A quick Note:
I am not going to go in depth about AP Physics, what it stands for, what it covers, and so on. Throughout the year I will give you all the information you will need for this class and the test, and I do not want to overwhelm you just yet. We will take practice tests throughout the year, and I base my tests on the AP test to prepare you for the pacing and style of that exam. This is the last I will mention the test for a while so we can focus on physics and getting the year underway. If you wish to get more information on this test you can always go to this site: www.apcentral.collegeboard.com

AP Physics 1 is a tough class. This is not just any physics class. It involves more math and more conceptual understand than other physics classes and because the test is in May, it is taught in a shorter time then most physics classes. Therefore, I follow the syllabus given in the AP handbook; I do not teach more than required due to the lack of time, but I will be touching each topic covered in the test. This means that your level of responsibility in this class may be greater than in your other classes here at Central. I expect for you to be here everyday, but there is no hand holding and if you miss a lecture or a lab you are responsible to getting the info you missed, I will not track you down.

I am not trying to scare you here but to prepare you for a tough, but fun and informative, year. I love the area of physics and I am very excited to share it with you. Stay positive, ASK QUESTIONS, and have fun. My goal is for all of you to leave this class with a good understanding of physics, but more importantly, an understanding of study skills, learning methods, and problem solving.

My Policies:

I. What you need- (all supplies must be ready by Monday, August 27)

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Composition Notebooks</td>
<td>Notebook paper</td>
</tr>
<tr>
<td>Graph Paper</td>
<td>Calculator (Graphing is best)</td>
</tr>
<tr>
<td>Pencil every day</td>
<td>Colored pencils or fine tip markers for notetaking</td>
</tr>
</tbody>
</table>

Additional Supplies I am requesting for the classroom use:
- Glue sticks (we use a lot), paper towels, Kleenex, sanitizing wipes, hand sanitizer.

This list is optional but appreciated 😊

II. Classroom responsibilities-

a. In your seats when the bell rings!!
b. Cell phones stored inside bag during class, unless instructed otherwise
c. No food or drink in the lab
d. Participate in group discussion over problems.
e. Actively participate during labs in the groups
f. Turn in work on time
g. Be respectful to your classmates, the room and the teacher
h. Use classtime for physics, do not work on other classes work during the period
III. Your responsibilities outside of class-
   a. Do the assigned work and be prepared for class
   b. Ask your fellow classmates for help when you are stuck
   c. Keep up with your interactive notebook
   d. Get extra help from me both in and out of class (see my tutorial schedule)
   e. Do the outside of class reading

IV. Grading policy-

   Tests – 40%
   Labs – 30%
   Quizzes – 20%
   Homework – 10%

   I will grade tests and quizzes the way the AP graders will grade. I will be tough, but it important to see what you have missed and to do test corrections. You will receive the curve on the test for completing test corrections. The test corrections must be completed outside of classtime during tutorials and must be completed while in my classroom (you cannot take them home). The corrections provide for remediation and reteaching and must be thorough in order to receive the curve. The curve is different based on the difficulty of the test and what your score is. Test corrections are worth it for anyone and are available no matter what grade you made. As for your homework, labs, quizzes and class participation, there will be no corrections.

V. Homework and Quizzes-

   You will be assigned homework for every unit. There is an online homework program called Mastering Physics that you will be required to use. If you do not have internet at home, you may use the computers at the school, in my classroom, or at the public library outside of classtime. You will also be responsible for reading notes from the textbook using a formatted note taking guide. These notes will be for a grade and are not optional.

   You will be given quizzes covering the assigned homework. It is your responsibility to know how to do the homework problems and to follow along during class time and participate in working problems so that you are prepared for the quizzes.

VI. Interactive Notebooks-

   Your notebook will be created by combining two composition notebooks together. Your notebooks are yours. I may take them and grade them. I do stress to take good clean notes using colored pencils whenever possible. This notebook will contain all my lecture notes, reference materials and your in-class work that you will find very valuable when studying for class tests and the AP exam.

