

# Syllabus for PHY250, Physics Journal Workshop Spring 2006

## Contact information and office hours - Prof. Alan Middleton

My office is Room 213, Physics Building. I am quite often free for drop-in discussions. You are welcome to call or write at any time to let me know you would like to drop by, to discuss the course readings or whatever. My office number is x3-2408. My home number is 423-0321 (before 9 pm, please). My e-mail is [aam@syr.edu](mailto:aam@syr.edu).

## Course goals and content

The purpose of this course is to familiarize you with some of the current activities in fundamental physics: black holes, optical traps, dark energy, biomolecular motors, quantum computing, etc. This should be fun.

Most of the physics you have learned so far could have been taught over a century ago. This is necessary as there is a basic set of knowledge that is needed and you have built skills in problem-solving in physics. But physics is so much more than what is taught in high school or in General Physics I & II. We will be looking at 21st Century physics.

There is content, but we will also be focusing on *how* to read about the cutting-edge physics that is not yet in textbooks. You should learn how to dig in to an article, pick out the important points, even if you don't get all the details, and how to find background information and vocabulary.

We will also discuss post-graduate opportunities, especially in careers that have a strong technical component and graduate school.

## Assessment

The general format of this course, with its emphasis on exploration, is unstructured. However, to encourage you to keep up with the reading and discussions, you will receive a course grade. Most of your grade will be based on your *active* participation and effort, as evinced by your contributions to discussions and completion of weekly assignments. There will be no graded exams.

Your weekly assignment is to submit, via e-mail or on paper, a 220-300 word summary of the week's reading, *by the beginning of class*. This essay should describe something you learned from the reading *and* pose questions about what you did not understand. I include a sample essay. I expect that one to two hours of reading and research and twenty minutes of writing will suffice.

To be precise, for every two "strikes", i.e., lack of contribution to the discussion or not turning in an acceptable essay, your grade will drop one level from an A. For example, if you miss or don't contribute to two meetings and fail to submit three essays on time, your grade would be A less two levels, i.e., B+.

As a reminder, please be aware of the University's academic honesty policies. The most relevant policy here is the need to cite your sources. Acknowledging sources is an extremely valuable part of preparation of any materials, both for an academic class or for other purposes.

## Some resources

### Reading suggestions

During and after this class, you might want to learn more about what we know and also see what is going on now in the world of physical science. Reading helps you keep up, so you can impress your friends, and also gives you examples of how to communicate.

## PERIODICALS (available in the Physics Library and in Sci-Tech)

*Scientific American, Discover:* These are popular journals, intended for a general educated audience. These provide good introductions to a number of topics, but the selection of topics is not comprehensive (they write on what they think will sell).

*Physics Today:* This is intended for professional physicists, but is useful for seeing what is going on in physics. All members of the American Physical Society (and some other organizations) receive this periodical. Highly recommended for browsing.

*Science; Nature:* These are the two major interdisciplinary science journals. They are the most up-to-date in their coverage. Each week, they contain the latest news about physics and research articles. Most of their content is in **other** disciplines (i.e., not physics), which is very useful for seeing the connections among the sciences.

## BOOKS

There are a number of good books out there on physics, especially if you are interested in cosmology, particle physics, and string theory. When you have time to read, consider these:

The current hot book on extra dimensions is Lisa Randall's *Warped Passages: Unraveling the Mysteries of the Universe's Hidden Dimensions*. I haven't read it; it is supposed to be quite good.

A number of students have enjoyed Brian Greene's *The Elegant Universe*, for example. [Physics Library reserve shelf.]

## BACKGROUND PHYSICS

The *Flying Circus Book of Physics*, by Jearl Walker: a collection of "Why does this strange, but common, thing happen?" problems. The type of problem is more qualitative than useful for many purposes, but it helps stretch your understanding of basic physical principles.

*How Things Work*, Bloomfield: A first-year non-science major text that draws connections between elementary principles and applications.

*Feynman Lectures on Physics*, Feynman and Sands: if you understand this three-volume set, written over the heads of its intended audience (Caltech first-year students), you will do well on almost any exam. [Physics Library reserve shelf.]

## The web

The Web is big. Really big. Go see it some time. You can find large quantities of tutorial and pedagogical introductions to topics of interest to physicists. I will focus here on central sites for organizations that provide career information for physicists and physics students.

The American Physical Society ([aps.org](http://aps.org)), soon to become the American Physics Society, and the American Institute of Physics ([aip.org](http://aip.org)) are the main sites.

[focus.aps.org](http://focus.aps.org) has highlights of the latest physics news.

[www.compadre.org](http://www.compadre.org) is a student-oriented site with discussions of physics, jobs, etc.

[www.aps.org/jobs](http://www.aps.org/jobs) is self-explanatory.

[www.aip.org/statistics](http://www.aip.org/statistics) has a great set of statistics: numbers of majors, career choices, trends in participation by women and minorities, what fields have the most PhDs, what people state they find useful for their jobs in academics or industry, etc. They provide the posters that are opposite my office on the second floor.

[www.physicsgre.com](http://www.physicsgre.com) has resources and links to resources for the physics GRE.

[www.gradschoolshopper.com](http://www.gradschoolshopper.com) has detailed information on graduate schools.

## People

Talk to your peers and upper class students and graduate students to learn what they do and know.

Professors are generally happy and eager to meet with students to explain what they are doing. Write them or drop by if you want to learn more about their topic.