

PHYSICS II-PHY156– SPRING 2024

I. INSTRUCTOR CONTACT INFORMATION

Names: Dr. Kalani Hettiarachchilage (Dr. Hetti)
Office Hours: Thursdays: 10:10 -11:00 AM: through Zoom: <https://zoom.us/j/2436817997>
Email: Kalani.hettiarachchilage@csi.cuny.edu
Group work: <https://us02web.zoom.us/j/83156318475?pwd=ZWVhMTFwYm9kZDZlQWVlQSDVyd309>
Playlist: https://www.youtube.com/playlist?list=PLv_BVWnieP40CC9-ENqy_X4MkQh7FMi5Z

Meeting time: There are three components: you should be available for all following times.

1. Asynchronous Lecture and problem-solving Thursdays 10:10-11:00 AM
2. Mandatory Synchronous discussion and group work Tuesdays 10:10 AM-12:05 PM
3. In-person lab: You are registered for one of the following sessions and attend accordingly.
Please check CUNYFirst for your registered session.
 - Mondays 8:00 - 9:55 AM room 4N 215
 - Mondays 10:10 AM-12:05 PM 4N 215
 - Mondays 6:30 - 8:10 PM room 4N 214
 - Mondays 8:20– 10:00 PM room 4N 214
 - Thursdays 12:20 – 2:15 PM room 4N 214

You should pass the lab class and lecture class separately to have a passing letter grade of PHY156. Your lab class passing grade will be decided by lab instructor. Table 4 shows my final grade calculation and Table 5 shows letter grade boundaries for the whole PHY156.

II. COURSE DESCRIPTION:

Second part of two semester Algebra-based introductory physics course of four-credits. The course is overlapping of following topics in laws of electricity and magnetism, optics, and modern physics. The important laws of physics in these areas and problem solving are emphasized. Problem solving is an integral part of the course. Conceptual understanding is reinforced using interactive computer-based techniques, demonstrations, and laboratory experiences.

Usual Pre- or Corequisite: Appropriate math placement and PHY116

Unit	Topic	Chap #	Sub/Due
Intro	Introduce yourself to the class: Discussion Forum + Padlet	BB/Intro	Jan 30
	Watch “Welcome” and “Class navigation & syllabus overview” recordings	BB/Intro	Jan 30
	Sign up for group work within the lab section classmates	BB/Intro	Jan 30
	Complete the syllabus review Quiz	BB/Intro	Jan 30
1	Electric charge and Electric fields: Electric charge, charging objects, conduction, induction. Conductors & Insulators; Coulomb’s law for electric force	18.1-18.3	LN1,WS1: Jan 25 GW1, SL1: Jan: 30
	Particle in an electric field, Electric fields of charge particles, point charge and dipole, electric field lines, the motion of a charged particle in a uniform electric field, charge conservation and quantization, electric flux, Gauss’s law, conductors in electrostatic equilibrium	18.4-18.8	LN2,WS2: Feb 1 GW2, SL2: Feb 6
	Electric Potential and Energy: potential due to charge particle, potential difference, potential energy, Capacitors, capacitance, and dielectric. Calculation capacitance for combinations such as series and parallel capacitors, energy stored in a charged capacitor. The capacitance of the parallel plate, charging and discharging capacitors	19.1-19.7	LN3,WS3: Feb 8 GW3,SL3: Feb 13
	Quiz 1 from Lecture 1-3	18.1-19.7	Feb 20
2	Current, Resistance, and Ohm's Law: Electric current, resistance, electrical conductor, Ohm’s law, resistivity, conductivity, drift current, current density. Resistance to temperature, electric power. Alternative and direct currents, Electric hazards and the human body, Electrocardiograms.	20.1-20.7	LN4, WS4: Feb 15 GW4, SL4: Feb 27
	Circuits and DC Instruments: Electromotive force, Batteries in series and parallel, Single-loop circuits, Series resistors in the circuit, Power dissipation	21.1-21.2	LN5,WS5: Feb 29 GW5, SL5: Mar: 5