VII. Tests-

   There will probably be at least one, maybe two quizzes on each unit and one test. The quizzes will be short while the tests will look at your in-depth level of understanding. I will be creating these fun events in the same fashion as the real AP exam. My goal is to get you used to the exam format, style of questions, pacing etc. so that way you feel more comfortable when the real exam is in front of you.

VIII. Remind App-

   I will use Remind in order to make class announcement, remind about due dates and communicate with the students. In order to join remind, please text @apdcp to 81010
IX. Tardy Policy
Out of respect for me and your peers/lab partners be on time. Excessive tardies will result in a disciplinary measures.

X. Classroom Policies-
This is a college class, so I will try and run it that way.

a. Restrooms- Go when you have to, do not ask, your old enough now. Take the pass with you.

b. Talking- When I am in front and lecturing, you are to be quite. I will kick you out if you are asked more then once to stop talking. During labs, have fun and talk all you want.

c. Food and Drinks- No food or drink in the labs. If you make a mess clean it up.

d. Clean Room- I like my room clean. I work hard to keep it that way and our Janitorial staff has better things to do then clean my room. Thus, if my room is messy and the bell is about to ring you better clean it up. I will hold the whole class, regardless, until my room is clean.

e. The classrooms materials- they are there for you to use so use them.

f. Questions- Ask many and often, without the whole “raise your hand” bit. Your adults, find the right time and blurt your questions out.

g. Cheating- Please refer to academic policy statement on last page.

h. The bell- When it rings you need to be in your seats and ready to go. When it rings at the end of class that means nothing. I dismiss you, so do not pack-up early.

i. Late work- If you missed turning something in because you were absent and it was excused then your work is not late. However, it you do not turn in your work because of an unexcused absence, a bad memory or whatever, you will receive no credit. Also, if you know you are going to miss a test, quiz, or lab, you must tell me and do it BEFORE you leave. I will not track you down and tell you or remind you that you missed something; that is your responsibility. ALL missing work must be made up before the unit test that covers this work.

j. Cell Phones – While some use of technology will be utilized in this class, unless otherwise told, cell phones are NOT allowed to be out during class. Your phone will be taken up if you have it out without permission. There is a cell phone parking station at the front of the room that I highly suggest you use so that you will remove the temptation of looking at your phone when you shouldn’t. On test days, ALL CELL PHONES must be placed in the appropriate pocket on the parking station until the end of the period.

RESOURCES

TEXTBOOK

TEACHING RESOURCES

Final Examination for Angelo State Dual Credit will be May 1-2, 2019 during scheduled class

All SAISD Advanced Academic policies will be strictly adhered to. Please make sure you are fully aware of all these policies.
COURSE SYLLABUS

I. Introduction -
   Big Ideas: 3 and 5
   A. Review of physical quantities (chapter 1)
   B. Algebra and trigonometry review
   C. Newton’s biggest hits (review of important Physics 1 topics)

   CR2c — The course design provides opportunities for students to develop understanding of the foundational principles of electrostatics in the context of the big ideas that organize the curriculum framework.

II. Electricity -
   Big Ideas: 1, 2, 3, 4, and 5 [CR2d]
   [CR2d]
   A. Electrostatics
      1. Coulomb’s Law
      2. Electric Field
      3. Electric Potential
      4. Electrostatics with Conductors
   B. Capacitors
      1. Capacitance
      2. Energy and charge stored
      3. Parallel plates
   C. Electric Current
      1. Definition of direction of current
      2. Ohm’s Law
      3. Resistance and Resistivity
      4. Power
   D. DC Circuits
      1. Schematic diagrams/Kirchhoff’s Laws
      2. Resistors
      3. Capacitors
      4. Terminal voltage and internal resistance
      5. Steady-state RC circuits

   CR2d — The course design provides opportunities for students to develop understanding of the foundational principles of electric circuits in the context of the big ideas that organize the curriculum framework.

