



## PHYS136: Introduction to Physics II (w/Calculus) Spring 2024

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

### Course & Instructor Information

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Instructor: Irene D. Guerinot

Office: 215 Nielsen Bldg. (Physics Bldg.)

E-mail: [iguerino@utk.edu](mailto:iguerino@utk.edu) *To help me keep track of email messages, please include “PHYS136 Online/Spring 2024: Your name” in the subject line of any email message you sent to me.*

Office Hours: Tuesday & Thursday 9:30am-10:30am EST In Person

OR Virtual (Zoom) by appointment <https://calendly.com/iguerino>

Lab Instructor: TBD

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 Assistant-The lab instructor will have online office hours. There are also in-person tutors available in the Department of Physics tutoring center Physics Tutorial Center (Nielsen 512) to provide personal attention and assistance from experienced physics students, both graduate and undergraduate. You are more than welcome to use tutorial center to get help on learning materials, HW, exams, and so on. For details, please check the link: <http://www.phys.utk.edu/physlabs/tutorial-center/index.html>

*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

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**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 10 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

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Physics 136 (calculus based introductory physics) introduces students to the basic principles of fluids, thermodynamics, electricity, magnetism, and optics. Physics 136 (section 2) is an online, first-year physics course for majors in mathematics, physics, computer science, and the physical sciences. It is a 4-credit hour course. Only students which have already completed a first-year **calculus** course and Physics 135 (or equivalent) are allowed to attend PHYS136.

**You must have a computer with a webcam, reliable connectivity, and you will need a calculator.**

## Student Learning Outcomes/Objectives

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

- understand the relationship between force and pressure; how pressure changes with depth; to calculate the buoyant force on objects using Archimedes' principle.
- analyze fluid flow using Bernoulli's equation; understand how Poiseuille's law applies to viscous flow; will be able to distinguish between laminar and turbulent flow.
- identify the various types of thermometers; calculate the amount of thermal expansion of solids and liquids due to a change in temperature; and describe different types of heat transfer mechanism.
- analyze the ideal gas law.
- discuss the first law of thermodynamics is a statement of energy conservation; the variations of the second law of thermodynamics; and the definition of adiabatic, isobaric, isothermal, and isometric processes.
- describe the concept of a reversible engine and the Carnot cycle; calculate maximum possible efficiency of heat engines and maximum coefficient of performance of a heat pump or a refrigerator.
- define changes in entropy and to explain the connection between entropy and disorder.
- 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.
- 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 your work.

## 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. You might also want to check out the following: [How to be Successful in an Online Course](#).
- Check your UT email and Canvas site regularly.

Participation in class discussions is expected to be carried on in a professional matter, respecting the instructor and fellow students. Communicate with me if any issues arise. Make sure your technology works and seek help from OIT HelpDesk immediately if you experience technical difficulties.

## Course Communication Policy

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### 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 "PHYS136/Spring 2024: Your Name\_Office Hours."

## Required Textbooks & Readings

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- Textbook: "University Physics, Vol. 1, 2, 3", free, online textbooks by OpenStax.
  - <https://openstax.org/details/books/university-physics-volume-1>
  - <https://openstax.org/details/books/university-physics-volume-2>
  - <https://openstax.org/details/books/university-physics-volume-3>
  - 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: YouTube Videos-Organic Tutor Physics  
<https://www.youtube.com/channel/UCEWpbFLzoYGPfuWUMFPSaoA/search?query=Physics>  
<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

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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)	45%
Homework Assignments (lowest score will be dropped)	25%
Discussions/Participation	10%
Laboratories (10 reports + optional make up /the best 10 grades count)	20%
Extra Credit	~ 10%

### Homework assignments:

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:

The Spring 2024 Physics 136 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). Write ups and grading scheme can be found on Canvas.

#### Class participation:

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.

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 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.

