



COURSE INFORMATION

Elements of Physics II

Course Section: 222001-222005

Course Credit Hours: 4

Faculty Contact Information: Irene Datskou Guerinot

- iguerino@utk.edu
- 611 Nielsen Bldg. (Physics Bldg.)
- Office Hours: Tuesday 10am-11am & Thursday 12:45pm-1:45pm EST in person **OR** virtual (Zoom) by appointment

Please don't hesitate to email me with updates, questions, or concerns. I will usually 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. Typically, it is preferable to use the discussion forums for content related questions and

e-mail for personal matters.

Graduate Teaching Assistant(s)-TBD-All instructors will have office/tutoring hours at different times during each week. Students from all sections can attend any instructor's office/tutoring hour.

Lab Sections (Rm. 207):

(1) M 5:40pm-8:25pm

(2) T 11:20am-2:05pm

(3) T 2:30pm-5:15pm

(5) W 9:10am-11:55am

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.

COURSE DESCRIPTION

Physics 222 is a 4 credit-hour, introductory physics course with laboratories. Physics 222 is a general education course and a required course in pre-medical, pre-pharmacy, and pre-vet programs. This course is taught in a hybrid format. Students will only meet once per week for one hour and 15 minutes in a large lecture hall (Thursdays, 11:20am - 12:35pm, room 415, Nielsen Physics Building) and once per week, by section, for 2 hours and 30 minutes in a studio physics classroom (Mondays, Tuesdays, and Wednesdays, room 207 Nielsen Physics Building). The traditional second meeting in the large lecture hall is replaced by online activities that students schedule themselves. Students are expected to complete the online class modules on time. Each module consists of two sets of online class materials that students are required to study, two homework assignments, one laboratory write-up, a class participation discussion forum, and optional extra credit opportunities.

Time Commitment: A hybrid 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 preparation, there are required due dates (many! - check the syllabus, the modules, and the "at-a-glance" course schedule (Canvas Home Tab).

Class participation (discussion forums) 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 lab reports online on time. For class participation credit students must contribute questions, answers, hints, or comments to a discussion forum. Optional extra credit assignments associated with each module will be assigned often and must also be submitted on time.

Laboratory work seeks to demonstrate the validity of theoretical descriptions and to impart a deeper understanding of physical phenomena and associated concepts. The only acceptable portal for assignment submission will be our Canvas space. **Prerequisites:** PHYS221.

Student Learning Outcomes

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, 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.
- 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.

HOW TO BE SUCCESSFUL IN THIS COURSE

- 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.

COURSE REQUIREMENTS

Textbook: "University Physics, Volume 1", a free, online textbook by OpenStax College.

<https://openstax.org/details/books/college-physics-2e> A PDF copy of the book can be downloaded from the OpenStax website.

Great free resources: a) <https://www.physicsclassroom.com/>

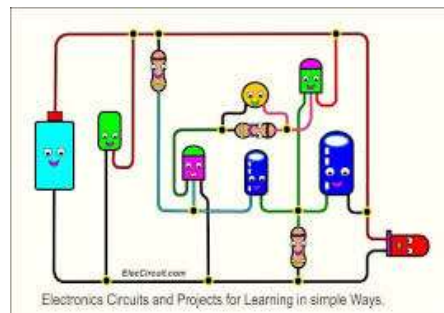
b) <http://hyperphysics.phy-astr.gsu.edu/hbase/index.html> You must have a computer with a webcam, reliable connectivity, and you will need a calculator.

ASSIGNMENTS, ASSESSMENTS, AND EVALUATIONS

The class will be graded on a straight percentage with the following breakdown:

A:>90% A-:87%-89% B+:86% – 83% B:82%-80% B-:79%-77% C+:76%-73% C:72%-70% C-:69%-67% D+:66%-63% D:62%-60% D-:59%-57% F: ≤ 56%

Element	Contribution
Tests (2)	50%
Homework Assignments	20%
Discussions/Participation	10%
Laboratories	20%
Extra Credit (up to 50pts max)	10%



Homework assignments:

Assignments cover the material presented in the course schedule, modules, textbook, and labs. They may refer you back to a module or to some activity you were asked to complete in a laboratory. 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. The vast majority of assignments are due at 11:59 PM on the indicated date. No late assignments will be accepted.

Laboratories:

There is a module on Canvas dedicated to the expected lab work, lab reports, and lab grading policy. You cannot earn a passing grade for the course unless you earn a passing grade for the labs.

