

Hidalgo Early College District Toolkit

South Texas College
Mathematics & Science Division
Department of Physical Sciences and Engineering
Spring 2011

Name of Instructor: Ms. Lyn D. Onato

Office Location: Room J-4, Hidalgo Early College High School

Telephone #: (956) 843-4300

E-mail Address: ldonato@southtexascollege.edu, lyonato@hidalgo-isd.org

Tutoring Hours: Tuesdays & Thursdays, 4:00-5:00 pm

Course Information:

Course Name: College Physics II

Course#& Section #: PHYS 1402 – S01 Dual Enrollment

CRT HRS: 04 **LE HRS:** 03 **LAB HRS:** 03 **MWTRF** 1:10-2:00 pm

Course Description:

This course covers principles and application of electricity, magnetics, light, and sound with emphasis on fundamental concepts, problem solving, notation and units.

Prerequisites: PHYS 1401 with a grade of "C" or better.

Required Textbook & Resources:

- **Physics: Cutnell and Johnson, Wiley, (8th Edition)**
- pencils and a good eraser, blue/black pens only
- 2- or 3-inch 3-ring binder with 4 dividers (syllabus, tests, class/homework, labs)
- 3-ring college ruled loose notebook paper, or spiral notebook
- TI-84+ calculator (class set)

Program Learning Outcomes:

- 1 General principles with applications of Classical Mechanics (particles, rigid bodies, waves)
- 2 Understanding the basic concepts of thermodynamics with applications
- 3 Understand principles of Electromagnetics with applications
- 4 Understand the principles of Optics with applications
- 5 Understand the basics of Modern Physics
- 6 Conduct Experimental Design, techniques and analysis

A. Department Course Learning Outcomes

1. Core Curriculum Exemplary Educational Objectives

- To understand and apply method and appropriate technology to the study of natural sciences.
- To recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
- To identify and recognize the differences among competing scientific theories.
- To demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
- To demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.

2. Departmental Outcomes or Course Specifics

The student, after taking this course will:

- Describe the speed of sound, sound spectrum, sound intensity and intensity level, applications of sound, sonar, ultra sound, and Doppler's effect and their applications.
- Describe and differentiate between constructive and destructive interference of sound, beats, and transverse and longitudinal standing waves.
- Describe electric force and electric field, Coulomb law, and Gauss' law, and applications to copiers and printers;
- Describe electrical potential energy and electric potential, capacitors, and dielectric; electric circuits, Ohm's law, electric power, series and parallel wiring, and RC circuits with applications;
- Describe magnets and magnetic fields; electromagnetic induction; alternating current and resonance in electric circuits with applications.
- Describe and differentiate between the nature of electromagnetic waves, electromagnetic spectrum, and polarization;
- Describe and apply the concept of the reflection of light and mirrors, and image formation by the spherical and plane mirrors with applications;
- Describe and apply the refraction of light with application to lenses, image formation by lenses, optical instruments, human eye dispersion of light, and polarization by reflection
- Describe and apply the concepts of interference and wave nature of light; diffraction, and application of interference to compact disc and thin films.
- Describe the special relativity, particles – waves duality;
- Describe different steps in the development of atomic physics and its applications
- Describe different steps in the development of nuclear physics, and radioactivity with applications

3. Intellectual Competencies

- a. Students will read, analyze and interpret textbook, handouts, physics experiment manuals, and/or visual aids used during the semester.
- b. Students will develop, organize, draft, revise, and write **reports for experiments** conducted during the semester and/or research topic related to physics.
- c. Students will use computer-based technology in solving problems, conducting **computer based physics labs** and will use internet to access websites that will assist in their study of physics.
- d. Students will demonstrate effective oral communication techniques using clear concise and informative language when speaking.
- e. Students will analyze and interpret various forms of spoken communication like lecture by the instructor, discussion with the lab partners, or audio video demonstrations during the lectures.
- f. Students will demonstrate problem-solving skills in a logical step-by-step process when doing **physics labs**. They will apply methods of qualitative and quantitative analysis during their understanding and following the lab procedures.

