



PHYS222: Elements of Physics II Spring 2025

*“Our goals can only be reached through the vehicle of a plan. There is no other route to success.”
- Pablo Picasso*

Course & Instructor Information

Instructor: Irene D. Guerinot

Office: 215 Nielsen Bldg. (Physics Bldg.)

E-mail: iguerino@utk.edu *To help me keep track of email messages, please include “PHYS222 Online/Spring 2025” in the subject line of any email message you sent to me.*

Office Hours: Virtual (Zoom) by appointment-check my schedule here: <https://calendly.com/iguerino>

If the listed times are not convenient, get in touch with proposed dates and we will schedule a meeting. Please don't hesitate to email me with updates, questions, or concerns. I will typically respond within 24 hours during the week and 48 hours on the weekend. I will notify you if I will be out of town and if connection issues may delay a response.

Lab Teaching Assistants: The lab instructors will announce their office hours on Canvas. There are also in-person tutors available in the Department of Physics tutoring center - Physics Tutorial Center (Nielsen-512). Experienced Physics students (graduate and undergraduate) provide personal attention and assistance. You are more than welcome to use the tutorial center to get help on the learning materials, HW assignments, laboratory work, exams, and so on. For details, please check the link: <https://physics.utk.edu/undergraduate/>

Each student acknowledges and agrees that all (in person and digital) materials and instruction related to this course, including this syllabus, lectures, presentations, and any verbal and written communications, are the sole and exclusive intellectual property of the instructor. Each student agrees not to (or permit anyone else to) record, copy, or transmit any physical or online classes or any related materials without the instructor's prior approval.

Learning Environment/Course Format

This is a fully online course (lectures & laboratories), which means to complete this course you are not required to travel to campus. You will participate in this course asynchronously and using Canvas, the University of Tennessee's Learning Management System. **Time Commitment:** An online course requires discipline, self-motivation, collaboration, and organization. It also requires the same credit hours of work as a face-to-face course. Although there is greater flexibility for “when” you may complete coursework online, there are required due dates (many!). Class participation is required and expected. You should expect to spend between 12 and 16 hours per week (more if you need a good math review) working and learning in the course. Please plan your time accordingly.

The class material is divided into 12 modules. For each module students are expected to submit assignments and a lab report online on time. The course uses online class modules, a textbook, and a workbook (offering math review amongst other units). There are no formal lectures. Students are expected to complete two online sub-modules per week. Students earn class participation credit by participating in the Canvas discussions forums. They must make at least one meaningful contribution to the discussion associated with each module.

Course Description & Learning Outcomes

Physics 222 introduces students to the basic principles of electricity, magnetism, optics, and quantum and nuclear physics.

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

- Define, describe, and analyze the following physical quantities: electric charge, magnetic poles, electric and magnetic force, electric and magnetic field, electric and magnetic energy,

capacitance, potential, resistance, current, doses, focal length, wavelength, frequency, and slit width. Describe essential features of a LASER.

- Define, describe, and analyze the following physical phenomenon: attraction, repulsion, connections in series and parallel, dielectric strength, convex and concave image formation, and dispersion. Identify regions of the electromagnetic spectrum.
- Explain how devices such as electric generators, transformers, maglev trains, magnetic brakes, etc., work, based on Faraday's law.
- Draw ray diagrams and be familiar with the functions of optical instruments.
- Describe the static properties of nuclei and the radioactive decay of certain nuclei, the collective model and the shell model of the nucleus.
- Describe fission, fusion, and principles of nuclear energy generation.
- Appreciate the role of science in society and the historical development of physics in the ongoing quest to discover the structure of the universe.
- Critically analyze science found in the news and be able to examine published articles for sense and consistency.
- See how Physics is applied to everyday life/things, and to understand how objects around you work.

Required Textbooks & Readings

- Textbook: "College Physics", free, online textbooks by OpenStax.
 - <https://openstax.org/details/books/college-physics-2e>A PDF copy of the book can be downloaded from the OpenStax website.
- Workbook / Links to the workbook can be found on Canvas under Module 0.
- Great free resources: <https://www.physicsclassroom.com/> <http://hyperphysics.phy-astr.gsu.edu/hbase/index.html>
- You must have a computer with a webcam, reliable connectivity, and you will need a calculator.

For technical issues, contact the OIT HelpDesk by phone at (865) 974-9900 or at the [Walk-in HelpDesk](#). For IT and Computing issues, use the online [Contact Form](#). Also: [Getting Started with Zoom](#), [Online@UT Canvas](#), the [UT Library](#), the UT Library's [Information for Distance Education](#), and UT [Research Guides](#) and [Subject Librarians](#).

