Syllabus
PHY 102 Major Concepts of Physics Spring 2016

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Office hours
Mondays and Tuesdays, 5:00 - 6:00 PM, otherwise by appointment. I am often in my office (443-8078) or in my laboratory (443-0249). Please call me when you have an emergent problem. You are most welcome to contact me by e-mail. Please do not e-mail me questions that are already answered in this syllabus.

Prerequisite
PHY 101 – Major Concepts of Physics. Exceptions are permitted based on various circumstances.

Lectures
Mondays and Wednesdays, 2:15 – 3:35 P.M., until Monday, May 2 (including).
Lectures will be held in Stolkin Auditorium, Physics Bldg. It is important that you ATTEND and ACTIVELY PARTICIPATE in these lectures. We introduce new ideas, concepts, formalisms, typical homework/conceptual examples, and demonstrate them by demo experiments.

Workshops
Workshops will be held in Room 110, Physics Bldg. Each of you must be registered for a lab meeting (Workshop), which will be scheduled once a week. The labs will provide experiments that reveal and support an idea or a principle that has already been discussed in the lecture. Workshops will provide a unique opportunity for enriching the student understanding about conceptual physics by reinforcing difficult concepts, engaging them in cooperative learning activities, describing applications, and working through example problems.

Textbook:
“Physics” by Alan Giambatista, Betty Richardson, and Robert C. Richardson, Volume 2, Third Edition, McGraw-Hill, 2016. This is a truly outstanding textbook for conceptual physics. Students must use the textbook to supplement their lecture notes.

Quizzes:
There will be six quizzes that will be held during the lecture periods. You will be graded the best five out of these six quizzes. They will be ten to fifteen minutes in length, and will cover material from last two/three lectures and labs, including lecture demonstrations. The date of each quiz will NOT be announced. No make-up quizzes will be given.

Physics Clinic:
The Physics Clinic will be held in Room 112, Physics Bldg. Every member of the staff of PHY 102 is committed to giving you every opportunity to succeed in this class. If you need help, please speak to one of us. We would also be happy to discuss any course topic in more detail, if required. The other members of the PHY 102 staff will announce their Physics Clinic hours shortly.

Grading Policy
You will be evaluated, based upon your commitment and accomplishments in the labs, on the assigned homework, and on the exams and quizzes. The final exam will count as 35%, and the two highest scores on the three in-lecture exams will count as 30%. The lab grade will count as 15%. The homework will count as
10%, and the quizzes will count as 10%. As you can see, the labs, homework and quizzes will make 35% of your grade, highlighting the importance of class attendance and active participation. The lowest homework assignment grade will be dropped; the lowest lab grade will be dropped. This paragraph details how your net numerical grade for the course is computed. From the net numerical grade, a letter grade is derived. The grade limits will not be stricter than the following: 60% for a C-, 80% for a B-, and 90% for an A-.

Exams

The dates of Exams #1, #2 and #3, given in the lecture, are indicated in Timetable (see the web page of the course). The date of the final exam is Wednesday, May 11, 2016, in Stolkin Auditorium, 8:00 A.M. – 10:00 A.M. No make-up exams will be given. All materials taught in this class, including lectures, labs, example homework problems, conceptual examples, and lecture demonstrations are subject to the mid-term and final examinations.

Homework:

The homework assignments will be distributed weekly either on Mondays or Wednesdays. Homework will normally be due on the lab scheduled the following week. Solutions to the homework assignments will be posted online after the problems have been collected. No late homework will be accepted! A deviation from this rule is permitted only in exceptional cases (e.g., you are excused due to an illness etc.). Homework problems are a very important part of the course. The only way to obtain a comprehensive understanding of conceptual physics in a quantitative manner is to practice it as much as possible. Working problems is the only way to obtain a deep clarification of each topic.

Academic Integrity:

We encourage you to find other classmates with whom to study. Working with friends can be very helpful in learning a difficult subject like physics. However, the final work you turn in must be your own. There is a distinction between discussing the work and merely copying someone else's work. The idea here is that you should communicate and help each other to understand the problems and concepts involved; you will learn more, if you work on many assignments in groups as well as explain the methods and various approaches to each other. You must engage in your own effort on solving the problems.

Syracuse University’s Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the policy and know that it is their responsibility to learn about course-specific expectations, as well as about university policy. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first offense by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of Academic Integrity Policy. The standard sanction for a first offense by a graduate student is suspension or expulsion.

For more information and the complete policy, see http://academicintegrity.syr.edu/academic-integrity-policy/
Disability-Related Accommodations:
If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498, TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Religious Observances Policy
SU religious observances policy, found at http://supolicies.syr.edu/emp_ben/religious_observance.htm, recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice/StudentServices/Enrollment/MyReligiousObservances from the first day of class until the end of the second week of class.

