

# PHYSICS 222: ELEMENTS OF PHYSICS II

University of Tennessee, Spring 2022

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|--------------------|--|---------------|-----------------------|
| <b>Instructor:</b> | Prof. Holmes   | <b>Time:</b>  | Tuesday 11:30 – 12:45 |
| <b>Email:</b>      | <a href="mailto:tholmes@utk.edu">tholmes@utk.edu</a> | <b>Place:</b> | Nielsen 415           |

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**Course Page:** <https://utk.instructure.com/courses/144495>

## Teaching Assistants:

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| Brandi Skipworth<br><a href="mailto:bskipwo1@vols.utk.edu">bskipwo1@vols.utk.edu</a><br>Sections 12 & 16 | Scarlett Wilson<br><a href="mailto:swils117@vols.utk.edu">swils117@vols.utk.edu</a><br>Sections 14 & 15 | Jordan O’Kronley<br><a href="mailto:jo39kron@vols.utk.edu">jo39kron@vols.utk.edu</a><br>Section 13 |
| Jacob Gouge<br><a href="mailto:jgouge4@vols.utk.edu">jgouge4@vols.utk.edu</a><br>Section 17              | Abhyuday Sharda<br><a href="mailto:asharda@vols.utk.edu">asharda@vols.utk.edu</a><br>Section 11         | Jesse Farr<br><a href="mailto:jfarr7@vols.utk.edu">jfarr7@vols.utk.edu</a><br>In-Class TA          |

## Textbook:

- OpenStax College Physics, <https://openstax.org/details/books/college-physics> (Free)
- Supplemental practice problems: OpenStax Tutor, College Physics (\$10)

**Overview:** Welcome to Physics! This course covers basic physical principles and applications, and fulfills the second half of the physics requirement for pre-medical, pre-pharmacy and pre-veterinary programs. Topics include electricity and magnetism, optics, and modern physics. Physics 221 is a prerequisite for this course.

## Structure:

Physics 221 is a 4 credit-hour introductory physics course with a laboratory component. Students meet all together once a week (Tuesdays, 11:30 - 12:45) and once a week, by section, in a studio physics classroom (Wed/Thu/Fri, room 203 Nielsen Physics Building).

This course is designed to give students an opportunity to direct their own learning. Each week, you will be expected to read the course material before the Tuesday class. The full class meetings on Tuesday are not formal lectures, but a discussion of concepts that students are expected to learn outside of class. You will practice concepts by solving problems, and responses will be recorded as part of the participation component of the course. After each full class meeting, you will complete an online pre-lab assignment.

The studio sessions are a combination of a laboratory and discussion section, and will be led by your laboratory TA. You will perform experiments, and session instructors will guide you to further explore the physics concepts introduced in the reading assignments and gain an understanding of how these concepts apply to a wide range of real world problems and situations. After each studio session, you’ll submit a laboratory report.

You’ll be graded on a combination of homework, pre-lab assignments, lab reports, participation, and midterm and final scores. In order to pass, you must have at least 60% on your lab reports.

**Tentative Course Outline:**

|         |   |                                |           |
|---------|---|--------------------------------|-----------|
| Jan. 25 | █ | Electric Forces and Fields ... | Ch. 18    |
| Feb. 1  | █ | Electric Energy and Potential  | Ch. 19    |
| Feb. 8  | █ | Electric Current .....         | Ch. 20,21 |
| Feb. 15 | █ | Magnetic Fields .....          | Ch. 22    |
| Feb. 22 | █ | Electromagnetic Induction ...  | Ch. 23    |
| Mar. 1  | █ | Electromagnetic Waves .....    | Ch. 24    |
| Mar. 8  | █ | Review & Midterm               |           |
| Mar. 15 | █ | Spring Break!                  |           |
| Mar. 22 | █ | Geometrical Optics .....       | Ch. 25    |
| Mar. 29 | █ | Optical Lenses and Devices...  | Ch. 26    |
| Apr. 5  | █ | Wave Optics .....              | Ch. 27    |
| Apr. 12 | █ | Spring Recess!                 |           |
| Apr. 19 | █ | Modern Physics .....           | Ch. 29    |
| Apr. 26 | █ | The Structure of Matter .....  | Ch. 30    |
| May. 3  | █ | Nuclear Physics .....          | Ch. 31,32 |
| May. 10 | █ | Review                         |           |

**Grading Breakdown:** Homework and pre-lab assignments (25%), lab reports (20%), tests (35%), class participation (20%). Class participation beyond what is required will earn you extra credit. You have three attempts at each assignment, and the best score will be taken. No assignments will be dropped.

