

# PHYS 231: Electricity & Magnetism – Fall 2020

## Instructor Information:

<b>Instructor:</b>	Dr. Nau Raj Pokhrel, Department of Physics & Astronomy
<b>Office:</b>	611 Nielsen Physics Building
<b>Email:</b>	<a href="mailto:npokhrel@utk.edu">npokhrel@utk.edu</a> or, via the Canvas message system
<b>Class:</b>	Synchronous Lecture via Zoom
<b>Class Time:</b>	Monday and Wednesday, 11:45 AM – 12:35 PM
<b>Office Hours:</b>	Monday from 1 pm to 2:30 pm (or by email appointment)
<b>Communication:</b>	The majority of classroom communication will be conducted via the Zoom and Canvas site for this class. To ensure prompt response from me, follow the email policy:

- Please put **“PHYS 231”** in the subject line of all course related emails. This practice will help me identify course related emails and respond promptly.
- You can expect up to a 24-hour delay in responding to emails; I will try to minimize such delays, but do not email me on the evening an assignment is due or before an exam expecting an immediate response.
- Before emailing me with questions about the course, please ensure that the information is not already provided in the course syllabus or on Canvas.

## Course Description & Goals:

**Course Overview:** Physics 231 is a 3 credit-hour fundamentals of physics course with laboratory. This course covers the Fundamentals of Electricity and Magnetism (E&M). The goal is to make you familiar with the concepts of electromagnetism, and give you the skills needed to work with these concepts to solve problems in this field.

**Pre/corequisites:** The course and text assume you are familiar with calculus and calculus concepts, as well as concepts in vector algebra. The prerequisite(s) of the course are PHYS 135 or PHYS 137 or EF 151 or EF 152, and the corequisite is Math 142.

## Resources(s): You will need the following materials for the course:

1. Pearson MyLab and Mastering Physics for University Physics with Modern Physics (15th Edition) by Young and Freedman. For registering with Pearson Mastering Physics, please follow **VitalSource Bookshelf** tab on the left sidebar in Canvas. For details, please follow the instruction provided in this YouTube link: <https://youtu.be/5HpBeu3G6gQ>
2. University Physics with Modern Physics (15th Edition) by Young and Freedman. **If you are fine with eText, it is included in the Pearson MyLab, you don't need to buy the Textbook separately.** If you prefer reading physical book, you can have one, ***but you do not need to purchase the current edition of the textbook.*** The material does not change significantly between editions and any recent edition will meet your needs for the course.

- Contemporary Introductory Physics Experiments, 2nd Edition by James E. Parks, Hayden-McNeil Publishing, ISBN 978-0-7380-6168-9. **You are required to purchase a current edition of the Laboratory manual. Please wait to hear from your TA for the details about the book and other lab resources.**

## Course Format:

- We will cover the **Electromagnetism** section of the textbook, which includes chapters 21 through 31. We will build heavily on concepts presented in your previous physics courses.
- The course consists of two 50 minutes lecture hours/week, which does not leave enough time to cover every aspect of each chapter in detail. We will, therefore, proceed using a mix of traditional lecturing, and problem-solving demonstrations/active-learning exercises.
- For this approach to succeed, you have to come to meeting prepared.* I strongly encourage you to complete the reading assignments as posted on Canvas. That way, you will have an opportunity to email me questions you might like to have addressed during the meeting.

**Class Schedule:** The following is a class schedule along with lecture topics, assignments etc. This is a tentative schedule, and might differ as our class speed. We will discuss in the class if there are any changes, and notices made in the classes/announcements supersede the schedule.

