

PHY 241: University Physics III

Course and Faculty Information

Course Description: This course provides an introduction to thermodynamics, kinetic theory, physical and wave optics, relativity, photons, matter waves, atomic physics. This course builds on knowledge of mechanics and electric and magnetic fields. It presents principles of physics and topics that are important for a modern education in a science/engineering curriculum.

Credits: 3

Prerequisites:

- PHY 131
- MAT 266 or MAT 271 with C or better; PHY 121 with C or better; Pre/Co-requisite: MAT 267 or MAT 272 with C or better if completed.
- Students are required to have passed the previous course, PHY-131: University Physics II. For PHY 131 and PHY 241, a strong background in calculus is necessary as well as familiarity with vectors and trigonometry.

Instructor: Professor Robert J. Nemanich

Contact Info:

- Office: PSB-353, (Bateman Physical Science Complex wing B, floor 3, room 353)
- Phone: 480-965-2240
- Email address: Robert.Nemanich@asu.edu
- Office Hours: 9:00-10:00 am Tues. (or to be arranged via email)

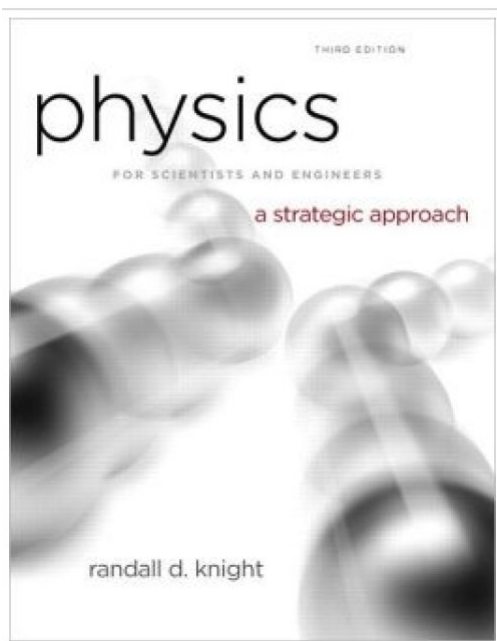
Course Learning Outcomes

At the completion of this course, students will be able to:

- Understand how work, heat and energy is transformed into each other and transferred.
- Understand macroscopic thermodynamic properties of solids, liquids and gases in terms of the microscopic motion of atoms and molecules.
- Understand the principle of superposition, and how it leads to interference, diffraction and standing waves in string waves, sound waves and light waves.
- Understand the principles of relativity: the speed of light is constant and all the laws of physics are the same in all inertial frames of reference.

- Apply the principles of relativity to solve problems of time dilation and length contraction.
- Understand rest energy, kinetic energy and the conversion of mass and energy.
- Understand that photons have quantized energy and are emitted and adsorbed in an all-or-nothing basis.
- Understand quantized levels in atoms and light emission and absorption.
- Understand the wave nature of matter and the uncertainty principle.
- Understand the wave function as related to probability density for quantum systems.
- Apply Schrodinger's equation to understand the wave function for some one dimensional systems.

Textbooks/Materials



Title: Physics for Scientists and Engineers **with Modern Physics**

Author: Randall D. Knight

Publisher: Pearson, 3rd Edition

Homework, and Practice Tests: are online with MasteringPhysics.

To sign up for Mastering Physics and the etext:

Select the Pearson Access tab.

When prompted to sign into Pearson, you may

- o Select Create to create a new account.
- o Sign in with a pre-existing Pearson account.
- o Retrieve a forgotten username or password.

After linking your accounts, select Go to My Courses to launch into the course.

All future

access to MyLab or Mastering will always take place through the 'Pearson Access' tab on the Canvas course menu.

A scientific calculator is required for homework.

Assignments are handled through access to the homework system MasteringPhysics. Students must have an account with this system from the very first day of classes.

Course Access

This is an I course. All content is available on-line. Tests will be administered on campus at set times in the Physics Testing Center.

Your ASU courses can be accessed by both my.asu.edu ([Links to an external site.](#)) and asu.instructure.com; bookmark both in the event that one site is down.