**Tentative Exam Dates:**

Midterm .. Mar. 16-18, 2022 (In lab sections) ([formulas](#))  
 Final Exam: ..... TBD ([formulas](#))

**Course Policies:**

- **Code of Conduct:** This class welcomes people with many different experiences and backgrounds, all of whom should feel comfortable participating in group work and discussion. Questions should be asked and answered respectfully. No forms of harassment, including any form of abuse or exclusionary jokes, will be tolerated in the classroom or in any online forums.
- **Pronouns and Preferred Names:** I'm happy to address you by a preferred name and gender pronoun – just send me an email or come talk to me if you'd like to let me know what they are.
- **Academic Integrity:** Please do not cheat. If you find yourself struggling with material, please reach out to me or your TA, and we'll be more than happy to help. It's why we're here. If you're found to be cheating on an assignment you will get 0 credit for it. Repeated offenses will be reported for academic integrity violations, and may come with additional grade penalties.
- **Missed homework, exams, etc:** Contact the [Office of the Dean of Students](#) if you have extenuating circumstances, and fill out an absence notification. Otherwise, no late work is accepted. If you have need to miss class due to COVID illness or exposure, please fill out a [COVID Support Form](#).
- **COVID Policies:** The university expects everyone to protect others from the spread of COVID-19 and strongly recommends wearing masks in academic and administrative spaces as long as

transmission rates are high. Current CDC guidelines recommend using N95, KN94 or K95 masks, which are the most effective in preventing infection from the current Omicron variant. A reasonable alternative is double masking. The option to attend Tuesday class remotely will be available for all students.

- **Grading scale:**

| Grade | Percentage      | Grade | Percentage      |
|-------|-----------------|-------|-----------------|
| A     | $\geq 93$       | C     | $\geq 73, < 77$ |
| A-    | $\geq 90, < 93$ | C-    | $\geq 70, < 73$ |
| B+    | $\geq 87, < 90$ | D+    | $\geq 67, < 70$ |
| B     | $\geq 83, < 87$ | D     | $\geq 65, < 67$ |
| B-    | $\geq 80, < 83$ | F     | $< 65$          |
| C+    | $\geq 77, < 80$ |       |                 |

If you need course adaptations or accommodations because of a documented disability, please contact [Student Disability Services](#) (SDS). This will ensure that you are properly registered for the services provided by SDS.

### Participation:

Participation is a key component of this course, but participation can mean different things to each student. Fundamentally this is an opportunity for you to have your level of engagement boost your overall grade in the course. Participation is required, but participation above the required amount will result in extra credit: if you max out your participation score, your overall score will be boosted by a **full lettergrade**.

Here's how it works: every week you need 15 participation points to get full credit, but you can earn up to 22.5 (i.e. it's possible to get up to 150% credit each week). You can pick how you earn your points from a menu of different options, depending on how you personally like to engage with with courses:

- **In-class participation (15 points):** You'll earn up to 10 points each week for participating in in-class poll questions, and 5 points each week for getting the correct answers.
- **Discussion forum (10 points):** You'll earn points for starting conversations on the discussion forum about the material, and for answering your peers' questions. Points are awarded for content, not for number of posts.
- **Office Hours (10 points):** If you attend my office hours or those of any of the course TAs, you'll get participation points. You get 5 points for attending, and another 5 if you participate in discussion.
- **Open Stax Tutor (10 points):** While your textbook is free, there's a partner service that costs \$10 for the semester which will guide you through supplemental reading and ask comprehension questions. You'll get 5 points for answering questions, and another 5 points for correctness of those answers.
- **Note-taking (5 points):** This is a new one I'm trying out – I'll keep it if it seems like it's going well. You can take notes on the material for a given module and upload an image of them. This must be done **before** Tuesday class for a given module.

All together that's 50 points available each week, but your credit will max out when you've received half of them. Try out different participation modes and see what works for you!