

## PHY470, AP Physics C: Level AP

2010-2011

**Faculty Name:** Kenneth A. Magno Jr.**Email Contact:** [kmagno@mpsd.org](mailto:kmagno@mpsd.org)**Web page:** <http://www.mobius8.org>**Room Number:** 215**Course Email:** [physicsapc@mobius8.org](mailto:physicsapc@mobius8.org)**Moodle:** <http://moodle.mobius8.org>**Course Description:**

AP Physics C: Mechanics & Electricity and Magnetism provide the academically talented student the opportunity to continue study of physics. It is most appropriate for those students who plan to pursue a college program in engineering or a science. This course will develop students skills through rigorous exposure to physics using both an experimentally oriented approach and mathematically intensive problem solving. AP Physics C emphasizes the development of an understanding of the physical relationships and theories concerning the natural world. This is accomplished through independent student laboratory work and problem solving which involves logical reasoning based on quantitative experimental evidence. Students are required to take the AP Physics C: Mechanics Exam and are strongly encouraged to take the AP Physics C: Electricity and Magnetism Exam. Students taking this course must be concurrently enrolled in either Calculus or Calculus AP.

**Key Prerequisite Knowledge/Skills for Success in this course:**

- Students should have a successfully completed:
  - PHY440 with a B- minimum
  - or PHY441 with a B+/A-
- Students must have completed Pre-Calculus successfully
- Students must be enrolled in Calculus or Calculus AP

**Learning Outcomes:***Outcomes of this Course*

- Students will be exploring the following major topics: Newtonian Mechanics and Electricity & Magnetism.
- Students will gain new techniques for reasoning and problem solving using Calculus.
- Students will take the AP Physics C: Mechanics Exam and AP Physics C: Electricity and Magnetism Exam

**Textbooks & Reading Materials:**

Textbook:

*Physics: for Scientists & Engineers* (Fourth Edition) by Giancoli (Pearson Higher Education), ISBN 0131495089

Other reading material may be assigned throughout the year which corresponds to content being covered in class. These may include excerpts from other books, scholarly articles, or academic journals.

**Behavior Expectations & Classroom Conduct:**

All students are expected to follow all student handbook policies.

A copy of the student handbook is located online on the Marshfield High School website.

**Be respectful:**

**Students are expected to be respectful of all faculty members, school property, and other students.**

All students must behave in a manner which is not disruptive to the classroom experience of other students.

Examples of disruptions include: talking during lectures when not called upon, making disruptive noises, or purposefully distracting an other student.

Any student who is disruptive will receive one warning to identify their disruptive behavior.

Once warned, a second violation will result in a Teacher Assigned Detention (TAD). According to student handbook policies, TADs are to be served on the date issued. If a student is unable to serve on the date issued, they must make arrangements to serve their detention and give a parental note explaining the reason they could not serve on the date of issue. Any student who does not serve a TAD will have an office referral sent to their Assistant Principal. This may result in an Office Detention.

Once a TAD is issued, a third violation will result in the student being removed from the classroom. Any removed student must immediately report to their Assistant Principal's office. At that time, a student may be issued further disciplinary action by administration.

**Be responsible:**

**Student are responsible for their behavior and actions.**

This means that any student who violates a student handbook policy should expect consequences for their actions.

For example, any student who has a cell phone, camera, iPod/MP3 players, or other electronics devices will have those items confiscated and delivered to the Principal's Office. Students will be given one warning about putting the items away before they are taken. Upon confiscation for a second offense, students will be issued a TAD. Once confiscated the student must acquire their items from the Principal's Office.

Food and Drinks **are not allowed** in the classroom. Also, no student may ask for a pass to get food or drink during class. Students who arrive or return to class with food or drink will be asked to dispose of their items into the trash.

Students responsible for any damage which occurs to school equipment from deliberate misuse or purposeful damages. Failure to properly respect equipment may result in a TAD.

For example, meter sticks, lab bench rods, etc. are not to be used as swords.

Be prepared:

Students are expected to come to class prepared. Students are expected to have a notebook, writing utensil, and a calculator for all classes. Students are encouraged to bring their textbooks everyday.

Students are also expected to have all assignments completed and ready for class.

**Grading Policies:**

## Course Evaluation:

The grading system used for this course is a “total points system.” Basically, each piece of student work is assigned a point value (Examples: 1 to 5 points for a Homework, 10 points for a quiz, 70 points for a test, 100 points for a project, etc.) Point values for each type of work will vary depending on the length and difficulty of material. At the end of the term the total points that student earned are divided by the total points possible for that term. This is then multiplied by 100 to give the students average for the term. Any extra credit is calculated into this average as points earned by the student. The following is an outline of the major categories of assignments students will be assigned in this course.

- Homework:

Students are expected to keep abreast of the class work by reading the assigned material before class. Students are **required** to outline their readings and keep these notes in their binder/notebook. Students should expect to complete an assignment for almost every day that our class meets. On days when no written assignment is due, students are expected to catch up on their reading and outlining. In other words, students have homework every day whether or not there is something to pass in! Homework updates will generally occur on the class web page.