4. Departmental Course Perspective

- Students will **recognize the importance of maintaining health and wellness** by following the safety procedures, maintaining cleanliness, and avoiding contact with materials hazardous for health, while doing the physics labs
- Students will **develop a capacity to use knowledge of how technology and science affect their lives** by utilizing everyday practical examples and applications of physics and by performing physics experiments.
- Students will **develop personal values for ethical behavior** by understanding the rules and regulations in relation to safety, cited works, and disposal of waste materials after performing physics labs.
- Students will **use logical reasoning in problem solving** by identifying and analyzing physics word problems and selecting a logical solution
- Students will **integrate knowledge and understand the interrelationships of scholarly disciplines** by using technical writing, applying the rules of mathematics, tracing the history of philosophy describing different aspects of sciences, and finding physics' applications in biology and technology while studying physics.

Department's Course Grading Criteria

<u>Lecture:</u>	75%	
Tests (3 to 4)		40%
Quiz/Homework/Tutoring		10%
Research Project Proposal		5%
Project Presentation & Final Paper		5%
Comprehensive Final Exam		15%

<u>Laboratory:</u>	25%	
Lab Reports/Participation/Assessments		<u>25%</u>
		100%

90 or more = A grade; 80 or more = B grade; 70 or more = C grade;
60 or more = D grade; Less than 60 = Fail

Email assignment: Email assignments to the instructor and send a copy to your personal email as backup.

Grading timeline: Graded quizzes/exams within two days, and lab reports after a week.

Guidelines for Classroom Conduct

1. All students are expected to be in their assigned seat and be quiet when class begins. Attendance is taken when the bell rings. If you are not in your seat, you may be marked absent or tardy.
2. Please bring everything you will need in class. You may not be allowed to return to your locker once class begins. If you must leave the room after the bell has sounded, you may be marked tardy.
3. Please refrain from talking to your classmates while teacher is lecturing and instructing the class.
4. When you are given an assignment, begin working promptly, quietly and independently until time is up.
5. Mobile phone and other electronic devices are strictly prohibited in class.
6. Do participate in class discussions.
7. The usual courtesies of hand-raising and taking your turn are expected and appreciated.
8. Use paper rather than desks or other school property for note taking and calculations.
9. No food, candy, gum, etc. in class. Keep the room a pleasant place to be by erasing any marks on your desk and throwing trash in the waste basket by the door when class is dismissed. Your thoughtfulness is appreciated.
10. Wait for teacher to dismiss the class.

Guidelines for Classwork & Testing

- Assignments are given either in class or online. Email assignments to teacher (lyonato@hidalgo-isd.org or lyonato@southtexascollege.edu) and send a copy to your personal email as a backup.
- Quizzes may be given unexpectedly. No make up for missed quizzes and labs.
- All laboratory reports will be graded for completeness. Selected lab reports must be typed and graded for accuracy and clarity.
- Answers in the lab handouts must always be written in **pen**, and collated lab data in **pencil** in order for neat erasures to be done when you make mistakes.
- Group discussion is encouraged during lab work. However, lab questions must be answered individually in your own words.
- A make-up test may be arranged with the instructor to cover for emergencies.
- Cheating or copying will not be tolerated. If you cheat on a quiz or exam, you will receive a zero for the test and no make-up test. If you are having difficulty with the course, please seek tutoring with a study group, or use online smart thinking.

Semester Research Project

You are required to write a research paper and present it to the class. Topics should be relevant to materials covered in class. You will apply the scientific method by designing and conducting an experiment to verify your hypothesis. Final paper will be graded based on science content and research (55 points), level of comprehension and originality (20 points), organization and quality of editing (15 points), reference list – use MLA format for both the paper and the PowerPoint presentation (10 points). Details will be discussed later during the semester.

Presentations due on May 9, 2011

You are required to e-mail me the title of research, hypothesis, historical background of study and experimental design to ldonato@southtexascollege.edu or lyonato@hidalgo-isd.org on or before March 31, 2011.

SCAN SKILLS

Reading: Reading at the college level means the ability to analyze and interpret a variety of printed materials—books, articles, and documents. A core curriculum should offer students the opportunity to master both general methods of analyzing printed materials and specific methods for analyzing the subject matter of individual disciplines.

