



PHY 122: Physics for the Life Sciences
Course Syllabus
Spring 2020

Instructor:	Dr. Angela Kelly	angela.kelly@stonybrook.edu
Class Hours:	Mondays, Wednesdays, 8:00-9:20am; Fridays, 8:00-9:50am	
Classroom:	Physics P-118	
Graduate TAs:	Waltraut Knop Jason Taibi	waltraut.knop@stonybrook.edu jason.taibi1@stonybrook.edu
Office Hours:	Dr. Kelly: Mondays 12:00-1:30pm in Life Sciences 092; Wednesdays/Fridays by appt. Waltraut Knop: Jason Taibi:	

I. Course Description

PHY 122: Physics for the Life Sciences II (4 credits). The course is the second part of a two-part sequence with applications to biology, primarily for majors in biological sciences or pre-clinical programs. It focuses on electromagnetism, electric circuit theory, optics, and radiation phenomena. Strong algebra skills and knowledge of the ideas of calculus are required. The material will be addressed with chapters 17-30 in the required textbook (Knight, Jones, & Field, 3rd edition). The course consists of three hours of lecture and two hours of laboratory per week. Not for credit in addition to PHY 127, PHY 132, or PHY 142.

Prerequisite: C or higher in PHY 121/123

II. Course Learning Objectives

1. Students will demonstrate mastery of physics concepts related to electrostatics, electric circuit theory, magnetostatics, electromagnetism, reflection, refraction, geometric optics, diffraction, interference, and atomic and nuclear physics.
2. Students will be able to think critically and apply appropriate physics concepts in analyzing qualitative problems in classical physics.
3. Students will demonstrate the ability to apply algebraic mathematical reasoning and basic calculus concepts in solving quantitative physics problems.
4. Students will demonstrate proficiency in science process skills by designing and performing experiments to measure physical phenomena and minimize experimental error.
5. Students will demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and dissemination of experimental results.

III. Blackboard

Stony Brook's Blackboard website is the location where course files are shared and stored. The course is listed under PHY 122.90 and PHY 122.L90 (Kelly) Physics for Life Sciences II – Spring 2020. Files will be posted for laboratory procedures, lecture notes, clicker questions, etc. The gradebook will be updated regularly with clicker, lab, and exam grades. Homework grades will be listed on Mastering Physics.



E-mail messages from the instructor and teaching assistants (TAs) will be distributed via blackboard, so it is important that you register an email address that you check regularly for important course information.

IV. Required Materials

1. Textbook: Knight, R. D., Jones, B., & Field, S. (2019). *College Physics: A Strategic Approach* (4th Edition). Pearson Publishers. ISBN-13: 978321879721 You may obtain this text from the Stony Brook Bookstore. You may also purchase the e-book version from Mastering Physics. We will cover chapters 17-30 in this course so renting Volume II is another option from sites such as Amazon, Chegg, etc. It is important to have access to the textbook; by the structure of this course, there may not be time to cover all required material in class time.
2. Along with the text, you MUST purchase a Mastering Physics subscription with student access code; it is available in the Stony Brook University Bookstore and is valid for 24 months: <http://www.pearsonmylabandmastering.com/northamerica/masteringphysics/students/>. The course ID associated with this course is **MPKELLY122**. All homework will be assigned and graded electronically.
3. Scientific calculator with trig functions (e.g., TI-83)
4. Turning Point Technologies clicker or similar device, which **must** be registered by clicking on the "Turning Account Registration (clickers)" link in Blackboard under Tools.
5. Laboratory notebook

V. Homework

Homework problems will be due Monday evenings at 11:59pm. The problems will be posted on the Mastering Physics website under course **MPKELLY122**. Please register using your student number so your grade may be linked to Blackboard. A Mastering Physics access code is required to view problems and submit solutions electronically. Students will not be penalized for multiple attempts at problems, but there is a maximum of ten submissions for each part of each problem. Solutions will be discussed as needed in class and office hours. Late work is not accepted without a documented medical excuse. Homework will count towards 10% of the final grade for the course.

