Montgomery College

SYLLABUS
PHYS-263 GENERAL PHYSICS III
WAVES, OPTICS, and MODERN PHYSICS

INTRUCTOR	Dr. Catalina Cetina	**Office:**	SC 436G
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Zoom:	https://montgomerycollege.zoom.us/j/2103917510		R 2 – 3 pm OR by appt, Remote

GENERAL COURSE INFORMATION
Course: General Physics III, **Waves, Optics, Modern Physics,** 4 credits
CRN 21255, PHYS-263,   Lecture   MW   10:00 - 11:15 am   SC 412
CRN 21256, PHYS-263D, Discussion   MW   11:25 – 11:50 am   SC 412
CRN 21257, PHYS-263L, Lab   F   9   –   11:40 am   SC 412

Course Description
Third of three related courses, along with PHYS-161 and PHYS-262. Topics include mechanical and electromagnetic waves, geometrical and wave optics, selected topics in special relativity, quantum mechanics, atomic, nuclear, and solid-state physics, and related fields. A calculus-based general physics course required for students majoring in engineering or one of the physical sciences.
Pre-requisite: PHYS-262 with grade C or better or department consent.

Course Outcomes
Upon course completion, studenst will be able to:
• Identify and apply physical concepts, principles and laws associated with mechanical and electro-magnetic waves, optics, and modern physics.
• Develop strategies and apply calculus techniques to solve physics problems involving mechanical and electro-magnetic waves, optics, and modern physics.
• Apply scientific methods to investigate physical concepts, principles and laws associated with mechanical and electro-magnetic waves, optics, and modern physics.
• Perform experiments to collect quality data, analyze experimental results, and derive valid conclusions related to mechanical and electro-magnetic waves, optics, and modern physics.
• Use computational graphing tools to build and analyze graphical representations of specific physical quantities and laws associated with mechanical and electro-magnetic waves, optics, and modern physics.
• Identify reliable sources of information and use their content to answer conceptual questions related to mechanical and electro-magnetic waves, optics, and modern physics.
• Integrate different concepts, laws and principles into a unified framework and use it to explain practical applications in related to mechanical and electro-magnetic waves, optics, and modern physics.

COURSE MATERIALS
OpenStax, University Physics, https://openstax.org/details/books/university-physics-volume-1
University Physics with Modern Physics, H.D. Young & R.A. Freedman, 13th to 15thth ed. - recommended

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GRADING FORMULA

Three Exams	(1.5 h)	45%	15% each
Final Exam	(2 h)	20%	
HW Quizzes	(20 min)	20%	
Laboratory		15%	10% Weekly labs + 5% Lab final

GRADING SCALE A > 90% B > 80% C > 70% D > 60% F < 60%

COURSE GUIDANCE

Sustained, steady-pace study and participation are key for a positive experience and a successful class.
A significant commitment level and time investment is necessary, and struggle is sometimes part of it. The instructor will offer guidance and support, but students must accept responsibility for their learning progress.

Course schedule (please see table on the last page)
It is a *tentative* schedule for the semester, and it is subject to change with notice from the instructor.
It is the responsibility of the student to maintain class attendance and stay informed.

Lectures set the structure of the course and thus you are expected to attend all lectures.
Familiarity with the material prior to class is strongly encouraged.
Lecture notes, available in pdf format on Bb, are designed only as a summary and guideline and are supposed to be supplemented by independent study.

Discussions

It is beneficial for you to be familiar with the discussion problems before class.
During the discussion periods you will be expected to work in small groups, consult each other, and work out the problem solution on the whiteboards.
The instructor is there to point you in the right direction—not to solve the problems for you.
You are expected to stay the entire discussion period.

Homework/Quizzes

HW is assigned, some with low weight, and some not directly graded. It is tested through weekly quizzes.
Therefore, the HW is "due" the day of the quiz for a specific topic.
Work all the problems out on paper, as if you were turning them in. Keep your work organized in a loose-leaf notebook that will contain all HW, discussion activities, and lecture notes.
The "Examples" in the Young-Freedman and in the OpenStax textbooks are a very valuable resource and it is assumed you can work them out.

Tests will involve problem-solving, graphical interpretation, and conceptual questions. Problems similar to HW and discussion problems *may* appear on a test.
Tests will be closed book, except for a standard formula sheet.
None of the exam grades will be dropped.
Final Exam is comprehensive.

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Laboratory

You must achieve 60% or above in the lab to be eligible to pass the course.

Lab attendance is required unless specifically excused.

