

Course Description: PHY 122: Physics for the Life Sciences II

This course is the second part of a two-part sequence of introductory physics 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](http://www.stonybrook.edu/coursefees) for more information.

The concurrent laboratory component, PHY122L90, 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 re-scheduling 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.

Prerequisites: C or higher in PHY 121  
(Pre-requisite for PHY 121 is one of MAT 125, MAT 131, MAT 141 or AMS 151)

Corequisite : CHE 132 or CHE 152

Credits: 4 credit course

Stony Brook Curriculum Learning Objectives:

Studying the Natural World (SNW)

Explain the methods scientists use to explore natural phenomena including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling.

Explain the application of scientific data, concepts, and models in one of the natural sciences.

Student Learning Objectives:

The broad learning objective or goal for this course is that, upon completion, 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.



Course Meeting Time: Monday and Wednesday 8:30-9:50am and Friday 8:30-10:20am in P-118 of the Physics Building

Course Instructors: Richard S. Lefferts  
Contact: richard.lefferts@stonybrook.edu  
Office: A-112 of Physics Building  
Office Hours: TBD in Physics Help Room, Online Meeting or by Appointment

Dr. Harold Metcalf, Distinguished Teaching Professor  
Contact: harold.metcalf@stonybrook.edu  
Office: S-225 of the Physics Building  
Office Hours: TBD

Lab Section Instructors: Teaching assistants, most often graduate students in Physics and Astronomy  
Contact: TBD

#### Required Textbooks and Materials:

##### Mastering Physics and Electronic Textbook:

Students must have a Mastering Physics license for the course (a license is good for two semesters!). There is a link to the appropriate site on the course Brightspace.

In Spring 2024 the test will primarily be “College Physics, a Strategic Approach”, 4th edition, by Knight, Jones, and Field

##### Calculator

Students will need a basic scientific calculator with trig functions, square root, log, exponential notation. This will be helpful for homework and in-class work; it will be essential for exams.

#### Recommended Readings:

Additional notes and suggested readings will be available or linked to in Brightspace.

Course Structure: Monday and Wednesday meetings (8:30-9:50, P-118) will be a mixture of lecture, demonstrations, individual work and group work. Attendance and participation are required and will be part of the course assessment. Accommodations will be made for excused absences only.

Friday meetings will be used for doing laboratory experiments, with a few exceptions for extra lectures or exams.

Labs will be done in groups of 2 or 3 students under the guidance of teaching Assistants.

Students will then submit their own, **individual** report on the experiment.

Details on the lab schedule and report requirements are found in Brightspace.



## Assignments and Assessment:

- Midterm 1 , tentatively February 23, 8:30-9:50am 15%
- Midterm 2 , tentatively April 5, 8:30-9:50am 15%
- Final Exam, Thursday May 9, 11:15-1:45pm 25%
- Homework via MasteringPhysics 10%
- 10 Lab Reports 25% total
- Class participation via worksheets and in-class quizzes 10%

Grade Determination: Course grades will be based on total scores as calculated using the values listed above. We will strive for a straight scale with approximate ranges as below. We reserve the right to scale scores or shift thresholds to have grades reflect the level of performance and achievement of the students. See the Undergraduate Bulletin for details.

[https://www.stonybrook.edu/sb/bulletin/current/policiesandregulations/records\\_registration/grading\\_system.php](https://www.stonybrook.edu/sb/bulletin/current/policiesandregulations/records_registration/grading_system.php)

Rough scale: 90-100, A; 80-89, B; 70-79, C, 65-69, D, <65, F.

Communication: Brightspace <https://mycourses.stonybrook.edu/d2l/login>

122.90 Announcements from the instructors  
Course Schedule  
Support materials (videos, notes, links)  
Grades for in-class work, exams and final grades

122.L90 Announcements from teaching Assistants  
Lab Schedule  
Manuals (instructions) for laboratory experiments  
Guidelines for reports, text on uncertainty & error  
Links to plotting tool, tutorials  
Pre and post lab quizzes (tentative)  
Place to submit laboratory reports  
Quiz and report scores

SBU Google Apps

E-mail: This course will only use University e-mail for official business

Google Sheets: This course makes extensive use of spreadsheets for data recording and analysis.

Teams, Meet, Zoom, Slack: (Possible) teaching assistant office hours

**Technical Requirements:**

This course uses Brightspace for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Brightspace course site can be accessed at

<https://mycourses.stonybrook.edu/d2l/login> .

If you are unsure of your NetID , visit

<https://it.stonybrook.edu/help/kb/finding-your-netid-and-password>

for more information.

You are responsible for having a reliable computer and Internet connection throughout the term.

**Attendance, Late Work and Make-Up Policy:**

Attending class regularly will help you succeed in this course. You are expected to attend all classes and credit for in-class work will not be given for those not present. Accommodation will be made for excused absences only.