Writing: Competency in writing is the ability to produce clear, correct, and coherent prose adapted to purpose, occasion, and audience. Although correct grammar, spelling, and punctuation are each a *sine qua non* in any composition, they do not automatically ensure that the composition itself makes sense or that the writer has much of anything to

say. Students need to be familiar with the writing process including how to discover a topic and how to develop and organize it, how to phrase it effectively for their audience. These abilities can be acquired only through practice and reflection.

Computer Literacy: Computer literacy at the college level means the ability to use computer-based technology in communicating, solving problems, and acquiring information. Core-educated students should have an understanding of the limits, problems, and possibilities associated with the use of technology, and should have the tools necessary to evaluate and learn new technologies as they become available.

Speaking: Competence in speaking is the ability to communicate orally in clear, coherent, and persuasive language appropriate to purpose, occasion, and audience. Developing this competency includes acquiring poise and developing control of the language through experience in making presentations to small groups, to large groups, and through the media.

Listening: Listening at the college level means the ability to analyze and interpret various forms of spoken communication.

Critical Thinking: Critical thinking embraces methods for applying both qualitative and quantitative skills analytically and creatively to subject matter in order to evaluate arguments and to construct alternatives strategies. Problem solving is one of the applications of critical thinking, used to address an identified task.

Developmental Studies Policy Statement:

The College's Developmental Education Plan requires students who have not met the college-level placement standard on an approved assessment instrument in reading, writing, and/or mathematics to enroll in Developmental Studies courses including College Success. Failure to attend these required classes may result in the student's withdrawal from ALL college courses.

Statement of Equal Opportunity: No person shall be excluded from participation in, denied the benefits of, or be subject to discrimination under any program or activity sponsored or conducted by South Texas College on the basis of race, color, national origin, religion, sex, age, veteran status or disability.

Alternative Format Statement: This document is available in an alternative format upon request by calling (956) 872-8355.

ADA Statement: Individuals with disabilities requiring assistance or access to receive services should contact disABILITY Support Services at (956) 872-2173.

PHYS 1402 – College Physics II
Tentative Schedule and Course Timeline
Spring 2011

Week	Topic/Activity	Laboratory
1	Ch 16 – Waves and Sound Ch 17 – The Principle of Linear Superposition and Interference Phenomena	Experiment 1
2	Ch 18 – Electric Forces and Electric Fields	
3	Ch 19 – Electric Potential Energy & the Electric Potential	Experiment 2
4	Ch 20 – Electric Circuits	Experiment 3
5	Review Ch 16, 17, 18 19 & 20 Exam 1	
6	Ch 21 – Magnetic Forces & Magnetic Fields	Experiment 4
7	Ch 22 – Electromagnetic Induction	Experiment 5
8	Ch 23 – Alternating Current Circuits	Experiment 6
9	Ch 24 – Electromagnetic Waves	
10	Review Ch 21, 22, 23 & 24 Exam 2	
10	Ch 25 – The Reflection of Light: Mirrors	Experiment 7
11	Ch 26 – The Refraction of Light: Lenses & Optical Instruments	Experiment 8
12	Ch 27 – Interference & The Wave Nature of Light	Experiment 9
13	Review Ch 25, 26, & 27 Exam 3	
13 – 14	Ch 28 – Special Relativity Ch 29 – Particles & Waves	
14 – 15	Ch 30 – The Nature of the Atom Ch 31 – Nuclear Physics and Radioactivity	Experiment 10
15	Review Ch 28, 29, 30 & 31 Exam 4	
16	Review for Final Exam Comprehensive Final Exam	Research Presentation

Note: Lab activities will correspond to the lecture topics.

**January
2011**

19 DAYS	PHYS 1402	TENTATIVE	COURSE	TIMELINE	
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Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

						1
2	3 STAFF DEV	4 STAFF DEV	5 1 ST SEMESTER REVIEW	6 FLUIDS	7 FLUIDS	8
9	10 FLUIDS	11 WAVES & SOUND	12 GAS LAWS & KINETIC THEORY	13 THERMODYNA MICS	14 THERMODYNA MICS EXAM 1 FR	15 LAB 8-11 am
16	17 EXAM 1 MC	18 PHYS 1402 SYLLABUS (63 DAYS) ELA Benchmark	19 WAVES & SOUND	20 WAVES & SOUND	21 WAVE INTERFERENCE, STANDING WAVES	22
23	24 ELECTRIC FORCES	25 ELECTRIC FORCES	26 ELECTRIC FIELDS	27 ELECTRIC FIELDS	28 ELECTRIC FIELDS	29 LAB 8-11 am
30	31 ELECTRIC POTENTIAL					