### Fall 2020 Class Schedule (P 231, MW)

First day of the Class August 19, Wednesday

Day	Week	Chapters 21-31	Topics	HW
19-Aug	1	Chapter 0	Introduction/Vector Revisit	HW 1 Electric Charge and Coulomb's Law
24-Aug	2	Chapter 21	Electric Charge & Electric Field	HW 2 Electric Field and forces Exerted by E field on charges
26-Aug		Chapter 21	Electric Charge & Electric Field	
31-Aug	3	Chapter 22	Gauss's Law	HW 3 Gauss's Law
2-Sep		Chapter 22/23	Gauss's Law/Electric Potential	
7-Sep	4	Labor Day Holiday		HW 4 Electric Potential
9-Sep		Chapter 23	Electric Potential	
14-Sep	5	Chapter 24	Capacitance and Dielectrics	HW 5 Capacitors
16-Sep		Chapter 24	Capacitance and Dielectrics	
21-Sep	6	Exam I Review		
23-Sep		Exam I	Chapters 21-23	
28-Sep	7	Chapter 25	Current, Resistance and EMF	HW 6 Current Resistance and EMF, DC Circuits
30-Sep		Chapter 25	Current, Resistance and EMF	
5-Oct	8	Chapter 26	DC circuit	
7-Oct		Chapter 26	DC circuit	
12-Oct	9	Chapter 27	Magnetic Field and Magnetic Forces	HW 7 Magnetic Field and Forces
14-Oct		Chapter 27	Magnetic Field and Magnetic Forces	

19-Oct	10	Chapter 27/28	Magnetic Field and Magnetic Forces/Sources of Magnetic Fields	HW 8 Sources of Magnetic Field
21-Oct		Chapter 28	Sources of Magnetic Fields	
26-Oct	11	Chapter 28	Sources of Magnetic Fields	
28-Oct		Exam II Review		
2-Nov	12	Exam II	Chapters 24-28	
4-Nov		Chapter 29	Electromagnetic Induction	
9-Nov	13	Chapter 29	Electromagnetic Induction	HW 9 EM Induction, Inductance and AC
11-Nov		Chapter 29	EM Induction Problems	
16-Nov	14	Chapter 30	Inductance	
18-Nov		Chapter 30/31	Inductance/Alternating Current	
23-Nov	15	Final Exam Review		HW 10 (Optional)
25-Nov		No class day		
30-Nov	16	Study Day		
2-Dec		Final	Cumulative (Chapters 21-31)	

**Clicker Information:** *We will be using the clickers in almost all lectures, so, make sure you have the app and it is ready by Monday's class.* You can visit the UTK OIT website (<https://help.utk.edu/kb/index.php?func=show&e=2784>) for further instructions. The link is posted on the Modules section as well. Note that **you have to use your UTK email ID** to register otherwise your score won't be integrated into Canvas and won't be registered. So, do not use non-UTK email addresses to register your clicker.

**Course Repetition Policy:** If you are repeating the course, you may not need to repeat the laboratories. Please refer to the Laboratory policy regarding repeating a course and follow instructions there: <http://www.phys.utk.edu/labs/Lab%20Repeat.pdf>

## Grading & Evaluation:

**Clicker Quizzes & Discussion Participation:** In the class meeting, you will be responding quizzes at the end of the lecture. Clicker response grade is divided equally to participation (50%) and the correct response (50%). Your participation in discussion forum on canvas also includes the participation grade.

**Homework Assignments:** You will be assigned homework on MyLab and Mastering Physics. The assignments will be due on the indicated due date.

**Midterm Exams:** There will be two midterm tests on canvas. The tentative dates for the midterms are indicated on the schedule. **Please note that these dates are subject to change as we progress through the course material but they will be finalized at least a week prior so that you can plan accordingly.** Each midterm exam will be 60 minutes in length.

**Final Exam:** The final exam will be available on Wednesday, December 2<sup>nd</sup> on Canvas. If you determine that you have a conflict with that time or have three or more exams scheduled on that day, please let me know as soon as possible. The Final Exam will be two hours in length and cumulative in scope, covering chapters 21 to 31 of the textbook.

A formula-sheet will be available for each exam for a quick reference.

**Laboratory:** The laboratory sections are mandatory. If you fail the Laboratory section of the course, you will fail the course regardless of your scores in class. Lab reports will be turned in to your Teaching Assistant. Teaching Assistant is responsible for grading them. Please resolve any disputes regarding your laboratory grade with your TA. If you are unable to reconcile the issue, please write to me.

