FLORIDA POLYTECHNIC UNIVERSITY

Welcome to PHY2049 – Physics 2

Academic Integrity

The faculty and administration take academic integrity very seriously. Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties. Do not compromise your integrity for a perceived short-term gain

Course Information

- **Course Number and Title:** PHY 2049 Physics 2
- **Credit Hours:** 3 (lecture)
- **Academic Term:** Fall 2024

Course Meeting Information

Section	Instructor	Meeting Time	Room
1	Dr. Fouad	MWF 9:00-9:50 am	IST1049
2	Dr. Fouad	MWF 10:00-10:50 am	IST1049
3	Dr. Adamek	MWF 11:00-11:50 am	IST1049
4	Dr. Adamek	MWF 1:00-1:50 pm	IST1049
5	Dr. Saeidi	MWF 2:00-2:50 pm	IST1049

Instructor Contact and Office Hours

Here is the schedule for office hours. Feel free to come to any office hours to discuss concepts or for coursework help. Please contact your section instructor for questions about specifics discussed in lecture or about grades.

All office hours will be in the instructor's office listed in the table below.

Sections	Instructor	Email and Office	Monday	Tuesday	Wednesday	Thursday	Friday
1-2	Dr. Fouad	efouad@floridapoly.edu BARC 2274	1:00 pm - 02:00 pm		12:00 pm - 01:00 pm		12:00 pm -01:00 pm
3-4	Dr. Adamek	eadamek@floridapoly.edu BARC 2276	TBA		TBA		TBA
5	Dr. Saeidi	ssaeidi@floridapoly.edu BARC 2270	TBA		TBA		TBA

Course Details

Official Catalog Course Description:

- **Course Description: This calculus-based course serves as the second in a two-part series, covering topics like thermodynamics, electricity, magnetism, circuits, electromagnetic waves, optics, and interference. Designed for science and engineering majors, the course integrates critical thinking, analytical skills, and real-world applications.**
- **Prerequisites: PHY 2048 - Physics 1 and MAC 2312 - Analytic Geometry and Calculus 2**
- **Co-requisite: PHY 2049L - Physics 2 Laboratory**

Required Texts and Materials:

- **Required Text: University Physics Volume 2 and 3 by OpenStax, freely available at:** https://openstax.org/details/books/university-physics-volume-2 and https://openstax.org/details/books/university-physics-volume-3
- **Equipment and Materials: TI-30XIIS Scientific calculator (required for homework, quizzes, and exams). Canvas (for Homework, Instructor Notes, Practice Tests, and Grades). University Email for any relevant reminders and updates.**

Course Objectives: This course (through lecture, student coursework, etc.) is intended to:

- **Define physical concepts related to thermodynamics, electromagnetism, circuit analysis, electromagnetic wave phenomena, and geometric optics, and to reinforce previously introduced concepts (including energy, force, interference).**
- **Develop processes for interpreting physics question prompts to turn them into actionable problems, and**
- **Demonstrate methodologies to derive a clear and concise solution from provided information.**

Course Learning Outcomes: Upon completion of the course, students should be able to

- **Identify physically relevant equations and demonstrate mathematical skills required to manipulate those,**
- **Apply physics concepts to solve problems based on real world situations,**
- **Integrate scientific communication tools (tables, graphs, etc.) with the underlying physics concepts, and**
- **Create accurate solutions that are relevant to the real world based on physical principles.**

Alignment with Program Outcomes:
Program Learning Outcomes and General Education Competencies may be found in the Academic Catalog (http://catalog.floridapoly.edu/).

Student Learning Outcomes (SLO) Table

Course Learning Outcome	Learning Level	Program Learning Outcome (ABET)
Identify physically relevant equations and **demonstrate** mathematical skills required to manipulate those.	**Remember and Recognize** Recall	**1** an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
Apply physics concepts to solve problems based on real world situations.	**Apply and Analyze** Execute Implement Differentiate Organize	**1** an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
Integrate scientific communication tools (tables, graphs, etc.) with the underlying physics concepts.	**Understand** Interpret Compare Explain	**3** an ability to communicate effectively with a range of audiences
Create accurate solutions that are relevant to the real world based on physical principles.	**Evaluate** Check Critique	**1** an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics **4** an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

Academic Support Resources

- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit floridapoly.edu/writingcenter.

Course Schedule

The two course schedules listed below are tentative and subject to change as a result of extreme weather, changes made by the registrar's office or for some other unforeseen reasons. Any updates to these schedules will be announced in class and on Canvas.

