

# Physics 2321 - Introductory Electromagnetism



Dr. Jorge Lopez



## PHYS 2321 INTRODUCTORY ELECTROMAGNETISM

Fall 2022, CRN 19687, TR 10:30 – 11:50 PM, LART 319

**INSTRUCTOR:** Jorge A. López

**COORDINATES:** Office PSCI 311, 747-7528, [jorgelopez@utep.edu](mailto:jorgelopez@utep.edu)

**OFFICE HOURS:** In my office (one person at a time) or via Blackboard Collaborate Ultra.

- Without appointment: TR 9:00 AM - 10:00 AM, 12:00 PM - 3:00 PM
- With appointment: MW 1:00 - 4:00

### COURSE DESCRIPTION

Introductory Electromagnetism is the second part of a sequence of calculus-based introductory physics courses whose main objectives are to provide students with a rigorous description of electricity and magnetism. It covers charges, electric forces, electric fields and potential, current and magnetism, induction, time varying fields and electromagnetic waves, and improves student's problem-solving abilities, and basic laboratory experiments on principles of electricity and magnetism including experimental design, data collection and analysis, and preparation of laboratory reports.

Class will be composed of two 1.5-hour weekly lectures with the instructor, a 1-hour weekly workshop/seminar, and a 2-hour weekly laboratory.

Prerequisite: PHYS 2420 and MATH 1312. MATH 1312 may be taken concurrently with PHYS 2421. The course counts as 4 credit hours.

### LEARNING OUTCOMES

At the end of this course, students will be able to understand

- Electric charges, electric forces, Coulomb's law, electric fields
- Electric potential energy, electric potential, Gauss' law,
- Currents, circuits, resistance, resistivity, capacitors, batteries,
- Magnetic fields, sources of magnetic fields, Biot-Savart Law, Ampere's law,
- Induction, AC currents, inductors, RLC circuits, resonance, impedance
- Electromagnetic waves.

### TEXTBOOK AND OTHER MATERIALS

- *Physics for Scientist and Engineers*, Knight, Field, 4rd Ed. or newer.
- *iClicker*. Register at <https://www.iclicker.com/> and sign up for PHYS 2321. Login into your Blackboard and click on the icon to launch a special instance of iClicker, then log in or create a new iClicker account if you don't already have one. Signing into



iClicker for PHYS 2321  
Click on this link to connect your iClicker student account to this Blackboard course.

iClicker through this link will synchronize your iClicker account with your Blackboard account.

- Scientific calculator.

## COURSE OVERVIEW

- Ch. 22: Electric charges and forces
- Ch. 23: Electric field
- Ch. 24: Gauss' Law
- Ch. 25: Electric potential
- Ch. 26: Potential and field
- Ch. 27: Current and resistance
- Ch. 28: Fundamentals of circuits
- Ch. 29: Magnetic field
- Ch. 30: Electromagnetic induction
- Ch. 32: AC circuits

## COURSE EVALUATION

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|-------------------------------|-----|--------------|-----|
| • Weekly quizzes              | 55% | • Final exam | 20% |
| • In-class iClicker questions | 5%  | • Laboratory | 15% |
| • Seminar/Workshop            | 5%  |              |     |

**QUIZZES** Weekly quizzes based on the homework and topics covered in the lecture of the previous week will be given through Blackboard every Thursday in the last 20 minutes of class. The quizzes are open-book and open-notes.

**There will be no makeup quizzes.** Instead the lowest two test grades will be dropped. If you miss more than two quizzes and have proper justification (written evidence of medical urgencies, death in family, military duty, etc.) can arrange a re-test. Please do not request make up quizzes or send absence justifications unless you have missed more than two quizzes.

**LABORATORY:** Attending the Laboratory is mandatory and the lab grade will count 15% of your total grade. You must approve the lab with a minimum of 70% in order to approve the class.

You will receive instructions from the lab coordinator, Karla Carmona ([kcarmona@utep.edu](mailto:kcarmona@utep.edu)).

**HOMEWORK:** Homework problems will be assigned but not collected nor graded, but solutions will be discussed in class, and posted on Blackboard: i) in the PPT lecture files, and ii) on the Yuja Video library (click on PHYS 2421 Video Problems).

**IN-CLASS CLICKER QUESTIONS.** We will be using iClicker polling to grade about 150 multiple-choice questions. The grade for the iClicker questions is worth 5% of the semester grade

**WORKSHOP:** Workshops will be hybrid with 49% or less online. The grade for the workshop is worth 5% of the semester grade, based on attendance (1%) and a weekly quiz (4%). The workshops for this class are:

- 19835 PHYS 2321 T 9:00 AM – 9:50 AM Education Bldg 312
- 19877 PHYS 2321 R 3:00 PM – 3:50 PM Education Bldg 312
- 19914 PHYS 2321 T 3:00 PM – 3:50 PM Education Bldg 311

**FINAL EXAM** is comprehensive covering chapters 22 - 32 of the textbook *Physics*.

## CLASS PARTICIPATION

This is an in-person class, but it will also be broadcast through Blackboard Collaborate.

- **IN-CLASS PARTICIPATION**

- Students must maintain 6 feet of distance while entering and exiting the classroom and the use of face covering is recommended at all times during class.
- **ONLINE PARTICIPATION**
  - We will use Blackboard Collaborate Ultra for online communication. See <https://help.blackboard.com/Collaborate/Ultra/Participant> for instructions.
  - **Netiquette:** please follow these guidelines while using online communication:
    - All communication should be polite. Mute your microphone unless you need to ask a question, and block your video unless you want to share an image.
    - Blackboard is not a public internet venue; all postings are private and confidential, and intended for classmates and professor only. Please do not paste class documents on publicly accessible website, blog, or other spaces.
    - Online sessions will be recorded, and can be reviewed later.
    - Your location will be monitored through the IP address from which you log in to Blackboard and iClicker. Please notify the instructor if you are not in El Paso, and be prepared to show evidence of location. Also avoid using a VPN or else justify its use.
  - **Technology requirements**
    - You will need a computer, laptop or mobile device, with a camera, microphone, access to Internet, Microsoft Office programs (Word and Powerpoint) and Adobe Acrobat Reader. This software can be accessed for free via UTEP's [Microsoft Office 365](#).
    - If you encounter technical difficulties please contact the UTEP [Help Desk](#).