All HW assignments should be kept in a separate notebook. This is due to the fact that I will on occasion collect HW notebooks for grading purposes.

**Homework is important!** Students who do not do their homework will find themselves at a severe disadvantage during quizzes and unit tests. Most homework assignments will have a point value of 1 to 5 points.

- Quizzes:

Quizzes **are unannounced**. They are intended to encourage students to keep up with their readings and homework. Students should expect at least one quiz a cycle. These quizzes are based on recent lecture material, reading assignments, and homework questions. The point value of quizzes generally vary from 10 to 15 points.

- Tests:

At the end of each study unit students will take a comprehensive test on the subject material. These tests may include essays, true and false, fill-in, and other "objective" type questions. Tests in my courses require students to use their class work and readings to synthesis ideas from a variety of points of view and sources. Quantitative analysis including graphing and data interpretation are included whenever possible. A majority of tests will be problem solving since a large portion of class time will be spent on this concept. There are generally three unit tests

each term. Each test is worth 60 to 100 points. All tests are scheduled at least 2 classes in advance. It is particularly important that students take the time to read the assigned text material and take careful notes.

All tests are returned to students with the test grade written on them. There is a place for the parent or guardian to sign these tests and return them to me. Students will be required to return the test signed by parent or guardian as a homework grade.

- Lab Reports:

Labs make up a about 25% of the time students are in class and most labs run 1 class block. All ten of the AP labs are preformed and all AP labs are student conducted and hands-on.

Supplemental labs and activities are used to widen the range of topics covered in a hands-on, discovery mode. Student will be required to keep separate lab notebooks. This helps to further simulate the college experience. Lab work is preformed in groups of 2 or 3. This ensures that all students develop good lab skills, learn to work in groups, and understand the importance of collaboration among scientists. All labs that come from the AP Lab Manual have some type of pre-lab discussion and post lab summary. Students are required to turn in a write-up for each lab preformed. Write-ups will vary depending on the lab. All data tables and questions in the lab manual must be filled in and answered for all ten AP labs. Many labs will require a formal lab report (i.e. title, introduction/background information, purpose, procedure, data, analysis, conclusion, and recommendations), while others only require a well-organized data summary and brief conclusion. Quality over quantity is highly stressed and students are generally given 2-3 classes to complete a lab report.

- Article Summaries:

During the term students may be required to read articles from the popular press and magazines on various topics of science. They will then write a critical summary of the article reviewing and evaluating its content. A rubric for writing these summaries will be given to students at the time of the assignment. Article summaries are worth 15 to 20 points.

- Essays and other Writing:

Throughout the term students will have an opportunity to write in several styles ranging from short critical essays, book reports, and longer research papers. The point value of these assignments varies greatly depending on their length and difficulty.

- Class Folder/Binder:

Students are be required to maintain a class folder/binder which contains their notes, homework, tests, quizzes, and other work. Organization is crucial for the success of any student! The point value of the folder/binder will be approximately the same as a quiz.

- Projects:

During each marking term there will be one long term project assigned that students will be expected to work on outside of the classroom. These are more involved than a standard lab activity and will require a larger writing component than a lab report. Most projects will present students with an engineering problem, which will require the construction of an apparatus. The project will generally connect several concepts learned in this course, utilizing the apparatus

built to enhance the understanding of the material. Projects will normally be completed in small groups, and are student-guided and student-centered in nature. Each student will have an independent writing component due which will analyze the project. A rubric for these individual writings will be given to students at the time of the projects. Each project will have its own rubric and point value.

- *Science Fair Projects:*

Depending on course progression, science fair projects may be assigned. Additional information on requirements and grading will be provided when assigned.

**Students who are successful in this course are prepared for the following courses:**

- College Level Physics

**Additional Policies:**

*Groups and Learning Partners:*

All groups and learning partners for laboratory activities, projects, and classwork will be assigned by Mr. Magno. Students will be responsible for their own individual work with any group activity.

*Late work:*

Students are expected to turn in their assignments without being reminded. Unless a student misses class because of an excused absence, all homework and other assignments are expected at the beginning of class the day they are due. A breakdown is as follows:

- **Late homework is not accepted.** Late homework assignments will receive a grade of zero.
- Assignments which are worth more points such as essays, lab reports, etc. will be penalized 25% of points for every school day they are turned in late beginning with the day the assignment is due and including the day the work is actually turned in. This penalty for late work applies whether or not the student's class meets. After 3 days the grade will be a zero. (1 day late = 75%, 2 days late = 50%, 3 days late = 25%)
- It is the student's responsibility to find me and hand me their work.
- Late work will not be accepted after the next scheduled test or exam. After that, late work will not be accepted and will be recorded as a zero.
- **Work will not be accepted via e-mail.** Many writing assignments are uploaded via Moodle, an online course management system.
- Students who have been absent for an excused reason are expected to turn in their work upon their return to school.
- Extenuating circumstances will be evaluated on a case by case basis.
- Under no circumstances should a student leave their work on my desk, in my mailbox, with another teacher or student. Students must hand me their work to me in person. Students who fail to follow this policy are entirely responsible for any work lost, misplaced, or stolen. In such a case the work will be considered late when it is finally turned in to me.

