Course Syllabus for
PHYA21H
Introduction to Physics IIA
(Physics for physical, environmental and mathematical science students)

Dr. Brian Wilson
Office: SW-503B
brian.wilson@utoronto.ca

COURSE DESCRIPTION: *This second physics course is intended for students in physical and mathematical sciences programs. Topics include electromagnetism and special relativity.*

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:

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. If you are bored, please don't 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 (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, you do not need to get a package which includes it.

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

OFFICE HOURS:

Wednesdays 12-3.

If you cannot make them it may be possible to schedule occasional 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 in-box can get rather full.

ASSESSMENT:

FINAL EXAM:	40%
TERM TEST:	30%
PRACTICAL QUIZZES:	10%
PRACTICAL GROUP WORK:	10%
FORMAL LAB REPORTS:	10%

In addition, if you do poorly on the test, you can arrange a meeting with me. If you do, you will be given the option of moving half of the test grade to the final exam. There will be a deadline to do this, it will be approximately one to two weeks after the test is returned in the practicals.

TEST AND EXAM:

Both the term test 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.

The exam is cumulative.

You will be allowed to bring a single 8.5 by 11 page, double sided, for the test and exam. **The same size restrictions apply for the exam - ONE SHEET ONLY** - so you will have to redo your aid sheet. Note: you are not allowed to bring a magnifying glass, so don't make the writing too small.

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.

You are not allowed an aid sheet for the quizzes.

Please note that these questions will be basic problems that you should master before the tests and exam. Questions on the test 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.

PRACTICALS:

You will meet every week (except the first week) for practicals. Two of those weeks will be lab based. Both labs will require that you submit a formal lab report. The other weeks will involve group-based problems and activities.

You must submit wholly original work. If you are caught plagiarizing, you will be sent to the Dean's office. If you are unsure as to what constitutes legitimate referencing and what constitutes plagiarism, ask for help! Hint: copying a sentence or a paragraph from Wikipedia is plagiarism unless you put the text in quotation marks and clearly describe where you got the quote.

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) it will not look very professional. 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 involve group work. Some activities will be theoretical, and some will be hands-on. One member of your team will record your work. Each week, a subset of the activities you do will be graded based on the logic and conceptual understanding present in what was written. 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 regular attendance, 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%, whereas missing just 1 Practical will have a very small (1%) penalty. This is in addition to not getting credit for the group work for which you were absent. Note that missing Practicals for valid excuses (such as medical reasons) will not cause any penalties.

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. Again, this is to encourage cohesion in the groups.

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 ACCESS*Ability* Services who can advise us both.

TENTATIVE **LECTURE SCHEDULE**

This is the pace I hope to keep in the course. It is tentative though, and we might speed up or slow down in various parts.

- Week 1 – Introduction, Oscillations (Chapter 14)

- Week 2 – Waves (Chapters 20-21)

- Week 3 – Wave Optics (Chapter 22), Electric Charges (Chapter 25)

- Week 4 – Electric Fields (Chapter 26)

- Week 5 – Electric Potential (Chapter 28), Potential and Field (Chapter 29)

- Week 6 – Circuits (Chapters 30-31)

- Reading Week (no classes)

- Week 7 – Test, and finish Circuits (Chapters 30-31)

- Week 8 – Magnetism (Chapters 32-33)

- Week 9 – Electromagnetic Fields and Waves (Chapter 34)

- Week 10 – Relativity (Chapter 36)

- Week 11 – Relativity (Chapter 36)

- Week 12 – Relativity (Chapter 36)