

PHYA22H

Introduction to Physics IIB
(Physics for Life Science)

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COURSE DESCRIPTION:

This course covers the main concepts required for an understanding of Waves, Optics and Electricity and Magnetism. It provides an introduction to these topics with particular emphasis on applications in the life and environmental sciences. Time permitting, we may cover some of the applications to modern physics such as atomic physics and nuclear radiation.

Physics is one of the oldest sciences, and in some ways it is the most simple. Physicists start with a big, often complicated, 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 model that can be applied to situations encountered in nature.

By the end of this course you will be able to use basic concepts from physics to explain and predict what will happen in simple situations. You will also be able to incorporate several concepts in order to explain and predict what will happen in 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 applicable.

LECTURES:

There will be an in-class participation grade (using Clickers, see below).

Please respect others in the classroom. Turn your cell phones to silent mode. Do not play games or watch TV shows, etc. If that is what you prefer to be doing you should not attend the lectures.

Lectures will often be structured on the assumption that you have read the textbook before coming to lecture. Please see the lecture/reading schedule at the end of this document.

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.

PRACTICALS:

Practicals start in Week 2. This is earlier than most courses do it!

Students registered in the course are expected to enroll in one practical session. These are 3 hours in duration. Attendance is mandatory and unexcused absences will result in a penalty to your grade (see below for more details). Some Practicals will be like traditional labs where you have an experiment to perform and you must submit a formal report. The majority, however, will be based on group exercises covering difficult conceptual material in the course.

COURSE MATERIAL:

Physics for Scientists and Engineers (3rd 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 PHYA22, 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.

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

You will want to purchase an iClicker. There are two 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:

TBA. 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 discussed 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%
READING QUIZZES :	5% in total
PRACTICAL QUIZZES:	5% 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.

You will be allowed to bring a single 8.5 by 11 page, double sided, and hand-written (no photocopies) for the tests and exams. This aid sheet can feature whatever you wish. **The same size restrictions apply for the exam - ONE SHEET ONLY** - so you will have to redo your aid sheet for each test.

There will be no make-up tests. If you miss a test for an excusable reason (usually medical) the weighting of the missed test 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:

These will be done online, on the Blackboard site, once per week. You are responsible for reading the assigned sections of the textbook and answering a series of multiple choice questions. The purpose of this is to help you come to lectures with a basic understanding of the material so that we can focus on the more subtle points in class. If you have time, you should really be doing this for every course as it will really help your understanding (and hence your GPA).

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 using two clickers in class, you 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, the situation will be dealt with.

All Practical work, including the labs, will be done in groups. Lab reports will be submitted one per group. **A consistent 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.

PROBLEMS?

If you see a potential problem with your ability to participate in the course or the assessment methods you can speak with me or 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 8 – Electric Potential, Capacitors (Chapter 29)
- Week 9 – Current, Resistors and Circuits (Chapter 31)
- Week 10 – Series and Parallel, RC Circuits (Chapter 32)
- Week 11 – Magnetism (Chapter 33)

ACADEMIC INTEGRITY AND RESPECT FOR THE ACADEMIC ENDEAVOUR

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each students individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's *Code of Behaviour on Academic Matters*:

<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>

outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- In papers and assignments: Using someone elses ideas or words without appropriate acknowledgment; submitting your own work in more than one course without the permission of the instructor; making up sources or facts; obtaining or providing unauthorized assistance on any assignment; using someone elses clicker or multiple clickers for participation grades.
- On tests and exams: Using or possessing unauthorized aids; looking at someone elses answers during an exam or test; misrepresenting your identity.
- In academic work: Falsifying institutional documents or grades; falsifying or altering any documentation required by the University, including (but not limited to) doctors notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the *Code of Behaviour on Academic Matters*. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see <http://www.utoronto.ca/academicintegrity/resourcesforstudents.html>).