



PHY 122: Physics for the Life Sciences II Syllabus

Updated January 17, 2023

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Part 1: Course Overview**Course Information:**

Course title: Physics for the Life Sciences II

Course catalog # and section: PHY 122.90

Credit hours: 4

Semester: Spring 2023

Course Meeting Time/Location: Physics P-118; Monday & Wednesday 8:30–9:50am (lecture); Friday 8:30-10:40am (laboratory)

General education designation (SBC): Study the Natural World (SNW)

Prerequisites: C or higher in PHY 121

Corequisites: CHE 132 or CHE 152

Required Course Textbook and Materials: Knight, R. D., Jones, B., & Field, S. (2018). *College Physics: A Strategic Approach* (4th Edition). Pearson Publishers. ISBN-13: 0134609034. You must also purchase a Mastering Physics subscription with student access code; it is valid for 24 months. The Mastering Physics license plus e-text, ISBN 978-0134724747, is available for \$74.99 from Pearson (18-week access), \$115.50 from Amazon. Please follow the instructions in Blackboard to register for Mastering Physics.

The course may be accessed through Blackboard to complete the homework assignments and optional exam practice problems.

TurningPoint access is required for quizzes and class participation. You may use a physical clicker or TurningPoint Mobile on your smartphone, tablet, or web browser. While the app is free to download, you must have a valid Turning Account subscription to use TurningPoint Mobile. If you did not purchase a clicker set that included the Turning Account subscription card, then you must purchase a Turning Account subscription card (bookstore or [Turning Account page](#)). Enter the session ID provided at the beginning of each class meeting. Register your clicker on Blackboard to link your responses to quiz/participation grades.

Recommended Course Materials: Scientific calculator with trig functions (e.g., TI-83).

Course Description: This 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 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. 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. This course has an associated fee. Please see www.stonybrook.edu/coursefees for more information.

The concurrent laboratory component, PHY122 L-90, consists of ten mandatory two-hour lab sessions. All labs must be completed to pass PHY122, and the lab grade will constitute 25% of the final PHY 122 grade. Missing a lab session without rescheduling it will result in a failing grade for the entire PHY 122 course – this is the policy of the Department of Physics & Astronomy.

This course is structured in the “Studio Physics” format, whereby lecture and group problem solving are integrated throughout class sessions. Students will be asked to work in problem-solving groups at the whiteboards at the perimeter of the room at various times during lectures. Your active participation is a critical part of the learning process.

Course Expectations:

Instructor Information:

Instructor name: Dr. Angela Kelly

Instructor’s email: angela.kelly@stonybrook.edu

Office location and hours: Mondays 1:00–3:00pm, Wednesdays 10:30–11:30am (Life Sciences 092, basement across from elevators), and by appointment. I am also generally available after each lecture to answer questions.

Graduate teaching assistants (Fridays):

Meghan Hott meghan.hott@stonybrook.edu

Nabil Lhachemi mohamedNabilY.Lhachemi@stonybrook.edu

Undergraduate teaching assistant (Mondays):

James Burns james.burns@stonybrook.edu

Help Room and Tutoring:

The Physics Help Rooms are located on the A-level of the Physics Building (A-129 and A-131). The hours are approximately 9:00am–6:00pm, Monday to Friday. Teaching assistants, teaching staff, and faculty will be available for extra help.

You may also request one-on-one or small group tutoring from the Academic Success and Tutoring Center in the Stony Brook Union, starting the week of January 30: [https://www.stonybrook.edu/commcms/academic_success/students/index.php#APPOINTMENTS\(ASTC\)](https://www.stonybrook.edu/commcms/academic_success/students/index.php#APPOINTMENTS(ASTC)).

Classroom Expectations and Information:

- **Class attendance:** Attending class regularly will help you succeed in this course. You are expected to attend all classes. If you are unable to attend due to illness or emergency, please contact me ahead of time to let me know (if possible) and

be sure you get any important information you missed from Blackboard. Students must be physically present to submit clicker responses to quiz questions.