#### WHAT DO YOU NEED TO DO TO BE SUCCESSFUL IN THE COURSE

- **Pay attention to the weekly e-mail messages from the instructor.**
- The lecture material to be used in class is available in Blackboard ahead of time, download it and study before class. If you print it you won't need to take notes during class!
- Participate in class, ask questions and answer the iClicker questions.
- Do not miss the thursday quizzes. Old quizzes are available to study in Blackboard.
- Complete the homework early in the week, it will help you in the thursday quizzes.
- Keep summaries of the material covered, this is helpful to study for the final exam.
- Form a study group with one or more peers, and study together.
- Get help from the Miner Learning Center, see below for instructions.

#### MINER LEARNING CENTER

Tutoring for PHYS 2321 is available at the Miner Learning Center (<https://www.utep.edu/mlc/>); if no tutor is available for 2321, request to be tutored for PHYS 1304. MLC tutoring may be done in person or via Zoom. Please contact the MLC for tutoring times, etc.

#### OFFICIAL STATEMENTS

<b>Course Activities</b>	Class will be composed of two 1.5-hour lectures with the instructor, and a 2-hour lab.
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<p><b>Excused absences and/or course drop policy</b></p>	<p>According to UTEP Curriculum and Classroom Policies, “When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of “W” before the course drop deadline and with a grade of “F” after the course drop deadline.” See academic regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to non-performance in the course, you are at risk of failing, I will drop you from the course. I will provide 24 hours advance notice via email.</p>
<p><b>Incomplete grade policy</b></p>	<p>Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.</p>
<p><b>Accommodations policy</b></p>	<p>The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the <a href="#">UTEP Center for Accommodations and Support Services</a> (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at <a href="mailto:cass@utep.edu">cass@utep.edu</a>, or apply for accommodations online via the <a href="#">CASS portal</a>.</p>
<p><b>Covid-19 accommodations</b></p>	<p>Students are not permitted on campus when they have a positive COVID-19 test, exposure or symptoms. If you are not permitted on campus, you should contact me as soon as possible so we can arrange necessary and appropriate accommodations.</p> <p>Students who are considered high risk according to CDC guidelines and/or those who live with individuals who are considered high risk may contact <a href="#">Center for Accommodations and Support Services</a> (CASS) to discuss temporary accommodations for on-campus courses and activities.</p>
<p><b>Covid-19 precautions</b></p>	<p>Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to <a href="mailto:covidaction@utep.edu">covidaction@utep.edu</a>, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.</p> <p>The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit <a href="http://epstrong.org">epstrong.org</a>.</p>
<p><b>Attendance Policy</b></p>	<p>Attendance is not taken into account for the grade, but not attending the class will result in missing quizzes and iClicker questions.</p>

<b>Academic Integrity Policy</b>	Any student who commits an act of academic dishonesty is subject to discipline. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures, and available on the homepage of the Dean of Students at <a href="http://www.utep.edu/dos">www.utep.edu/dos</a> , may result in sanctions ranging from disciplinary probation, to a failing grade on the work in question, to a failing grade in the course, to suspension or dismissal, among others.
<b>Civility Statement</b>	During class, please do not eat, sleep or read newspapers or any other material not related to class. Turn off cell phones, ipods, and any other devices which might disturb class. Use computers and tablets only for class purposes, and do not talk excessively (definition of "excessive" is up to the instructor)
<b>Disability Statement</b>	If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to <a href="mailto:cass@utep.edu">cass@utep.edu</a> , or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at <a href="http://www.sa.utep.edu/cass">www.sa.utep.edu/cass</a> .
<b>Military Statement</b>	Students being called for military duties need to contact the instructor as soon as possible.
<b>Drop deadline</b>	The College of Science will not approve any drop requests after the deadline date.
<b>Class recordings</b>	The use of recordings will enable you to have access to class lectures, group discussions, and so on in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstance. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. You may not share recordings outside of this course. Doing so may result in disciplinary action.

## TENTATIVE CALENDAR

WEEK	CONTENT	OBSERVATIONS	QUIZ
8/22-26	Intro + Ch. 22		No quiz on first week
8/29-9/2	Ch. 22		1: Ch. 22
9/5-9	Ch. 23	Monday is a holiday	2: Ch. 22
9/12-16	Ch. 24		3: Ch. 23
9/19-23	Ch. 25		4: Ch. 24
9/26-30	Ch. 26		5: Ch. 25
10/3-7	Ch. 27		6: Ch. 26
10/10-14	Ch. 28		7: Ch. 27
10/17-21	Ch. 29		8: Ch. 28
10/24-28	Ch. 29 - 30	Drop deadline: 10/28	9: Ch. 29
10/31-11/4	Ch. 30		10: Ch. 29-30
11/7-11	Ch. 31		11: Ch. 30
11/14-18	Ch. 31 - 32		12: Ch. 31
11/21-25	Ch. 32	Thanksgiving 11/24-25	No quiz - Holiday
11/28-12/2	Review	12/2 is dead day	
12/5-9		Final exam: Thursday, Dec. 8, 10:00 AM – 12:45 PM	