Advanced Placement Physics C: Course Outline

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Class Time

The Advanced Placement Physics C course at Olympiads School runs for a total of 40 hours, on Saturdays and Sundays from 7:00 pm to 9:30 pm

Course Pre-requisites

When taking the course, you should be comfortable and competent in the material covered in:

- **Physics 11 and 12:** Student will need to be competent in all the topics covered in the high-school level physics courses. Many topics from Phyiscs 11 and 12 are covered more in-depth in this course.
- **Calculus:** Both C exams (Mechanics, and E&M) are calculus based, and students will be 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

The course is divided into two parts, and covers all the topics in the two calculus-based exams:

- Mechanics
  1. Kinematics
  2. Dynamics
  3. Work and energy
  4. Momentum and collisions
  5. Center of mass
  6. General circular motion
  7. Rotational motion
  8. Harmonic motion (oscillations)
  9. Universal gravitation and planetary motion
  10. **Practice AP Physics C: Mechanics exam**
- Electricity and Magnetism ("E&M")

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11. Electrostatics
12. Capacitance
13. Magnetism
14. Circuit analysis (RC, RL, LC and RLC circuits)
15. Maxwell's equations and electromagnetic wave
16. **Practice AP Physics C: E&M exam**

Course Material

- Textbook is not required. However, lecture slides, handouts and any additional resources are posted on the school website each week (please check and download)
- Homework questions are generally based on university-level textbook problems, and past AP C exams
- 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 attending this course will be expected to:

- Be 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 after every topic is finished (approximately every week during the fall/winter session, and twice a week during the summer), depending on the length and difficulty of the material for that topic
- Homework questoins, like the AP exams themselves, will include both multiple-choice questions and free-response questions
- Late homework is always accepted. However, the longer you wait, the less meaningful they will be n your learning

- For free-response questions:
  - Show *all* work by providing complete and organized steps. In all AP exams, only part marks are awarded for the correct answer; most of the marks are for applying the correct concepts and diligent work.
  - If a question requires you to *explain*, please do so using short complete sentences with sufficient 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.

Notes

To help students with getting comfortable with the format of the AP exams, all effort have been made to ensure that

- Whenever possible, the course material uses American spelling (e.g. meter instead of *metre*, color instead of *colour*)
- The homework questions are formatted to look like the actual AP exams