Submitting responses without being present in the classroom, or having another student submit responses for you, is considered academic dishonesty and will be referred to the Academic Judiciary.

- **Class participation:** This course requires thoughtful and engaging participation in class discussions and group problem solving.
- **Class cancellation or delay:** In the event that our class is cancelled, you will be notified via Blackboard Announcements and/or by your stonybrook.edu email. In the event of inclement weather, you can check www.stonybrook.edu for updates on weather related delays or cancellations.
- **Classroom environment:** It is important for everyone that we maintain a positive and respectful learning environment both in class and online. We treat others and their ideas and experiences with respect and tolerance. If you have concerns, please contact me.
- **Instructor email and office hours:** I am accessible via email and will make every effort to respond as quickly as I can. When sending emails please include the course number in the subject line. If you would like to speak to me, you may come to my office hours or schedule an in-person or virtual (Zoom) meeting.
- **Blackboard access:** Stony Brook's Blackboard website is the location where course files are shared and stored. The course is listed under **PHY122.90. Physics for the Life Sciences II – Spring 2023**. I will post files for lecture notes, clicker questions, exam review materials, etc. Lecture notes (PowerPoint slides in pdf format) will be posted before each lecture. Lecture notes with solutions to problems and clicker questions will be posted after class.

Review some [Academic Success Strategies](#) and visit the [Student Resources](#) page to ensure that you are successful in this course.

Technical Requirements:

Having a reliable computer and Internet connection throughout the term will benefit you.

Caution: It may not be possible to review files required for your assignments using a smartphone or tablet. Blackboard, for example, has limited functionality on mobile devices. If you need to borrow a laptop, please visit [SBU's Laptop Loan Program](#).

Technical Assistance:

If you need technical assistance at any time during the course or to report a problem with Blackboard you can:

- Phone: 631-632-9800 M-F 9:00-5:00 (device support, Wi-Fi, software, hardware, logins)
- Submit a help request ticket: <https://it.stonybrook.edu/services/itsm>
- Email blackboard@stonybrook.edu

Part 2: Course Learning Outcomes

These are your course level learning outcomes, or broad goals you will achieve in this course. There may be more specific outcomes in your modules or units. You can refer back to these to study for quizzes and exams.

Upon completion of the course, students will be able to:

1. Demonstrate qualitative and quantitative mastery of physics concepts related to electrostatics, electric circuit theory, magnetostatics, electromagnetism, reflection, refraction, geometric optics, diffraction, interference, and atomic and nuclear physics.
2. Critically evaluate physical parameters and apply appropriate physics concepts to analyze problems in classical physics.
3. Demonstrate the ability to apply algebraic mathematical reasoning and basic calculus concepts in solving quantitative physics problems.
4. Demonstrate proficiency in science process skills by planning and performing experiments to measure physical phenomena and minimize experimental error.
5. Demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and dissemination of experimental results.
6. Understand the methods scientists use to explore natural phenomena including observation, hypothesis development, measurement and data collection, experimentation, and evaluation of evidence.
7. Understand the natural world and the major principles and concepts that form the basis of knowledge in the natural sciences.
8. Assess scientific information and understand the application of scientific data, concepts, and models in the natural sciences.
9. Make informed decisions on contemporary issues involving scientific information.

Part 3: Course Schedule

Exams: There will be two midterm exams, each constituting 15% of the final grade, during regular class hours in Physics P-118:

- **Friday, February 24, 8:30–9:50am** (Chapters 20–23)
- **Friday, April 7, 8:30–9:50am** (Chapters 17, 24–26)

The final exam is scheduled for:

- **Thursday, May 11, 2:15–5:00pm** (Chapters 17–30, cumulative)

The final exam will constitute 25% of the final grade. The exam will be cumulative though weighted more heavily towards material in Chapters 18-19, 28-30. The location of the final exam will be announced in April.