Tentative PHY 2049 Schedule MWF – Fall 2024

Week Topic	Monday	Tuesday	Wednesday	Thursday	Friday
8/19-8/23 Temperature and Heat			Ch 1.1-1.3		Ch 1.4-1.5
8/26-8/30 Thermodynamics	Ch 2.1-2.2		Ch 2.3		Ch 3.1-3.2
9/2-9/6 The First Law of Thermodynamics			Ch 3.3-3.4		Ch 4.1-4.2
9/9-9/13 The Second Law of Thermodynamics	Ch 4.4-4.5		Ch 4.6		Ch 5.1-5.2
9/16-9/20 Electric Charges and Fields	Exam 1 Review		5.3-5.4 Exam 1 (Ch 1-4)		Ch 5.5-5.6
9/23-9/27 Gauss's Law	Ch 6.1-6.2		Ch 6.3 - 6.4		Ch 7.1-7.2
9/30-10/4 Electric Potential	Ch 7.3-7.4		Ch 7.5		Ch 8.1 – 8.2
10/7-10/11 Capacitance	Ch 8.3-8.4		Ch 9.1-9.3		Ch 9.4-9.5
10/14-10/18 Direct-Current Circuits	Exam 2 Review		Ch 10.1-10.2 Exam 2 (Ch 5-8)		Ch 10.3
10/21-10/25 Magnetic Forces and Fields	Ch 11.1-11.3		Ch 11.4-11.5		Ch 11.6
10/28-11/1 Sources of Magnetic Fields	Ch 12.1-12.3		Ch 12.4-12.5		Ch 13.1-13.2
11/4-11/8 Electromagnetic Waves	Exam 3 Review		Ch 13.3-13.4 Exam 3 (Ch 9-12)		Ch 16.1-16.2
11/11-11/15 The Nature of Light			Ch 16.3-V3 Ch 1.1		Ch 1.2-1.4
11/18-11/22 Optics and Image Formation	Ch 2.1-2.2		Ch 2.3		Ch 2.4
11/27-12/1 Interference	Ch 3.1-3.2				
12/4-12/8 Review	Ch 3.4		Final Review		
12/11-12/15	Final Exam (All with focus on Ch 13 V2 and Ch 1-3 V3)				

Course Policies

Requirements and Evaluation

Your grade will be based on:

(5%) participation and attendance (in class),
(5%) reading assignments (on Canvas),
(20%) homework assignments (also on Canvas),
(5%) quizzes (in class),
(45%) three exams with each worth 15%, and
(20%) final exam (all common exams scheduled out of class).

Attendance and Participation

- Students in this course are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP).
- A+ Attendance will be used to track attendance. Falsifying attendance for yourself or for another student is an act of academic dishonesty and is considered a violation of the university's academic integrity policy.
- Students should not come to class if they are feeling ill, particularly if experiencing symptoms of COVID-19, or if you have been directed by a health professional to quarantine. Students who are experiencing an emergency situation that aligns with an academic exercise of consequence (e.g., /a Common Exam) should work with CARE Services at care@floridapoly.edu.
- If you must miss class for a justifiable reason, then please make sure that the absence is excused in a timely manner.
- You will receive a ½% percent deduction from your final grade for each unexcused absence, after the first 2, or for any failures to respond in class, up to the 5% total allocated to attendance.

Homework and Reading Assignments

There are two types of assignments that need to be completed on Canvas throughout the semester.

- The reading assignments are intended to provide some quick checks of terminology and simple use of equations both of which are included in the chapter summary at the end of each chapter. These are due at the end of the week (11 pm Friday). These assignments consist of eight multiple choice questions per chapter and each entire assignment can be reattempted once.
- The homework assignments consist of more challenging problems for which you need to solve them on canvas and to upload a clear and concise solution for some of them.
- Your grade in both categories will be calculated with one assignment of each type dropped. This rule does not apply to unattempted assignments.

In Class Quizzes

- There will be quizzes covering the major physical concepts (e.g., thermodynamic cycles, electric forces, electric potential, circuit evaluation, electromagnetic waves, optics) discussed this semester. These quizzes will be taken in class and will consist of one multi-part question toward the end of a lecture class.
- The date of each individual quiz and the corresponding content topic will be announced in class and on Canvas before the quiz is given. Each student is responsible for following up with their instructor in the event of an absence.
- The lowest quiz grade will be dropped.

Exams

There will be three common exams, and a comprehensive final. Each exam will have fifteen or so total questions, some will be multiple choice, and others may require work to be shown.

