

SYLLABUS

PHYS-201 FUNDAMENTALS OF PHYSICS III FALL-2020

Course Director: Prof. Alexey Aprelev (aprelev@drexel.edu)

Office hours:

1. Alexey Aprelev , ama34: MW (11am-1pm) <https://drexel.zoom.us/j/4262491340>
pass code 60508
2. Joseph Tumulty, jst56: WF 3-4pm <https://drexel.zoom.us/j/98420695301>
3. Watson, William wew34 : Thursday 10-12 <https://drexel.zoom.us/j/89256084530>
4. Kovacevich, Michael mgk56 : Tuesday 9-11am
https://drexel.zoom.us/meeting/register/tJcqO2vrD4rGteZOPDA2HtcpEsneAliv_4V
5. Lamb, Noah nrl47 : M 3-5pm <https://drexel.zoom.us/j/87854278347>

Lectures: MW (1-1:50 pm) The zoom link:

<https://drexel.zoom.us/j/97493225665?pwd=eDByYjJ4K092LzVCVWNmOTU5YjkwQT09>
pass code 60508

Textbooks: UNIVERSITY PHYSICS by H.D. Young and R.A. Freedman, 15th Ed. Pearson.

Note: There are several purchasing options for the textbook. +[access code for online homework](#).

Course Website on BB Learn: learn.dcollege.net

The course week starts with the Monday lectures on 9/21

Recitations start during Week 1.

Labs start during Week 2 (simulation).

Homework assignments (weekly) are on portal.mypearson.com. An access code is required for online homework. Instructions:

https://help.pearsoncmg.com/mastering/student/ccng/TopicsStudent/gettingstartedwithmastering_student.htm.

Course ID on Mastering Physics: [aprelev60508](#)

WEEK	LECTURE TOPICS (Chapter-sections)	RECITATION ASSIGNMENTS
01 (09/21/20)	Ch.32.1-5. Maxwell's equations, plane electromagnetic (<i>em</i>) waves.	Ch.32: 4,6,8,17
02 (09/28/20)	Ch.32.1-5 (contd.) Energy and momentum carried by <i>em</i> -waves	Ch.32: 21, 25, 26, HW setup .
03 (10/05/20)	Ch. 33.7, Ch.35.1-4. Young's double slit experiment , Huygen's Principle . Interference in thin films,	Ch.35: 8,11,14,23,25 Setup HW Lab1 due 10/11
04* (10/12/20)	Ch.33. 5, Ch.36.1-7. Michelson Interferometer . polarization of em-waves.. Diffraction (Monday is Asynchronous)	Ch 33. 27, 29 Ch.35.31 Ex. 34, 37 Lab 2 due 10/18.
05 (10/19/20)	Ch.37.1-5. Special theory of relativity. Lorentz transformations. Length contraction and time dilation.	Ch37. 2,4,6,13,18 Lab3 due 10/25

06 (10/26/20)	Ch.37.6-8 (contd.) Relativistic energy and momentum, mass and energy equivalence.	Ch.37: 22setup, 23, 47, 51, 56, 58. Hw: 22 26 32 34 59 60
07 (11/02/20) Midterm 11/3	Ch.38.1-3. Quantum physics, the photoelectric effect, Compton effect	Ch.38: 6,9,10,, 23, 25,
08 (11/09/20)	Ch.38.3 Annihilation and pair production Ch.38.4 Ch 39.1 Wave-particle duality. Electron diffraction. the uncertainty principle.	Ch.38: 20, 21, 32 Ch.39: 1,3,4,
09 (11/16/20) Makeup 11/17	Ch.39.3,5,6, blackbody radiation, Ultraviolet catastrophe,	Ch.39: 20,25,37,57,77
10** (11/23/20)	Ch.40.1-2. Quantum Mechanics, Wave function,	Ch.40: 8,12, 14
11 (11/30/20)	Ch.40.2-4. The Schroedinger equation, quantum tunneling (barrier penetration).	
12 (12/07/20)	Review Final test: dec9	

* October 12 (Mon) University Holiday, no classes

** November 26,27 (Th, Fr) Thanksgiving Holiday, no classes

COURSE LEARNING OBJECTIVES:

- Mathematically describe the basic physics of electromagnetic waves and related phenomena.
- Mathematically describe time dilation, length contraction, twin paradox, and related phenomena associated with special theory of relativity.
- Understand a concept of massless photon with non-zero momentum and energy.
- Conceptualize wave-particle duality and transition into a wave function description of a particle and Heisenberg uncertainty principle.
- Mathematically describe the simplest quantum mechanical system - a particle in a box.
- Understand the main experimental phenomena that cannot be explained by classical Newtonian physics and are critical in the development of quantum physics.

QUIZZES: Two 50-min. quizzes will be given during the term. **If you miss a quiz** and have a documented, valid reason for doing so, please discuss it with the Course Director as soon as possible. If the reason is considered valid, you can take the Make-up Quiz. If we get nothing in writing from you, a score of zero will be assigned for the quiz you missed, and you may not be allowed to take the Make-up quiz. The scope of the make-up quiz will be different from

that of Quiz-I or Quiz-II. The make-up quiz will contain problems from topics covered up to and including Week 8.

QUIZ SCHEDULE

QUIZ	Date/Time	material
I TUE 10/20/2020 week5	8:00-8:50am	Ch32 33 35
II TUE 11/03/2020 week7	8:00-8:50am	Ch 36, 37(1-5)
MAKE-UP TUE 11/17/2020 week9	8:00-8:50am	

LABS: Labs are an integral part of this course.

