

Welcome to the third semester of the introductory physics sequence. Physics provides a framework in which to understand our universe by using our observations, logical deduction and mathematical descriptions. I hope that by now, you are excited and amazed at the marvelous complexity and underlying simplicity of the workings of the universe – from the smallest particles to the stars themselves.

I want to give you the big picture right now because the various details will sometimes hide what is happening, and the sequence of topics can seem disjointed and unconnected. We will relate the energy of the system to a variety of measurable characteristics – from the speed of propagation to the temperature, from the material to the geometry, and we will examine the relationships between the physical characteristics of the system and the behavior of the energy propagating through it.

It will be important that you remember every single thing you have ever been shown in a classroom. Although that is a little bit of an exaggeration to be sure, in this course we are finally in a position to use the language\* that we have been learning. We are not only interested in expressing concepts, but looking for simple and elegant means of description, and that will mean connecting very disparate ideas and drawing conclusions from studying analogous systems.

This semester will be very simpler if your mathematical skills are polished and you can spend your time wrestling with the concepts involved. If you are uncomfortable with the mathematics then this course can be difficult. If you do find yourself having difficulty try to separate the physics (the ideas and concepts) from the description (the mathematics) and you will find the material easier to understand. To help with the mathematics, you must be certain that you understand how the variables are defined in each system. We will be using many of the same symbols to describe completely different variables in different systems, so understanding the definitions will be essential.

The conclusions derived from the final portion of the semester can challenge even the most flexible and open mind, so if you find yourself a bit confused...that is completely understandable. However odd it may all seem, this is how we currently understand our reality. Remember that these are only the first few steps on a very long journey to understand the universe. In fact, you should be glad that everything is as complex as it seems to be. Otherwise, we would have nothing left to do!

*\*In case you care to read some more of my philosophy on physics, I refer you to 'Physics as a Language' which can be found here: <http://homework.sdmesa.edu/cmona/general/genfiles/intro.pdf>*