	Multi-loop circuits, parallel resistors, Kirchoff's rules, RC circuits, Household wiring, and safety, Voltmeter and Ammeter.	21.3-21.6	LN6, WS6: Mar 7 GW6,SL6: Mar:12
	Quiz 2 from Lecture 4-6	20.1-21.6	Mar 19
3	Magnetism: magnets, magnetic fields: Motion of charge particle in a uniform magnetic field, magnetic force acting on a current carrying conductor, Torque on a current loop, magnetic moment, Hall effect,	22.1-22.6	LN7,WS7:Mar21 GW7,SL7:Mar26
	The Biot-Savart law, Ampere's law to find a magnetic field in infinite long wires, arc-shaped wires, sphere, ring. The magnetic force between parallel wires, Magnetic field of solenoid and toroid, magnetic matters.	22.7-22.11	LN8,WS8:Mar28 GW8, SL8:Apr 2
	Electromagnetic Induction, AC Circuits, and Electrical Technologies: Faraday's Law, the law of induction, magnetic flux, motional emf, Lenz's law, induced emf and electric fields, Eddy currents, generators, motors, and transformers.	23.1-23.8	LN9,WS9: Apr 4 GW9, SL9:Apr 9
	Electromagnetic Waves: Maxwell's equations, radiation pressure and force, EM spectrum	24.1-24.3	
	Quiz 3 from Lecture 7-9	22.1-24.3	Apr 16
4	Introduction to geometrical optics: The Nature of light: reflection, refraction and polarization, total internal reflection. Types of images. Reflection by plane and spherical surfaces. Refraction by thin lenses. Image locations by drawing ray diagrams.	25.1-25.7	LN10,WS10:Apr 11 GW10, SL10: May 7
	Vision and optical instruments: Optical instruments, magnification, the Human eye, microscope, Telescope	26.1-26.5	LN11,WS11:May2 GW11,SL11:May7
	Wave Optics; Interference: Light as a wave, Diffraction, Photoelectric effect, Quantum effect, Young's double slit experiment, Intensity distribution, Huygens's Principle.	27.1-27.8,27.8	LN12,WS12:May9 GW12: May 14
	Quiz4 from Lecture 10-12	25.1-26.5	May 14

Table 1: Contents, assignments, and due dates

I will provide you with enough materials and problems to learn, it is your responsibility to watch them carefully and solve problems yourself. Referring to textbooks and working together with your classmates or tutors are recommended for all Lecture Notes (LN), Worksheet (WS), and group work problems (GW), but make sure you learn, attempt, and work individually to learn yourself. Three quizzes should be attempted individually at the given class time synchronously as assigned above and show what you learn throughout the class by following all required class rules and ethics. Participating in online class activities effectively, asking questions, discussing with classmates and instructor are the key points for succeeding in this class.

III. COURSE MATERIALS

This course is based on OER (online educational resources). It is zero cost for you, but it is the best resource that guides you to learn excellent knowledge in materials.

Required Textbook: OpenStax College Physics.

Free online link: openstax.org/details/books/college-physics

Senior Authors: Paul Peter Urone and Roger Hinrichs

Digital: ISBN-10: 1-947172-01-8

ISBN-13: 978-1-947172-01-2

Web Version Last Updated: Mar 03, 2022

IV. COURSE LEARNING OBJECTIVES (CLOs)

At the end of this course, students will be able to:

CLO 1: Describe physics concepts verbally, graphically, and mathematically by identifying and defining physical quantities to explain major laws of Physics and its applications by using mathematical models for quantitative reasoning and describing physical reality.

CLO 2: Apply knowledge of electricity and magnetism including electromagnetic waves to explain natural physical processes and related technological advances including critical analytical skills to evaluate physical phenomena and their effects

CLO3: Demonstrate the understanding of algebraic mathematics along with physical principles to effectively solve problems encountered in everyday life, applicable to biological activity and health care, and further study in science, and professional world.

CLO 4: Design and demonstrate experiments and acquire data to explore physical principles, effectively, communicate results, and critically evaluate related scientific studies and use basic level programming including detail data analysis technics.

V. EXPECTATIONS

Students are expected to:

- Use your **CSI email address or other institutional email address** when emailing instructors and fellow students with the proper subject line such as “PHY 156-short reason to contact”.
- Introduce yourself to the class during the first week by posting a self-introduction in the appropriate discussion forum and padlet.
- Review the syllabus, course calendar, final grade calculations, submission carefully.
- Be familiar with the blackboard page and learn how to submit work and locate your course materials.
- Interact online with instructor/s and peers. Be an active participant in each component of the course.
- Submit assignments by the corresponding deadline.
- Always think and learn by using assigned class time effectively, use only my class materials, formulas, symbols, and strategies for all work.
- Always use your face framed **camera during the synchronous class and office hours** as required.
- **Don't publish any of the class documents anywhere without my permission.**
- Don't share your own work of the assignments with others, that will be plagiarized for both ends.
- Always take screenshot of your trophy during slido work and send me.

