

## **PHYA22H Summer 2013**

### *Introduction to Physics IIB (Physics for Life Science)*

**INSTRUCTOR: Mr. Gyula Lorincz**

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#### **COURSE DESCRIPTION:**

The course covers the main concepts of Electricity and Magnetism, Optics, Atomic and Nuclear Physics. It provides basic knowledge of these topics with particular emphasis on its applications in life and environmental sciences. It also covers some of the applications of modern physics such as atomic physics and nuclear radiation.

The purpose of this course is to give you an introduction to how scientists think, and how they approach problems. Physics is one of the oldest sciences, and in some ways it is the most simple. Physicists start with a big, messy problem and they first simplify it as much as they possibly can. Only then do they try to analyze the situation. They then gradually introduce more complications, one at a time, until they eventually end up with a very complicated model.

By the end of this course you will be able to use basic concepts from physics to explain and predict simple situations. You will also be able to incorporate several concepts in order to explain and predict what will happen to messy problems which approximate real life situations. Finally, you will be able to describe basic concepts from physics and explain how and when they are useful.

#### **LECTURES:**

Lectures will be videotaped. Recordings should be available until after the final exam. However, there will be an in-class participation grade (using Clickers, see below).

Please respect others, including the professor, in the classroom. Turn your cell phones to silent mode. Do not play 'Angry Birds' or watch TV shows unless you're in the back row where you will not distract others.

Lectures will be structured assuming that you have read the textbook before coming to lecture.

#### **LECTURE NOTES:**

Lecture notes (i.e., slides) will be posted on Blackboard. I will do my best to get them posted by the night before each lecture.

**COURSE MATERIAL:**

*Physics for Scientists and Engineers (2nd edition)* by Knight. Copies are available at the UTSC bookstore. There are a variety of formats (including an e-book). As we will not be using Mastering Physics in PHYA11, you do not need to get a package which includes it. If you get the third edition that should suffice, though page numbers and back of the chapter questions may differ. I will be posting numbers based on the second edition.

You do NOT need to purchase a lab manual for this course!

You will want to purchase an iClicker. There are 2 versions, either will work since we will not be using any of the features of the newer, more advanced version. You may be able to get a deal if you buy the textbook and Clicker together. Used Clickers also work, just be sure to get the serial number. When you register your iClicker, be sure to use your UTORid not your student number. The website will ask you for your student number – ignore that and use your UTORid.

**OFFICE HOURS:**

TBD. If you cannot make them it will be possible to schedule office hours at different times. Please setup an appointment via e-mail, and expect it to take a few days (so don't wait until the day before a test to try to visit).

**E-MAIL:**

For most questions, please use the Discussion Board on Blackboard (Portal). For one thing, another student might answer you more quickly than I can. Medical and other personal issues should be done via e-mail. If I do not reply within 48 hours, you should send me a reminder e-mail as my inbox can get rather full.

**ASSESSMENT:**

FINAL EXAM:	35%
TERM TEST 1:	15%
TERM TEST 2:	15%
PRACTICAL QUIZZES:	10% in total
CLASS PARTICIPATION (Clickers):	5% in total
PRACTICAL GROUP WORK:	10% in total
FORMAL LAB REPORTS:	4% and 6%, 10% in total

Note: if your final exam mark is better than your class participation mark, the exam will be worth 40% and your participation mark will be nothing. This is done on an individual basis, and will be done automatically.

**TESTS AND EXAM:**

Both the term tests and final exam will draw from the lectures, practicals and textbook. This could include material presented in the lectures or tutorial material that is not covered in the textbook. It could also include assigned reading material that was covered in the textbook but not explicitly discussed in lectures.

All tests and exams are cumulative.

There will be no make-up tests. If you miss a test for an excusable reason (usually medical) that grade will be added to the next test or exam mark. So if you miss the first term test, your second term test will be worth 30%. If you miss the second term test, your exam will be worth 55%. Students who miss both term tests need to speak with me about their final exam.

## **READING QUIZZES:**

There will be no weekly reading quizzes as was done in PHYA11 last term. You are still expected to keep up with your readings.

