

**PHYS 273 TLC – Fundamentals of Physics II: Electromagnetism
Spring 2017**

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Text: Katz, *Physics for Scientists and Engineers: Foundations and Connections*, 1st Ed. (Cengage)

As part of the online homework system for the course, you will have access to an electronic version of the textbook. The publisher has also agreed to provide a printed version for minimum cost: <http://www.cengagebrain.com/course/2048207>

You can also purchase the textbook on your own. You will only need “Volume 2” for this course. Make sure to get the 1st Edition, and not the “Advance Edition”. (Note: if you still have the full version of the Giancoli textbook from PHYS 253, you will still need this textbook if you will be taking PHYS 283.)

We will be using *Enhanced WebAssign* as an online homework portal. We are engaging in a pilot of this (new) textbook and online portal, so it will be provided free of charge. You can register on the WebAssign site with the course code “niu 2054 4779”.

Course description: PHYS 273 is the second semester of calculus-based general physics covering physical laws governing electrostatics, electrodynamics, circuits, magnetostatics, and Maxwell’s equations. This includes concepts of electric charge, electric fields, magnetic fields, inductance, and both direct current and alternating current circuits. There is one three-hour laboratory a week.

The MATH 230/PHYS 273 themed learning community is a unique opportunity for engineering students. Students are simultaneously enrolled in both Calculus II and General Physics II and the course schedules have been adjusted to ensure that students have covered the needed topics in calculus. In addition, several special activities will occur during the semester.

Course objectives:

By the end of the course, students will be able to

1. Analyze and solve problems or situations involving fundamental physics principals in the areas of electricity, magnetism, electromagnetism, and circuits.
2. Use appropriate mathematical techniques and concepts to obtain quantitative solutions.
3. Describe, calculate, and visualize an electric field and calculate the force in it.
4. Describe, calculate, and visualize a magnetic field and calculate the force in it.
5. Describe and understand basic electronic elements such as resistor, capacitor, and inductors.
6. Use Maxwell's equations and understand their implications.

Expectations:

Students are expected to attend both the lecture portion of the course (MWF 2-2:50pm in Faraday Hall 238) and the lab section (Tu 6:00-8:50pm in Faraday Hall 105). All assignments need to be completed and turned in on time. Significant additional resources and help outside of class are available and as college students it is your responsibility to seek out these resources if you are having difficulty in the course. For example, there is a physics help room (Faraday Hall 251), your lab TA, and the peer leader for the course. Cell phones and all other electronic devices must be silenced during class.

Course information will be disseminated through the Blackboard site (<http://webcourses.niu.edu>).

Attendance:

Students are expected to attend all class meetings. If there are any extenuating circumstances, arrangements need to be made in advance of the absence with the instructor (for the lecture sessions) or the TA (for the lab section). Many studies have shown that the single biggest predictor of success in college is attending classes!

Assignments and Grading:

Your grade will be determined from a combination of in-class activities, homework, labs, quizzes, tests, and the final. There will be approximately one homework assignment, one in-class assignment, and several pre-lecture assignments per week. These assignments and the due dates will be announced in class and will be posted on blackboard. Each lab will have an associated assignment which is due at the beginning of the next week's lab session. There will be frequent in-class quizzes during the lecture sessions. These quizzes cannot be made up if you miss class. There will be three in-class exams during the semester. Finally, there is a comprehensive final exam.

Your final grade for the course will be made up of 25% for the lab portion and 75% for the lecture portion. The lecture portion of your grade will be composed of 30% from quizzes, homework, and in-class activities, 15% for each of the three tests, and 25% for the final.

IMPORTANT NOTE: YOU MUST PASS THE LABS TO PASS THE COURSE. THAT IS, YOUR CUMULATIVE SCORE ON THE LABS MUST EXCEED 60% OR YOU WILL RECEIVE A FAILING GRADE FOR THE COURSE.

The tentative grading scale will be:

A: 93% and higher

A-: 90-92%

B+: 87-89%

B: 83-86%

B-: 80-82%

C+: 77-79%

C: 70-76%

D: 60-69%

F: below 60%

Late assignments will be accepted up to two days (48 hours from the original deadline) late for a 25% penalty. Assignments will be accepted up to one week late for a 50% penalty. No assignments will be accepted more than one week after the original due date.