**February
2011**

18 DAYS

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 ELECTRIC POTENTIAL	2 ELECTRIC ENERGY	3 ELECTRIC ENERGY	4 CAPACITANCE	5 LAB 8-11 am
6	7 ELECTRIC CURRENT, OHM'S LAW	8 ELECTRIC POWER	9 KIRCHOFF'S RULES	10 COMBINATION DC CIRCUITS	11 COMBINATION DC CIRCUITS	12
13	14 COMBINATION ELECTRIC CIRCUITS	15 REVIEW	16 EXAM 2 MC	17 EXAM 2 FR	18 END OF 6 WKS	19 LAB 8-11 am
20	21 NO SCHOOL	22 MAGNETIC FORCES	23 MAGNETIC FORCES	24 MAGNETIC FIELDS	25 MAGNETIC FIELDS	26
27	28 MAGNETIC FIELDS					

**March
2011**

13 DAYS

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 ELA TAKS TEST AP Benchmark	2 REVIEW PACKET FIRST Robotics Competition	3 REVIEW PACKET FIRST Robotics Competition	4 REVIEW PACKET FIRST Robotics Competition	5 FIRST Robotics San Antonio
6	7 ELECTROMAGN ETIC INDUCTION	8 ELECTROMAGN ETIC INDUCTION	9 ELECTROMAGN ETIC INDUCTION	10 ELECTROMAGN ETIC INDUCTION	11 EARLY RELEASE	12 LAB 8-11 am
13	14 SPRING BREAK VACATION	15 SPRING BREAK VACATION	16 SPRING BREAK VACATION	17 SPRING BREAK VACATION	18 SPRING BREAK VACATION	19
20	21 REFLECTION OF LIGHT: MIRRORS	22 REFLECTION OF LIGHT: MIRRORS	23 REFLECTION OF LIGHT: MIRRORS	24 REFRACTION OF LIGHT: LENSES	25 REFRACTION OF LIGHT: LENSES	26 LAB 8-11 am
27	28 REFRACTION OF LIGHT: LENSES	29 WAVE NATURE OF LIGHT	30 WAVE NATURE OF LIGHT	31 EARLY QUANTUM THEORY		

**April
2011**

13 DAYS

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 QUANTUM MECHANICS OF ATOMS	2 LAB 8-11 am
3	4 QUANTUM MECHANICS OF ATOM	5 NUCLEAR PHYSICS & RADIOACTIVITY	6 NUCLEAR PHYSICS & RADIOACTIVITY	7 EXAM 3 MC	8 EXAM 3 FR	9
10	11 AP REVIEW	12 AP REVIEW	13 AP REVIEW	14 AP REVIEW	15 END OF 6 WKS	16 EXAM 4 AP PHYS B MOCK EXAM
17	18 AP REVIEW	19 AP REVIEW	20 AP REVIEW	21 NO SCHOOL	22 NO SCHOOL	23
24 TAKS TESTS →	25 AP REVIEW	26 AP REVIEW	27 TAKS MATH	28 TAKS SCIENCE	29 TAKS SOCIAL STUDIES	30

May 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 AP EXAMS →	2 AP CHEM AP ENV SCI	3 AP COMP SCI AP SPAN LANG	4 AP CALC AB	5 AP ENGLISH LIT	6 AP US HISTORY	7 FTC Robotics Challenge UT Brownsville
8 AP EXAMS → STC FINALS →	9 AP PHYSICS B	10 AP US GOVT	11 AP ENG LANG AP STATS	12 AP WRLD HIST AP ECON	13 AP SPANISH LIT STC GRADES DUE	14
15	16 START SEMESTER PROJECT	17	18	19	20	21
22	23	24	25 PROJECT PRESENTATION	26 PROJECT PRESENTATION	27 PROJECT PRESENTATION	28
29 SEMESTER EXAMS →	30 SENIOR FINAL EXAMS	31 SENIOR FINAL EXAMS				

**June
2011**

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Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

			1 EARLY RELEASE	2 EARLY RELEASE	3 WORK DAY GRADUATION	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		