## **PRACTICAL QUIZZES:**

There is no graded homework for this course. Instead, every other week a list of suggested problems from the textbook will be given. During every other practical session there will be a quiz. This quiz will be based on the suggested problems. These quizzes should be easy if you do all the suggested problems.

Please note that these questions will be basic problems that you should master before the tests and exam. Questions on the tests and exam will likely be more *difficult* than these quiz questions. Think of them as the first few rungs on a ladder, with the exam being the top of the ladder.

## **CLASS PARTICIPATION:**

During lectures, Clicker questions will be asked. These are multiple choice questions. You get marks for participating, you don't need to get these correct. Often these questions will be *difficult* (and occasionally they will be deliberately misleading), so I don't feel it is fair to give marks for accuracy.

You may not use someone else's Clicker to vote. This is giving them marks which they did not earn, hence is academic fraud! If you are caught, all students involved risk severe academic sanctions. For a first *offense* you are unlikely to be expelled or suspended, but that is theoretically possible.

At the end of the term there will be approximately a 10% forgiveness for the Clicker marks. For example, if there were 106 Clicker questions over the course of the term then anyone who voted in 95 (or more) of them will get a perfect. Students who voted less than 95 times will get a mark out of 95, instead of out of 106.

## **PRACTICALS:**

There will be ten (10) weeks of Practicals. Two of those weeks will be Lab based and will require you to produce a formal lab report. The first Lab's formal report will be worth 4% of your final grade. The final Lab's formal report will be worth 6% of your final grade. Please make sure you submit original work! If you are caught plagiarizing, you will be sent to the Dean's *office*.

All Practical work, including the labs, will be done in groups. Lab reports will be submitted one per group. *STYLE* is important! If you submit a Frankenpaper (three sections written in three very *different* ways and then crudely stitched together) your grade will *suffer*. So make sure you get together early and have it well written! I recommend nominating one person to be the editor and have them do a little less writing and a lot more editing so that the final report looks good.

The non-Lab Practicals will include problem-solving in groups. One member of your team will be required to record your work. Each week, two of the activities you do will be graded. During the lab Practicals, the notes you take will count as activities and will be similarly graded with similar weights to the other Practical sessions. Thus every week's Practical will generate grades. These marks will sum up to your 10% grade for Practical work.

Finally, since the Practicals are team-based, it is important that you show up every week. To encourage this, a penalty to your Practical Group Work and Formal Lab grades will be applied. So you stand to lose up to 20% of your final grade for absences from Practicals. This penalty will be the CUBE of the number of absences, as a percent. If you miss 4 Practicals, your grade will *suffer* by 64%. This is in addition to not getting credit for the

group work which you were absent for.

If you are more than 10 minutes late (arrive at 9:20, say, instead of 9:10) you will be counted as absent, but will still get credit for the group work. Similarly, if you leave early you will also be counted as absent.

### **CONCERNS?**

If you have any concerns about the course and your ability to do well, please come see me and we can discuss your situation. I am happy to make reasonable accommodations to ensure that all students have an equal opportunity to do well in this course. You can also speak with the people at *ACCESSAbility* Services who can advise us both.

### **TENTATIVE LECTURE SCHEDULE**

- Week 1 – Travelling Waves (Chapter 20)
- Week 2 – Standing Waves, Inteference (Chapter 21)
- Week 3 – Optics, Ray Optics (Chapters 22 & 23)
- Week 4 – Lenses (Chapter 24)
- Week 5 – Electric Forces (Chapter 26)
- Week 6 – Electric Fields (Chapter 27)
- Week 7 – Electric Potential, Capacitors (Chapter 29)
- Week 8 – Current, Resistors and Circuits (Chapter 31)
- Week 9 – Series and Parallel, RC Circuits (Chapter 32)
- Week 10 – Magnetism (Chapter 33)
- Week 11 – Atomic Models, Quantum Mechanics (Chapters 38 & 39)
- Week 12 – Radioactivity, Nuclear Physics (Chapter 43)