Themed Learning Community (TLC) Policy

This course is part of a Themed Learning Community, meaning it is intentionally paired with one or two other courses taken in conjunction with one another. It is required that you are enrolled in **ALL TLC** courses simultaneously in order to benefit from the unique learning opportunity created by these bundled courses. If, for some reason, you wish to drop one of your TLC courses, you must drop all of the courses that make up this TLC. Students are responsible for seeking additional guidance from their TLC instructors or the Office of Student Engagement and Experiential Learning (OSEEL) regarding possible withdrawal from TLC courses. Along with the benefits of integrative coursework, TLC students will also benefit from additional mentoring, academic support, and additional co-curricular opportunities.

Course Schedule

This schedule is tentative and subject to change.

| Week | Topic | Chapters | Lab | |
|----------------------|--------------------------------------|-----------------|------------------------|---|
| Week 1 Jan 16 | Electrostatics, Coulomb's Law | 23 | Pre-assessment | <i>MLK Day</i> |
| Week 2 Jan 23 | Electric Field, Gauss' Law | 23, 24 | TBA | |
| Week 3 Jan 30 | Gauss' Law, Electric Potential | 25, 26 | Electrostatics | |
| Week 4 Feb 6 | Potential Difference | 26 | Electric Fields | |
| Week 5 Feb 13 | Electric Field and Potential | 26 | Ohm's Law | Test 1 |
| Week 6 Feb 20 | Capacitors and Dielectrics | 27 | The Oscilloscope | |
| Week 7 Feb 27 | Electric Current, Ohm's Law | 28 | The Oscilloscope II | |
| Week 8 Mar 6 | EMF, DC Circuits | 29 | Capacitors | Test 2 |
| Mar 13 | | | | <i>Spring Break</i> |
| Week 9 Mar 20 | RC Circuits, Magnetism | 29, 30 | Kirchoff's Rules | |
| Week 10 Mar 27 | Magnetic Fields and Forces | 30 | Magnetic Fields | |
| Week 11 Apr 3 | Ampere's Law | 31 | Faraday's Law | |
| Week 12 Apr 10 | Magnetic Fields in Materials | 31 | AC Resonance | Test 3 |
| Week 13 Apr 17 | Faraday's Law of Induction | 32 | TBA | |
| Week 14 Apr 24 | Inductance, AC Circuits | 33 | TBA | |
| Week 15 May 1 | Maxwell's Equations | 34 | Post- assessment | |
| Finals Week May 8 | | | | Final exam is Monday, May 8 from 2-3:50pm |

Accessibility: If you need an accommodation for this class, please contact the Disability Resource Center as soon as possible. The DRC coordinates accommodations for students with disabilities. It is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu.

Also, please contact me privately as soon as possible so we can discuss your accommodations. The sooner you let us know your needs, the sooner we can assist you in achieving your learning goals in this course.

Academic Integrity: As detailed in the current NIU undergraduate catalog: *Good academic work must be based on honesty. The attempt of any student to present as his or her own work that which he or she has not produced is regarded by the faculty and administration as a serious offense. Students are considered to have cheated if they copy the work of another during an examination or turn in a paper or an assignment written, in whole or in part, by someone else. Students are responsible for plagiarism, intentional or not, if they copy material from books, magazines, or other sources without identifying and acknowledging those sources or if they paraphrase ideas from such sources without acknowledging them. Students responsible for, or assisting others in, either cheating or plagiarism on an assignment, quiz, or examination may receive a grade of F for the course involved and may be suspended or dismissed from the university.*

*A faculty member has original jurisdiction over any instances of academic misconduct that occur in a course which the faculty member is teaching. The student shall be given the opportunity to resolve the matter in meetings with the faculty member and the department chair. If the facts of the incident are not disputed by the student, the faculty member may elect to resolve the matter at that level by levying a sanction no greater than an F for that course. The faculty member shall notify the student in writing whenever such action is taken, and the **Office of Community Standards and Student Conduct** shall receive a copy of the Academic Misconduct Incident Report indicating final disposition of the case, which will be placed in the student's judicial file. In all matters where the charge of academic misconduct is disputed by the student or if the faculty member feels a sanction greater than an F in the course is appropriate (such as repeated offenses or flagrant violations), the faculty member shall refer the matter to the Office of Community Standards and Student Conduct making use of the Academic Misconduct Incident Report. Additional sanctions greater than an F in a course can be levied only through the University Judicial System. With regards to finding the student either responsible or not responsible for his or her action, the ruling of the Judicial Hearing Board shall be binding. In cases where there is either a finding of responsibility or an admission of responsibility by the student, any recommendations by the hearing board regarding the course grade are non-binding on the instructor, who remains solely responsible for assigning a course grade, consistent with the policies set forth in the course syllabus.*