

PHYS 274 - General Physics III**(Modern Physics w/ calculus)****Department of Physics & Astronomy****University of Hawai'i****Instructor: Prof. Tom Browder****Class Meets TuTh 13:30-14:45 in Bilger 150****(Fall 2022 edition)****(<http://www.phys.hawaii.edu/~teb/phys274/phys274.html>)**

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Text: University Physics (Chapters 35-44), 15th Edition, by Young and Freedman, Published by Pearson

***** A smart phone or smart device with the Iclicker REEF app is required, please bring your cell phone (or device) to every class meeting *****

We now use IClicker Cloud software.

Join Code: WJ0KQ

<https://join.iclicker.com/WJ0KQ>

***** Mastering Physics is required for the homework. The textbook and electronic problems (Young & Freedman, 15th edition) are available through IDAP and can be accessed via Laulima.**

o **[Homework Assignments](#) (check frequently for updates, Mastering Physics course code: browder52839 (Fall 2022))**

Grading:

Grading is based on an absolute scale.

Total (100%) = quizzes/iclicker questions (15%) + HW (25%) + (Midterm 1+ Midterm 2 + Final=(60%)).

The combined % for Midterm 1+ Midterm 2 + Final=60%; the highest score=25%, middle score=20%, lowest score=15%.

Approximate (very rough) values:

90-100 (A), 71-89 (B) 58-70 (C) 41-57 (D) <40 (F)

Tests:

There will be two midterms and a final.

The midterms, will be a combination of quantitative (3) and conceptual (1).

For the two midterms, you can bring a standard size notecard with formulae.

****** Midterm I, Thursday September 6th***

(Problem 1: Interference; Problem 2: Diffraction; Problem 3: Special Relativity (remember to study relativistic energy and momentum); Problem 4: Short answer conceptual questions)

****** Midterm II, Tuesday Nov 15th***

(Problem 1: Photons; Problem 2: Particles behaving like waves; Problem 3: Quantum Mechanics; Problem 4: Short answer/ conceptual questions)

Remember to study hydrogen-like atoms in the Bohr model, the QM particle in a box, tunneling and the Heisenberg uncertainty principle.

For the final exam (Finals week Tuesday, Dec 13th, 12-2pm) you can bring a single sheet of paper with formulae.

The final exam will have 8 problems

(6 problems requiring calculation and 2 short answer/conceptual questions (including chapter 44)).

The last two problems will include some questions about energy and momentum in special relativity and particle physics.

Problem 1: Interference/Diffraction

Problem 2: Heisenberg Uncertainty Principle (Particles and/or Waves)

Problem 3: QM I: Wave Functions

Problem 4: QM II: Atomic Structure

Problem 5: Molecules/Solid State

Problem 6: Nuclear Physics

Tutoring information (TBA)

Simulations:

[Cartoons](#) that illustrate coherence length in the context of thin film interference

The java applets used for lecture demonstrations of interference, diffraction, and atomic orbitals can be found on the web site falstad.com

[Segre Chart](#) of atomic nuclei.

Syllabus for Physics 274 (Fall 2022 version, preliminary and under construction)

- ***Tuesday August 23: Interference, Chapter 35***
- ***Thursday August 25: Interference, Chapter 35***
- ***Tuesday August 30: Diffraction, Chapter 36***
- ***Thursday September 1: Diffraction, Chapter 36***
- ***Tuesday September 6: Finish Diffraction, Special Relativity Chapter 37***

- *Thursday September 8: Relativity, Chapter 37*
- *Tuesday September 13: Relativity, Chapter 37*
- *Thursday September 15: Special Relativity, Chapter 37*
- *Tuesday September 20: Special Relativity, General Relativity, Chapter 37*
- *Tuesday September 22: Chapter 38, Waves as particles*
- *Tuesday September 27: Chapter 38, Waves as particles, Compton Scattering*
- *Thursday September 29: Chapter 39, Waves as Particles, Heisenberg Uncertainty Principle*
- *Tuesday October 4: Review for Midterm I*
- *Thursday October 6: Midterm I*
- *Tuesday October 11: Chapter 39, Particles as Waves*
- *Thursday October 13: Chapter 40, Particles as Waves*
- *Tuesday October 18: Chapter 40, Quantum Mechanics I*
- *Thursday October 20: Chapter 40, Quantum Mechanics I*
- *Tuesday October 25: Chapter 40, Quantum Mechanics I*
- *Thursday October 27: Chapter 41, Quantum Mechanics II*

- *Tuesday November 1: Chapter 41, Quantum Mechanics II, Atomic Structure I*
- *Thursday November 3: Chapter 41, Quantum Mechanics II, Atomic Structure II*
- *Tuesday November 8: Election Day (no class)*
- *Thursday November 10: Review for Midterm II*
- *Tuesday November 15: Midterm II*
- *Thursday November 17: Chapter 41, Quantum Mechanics II, Atomic Structure III*
- *Tuesday November 19: Chapter 42, Molecules and Condensed Matter*
- *Tuesday November 22: Chapter 43, Molecules and Condensed Matter*
- *Thursday November 24: Thanksgiving Break*
- *Tuesday November 29: Chapter 43, Nuclear Physics*
- *Thursday December 1: Chapter 43, Nuclear Physics*
- *Tuesday December 6: Chapter 44, Particle Physics*
- *Thursday December 8: Particle Physics wrap-up and Review*
- *Final Exam: Tuesday December 13th, 12-2pm*