

Prerequisite: PHY 2130**Co-requisite:** PHY 2141 Lab

Lecture : MWF 9:30 a.m. to 10:20 a.m. Rm 2009 Science hall

Discussion : Lecture Lab (LL) sessions

| Section | Day/time | Location | TA |
|----------------|----------------------|------------|---------|
| QUIZ 001 25976 | 9:30 - 11:20 T 64 | Manoogian- | Rijal |
| QUIZ 002 25977 | 10:30 - 12:20 W 64 | Manoogian | Bashiri |
| QUIZ 003 25978 | 10:30 - 12:20 M 43 | Manoogian | Bashiri |
| QUIZ 004 25979 | 10:30 -12:20 F 116 | Main | Rijal |
| QUIZ 009 26521 | 9:30 - 11:30 Th 0020 | Manoogian | Bashiri |

Text: College Physics, Serway and Vuille, 10th edition, Cengage Learning**Instructor:** Prof Karur R Padmanabhan**Office:** 364 Physics building**Phone:** (313) 577 -3005**E mail:** ad2639@wayne.edu

Office Hours: M W 11:30 pm. – 1:30 pm. or by an appointment

Goal: The goal of this course, which is the traditional goal in Physics, is that you be able to apply basic physical laws to analyze real-life or unstructured situations (“word problems”), both descriptively and numerically, at least for the aspects covered in this course. You should be able to analyze both existing situations and situations that you or someone else may want to construct. Research and experience indicate that, to get to this point, you also need to be able to:

- State and paraphrase definitions and laws, and apply them in simple cases
- Have opportunity to practice, with feedback (e.g. homework) before exams.

Consequently, homework, quiz and conceptual questions will be included.

Course Objective: This is a four credit course that must be taken concurrently with the one credit lab, PHY 2141. The goal is to familiarize the student with the fundamental concepts Electricity and Magnetism, Electromagnetic waves leading to the study of Optics and Modern Physics. Together with the lab course, this course will help you appreciate how people make scientific discoveries and how physics is applied to the real world.

Course Description: This is a relatively new way to teach physics that combines a variety of classroom demonstrations, class room lectures and associated Lecture Lab (LL). discussion section. LL method uses team (peer) instruction methods to allow students to work in groups to solve problems or perform simple experiments to provide conceptual insights into the material. Research has shown that active learning is more effective than passive (which is what you have in lectures). In particular, this hybrid method has been shown to improve problem solving skills, conceptual understanding, students' attitudes toward the subject, and to reduce failure rates. This method is being introduced all over

the country, not only in physics, but also in other fields. Hands-on group activities, discussions, demonstrations, and experiments, are combined with regular reading assignments and weekly homework

Lectures and Reading Assignments: The tentative schedule of lectures and reading assignments for the course is given on page 7. In order to learn from and participate in the discussion of the material covered during the lecture and in the discussion Lecture Lab (LL) section, it is very important for you to do the reading assignment **before coming** to class. There may be graded reading assignments before and /or during lecture and in discussion section.

LL discussion Sections: Discussion sections meet once a week and are important because they give you an opportunity to meet in smaller groups to ask questions, discuss homework assignments and some practice problems. You are expected to do the homework that relates to the material covered during the week prior to each discussion class. LL instructors and peer mentors are there to help students understand the problems and learn problem solving skills. However, they may not have time to do all the problems in detail, but they may do few examples instead. Also, you will be given short quizzes in the LL class (usually at the end), which will have questions and problems similar to your homework assignments. You will have the opportunity to **earn up to 18.5% of the points towards your course grade** for the performance of the LL sections. No make-up quizzes will be given.

Approach: This is an integrated lecture/Lecture lab (LL) course with some lecturing and some group work. Like a class in English Literature, you are expected to read the course material in order to prepare for each class. The majority of LL time will be spent on activities to help you to learn, understand, and apply the material from the readings. The course will emphasize rigorous problem solving in physics using interactive instruction, some computer simulations, and cooperative learning. LL time will require students to be responsive, to think, perform hands-on tasks and complete the work sheets. Good preparation is essential for successful classroom activities. If you devote a reasonable amount of time each day to studying physics, you will be in a position to attack class activities and physics problems efficiently, based on a clear understanding of the fundamental physical principles that underlie all successful analyses. Please note that attending and completing work sheets and quizzes LL sessions for the whole semester is a requirement to get a grade in the course.

