

## Physics 122

Sections 1, 2, 3; CRNs 60098, 60099, 60731

Fall 2019

**Website (Cambas)** <https://nmt.instructure.com/courses/11536>

**NMCCNS.** New Mexico Common Course Numbering System. PHYS 1225:  
General Education Area III.

**Prerequisite.** PHYS 121; **Corequisite.** MATH 132; PHYS 122L

**Lecture.** MWF, 0900-0950, WORKC 101

**Recitations.** Section 1: M, 1400-1550, WORKC 109; Section 2: M, 1900-2050,  
WORKC 109; Section 3: F, 1400-1550, WORKC 109.

**Instructor.** Carlos Lopez Carrillo.

email: [carlos.lopezcarrillo@nmt.edu](mailto:carlos.lopezcarrillo@nmt.edu)

phone: 575.835.5047

Office: 111 Workman Bldg.

Office hours: T, W, 14:00 to 16:00; other times by appointment.

**Description.** Physics 122 is a general education core course and part of the required curriculum for Tech Students. It is a calculus-based introduction to electricity and magnetism.

**Goals** The student should develop an understanding of the concepts of superposition and flux, an intuition about the interaction of charges with electric and magnetic fields, and how charge distributions and their motion bring about electromagnetic fields.

**Learning Outcomes.** Regarding the subject matter of this course, the student will demonstrate good problem-solving skills, the ability to make decisions based on the information at hand, and the ability to write clearly and coherently the solution to a given problem. The students will demonstrate the ability to work with SI units commonly used in solving electromagnetic problems.

## Course Instructions

**Safety.** In case of a Fire alarm, the students are expected to evacuate the building and proceed to a location designated during the first Lecture.

**Book.** (Mandatory) University Physics Volume 2 from OpenStax, Print ISBN 193816816X, Digital ISBN 1947172212, [www.openstax.org/details/university-physics-volume-2](http://www.openstax.org/details/university-physics-volume-2)

The textbook is available for free online in web view and PDF format. You may also purchase a print version at the campus bookstore or from OpenStax on Amazon.com. If you buy on Amazon, make sure you use the link on your book page on openstax.org, so you get the official OpenStax print version.

### Grading:

		Point Cutoff	Letter Grade
Three partial tests	45%	93	A
Final Test (Comprehensive)	15%	90	A-
Written Homework	15%	87	B+
Online Homework	15%	83	B
Class Participation	6%	80	B-
Class Attendance	1%	77	C+
Recitation Participation	3%	73	C
Recitation Attendance	1%	70	C-
Final Project (Extra Credit)	3%	67	D+
		60	D
		<60	F

**Tests.** There will be three partials and one final test.

The content of each exam may vary as I see fit, but I let you know at least a week in advance. The Final will emphasize the later parts of the course, but will include all the material covered during the semester. All tests are to be taken individually. Tentative dates for the partials are given in the class calendar (see below). The registrar office will determine the time and place for the final.

**Homework.** Two types of Homework will be assigned: written and online.

You are encouraged to discuss homework problems with your classmates, but I expect that the work that you present for grading is your own.

**Written Homework** will be normally assigned on Wednesday and due on the following Wednesday; marked papers will generally be returned on the following Monday. Homework papers must be stapled with each page showing the homework number. Also, write problem number clearly at the top of the page. You must show all your work so that it is easy to follow how you arrived at your solution. When a numerical or algebraic answer is required, draw a box around it. Answers must be labeled with the proper units. Homework papers which do not meet these guidelines may be rejected with no grade.

**Online Homework** will be assigned on most classes and due on the following day by 11 PM. You will need to purchase an Expert TA registration to access the problem sets. You may register to and learn about Expert TA by completing the first Online Homework: go to the course Canvas page, Assignments, and click on "Load Learning Expert TA in a new window" That directs you to the Expert TA website where you can register (with a credit card or bookstore code) and complete the assignment.

**Class Participation** is measured with the iClickers. Each iClicker question counts 2 points. You earn 1 point for participating in the poll and a second point by answering correctly.

Students are required to either purchase an iClicker remote, or have the app installed in a mobile device. Due to possible internet glitches, the remote is preferred. Students using the mobile app must have version 5.0.4 (Oct 2018) or newer. For more information, go to [www.iclicker.com](http://www.iclicker.com)

We will start using iClickers the second week. To create an iClicker account go to our Canvas page, iClickers, and iClicker Reef. Click "Load iClicker Reef in a new window", and follow the instructions.

**Class Attendance.** You are expected to attend every Lecture. Furthermore, being on time is important. If you are late, please try to keep the disruption to a minimum. If you are more than ten minutes late, you may lose important information and perhaps the roll call.

If you are absent or late, it is your responsibility to find out what you have missed.

**Recitation Participation** Recitations provide various activities to practice lecture material under the supervision of a Teaching Assistant. By participating in these activities, you earn points associated with this item.

**Recitation Attendance.** You are expected to attend every recitation session.

**Final Project.** For extra credit, You may choose to work on one of the following projects: build a uni-polar electric motor that works with a single 1.5 V D battery, an LED lamp with a 6 V battery (and some resistors), or a homemade light bulb that works with a 6 V battery. Completed projects will be scheduled for presentation during the last week of classes. A functioning apparatus should be presented along with a short (no more than two pages) write up describing the goal, materials, procedure, and results for the project. Your write up is due the day of the presentation.

