

Instructor's Office A126-A. Hours MW 3:15-4:15p; T 4:15-5:30p; Th 11:45a-12:30p, 1:15-2:45p, 4:15-5:45p
505-925-8727 wcmurray@unm.edu

Prerequisite: Completion of Phyc160 with course grade of C or higher.

Useful Materials:

Text: Fundamentals of Physics 10th ed., by Halliday, Resnick, & Walker. Nearly all homework assignments, and 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 full reasoning &/or mathematics behind it, will result in little or no credit.

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 voltage, 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 its 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>

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 tests. Only minor notes, such as a word describing a formula of a quantity, may be added to the sheet. No example problems, whether partially or fully worked out, are allowed on the formula sheets. 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. That is, if sec 3.1 and 3.2 are presented on the same day, 3.1 and 3.2 should be grouped together—stapled—not separate.

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 these type problems, a simple **sketch** is required.

Physics homeworks 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, if the final homework total is less than 50%-- the student is disqualified from receiving an A+.

Homework : 1 class day late: -50%. 2 class days late: Zero credit.

All Homework assignments are due at first of class, on 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)	<u>150</u> min to pass course 97.5 (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)
$495 \leq x < 512$	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-
$330 \leq x < 385$	D
$0 \leq x < 330$	F

PHYSICS II / 161

TTH 10:30-11:45a **STABLE** TURN IN HWK, BY CHARTER, @ START OF TESTS.

SPRING 2018

CLIFTON MURRAY UNM-VALENCIA

TUESDAY

16 JAN CH 21 ELECTRIC CHARGE q , CURRENT $i = \frac{dq}{dt}$
COULOMB'S LAW
 $F = k \frac{q_1 q_2}{r^2}$ HWK #3, 4, 5, 13, 28, 37, 49, 56
CH 21)

23 JAN CH 23 ELECTRIC FLUX Φ_E . GAUSS'S LAW
 $\Phi_E = \oint \vec{E} \cdot d\vec{A} = \epsilon_0 \Phi_E = \frac{q_{enclosed}}{\epsilon_0}$
1, 25, 36, 47

30 JAN FINISH CH 21, 22, 23, 24.

6 FEB CH 21, 22, 23, 24 HWK DUE AT START OF CLASS.
TEST # 1

13 FEB CH 26 RESISTANCE R , CURRENT i , VOLTAGE V , POWER P IN CIRCUITS. $V = iR$, $P = iV$.
1, 7, 13, 19, 41, 49.

20 FEB CH 27 CONTIN. EMF, \mathcal{E} ; KIRCHHOFF'S RULES FOR ANALYZING LOOP CIRCUITS.
1, # 30

27 FEB CH 25, 26, 27 HWK DUE @ START OF CLASS
TEST # 2

6 MAR CH 29 # 1, 3, 4, 9, 42 1/2 [DERIVE FORMULA FOR # 43], # 43, 45, 51. AMPERE'S LAW
 $\oint \vec{B} \cdot d\vec{s} = \mu_0 i_{enclosed}$

13 MAR
SPRING

20 MAR CH 31 a.c. CIRCUITS; POWER, REACTANCE, IMPEDANCE. VOLTAGE TRANSFORMERS [CH: BE REALISTIC, NO THEORY]
28, 29, 30, 41, 62

27 MAR CH 32 MAXWELL'S EQUATIONS
CH 32: # 2, 5, 16. CH 23: # 56
L.P. 683-1

3 APR
RVW

10 APR CH 18 THERMAL ENERGY - HEAT Q , 1st LAW THERMODYNAMICS, $Q = \Delta U + W$. Q ABSORBED, Q RELEASE CALCULATIONS. # 23, 37a, 45, 53, 93

17 APR CH 19 KINETIC THEORY OF GASES. $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$
PV = nRT. ADIABATIC PROCESS: $PV^\gamma = \text{CONST}$

24 APR
RVW

1 MAY
RVW FOR FINAL

8 MAY **FINAL EXAM** 10:30a-12:30p

THURSDAY

18 JAN CH 22 THE ELECTRIC FIELD \vec{E}
5, 11, 22, 24a, 24b, 42, 43, 46, 62

25 JAN CH 24 ELECTRIC POTENTIAL DIFFERENCE
 $\Delta V = \frac{\Delta U}{q}$ $\Delta V = \oint \vec{E} \cdot d\vec{s}$ $E_s = -\frac{\Delta V}{\Delta s}$
1, 2, 4, 28, 35, 47

1 FEB
RVW

8 FEB RVW TEST 1 - CH 25 CAPACITANCE
 $C = \frac{Q}{V}$, CAPS IN SERIES, PARALLEL.
2, 6, 8, 11, 30, 40, 41, 42, 60

15 FEB FINISH CH 26.
CH 27 RESISTORS IN SERIES, IN PARALLEL;
RC CIRCUITS CH 27 # 8, 20, 39

22 FEB
RVW

1 MAR CH 28 THE MAGNETIC FIELD, \vec{B}
1, 3, 23, 39. MAG. FORCE ON MOVING CHARGE:
 $\vec{F} = q\vec{v} \times \vec{B}$, $\vec{F} = i\vec{l} \times \vec{B}$

8 MAR FINI CH 29. CH 30 # 29, 36, 40, 55
MAGNETIC FLUX / FARADAY'S INDUCTION LAW
 $\Phi_B = \int \vec{B} \cdot d\vec{A}$ $\mathcal{E}_{IND} = -N \frac{d\Phi_B}{dt}$ [START CH 31, Q.C.]

15 MAR
BREAK

22 MAR CH 31 CONTIN: OSCILLATOR CIRCUITS, RESONANT CIRCUITS, EM RADIATION.
HWK: MAXWELL'S EQUATIONS HANDOUT: "STUDY"

29 MAR FINI CH 32 MAXWELL'S EQUATIONS
HWK: INSTRUCTOR'S HANDOUT
SPEED OF LIGHT, c : CALC. FROM E/M CONSTANTS.

5 APR HWK CH 28, 29, 30, 31, 32 DUE, 1st OF CLASS.
TEST # 3

12 APR CONTIN. CH 18 & TEMPERATURE T . HEAT TRANSFER METHODS. $Q = mc\Delta T$, $Q = mL$. THERMAL EXPANSION. # 5, 9, 10, 13, 17, 21.

19 APR FINI CH 19. CH 20 ENTROPY. HEAT ENGINES. 2nd LAW THERMODYNAMICS.
HWK [QUES # 9] + PROS # 4, 6, 24, 26, 27, 30, 40, 48, 72

26 APR CH 18, 19, 20 HWK DUE @ START OF CLASS.
TEST # 4

3 MAY
RVW FOR FINAL

10 MAY