The timetable regarding Lectures, Workshops, Exams etc. is presented in several sections of the web page of PHY 102 (Lectures, Timetable/Miscellaneous etc.).

Course secretary Ms. Patricia Whitmore (443-5958) is available in Room 111, Physics Bldg, from 8:00 A.M. to 4:30 P.M. weekdays. She is the person to see for signatures on add/drop forms or for other administrative matters. If she is ever unavailable, please go to the Physics Department Main Office, Room 201, Physics Building, for assistance.

Course description PHY 102 is a continuation of PHY 101 class. The instructor of this course assumes that most of the students have already had an exposure to introductory and conceptual physics via PHY 101, which was taught during the Fall semester. The course is a survey of introductory physics and its applications to an extraordinary large number of sciences, including biology, chemistry, biotechnology, medicine, engineering, nanotechnology, geography and so on. Energy and electromagnetic radiation are the most unifying concepts in PHY 102. Students will learn the following sub-fields of physics (chapters are from "College Physics"):

a. Magnetic Forces and Fields (Chapter 19);
b. Electromagnetic Induction (Chapter 20);
c. Vibrations and Waves (Chapter 22)
d. Electromagnetic Waves (Chapter 22)
e. Light: Geometric Optics (Chapter 23)
f. The Wave Nature of Light (Chapter 25)
g. Quantum Theory and Models of the Atom (Chapter 27)
Quantum Physics (Chapter 28)

Nuclear Physics and Radioactivity (Chapter 29)

Radiation and Its Applications in Biology and Medicine (Chapter 29)

Please be aware that many of the chapters will not be entirely covered, or the course outline will slightly deviate from that of the textbook. In some situations, only a small fraction of the respective chapter will be employed during the lecture time. I will show explicitly in due course which textbook fragments are most relevant for the PHY 102 exams.

Primary goals for this course:

What should you be getting out of your PHY 102 experience? Our primary goals for you are the following:

A. Understand that the laws of nature are a few in number and that a wide variety of phenomena are explainable by postulating just a few principles.
B. Gain the skills to solve quantitative problems and to be able to predict a variety of physical phenomena.
C. Acquire many of the skills necessary for critical thinking. This will be accompanied by a deeper understanding of the spirit of scientific reasoning.

More specific goals are the following:

A. To understand and be able to explain: (i) the nature of light and sound as waves; (ii) interference of waves; (iii) blackbody radiation; (iv) geometrical optics; (v) principles and applications of radioactivity.
B. To be able to answer a variety of conceptual questions, such as those assigned (see Homework assignments).
C. Develop your understanding of physics to such an extent that, after studying a chapter of "Physics," you will be able to answer the conceptual questions and solve quantitative problems given at the end of the chapter.

A note to premeds:

- Persistently use the textbook; this is the reason for which the instructor of the PHY 102 class had to take a tough decision selecting a single book against more than one hundred of conceptual physics texts on the market.
- Each topic covered in PHY 102 is covered on the MCAT exam. The vice-versa is not true.
- Always bear in your mind that every time you study physics and grapple with conceptual questions, you are studying for the MCAT exam.
- You need to solve a problem algebraically first. Then, you insert the numbers.
- Communicating ideas, concepts, formalisms, and examples with your student peers will help you do well on the MCAT exam.

General tips for making PHY 102 a success:

- Most lectures will build on previous material. This rule does not deviate from the general way in which scientific knowledge builds on. For this reason, it is important not to fall behind.
- You will do yourself a favor by scheduling at least 8 hours per week outside of class time and sticking to that schedule.
- The purpose of the lectures is to introduce new concepts and to relate them to more familiar ones. These connections are important. You need to identify these connections, and use them whenever necessary. If you simply memorize
techniques to solve problems, then you will find physics to be a disconnected subject. On the other hand, if you learn to think of physics as governed by just a few rules (e.g., the conservation of energy), then you will find physics to be not only manageable, but also enjoyable.

- Lectures and study assignments set the stage. But only by answering questions and effectively doing the problems does deep understanding arrive. Get help early and often. Falling behind will only make your everyday life with PHY 102 harder.
- Test out your skills in a situation in which you can get feedback!
- Use the Physics Clinic and my office hours.

**Course Fee:**

To support the laboratory and related lecture demonstrations in the co-requisite course, PHY 102, you have been charged a course fee of $30. This fee helps pay for (i) laboratory manuals and other handouts, (ii) supplies, small pieces of apparatus, and maintenance for laboratory of apparatus for lecture demonstrations, and (iii) undergraduate students working in the student and demonstration laboratories.

**We wish you best of success with PHY 102 in spring 2016 semester!**