Students committed to learning will find many possible paths to success. No path is error free, but the path best for you may not look like the same path as another student. For this reason, students should continuously assess their academic progress in courses and adjust their academic strategies accordingly.

While there is no magic formula, the following suggestions may improve your ability to succeed in physics and increase your retention of knowledge.

**First things first, learning to learn.** The following tips are based on suggestions listed in the PHYS 221/222 textbook. These tips are transferrable to any physics courses and most other courses.

- Review fundamental math concepts (algebra, geometry, and trigonometry) if needed.
- Determine what has caused you to struggle in other problem-solving courses. These similar struggles may appear in physics if not addressed.
- Determine how to incorporate reading before and after lectures.
- Spend adequate amounts of time studying physics.
- Spend time daily studying physics.
- Stay focused by studying in distraction-free locations.

Use **extra study opportunities to learn with peers.** Problem solving in groups is a key consequence of long-term retention of knowledge. The PHYS 221/222 book points out that most scientists and engineers rarely work in isolation. Hence, working with peers is a critical, valuable experience. Be actively involved in class, Supplemental Instruction, the math help room, recitation, or other study group opportunities.

As soon as you struggle, determine why. You must resolve your struggles with one concept before your struggles compound. Besides using group study opportunities to develop your ability level, also connect with your instructor or TA.

**Do all homework.** Physics homework replicates what may appear on exams/quizzes. Hence, all homework is test preparation.

**Embrace repetition in problem solving.** If your instructor expects you to solve 10 problems, consider this your minimum. You should work out every problem twice and do extra problems. This extra effort is the difference between testing your luck and being a good student.

**Attend class.** This is like stating the obvious, but there is a lot of content in physics classes that may be presented to you for the first (and possibly only) time. If you miss class, you may never know the details of what you missed.

**Read ahead of lectures.** If you are frantically taking copious notes during class (or are lost) you likely are not reading enough before class. You can control your reading pace but you cannot

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control your instructor’s lecturing. Hence, make your “first contact” with new course material be under your control by reading before class. You will find that reading ahead allows you to focus on new details in class that you might otherwise have missed.

**Listen in class during presentation of examples.** Many students want to write down all examples for later reference, but are so focused on writing that they fail to hear the instructors’ explanations and solution process. Your textbook has examples that you can reference later, so listen carefully during lectures and only take notes of the essential, new information.

**The correct solution process is the right answer.** You can get the right final answer as a fluke, without having any idea how you did. Focus on understanding the solution process as the right answer.

**Be logical and critical.** Problem solving is a process of logical steps, but to be a good problem solver requires critical thinking ability. Think. Think! THINK!

**Study daily.** One hour per day every day as a minimum is better for your learning than two large study sessions per week. The minimum amount of time students should devote to physics is not the same for everyone. In fact, it’s likely that you need to devote two hours per day or more to your physics course. Determine your minimum amount per day and seek to exceed this goal.