

PHYS 137 - Honors: Fundamentals of Physics for Physics Majors I

Instructor:

Dr. Christine Nattrass

Office: SERF 609 or over Zoom with advanced notice

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Office hours: TBA

Teaching assistant: TBA

Class time & Location: Lecture Nielsen 306 MWF 10:20-11:10, Nielsen 608 Recitation Mondays 2:15 pm - 3:05 pm, Nielsen 508 Lab Mondays 3:15 pm - 5:15 pm.

Zoom: This class will be broadcast and recorded over Zoom. Students may attend over Zoom and students should be prepared to collaborate with classmates over Zoom. The class may move to Zoom if necessary, for example in case the instructor is quarantined or in self-isolation.

COVID-19:

CDC guidance recognizes the changing dynamics of living in a world with COVID-19. It rates COVID-19 community levels as low, medium, and high, with recommendations at each level about the use of masks and other precautions. At all levels of community spread, staying up-to-date with vaccination is the best way to protect yourself from serious illness and to limit the spread of COVID-19. Wearing a mask is always an option for any individual who chooses to do so, and the CDC recommends that those with high risk of severe illness talk with their health care providers. If you are sick, please stay in, avoid being around others as much as possible, and contact your health care provider for any symptoms that are worsening, moderate to severe, or concerning to you. For more information about vaccination or to self-report an illness and receive support, visit <https://studenthealth.utk.edu/CommunityHealth>. For more information about COVID-19, visit <https://studenthealth.utk.edu/covid-19>.

If you need to miss class for illness, contact the instructor.

Course Description:

5 Credit Hours. Calculus-based physics of mechanics, sound, waves, and thermodynamics. For physics and engineering physics majors and qualified students from other majors.

Satisfies General Education Requirement: (NS).

(RE) Corequisite(s): MATH 132 or MATH 141.

Registration Permission: Consent of department.

Co/Pre-requisites: Previous completion of Calculus I (Math 132, 141, Math 147) or current enrollment in Calculus I. Mathematical proficiency in pre-Calculus is expected.

Required text and materials:

University Physics Volume 1 from OpenStax, Print ISBN 1938168275, Digital ISBN 1947172204, www.openstax.org/details/university-physics-volume-1

University Physics Volume 2 from OpenStax, Print ISBN 193816816X, Digital ISBN 1947172212, www.openstax.org/details/university-physics-volume-2

This textbook is free online, but you may buy a printed copy from the link above. Please bring your calculator and a pencil to every class meeting.

Contemporary Introductory Physics Experiments, 2nd Edition by James E. Parks, Hayden-McNeil

Publishing, ISBN 978-0-7380-6168-9

Suggested materials:

Schaum's 3,000 Solved Problems in Physics (Schaum's Outlines) ISBN 0071763465, any edition.

Schaum's Outline of Mathematical Handbook of Formulas and Tables 0071795375, any edition.

Students may consider an old edition of another introductory physics text to supplement the required text, which has the same structure as Young & Freedman.

Course Schedule: The course schedule (including reading sections) will be posted on Canvas. Please note that the schedule is subject to change and that any changes will be posted on Canvas.

Campus Syllabus:

The campus syllabus applies to this class. You are encouraged to review the [campus syllabus](#).

Personal Pronouns:

I will be happy to honor your request to be addressed by a preferred name and gender pronoun. Please advise me of this preference as early as possible in the semester.

Learning outcomes:

After completing this course, students should be able to:

- Relate physical theories and principles to everyday, real-life experiences/occurrences
- Develop problem-solving skills and critical thinking skills
- Encounter a problem and offer conceptual solution based on physical reasoning and real-life experiences
- Extract concrete known and unknown quantities
- Express known and unknown quantities in a meaningful numerical/mathematical form
- Determine unknown quantities using a set of equations
- Apply physical concepts and problem-solving skills to a novel situation
- Realize that physics applies to a variety of situations
- Generate animated 3D computer models that represent a physical system

Course Structure:

This is a flipped format physics course, meaning the majority of class time will be dedicated to group activities. Students are expected to come prepared, having read all of the required sections from the textbook prior to coming to class.

Students will also engage in computational activities using VPython – no previous computer programming skills are required, since students will work on building their VPython proficiency as the semester progresses.

Please check the Canvas course site regularly for important announcements and updates (announcements will also be emailed to students). It is the students' responsibility to ensure they are receiving email notices and announcements from Canvas.

Communication:

Emails to the instructor should have "Phys 137" in the subject. Students are expected to use their UTK email address for communication regarding the class and are expected to check their email regularly. You are very strongly encouraged not to disable emails from Canvas. Questions of general interest should be directed to the discussion forum, not made via private emails to the instructor. Only ques-

tions particular to an individual student should be made via private emails to the instructor. Questions of general interest made via a private email to the instructor may not be answered.

Grade:

The grade is:

- Exams: 40%
- Homework: 30%
- Lab: 20%
- Class participation: 10%_

The grading scale will be:

- 93.00% and above A
- 90.00% - 92.99% A-
- 87.00% - 89.99% B+
- 83.00% - 86.99% B
- 80.00% - 82.99% B-
- 77.00% - 79.99% C+
- 73.00% - 76.99% C
- 70.00% - 72.99% C-
- 67.00% - 69.99% D+
- 63.00% - 66.99% D
- 60.00% - 62.99% D-
- 59.99% and below F

Homework:

There will be three types of homework, reading quizzes, standard homework assignments, and computational homework. Reading quizzes will be administered and graded online through Canvas. These are designed to test your understanding of basic concepts. Standard homework will be turned in on paper and graded by the teaching assistant. Computational homework will be turned in online and graded by the teaching assistant. You are encouraged to study with other students, but every student is expected to understand the work they are submitting. Students are encouraged to seek help during office hours, using the discussion forum, or at the physics department tutorial center, all of which will be held online. Seeking help on Chegg, looking at solutions posted elsewhere, or sharing your solutions with others is considered cheating.

