

Course Syllabus for
PHYA11H
Introduction to Physics IB
(Physics for Life Science)

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COURSE DESCRIPTION: *This first course in Physics at the university level is intended for students enrolled in the Life Sciences. It covers fundamental concepts of classical physics and its applications to macroscopic systems in one and three dimensions. It deals with two main themes; which are Particle and Fluid Mechanics, and Waves and Oscillations. The approach will be phenomenological with applications related to life and biological sciences.*

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 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 (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 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 everything based on the third 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 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:	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 REPORT:	10%

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.

In addition, if you do poorly on a test, you can arrange a meeting with me. If you do, you will be given the option of moving 5% of the test grade to the final exam. For example, if you do poorly on the first term test, you can make it worth 10% and the final exam worth 40%. There will be a deadline to do this, it will be approximately one to two weeks after the tests are returned in the practicals.

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 have 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.

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.

PRACTICALS:

There will be ten (10) weeks of Practicals. Two of those weeks will be lab based. Both labs will require that you submit a formal lab report. The first one will be graded, **but that grade does not count!** You should use the feedback you get from the first lab to make sure you do a good job on the final lab report.

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!

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 include problem-solving in groups. One member of your team will record your work. Each week, **two** 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 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%, 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 ACCESSAbility Services who can advise us both.

TENTATIVE LECTURE SCHEDULE

Knight is a good textbook, and like many first year physics textbooks it presents things in a certain, logical order. I do not particularly like that order. Specifically, I think Energy should be done before Forces. We will thus be doing things out of order. In addition, while we will not spend much time in class looking at the first 3 chapters of the text, **you should read those chapters on your own** since they build the foundation of much of the rest of the book. If you have taken high school physics most of that material will already be familiar to you.

- Week 1 – Energy (Chapter 10)
- Week 2 – Work, Energy Conservation (Chapter 11)
- Week 3 – Forces, Newton's Laws (Chapters 5, 6)
- Week 4 – Newton's Laws, Momentum (Chapters 7, 9)
- Week 5 – Kinematics and Motion (Chapters 4, 8)
- Week 6 – Rigid Objects and Torque (Chapter 12)
- Week 7 – Oscillations (Chapter 14)
- Week 8 – Stationary Fluids (Chapter 15)
- Week 9 – Dynamic Fluids (Chapter 15)
- Week 10 – Macroscopic Description of Matter (Chapter 16)
- Week 11 – Thermodynamics (Chapter 17)
- Week 12 – Catch-up or Review