**AP Physics C- Mechanics/Electricity & Magnetism** Mr. Glende - Office Rm 217J

 **mglende@west-fargo.k12.nd.us**

**Overview**

AP Physics C- Mechanics/Electricity & Magnetism is a year-long course for calculus-based physics. The class meets for 50 minutes a day five days a week. Students will learn and use the appropriate calculus concepts as they learn the physics concepts. I will teach you the calculus you need. We will move VERY fast through the Mechanics portion to allow more time for the more difficult Electricity & Magnetism portion. DON’T GET BEHIND!

**Textbook** *University Physics Volume 1 and Volume 2* This is a calculus-based online textbook by OpenStax (links shown below and pdf of each volume is in the Welcome folder in Schoology.

[**University Physics Vol1 (Mechanics)**](https://openstax.org/books/university-physics-volume-1/pages/1-introduction)

[**University Physics Vol2 (EM)**](https://openstax.org/books/university-physics-volume-2/pages/1-introduction)

**Classroom Techniques**

Students will take charge of their own learning in this course. Time in class will be devoted to working together for labs and solving problems on a whiteboard to share solutions with the class. Expect some to put in 15-30 minutes out of class each day. You will get out of this class what you choose to put into it.

**Main Objectives- (along with topics covered- as required by AP)**

1. Analyze problems involving 1D and 2D kinematics; motion graphs, circular and projectile motion
2. Using Newton’s 3 Laws, analyze the motion of objects; Newton’s 1st, 2nd, and 3rd Laws
3. Use work, energy and power relationships to analyze motion of objects; work, energy conservation of energy, power
4. Analyze collisions using conservation of linear momentum; impulse, momentum, conservation of momentum, center of mass
5. Analyze the motion of objects that are rotating; rotational kinematics, rotational dynamics, equilibrium, conservation of angular momentum
6. Analyze the motion of objects that are oscillating; simple harmonic motion, pendulums, springs
7. Analyze the motions of objects in orbit; Newton’s Law of Gravitation, Kepler’s Laws
8. Explain electric charges & forces; insulators and conductors, Coulomb’s Law
9. Using electric fields, explain the long range interaction between charges; parallel-plate capacitor
10. Use Gauss’s Law to calculate electric field of symmetric charge distributions; electric flux; conductor and insulators
11. Using potential energy and the electric potential, analyze the motion of charged particles ;point charges, multiple charges, parallel-plate capacitors, conductors, capacitors and dielectrics
12. Use Ohm’s Law to calculate current through a conductor; Ohm’s law; resistivity
13. Analyze simple and complex DC circuits; -single and multiple loops; Kirchhoff’s Laws; power; RC circuits
14. Analyze the behavior of charged particles in a magnetic field; currents; Ampere’s Law; forces and torques on current loops
15. Analyze the magnetic flux and its resulting induced current; electromagnetic Induction; Faraday’s Law and Lenz’s Law; Inductors, LC and LR circuits

**Course Expectations**

1. Come prepared to class ON TIME everyday with required materials (including CALCULATOR, assignments, questions ready, and a great attitude.)
2. Follow all WFHS rules. Remember CCR!

**Absences** Absences are a fact of life, but as this is an AP class, we move fast. Try to make up work ahead of any absence if possible. It is your responsibility to make up what you have missed ASAP. At the pace we will be going, getting behind is NOT an option, so keep on top of things.

**Course Resources**

1. **Schoology**: All my notes (PowerPoints) as well as the whiteboard problems can be found on Schoology. In addition, there are videos of the worked examples and video reviews for all Quests/exams.
2. **Online Textbook**: Mentioned above - online textbook.
3. **AP Classroom**: This is where you will do online homework, doing review and taking some practice exams. **For any online homework, you MUST turn in your work for all the problems on the due date.**
4. **ClassKick.** This is the program we will use to collaborate on “whiteboards.”

**Course Grading**

I will only give credit for work shown with correct units on answers. **LATE WORK IS NOT ACCEPTED**. Online grades are updated frequently. Please check to make sure that no mistakes have been made. You are expected to be an active participant in this class. There are never any dumb questions or answers. All I ask is that you always try to do your best. **Assignments/Participation (20%)**- Just considered practice for the exams, but VERY important for you to make sure you know what you are doing.

1. Online assignments- 50% of the grade is based on the completion of the online homework, 50% is based on the **turning in of the work done for the online homework** (due the day the online homework is due). Must be worked out CLEARLY with all steps shown (including any necessary diagrams and listing of concepts)
2. Problem of the week- Generally assigned Monday, due Friday. Must be worked out CLEARLY with all steps shown (including any necessary diagrams and listing of concepts)
3. Whiteboard problems are worked on in class in assigned groups. Each set of WB problems will earn you 0, 5 or 10 points depending on how you are participating. **If you are absent on a WB day, you must complete the WB problems (found on Schoology/Classkick) within 2 days to earn the points.**

**Lab Reports/Lab Notebook (30%)** Labs will be hands-on and will occur on average once a week. This will ensure that a minimum of 25% of the instructional time will be spent in the lab. Students will be required to keep a digital lab notebook. The lab notebook can be shown to prospective universities for possible lab credit. Students will be required to ask questions, prepare procedures, collect and analyze data, explain sources of error and draw conclusions from mathematical relationships.

\*Lab Notebooks will be collected at the end of each unit. It is important that you keep current on the lab notebook, or you will forget important information. Students will work in groups for labs, and I will pull 1 name from each group and collect their lab notebook for the unit. That lab notebook will serve as the groups grade. If that person has not completed the lab notebook, they will receive a 0 and will have until the next class day to turn in a completed lab notebook for maximum of 50% credit. I will pull another name for the group and the max the group can earn is 90%.

**Assessments (50%)**

**Quizzito/Exams** Students will have short tests (Quizzito) for each chapter. Students will then have a major exam covering 3-4 chapters. The exams will be composed of previous AP multiple choice and free response questions. Students will be able to use the same materials on my exams as are allowed on the AP exam (formula sheet and sheet of constants) so as to prepare the students for the AP exam conditions.

Grade scale is one used by all of WFHS and is found in the students’ handbook

A 90-100% B 80-89% C 70-79% D 60-69% F below 60%

**AP Physics C Exam:**

Mechanics: Tuesday, May 14 (12:00 noon)

E&M: Tuesday, May 14 (2 pm)