It is essential for students to be punctual and arrive prepared for exams with a pencil and calculator (check batteries). Equation sheets will be provided. Cell phones may not be used during exams for any reason.

Homework: Homework will be assigned through Mastering Physics, posted on the Mastering Physics website under course **kelly63627**. These problem sets will be due **Monday evenings at 11:59pm** according to the schedule in Table 1. Additional optional practice problems and prior exams with solutions will be posted to help you prepare for exams. Please register through 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 (10 attempts are allowed). Solutions will be discussed in class as questions arise. No homework is due the Mondays following midterm exams. Homework will constitute 10% of the final grade for the course.

Table 1 indicates the tentative schedule of physics topics, exam dates, and due dates for homework assignments. I encourage you to read the corresponding textbook chapters for individual topics before class so you are better prepared to learn and master the lecture material.

The possibility exists that unforeseen events will make schedule changes necessary. Any changes will be clearly noted in Announcements on Blackboard and/or through Stony Brook email.

Table 1. Course Schedule of Topics, Readings, and Assessments*

Monday	Wednesday	Friday
January 23 – Electrostatic Charge, Force, Coulomb's Law (Ch20)	January 25 – Electric Field (Ch20)	January 27 – Electric Potential (Ch21) ***via Zoom, optional
January 30 – Electric Potential (Ch21) Homework #1 Due	February 1 – Capacitance, Current, Resistance (Ch22)	February 3 – LAB #1 Resistance & Ohm's Law
February 6 – Capacitance, Current, Resistance, Power (Ch22) Homework #2 Due	February 8 – Circuits & Kirchoff's Rules (Ch23)	February 10 – LAB #2 Electric Field Mapping
February 13 – Capacitors in Series & Parallel (Ch23) Homework #3 Due	February 15 – RC Circuits (Ch23)	February 17 – LAB #3 DC Resistor Circuits
February 20 – Midterm Review Homework #4 Due	February 22 – Midterm Review	February 24 – Midterm #1 (Ch20-23)**
February 27 – Magnetic Field & Force (Ch24)	March 1 – Magnetic Field & Force (Ch24)	March 3 – No Lab
March 6 – Electromagnetic Induction (Ch25) Homework #5 Due	March 8 – Electromagnetic Waves (Ch26)	March 10 – LAB #4 Magnetic Force
March 13 – Spring Break	March 15 – Spring Break	March 17 – Spring Break
March 20 – Inductance & AC Circuits (Ch26)	March 22 – Inductance & AC Circuits (Ch26)	March 24 – LAB #5 q/e Ratio for the Electron

Homework #6 Due		
March 27 – Waves & Light (Ch17) Homework #7 Due	March 29 – Interference & Diffraction (Ch17)	March 31 – LAB #6 Faraday's Law
April 3 – Midterm Review Homework #8 Due	April 5 – Midterm Review	April 7 – Midterm #2 (Ch17,24-26)**
April 10 – Optics, Refraction (Ch18)	April 12 – Optics, Refraction (Ch18)	April 14 – LAB #7 Geometric Optics
April 17 – Optical Instruments (Ch19) Homework #9 Due	April 19 – Quantum Physics (Ch28)	April 21 – LAB #8 Refraction
April 24 – Atoms & Molecules (Ch29) Homework #10 Due	April 26 – Nuclear Physics (Ch30)	April 28 – LAB #9 Diffraction
May 1 – Final Exam Review (Ch20-26) Homework #11 Due	May 3 – Final Exam Review (Ch17-19,28-30)	May 5 – Final Exam Review (Ch17-30) ***via Zoom, optional
Final Exam: Thursday, May 11, 2:15–5:00pm, location TBA		

*Dates are tentative for specific topics.

**Midterm exams will take place during regular class time in Physics P-118.

***These classes are optional review sessions.

Part 4: Grading and Late Work Policies

Assessment and Grading:

Points for graded activities will be posted to the My Grades area on Blackboard.