- Common exam dates listed in the schedule are tentative and will be finalized early in the semester by the Registrar's office. The dates/times will be posted to our Canvas course site once available. Exam dates are subject to change, and you should refer to the Academic Calendar website for the most up-to-date exam schedules. Exam dates will also be announced in class at least one week prior to the scheduled event.
- A list of good, odd problems (which the back of the book has answers for) has been included on the next page of this document. Also, a practice exam will be available before each exam so you can see the exam format and further test yourself before taking it.
- You must bring a calculator for every exam.
- Make-up exams will be given only in extreme circumstances with a documented excuse. If you miss an exam because you are sick or participating in a college-sponsored activity, inform your instructor before the exam and provide them with documentation.
- The final exam grade may replace the lowest exam grade if it benefits the overall grade in the course. Note: All exams are required. The final will not replace a 0 from a missed exam.

Solutions to Free Response Problems

You will see a demonstration of algebraic manipulation of equations during the lectures. For the free response homework and exam problems, include an algebraic solution before the quantities and units are placed in. The following is a checklist for what is looked for in a complete and correct solution:

- the correct initial equations/justifications/diagrams are used,
- the mathematical steps are correct, and an algebraic solution is determined,
- all units and scientific notation are properly substituted, and
- the numeric solution is boxed with the correct units.

Late Work

- Contact your instructor if you need an extension of a homework or reading assignment for a justifiable reason.
- Late homework or reading assignments that have not been excused will not receive credit.

Grading Scale

Below is the grading scale that will be used in the course. (See also University Grading Policy).

Grade	A	B+	B	B-	C+	C	D	F
Percentage	90%	87%	83%	80%	77%	70%	60%	< 60%
GPA	4.0	3.33	3.0	2.67	2.33	2.0	1.0	0.0

Official Email Address

Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently (at least once per day). We cannot reply to any email received from an address other than those that end in floridapoly.edu.

Additional Textbook Information

Below is a list of the chapters covered, the sections and corresponding topics that will be omitted (both what is worth reading in blue and what isn't worth reading in red), and a list of good additional practice problems which have answers provided at the end of our textbook.

Chapter	Omit	Topics omitted	Recommended Odd Problems
1	1.6	Mechanisms of Heat Transfer	49, 61, 65, 69, 73, 85
2	2.4	Distribution of Molecular Speeds	21, 27, 37, 39, 49, 59, 61
3	3.5, 3.6	Heat Capacities of an Ideal Gas, Adiabatic Processes for an Ideal Gas	25, 29, 33, 37, 47, 49, 59
4	4.3, 4.6, 4.7	Refrigerators and Heat Pumps, Entropy, Entropy on a Microscopic Scale	19, 25, 33, 35, 37
5	5.7	Electric Dipoles	39, 47, 51, 53, 55, 63, 73, 87, 93
6			21, 23, 27, 31, 35, 57,67, 71, 77
7	7.6	Applications of Electrostatics	31, 39, 41, 47, 55, 61, 99
8	8.5	Molecular Model of a Dielectric	19, 23, 25, 35, 43, 51, 75
9	9.6	Superconductors	23, 25, 29, 37, 41, 51, 55, 57, 59
10	10.4, 10.5, 10.6	Electrical Measuring Instruments, RC Circuits, Household Wiring and Electrical Safety	23, 27, 35, 37, 39, 41, 43
11	11.7	Applications of Magnetic Forces and Fields	15, 17, 21, 23, 25, 33, 35, 41, 49
12	12.6 12.7	Solenoids and Toroids, Magnetism in Matter	19, 23, 27, 31, 35, 37, 41, 43
13	13.5 13.6 13.7	Eddy Currents, Electric Generators and Back Emf, Applications of Electromagnetic Induction	27, 33, 37, 39, 43, 45, 53
16	16.3 16.4	Energy Carried by Electromagnetic Waves, Momentum and Radiation Pressure	37, 39, 41, 43, 45, 47, 75, 83
V3 1	1.5 1.6 1.7	Dispersion, Huygens's Principle, Polarization	31, 35, 37, 39, 43, 49, 53
V3 2	2.5 2.6 2.7 2.8	The Eye, The Camera, The Simple Magnifier, Microscopes and Telescopes	27, 37, 39, 43, 45, 55, 57, 59
V3 3	3.3 3.5	Multiple-Slit Interference, The Michelson Interferometer	17, 19, 21, 31, 39, 41, 45

Additional University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The University, through the Office of Disability Services (ODS), facilitates reasonable accommodation for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodation.

If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive.
If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible.

The Office of Disability Services (ODS):
DisabilityServices@floridapoly.edu
(863) 874-8770
The Access Point
ODS website: http://www.floridapoly.edu/disability

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discussion resources and options available.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action).

Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is ***prohibited****.*