VI. ASSIGNMENTS & ACTIVITIES:

Be sure to complete the assignments associated with all the materials thoroughly and carefully. Please always use your mind and learn to think effectively. This will be the most valuable result of your college education and learning experience.

- Access all the assignments through the unit module on the blackboard.
- You should watch the lectures and worksheet problems by spending class time plus extra minutes.
- You should submit your work for each lecture (LN) and problem solving (WS) before due, usually **Thursday midnight**.
- Group work (GW) and Slido concept check (SL) will be completed, graded, and submitted during **Tuesday class time with mandatory attendance**.
- Three quizzes are assigned to do during **Tuesday class time synchronously with camera on**. There will not be any change of those days or times, **make sure you are available to take the quizzes**. It is very important you show your detailed calculations by following class ethics and requirements to earn full credits by doing work individually.
- Quizzes will be graded by following the rubric. Lecture note (LN) and worksheets will receive full credit if you follow the model and complete on time. LN should be completed first, then complete the problem solving WS.
- All submissions of work should be your own, if I find any copies, **both parties will receive zero credits**.
- Graded work should not compare or share with others, these discrepancies will **receive lowest grade** for both parties and/or **retested both parties** with quiz makeup.
- Submissions are allowed only through the blackboard. There are two attempts for each submission, therefore you should prepare your completed work earlier and convert it into a **single pdf file and submit it to correct place before due**. (No submission accepted through emails but last minutes technical difficulties you should email your work before due time with the acceptable description why you are emailing). Then you should submit it to the blackboard with a note saying what happened and why late when the technical problem is resolved.
- Follow the due date/time for all submissions carefully. All due dates are labeled in red in table 1 and they will be available on the blackboard page too.
- You can find the grading rubric in table 6 with point distribution for quizzes and group work.
- Late work (LN and WS) will not be graded unless it is a real emergency and shows required documents within 24 hours of missing work. Please see more details in late policy. If you miss the class, you should not submit GW for points, but you should work and learn the materials for Quiz.
- If you miss a quiz or some GW, you can take universal quiz from all chapters to cover them at the end but need a notice of missing work within 24 hours.

VII. COURSE COMPONENTS DETAILS:

Asynchronous lectures: The goal of the course is to use 55 minutes effectively.

- Asynchronous lectures are required to watch during the assigned time interval or your choice.
- The lectures will provide the key content knowledge to be conveyed in this course.
- You should take notes and complete the related lecture summary assignment while watching it.
- The rest of the class time should be used to rewatch the materials or read the textbook to sharpen your understanding of the material.

Asynchronous problem solving: The goal of this component is to use learnt concepts in lectures to problem solving or real-world applications. This component of the course is very important.

- Assume this as your homework, spend another 55 minutes on your own to watch recorded problem solving. If you need help or if you have any concerns, you can join the office hours to talk.
- This is an extremely important component in your overall learning experience.
- Follow the lectures (LN) and worksheet (WS) to complete your groupwork (GW) assignment and other activities during class time on Tuesdays.

Synchronous class work: It is very important that you attend synchronously and work effectively in all activities. I am planning to provide a summary of the lecture, work on a problem and more detailed understanding of concepts through Slido. Additionally, we will do group work, discussions and grade the work. You will get a chance to work with your classmates. Everyone should submit work individually. But the following list of roles should be assigned to members of the group and rotated among each assignment within the semester to have equal opportunities for all members. If a few members are absent in the sessions, please distribute the roles among the rest as combined roles. All members should agree on the final product and work equally and understand all work. This will help you to contribute equally to all aspects of learning, communicating, organizing, and collaboration.

List of roles:

All students should handwrite the process, answers, and submit them individually to BB as assigned.

- Student 1: Distribute the roles, then submit the roles with your work.
- Student 2: Take, record, and submit attendance with your work. Ask to introduce during the first session.
- Student 3: Explaining the assignments rules and requirements. Be responsible for explaining them.
- Student 4: In charge of the ground rules related to justice, equity, diversity inclusion (JEDI) below.
- Student 5: Listen to instructor carefully and manage given time and distribute among members.
- Student 6: Help everyone to submit a single PDF file to BB for all assignments.

Following JEDI ground rules should be reinforced by student # 4 to make sure every student has an equal opportunity and respect for their work, ideas, and learning.