Collaborative Work: Contrary to the common perception, scientists and engineers tend to work more in group than alone. Social interactions are critical to their success. Most good ideas grow out of discussions with colleagues. This course encourages collaborative teamwork, a skill that is valued by most employers of scientists, engineers, and technicians. As you work and study together, you will help your partners to get over confusions, ask each other questions, and critique your group homework and lab write-ups. In other words, you will teach each other! You can learn a great deal by teaching your teammates.

While collaboration is the rule in technical work, evaluation of individual performance also plays an important role in science and engineering. Individual quizzes, tests, and exams are to be done without help from others; group quizzes and test problems are to be done only with members of your group or team

Homework: Textbook homework assignments are done through WebAssign, while (occasional) special assignments are to be submitted on paper. *You will have new WebAssign homework assignment each week.*

- **Assignments:** WebAssign access card. WebAssign is an online homework system, at www.webassign.net. A two-semester WebAssign access card is included in the price of a new textbook purchased at the BN campus bookstore, or, if you are not getting a new textbook from this bookstore, available separately from the Barnes and Noble campus bookstore. Or, pay online at www.webassign.net. If you pay online, make sure to select the above Halliday, Resnick and Walker 10th edition. There is a link to WebAssign on the Blackboard website for this course.

Each week (except for Exam weeks), five to seven WebAssign problems will be assigned for credit. The credit problems for each week are due that Sunday. For example, the homework covering parts of Chapter 21 during first week is due Sunday Sept. 11, 2016, 11.59 PM. The credit problems can be discussed in a general way in the LL Sections, but not worked out to a final numerical answer, while the non-credit problems can be worked out in LL Sections including a final numerical answer. You “do” a WebAssign problem by logging in to the WebAssign site (www.WebAssign.net), reading the problem, working it out on the side, and entering the answer in the website. I allow you 5 tries for each problem, to get the answer right. You will lose 5% for each attempt after the first.

Your Webassign account will be set up by the start of classes. Your login information is:

- UserID: First initial and full last name, up to a maximum of seven characters, excluding any special characters such as periods or dashes. For example, my name is Karur Padmanabhan, so my User ID would be kpadman
- Institution: wayne (just that, not Wayne State University or anything else)
- Password: Access ID, for example ad2639 for me, since my WSU email address is ad2639@wayne.edu.
- If you already have user ID and PW, you may need a class access key. This will be posted on blackboard by first week in September.

For additional help with WebAssign, see “Using WebAssign” under “Content” on Blackboard, the non-credit assignment on WebAssign, “Intro to WebAssign 2011-2012,” and the online WebAssign help.

Lately it has become possible to "buy" or 'Google' homework solutions. This practice is unethical and if anyone is found to be using these services, he/she will be recommended for appropriate action by the Office of Student Conduct. This policy also extends to quizzes, tests, and examinations. In any such case, an F will be "awarded". Note that there are legitimate solutions manuals that you may want to purchase. These are very helpful if they are used properly.

Because these solutions are so prevalent, the overall grading values for homework assignments may be reduced if this type of activity is suspected. This does not reduce the importance of doing these assignments because the WebAssign problems, or problems similar to them, have a nasty habit of showing up on examinations.

Missing Class or Homework due to Excused Absences: Attendance is mandatory and will be taken every day for all lectures and LL sessions. Consecutive absences in excess of two will imply in a penalty in the computation of the final grade: for every extra missed class, 5 points will be subtracted from your total score (in a scale from 0 to 100). In general, there are four acceptable excuses for missing class: illness or medical emergency, family emergencies, religious holiday, and approved university activities (varsity sports, required club function, etc.). You are not penalized for excused absences. Advance notice is required for religious holidays and approved university activities. When possible, advance notice for family emergencies is appreciated. Since our classes starts in the morning, make sure you can make it to campus in time. Attendance will be taken in lecture no later than 09:40 AM. Later arrivals beyond 10 AM will be counted as absences.

Cell phone use: *Texting, Internet browsing, or cell phone conversations will not be allowed during class.* Cell phones should be turned off or put in silent mode. Smartphones may be used as calculators or for e-book access only when allowed by the instructor. Homework webassign problems absolutely should not be accessed or answered during lectures. Checking email, Facebook, or any other social media will not be allowed during class. If you need to make an emergency call, step out of the classroom after informing the instructor.

Class Notes: PowerPoint notes (if presented) for each lecture class will normally be available on the Blackboard website for this course **after** the class for you to review and print.

Non credit problems: Each chapter will also have assigned non credit problems. These Problems are for practice. They will not be collected or graded. Your LL instructor may help you solve some of the problems in your LL sections.