Course Evaluation and Requirements

Homework Assignments (125 points (25% of your grade)): Assignments cover the material presented in the online material. They may refer you back to a module, to some activity you were asked to complete in a laboratory, or to the workbook. Assignments are submitted online on Canvas. Assignments are scored by the computer, and you will receive your assignment grade immediately. You can submit the assignments up to three times if you need to improve your score. The highest score counts. Most assignments are due at 11:59 PM on the indicated date. No late assignments will be accepted.

Laboratories (125 points (25% of your grade)): The Spring 2025 Physics 222 Lab Syllabus on Canvas explains the lab grading policy. You cannot earn a passing grade for the course unless you earn a passing grade for the labs (60% or higher). Lab write-ups, guidelines about reflection expectations, and grading scheme can be found on Canvas.

Class participation (50 points (10% of your grade)): Participate in online discussions for class participation credit. Meaningful participation before the due date of the second homework (for the module), lab, and extra credit associated with a module gives you 100% class participation credit for this module. Post questions, answers, hints, comments, etc., under one of the suggested topics or start your own topic.

Tests (100 points per test(20% of your grade each test)): Tests are 90-minute online exams. Exam 1 (March 11) questions are about material covered in modules 1 - 6, and exam 2 (May 9) questions are about material covered in modules 7 - 10. **You will take the tests online using the Chrome browser with the Proctorio plug-in. Make sure you practice ahead of time using the Practice Tests.**

Extra credit assignments (optional but highly encouraged!):

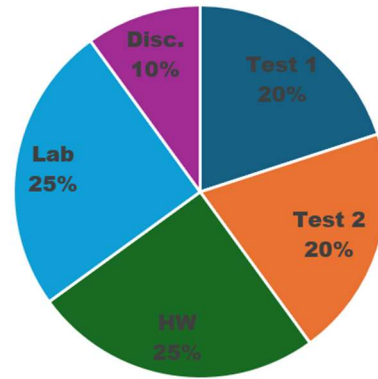
You can earn up to 50 points extra credit by answering 25 extra credit questions, distributed over the 10 modules. You can submit this extra credit assignment twice. The questions are challenging, but you are

encouraged to discuss the assignment with your fellow students in the discussion forum before the submission. Extra credit points are added to your total score from tests, homework assignments, class participation, and laboratories.

Remember that each component of this course is structured to enhance your understanding and mastery of the material. Should you have any questions or need further clarification about these requirements or procedures, please do not hesitate to reach out.

No grades will be dropped. The final letter grade will be determined using the following breakdown:

Points	Letter Grade
450 and above	A
435-449	A-
415-434	B+
400-414	B
385-399	B-
365-384	C+
350-364	C
335-349	C-
315-334	D+
300-314	D
285-299	D-



How to Be Successful in This Course

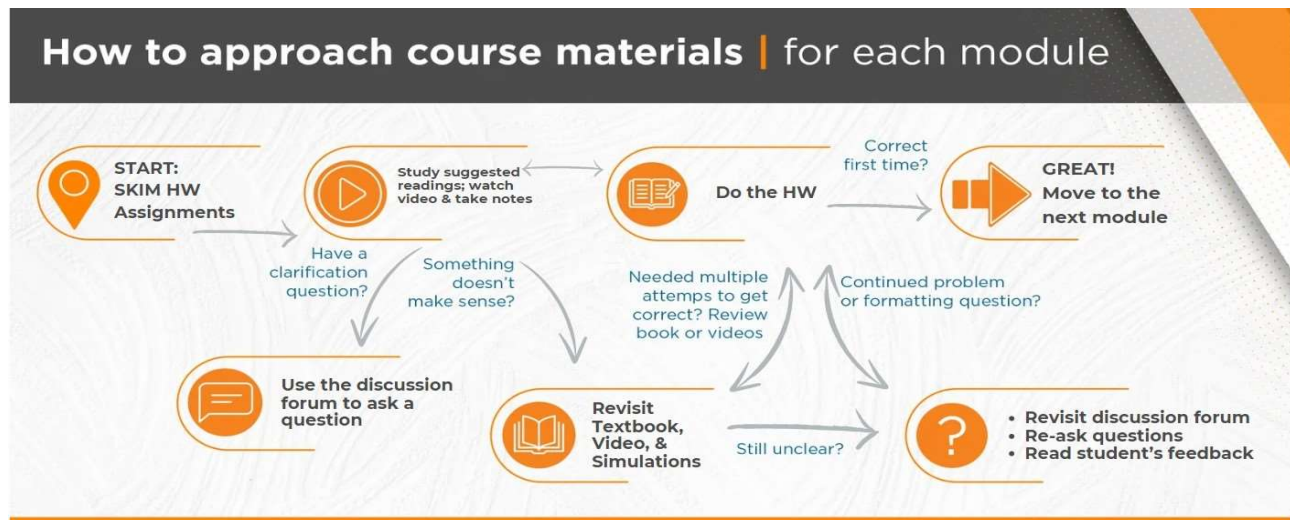
This is an intensive online course. Assignments will typically be due twice a week. Each week will have assigned readings, supplementary materials (e.g., recorded lecture), and activities (e.g., weekly discussion, lab reports, and homework assignments-solving problems). Work is expected to be completed on time. Late assignments are not accepted. So, get organized and manage your time wisely.