JEDI (justice, equity, and diversity inclusion) ground rules:

- One person should speak at a time
- Provide reasons when you make statements
- Raise a hand or signal when you have something to say
- Listen carefully to what other people are saying
- Respect other people and their ideas
- Should not interrupt others
- Should not speak too long and give the opportunity to others
- Should not bias in gender, color, major, body shape, college, and all other diversities and demographics

Tentative Synchronous class meeting Schedule:

Time	10:10 AM-12:05 PM: Tuesdays		
Date	Plan	Date	Plan
Jan 30	SL1, GW1	Mar 19	Quiz 2
Feb 06	SL2, GW2	Mar 26	SL7, GW7
Feb 13	SL3, GW3	Apr 02	SL8, GW8
Feb 20	Quiz1	Apr 09	SL9, GW9
Feb 27	SL4, GW4	Apr 16	Quiz 3
Mar 05	SL5, GW5	May 07	SL10, GW10, SL11, GW11
Mar 12	SL6, GW6	May 14	Quiz 4, GW12

Table 2: Tentative schedule for mandatory synchronous sessions, you should attend and complete required work

In person laboratory: The goal of this component is to connect physics concepts to application and demonstrations. The lab will be used to introduce, reinforce, and/or enrich the treatment of related topics studied in the lecture portion of this course. Here you can visualize, demonstrate, and analyze the physics concepts while developing hands on experiences, collaborations, communications, and organization skills.

- You should participate in a registered lab session.
- Conduct laboratory exercises with an instructor's guidance and a technician's supervision.
- Turn in lab reports, datasheets, pre quizzes, post quizzes as assigned by your instructor.
- Must attend, participate, complete, submit the work and pass, otherwise you will fail entire course PHY156.

Here are the experiments that we are planning to complete which are well aligned with the class materials. Your lab grade will be calculated by lab instructors according to their own grading criteria. Please see your lab instructor syllabus for more information.

Week	Exp	Experimental name
1	Intro	Lab rules, lab report format, grading policies, error and significant analysis, introduction to basic measurements and instruments: Resistor, Capacitor, multimeter
2	1	Electrostatics analysis and Observation
3	2	Equipotential and Electric field lines
4	3	Ohm's law and Resistance
5	4	Resistivity
6	5	Series and parallel resistors and capacitor
7	6	Kirchhoff's Rules
8	7	Sources of Electromotive force in Direct current Circuits
9	8	RC Circuits: charging and discharging
10	9	Magnetic Field lines produced by a permanent Magnet
11	10	Magnetic Field in a Slinky Solenoid
12	11	Reflection and refraction laws of light
13	12	Geometrical optics: image formation and focal points
14	13	Make up lab: More image formation or magnetic field in a current carrying wire

Table 3: Tentative laboratory schedule

VIII. GRADING:

Students will **not** be graded "on a curve". Your grade will **not** depend on the grade of your classmates. You will be graded on an absolute scale.

Description	Percentage
Quizzes 4: (@ 10 points each)- synchronous	40%
Lecture notes (LN) 12 (@ 0.5 points each)	06%
Worksheet (WS) 12 (@ 0.5 points each)	06%
Group Work (GW) 12 (@ 1 point each)-should submit work individually- synchronous	12%
Slido concepts (SL) 12 (@ 1 point each)-synchronous	11%
Lab work- should attend, complete enough work, and pass the lab class- in person	25%
Total	100%
Discussion forums+ padlet introduce yourself before Jan 31 st -extra credit	0.25%
Syllabus Review before Jan 31 st -extra credit	0.25%
Slido trophy winners one or more times-extra credit	01%

Table 4: Grading Items

Extra Credits:

There is not any other extra credit opportunity for this class other than the grades assigned in the above table and 0.5 extra point for syllabus review and Discussion forum, 1.0 point for slido concepts winners one or more times. Therefore, plan to complete work and earn the grade.

Late Policy:

Late work will not be accepted! In a real emergency, students should contact the instructor no later than 24 hours after the missed work otherwise they will be given a zero grade for the missed evaluation. This process will accept only **two late LN and two WS submissions**. If you missed more than four submissions, there will be 20% off per day for each late submission although it is an emergency.

All late submissions should be submitted to the blackboard with a note and proof of why it is late. **Quizzes cannot have any excuses since they will be assigned to complete during synchronous class time. If you miss a quiz or some GW, you should take an in-person universal quiz (all contents) to make it up at the end of the semester.**

Grading scale:

Grade Ranges			
A	92.60% - 100%	C+	75.60% - 78.59%
A-	89.60% - 92.59%	C	69.60% - 75.59%
B+	86.60% - 89.59%	D	59.60% - 69.59%
B	82.60% - 86.59%	F	<59.59
B-	78.60% - 82.59%		

Table 5: Grade Scale

IX. GRADING RUBRIC FOR HW AND QUIZ:

Below rubrics are roughly the way a grade will be assigned to HW and Quiz. The way grades are assigned depends on how well you meet the goals of each assignment. You can use the rubric as a guideline for preparing your assignment.

