

SYLLABUS

PHYS-102: Fundamentals of Physics II - Electricity and Magnetism

Spring 2019-2020

Drexel Learn

PHYS-102-A/B/C/D-XLIST-201935

https://learn.dcollege.net/ultra/courses/_260396_1/cl/outline

Mastering Physics

dinardo02496

<https://www.pearsonmylabandmastering.com/northamerica/>

Course Director and Section A Lecturer

Dr. N. John DiNardo (dinardo@drexel.edu)

Office Hours: Monday, Wednesday 12pm-1pm EDT or by appointment

Zoom link: <https://drexel.zoom.us/j/2158952790>

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Mastering Physics ID (Section A): **dinardo02496**

Section B, D Lecturer

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Mastering Physics ID (Section B): **aprelev66755**

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Section C Lecturer

Dr. Russell Neilson (neilson@drexel.edu)

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Mastering Physics ID (Section C): **neilson68585**

Teaching Assistants

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Course Materials

UNIVERSITY PHYSICS by H.D. Young and R.A. Freedman, 15th Edition, Pearson

Note that there are several textbook purchasing options.

You are required have an access code for the online pre-lecture exercises and homework sets (Mastering Physics) and for the lecture learning response system (Learning Catalytics). Information is provided on the [course website](#).

Course Website: https://learn.dcollege.net/ultra/courses/_260396_1/cl/outline

Mastering Physics Website: <https://www.pearsonmylabandmastering.com/northamerica/>

Register for your Lecture Section

Updated Course Description

Second of a three-course physics sequence introducing electricity and magnetism to engineering and science majors. Topics include: Electrostatics, Coulomb's law, electric field and flux, and Gauss's law. Electric potential and potential energy and capacitors. Charges in motion, voltage and current measurements. Direct current circuit analysis using Ohm's law and Kirchhoff's rules. Sources of magnetic fields, concepts of magnetic flux and electromagnetic induction.

Course catalog information can be found at [catalog physics](#)

Prerequisite: PHYS 101 [Min Grade: D]

Updated Student Learning Outcomes

- Introduce and apply key concepts and physical laws of electricity and magnetism including conservation of charge, Coulomb's law, Gauss's law, electric potential, Kirchhoff's rules, Biot-Savart law, Ampere's law, Faraday's law and Lenz's law
- Analyze the dynamics of charged particles in electric and magnetic fields
- Discuss sources of electric potential and analyze direct current circuits including steady state and time-varying conditions
- Develop critical thinking skills in the analysis of theory and applications in electricity and magnetism by problem solving and performing laboratory experiments

Course Organization

Pre-lecture reading and exercises introduce material using Mastering Physics (grades reduced by 25% per day for late submissions). Introductory lecture materials are provided before lecture.

Synchronous (live) **Lectures** present concepts and examples; concepts may be explored during lectures using the **Learning Catalytics** student response system. A web-enabled device is required. Lecture videos and transcriptions are posted on Drexel Learn.

Recitations are conducted synchronously using Zoom to discuss and solve problems to advance the application of physics concepts. Collaborative problem solving and discussion/presentation using a Subgroup Worksheet available on Drexel Learn occurs in breakout subgroups using Zoom. Recitation problem solutions are made available at week's end on Drexel Learn.

Homework problems allow student to apply concepts through problem-solving

- Online problems are solved and graded in Mastering Physics due Wednesdays (grades reduced by 25% per day for late submissions)
- One problem per week, available in Drexel Learn, due Wednesdays to be submitted by upload to Drexel Learn for annotation and grading

Four **Laboratory Exercises** are conducted by Recitation Subgroups for grading (see below)

Evaluations

- Two one-hour online **Mid-term Examinations** and a comprehensive two-hour **Final Examination**

Optional Online meetings

- Optional online discussion, organizational meetings may be held during the term as needed

Virtual Laboratory

The Physics Laboratory, while it will be conducted virtually, is an integral component of this course. Four laboratory experiments will be completed by Recitation Subgroups asynchronously. The laboratory document and worksheet will be posted and a brief introductory video will introduce the topic. Each Recitation Subgroup will research the topic, perform analysis of virtual data, and develop a conclusion and submit the completed Laboratory Worksheet. A single grade will be given to each Recitation Subgroup. Recitation instructors will advise as questions arise.

Syllabus Note

Considering this non-traditional form of course delivery for Spring term, changes may be made to the Syllabus over the course of the term. Changes, if any, will be posted on the course web site and noted in Lecture.