III. Magnetism -
   Big Ideas: 2, 3, and 4 [CR2e]
   A. Magnetostatics
      1. Magnetic field
      2. Forces on moving charges
      3. Force on a current-carrying wire
      4. Magnetic field of current-carrying wires
   B. Electromagnetism
      1. Magnetic flux
      2. Faraday’s Law and Lenz’s Law
      3. Induced emf and induced current

   CR2e — The course design provides opportunities for students to develop understanding of the foundational principles of magnetism and electromagnetic induction in the context of the big ideas that organize the curriculum framework.

   CR2b — The course design provides opportunities for students to develop understanding of the foundational principles of fluids in the context of the big ideas that organize the curriculum framework.
iv. Fluid Mechanics -
Big Ideas: 1, 3, and 5 [CR2b]
A. Density and Pressure
   1. Density and specific gravity
   2. Pressure as a function of depth
   3. Pascal’s principle
B. Buoyancy
   1. Buoyant force
   2. Archimedes’ principle
C. Fluid flow continuity
D. Bernoulli’s Equation

v. Thermal Physics -
Big Ideas: 1, 4, 5, and 7 [CR2a]
A. Temperature and Heat
   1. Mechanical equivalent of heat
   2. Heat transfer and thermal expansion
B. Kinetic Theory
   1. Ideal gases
   2. Gas laws
C. Thermodynamics
   1. Thermodynamic processes and PV diagrams
   2. Zeroth, First, and Second Law of Thermodynamics

vi. Optics -
Big Idea 6 [CR2f]
A. Physical Optics
   1. The electromagnetic spectrum
   2. Interference
   3. Diffraction
   4. Thin films
B. Geometric Optics
   1. Reflection and refraction
   2. Images formed by mirrors
   3. Images formed by lenses

vii. Atomic and Nuclear Physics -
Big Ideas: 1, 3, 4, 5, 6, and 7 [CR2g]
A. Atomic Physics and Quantum Effects
   1. Discovery of the Electron and Atomic Nucleus
   2. Photons and the Photoelectric Effect
   3. Bohr Model
   4. DeBroglie Wavelength
   5. Production of X-rays
   6. Compton Scattering
B. Nuclear Physics

CR2a — The course design provides opportunities for students to develop understanding of the foundational principles of thermodynamics in the context of the big ideas that organize the curriculum framework.

CR2f — The course design provides opportunities for students to develop understanding of the foundational principles of optics in the context of the big ideas that organize the curriculum framework.

CR2g — The course design provides opportunities for students to develop understanding of the foundational principles of modern physics in the context of the big ideas that organize the curriculum framework.
1. Atomic number, mass number, and atomic mass
2. Nuclear processes
3. Mass-Energy equivalence

VIII. Modern Physics and Review for AP Exams

Laboratory Investigations and Science Practices

The AP Physics 2 course devotes over **25% of the time** to laboratory investigations. The laboratory component of the course allows the students to demonstrate the seven **science practices** through a variety of investigations in all of the foundational principles. The students use **guided-inquiry (GI)** or **open-inquiry (oI)** in the design of their laboratory investigations. Some labs focus on investigating a physical phenomenon without having expectations of its outcomes. In other experiments, the student has an expectation of its outcome based on concepts constructed from prior experiences. In application experiments, the students use acquired physics principles to address practical problems.

Instructional Activities

Throughout the course, the students engage in a variety of activities designed to build the students’ reasoning skills and deepen their conceptual understanding of physics principles. Students conduct activities and projects that enable them to connect the concepts learned in class to real-world applications. Examples of activities are described below.

1. Simulation Activity
Students engage in activities outside of the laboratory experience that support the connection to more than one Learning Objective.

ACTIVITY: Quantum Wave Interference Description:
The PhET Quantum Wave Interference simulation ([http://phet.colorado.edu/en/ simulation/wave-interference](http://phet.colorado.edu/en/simulation/wave-interference)) helps students to visualize the behavior of photons, electrons, and atoms as particles and as waves through a double-slit. The students work in small groups through a series of ‘experiments’ that confront students with the basic conflict between the wave model and particle model. The groups have to gather evidence that will allow them to justify how the double slit interference pattern is consistent with both the classical wave view and the photon view. After the class discussion, the students should be able to articulate how the wave view is related to the photon view. This activity is designed to allow students to apply the following Learning Objectives:

**Learning objective 1.D.1.1**
The student is able to explain why classical mechanics cannot describe all properties of objects by articulating the reasons that classical mechanics must be refined and an alternative explanation developed when classical particles display wave properties.

