Geog 142 (Climate Dynamics) Note regarding prior background for the course

I often get asked about backgrounds for taking this course. I hope the below helps.

1. If you have a strong physics and/or mathematics background

What I mean by 'strong' are the first courses in undergraduate physics (classical mechanics, electromagnetism, waves) and mathematics up to multivariate calculus and some exposure to ODEs and PDEs.

You're possibly a physics/chemistry/mathematics/engineering student curious about how you can use your knowledge in an applied environmental field.

This course won't be 'difficult' from a physics or mathematics viewpoint. If you are looking to start from basic physical principles and solve equations, I teach a 'Atmospheric Physics and Dynamics' course (Geog C139 / EPS C181) every other year which would be more appropriate.

Nevertheless, I do think you'll learn something from this course. The course aims to give a conceptual basis of how climate works. You need to know the gross structure of the atmosphere and ocean. This holistic view is not emphasized as much in the 'Atmos Physics and Dynamics Course', since that course is more reductionist.

The roots of climate science are empirical – observations usually came first, before theory. This is still very much true for a lot of what climate scientists do today.

2. If you don't have a strong physics or math background

You might have taken physics and calculus in high school, but haven't used it over the years. Or, you may not have taken calculus at all.

You're possibly a philosophy/economics/political science major interested in climate change. Or, a biology major who has taken some physics and mathematics somewhere along the line, but have not used it much.

With this course, I emphasize the conceptual aspects of climate. Climate science is, however, a physical science – you can't avoid the physical basis. And, the natural language for physics is mathematics. That is why I state in the prerequisites that a first course in undergraduate physics is highly recommended, and that basic calculus is helpful.

I do introduce equations and expect you to be able to do algebraic manipulations and relatively simple calculations. If you have no exposure whatsoever to algebra and physics, I do not recommend you take this course.

That being said, this is not a course about solving equations. It is about giving a holistic overview of the climate system. Climate science is rooted in empiricism – a lot of what you need to know about climate is from observations.

What I have found in the past is that students that do well in the course are those with a curiosity about the natural world, coupled with a strong physical intuition and a good work ethic. Some of the best students were philosophy and political science majors (one is now my graduate student).

However, these are hard to quantify in terms of 'prerequisites'. The only thing I can suggest is for you to take a look at my previous notes, and judge for yourself. The website for the Fall 2005 class is here: http://geography.berkeley.edu/ProgramCourses/CoursePagesFA2005/Geog142/Geog142.html

I do spend some time on the physics of global warming, but this course isn't oriented towards it. I also *do not* cover any social aspects of climate change in this course. If you are looking for a global warming course and social implications, you should look elsewhere. For example, I teach a lower division course on 'Global Warming' with a social scientist (next offering is likely to be 2008-2009); other departments (ERG, ESPM, EPS) also teach various courses related to global warming.

For graduate students: if your *research* interest is on an aspect of climate change (e.g. ecosystems, societal impacts), and you think its just about increasing temperatures and melting ice, you are gravely mistaken. The climate system is much more complicated than that. Also, when you read the IPCC summary for policymakers and they talk about things like 'radiative forcing' and 'tropopause', shouldn't you try to understand what they mean? This course will help you understand the basics of climate dynamics.