**Etiquette.** Cell phones should be reserved for emergencies –no text. If you must take a call, please take it outside the class. Come prepared and ready to work with materials needed (book, notebook, calculators, pencils, etc.). Please feel free to email your instructor; you should receive a reply within a business day.

**Philosophy and Work Ethics.** My philosophy about taking a class is that you should take it in a similar way as you would take a job in physics or any job for that matter. So, one should show up to work, work diligently in every assignment, and be prepared for the challenges of the job.

Since everyone is different, the time required to complete a task is different for everyone. However, on average, to learn the material presented

in class, I expect you to work between 8 and 10 hours per week outside the class.

This time should be dedicated mostly to work on your Homework, including time expended in recitations and help sessions, as well as any time, reading the material before coming to class.

The Final project should not take more than a total of 10 to 12 hours during the entire semester.

## **POLICIES.-**

**Makeup tests or Homework.** It is our policy not to have "makeups."

However, under extenuating circumstances, we may be able to accommodate a request.

**Missed deadlines.** Written Homework that is late no more than three days will be accepted but will earn at most 80% of the points.

In general, late submission of online Homework is not allowed, and written homework past due more three days will not be accepted. However, an extension of the due date can be granted for circumstances that in my opinion, warrant an extension.

You may turn in late Homework at my office. Alternatively, deposit your paper in the slot that has my name on the cabinet next to the physics office. Please let me know via email that you have submitted a late homework.

**Academic honesty.** Discussing material with each other is encouraged.

However, your written assignment must be your own work. Furthermore, obtaining answers that in any way bypass the need to think about the questions is a violation of this policy and can have serious consequences. If in doubt, ask. Violation of the letter or intent of this policy will result in serious harm to your grade, and may result in recommendation for suspension from the Institute.

## **NMT Services and Policies**

**Homework and study help.** The Physics department and the Office of Student Learning (OSL) offer drop-in help from graduate students and learning coaches in Speare. Information about these sessions is available from either the Physics department (Workman 333) or the OSL in Speare.

**Canvas, iClicker, and Expert TA** For technical support, You may direct questions to [curtis.warren@nmt.edu](mailto:curtis.warren@nmt.edu)

**Reasonable accommodations.** New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs

known to the Office of Counseling and Disability Services (OCDS) as soon as possible. To schedule an appointment, please call 835-6619.

**Counseling services.** New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. The confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call 835-6619.

**Academic honesty.** New Mexico Tech's applicable policy regarding academic honesty is expressed in the NMT Undergraduate Catalog.

You are responsible for knowing, understanding, and following this policy.

**Respect Statement.** New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the New Mexico Tech Guide to Conduct and Citizenship: SNew Mexico Tech's primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community.

P122-Calendar

Week	Week's Lab	Monday Date	Book-Chapter	Monday	Tu	Wednesday	Th	Friday	Written HW
1	No Lab	Aug_19	1-16	Intro To all EM Laws, Fields and Flux	Superposition: Applied to Waves	Superposition of forces (mechanical); the property of charge.			
2	Wave Superposition	Aug_26	2-5	Superposition with Charges; Coulomb's law (HW)	Electric Field	Electric Filed of Charge distributions			1
3	Oscilloscopes	Sep_02	2-5,6	<b>LaborDay</b>	Examples (E, Field)	Flux and Gauss' Law			2
4	Electric Field Superposition	Sep_09	2-6,7	Gauss' Law(examples)	Superposition and Potential	Examples (E, Potential)			3
5	Electric Field Mapping	Sep_16	2-7	Determining Field from Potential.	Review For test 1	<b>TEST1</b>			
6	Capacitors	Sep_23	2-8,9	Review of Test 1; Capacitors –definition; series and paralel	Capacitors and Energy.	Current and Ohm's law; Energy and power.			4
7	Ohm's law	Sep_30	2-10	DC-circuits; electromotive force	Resistors (series parallel)	Kirchoff's laws and exmples			5
8	Kirchoff's laws	Oct_07	2-11	Magnetic Forces	<b>Mid Semester;</b> Magnetic Forces (examples)	Examples			6
9	Magnetic Forces	Oct_14		Review For Test 2	<b>TEST2</b>	<b>49ers</b>			
10	Magnetic Forces II	Oct_21	2-12	Review of Test 2; Sources Of Magnetic Fields (Biot-Savart law)	Amperes' Law and right-hand rule	Examples			7
11	Velocity of EM signals	Oct_28	2-13	Faraday's & Lenz's Laws	Examples	Examples			8
12	Faraday's Law	Nov_04	2-14	Inductance	Mutual Inductance (Transformers)	Selfinductance			9
13	Mutual Inductance	Nov_11	2-16	Displacement Current and Ampere's Law	Integral Form of Maxwell's Equations	Wave Equation			10
14	Current Displacement	Nov_18	2-16	WaveEquation	Review For Test 3	<b>TEST3</b>			
15	No Lab	Nov_25		Review of Test 3	Reading week Begins; Review and Final Projects	<b>Th</b> anksGivens			
16	No Lab	Dec_02		Review and Final Projects	Review and Final Projects	Review and Final Projects.			Finals Begin
17	No Lab	Dec_09		Finals	Finals	Finals			