

**Prerequisite:** High school algebra and trigonometry, **Co-requisite:** PHY 2131 Lab

**Lecture:** T,TH 6:00 PM to 7:20 PM, Rm 1125 Science Hall

**Discussion:** Lecture Lab (LL) sessions

006 16655 4:05 - 5:55 TH 0135 State Arthur Bowman

007 16657 4:05 - 5:55 T 0324 State Arthur Bowman

009 12698 7:30 - 9:20 T 0319 State Christopher Zin

012 13095 7:30 - 9:20 TH 0123 State Arthur Bowman

**Text:** College Physics, Serway and Vuille, 10<sup>th</sup> edition, Cengage Learning

**Instructor:** Prof Karur R Padmanabhan

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**Office hours:** MW 11 AM -12 Noon

T, 4:30 to 5:30 PM, TH 4:45PM to 5:30 PM

**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 2131. The goal is to familiarize the student with the fundamental concepts and methods of mechanics, wave motion, and thermal 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). 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. Group activities, discussions, simulation of experiments and some lecture demos are combined with regular reading assignments and weekly

**Lectures and Reading Assignments:** The tentative schedule of lectures and reading assignments for the course is given on page 6. 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 class.

**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 25% 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, and complete the work sheets. Good preparation is essential for successful classroom activities. If you devote a reasonable amount of time (minimum 40 minutes) 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](http://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](http://www.webassign.net). If you pay online, make sure to select the above College Physics, Serway and Vuille, 10<sup>th</sup> 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 1, 2 during first week is due Sunday September 6, 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](http://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:

- User ID: 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](mailto: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, 2 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.

**Cell phone use:** *Texting, Internet browsing on laptops, ipads or cell phone 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 should not 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, please step out of the classroom.

**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 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. You will not be able to earn a grade if you skip the webassign homework.

**EXAMS:** There will be three 60-minute exams in class, consisting mostly of multiple choice questions along with some free response type problems. The lowest exam score **may be** replaced by half of your earned score on the Final Exam **at the discretion of the instructor**. Do not assume this and calculate your grade in the middle of the semester. Therefore, no makeup exams will be given. 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**

**GRADING:** Your course grade will be determined by your performance on the three hour Exams, Online Homework, Quiz 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
<b>Total</b>	<b>700 points</b>

\* 70 points quiz, 20 points attendance, 40 points tutorial work & participation as decided by LL instructor

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

• **SCHEDULE OF CLASSES** (subject to changes)

Week	Day / Date	Topic	Reading Assignment
1	Th 9/1	Intro, units, dimensions, Scientific notation units, measurements sig fig graphs, trig	1.1-1.3 1.4-1.8
2	T 9/6	Displacement, velocity and acceleration Motion in one dimension, constant accn.	2.1-2.3 2.4-2.5
	Th 9/8	Motion of freely falling objects	2.6
3.	T 9/13	vectors, properties, components Displacement, velocity and accn as vectors	3.1,.3.2 3.3
	Th 9/15	Motion two dimension, circular motion	3.4
4	T 9/20	Force and Newton's 1st Law of Motion Newton's 2 <sup>nd</sup> and 3 <sup>rd</sup> laws, contact forces	4.1-4.2 4.3, 4.4
	Th 9/22	Tension, Frictional forces	4.6
5	T 9/27	Applications of Newton's laws Work, work-energy theorem	4.5 5.1, 5.2
	Th 09/29	Gravitational PE, PE of spring	5.3-5.5
6	T 10/4 Th10/6	Power, work and Variable force <b>Exam-1(Ch 1-4)</b>	5.6, 5.7
7.	T 10/11	Impulse, momentum, conservation of mom All about Collision	6.1, 6.2 6.3
	Th 10/13	Uniform circular motion, centripetal accn.	7.4
		Angular motion, angular velocity, accn.	7.1, 7.2
8	T 10//18	Angular and linear quantities Newton's law of gravitation, Kepler's laws.	7.3 7.5, 7.6
	Th 10/20	Torque, equilibrium conditions, CG	8.1 – 8.3
9	T 10/25	Examples/ problems related to equilibrium Torque and angular accn., ang mom, rot KE	8.4 8.5-8.7
	Th 10/27	Matter, density, deformation of solids	9.1 -9.3

10.	T 11/1	Pressure and Buoyant forces	9.5, 9.6
	<b>Th 11/03</b>	<b>Exam-2 (Chapters 5 to 8)</b>	
11.	T 11/8	Fluid in motion, applications Hook's law, spring PE, SHM, Pendulum	9.7, 9.8 13.1-13.5
	Th 11/10	Waves, Properties and speed of waves	13.7-13.11
12.	T 11/15	Sound waves, characteristics, speed, energy	14.1-14.4
	Th 11/17	Standing waves and Doppler effect	14.6-14.8
13.	<b>T 11/22</b>	<b>Exam-3 (Chapters 9-13 and 14)</b>	
	Th 11/24	(No class Thanksgiving Recess)	
14.	T 11/29	Heat and Temperature, Temp scales Ideal gas, Kinetic theory of gases	10.1, 10.2 10.4, 10.5
	Th 12/1	Heat and internal energy, heat exchange	11.1-11.3
15	T 12/6	Latent heat-problems Heat transfer processes	11.4 11.5
	Th 12/8	First and second law of thermodynamics	12.1- 12.4

**\*\*Final Exam      Dec 20 1.20 to 3.50 PM Gen Lecture 100**

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

\* Schedule subject to changes

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.