Advanced Placement Physics

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

Summer 2019

Class Time

Saturdays & Sundays 7:00–10:00pm (July and August)
Class time in September TBA

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 classrom 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 material being taught.
- Not regularly completing the homework prompts a phone call to communicate with the parents in order to help you better manage your time and achieve your goal.
- 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.

- I will take up some of the more difficult questions during class. However, this does *not* mean you don't need to do your homework at home. Always do your best.
- Please keep all returned homework assignmentsin your binder until the end of the term.
- The homework is marked with "P" for pass and "I" for incomplete. If you do get an "I", I will let you know how to fix it so you can re-submit to pass the homework.

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 Phyiscs 11 and 12 are covered more in-depth in this course. covered
- **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) Momentum, impulse and energy
   (d) Center of mass
   (e) General circular motion and angular momentum
   (f) Simple harmonic motion–general equation of oscillatory systems, pendulums and spring-mass systems
   (g) Universal gravitation and planetary motion
   (h) **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) Mechanical waves
   (d) Light and optics
   (e) Special relativity
   (f) Quantum mechanics
   (g) **Practice AP Physics 2 Exam**