” to be sure to capture our attention.

- E. We also have an on-line virtual help room, staffed by the lab TA's and undergraduate TA's, starting in the second week of classes. The schedule will be posted in Blackboard once the semester gets going.
- F. The schedule of material studied in this course will be approximately as follows. Chapter numbers refer to Knight, Jones, and Field, *College Physics, a Strategic Approach* 4th edition.

Date	Chapter	Topics	Quizzes
25-Aug	1,2	Course intro, units, models, 1D motion, velocity, acceleration	
27-Aug	2	1 D motion constant acceleration, free fall	Rehersal
1-Sep	3	Vectors, 2D motion	
3-Sep	3	Projectile motion, circular motion	Ch. 2
8-Sep	4	Forces and Newton's laws	
10-Sep	4	Free body diagrams, Newton's 3rd law, applying	Ch. 3
15-Sep	5	Applying Newton, friction, drag	
17-Sep	5	Interacting objects, ropes and pulleys	Ch. 4
22-Sep	6	Uniform circular motion, fictitious force	
24-Sep	6	Gravitation, circular orbits, weightlessness	Ch 5
29-Sep	7	Rigid body rotation, kinematics, torque, center of gravity	
1-Oct	7	Rotational dynamics, moment of inertia, coupled rotation and translation	Ch 6
6-Oct	8	Static equilibrium, Elasticity	
8-Oct	9	Impulse, Momentum, conservation of momentum, angular momentum	Ch 7
13-Oct	10	Energy and work, kinetic and potential energy	
15-Oct	10	Conservation of energy, thermal energy, collisions	Ch 8, 9
20-Oct	12	Atomic model of matter, ideal gas, specific heat,	
22-Oct	12	calorimetry, heat transfer	Ch 10
27-Oct	11	Transformation of energy, thermal energy, 1st law	
29-Oct	11	Heat engines, heat pumps, entropy, 2nd law	Ch 12
3-Nov	13	Fluids at rest, pressure, buoyancy	
5-Nov	13	Fluids in motion, Bernoulli, Poiseuille	Ch. 11
10-Nov	14	Oscillations, Simple harmonic motion, energy	
12-Nov	14	Damped oscillations, resonance	Ch 13

17-Nov	15	Waves, wavelength, frequency, sound	
19-Nov	15	Sound, energy and intensity, loudness, doppler	Ch 14
1-Dec	16	Superposition and Standing Waves	
3-Dec		Spare. Review?	Ch 15
10-Dec		Final exam: cumulative, with an extra question or two on Ch. 16	

IV. Required Materials:

- A. You will need a computer, either Windows (version 7 or higher) or Macintosh (OSX 10.10 or higher), and an internet connection capable of streaming video. Chrome browser seems to be the best for connecting to Blackboard.
- B. You gain online access to the textbooks and the homework system, Mastering Physics (MP), via Blackboard, through the tab, "Mastering Physics." Instructions to register for MP and the online edition of the texts are in the Documents section of the course page in Blackboard. Do not try to register through the Pearson website, or www.masteringphysics.com. Go through Blackboard, both to register at the start of the semester, and to do each homework assignment. The publisher, Pearson, has arranged a bundle of online access to MP and two texts at a cost of \$119, for the two-semester sequence, PHY 121 and 122. The texts are "College Physics, a Strategic Approach", 4th edition, by Knight, Jones, and Field and "College Physics: Explore and Apply," 2nd edition, by Etkina, Planinsic and Van Heuvelen.
- C. Access to stonybrook.edu email and Blackboard. Make sure that you frequently check the email that you have linked to your Blackboard account. Important announcements will be sent to you via the mail link in Blackboard. Email to your University email account is an important way of communicating with you for this course. For most students the email address is 'firstname.lastname@stonybrook.edu'. It is your responsibility to read your email received at this account. For instructions about how to verify your University email, or to forward it to a different address, see: <http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>. If you choose to forward your University email to another account, we are not responsible for any missed messages.

V. Grades:

The course is graded on a curve, based on your standing within the class. In previous semesters we have taught, about 10% of the class received each letter grade, A, A-, B+, B, B-, and C+, about 30% C, and about 10% below C; we expect that this class will follow this pattern.

Your grade will be calculated with the following weights.

- In class quizzes throughout the semester, 35%.

- Labs, 25%.
- Final exam, 15%.
- Homework via Mastering Physics, 15%.
- Class participation in survey questions linked to the prerecorded lecture modules, 10%. At the outset, this is purely a participation score, counted equally for correct or incorrect answers. If we change that policy, it will be made very clear in advance.

In view of the vagaries of internet service, some fraction of the lowest scores in the quizzes will be dropped. Those fractions, on the order of 10% to 20%, will be decided and posted once the semester gets going.