The function of homework is to reinforce and apply concepts that you are learning; it is not to write down the correct answer. If you get homework solutions online without working out the solution yourself, you will not get much educational benefit, and you will probably not be prepared for the exams.

VI. Laboratory

Laboratory experiments will be conducted during regular class time on Fridays. Attendance on Fridays is mandatory during the entire semester – most weeks include laboratories although some weeks there are lectures and/or recitations instead of laboratory activities. Instructions for each lab are posted on Blackboard in PHY 122.L90 Documents. Laboratory performance will constitute 25% of the final grade in PHY 122.

Informal Lab Reports. The laboratory grade will be based upon participation and successful completion of experiments. For each experiment, students will record 1) the purpose of the experiment, 2) *brief* procedural outline, 3) materials, 4) data and calculations, 5) graphs (where appropriate), 6) error analysis, and 7) conclusions. The **first three sections** must be completed **before** you come to the laboratory; the final four sections will be completed in class (and for some calculations, after class) and checked **the following week**. Teaching assistants will check and initial laboratory notebooks at the end of each period for data collection.



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These reports are *informal*, and are graded on a 10-point scale. No informal pre-labs will be accepted late. Late informal post-labs will be penalized 1-point per day.

Formal Lab Reports. In addition, students are required to complete **three formal laboratory reports** during the semester. Each formal lab report will include the 7 sections listed above, typed with 1" margins, 12-point font, and single-spaced. The first page of the lab report should have your name, the names of your lab partners, the date of the experiment, the lab number and the title of the lab as it appears in the lab instructions. Submit formal reports in .doc, .docx, or pdf files with your name and lab number in the file name (e.g., KIM JONES_LAB 4). Please submit reports on Blackboard (due at 11:59pm on the following dates):

- Formal Lab Report #1 (select one from Labs 1-3) due Monday, March 2.
- Formal Lab Report #2 (select one from Labs 4 or 6) due Monday, April 6.
- Formal Lab Report #3 (select one from Labs 8-10) due Friday, May 8.

No formal reports can be written for labs 5 or 7. Each formal laboratory report will be graded on a 100-point scale. Late work will be penalized by subtracting 10 points for each day late. In order to pass the lab course, you must submit a report even if it is so late that it will receive zero points. The laboratory grade will be based upon the completion of *all* experiments and the three formal laboratory reports.

Lab Make-Ups. Students *must* complete all ten labs to receive a passing lab grade. Make-up labs will be scheduled at the convenience of the TAs or instructors *only with a valid medical or university excuse*. Please see Dr. Kelly to discuss all lab make-ups.

Academic Integrity. Although you will have the same data and graphs as your lab partners, remaining portions of the lab report must be completed individually. Copying the work of another student violates Stony Brook's Academic Integrity Policy (see below in Section XI). If the instructors find that you have violated this policy, you will receive a zero for the assignment and you will be referred to the Academic Judiciary for disciplinary action.

VII. Exams

There will be two midterm exams – **Friday, February 28 (Chapters 20-23)**, and **Friday, April 3 (Chapters 24-26)**. They will be given during the regularly scheduled class/laboratory time in Physics P-118. Students must remain in the classroom for the entire exam period. The final exam is **Thursday, May 14 at 2:15pm**; the location will be announced. The final exam is cumulative and based upon Chapters 17-30.

VIII. Grading Structure

Final grades in PHY 122 will be determined as follows:

1. Midterm exams: 15% each
2. Final exam: 25%
3. Homework: 10%
4. Clicker participation: 10% (including attendance)
5. Laboratory: 25%

IX. Extra Help



Dr. Kelly will be available for office hours Mondays (1:00-2:30 pm) in 092 Life Sciences, and by appointment on Wednesdays and Fridays (please e-mail). We encourage you to seek help as soon as you are having difficulty, since the cumulative nature of the material makes it difficult to catch up if you fall behind. Teaching Assistants will also be available as indicated on p.1. You may also check the departmental schedule for the Help Room in Physics A-131.