NOTE 1 ON HOMEWORK AND EXAM PROBLEMS: The Exams will be mostly problems (plus a few definitions, formula statements and so forth). There is NO WAY that you will be able to do the problems on the Exams without practicing doing problems ON YOUR OWN, First you might want to know how to solve each assigned homework problem but it is possible at least some of the Exam problems will be of types that you have not exactly seen before. Your goal should be to understand how to apply the basic theories to solve problems. If you can apply the basic theories, on your own, then you should be able to do all of the Exam problems. Normally it is a good practice to time yourself in solving each problem since most of the exam questions may not require more than maximum of 10 minutes for the correct answer.

NOTE 2 ON HOMEWORK PROBLEMS AND EXAMS: Normally, you must complete the homework assignments covered on an exam with a minimum average of 75 by the time of the exam review session, in order to qualify for taking the exam. If you miss this requirement, take the exam anyway and your grade will be counted when you bring the homework average up to 75. Note that you will have to ask to have the homework assignments opened up for you.

EXAMS: There will be three 60-minute exams in class, consisting mostly of multiple choice questions along with some free response type problems. Where appropriate, it will be at the discretion of the instructor to consider replacement of a low score in one of the mid-term exam with half the points of the final exam. It is not automatic and not to be decided by the student. All 3 mid-term, homework, discussion section work and final exams must be completed to get a final grade. You **MUST** bring your Wayne State ID to the exam and present it to a proctor when asked during the exam. **A group photograph of the class may be taken during each exam.** No electronic devices (other than a calculator) are allowed in the room during the exam (**no iPods, headphones, cell-phones, smart phones, Blackberries, etc.**). You will need a stand-alone calculator (“standalone” excludes calculators on cell phones, for example). Graphing calculators or other calculators with communications capacity will not be allowed. ***NO MAKE-UP EXAMS WILL BE GIVEN.* Final exam is cumulative for all sections. Absolutely do not schedule any vacation travel before and on the day of the Final Exam.** Generally, emails will receive no response after the final exam until after final grades are recorded.

GRADING: Your course grade will be determined by your performance on the three hour Exams, Online Homework, LL Discussion Section results and the Final Exam. The Final Exam will cover the material presented during the entire semester. The overall course grade will be determined on the basis of the following distribution:

| | |
|---|-------------------|
| Three In-class 60 Minute Exams (100 points each) | 300 points |
| Quizzes, LL attendance /group work in LL sections | 130 points* |
| Final Exam | 200 points |
| Webassign homework | 70 points |
| Total | 700 points |

* 80 points quiz, 20 points attendance, 30 points discussion section work & participation

| Percent | Grade |
|---------|-------|
| 91-100 | A |
| 85-90 | A- |
| 80-84 | B+ |

| | |
|-------|----|
| 75-79 | B |
| 70-74 | B- |
| 65-69 | C+ |
| 60-64 | C |
| 55-59 | C- |
| 50-54 | D+ |
| 45-49 | D |
| 40-44 | D- |
| 0-39 | F |
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ADDITIONAL STUDY HELP: If you have difficulty doing homework or lab work, or understanding some of the course material, you can get help from the *Physics Resource Center*, in room 172 Physics Building. The center will open a couple of weeks after the beginning of the semester.

Honors Credit: If you are requiring Honors Credit, please contact the instructor by the end of first week of September.

Accommodation: If you feel that you may need an accommodation based on the impact of a disability, please feel free to contact me privately to discuss your specific needs. Additionally, Student Disability Services (SDS, formerly the Office of Educational Accessibility Services), coordinates reasonable accommodations for students with documented disabilities. The office is located in 1600 UGL, phone: 313-577-1851 (Voice) / 577-3365 (TTY), web site <http://studentdisability.wayne.edu/>.

Responsibility for Work: Whether on homework or an exam, I will never take seriously a statement such as, “but that’s how (another student or someone in the Resource Center or anyone else) told me to do it.” Your work is your own, and you should always try to tie the solution back to the fundamental laws. You can always check with me.