MIDTERM EXAMINATION SCHEDULE (Midterm examinations at Noon, EDT)

MIDTERM	Day/Date
I	Monday, May 4, 7:30am
II	Monday, May 18, 7:30am
Make-up*	To be determined

* In special cases, with the permission of the Course Director, a Make-up exam may be given.

FINAL EXAMINATION – To Be Determined

COURSE SCHEDULE

WEEK OF:	LECTURE TOPICS (Chapter-sections)	Recitation Problems
01 (04/06/20)	Lecture 1: 04/06/20 Chp 21 (1-3) - Electric Charge and Electric Field Introduction: Electricity and Magnetism Units, Physical Quantities, Equations Reference Mechanics - Forces, Energy Electric Charge Conductors and Insulators, Induced Charges Coulomb's Law Lecture 2: 04/08/20 Chp 21 (4-7) - Electric Charge and Electric Field Electric Field / Electric Forces / Electric Field Lines Electric Dipoles	Chp 21 75 38 21 27(a) 63 54 Worksheet 1
02 (04/13/20)	Lecture 3: 04/13/20 Chp 22 (1-3) – Gauss's Law Charge Electric Flux Gauss's Law Lecture 4: 04/15/20 Chp 22 (4-5) – Gauss's Law Applying Gauss's Law Charges on Conductors	Chp 22 3 17 21 24 26 31 Worksheet 2
03 (04/20/20)	Lecture 5: 04/20/20 Chp 23 (1-3) – Electric Potential Electric Potential Energy Electric Potential Electric Potential Calculations Lecture 6: 04/22/20 Chp 23 (3-5) – Electric Potential Electric Force, Electric Field, Electric Potential Equipotential Surfaces / Potential Gradient	Chp 23 8 17 40 50 54 Worksheet 3
04 (04/27/20) Midterm 1 Thursday 4/30/20	Lecture 7: 04/27/20 Chp 24 (1-2) – Capacitance and Dielectrics Introduction to Electric Circuit concepts Capacitors and Capacitance Capacitors in Series and Parallel Lecture 8: 04/29/20 Chp 24 (3-5) – Capacitance and Dielectrics Energy Storage in Capacitors; Energy in Electric Field Dielectric Materials Molecular Model of Induced Charge	Chp 24 5 20 26 33 45 Worksheet 4

WEEK	LECTURE TOPICS (Chapter-sections)	Recitation
05 (05/04/20)	Lecture 9: 05/04/20 Chp 25 (1-4) – Current, Resistance, and Electromotive Force Electric Current Resistivity / Resistance Electromotive Force / Electric Circuits Lecture 10: 05/06/20 Chp 25 (4-6) – Current, Resistance, and Electromotive Force Energy and Power in Electric Circuits	Chp 25 18 30 42 65 70 Worksheet 5
06 (05/11/20) Midterm 2 Thursday 5/14/20	Lecture 11: 05/11/20 Chp 26 (1-3) – Direct-Current Circuits Resistors in Series and Parallel Kirchhoff's Rules Electrical Measuring Instruments Lecture 12: 05/13/20 Chp 26 (4-5) – Direct-Current Circuits Time dependent circuits / RC Circuits Power Distribution Systems	Chp 26 6 24 41 54 Worksheet 6
07 (05/18/20)	Lecture 13: 05/18/20 Chp 27 (1-4) – Magnetic Field and Magnetic Forces Magnetism / Magnetic Fields Magnetic Flux / Magnetic Field Lines Motion of Charged Particles in a Magnetic Field Lecture 14: 05/20/20 Chp 27 (5-8) – Magnetic Field and Magnetic Forces Applications: Charged Particles in a Magnetic Field Magnetic Forces / Torques on Current-carrying Conductor Configurations	Chp 27 14 18 25 29 36 56 Worksheet 7
08 (05/25/20)	Memorial Day Holiday: 05/25/20 Lecture 15: 05/27/20 Chp 28 (1-5) – Sources of Magnetic Field Magnetic Field produced by Moving Charge(s) / Current Elements / Current-carrying Conductors Forces between Current-carrying Conductors	Chp 28 9 21 25 29 35 39 59 Worksheet 8
09 (06/01/20)	Lecture 16: 06/01/20 Chp 28 (6-7) – Sources of Magnetic Field Ampere's Law and Applications Magnetic Materials Chp 29 (1-2) – Electromagnetic Induction Electromagnetic Induction Lecture 17: 06/03/20 Chp 29 (2-5) – Electromagnetic Induction Electromagnetic Induction Faraday's Law, Lenz's Law Motional emf / Induced Electric Fields	Chp 29 14 24 28 48 Worksheet 9

Assignment Due Dates (Pre-Lecture Mastering Physics | Homework Mastering Physics / Written homework problem) / Labs

Online homework problems are found in Mastering Physics (MP)

Written homework problems for scanned/photographed submission are found in BBLearn.