- There is some **math** in this course. Quite a bit actually---but that's good.
- This could be a challenging course if you do not keep up with the material.
- Math is never more than simple algebra and calculus---if you find yourself doing a page of calculations, you are way off the path.
- The hardness is conceptual---and with applying logic.
- When confronted with a problem, recognize the concepts needed for a solution, and then you should know or be able to find the right equation (and then do the algebra in usually just a couple lines).
- Do your homework (yourself)!
- Do the homework in groups!
- Make sure you understand both "why" and "why not."
- Note all the course graded assignments and exams on your **personal calendar**.
- Read (carefully and take notes) the **textbook and other assigned reading material!**
- **Nail the early material!** Every concept builds on the previous, so it is imperative to get the early material down.
- **Don't get behind!** A Physics course is **never** a "crammable" course. We will cover a lot of information in a short amount of time. It is impossible to learn this material right before an exam.
- **Check your UT email and Canvas site every day.** Set Canvas notifications.
- I am trying to convince you NOT to take the seemingly easy path of just trying to memorize a trick for every problem you see.
- I am trying to convince you to understand the general approach---that's the way to prepare to deal with problems you've never seen before.
- Ask for help.
- Check your UT email and Canvas site regularly.

AI Policy: Permitted in this Course with Attribution

In this course, students are allowed and *infrequently encouraged* to use Generative AI Tools like ChatGPT to support their work. To maintain academic integrity, students must disclose any AI-generated material they use and properly attribute it, including in-text citations, quotations, and references.

A student should include the following statement in assignments to indicate use of a Generative AI Tool: “The author(s) would like to acknowledge the use of [Generative AI Tool Name], a language model developed by [Generative AI Tool Provider], in the preparation of this assignment. The [Generative AI Tool Name] was used in the following way(s) in this assignment [e.g., brainstorming, grammatical correction, citation, which portion of the assignment].”



Course Communication Policy

Netiquette

Please communicate respectfully and clearly with your peers and your instructors on discussion boards, in chats, groups, email, and any other online interactions. Familiarize yourself with UT's [Principles of Civility and Community](#).

Announcements and Email

I will use canvas announcements and email to communicate with the class. Activate your Canvas notification settings and check your UT email regularly (at least once a day) for any communications about the class! I will typically respond within 24 hours during the week and 48 hours on the weekend. I will notify you if I will be out of town and if connection issues may delay a response.

Virtual and On-Campus Office Hours

You can always schedule to talk to me by arranging a virtual office hour (via zoom - see information above). Email me to schedule a meeting, with the subject line “**PHYS222-Online/Spring 2025**”

Academic Honesty/Student Conduct

Students are expected to complete their own work. Student work completed for a former class or by someone other than the student could result in disciplinary action.

Students shall not:

- Cheat.
- Plagiarize.
- Collaborate with others on an assignment unless the student is assigned by the instructor to complete group work.
- Allow another student to access your Canvas account using your NetID.

*Please note: The instructor reserves the right to revise, alter or amend this syllabus as necessary. Students will be notified in writing/email of any such changes.

SPRING 2025 PHYS222 - ONLINE

Tentative - Subject to change

This syllabus is intended to give the student guidance in what may be covered during the semester and will be for the Tuesday class (Hybrid version). However, the professor reserves the right to modify, supplement and make changes as the course needs arise. Each week, you will be expected to attend the Tuesday class (Hybrid version). These full class meetings on Tuesdays are not formal lectures, but a discussion of concepts that students are expected to learn outside of class. Please, see me early on if you have any difficulty.

