

Frequently Asked Questions

What's the structure of the course?

Each unit of the course consists of a handout with about 30 problems and a 1 hour one-on-one meeting to discuss them. Your job is to solve as many of the problems as you can, while my job is to evaluate your solutions, show the intuition behind the problems, tell you the ideas behind the problems you didn't solve, and give occasional hints. You can attempt the units in any order or combination, though there is a suggested order. For a list of the units, see the [syllabus](#).

I will not spend much time introducing the material; if it's new to you, it'll be your job to learn it by reading books. Relevant textbook chapters will be listed in each problem set.

When is the course?

The course will run from summer through March. The meetings each week will be arranged to fit your schedule. The month of March will be devoted to review and practice exams. If desired, students can continue through April and May to cover more advanced material.

What's the cost?

Each unit costs \$200, broken up as \$100 for the handout and \$100 for the meeting. Usually students take one unit per week in the summer, and one unit per two weeks in the middle of the school year. (If you prefer, you can also arrange for more or fewer meetings, such as two meetings for a particularly long handout or one meeting for two handouts.) I send bimonthly invoices, and payment can be via PayPal or bank transfer.

The core USAPhO material is covered in 24 units. It covers roughly the material of the first two years of an honors-level university physics degree, but with more difficult problems. Essentially all USAPhO problems, and many IPhO and APhO problems are included in the curriculum, along with problems from many other textbooks and Olympiads. After the core material, there are 5 units devoted to USAPhO review, and 6 units of advanced topics, more relevant for IPhO preparation.

The reason the cost is higher than a generic prep program is two-fold. First, a very large amount of material is provided. The course is at least twice as intense as any other that I know of, with handouts totaling 300,000 words in length, containing 200 worked examples and 1,000 challenging problems with detailed solutions, along with 7 practice USAPhOs. It has enough content that I doubt anybody, even IPhO gold medalists, could run out of things to do. Second, all the teaching is done one-on-one, i.e. I'll spend the meeting time answering only your questions, and the explanations will be tailored to your background. I've experimented with other formats, but always found that one-on-one discussion is by far the most useful.

How do you select the students?

Applications for the 2021/2022 academic year, which is the last year this program will run, will be accepted on a rolling basis, from **6/4** to **8/14**. Submit your application to kzhou7@gmail.com. The requirements are the following:

- There is a [preliminary problem set](#) with a variety of basic problems. These problems should be approachable if you understand the core material in Halliday, Resnick, and Krane. Solve the problems and write up your solutions, as described in the syllabus. This problem set is similar

in style to problem sets in the course, though more basic, so by doing it you'll also find out if you'll enjoy the course.

- Tell me about your past performance on the $F = ma$ and USAPhO exams, your goals for the training, and where you've learned physics from. I don't require students to come in with USAPhO medals, but I do expect them to easily pass the $F = ma$.

If you're interested in the class, I recommend applying as early as possible. You'll be able to start the class earlier, and it's much easier to learn physics during summer than during the school year. I don't accept applications from parents, because this tutoring is meant for motivated and self-driven students. If you're a parent and you're not sure if this program will be suitable for your kid, I strongly recommend asking them to decide for themselves by reading this document. If you're a student, I would be very happy to hear from you, so feel free to email me for clarifications or hints!

How have previous students performed?

For the 2017/2018 academic year I had two students, whose progress was:

- USAPhO Gold \rightarrow USAPhO Camp, IPhO Gold (2018/2019 TA)
- Did not qualify \rightarrow USAPhO Camp

For the 2018/2019 academic year I had four students, whose progress was:

- USAPhO Camp \rightarrow USAPhO Camp, IPhO Gold (2019/2020 TA)
- USAPhO Gold \rightarrow USAPhO Gold
- USAPhO Bronze \rightarrow USAPhO Silver
- USAPhO qualification \rightarrow USAPhO Gold

For the 2019/2020 academic year I had eight students, but the USAPhO was not graded and the IPhO was not held. For the 2020/2021 academic year I had five students. In the Physics Unlimited Premier Competition, these students took four of the top five places among all competitors from the US. This year, camp was replaced with qualification for USAPhO+ (top 30, with more slots for younger students), and medals were replaced with a book prize (top 50, rough equivalent of gold) and honorable mention (top 50%). The students' progress was:

- USAPhO Camp \rightarrow USAPhO+
- USAPhO Bronze \rightarrow book prize
- USAPhO qualification \rightarrow book prize
- USAPhO qualification \rightarrow USAPhO+
- USAPhO qualification \rightarrow USAPhO+

How difficult are the problems?

See the sample problem sets on [my website](#). These are representative in difficulty and length.

What other things can I do to prepare?

See my [advice on learning introductory physics](#) for more references. If you've qualified for USAPhO but haven't gotten at least a USAPhO silver medal yet, two very good and accessible resources are Halliday, Resnick, and Krane and the Art of Problem Solving PhysicsWOOT program.