

Advanced Placement Physics

Instructor: Dr. Timothy Leung (tleung@olympiadsmail.ca)

Fall/Winter 2019

Class Time

Saturdays 4:10pm–6:40pm (Starts November 2)

Course Material

- No textbook required
- Please check the school website for lecture slides, homework, and other resources
- Students are expected to bring the following to each class:
 - A pen/pencil for note-taking
 - Paper/notebook/binder
 - A scientific calculator for working in-class example problems

Classroom Expectations

Students are expected to:

- Be in your seat and ready to learn and participate during class
- Stay on task without disturbing or distracting others
- Raise your hand if you have any questions or comments and wait to be called. Don't wait too long before you ask a question
- If you need to leave the class early, your parent needs to pick you up at the classroom door
- Be respectful for yourself, others, and the facilities; act in a responsible manner in everything you do

Homework Expectation

- Homework is assigned approximately every *two* weeks, depending on the course material
- Late homework is accepted
- For free-response questions:
 - Show *all* work by providing complete and organized steps. Answer the questions as if the reader is learning the concept from you, not as if s/he already understands it.
 - If a question requires you to *explain*, please do so using complete sentences with supporting detail.
 - Proper math format must be used, e.g. proper use of “=” sign, units, etc.
 - Circle or box all your final answers.
- Some of the more difficult questions will be taken up during class. However, this does *not* mean you don't need to do your homework at home. Always do your best.

Pre-requisites

- **Physics 11 and 12:** Student will need to be competent in all the topics covered in the high-school level courses. Many topics from Physics 11 and 12 are covered more in-depth in this course.
- **Calculus:** The two “C” exams are calculus based, and students are required to perform basic differentiation and integration.
- **Vectors:** Students need to have basic understanding of vector operations, including addition and subtraction, as well as dot products and cross products.

Course Outline

1. Topics in *AP Physics C: Mechanics*

- (a) Kinematics
- (b) Dynamics
- (c) Work and energy
- (d) Momentum, impulse and collisions
- (e) Center of mass
- (f) General circular motion and angular momentum
- (g) Simple harmonic motion
- (h) Universal gravitation and planetary motion
- (i) **Practice AP Physics C: Mechanics exam**

2. Topics in *AP Physics C: Electricity and Magnetism* (“E&M”)

- (a) Electrostatics
- (b) Gauss’s law
- (c) Capacitance
- (d) Magnetism
- (e) Inductance
- (f) Circuit analysis (RC, RL, LC and RLC circuits)
- (g) Maxwell’s equations and electromagnetic wave
- (h) **Practice AP Physics C: E&M exam**

3. Additional topics in *AP Physics 1* and *AP Physics 2*

- (a) Fluid dynamics
- (b) Thermal physics
- (c) Special relativity
- (d) Quantum mechanics
- (e) **Practice AP Physics 2 Exam**