Pre-Lecture	Due Date		Homework	Due Date	Labs	Due Date
	Sunday 11:59pm		MP / Problem	Wednesday 11:59pm		
			HW #1 - Chp 21	04/15/20		
PL - Chp 22	04/12/20		HW #2 - Chp 22	04/22/20		
PL - Chp 23	04/19/20		HW #3 - Chp 23	04/29/20	1	05/01/20
PL - Chp 24	04/26/20		HW #4 - Chp 24	05/06/20		
PL - Chp 25	05/03/20		HW #5 - Chp 25	05/13/20	2	05/15/20
PL - Chp 26	05/10/20		HW #6 - Chp 26	05/20/20	3	05/22/20
PL - Chp 27	05/17/20		HW #7 - Chp 27	05/27/20	4	06/01/20
PL - Chp 28	05/24/20		HW #8 - Chp 28	06/03/20		
PL - Chp 29	05/31/20		HW #9 - Chp 29	06/08/20 (Note: Monday, Mastering Physics only)		

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

Midterm Exams (2)	30%
Mastering Physics: Pre-lecture exercises	5%
Mastering Physics Online Homework	10%
Drexel Learn: Written Homework problem	5%
Lecture response exercises - Learning Catalytics	5%
Recitation participation	5%
Group Virtual Laboratories (4)	15%
Final Exam	25%
TOTAL	100%

Letter Grades

Course numerical grades	Letter Grade
> 96 %	A+
90 % and Less than 96%	A
86% and Less than 90%	B+
80% and Less than 86%	B
76% and Less than 80%	C+
70% and Less than 76%	C
65 % and Less than 70%	D+
60 % and Less than 65%	D
Less than 60%	F

The grading scale may be modified slightly towards lower numerical grade thresholds (in students' favor).

Notes

Respect for Diversity

Drexel University from its founding has been committed to diversity and inclusive excellence. As part of its mission, the [Office of Equality and Diversity](#) aspires to recognize the value of each person as an individual.

The PHYS 102 instructors and teaching assistants recognize the talents and diversity of our students. Students' perspectives benefit the learning process and the entire Drexel University community. We will strive to be sure that materials and activities in this course respect the diverse backgrounds of our students including race, ethnicity, gender, sexuality, disability, age, religion, socioeconomic status, and culture. We believe that each student should be respected by us and by their peers. Please provide the Course Director with any suggestions that can improve the course in any way.

Tutoring

The [Physics Help! Center](#) offers free tutoring sessions to Drexel students in introductory physics courses. Find PHYS 102 in the calendar drop-in at the Korman Center Room 104.

Disability Services

Students with disabilities requesting accommodations must present a current Accommodation Verification Letter (AVL) to the Course Director before accommodations can be made. AVLs are issued by the Office of Disability Services. The Office of Disability Services can be contacted at: www.drexel.edu/ods, by phone at 215-895-1401 or TTY at 215-895-2299.

Health Center and Student Counseling

Health and wellness resources for students can be found at the following websites.

<http://drexel.edu/counselingandhealth/student-health-center/overview>

<http://drexel.edu/counselingandhealth/counseling-center/overview>

Academic Integrity

Breaches of academic integrity, for example by cheating or plagiarizing from another student or from online sources are serious infractions of the community standards of Drexel University. Likewise, breaches of computer systems policies are serious infractions of the community standards of Drexel University. Refer to the following websites to understand expectations of students and consequences for violating these standards.

[Academic Integrity](#)

[Student Code of Conduct](#)

[Security of Enterprise Systems policy](#)

[Security of Information and Networked Systems policy](#)

You will be reminded of these policies prior to each examination and you will be expected to certify your understanding of these policies and your intention to follow them.

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 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.

Registration policies

Please note the following policies for adding, dropping, or withdrawing from courses at Drexel University.

[Course Add/Drop](#)

[Course Withdrawal](#)

Course Attendance and Participation

Attendance at and participation in lectures, recitation, and virtual laboratory activities is expected. Attendance at midterm and final examinations is required.

In some instances, a student may be unable to attend a course activity. In such a situation, e-mail and/or discuss the situation with the Course Director (dinardo@drexel.edu) or Lecturer before an expected absence or within one week after an unexpected absence to be granted an excused absence. Students should refer to the [Absence from Class](#) policy that includes the University policy on excused absences including absences for [religious observances](#). In this remote teaching and learning environment, we will make every effort to accommodate student absences and make available materials and documents on the course website.