It is individual assignment; reports should be uploaded to your BBLearn Lab class page.

There are no labs done during the first week. Labs are performed every week except week 1 and 3.

LAB #	Week #	Lab Title
LAB 01	Week #2	Properties of Electromagnetic Waves
LAB 02	Week #4	Interference of EM Waves
LAB 03	Week #5	Diffraction of EM Waves
LAB 04	Week #7	Photoelectric Effect
LAB 05	Week #9	Blackbody Radiation

FINAL EXAM: Dec 09, 2020 10:30 -12:30 Ref:

<https://drexel.edu/registrar/scheduling/exams/>

The final exam is comprehensive – it will be based on all the subject material covered in the course. However, the material covered during the last five weeks is given more emphasis.

INSTANT POLLING USING LEARNING CATALYTICS: During lecture sessions, we will be doing a lot of activities that involve instant polling (clicker-type questions). The purpose of these activities is to assess your conceptual understanding of the material and to engage in classroom discussions.

In order to register for Learning Catalytics or access your existing account please go to your Mastering Physics Course and click on LC button in the upper right corner.

Participation in the polling will earn you a credit for the Lecture attendance (in-class activity) component of the grade (5%).

Instructions:

https://media.pearsoncmg.com/long/CEPM.selfpaced/Mastering/Get%20Access%20to%20Learning%20Catalytics%20in%20Mastering_Students_allMastering.pdf

GRADING: The final course grade will be based on the following weights.

Two Quizzes	30 %
Homework	10 %
Pre-lecture assignments	5 %
In-class activity (Learning Catalytics)	5%
LABS	15 %
Final	35 %
TOTAL	100 %

Letter grades are assigned as follows:

A: 90 -100	B: 80 - 89.9	C: 70 – 79.9	D: 60 – 69.9	F: < 60
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Plus and minus grade ranges (A+, A, A-, etc.) will be assigned at the discretion of the instructor. We do not ‘curve’ the exams scores.

ACADEMIC POLICIES

The instructor reserves the right to change the course as described in this syllabus at any time. Students will be notified of changes via one or more of the following: email, online announcement, announcement in class. Please also refer to the Drexel University policies and resources listed below.

- **Academic integrity, plagiarism, and cheating policy:**

http://www.drexel.edu/provost/policies/academic_dishonesty.asp

- **Students with disability statement:**

Students requesting accommodations due to a disability at Drexel University need to request a current Accommodations Verification Letter (AVL) in the ClockWork database before accommodations can be made. These requests are received by Disability Resources (DR), who then issues the AVL to the appropriate contacts. For additional information, visit the DR website at:

<http://drexel.edu/oed/disabilityResources/students/>,

or contact DR for more information by phone at 215.895.1401, or by email at disability@drexel.edu.

- **Course add/drop policy:**

<http://drexel.edu/provost/policies/course-add-drop/>

- **Course withdrawal policy:**

<http://drexel.edu/provost/policies/course-withdrawal/>

- Some specific guidelines for the online material of this course:

Appropriate Use of Course Materials

It is important to recognize that some or all of the course materials provided to you may be the intellectual property of Drexel University, the course instructor, or others. Use of this intellectual property is governed by Drexel University policies, including the IT-1 policy found here:

<https://drexel.edu/it/about/policies/policies/01-Acceptable-Use/>

Briefly, this policy states that course materials, including recordings, provided by the course instructor may not be copied, reproduced, distributed or re-posted. Doing so may be considered a breach of this policy and will be investigated and addressed as possible academic dishonesty, among other potential violations. Improper use of such materials may also constitute a violation of the University's Code of Conduct found here: <https://drexel.edu/cpo/policies/cpo-1/> and will be investigated as such.

Recitations details and contacts:

3	<u>10807</u>	R	12:20 pm - 01:50 pm	Tumulty, Joseph jst56 https://drexel.zoom.us/j/97522340107
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4	<u>10514</u>	R	02:00 pm - 03:20 pm	Tumulty, Joseph jst56 https://drexel.zoom.us/j/95440560151
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5	<u>10515</u>	R	05:00 pm - 06:20 pm	Tumulty, Joseph jst56 https://drexel.zoom.us/j/99942104479
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6	<u>10519</u>	F	03:30 pm - 04:50 pm	Watson, William wew34 https://drexel.zoom.us/j/94540256131
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7	<u>10516</u>	F	09:30 am - 10:50 am	Kovacevich, Michael mgk56 https://drexel.zoom.us/meeting/register/tJEuceurpj4vH9xg6BT6-HK2LTVXe46MTeqZ
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8	<u>10975</u>	F	11:00 am - 12:20 pm	Kovacevich, Michael mgk56 https://drexel.zoom.us/meeting/register/tJYIce2orz0sGNaF1sknKuJ_DAXEsPDllsZJ
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9	<u>10518</u>	F	12:30 pm - 01:50 pm	Lamb,Noah nrl47 https://drexel.zoom.us/j/99303261223
10	<u>10517</u>	F	02:00 pm - 03:20 pm	Lamb,Noah nrl47 https://drexel.zoom.us/j/96731341341
11	<u>16235</u>	F	03:30 pm - 04:50 pm	Lamb,Noah nrl47 https://drexel.zoom.us/j/96528660501
12	<u>16236</u>	F	05:00 pm - 06:20 pm	Watson,William wew34 https://drexel.zoom.us/j/92850056185