Week	Module	Online material	Textbook Chapters	Homework Assignments (A&H), Lab Reports, Discussion, and Extra Credit schedule
1	1	Electric forces Electric fields	18.1 - 18.3	A1
			18.4 - 18.6	H1, Lab 1, Ex. Cr. 1, Discussion
2	2	Electric potential Electrostatic devices	19.1 - 19.4	A2
			19.5 - 19.7	H2, Lab 2, Ex. Cr. 2, Discussion
3	3	Steady currents Kirchhoff's rules	20.1 - 20.4, 20.6, 20.7	A3
			21.1, 21.6	H3, Lab 3, Ex. Cr. 3, Discussion
4	4	Magnetic fields and force Application/Magnetic materials	22.1 - 22.5, 22.7	A4
			22.8, 22.10, 22.11	H4, Lab 4, Ex. Cr. 4, Discussion
5	5	Faraday's law Devices	23.1 - 23.3	A5
			23.4 - 23.8	H5, Lab 5, Ex. Cr. 5, Discussion
6	6	Electromagnetic waves EM spectrum / polarization	24.1, 24.2	A6
			24.3, 24.4	H6, Lab 6, Ex. Cr. 6, Discussion

Review-TBD-Your GTA(s) will be in touch

Proctorio Extra Credit (2pts) to make sure Proctorio is working correctly on your computer - available between 2/23 midnight and 3/11 7AM

Test 1 Discussion Forum (EC assignment-2pts) available between 2/23 midnight and 3/11 7AM / Test 1 ONLINE Proctorio - March 11th / 7am-11:30pm /

SPRING BREAK - NO CLASSES - March 17-21

8	7	Reflection and refraction Mirrors	25.1 - 25.5	A7
			25.7	H7, Lab 7, Ex. Cr. 7, Discussion
9	8	Lenses The human eye	25.6	A8
			26.1 - 26.6	H8, Lab 8, Ex. Cr. 8, Discussion
10	9	Diffraction and interference Thin films / resolving power	27.1 - 27.5	A9
			27.6, 27.7	H9, Lab 9, Ex. Cr. 9, Discussion
11	10	Photons Matter waves No classes Apr. 17 & 18	29.1 - 29.3	A10
			29.5 - 29.7	H10, Lab 10, Ex. 10, Discussion
12	11	The hydrogen atom The periodic table / lasers	30.1, 30.2	A11
			30.5 - 30.9	H11, Lab 11, Ex. 11, Discussion
13	12	Nuclear decay Nuclear energy	31.1 - 31.5	A12
			31.6, 32.1	H12, Lab 12, Ex. 12, Discussion

Review-TBD-Your GTA(s) will be in touch May 8=Study Day

Test 2 Discussion Forum (EC assignment-2pts) available between 4/21 midnight and 5/9 7AM

Test 2 ONLINE Proctorio - May 9th / 7am-11:30pm / 90 minutes

Open Records Act

This course adheres to the University's policy regarding the use and release of student records that are governed by Public Law 93-380, the Family Educational Rights and Privacy Act and the Tennessee Public Records Act, which charges the University and its employees with protecting the confidentiality of the educational records or its prospective, current and former students. One way this affects you is that the professor cannot share or discuss grades via email.

Students with Disabilities

Students with documented disabilities should notify the instructor immediately to discuss requests for special provisions. Students who have a disability that requires accommodations should make an appointment with the Office of Disability Services, 2227 Dunford Hall, (974-6087) to discuss specific needs and get official documentation of the disability.

College of Arts & Sciences Diversity Statement

"The College of Arts and Sciences at the University of Tennessee believes in the value of diversity.... We are committed to creating a vibrant multicultural, multi-ethnic community where diverse students, faculty, and staff are recruited and retained and where diversity scholarship is respected..."

UT ODS Disability Statement

"Any student who feels he or she may need accommodation based on the impact of a disability should contact the Office of Disability Services (ODS) at 865-974-6087 in 100 Dunford Hall to document their eligibility for services. ODS will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities."

University Civility Statement

Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability, and courteousness. Civility enhances academic freedom and integrity and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other's being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus: <http://civility.utk.edu/>.

Academic Integrity

"An essential feature of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student at the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

Academic Dishonesty

This course adheres to the university's Academic Standards of Conduct and Honor Statement, as presented in the student handbook Hilltopics. All students are expected to be honorable and to observe standards of conduct appropriate to a community of students and scholars. All work in this course should be **the original work of the student**. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course, dismissal from the program and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. Scholastic dishonesty includes **plagiarism**, which according to Webster is: "to take (ideas, writings, etc.) from (another) and pass them off as one's own." Therefore, handing in work that contains material written by someone else, whether it is a current or former student, or a secondary source and presenting it as your own efforts is a clear example of plagiarism.

Please review the [Campus Syllabus](#) for information that is common across all courses at UT.