SCHEDULE OF CLASSES*

| Wk | # | Date | Day | Topics | Ch, Sec |
|----|----|-------|------|--|-----------------|
| 1 | 1 | 01/09 | Mon | Preliminaries, Attendance class #, Webassign, Discussion section, Charge | 15.1-2 |
| | 2 | 01/11 | Wed | Introduction, Charge, Coulomb's Law, vectors , | 15.3-15.4 |
| 2 | 3 | 01/13 | Fri | Electric Field, motion of charges, electrostatics, Gauss's Law | 15.5-15.9 |
| | 4 | 01/16 | Mon | No Class (Holiday) | |
| | 5 | 01/18 | Wed | Electric potential and Electric potential energy | 16.1 -16.5 |
| 3 | 5 | 01/20 | Fri | Capacitance, E and charge of capacitor, combination of capacitors | 16.6- 16.9 |
| | 6 | 01/23 | Mon | Dielectrics, energy in capacitor, current, resistance, EMF | 16.10 -17.2 |
| | 7 | 01/25 | Wed | Kirchhoff's Rules, series and parallel circuits, circuit analysis | 17.3 -17.8 |
| 4 | 8 | 09/27 | Fri | Power and energy in circuits, I and V measurements, RC circuits | 18.1-18.5 |
| | 9 | 01/30 | Mon | Magnetic field, Magnetic forces on particles | 19.1-19.2 |
| | 10 | 02/01 | Wed | Motion of charged particle in B field, Charges in E and B fields, | 19.3-19.4 |
| | 11 | 02/03 | Fri | Mag force on a current carrying conductor, Torque on a loop | 19.5 -19.6 |
| 5 | 12 | 02/06 | Mon | Exam-1 | 15-19.4 |
| | 13 | 02/08 | Wed | Magnetic force on parallel conductors, loops and solenoids | 19.7-19.9 |
| | 14 | 02/10 | Fri | Motional emf, Faraday's law | 20.1-20.3 |
| 6 | 15 | 02/13 | Mon | Lenz's law | 20.3 |
| | 16 | 02/15 | Wed | Problems on Faraday's law and Lenz law | |
| | 17 | 02/17 | Fri | Inductance and RL circuits, Motors and generators, problems | 20.5-20.7 |
| 7 | 18 | 02/20 | Mon | AC Circuits, Transformer | 21.1-21.4, 21.7 |
| | 19 | 02/22 | Wed | Electromagnetic radiation waves and their speed | 21.7 |
| | 20 | 02/24 | Fri | Maxwell's equations, Electromagnetic radiation and transport | 21.8-10 |
| 8 | 21 | 02/27 | Mon | Doppler Effect | 21.11-13 |
| | 22 | 03/01 | Wed | Light rays, Reflection and Refraction, Dispersion, TIR | 22.1-22.7 |
| | 23 | 03/03 | Fri | TIR, | |
| 9 | 24 | 03/06 | Mon | Images formed by plane and spherical mirrors Ray Diagrams, | 23.1-.4 |
| | 25 | 03/08 | Wed | Problems on spherical mirrors and lenses | 23.4 -6 |
| | 26 | 03/10 | Fri | Hour Exam-2 (19.5-22) | |
| 10 | | 03/13 | Mon | No Classes, Spring Break Week | |
| | | 03/17 | -Fri | | |
| | 27 | 03/20 | Mon | Wave optics, Interference, Interference in thin films, problems | 24.1-25.4 |
| 11 | 28 | 03/22 | Wed | Diffraction by a single slit, diffraction gratings, polarization, | 24.6-9 |
| | 29 | 03/24 | Fri | Diffraction by a single slit , diffraction gratings | 24.6-25.7 |
| | 30 | 03/27 | Mon | quantization of electromagnetic radiation, Photoelectric effect | 27.1-27.2 |
| | 31 | 03/29 | Wed | X-Rays | 27.3-27.4 |
| | 32 | 03/31 | Fri | Compton scattering | 27.5-27.6 |

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|----|----|--------------|-----|---|-----------|
| 12 | 33 | 04/03 | Mon | Wave-particle duality Matter waves, Uncertainty principle | 27.7-8 |
| | 34 | 04/05 | Wed | Atomic Physics, Model of the atom, atomic spectra | 28.1-28.3 |
| | 35 | 04/07 | Fri | Quantum mechanics of hydrogen atom, electron configurations, Pauli's principle | 28.4-28.6 |
| 13 | 36 | 04/10 | Mon | Hour Exam-3 | |
| | 37 | 04/12 | Wed | Atomic transitions and Lasers | 28.7 |
| | 38 | 04/14 | Fri | Nuclear physics, nuclear structure, nuclear binding energy Nuclear stability and energy levels | 29.1-2 |
| 14 | 39 | 04/17 | Mon | Radioactivity, Decay rates and half lives | 29.3-4 |
| | 40 | 04/19 | Wed | Radioactivity (cont.), problems | |
| | 41 | 04/21 | Fri | Problems on chapter 29 | |
| 15 | 42 | 04/21 | Mon | Cumulative Review | |
| | | 04/28 | Fri | ** Final Exam, Friday, April 28, 2:45 to 4:45 PM, Gen Lec 150 | |

**The date, time and location of the exam will be confirmed again in class in advance and posted on blackboard.

* Schedule subject to changes

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