#### Tests:

Tests are 90-minute online exams. Exam 1 questions are about material covered in modules 1 - 5, and exam 2 questions are about material covered in modules 6 - 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.**

Test 1	March 19	<a href="#">formulas</a>	<a href="#">Study Guide</a>
Test 2	May 9	<a href="#">formulas</a>	<a href="#">Study Guide</a>

#### *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.

UTK SPRING 2024 PHYS136 - Sect.2 - Fully ONLINE **Tentative - Subject to change**

This syllabus is intended to give the student guidance 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. **Please, see me early on if you have any difficulty.**

Reading Schedule	Module	Online material	Textbook Chapters	Homework, Lab, Discussion, Extra Credit Schedule on Canvas	Due Date (11:59pm for most) (Canvas is the ONLY acceptable portal for assignment submission)
22-25Jan 29-Jan 1-Feb.	1	<a href="#">Introduction / Pressure and buoyancy</a> <a href="#">Ideal fluids</a> <a href="#">Viscous fluids</a>	14.1 - 14.4 Vol. 1	A1	29-Jan
14.5 - 13.6			A2	31-Jan	
14.7			A3, Lab 1, Ex. Cr. 1, Disc. 1	5-Feb	
5-Feb 8-Feb 12-Feb	2	<a href="#">Kinetic theory and the ideal gas law</a> <a href="#">Heat and heat flow</a> <a href="#">Thermal properties of matter</a>	1.1 - 1.3, 2.2 Vol.2	A4	7-Feb
1.6			A5	12-Feb	
1.4 - 1.5			A6, Lab 2, Ex. Cr. 2, Disc. 2	14-Feb	
15-Feb 19-Feb	3	<a href="#">The first and second law of thermodynamics</a> <a href="#">Heat engines and refrigerators, Entropy</a>	3.1 - 3.6	A7	19-Feb
4.1 - 4.7			A8, Lab 3, Ex. Cr. 3, Disc. 3	21-Feb	
22-Feb 26-Feb	4	<a href="#">Electric forces and fields</a> <a href="#">Gauss' law, polarization</a>	5.1 - 5.7	A9	26-Feb
6.1 - 6.4			A10, Lab 4, Ex. Cr. 4, Disc. 4	28-Feb	
29-Feb 4-Mar	5	<a href="#">Electric potential</a> <a href="#">Electrostatic devices</a>	7.1 - 7.6	A11	4-Mar
8.1 - 8.4			A12, Lab 5, Ex. Cr. 5, Disc. 5	6-Mar	
<b>SPRING BREAK - MARCH 11 - MARCH 15 NO CLASSES</b>					
Review--TBD / Extra Credit - Proctorio - Mar. 19 <sup>th</sup> 7am Test 1 - ONLINE Proctorio - Tuesday Mar.19 7am-11:30pm / 90 minutes					
21-Mar 25-Mar	6	<a href="#">Steady electric currents</a> <a href="#">Kirchhoff's rules</a>	9.1 - 9.5	A13	25-Mar
10.1 - 10.4			A14, Lab 6, Ex. Cr. 6, Disc. 6	27-Mar	
28-Mar 1-Apr	7	<a href="#">The magnetic field and force</a> <a href="#">Current loops, Magnetic materials</a>	11.1 - 11.5	A15	1-Apr
12.1-12.7			A16, Lab 7, Ex. Cr. 7, Disc. 7	3-Apr	
4-Apr 8-Apr	8	<a href="#">Faraday's law, motional emf</a> <a href="#">Devices</a>	13.1 - 13.5	A17	8-Apr
13.6 - 13.7			A18, Lab 8, Ex. Cr. 8, Disc. 8	10-Apr	
11-Apr 15-Apr 18-Apr	9	<a href="#">Electromagnetic waves</a> <a href="#">Diffraction and interference</a> <a href="#">Thin film interference</a>	16.1 - 16.5	A19	15-Apr
3.1 - 3.3 Vol. 3			A20, Lab 9	17-Apr	
3.5			A21, Ex. Cr. 9, Disc. 9	22-Apr	
24-Apr 25-Apr 29-Apr	10	<a href="#">Geometrical optics</a> <a href="#">Mirrors</a> <a href="#">Lenses</a>	1.1 - 1.7	A22, Lab 10	24-Apr
2.1 - 2.2			A23	29-Apr	
2.3 - 2.8			A24, Ex. Cr. 10, Disc. 10	1-May	
Review-TBD Test 2 ONLINE Proctorio - May 9 <sup>th</sup> 7am-11:30pm / 90 minutes			Study Day - 5/8/24	Make-Up Lab	1-May

### 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.