Exams:

Four exams will be given throughout the semester. The last exam will be the final and will be cumulative, with an emphasis on the sections not covered on previous exams. The exam dates and times are announced at the beginning of the semester. Students who have a conflict should inform the instructor as soon as reasonably possible.

Class participation:

Students will work in small groups on in-class problems that allow them to apply and implement the material they have read in the textbook. While students work in groups, it is essential that every group member is actively engaged and submits their own work. Detailed feedback will not be given, but solutions will be posted. Group work completed individually without permission of the instructor will not be given credit.

Laboratory

The laboratory exercises are an important and integral part of this course and must be completed before a final grade will be assigned. The score assigned by the lab instructor will count 20% of the final score.

Recitations

Recitations will normally be used to focus on how to solve problems. Your recitation instructor will be your lab instructor.

VPython

The VPython 3-dimensional computational modeling system is an integral part of this course. It will enable you to better visualize the behavior of the many systems we will discuss, and it will also teach you how to solve many problems using numerical techniques that often cannot be solved using analytical (calculus) methods.

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Dear Student,

The purpose of this **Campus Syllabus** is to provide you with important information that applies to all UTK courses. Please observe the following policies and familiarize yourself with the university resources listed below. At UT, we are committed to providing you with a high-quality learning experience. I want to wish you the best for a successful and productive semester.

–Dr. John Zomchick, Provost and Senior Vice Chancellor

ACADEMIC INTEGRITY

Each student is responsible for their personal integrity in academic life and for adhering to UT's Honor Statement. The Honor Statement reads: "An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of 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."

YOUR ROLE IN IMPROVING THE COURSE THROUGH ASSESSMENT

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester you may be requested to assess aspects of this course, either during class or at the completion of the class, and through the TNVoice course evaluation. Please take the few moments needed to respond to these requests as they are used by instructors, department heads, deans and others to improve the quality of your UT learning experience.

STUDENTS WITH DISABILITIES – <http://sds.utk.edu>

The University of Tennessee, Knoxville, is committed to providing an inclusive learning environment for all students. If you anticipate or experience a barrier in this course due to a chronic health condition, a learning, hearing, neurological, mental health, vision, physical, or other kind of disability, or a temporary injury, you are encouraged to contact [Student Disability Services](#) (SDS) at 865-974-6087 or sds@utk.edu. An SDS Coordinator will meet with you to develop a plan to ensure you have equitable access to this course. If you are already registered with SDS, please contact your instructor to discuss implementing accommodations included in your course access letter.

ACCESSIBILITY POLICY AND TRAINING – <http://accessibility.utk.edu>

The University of Tennessee, Knoxville, provides reasonable accommodations for individual students with disabilities through its office of [Student Disability Services](#). The university is also committed to making information and materials accessible, when possible. Resources and assistance to support these efforts can be found at <http://accessibility.utk.edu/>.

WELLNESS – <http://wellness.utk.edu/> and <http://counselingcenter.utk.edu/>

The [Center for Health Education and Wellness](#) empowers all Volunteers to thrive by cultivating personal and community well-being. The Center can answer questions about general wellness, substance use, sexual health, healthy relationships, and sexual assault prevention. The [Student](#)

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[Counseling Center](#) is the university's primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services.

Any student who has difficulty affording hygiene products, groceries, or accessing sufficient food to eat every day is urged to contact the [Big Orange Pantry](#) for support. The Big Orange Pantry, located in Greve Hall, is a free resource for all students, faculty, and staff, no matter how great or small their need is. Students who need emergency financial assistance can also request funding from the [Student Emergency Fund](#).

Students who are experiencing non-academic difficulty or distress and need assistance should call 974-HELP or [submit an online referral](#). The 974-HELP team specializes in aligning resources and support to students experiencing mental health distress.

EMERGENCY ALERT SYSTEM – <http://safety.utk.edu/>

The University of Tennessee, Knoxville, is committed to providing a safe environment for learning and working. When you are alerted to an emergency, please take appropriate action. Learn more about what to do in an emergency and sign up for UT Alerts. Check the emergency posters near exits and elevators for building specific information. In the event of an emergency, course schedules and assignments may be subject to change. If changes to graded activities are required, reasonable adjustments will be made, and you will be responsible for meeting revised deadlines.

COVID-19 GUIDELINES (updated August 8, 2022)

[CDC guidance](#) recognizes the changing dynamics of living in a world with COVID-19. It rates COVID-19 community levels as low, medium, and high, with recommendations at each level about the use of masks and other precautions. At all levels of community spread, staying up-to-date with vaccination is the best way to protect yourself from serious illness and to limit the spread of COVID-19. Wearing a mask is always an option for any individual who chooses to do so, and the CDC recommends that those with high risk of severe illness talk with their health care providers. If you are sick, please stay in, avoid being around others as much as possible, and contact your health care provider for any symptoms that are worsening, moderate to severe, or concerning to you. For more information about vaccination or to self-report an illness and receive support, visit <http://studenthealth.utk.edu/CommunityHealth>. For more information about COVID-19, visit <http://studenthealth.utk.edu/covid-19>.

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