Clicker Quizzes: Consistent **attendance and quiz responses/participation** are essential for your success in the course. Participation will be monitored with clicker quizzes that will also assess your knowledge of physics concepts and problem solving. These questions may be posed at any time during the lecture period. Students will not be penalized for incorrect responses, rather, the questions are an opportunity to self-assess your physics knowledge and correct your misconceptions. Unanswered questions will not receive any credit – it is your responsibility to confirm the TurningPoint application is fully functional. Clicker quizzes will constitute 10% of the final grade, and grades will be posted on Blackboard after each lecture. I will drop the lowest three clicker quiz grades at the end of the semester, which will accommodate absences due to illness, quarantine, emergency travel, etc. If you have more than three absences, you will need a verified medical excuse to receive any missed credit beyond three class.

Laboratory Grades: Laboratory experiments are an essential component of learning physics. The laboratory grade will be based on participation and the successful completion of experiments; this will constitute 25% of the final grade in the course.

- Laboratory experiments will be conducted during regular class time on Fridays. Most weeks include laboratories although some weeks there are exams,

lectures, and/or recitations instead of laboratory activities (see Course Schedule). Instructions for each lab are posted on Blackboard in PHY 122 Documents.

- **Pre-Lab Quiz.** The laboratory grade will be based upon participation, pre-lab preparation, and successful completion of experiments. Before each lab, students will complete a 5-point **lab quiz** through a Qualtrics link that will be posted on Blackboard. The quiz will include questions on the objectives of the lab and procedural details. The lab quiz must be completed before 8:00am on the day of the lab; no late responses will be accepted. There will be 10 lab quizzes for a total of 50 possible points.
- **Data Collection.** There will be a maximum of three students in each lab group. Lab groups will share equipment, report the same data, and generate the same graphs. Teaching assistants will check and initial laboratory notebooks at the end of each period to confirm data collection.
- **Lab Report.** For each lab report, students will submit a report that includes the following:
 - The first page of the lab report should include your name, the names of your lab partners (no more than two), the date of the experiment, the lab number and the title of the lab as it appears in the lab instructions.
 - Abstract of roughly 75-125 words that includes the purpose of the experiment, most significant results in general terms, and whether you met the objectives of the lab. [5 points]
 - Data and Calculations. Include well-organized data and one detailed sample of each calculation. Use correct significant figures, indicate uncertainty where appropriate, and include correct units with your results. Calculations and graphs should include error propagation, if required. All graphs should have a title/caption and axes should be labeled with units. The slope should also include units. [10 points]
 - Conclusions. Discuss how/whether your results are consistent with physics theory. Include notable trends and conclusions. Indicate sources of error and how/whether error might be diminished if performing the experiment again. A total of 75-150 words for this section should be adequate. [5 points]
 - Answers to Questions. Answer all questions in the lab manual – these questions are numbered and you should include the same reference numbers in your report. [5 points]
- The report is due **the week following the date when the lab was performed**, unless indicated otherwise on the Course Schedule. These reports are graded on a 25-point scale. Late lab reports will be penalized 3-points per day. In order to pass the lab course, you must submit a report even if it is late enough to receive zero points. The laboratory grade will be based upon the completion of *all* nine experiments.
- **Lab Make-Ups.** Students *must* complete all nine 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*.
- **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 Part 5). 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 further disciplinary action.

Overall Assessment. In this course, you will be assessed by the following components as outlined in Table 2:

Table 2. *Course Assessments and Weighted Distributions*

Graded Activity/Assignment	Percentage of Final Grade	Due Date
Homework #1	0.9% each (10% total)	Week 2: Monday, January 30
Homework #2	0.9% each (10% total)	Week 3: Monday, February 6
Homework #3	0.9% each (10% total)	Week 4: Monday, February 13
Homework #4	0.9% each (10% total)	Week 5: Monday, February 20
Midterm #1	15%	Week 5: Wednesday, February 22
Homework #5	0.9% each (10% total)	Week 7: Monday, March 6
Homework #6	0.9% each (10% total)	Week 9: Monday, March 20
Homework #7	0.9% each (10% total)	Week 10: Monday, March 27
Homework #8	0.9% each (10% total)	Week 11: Monday, April 3
Midterm #2	15%	Week 11: Wednesday, April 5
Homework #9	0.9% each (10% total)	Week 13: Monday, April 17
Homework #10	0.9% each (10% total)	Week 14: Monday, April 24
Homework #11	0.9% each (10% total)	Week 15: Monday, May 1
Final Exam	25%	Thursday, May 11
Clicker Quizzes/Participation	10%	Cumulative (recorded each class)
Laboratory	25%	Cumulative (10 experiments)

Letter Grades:

The grading scale is outlined in Table 3. This scale may be adjusted/curved downward depending on cumulative student performance in the course. For example, the threshold for a final A grade may be lower than 90%.

Table 3. *Grading Scale*

Letter Grade	Percentage Range
A	90–100
A-	86–89
B+	82–85
B	78–81
B-	74–77
C+	70–73
C	66–69
C-	62–65

D+	56–61
D	50–55
F	<50

These letter grades are threshold scores only. Actual final scores needed to earn a certain letter grade may be lowered if warranted based on the difficulty of the exams. In other words, if your final total points in the course equal a 90%, you will not earn less than an A; however, the threshold for an A may be lower. For additional information on Stony Brook's Grading and Grading System in the Spring 2022 Undergraduate Bulletin: [Undergraduate Grading System](#).

Late Work/Retake Policy:

Late homework will be penalized by 20% off per each day late and will not be accepted after the Friday following the assignment's due date. Please contact me directly to discuss extenuating circumstances. Missed midterms, laboratory experiments, and final exams will require a verified medical excuse for students to be eligible for a make-up exam. Make-up exams and labs will be scheduled at the discretion of the instructor and/or TAs.

Part 5: University and Course Policies

University Policies:

Student Accessibility Support Center Statement:

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Inion Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation are confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: <https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities> and search Fire Safety and Evacuation and Disabilities.

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. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. This also includes submitting clicker quiz responses for another student (or having another student submit responses for you),

copying, using outside materials or communications during exams, plagiarism, falsifying experimental data, and using data that you did not participate in collecting as your own. These infractions will result in a failing grade for the course.

For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website:

http://www.stonybrook.edu/commcms/academic_integrity/index.html.

In lecture, when a clicker quiz question is posed, you may discuss it with your peers. You may work with your colleagues on problem solving strategies for the homework problems, the clicker quizzes during lectures, and the laboratory preparation and execution. In the laboratory, you and your partner(s) are collecting the same data, and you may discuss subsequent steps of analysis. However, the formal laboratory reports should be your own writing, computation, analysis, and conclusions.

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. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Religious Observances:

See the policy statement regarding religious holidays at https://www.stonybrook.edu/commcms/registrar/calendars/religious_holidays.php#2022. Students are expected to notify me by e-mail of their intention to miss class for religious observances, which are excused absences. At that time, we can discuss how you will complete missed work.

Course Policies:

Understand When You May Drop This Course:

If you need to drop or withdraw from the course, it is your responsibility to be aware of the tuition liability deadlines listed on the registrar's [Academic Calendar](#). Before making the decision to drop/withdraw you may want to contact me or refer to the University's policies: [Undergraduate Course Load and Course Withdrawal Policy](#).

Incomplete Policy:

Under emergency/special circumstances, students may petition for an incomplete grade. Circumstances must be documented and significant enough to merit an incomplete. If you need to request an incomplete for this course, contact me for

approval as far in advance as possible. You should also read the University's policies that apply: [Undergraduate Bulletin](#).

Course Materials and Copyright Statement:

Course material accessed from Blackboard, Zoom, Echo 360, etc. is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or distributed without written permission of the instructor and/or the copyright holder. Duplication of materials protected by copyright, without permission of the copyright holder is a violation of the Federal copyright law, as well as a violation of Stony Brook's Academic Integrity Policy.