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

**Instructor:**
Dr. Christine Nattrass
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Office hours: Wednesdays 11:05-12 (in person or Zoom with notice), Thursdays 10-11 (Zoom only)

**Teaching assistant:** TBA

**Class time & Location:** Lecture Nielsen 306 MWF 10:30-11:20, 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:** All participants are expected to follow all UTK safety protocols for COVID-19.

**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 questions 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. Work will be graded by a peer based on a simple rubric. Detailed feedback will not be given.

**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.