## Grading Scheme:

**Grades:** Your grade is calculated based on many elements of the course. See the table below for details on this.

<b>Course Element</b>	<b>%</b>
Laboratory	25%
Mid Term 1	15%
Mid Term 2	15%
Final Exam	20%
Homework	15%
In-class Quiz/Discussion Participation	10%
Total	100%

Letter grade will be obtained using the conversion below:

<b>%</b>	<b>Grade</b>
90% and above	A
87% - 89%	A-
83% - 86%	B+
80% - 82%	B
77% - 79%	B-
73% - 76%	C+
70% - 72%	C
67% - 69%	C-
63% - 66%	D+
60% - 62%	D
57% - 59%	D-

## Other Information:

**Class Rules:** Students need to follow the following guidelines and class room etiquette in order to ensure a positive and respectful learning environment for everyone:

- **Please join the Zoom meeting on time:** don't make it a habit to join late. I will lock the meeting after certain time.
- **Be respectful:** Act in a matured/polite manner and be respectful of the learning process, your instructor, follow the guidelines for the Zoom meeting (See the rules posted on Canvas).
- **Raise your hand:** If you have a question or comment during the class, please raise your hand, or type on the chat-room on Zoom.
- **Share the air:** If you have been dominating the discussion or participating disproportionately, let others participate. Alternatively, if you haven't said much, you are encouraged to participate more.
- Please use **respectful and (socially) inclusive language**.

**How to succeed and get a good grade in the class:** The number of lecture hours in this class are not enough to cover all parts of the syllabus in detail. Hence reading assignments and home works are provided. A good portion of success in this class depends on coming class to prepared, actively participating during the class and completing home works as assigned.

- Read the course material before coming to the class otherwise you will be lost and cannot follow the lecture completely.
- This course assumes that you have calculus background. There is not enough time in the course to review math basics in detail, so it critical that you refresh your vector calculus, differentials, integrals and non-Cartesian coordinate systems. This will help you follow the material presented in the lecture more thoroughly. Otherwise you will be lost.
- For this reason, be critical of your math background. If you are having trouble with the mathematical concepts, please ask for help.
- In the class, participate actively and answer reading quizzes and other clicker questions so you can earn your participation credit. Again, this relies heavily on how prepared you come to the class.
- Follow the class rules and behavior etiquette while in the class. Don't surf the internet or text with your friends.
- Read the textbook **ACTIVELY**. Active reading means reading the book with a pen and paper nearby. You should try to re-derive equations as you go and be critical of your understanding of how the book gets from point A to point B. Note any questions that you have so you can ask them during lectures, via email, or during office hours.
- Take advantage of all the help you can get, you will need it: Instructor office hours, in-class TA help, Lab TAs tutoring hours etc.

**Your Feedback/Suggestions on the course:** You are encouraged to provide feedback on any aspect of the course all through the semester using any communication method you prefer. Your **grades will not be impacted by any feedback** you provide, they will be purely based on your coursework and lab work. However, your discretion in these matters is expected. You will also have an opportunity to give feedback at the end of the semester through the Course Evaluation System. Your feedback is critical in improving the course. Each year I take the information provided in feedback seriously so please take the time to fill out the feedback forms in a thoughtful manner.

## Students with disabilities:

If you need course adaptations or accommodations because of a documented disability, please contact the Student Disability Services (SDS). This will ensure that you are properly registered for the services

provided by SDS. *University Policy forbids me from making special accommodations without a letter from the Office of Student Disability Services.*

#### Disability Services Contact Information:

2227 Dunford Hall

Knoxville, TN 37996-4020

Phone: (865) 974-6087

Fax: (865) 974-9552

Email: [sds@utk.edu](mailto:sds@utk.edu)

Website: <https://sds.utk.edu/>

*For additional important information (Academic integrity, civility statement, UT alerts, COVID-19 procedures, ...) please see the Campus Syllabus ([Click here for Campus Syllabus](#)).*