Make Up Policy:

- Any student who misses a test, quiz, or other work due to an absence must make up that work as soon as possible, at Mr. Magno's convenience. This will generally occur after school in Room 215.
- The student must make arrangements for this with Mr. Magno the day they return to school after their absence, even if their class does not meet.
- Conflicts with extra curricular activities, sports practice, and work will not be considered as adequate reasons for missing a make up.
- A student who cannot make up work at this time because of extenuating circumstances must make alternative arrangements with Mr. Magno in advance.
- Students and their parents are responsible for making alternative transportation arrangements home.
- A student who does not make up their work as scheduled will be subject to a failing grade for that work.

Snow Day Policy:

- Students are expected to bring home all study materials necessary to be prepared for class upon their return if the cancellation of school due to poor weather is predicted.
- If students miss an test, quiz, or other work due to poor weather or other conditions, they should expect to complete that work during the first class after their return.

**Course Schedule:**

<b>Week # or Dates:</b>	<b>Major Topics</b>	<b>Assessment(s) (Quizzes/Exams)</b>
Term 1	<p><b>Unit 1: Kinematics (2 Weeks)</b>  a. Motion in One-Dimension  b. Motion in Two-Dimensions  c. Projectile Motion</p> <p><b>Unit 2: Newton’s Laws of Motion (2 weeks)</b>  a. Static equilibrium (first law)  b. Dynamics of a single particle (second law)  c. Systems of two or more objects (third law)</p> <p><b>Unit 3: Work, Energy, Power (3 weeks)</b>  a. Work and work-energy theorem  b. Forces and potential energy  c. Conservation of energy  d. Power</p> <p><b>Unit 4: Systems of particles, linear momentum (2 weeks)</b>  a. Center of mass  b. Impulse and momentum  c. Conservation of linear momentum, collisions</p>	<ul style="list-style-type: none"> <li>• Questions During Lectures</li> <li>• Homework Completion</li> <li>• Writing Assignments</li> <li>• Notebook Check</li> <li>• Lab Reports</li> <li>• Research Project</li> <li>• Quizzes</li> <li>• Tests</li> <li>• Class Participation</li> </ul>
Term 2	<p><b>Unit 5: Circular momentum and rotation (2 weeks)</b>  a. Uniform circular motion  b. Torque and rotational statics  c. Rotational kinematics and dynamics  d. Angular momentum and its conservation</p> <p><b>Unit 6: Oscillations and gravitation (3 weeks)</b>  a. Simple harmonic motion  b. Mass on a spring  c. Pendulum and other oscillations  d. Newton’s law of gravity  e. Orbital of planets and satellites</p> <p><b>Unit 7: Electrostatics (3 weeks)</b>  a. Charge and Coulomb’s law  b. Electric field and electric potential  c. Gauss’s law  d. Field and potentials of other charge distributions</p> <p><b>Unit 8: Conductor, capacitors,</b></p>	<ul style="list-style-type: none"> <li>• Questions During Lectures</li> <li>• Homework Completion</li> <li>• Writing Assignments</li> <li>• Notebook Check</li> <li>• Lab Reports</li> <li>• Research Project</li> <li>• Quizzes</li> <li>• Tests</li> <li>• Class Participation</li> </ul>

<b>Week # or Dates:</b>	<b>Major Topics</b>	<b>Assessment(s) (Quizzes/Exams)</b>
	<b>dielectrics (3 weeks)</b> a. Electrostatics with conductors b. Capacitors c. Dielectrics	
Term 3	<b>Unit 8: Conductor, capacitors, dielectrics (finish unit)</b> <b>Unit 9: Electric circuits (3-4 weeks)</b> a. Current, resistance, power (Ohm's law) b. Steady-state direct current circuits with batteries and resistors c. Capacitors in circuits d. Kirchoff's Circuit Law with multi-loop circuits <b>Unit 10: Magnetic Fields (3 weeks)</b> a. Forces on moving charges in magnetic fields b. Forces on current-carrying wires in a magnetic field c. Fields of long current-carrying wires d. Biot-Savart law and Ampere's law <b>Unit 11: Electromagnetism (3 weeks)</b> a. Electromagnetic induction b. Inductance c. Maxwell's Equations d. Faraday's Law e. Lenz's Law	<ul style="list-style-type: none"> <li>• Questions During Lectures</li> <li>• Homework Completion</li> <li>• Writing Assignments</li> <li>• Notebook Check</li> <li>• Lab Reports</li> <li>• Research Project</li> <li>• Quizzes</li> <li>• Tests</li> <li>• Class Participation</li> </ul>
Term 4	<ul style="list-style-type: none"> <li>● <b>Continuation of topics as needed.</b></li> <li>● <b>Review for Exams</b></li> <li>● <b>Additional topics as time permits</b></li> </ul>	

I have read the syllabus:

\_\_\_\_\_

(Print Parent Name)

\_\_\_\_\_

(Date)

\_\_\_\_\_

(Parent Signature)

I have read the syllabus:

\_\_\_\_\_

(Print Student Name)

\_\_\_\_\_

(Date)

\_\_\_\_\_

(Student Signature)