Computer Requirements

The online content requires a computer with internet access and the following technologies:

- Web browsers ([Chrome](#) ([Links to an external site.](#)))
- [Adobe Acrobat Reader](#) ([Links to an external site.](#)) (free)
- [Adobe Flash Player](#) ([Links to an external site.](#)) (free)
- Webcam, microphone, headset/earbuds, and speaker
- Microsoft Office ([Microsoft 365 is free](#) ([Links to an external site.](#)) for all currently-enrolled ASU students)
- Reliable broadband internet connection (DSL or cable) to stream videos.

Note: A smartphone, iPad, Chromebook, etc. will not be sufficient for completing your work in ASU Online courses. While you will be able to access course content with mobile devices, you must use a computer for all assignments.

Technical Specifications

- PC Users: A well-working computer running Windows 10.
- Mac Users: A well-working computer running Mac OS X or higher.
- A web cam with 640x480 video pixel resolution (web cams built into laptops or monitors are acceptable).
- Headphones or working speakers connected to the computer.
- A microphone connected to the computer (your web cam or laptop may already have one built into it).
- A reliable high speed internet connection.
- Web browser: Chrome or equivalent.

Student Success

To be successful:

- check the course daily
- read announcements
- read and respond to course email messages as needed
- complete assignments by the due dates specified
- communicate regularly with your instructor and peers
- create a study and/or assignment schedule to stay on track

Grading

Your grade will be determined based on the following grading schema:

Grade	Percentage
A+	97.0 – 100%
A	92.0 – 96.99%
A-	87.0 – 91.99%
B+	82.0 – 86.99%
B	77.0 - 81.99%
B-	72.0 - 76.99%
C+	68.0 - 71.99%
C	63.0 - 67.99%
D	55.0 - 62.99%

Grading Procedure

The final grade will be determined from the homework assignments (30%), tests (40%), and the final exam (30%).

- **Homework (30%):** There will be a total of thirteen (13) assignments, one per each chapter, which will all count towards your final grade. Scores from the Mastering Tutorial and practice tests will be added to homework points without increasing the total possible. The maximum score including extra credit can be no more than 100%.
- Late homework within 24 hrs of the submission deadline will receive a 25% deduction. Late homework submitted more than 24 hrs after the submission deadline and before the final exam day will receive a 50% deduction.
- **Tests (40%):** There will be three mid-term tests. All tests/exams will be held in the Physics Testing Room - PSH-563. The tests will be available from 3:00-5:00 pm on the scheduled date. An equation sheet will be provided for each test.

- **Final Exam (30%).** The exam (through Canvas) will be comprehensive covering all 13 Chapters of the course. The Final Exam will be held in the Physics Testing Room - PSH-563. The Exam will be available from 3:00-5:00 pm on the scheduled date. A comprehensive equation sheet will be provided.
- **Course Grade:** Total Percent = $(0.30 \times \text{Final Exam}) + (0.40 \times \text{Test Average}) + (0.30 \times \text{Homework percent})$ (note: tests are corrected to 100 pts maximum before averaging, homework percent includes extra points but is limited to no more than 100%).

Submitting Assignments

All assignments, unless otherwise announced, **MUST** be submitted through Mastering Physics. Do not submit an assignment via email.

Assignment due dates follow Arizona Standard time. Click the following link to access the [Time Converter \(Links to an external site.\)](#) to ensure you account for the difference in Time Zones. Note: Arizona does not observe daylight savings time.

Grading Procedure

Grades reflect your performance on assignments and adherence to deadlines. Grades on assignments will be available within 72 hours of the due date in the Gradebook.

Late or Missed Assignments

Notify the instructor **BEFORE** an assignment is due if an urgent situation arises and you are unable to submit the assignment on time.

Follow the appropriate University policies to request an [accommodation for religious practices \(Links to an external site.\)](#) or to accommodate a missed assignment [due to University-sanctioned activities \(Links to an external site.\)](#).

Activities used for instruction include video lectures, textbook readings, and online discussions. Assessment is based on homework assignments, tests, and a final exam.