Work submitted past due dates, such as homework or lab reports, will be discounted.

Class work, including exams, which is missed because of an excused absence will be made up at the instructors discretion, abiding relevant University policies and balancing accommodation with academic fairness.

**SUMMARY**

Consult **Brightspace** Frequently

<https://mycourses.stonybrook.edu/d2l/login>

Welcome to PHY 122!

PHY122.90 Physics for the Life Sciences II, Studio Version  
Calendar for Spring 2024 (tentative!)

Monday	Wednesday	Friday
January 22 – Course Introduction Electric Charge and Force (Chapter 20)	January 24 – Coulomb’s Law, Electric Field (Chapter 20)	January 26 – “Lab Zero” Introduction to lab in the Studio format
January 29 – Electric Field (Chapter 21) <b>Homework #1 Due</b>	January 31 – Electric Potential (Chapter 21)	February 2 - Current, Resistance (Chapter 22)
February 5 - Current, Power (Chapter 22) <b>Homework #2 Due</b>	February 7 - Circuits and Kirchoff’s Rules (Chapter 23)	February 9 - Lab #1 Electric Field Mapping
February 12 - Capacitance, Capacitors (Chapter 23) <b>Homework #3 Due</b>	February 14 - Capacitors in Circuits RC Circuits (Chapter 23)	February 16 - Lab #2 Resistance and Ohm’s Law
February 19 - Midterm Review <b>Homework #4 Due</b>	February 19 - Midterm Review	February 23 - Midterm #1 (Chapters 20-23)
February 26 - Magnetism (Chapter 24)	February 28 - Magnetic Force and Field (Chapter 24)	March 1 - Lab #3 Resistors and DC Circuits
March 4 - Electromagnetic Induction <b>Homework #5 Due</b>	March 6 - Inductance and AC Circuits (Chapter 26)	March 8 - Lab #4 Magnetic Force
March 11 - Spring Break	March 13 - Spring Break	March 15 - Spring Break

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Monday	Wednesday	Friday
March 11 - Spring Break	March 13 - Spring Break	March 15 - Spring Break
March 18 – Inductance and AC Circuits (Chapter 26) <b>Homework #6 Due</b>	March 20 – Electromagnetic Waves	March 22 - Lab #5 e/m Ratio of the Electron
March 25 – Midterm Review <b>Homework #7 Due</b>	March 27 – Midterm Review	March 29 Midterm #2 (Chapters 24-26)
April 1 – Waves and Light (Chapter 17)	April 3 – Interference and Diffraction (Chapter 17)	April 5 – Lab #6 Faraday's Law
April 8 – Optics and Refraction (Chapter 18) <b>Homework #8 Due</b>	April 10 – Optics and Refraction (Chapter 18)	April 12 – Lab #7 Geometric Optics
April 15 - Optical Instruments (Chapter 19) <b>Homework #9 Due</b>	April 17 - Quantum Physics (Chapter 28)	April 19 – Lab #8 Refraction
April 22 - Atoms and Molecules (Chapter 29) <b>Homework #10 Due</b>	March 6 - Nuclear Physics (Chapter 30)	April 26 - Lab #9 Diffraction
April 29 - Final Exam Review <b>Homework #11 Due</b>	May 1 - Final Exam Review	May 3 - Final Exam Review <b>Homework #12 Due</b>
<b>Final Exam: Thursday May 9, 11:15 – 1:45pm, location TBA</b>		

## Course and 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 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. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website:  
<http://www.stonybrook.edu/ehs/fire/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 is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website  
[https://www.stonybrook.edu/commcms/academic\\_integrity/](https://www.stonybrook.edu/commcms/academic_integrity/)

**Important Note: Any form of academic dishonesty, including cheating and plagiarism, will be reported to the Academic Judiciary.**

### 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 Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

### Understand When You May Drop This Course :

It is the student's responsibility to understand when they need to consider disenrolling from a course. Refer to the Stony Brook Academic Schedule for dates and deadlines for registration:





[https://www.stonybrook.edu/commcms/registrar/calendars/academic\\_calendars](https://www.stonybrook.edu/commcms/registrar/calendars/academic_calendars)

#### 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 the instructor for approval as far in advance as possible.

#### Course Materials and Copyright Statement:

Course material accessed from Brightspace, SB Connect, SB Capture or a Stony Brook Course website 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.

#### Communications Guidelines:

The course instructor and lab section instructors will conduct themselves according to the standards in the Stony Brook University Faculty Handbook <https://www.stonybrook.edu/commcms/provost/faculty/handbook/>

Students will conduct themselves according to the standards in the Stony Brook University Code of Student Responsibility <https://www.stonybrook.edu/commcms/studentaffairs/ucs/conduct.php>