Physics II/1320 Syllabus UNM-Valencia Spring Semester 2020 Clifton Murray
Class meets T&Th 10:30-11:45a.

Instructor's Office A126-A. Hours MW 3:20-4:20; T 4:15-5:15p; Th 11:45a-12:15p, 1:15-2:45p, 4:15-5:15p
505-925-8727 wcmurray@unm.edu

Prerequisite: Completion of calc-based Physics I with course grade of C or higher.
Useful Materials:

Text: Fundamentals of Physics 10th ed. Extended, by Halliday, Resnick, & Walker. Nearly all homework assignments, and even some test problems, will come from the text.

Calculator: A graphing scientific calculator will occasionally be used in basic ways—arithmetic, scientific notation, trig/inv trig functions, exponents, logs, and graphing. Calculators may be used on tests; however, all test problems requiring calculations must show those calculations, clearly and in detail, on paper--merely writing down results from a calculator (other than arithmetic), without giving the reasoning &/or mathematics behind it, will result in reduced credit. No cell-phone calculators allowed on tests.

Student Learning Objectives: By the end of the course, the student should be able to explain the physical meaning of, and solve problems involving, at least the following: *In Electricity and Magnetism*: 1) electric charges and Coulomb's Law; 2) electric fields; 3) electric flux and Gauss's law; 4) electric potential, and its relation to the electric field; 5) capacitance and capacitors, singly and in combination; 6) the relation between voltage, current, and resistance, in Ohm's law and in circuits; 7) resistors, singly and in combination; 8) electric power in d.c. circuits; 9) RC circuits and their behavior when charging or discharging; 10)magnetic fields; 11) how magnetic fields are produced; 12)the use of magnetic and electric fields to accelerate charge; 13) the relation between current and the magnetic field it produces (Ampere's law); 14) magnetic induction, inductance, inductors; 15) the relation between the rate of change of magnetic flux and the induced emf (Faraday's law); 16) electromagnetic oscillations and a.c. circuits; 17) the voltage-current transformer; 18) capacitive reactance, inductance, and impedance in RLC a.c. circuits; 19) rms votage, current, and power in a.c. circuits; 20)magnetism in matter, incl. the Earth's magnetic field; 21) Maxwell's equations. *In Temperature, Heat, and Thermodynamics*: 22) the meaning of temperature and heat, and their units of measure; 23) the First Law of Thermodynamics; 24) how to calculate the amount of heat for change-of-temperature processes and for change-of-state processes; 25) the 3 classical ways of thermal energy transfer: 26) the kinetic theory of gases; incl the Ideal Gas law in that theory; 27) entropy; 28) the 2nd Law of Thermodynamics, and it's consequence for heat engines; 29) the First Law of Thermodynamics applied to heat engines.

Academic Dishonesty as defined in the UNM-VC catalog includes copying work from other students. Any student found doing this on tests is subject to disciplinary action, ranging from "a reduced or failing grade for the work in question and/or the course" to "dismissal from the University".

Disruptive Behavior is any behavior which interferes with other student's learning or the instructor's ability to guide that learning. Examples include loud talking/ laughing/chatting with your buddy which require repeated warnings from the instructor, or derisive/ridiculing comments toward well-meaning students or the instructor—this is the quickest way to get expelled from the class. Keep your motives constructive, and it'll be a good educational experience.
* Please Keep *cell phones OFF* during class. **No use of cell phones during tests**.*

Sexual Misconduct : Any report made to a faculty member, TA, or GA regarding sexual misconduct or gender discrimination must be reported to the Office of Equal Opportunity and the Title IX Coordinator. For more information on campus policy regarding sexual misconduct, see https://policy.unm.edu/university-policies/2000/2740.html. The Tile IX coordinator can be reached at 505-277-5251 or acatena@unm.edu.

Children in Class: Children are not permitted in class. This is regrettable, but it is due to liability concerns.

Disabilities: Should you have a documented disability requiring special accommodations, please provide the instructor with appropriate documentation from Equal Access Services, so those accommodations can be made available.

A *formula sheet* will be provided for each test. Only minor notes, such as a word describing a formula or a quantity, may be added to the sheet. No example problems, whether partially or fully worked out, are allowed on the formula sheet. Any student found with such will have the formula sheet confiscated, and will be subject to disciplinary action.

Homework Format: Homework problems should be clearly separated, either by whitespace (that means more space between main problems than within the problem), or by a separation line between main probs (not between subprobs a, b, c…). Turn homework in by *day*—not by section. A list of each day's hmwk is provided on the Calendar which accompanies this document.

Also, please either put the **main** prob #--5, 11, 21, …etc (**not** a,b,c…).—to the left of all other work, **or** make it extra BIG. This is to also help make the separation between main problems really obvious, so the instructor can find and check off the main problems fast. Finally, nearly all homework problems pertain to a physical situation. For such problems, a **sketch** is required.

Physics homework should be turned in **by chapter**, stapled. DO NOT split chapters, even though the schedule might split problems from the same chapter across different days. A chapter will be graded only once-whatever comes in first. No credit will be given for later, partial turn-ins on the same chapter.

Makeup Work: Tests: There are no makeup tests, except in genuine emergencies—in such cases, expect a maximum score of 80%. (If needed for good reason, the Instructor will try and arrange an *early* test for the student.) The lowest of the tests or homework is dropped, but note that if any test is not taken, or the end-of-course homework total is less than 50%, the student will not receive a grade higher than A-, regardless of total after the low-score drop.

Homework : 1 class day late: -50%. 2 class days late: Zero credit.
All Homework assignments are due at first of class, on the relevant test day.