The lab final is scheduled during the last lab period of the semester. You will be expected to carry out an experiment, analyze data and report results. You will work individually and independently. The experiment will be using equipment you have previously used the course of the semester.

Ackerman STEM Learning Center, SW-109, 240-567-5200
http://www.montgomerycollege.org/Departments/mathscrv/.

CLASSROOM POLICIES *See:* **College-Wide Policies and Procedure Manual (CWPPM)**

Standards of College Behavior (Section III)

Please behave courteously and avoid disrupting the class.

Academic Honesty (Section IV)

Anyone practicing academic dishonesty will incur severe penalties which may include anything from receiving a zero grade to receiving an "F" for the entire course.

You will be asked to sign an honor pledge.

Attendance

See: CWPPM, Academic Regulations, Class Attendance (Section 9.823).

Attendance is mandatory. In a Monday-Wednesday-Friday class, 4 absences would be considered excessive. If you must miss a class, please notify the instructor in advance. In case of an emergency, instructors must be notified ASAP and may require documentation. This is mandatory in case of missed exams. If absent, it is your responsibility to find out what you have missed.

Accommodations: Students requiring accommodations must contact the DSS Office if they have not done so already. DSS accommodation letters must be emailed by the student to their instructor. This should be done as soon as possible. Instructors need at least 4 days advance notice before a quiz or exam in order to make arrangements.

Communication

The official means of communication is the ***MC e-mail account***.

Please DO NOT use the Course Mail feature on the Bb course site.

Please keep all communication at a relatively formal level and include a signature. Thanks.

Students are responsible for checking their MC e-mail account and Bb site for college and class information.

Montgomery College website: https://montgomerycollege.edu

In addition to course requirements and objectives that are in this syllabus, Montgomery College has information on its web site to assist you in having a successful experience both inside and outside of the classroom. It is important that you read and understand this information. The above link provides additional links for the following: Academic Calendar, ADA Information and Compliance, Alert Montgomery System, Code of Conduct, Combat to College, Counseling & Advising, Disability Support Services, Forms, Learning Centers and Academic Support Centers, Safety, Security & Emergency Operations Plan, Sexual Harassment or Discrimination.

If you have any questions, please bring them to your professor. By registering for this class and staying in this class, you are indicating that you acknowledge and accept these policies.

Albert Einstein: *Education is not the learning of facts, but the training of the mind to think.*

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Course Schedule (subject to change with notification)

Week	Date	YF ch	OS vol.ch	Lecture /Discussion	Test/Quiz	Lab
				Labor Day – No classes		
1	W 9/4	15	1.16	Mechanical waves		
	F 9/6					*Waves demo*
	M 9/9					***No grade***
2	W 9/11	16	1.17	Sound		
	F 9/13				Quiz 1	Standing Waves
	M 9/16					
3	W 9/18	32	2.16	Electro-magnetic waves		
	F 9/20				Quiz 2	Air column resonance
	M 9/23					
4	W 9/25	33	3.1	Light (Polarization) *Review*		
	F 9/27				**Test 1 Waves**	*Online lab TBD*
	M 9/30	33	3.1	Light (Reflection-Refraction)		
5	W 10/2	34	3.2	Geometric Optics		
	F 10/4					Microwaves
	M 10/7				Quiz 4	
6	W 10/9	35	3.3	Interference		
	F 10/11					Mirrors and Thin lenses
	M 10/14				Quiz 5	
7	W 10/16	36	3.4	Diffraction		
	F 10/18					Single and Double slits
	M 10/21			TBD	Quiz 6	
8	W 10/23			*Review*		
	F 10/25				**Test 2 Optics**	*Online lab TBD*
	M 10/28	37	3.5	Special relativity		
9	W 10/30					
	F 11/1					Diffraction gratings
	M 11/4	38	3.6	Duality I	Quiz 7	
10	W 11/6					
	F 11/8					Photoelectric effect
	M 11/11	39	3.6	Duality II	Quiz 8	
11	W 11/13					
	F 11/15					Bohr Spectra
	M 11/18	40	3.7-8	QM	Quiz 9	
12	W 11/20					***W grade***
	F 11/22			*Review*		*Frank-Hertz demo*
13	M 11/25				**Test 3 Modern**	
				Thanksgiving Break – No classes		
	M 12/2	43	3.10	Nuclear physics		
14	W 12/4					
	F 12/6					Radioactivity
	M 12/9			*Review*	Quiz 10	
15	W 12/11			*Review*		
	F 12/13					**Lab Final**
16	M 12/16				**Final exam**	10:15 am – 12:15 pm