Instructor: Dr. Patrick Moylan
Office: 218 Woodland
Office Hours: T-R 12-12:50, F 3-3:50 p.m., M 6:30-7:20, W 6-6:50 or by appointment
Phone: 215-881-7571
Email: pjm11@psu.edu

Meeting Time / Place: T-R, 10:00-11:50 a.m., F 2:00-2:50 p.m. / Woodland 123.
(Labs will during class time and will be announced usually on the class day before they are performed, in order to correlate better the lab with the lecture material.)

Additional material: (on reserve in Library)
Physics: A World View by Larry Kirkpatrick et al. (ISBN 049501088X for latest edition, but any edition of this excellent book will do for supplemental material). Additional physics 212 materials available from my website:

www.personal.psu.edu/pjm11/

Course Description: This is the second course in a three-course sequence for science and engineering majors at Penn State. In this part we shall study the subject known as electromagnetism.

Grade Weighting: Quizzes & Homework (10%) + Class Participation (5%) + Labs & Activities (20%) + Exams (30%) + Comprehensive Final Exam (35%)

Letter Grades: Scores from each of the above areas will be curved and compared to a standard grading scale: A (95-100), A- (90-94), B+ (83-89), B (77-82), B- (74-76), C+ (70-73), C (63-69), D (57-62), F (<57) (I don’t give minuses except in the case of As.)

Quizzes: We shall usually have a weekly pop quiz usually similar to some of the homework problems which were assigned. There will be no makeup quizzes, unless I have prior notification of your intended absence.

Homework: Homework will consist of two types: computer graded (WEB ASSIGN) and homework which is to be usually turned into me for grading. I will put the solutions to the problems which are to be turned into me on reserve in the library. I strongly suggest you work hard at completing all homework since gives you practice for the exams. The web assign homework can be found at the following web site:

http://www.webassign.net

Homework assignment deadlines, exam dates, lab announcements etc. will be listed on my website.

Exams: Most probably there will be 2 exams + Final. Problems will generally be similar to the homework problems. Each exam will typically consist of approximately 4 or 5 problems (depending on the scope of the material covered). The final exam will be cumulative. There will be no make-up exams, and I count the final exam score as the missed test score. You will be permitted to use a 3x5 index card for exams. It must only contain formulas without explanations of terms, and it cannot contain worked out problems. I will inspect your card during the exam. All exams will be taken in a large classroom (possibly in Woodland 121 or 134).
LEARNING OUTCOMES & SOME HELPFUL COMMENTS ON MASTERING
THE MATERIAL OF THE COURSE

Of all the introductory courses in physics you may encounter in your college career, this will be, by far, the most interesting. We will learn about a brave new world, which combines electricity and magnetism into one subject called `electromagnetism' and results in (among other things):

- explaining light as an electromagnetic field, and understanding the speed of light
- describing motors, generators and transformers;
- Maxwell’s equations;
- demonstrating how this modern theory of electromagnetism leads us to a relativistic world view consisting of time machines, contracting rods, light as an electromagnetic disturbance, and quantum electrodynamical perpetuum mobile (c.f. http://en.wikipedia.org/wiki/Perpetual_motion).

On the other hand, this most interesting of physics courses will be your most difficult one, since it involves many mathematical concepts of Vector Calculus (Math 230), which will be new to most of you. You will learn about

- line integrals;
- surface integrals;
- volume integrals;
- divergence theorem (Gauss’ law);
- Stokes’ theorem and Ampere’s law

and how to use them in simple, special cases with lots of symmetry. (It will be a help to you if you are taking simultaneously or have already taken Math 230.)

You will need to spend quite a lot of time studying and paying attention to the teacher in the classroom. If you miss class you will not do well in this course. What I stress in class will be reflected on the quizzes and exams. At the beginning of any class period, I may take attendance. Your presence will count as one homework grade. Missing labs is more serious (see my handout on lab rules for policy on missed labs).

Do the assigned homework and study the textbook!! It is absolutely necessary for doing well in the course.* We shall learn about the grand ideas mentioned above and many more, and see their wondrous applications in class. However, your understanding is only superficial, unless you can apply these same grand ideas to completely new circumstances. This ability comes from doing homework problems. Do not be surprised, if the homework is frustrating at times; however, solving one challenging problem sometimes helps to make the next one easier. And homework problems often are very similar to problems on tests. Doing the homework is the easiest way to improve your grade. Not doing homework is the easiest way to lower your grade, and an absolutely essential prerequisite to being able to do the homework effectively and for success on the tests is a careful reading of the basic textbook material which I cover in lectures.
My chief purpose is to provide you with an underlying motivation for the topics we are studying, and to help you pace yourself and select from a huge body of knowledge accumulated from more than 200 hundred years of intensive investigations by some of the most brilliant minds in human history. I should make the course more interesting and enjoyable and more digestible than it would be, if you attempted to study it on your own. Do not hesitate to come to my office during office hours or by appointment if you are having any difficulty whatsoever with anything related to the course, or just to discuss in more detail some of the fascinating topics which we will study.

*I suggest you form groups of 2 or 3 (maximum) for homework study, and meet regularly to work together, but you should only work together, once each of you has, at least, tried to understand the problems on your own and after studying the relevant material in the text. If you just copy from one of the other persons in the group, it, unfortunately, will not do you any good on tests etc.

NOTE FOR SCHREYER HONORS STUDENTS: For interested students there will be an honors section of this course. You must have my approval to sign up for it. Any interested student is welcome to sign up for it, but apparently it is only possible for Schreyer honors students to get the designation as PHYSICS 212H on your transcript. It will require an additional 1 hour/week commitment on your part, but will probably help your grade in the regular course.

Tentative Course Outline for Physics 212 (SPRING 2009)

Week of , Topic, Reading Assignment and Lecture Material
JAN. 12 Ch. 13: Gravitation & Ch. 21: Electric Charge
JAN. 19 Ch. 22: Electric Fields
JAN. 26 Ch. 23: Gauss’ Law
FEB. 2 Ch 23: cont.
FEB. 9 Ch 23: cont & TEST I
FEB. 16 Ch. 24: Electric Potential
FEB. 23 Ch. 24 cont. & Ch. 25: Capacitance
MAR. 2 Chs. 26 & 27: Current, Resistance & Circuits
MAR 9 SPRING BREAK (March 14: ALBERT EINSTEIN’S BIRTHDAY!)
MAR. 16 Chs. 26 & 27: Current, Resistance & Circuits cont.
(More of Chs. 26 & 27 will be covered thru the semester in lab work.)
MAR. 23 Ch. 28: Magnetic Fields
MAR. 30 Ch. 29: Magnetic Fields due to Currents
APR. 6 Test II Ch. 30 Induction & Inductance
APR 13 Ch. 30 continued
APR. 20 Ch 31: Electromagnetic Oscillations & Alternating Currents
APR. 27 Ch. 32: Maxwell’s Equations
MAY 4 FINAL EXAM during this week (time of exam from final exam schedule, Penn State Abington)

FINAL EXAM is comprehensive
RULES ON LABS AND ACTIVITIES

• No lab make-ups except in exceptional circumstances (e.g. serious illness usually requiring a doctor's excuse).

• Each student is expected to write his own lab reports, and do his own activities and pre-labs, even if they were performed jointly by a group of students. Labs, activities and pre-labs usually count 100 points each. Students are required to keep labs, activities and other handouts (like lecture notes etc) in a notebook. I will inspect the notebook at the end of the course, and give a grade of up to 200 points (worth 2 lab grades) for it.

• Some labs or activities may involve the use of symbolic computational software like Math Cad or Maple, and Scientific Workplace.

• Many labs will also use DATA SUDIO. The computers in the lab room (122 W) are equipped with this software.

• I will try to correlate labs with the lectures as much as possible, so as to supplement and reinforce the lecture material.

• In general, it is required to turn in the activities, lab write-ups etc. for grading on the next class day after the last day they are performed. Handing them in to me late will result in a penalty (grade reduction) of 20% for each day after the due date.

• Part of the lab grade will come from your grade on the handouts called Activities; some lab activities, called pre-labs, usually consist of problems like the homework problems, but which deal will material explicitly preparing the student for a lab. The same penalty for turning in labs late applies to turning in the pre-labs and activities late.

Format for Experimental Reports (FORMAL WRITE-UPS):

Name
Group’s Name

1. Title of Experiment
2. Purpose
3. Procedure (brief description of what you did)
4. Data and Results (include in this all graphs, sample calculations of relevant quantities like % errors etc.)
5. Conclusions
ABINGTON COLLEGE ACADEMIC INTEGRITY POLICY

Any form of cheating on exams or quizzes will be dealt with harshly. From me it will result in a grade of F for the course, and it may also result in possible expulsion from the University. All electronic devices (cell phones, calculators) are forbidden for use in exams unless stated to the contrary by me.

Academic integrity is the pursuit of scholarly activity in an open, honest, and responsible manner. Academic integrity is a basic guiding principle for all academic activity at the Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University’s Code of Conduct states that all students should act with personal integrity, respect other students’ dignity, rights, and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation, or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others. The following practices constitute, for the purpose of this policy, violations of academic integrity:

* Cheating
* Submitting previous work
* Copying on a test
* Tampering with work
* Plagiarism
* Ghosting
* Acts of aiding and abetting
* Altering exams
* Unauthorized possession
* Computer program theft

A student caught committing any of these violations will be subject to a sanction ranging from a document official warning to failure of the course. In extreme cases, failure due to violations of academic integrity will be noted on the student’s official transcript as an XF and become part of his or her permanent record. A student has the right to contest an instructor’s accusation and/or sanction and may seek a hearing before the College Academic Integrity Committee. For additional details, go to the following website: www.psu.edu/dept/tlc/events/integrity.html