

## Dr. Hood's Summer Assignment for SY25-26 AP Physics C students

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Enroll in *On-Ramp to AP Physics C: Mechanics* – it's free!

This course is self-paced and access is scheduled to open May 27, 2025.

This course is intended for high-school students who have taken an introductory-level physics course, acquired some background in Mechanics and intend to take a more advanced course – for instance, AP Physics C. The course will help refresh and strengthen fluency with mathematical tools and fundamental topics in Mechanics: Kinematics, Newton's laws and Laws of Conservation. The last unit of the course contains a comprehensive Final Exam. **Students who complete this mini-course will be well-prepared to tackle more advanced course material in the fall.** You will need Calculus for your actual AP Physics C course but not for this summer course. The purpose of this course is to help you achieve success in your AP Physics C Mechanics course at MAST Academy.

Prerequisites:

- Background in a course like Dr. Hood's Honors Physics!
- Fluency with basic algebra, trigonometry and vector operations.

What you'll learn/review:

- Algebra/trigonometry skills for an advanced Mechanics course
- Kinematics of motion with constant acceleration (
- Newton's laws and their application in problem-solving (
- Laws of conservation of energy and momentum and their application (in problem-solving (
- Basic information about the AP Physics C Mechanics course and Exam

If by Thursday August 14 you have earned a total of at least 85% of the course points then you will start Dr. Hood's AP Physics C Mechanics course in the fall of 2025 with two As in the gradebook! If you don't, then in addition to your regular classwork and homework, you will need to complete at least 80% by Monday August 18 (but not get the two freebie As!) And if you don't complete that much by then, you will get two Zs (equivalent to two Fs) AND get to take a different science class, with someone else...

Course description:

<https://www.edx.org/course/on-ramp-to-ap-physics-c-mechanics>

What are the most common challenges encountered by students in APCM? The most obvious one is the use of calculus, especially translating the verbal and the graphical descriptions of various situations into the “calculus” form. Another is the sheer pace and the sophistication of the material and the corresponding problems that the students are expected to solve. However, APCM has some other aspects that tend to surprise the students – not always in a pleasant way:

- **Independent Learning and Collaboration.** The students are expected to learn a lot on their own and in collaboration with their fellow students, without any direct involvement of the teacher. Well, *you* are not going to be surprised since you are taking this warm-up course on your own, aren't you?
- **Challenging problems.** Many students, having been very strong math and science students throughout their high-school careers, are shocked to find themselves, for the first time ever, dealing with the material that is quite challenging for them – for the best! Panic may ensue, and no one has ever been successful while panicking. So remember: yes, it is hard; yes, it is supposed to be hard; if it weren't hard, you'd pick a harder course – because you *like* a challenge, right? It's important to understand that not seeing the solution right away, struggling, starting over, etc. etc. is not only normal, it is necessary for anyone who wants to become a scientist or an engineer – after all, their professional lives tend to involve many more failures than successes. Such is life – deal with it; be patient, persistent and optimistic. You can do it – and this course will help you see how.
- **Numberlessness.** Yeah, I know, it's not a word. Here is what I mean: in introductory-level high-school courses all or nearly all problems are numeric: the final answer is *a number*. IN APCM, more often than not, the problems contain no numbers, and the final answer is an algebraic expression. Many students are put off by the lack of numbers. Get used to it – this is how *real* physicists solve their problems!
- **Multi-concept problems.** Many APCM problems require that you pull together your knowledge of different concepts and figure out which ones may be most helpful.
- **Inquiry-based lab experiments and data analysis.** You will be expected to design and carry out laboratory investigations, analyze your findings and present them in the manner consistent with the standards of a college-level science course.

Well, now you know what to expect SO GET STARTED – kinematics is waiting...