Final Exam Minimum: **Less than 65% on the final exam will result in a course grade no higher than "D"**, regardless of semester point total.

Grade weighting:

	Max possible points	
Homework	100	
4 tests	400	
Drop lowest one of tests or homework:	-100	
Final exam (not dropped, comprehensive)	150	**min to pass course with greater than D—97.5/150** (65%)
	550	Max poss course total

$532 \leq x \leq 550$	A+	(unless a test is missed, or homework total is less than 50%)
$512 \leq x < 532$	A	(unless a test is missed, or homework total is less than 50%)
$495 \leq x < 512$	A-	
$477 \leq x < 495$	B+	
$457 \leq x < 477$	B	
$440 \leq x < 457$	B-	
$422 \leq x < 440$	C+	
$402 \leq x < 422$	C	
$385 \leq x < 402$	C-	*note that a C- may not satisfy the prerequisite for certain courses or programs
$330 \leq x < 385$	D	
$0 \leq x < 330$	F	

No "Incomplete" (I) grades will be given.

HMWK #'s REFER TO PROBLEMS, UNLESS NOTED OTHERWISE.

SPRING 2020
PHYSICS II (1320, CALC-BASED)

T Th

10:30 a.m.

HMWK DUE AT START OF EACH TEST DAY, STAPLE BY CHAPTER, SEPARATELY.

T	Th
21 JAN ELECTRIC CHARGE, CURRENT, & FORCE $F=\frac{kq_1q_2}{r^2}$ CH 21 # 3, 4, 5, 13, 28, 37, 49, 56	23 JAN CH 22 ELECTRIC FIELD $\vec{E}$ # 5, 11, 22, 24 (a & b), 42, 43, 46, 62
28 JAN CH 23 ELECTRIC FLUX Φ_E · GAUSS's LAW $\Phi_E = \oint \vec{E} \cdot d\vec{A}$ $\varepsilon_0 \Phi_E = q_{encl}$ # 1, 25, 36, 47	30 JAN CH 24 ELECTRIC POTENTIAL DIFFERENCE $\Delta V = \frac{\Delta U}{q}$ # 1, 2, 4, 28, 35, 47
4 FEB FINISH CH 21, 22, 23, 24.	6 FEB RVW
11 FEB HMWK CH 21, 22, 23, 24 DUE AT START TEST # 1	13 FEB CH 25 CAPACITANCE $C = \frac{Q}{V}$ CAPS IN COMBINATION # 2, 6, 8, 11, 30, 40, 41, 42, 60
18 FEB FINISH CH 25. CH 26 CIRCUITS: RESISTANCE R, CURRENT i, VOLTAGE V, POWER P. $V = iR$ CH 26 # 1, 7, 13, 19, 41, 49 $P = iV$	20 FEB FINI 26. CH 27 R's IN COMBINATION. RC CIRCUITS. # 8, 20, 59
25 FEB CH 27 CONTIN. emf $\mathcal{E}$. KIRCHOFF'S RULES FOR LOOP CIRCUITS. CH 27 # 1, 30	27 FEB RVW
3 MAR CH 25, 26, 27 HMWK DUE AT START. TEST # 2	5 MAR CH 28 MAGNETIC FIELD $\vec{B}$, FORCE ON MOVING CHARGE $\vec{F} = q\vec{v} \times \vec{B}$, ON CURRENT LINE $\vec{F} = i\vec{l} \times \vec{B}$ # 1, 3, 23, 39, 56
10 MAR CH 29 AMPERE'S LAW $\oint \vec{B} \cdot d\vec{s} = \mu_0 i_{encl}$ # 1, 3, 4, 9, 42½ (DERIVE FORMULA FOR #43), 43, 45, 51.	12 MAR FINISH 29 _ CH 30 # 2, 9, 36, 46, 55 MAG FLUX $\Phi_B = \int \vec{B} \cdot d\vec{A}$ FARADAY'S LAW $\mathcal{E}_{IND} = -N\frac{d\Phi_B}{dt}$
17 MAR SPRING	19 MAR BREAK
24 MAR CH 31 A.C. CIRCUITS # 28, 29, 30, 41, 53, 54, 62	26 MAR CH 31 CONTIN: CIRCUIT RESONANCE, EM RADIATION. HANDOUT "MAXWELL'S EQUATIONS" HMWK: STUDY
31 MAR CH 32 MAXWELL'S EQUATIONS HMWK # 2, 5, 16, AND CH 23 # 56 ← TURN IN AS ONE PACKET	2 APR FINI CH 32 MAXWELLS EQ^N'S. CALCULATE SPEED OF LIGHT FROM ELECT. & MAGNET. HMWK: PROFESSOR'S HANDOUT
7 APR RVW	9 APR HMWK CH 28, 29, 30, 31, 32 DUE AT START. TEST # 3
14 APR CH 18 THERMAL ENERGY 1ST LAW THERMODYNAMICS; # 23, 37a, 45, 53, 93	16 APR CH 18 CONTIN: TEMP, HEAT, THERMAL EXPANSION # 5, 9, 10, 13, 17, 21. BEGIN CH 19
21 APR CH 19 KINETIC VIEW OF GASES # 2, 4, 9, 18, 55, 88 / START CH 20, ENTROPY	23 APR CH 20 HEAT ENGINES, 2ND LAW THERMO. HMWK QUES #9, PROB #4, 6, 24, 26, 27, 30, 40, 48, 72.
28 APR RVW	30 APR CH 18, 19, 20 DUE AT START TEST # 4
CINCO DE MAYO RVW FOR FINAL	7 MAY RVW FOR FINAL
12 MAY FINAL XAM 10:30a - 12:30p	14 MAY