Criteria	Need Improvement (1) 10%	Developing (2) 50%	Sufficient (3) 85%	Above Average (4) 100%
Follow guide (20%)	Not use correct ID, Not handwritten & sign honor statement	Use correct ID, but change during the work	Use correct ID, but not commentary usage of it throughout the work	Commentary use of ID
Content (20%)	Unsupported work without enough details.	Detailed work without clarification or overview of objectives and methods.	Detailed work with clear explanation of the problem	Insightful commentary on the solution.
Organization (20%)	Difficult to follow Not clear work Hard to read	Partially organized but some sections are difficult to follow.	Presented with a logical sequence of ideas and concepts.	Logical, effective, and interesting organization of ideas.
Mechanics (20%)	Contains many errors.	Fewer than 3 errors	Competent written	Well written!
Illustrations (20%)	unclear illustrations and lacking explanation and comparison.	Appropriate illustrations - not enough illustrations and comparison are used.	Contains original illustrations and theoretical approach to help reader understand the problem.	Demonstrate effective & efficient effort, illustration, and effective communication of the results.
Timelines	Late work has penalty (Read more information on the late policy section.)			20% off for every day (zero grade after 5 days)
Requirements for GW and Quizzes	<ul style="list-style-type: none"> • Missing handwritten statements, name, ID, letter spirit, date, and signatures • Wrong A, B, C and ID • Keeping answers with A, B, C or Changing them inside the assignment • Filling in the blank of given problem sheets or typing answers • Usage of random formulas and symbols that we didn't discuss in the class. • Writing number solutions without writing class formulas and concepts first. • Writing ChatGPT generated answers without effort and understanding. • Submitting many files instead of a single file with all work. 			25% off for missing 1 or more items on the list. Repeating the same mistake again and again has penalty 50%

Table 6: Rubric for grading

X. **ACADEMIC DISHONESTY:**

In education, integrity and ethical behavior are of paramount importance. All students are fully and completely responsible for understanding and honoring the rules of CUNY and CSI regarding academic integrity, plagiarism, and cheating. Violations of academic integrity may result in a lower grade or failure in a course and in disciplinary actions with penalties such as suspension or dismissal from the College.” More information on the CUNY policy, including numerous examples, can be found in the CUNY [academic integrity policy and procedure statement](#).

XI. **ATTENDANCE:**

A student who is absent for required lab classes and groupwork will be reported and lose the points or fail the class. Not submitting required work within first couple of weeks of the semester will be assigned a grade of WU (withdrew unofficially), subject to the discretion of the instructor. A student who does not attend a course within the first two weeks at all will be assigned a grade of WN (never attended). For other grades check the grading scale.

XII. **STUDENTS WITH DISABILITIES:**

“Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the [<https://www.csi.cuny.edu/campus-life/office-accessibility-services>]. Prior to granting disability accommodations in this course, the instructor must receive written verification of student’s eligibility from the Office of accessibility services, which is in 1P-101. It is the student’s responsibility to initiate contact with the Center for Student Accessibility staff and to follow the established procedures for having the accommodation notice sent to the instructor.”

XIII. **OTHER COLLEGE RESOURCES:**

- The College of Staten Island (CSI) is committed to addressing bias, discrimination, and retaliation complaints promptly, consistently, and objectively. CSI community members have the right to use and be referred to according to their preferred name, and/or personal pronouns. Everyone also has the right to use all spaces according to their self-identification. To learn more about how to change your preferred name and affirm your gender identity at CUNY (including requesting a new ID card and/or email address), go here: <https://www.csi.cuny.edu/about-csi/diversity-csi/lgbtq-resource-center/preferred-name-change>.
- Anyone who has experienced harassment related to gender or sexual identification, who needs assistance, or who wishes to file a complaint, can contact the Office of Compliance and Diversity: <https://www.csi.cuny.edu/about-csi/diversity-csi/office-diversity-equity-and-inclusion/complaint-procedures>
- CSI is committed to the health and well-being of all students. Everyone seeks assistance or help at some point in their life. The Counseling Center is committed to helping students achieve personal and academic success. The center offers individual, group, and couples counseling in addressing psychological and adjustment issues such as depression, anxiety, relationships, stress, time management, and many more. <https://www.csi.cuny.edu/students/counseling-center>