The University is studying options to provide a **final exam** in a proctored on-line environment, and we intend follow their recommendation. Details will be provided as the situation becomes clear.

The **final exam** is scheduled for Thursday, December 10, from 11:15 AM to 1:45 PM. Like the quizzes, it will be open book, open notes, and you may access resources on the internet; you may not consult with any other person while you are taking it. You must make sure there are no conflicts in your schedule. The University's policy that students have responsibility for avoiding exam conflicts is crystal clear, and exceptions will not be granted in this course. If you miss the final with a valid excuse, you will receive an Incomplete in the course and a makeup final will be scheduled as promptly as possible in the next semester.

VI. Academic Integrity (individual responsibility of each student): Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic integrity website at stonybrook.edu/commcms/academic_integrity/

Academic dishonesty will not be tolerated. In this course, the standards are as follows:

- In the recorded lecture modules, whenever a **survey question** is posed, you are invited to discuss it with your neighbors. However, one person furnishing answers for others is cheating and will result in an academic dishonesty complaint submitted to the Academic Judiciary against all involved.
- You may discuss with your colleagues (other students or Help Room personnel) the "physics" of assigned homework problems, but you should not ask to be given nor give to others actual solutions to those problems. Such collusion hurts both parties by answers being submitted that at least one (or both) student(s) do(es) not understand.
- In any on-line **quiz** or **exam**, copying answers from another person or use of materials or communication other than what is allowed by the instructors will

result in a claim of Academic Dishonesty being filed against you with a recommendation that the penalty be a final grade of **C- or lower** in PHY 121.

- In the laboratory, you are collecting data with your lab partner. But you are responsible to do the analysis and write up the results by yourself. Again, copying another person's work and submitting it as your own is academic dishonesty.

VII. University Resources and Administration.

- A. Student Accessibility Support Services (SASC):** If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. <https://www.stonybrook.edu/commcms/studentaffairs/sasc/facstaff/syllabus.php>
- B. Academic Integrity:** Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at: http://www.stonybrook.edu/commcms/academic_integrity/index.html
- C. Critical Incident Management:** Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.
- D. Student Participation in University-Sponsored Activities:** Students may have to miss class as a result of their participation in an event or activity sponsored by the University. This course will operate in compliance with the University policy set forth at: https://www.stonybrook.edu/sb/bulletin/current/policiesandregulations/policies_expectations/participation_univsponsored_activities.php. In particular, you should notify us in advance, but definitely before the final date of the 'add/drop' period of your intention to miss any class, exams, or labs that will arise due to such activities. At that time, we can discuss how you will be able to secure the work covered.
- E. Religious Holidays:** This course will operate in compliance with the University's policy regarding religious holidays, set forth at: http://www.stonybrook.edu/commcms/provost/faculty/handbook/employment/religious_holidays_policy.php. In particular, you should notify me in advance, but definitely before the final date of the 'add/drop' period, of your intention to be out

for religious observance. At that time, we can discuss how you will be able to secure the work covered.

VIII. Some Important Tips for Success:

- A. Physics depends heavily on mathematics. At this level, you'll need working familiarity with trigonometry and algebra, and a preparation to understand the ideas of calculus. So it is very important for your success that you meet the course prerequisites. Actually, calculus was invented to solve physics problems, and so we hope this course helps you understand some of the math you may have struggled to see the point of.
- B. Be familiar with your calculator, and use the same one for the on-line quizzes and the lab that you use for homework. You don't want to be spending valuable exam time figuring out how to use your calculator!
- C. Keep up to date with the material. The class has to move fast to cover everything, and most material builds on earlier topics.
- D. Read the book along with the recorded lecture modules, and turn in as many of the homework problems as you can early for bonus credit, as explained above.
- E. University guidelines state: "Students are expected to be 'on task' for 40-45 clock hours per credit, per semester. 'On task' pertains to all instructional activities (exams, homework, lectures, discussions, etc.)." That works out to ten to twelve hours per week for this four-credit course.
- F. Do the homework! Don't just use Chegg, Google, Bing, Course Hero, etc. to look up the answer. It may be a quick way to finish the assignment, but it won't nourish your understanding, and it really won't help you to retain the concepts. Most of our exam problems are going to be very similar to the homework and the survey questions. If you've only looked at them before, you're in trouble. If you've solved them before, you're prepared.
- G. Most of the course administration will be done via Blackboard. Please make sure that you have access to your Stony Brook Blackboard account, that this course is listed there, and that the email address listed in your Blackboard account is one that you monitor. The detailed course calendar, and lots of other useful information is available in Blackboard
- H. We encourage you to visit us in our on-line office hours, email us with questions, and visit the on-line Help Room!