X. Disability Instructions

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, 128 ECC Building (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following web site: <https://ehs.stonybrook.edu//programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities>.

XI. University and Academic Integrity Statement

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. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at https://www.stonybrook.edu/commcms/academic_integrity/. One person using the clicker of another to simulate participation in class meetings is academic dishonesty, and will be treated as such.

XII. 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 Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty are required to follow school-specific procedures: http://www.stonybrook.edu/commcms/emergency/critical_incident.shtml.



XIII. Schedule of Topics and Experiments

Monday	Wednesday	Friday
Jan 27 – Electrostatic Charge, Force, Coulomb’s Law (Ch20)	Jan 29 – Electric Field (Ch20)	Jan 31 – Electric Potential (Ch21)
Feb 3 – Capacitance, Current, Resistance, Power (Ch21-22) Homework #1 Due	Feb 5 – Capacitance, Current, Resistance, Power (Ch21-22)	Feb 7 – Lab #1 – Resistance/Ohm’s Law*
Feb 10 – Circuits & Kirchoff’s Rules (Ch23) Homework #2 Due	Feb 12 – Capacitors in Series & Parallel; RC Circuits (Ch23)	Feb 14 – Lab #2 – Series/Parallel Circuits *
Feb 17 – RC Circuits (Ch23) Homework #3 Due	Feb 19 – Magnetic Field & Force (Ch24)	Feb 21 – Lab #3 – Current in a Magnetic Field*
Feb 24 – Midterm Review Homework #4 Due	Feb 26 – Midterm Review Lab Make-Ups #1-3**	Feb 28 – Midterm #1 (Ch20-23)
Mar 2 – Magnetic Field & Force (Ch24) Formal Lab Due (from labs #1-3)	Mar 4 – EM Induction (Ch25)	Mar 6 – Lab #4 – Faraday’s Law*
Mar 9 – Electromagnetic Waves (Ch25) Homework #5 Due	Mar 11 – Inductance & AC Circuits (Ch26)	Mar 13 – Lab #5 – Building Motors
Mar 16 – Spring Break	Mar 18 – Spring Break	Mar 20 – Spring Break
Mar 23 – Inductance & AC Circuits (Ch26)	Mar 25 – Waves & Light (Ch17)	Mar 27 – Lab #6 – RC & RL Circuits*
Mar 30 – Midterm Review Homework #6 Due	Apr 1 – Midterm Review Lab Make-Ups #4-6**	Apr 3 – Midterm #2 (Ch24-26)
Apr 6 – Interference & Diffraction (Ch17) Formal Lab Due (from labs #4 or 6)	Apr 8 – Optics, Reflection, Refraction (Ch18)	Apr 10 – Lab #7 – Diffraction
Apr 13 – Optics, Refraction (Ch18) Homework #7 Due	Apr 15 – Optical Instruments (Ch19)	Apr 17 – Lab #8 – Refraction*
Apr 20 – Quantum Physics (Ch28) Homework #8 Due	Apr 22 – Quantum Physics (Ch28)	Apr 24 – Lab #9 – Lenses/Mirrors*
Apr 27 – Atoms & Molecules (Ch29) Homework #9 Due	Apr 29 – Nuclear Physics (Ch30)	May 1 – Lab #10 – Nuclear Decay/Radiation*
May 4 – Nuclear Physics (Ch30) Homework #10 Due	May 6 – Final Exam Review Lab Make-Ups #7-10**	May 8 – Final Exam Review Formal Lab Due (from labs #8-10)
Final Exam (Ch17-30) – Thursday, May 14, 2:15-5:00pm		

*Indicates pre-lab assignment due at start of class.

**Dates are tentative.