Course Topics & Schedule

Activities used for instruction include video lectures, textbook readings, and online discussions. Assessment is based on homework assignments, tests, and a final exam.

PHY 241 Spring 2020 Course Schedule

	Date	Day	Readings/Assignments/Tests
Week 1			(5/16 - 5/20)
	16-May	Mon	Course starts
	17-May	Tues	Mastering Tutorial
			Ch 16: A Macroscopic Description of Matter
	18-May	Wed	Ch 16 Homework
			Ch 17: Work, Heat, and the First Law of Thermodynamics
	20-May	Fri	Ch 17 Homework
Week 2			(5/23 - 5/27)
			Ch 18: The Micro/Macro Connection
	25-May	Wed	Ch 18 Homework
			Ch 19: Heat Engines and Refrigerators
	27-May	Fri	Ch 19 Homework
Week 3			(5/30 - 6/03)
	31 May	Tues	Practice Test 1
	31 May	Tues	TEST 1 (3:00-5:00 pm Tuesday, May 31, PSH 563)
			Ch 20: Traveling Waves
	02-Jun	Wed	Ch 20 Homework

		Ch 21: Superposition
	03-Jun Fri	Ch 21 Homework
Week 4		(6/06 - 6/10)
		Ch 22: Wave Optics
	08-Jun Wed	Ch 22 Homework
		Ch 23: Ray Optics
	10-Jun Fri	Ch 23 Homework
Week 5		(6/13 - 6/17)
	13-Jun Mon	Practice Test 2
	13Jun Mon	TEST 2 (3:00-5:00 pm, Monday, June 13, PSH 563)
		Ch 36: Relativity
	15-Jun Wed	Ch 36 Homework
		Ch 37: The Foundations of Modern Physics
	17-Jun Fri	Ch 37 Homework
Week 6		(6/20 – 6/24)
		Ch 38: Quantization
	22-Jun Wed	Ch 38 Homework
		Ch 39: Wave Functions and Uncertainty

	24-Jun Fri	Ch 39 Homework
Week 7		(6/29 – 7/03)
	27-Jun Mon	Practice Test 3
	27-Jun Mon	TEST 3 (3:00-5:00 pm, Monday, June 27, PSH 563)
		Ch 40: One-Dimensional Quantum Mechanics
Week 8		(7/05 – 7/09)
	05-July Tues	Ch 40 Homework
	07-July Thu	Final Exam (3:00-5:00 pm, Thursday, July 07, PSH 563)

Communicating with the Instructor

Community Forum

This course uses a discussion topic called "Community Forum" for general questions and comments about the course. Prior to posting a question or comment, check the syllabus, announcements, and existing posts to ensure it's not redundant. You are encouraged to respond to the questions of your classmates.

Email questions of a personal nature to your instructor. You can expect a response within 72 hours.

Chat

The Chat tool in Canvas allows students and teachers to interact in real time. Use Chat only for informal course-related conversations unless your instructor informs you otherwise. Chat is not ideal for questions about assignments; instructors are not required to monitor it and conversations may be buried or lost.

Email

ASU email is an [official means of communication \(Links to an external site.\)](#) among students, faculty, and staff. Students are expected to read and act upon email in a

timely fashion. Students bear the responsibility of missed messages and should check their ASU-assigned email regularly.

All instructor correspondence will be sent to your ASU email account.

ASU Online Course Policies

View the [ASU Online Course Policies \(Links to an external site.\)](#)

Accessibility Statements

View the [ASU Online Student Accessibility \(Links to an external site.\)](#) page to review accessibility statements for common tools and resources used in ASU Online courses.

If any other tools are used in this course, links to the accessibility statements will be listed below this sentence.

Title IX and University Policy on Discrimination and Harassment

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling> is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, <https://goto.asuonline.asu.edu/success/online-resources.html> ([Links to an external site.](#)).

Syllabus Disclaimer

The syllabus is a statement of intent and serves as an implicit agreement between the instructor and the student. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. Remember to check your ASU email and the course site often.