Class participation/Discussion forums:

Participate in online discussions for class participation credit. Meaningful participation before the due date of the second homework, 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. What is a meaningful contribution? A meaningful contribution is any contribution that shows that you gave it some thought. Questions, answers to student question, adding additional information to answers, asking for more information about certain aspects, disagreeing with aspects of an answer, correcting statements that you think are inaccurate, commenting on aspects of answers that you like but did not think about before, etc., are all meaningful contributions. You can and should discuss homework and extra credit questions with your classmates, but please do not post the answers directly. Just saying "Yes", "I agree", "I like your answer", etc. before the module's discussion deadline are not meaningful contributions.

Extra credit assignments (optional but highly encouraged!):

You can earn up to 50 points extra credit by answering extra credit questions (three attempts for the highest score). 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.

Tests:

Tests are 90-minute online exams. Exam 1 questions are about material covered in modules 1 - 6, and exam 2 questions are about material covered in modules 7 - 12. **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.**

Test 1 – October 12 Formulas: [Formulas 1 \(utk.edu\)](#) A practice test will be available later in the semester.

Test 2 – December 11 Formulas: [Formulas 2 \(utk.edu\)](#) A practice test will be available later in the semester.

Academic Honesty/Student Conduct

Students are expected to complete and submit their own work at all times. 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.

If you need course adaptations or accommodations, please let me know how I can help you. If you have a documented disability, please contact Student Disability Services (SDS). This will ensure that you are properly registered for the services provided by SDS.

[Student Disability Services](#)

915 Volunteer Blvd/100 Dunford Hall

Knoxville, TN 37996

Tel: 865-974-6087

Fax: 865-974-9552

VRS: 865-622-6566

Email: sds@utk.edu

Website: <http://sds.utk.edu/>

*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.

UTK FALL 2023 PHYS222 – Sect.1-5 – HYBRID Lect. R 11:20am-12:25am (Nielsen rm 415) **Tentative - Subject to change** This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. However, the professor reserves the right to modify, supplement and make changes as the course needs arise. Each week, you will be expected to read the course material **before** the Thursday class. These full class meetings on Thursdays are not formal lectures, but a discussion of concepts that students are expected to start working on 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	due date
1	1	Electric forces Electric fields	18.1 -18.3	A1	28-Aug
			18.4 - 18.6	H1, Lab 1, Ex. Cr. 1, Discussion 1	30-Aug
2	2	Electric potential Electrostatic devices	19.1 - 19.4	A2	5-Sep
			19.5 - 19.7	H2, Lab 2, Ex. Cr. 2, Discussion 2	6-Sep
3	3	Steady currents Kirchhoff's rules	20.1 - 20.4, 20.6, 20.7	A3	11-Sep
			21.1, 21.6	H3, Lab 3, Ex. Cr. 3, Discussion 3	13-Sep
4	4	Magnetic fields and force Application/Magnetic materials	22.1 - 22.5, 22.7	A4	18-Sep
			22.8, 22.10, 22.11	H4, Lab 4, Ex. Cr. 4, Discussion 4	20-Sep
5	5	Faraday's law Devices	23.1 - 23.3	A5	25-Sep
			23.4 - 23.8	H5, Lab 5, Ex. Cr. 5, Discussion 5	27-Sep
6	6	Electromagnetic waves EM spectrum / polarization	24.1, 24.2	A6	2-Oct
			24.3, 24.4	H6, Lab 6, Ex. Cr. 6, Discussion 6	4-Oct
7	Test 1	Review Oct. 5 Test 1 – ONLINE Proctorio - Tuesday Oct. 12 7am-11:30pm / 90 minutes			
8	7	Reflection and refraction Mirrors	25.1 - 25.5	A7	23-Oct
			25.7	H7, Lab 7, Ex. Cr. 7, Discussion 7	25-Oct
9	8	Lenses The human eye	25.6	A8	30-Oct
			26.1 - 26.6	H8, Lab 8, Ex. Cr. 8, Discussion 8	1-Nov
10	9	Diffraction and interference Thin films / resolving power	27.1 - 27.5	A9	6-Nov
			27.6, 27.7	H9, Lab 9, Ex. Cr. 9, Discussion 9	8-Nov
11	10	Photons Matter waves	29.1 - 29.3	A10	13-Nov
			29.5 - 29.7	H10, Lab 10, Ex. 10, Discussion 10	15-Nov
12	11	The hydrogen atom The periodic table / lasers	30.1, 30.2	A11	20-Nov
			30.5 - 30.9	H11, Lab 11, Ex. 11, Discussion 11	29-Nov
13	12	Nuclear decay Nuclear energy	31.1 - 31.5	A12	4-Dec
			31.6, 32.1	H12, Lab 12, Ex. 12, Discussion 12	6-Dec
14	Test 2	Review Dec. 6 Final - Test 2 ONLINE Proctorio - Dec. 11 7am-11:30pm / 90 minutes			