**Learning objective 6.G.1.1**
The student is able to make predictions about using the scale of the problem to determine at what regimes a particle or wave model is more appropriate.
2. Real World Applications

ACTIVITY 1. Fluid Applications
Students write a series of questions that they wonder about related to buoyancy and density in real world contexts. In teams of two, the students select one research question. They have two class periods to post their results of the research on a Google Doc. Each team presents their information and any sources of data found to the class. Sample questions are:
- How do metal ships float?
- Will a ship full of oil float differently than an empty ship?
- If an oil tanker develops a leak, why does it sink?
- How will a ship float in fresh water as opposed to salt water?
- How and why do hot air balloons work?
- Would hydrogen balloons float better than balloons filled with hot air?

Learning objective 1.e.1.1
The student is able to predict the densities, differences in densities, or changes in densities under different conditions for natural phenomena and design an investigation to verify the prediction.

Learning objective 1.e.1.2
The student is able to select from experimental data the information necessary to determine the density of an object and/or compare densities of several objects.

Learning objective 3.C.4.2
The student is able to explain contact forces (tension, friction, normal, buoyant, spring) as arising from interatomic electric forces and that they therefore have certain directions.

3. Scientific Argumentation

ACTIVITY: Nuclear energy: Friend or Foe
In addition to the physics concepts, this project requires the evaluation of ethical concerns in order to arrive at a decision regarding nuclear energy. This project is meaningful and engaging to students as it requires the use of evidence-based reasoning through dialogue and provides a context for understanding scientific information. Students work in teams of two to investigate the socio-scientific issue about the pros and cons of the use of nuclear energy. The research includes an explanation of the process of nuclear fission, the basic operation of a nuclear reactor, how a chain reaction works, and how magnetic and inertial confinements can provide thermonuclear power. Students have to discuss safety, cost-effectiveness, and environmental impact, including wildlife and human health. The culmination activity is a debate moderated by the students themselves.

Learning objective 5.G.1.1
The student is able to apply conservation of nucleon number and conservation of electric charge to make predictions about nuclear reactions and decays such as fission, fusion, alpha decay, beta decay, or gamma decay.
• **ASU Student Disability Services**

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA), and subsequent legislation.

The Office of Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student’s responsibility to initiate such a request by contacting:

**Ms. Dallas A. Swafford**  
325-942-2047  dallas.swafford@angelo.edu

• **ASU Academic Honesty**

**Academic Dishonesty**

The following are definitions of forms of academic dishonesty. The reason we are here is to hone our own individual skills and intellectual rigor, and as such, any form of academic dishonesty is an affront to our community. I have a zero tolerance policy for academic dishonesty in any form.

- **CHEATING**: intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.
- **FABRICATION**: intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- **FACILITATING ACADEMIC DISHONESTY**: intentionally or knowingly helping or attempting to help another to violate any provision of this Code.
- **PLAGIARISM**: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

ASU Academic honesty: Academic misconduct includes cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, violations of published professional ethics/standards, and any act or attempted act designed to give unfair academic advantage to oneself or another student. See the Angelo State University Student Handbook, Part II B: Academic Integrity for more information.
THIS IS TO CERTIFY THAT I/WE HAVE RECEIVED A COPY OF THE COURSE SYLLABUS AND THE REQUIREMENTS FOR AP/DC PHYSICS 2. I have read the grading policies, academic honesty policy, and classroom expectations.

STUDENT SIGNATURE: ________________________________

STUDENT’S PRINTED NAME: __________________________ PERIOD: ______

STUDENT EMAIL ADDRESS: ________________________________

PARENT/GUARDIAN NAME: ________________________________

PARENT/GUARDIAN SIGNATURE: ________________________________

PARENT E-MAIL ADDRESS: ________________________________

Parent Cell Phone(s): __________________________
Parent Home Phone(s): __________________________

Student extracurricular activities and outside work: