Syllabus for Physics 273, Fundamentals of Physics II: Electricity and Magnetism
Spring Semester, 2012
Section 1: MWF 9:00 – 9:50, Cole 100
Section 2: MWF 1:00 – 1:50, Davis 309
TLC: MWF 12:00 – 12:50, Davis 116
Instructor: Dr. Suzanne Willis
Office: Faraday Hall 218
swillis@niu.edu
815-753-6481
Office Hours: Daily 10:00 - noon, and by appointment

Course Textbook: Physics for Scientists & Engineers with Modern Physics (4th edition)
Author: Giancoli
You can buy either the two-volume edition (Volume 1 for PHYS 253 and Volume 2 for PHYS 273) – this will cost more in total but the books don’t weigh as much – or the one-volume edition which covers both PHYS 253 and PHYS 273 and is very heavy. Used textbooks are fine.

Homework: Homework will be done online through Sapling Learning, http://www.saplinglearning.com/. It will cost you $20 for the semester, but is not tied to any particular textbook; this means you can buy a used version of the textbook, or even an earlier edition. This is an excellent homework system, with extensive hints and help. Codes are available in the bookstore if you need to use financial aid to sign up. If you can’t pay right away, let Sapling know and they will sign you up on a trial basis for a couple of weeks.

1. Go to http://saplinglearning.com

2. a. If you already have a Sapling Learning account, log in, click "View Available Courses", then skip to step 3.
b. If you have Facebook account, you can use it to quickly create a Sapling Learning account. Click "create account" located under the username box, then click "Login with Facebook". The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and time zone, accept the site policy agreement, and click "Create my new account". You can then skip to step 3.
c. Otherwise, click "create account" located under the username box. Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.

3. Find your course in the list (listed by school, course, and instructor) and click the link.

4. Select your payment options and when prompted, enter the enrollment key. For Section 1, the key is 621901. For Section 2, the key is 912602. For the TLC, the key is 291603.

5. Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.

6. During sign up - and throughout the term - if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The
Sapling support team is almost always more able (and faster) to resolve issues than your instructor.

Coverage (see Blackboard for the lab schedule):

Week 1, 1/18 – 1/20: Chapter 21.1 – 21.6. Static electricity; electric charge; insulators and conductors; induced charge; Coulomb’s Law; electric fields.

Week 2, 1/23 – 1/27: Rest of Chapter 21. Calculating electric fields; field lines; electric fields and conductors; motion of charged particles in electric fields; electric dipoles.

Week 3, 1/30 – 2/3: Chapter 22; Chapter 23.1 – 23.6. Electric flux; Gauss’s Law; Electric potential energy and potential difference, and their relation to electric field; calculating electric potential; equipotential surfaces

Week 4 beginning, 2/6: Rest of Chapter 23. Electrostatic potential energy.

Exam 1, Chapters 21-23: Wednesday, February 8

Week 4 end, 2/10: Chapter 24.1 – 24.2. Capacitors; calculating capacitance.

Week 5, 2/13 – 2/17: Rest of Chapter 24; Chapter 25.1 – 25.3. Capacitors in series and parallel; electric energy; dielectrics; batteries; electric current; Ohm’s Law.

Week 6, 2/20 – 2/24: Rest of Chapter 25. Resistivity; electric power; alternating current; drift velocity.

Week 7, 2/27 – 3/2: Chapter 26. EMF; resistors in series and parallel; Kirchhoff’s rules; EMFs in series and parallel; RC circuits; electric hazards.

Exam 2, Chapters 24-26: Monday, March 5.

Week 8, 3/5 – 3/9: Chapter 27.1 – 27.4. Magnetic fields; force on electric current; force on electric charge.

Spring Break!

Week 9, 3/19 – 3/23: Rest of Chapter 27; Chapter 28.1 – 28.4. Torque on a current loop; magnetic dipole moment; properties of the electron; magnetic field due to straight wire; force between parallel wires; Ampère’s Law.


Week 11, 4/2 – 4/6: Chapter 29.1 – 29.6. Induced EMF; Faraday’s Law; Lenz’s Law; electric generators; back EMF; eddy currents; transformers.

Week 12 beginning, 4/9. Rest of Chapter 29. Changing magnetic flux produces electric field.

Exam 3, Chapters 27-29: Wednesday, April 11.


Week 13, 4/16 – 4/20: Chapter 30.3 – 30.6. Energy in magnetic field; LR circuits; LC circuits; oscillations; LRC circuits.

Week 14, 4/23 – 4/27: Rest of Chapter 30; Chapter 31.1 – 31.5. AC circuits and resonance; changing electric fields produce magnetic fields; displacement current; Gauss’s Law for magnetism; Maxwell’s equations; electromagnetic waves and their speed.

Week 15, 4/30 – 5/2: Rest of Chapter 31. Light; electromagnetic spectrum; speed of light; energy
in electromagnetic waves; Poynting vector.

**Final Exam, Chapters 30-31 and comprehensive** (according to the exam schedule, [http://www.reg.niu.edu/regrec/dates/fall/standardexams.shtml](http://www.reg.niu.edu/regrec/dates/fall/standardexams.shtml); exams take place in the regular classroom):

**Section 1: Wednesday, May 9, 8 – 9:50 am, Cole 100**
**Section 2: Wednesday, May 9, noon – 1:50 pm, Davis 309**
**TLC: Monday, May 7, 12:00 – 1:50 pm, Davis 116**

Homework assignments and their due dates can be found on the Sapling Learning site, [http://www.saplinglearning.com/](http://www.saplinglearning.com/). Please note that late homework will not be accepted.

There will be interactive exercises during class, and these will count towards your grade.

You will be encouraged to form small study groups. You may work on your homework with your study group, although you should each submit your own solutions. You may also do the in-class work with your study group, so be sure to sit together.

All exams are closed book, and closed notes. Calculators will be allowed for exams; you should have a scientific calculator that is not a graphing calculator or part of another device such as a smart phone. If you have questions about your calculator please ask the professor.

**Grading:**

Lecture grade:
- Homework 10%
- In-class exercises 20%
- Exams 1, 2, and 3 15% each
- Final exam 25%

Lecture grade will make up 75% of the final grade

Lab will make up 25% of the final grade. YOU MUST PASS THE LAB IN ORDER TO PASS THE COURSE. Your lab TA will have details about grading the lab portion of the course. Details about the labs can be found here:

**There are Physics Tutors available in Faraday Hall Room 251.**

**If You Need Physics Help**

If you need help, here is what you should do:
1. Ask the professor! This is why we have office hours. We are always happy to help you understand physics.
2. Ask your lab TA, particularly about questions involving the lab.
3. Go to the physics help room. It is staffed by physics graduate students.
4. There are tutoring services available at several locations around campus. See [http://www.niu.edu/access/guide/CampusResourceGuide.pdf](http://www.niu.edu/access/guide/CampusResourceGuide.pdf) for a complete list.
Disabilities

If you have specific physical, psychiatric or learning disabilities and require accommodations, please let me know early in the semester so that your learning needs may be appropriately met. You will need to provide documentation of your disability to the Center for Access-Ability Resources (CAAR), located on the 4th floor of the University Health Service, 753-1303.

Academic Misconduct

Academic misconduct is defined in the Student Code of Conduct as receipt or transmission of unauthorized aid on assignments or examinations, plagiarism, unauthorized use of examination materials, or other forms of dishonesty in academic matters. Sanctions vary; the instructor has the right to impose sanctions up to assigning a grade of F for the course.

Make life easier on all of us – don’t cheat! If you do, I will not overlook it. If you need help with anything, please ask.