Preregistration for Spring 2009 will begin shortly. This newsletter deals with common advising questions. It is not intended to be a substitute for seeing a Physics department adviser or for talking to students who are a year ahead of you in classes. The list of Physics department advisers and office hours is located at http://www.phys.ufl.edu/academics/undergraduate/

Requirements for Physics Degrees

The Physics department offers both Bachelor of Science (BS) and Bachelor of Arts (BA) degrees, as well as a minor in Physics. The course requirements for these degrees are listed on our web site at:

BS Degree	http://www.phys.ufl.edu/undergrad_program/reqBS.html
BA Degree	http://www.phys.ufl.edu/undergrad_program/reqBA.html
Minor	http://www.phys.ufl.edu/undergrad_program/minor.html

The minor requires only three appropriately chosen courses after introductory physics, the BA degree requires approximately 32 credits in physics, and the BS degree requires 41 credits in physics. The BA degree was created because many of our students do not go on to graduate school in physics, but go on to jobs in industry, to other graduate schools such as engineering, and to medical school. It has the scheduling flexibility to allow students to take courses outside of physics to further their career goals.

General Advising Comments

In physics (or any other discipline) the courses become more difficult as one goes from the freshman-sophomore courses to the junior level courses to the senior level courses. One reason for the courses becoming more challenging is that you need to have mastered more material, i.e., there are more prerequisites for the junior and senior level courses than for the introductory courses. However, the junior and eventually senior level courses are also just harder. The problems take longer to do and will require deeper thinking. Thus, in choosing courses you should (a) make sure you have the necessary background and (b) make sure that the difficulty level of the course you are taking is not too far beyond those you have taken before hand. In the course descriptions given below, we try to help you in making an informed decision.

Spring 2009 Junior and Senior Level Physics Major Courses

The following is a list of 3000- and 4000-level Physics major classes, which are offered in the Spring semester. It is recommended that students finish Physics 1 and Physics 2 before starting these courses.

Modern Physics - PHY 3101 or PHY 3063 :

Modern Physics covers such topics as relativity and quantum mechanics. We offer two courses in modern physics in the spring semester. Both use the same textbook; however, PHY 3063, which is part of the enriched program, has a higher mathematical level than PHY 3101. In particular PHY 3063 will assume familiarity with matrices, coordinate transformations, differential equations, and Fourier series, while PHY 3101 will only assume calculus and introduce the necessary material on differential equations in class. Thus, if you have a strong mathematical background take PHY 3063, otherwise take PHY 3101. The physics content will be the same.

Mechanics 1 - PHY 3221 :

Mechanics 1 covers the same material as the introductory mechanics courses except at a more advanced level. Students who have taken PHY 2060 may skip this course and take Mechanics 2, PHY 4222. Students who have taken PHY2048 should take PHY 3221 before taking PHY 4222. This course along with PHY 3101 (Modern Physics) are good 3000 level courses to start with once

you have finished the introductory physics sequence. This class is now taught in both the Fall and Spring semesters, while the sequel, PHY 4222, is only taught in the Spring semester.

Electricity and Magnetism 1 - PHY 3323 :
This is the first semester of our Junior/Senior electricity and magnetism sequence. It covers the same topics you would have had in PHY 2049 or PHY 2061, but at a much more advanced level. This class is now taught in both the Fall and Spring semesters, which the sequel, PHY 4324, is only taught in the Fall.

Thermal Physics - PHY 3513 :
This course is an introduction to thermal physics focusing on thermodynamics. The difficulty level of this course is above Mechanics 1. Thus, if you already taking two physics major classes such as Modern Physics and Mechanics 1, you may wish to postpone this course until next year. PHY 3513 has now been combined permanently with the old PHY 3062. Thus, students who have taken PHY 2060 and 2061 should sign up for PHY 3513. This class is now taught in both the Fall and Spring semesters, while Statistical Physics in is only taught in the Spring semester.

Mechanics 2 - PHY 4222 :
Mechanics 2 is the first 4000 level course that many students take. It is a challenging class and more difficult than the 3000 level classes. The prerequisites are either (a) PHY 3221 or (b) PHY 2060. If you have taken PHY 2060, you should first take some of the 3000 level accelerated option physics courses, preferably PHZ 3113, before tackling this 4000 level course. The material covered in this course includes the Lagrangian and Hamiltonian formulation of mechanics, which is useful in quantum mechanics.

Statistical Physics - PHY 4523 :
Statistical Physics is the sequel to our introductory thermodynamics classes (PHY 3513). Most students will take this class after they have one course in quantum mechanics; however, last year a few students took this without having taken quantum mechanics and did fine in the course.

Advanced Lab 1 - PHY 4802L :
There are two advanced laboratory classes. This is the first one. It covers the building of electronic circuits. The formal prerequisites for this class are introductory electricity and magnetism (PHY 2049 or PHY 2061) and differential equations. Because this is a 4000 level course, we recommend that you finish most of the 3000 level courses before taking this course. You should also be aware that the course demands a considerable amount of time in the lab. It is estimated that students will spend approximately 12 hours per week in the lab.

If you meet the above requirements, then there are two very good reasons for taking PHY 4802L in the Spring. First, if you wish to work in a lab doing research over the summer or in the future, this course will provide you with valuable skills. Second, the class size is limited to 16 students because of space in the room. If you intend to graduate next academic year, it is recommended that you take this class this Spring, because the class may fill up next Fall, delaying your graduation.

Advanced Lab 2 - PHY 4803L :
This is the second of our advanced laboratory courses. It covers modern physics experiments like nuclear magnetic resonance, X-ray scattering, lasers and light scattering, low temperature transport, etc. The first advanced lab, PHY 4802L, is a prerequisite for this course since you will use the electronics skills learned in PHY 4802L to connect the experiments in this lab.

Attention:
There is a departmentally controlled section number for both of the advanced labs, which you can obtain from the Student Services Office on

the first floor of the New Physics Building. We control the section number because we would like to ensure that Physics majors have priority.

Physics Electives:

The following are all options for the physics elective(s) required for either the BS or BA degrees.

Optics - PHY 4422 :
The prerequisites for this course are our advanced electricity and magnetism courses (PHY 3323-4324). This course is recommended for those who may be using optics in their future work or for those students not wishing to take Quantum Mechanics 2 or Biophysics as an elective.

Quantum Mechanics 2 - PHY 4605 :
This is the second course in our senior level quantum mechanics sequence. It is highly recommended for those students going on to graduate school in physics.

Solid State Physics - PHY 4905 :
This class is an introduction to solid state physics for undergraduates. Since many of our majors go on to study condensed matter physics in graduate school, there has been demand for this course for quite some time. This Spring is the second time we are offering it. It is recommended, but not required that students have complete a semester of quantum mechanics prior to taking this course.

Biophysics - PHZ 4710 :
The course covers the growing and exciting research area at the interface between physics and biology. The only prerequisites are our two introductory physics classes. This is an excellent elective for students going the pre-med route.

Math Electives:

Both the BS and BA degrees require 3000-level or higher math/computer science electives. The BA degree requires one course, and the BS degree requires two.

We recommend that you take at least one course in computer programming if you are not already familiar with programming. A good introductory course, which also satisfies the math elective requirement, is CGS 2421, Computer Programming for Engineers. It is listed in the UF course schedule under Industrial and Systems Engineering. CGS 2421 is a 2-credit class. There is an accompanying 1-credit lab, CGS 2421L, which gives some practical programming experience. The course comes in FORTRAN, C++, and VB.net versions. While FORTRAN is still the choice for many physicists doing large-scale number-crunching, most physicists will now recommend C++ for a first course, since FORTRAN can be easily learned once you know C++.

We also recommend that you have linear algebra before taking our senior level course in quantum mechanics. MAS 3114 - Computational Linear Algebra has been a popular linear algebra course for our majors. There is also a 4000 level linear algebra course, which tends to be proof oriented.

Some other useful mathematics courses for physics majors are:
MAD 4401 - Introduction to Numerical Analysis
MAA 4402 - Elements of Complex Variables for Engineers & Physical Scientists
MAP 4305 - Intro. to Differential Equations for Engineers & Scientists
MAP 4341 - Elements of Partial Differential Equations
MAP 4413 - Fourier Series and Transforms
These are not listed in any particular order, and other math courses may be very helpful.

Please send questions or comments to selman@phys.ufl.edu .