
Course Syllabus for
PHYA21H - Winter 2018
Introduction to Physics IIA

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Typos corrected on January 13th are shown in green.

COURSE DESCRIPTION

Happy new year and welcome to all of you!

This second physics course is intended for students in physical and mathematical sciences programs. It covers the main concepts required for an understanding of Longitudinal and Transverse Waves, Electricity and Magnetism, Optics, and Special Relativity. It provides an introduction to these topics with particular emphasis on developing a mathematical framework for problem solving and analysis. However, many important breakthroughs in the understanding of physics have resulted from observation. Consequently, there will be a substantial emphasis on empirical work in the weekly laboratories as well theoretical investigation.

Course Web Site <http://portal.utoronto.ca/>

COURSE MATERIAL

- **The Textbook** : Physics for Scientists and Engineers (4th edition) by Knight. Copies are available at the UTSC bookstore. There are a variety of formats (including an e-book). We will be using Mastering Physics in PHYA21, you do need to get a package which includes it.

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

- **iClicker** : You will need to purchase an iClicker. available from the campus bookstore. 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. There is a version which works on smart phones, you can get that app if you prefer.

LECTURES

Slides will be posted online after the lecture. They will be supplemented in class by worked examples of problems. These will not be posted online. Attendance is strongly recommended but will not be monitored.

There will be a participation component to this course, however you will be offered the option to opt out (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.

Lectures will be structured assuming that you have read the textbook before coming to lecture (please refer to the lectures calendar).

NOTE : You must register for both the lecture and the practical parts of this course.

OFFICE HOURS

Tuesdays from 13 :30-15 :00. If you cannot make any of these times due to a scheduling conflict it will be possible to schedule office hours at different times. Please setup an appointment via e-mail (see next), and expect it to take a couple of days for a reply (so do not wait until the day before a test to try to visit).

E-MAIL

I try to answer e-mails within 48 hours (excluding weekends and holidays). If I do not, please send a follow up e-mail. Please note that it is not always easy to answer a physics question by e-mail.

You must include "PHYA21" in the subject line. Only e-mail sent from official University of Toronto mail accounts will be acknowledged (i.e., no gmail etc).

For medical and other personal issues please contact me via e-mail. Do not expect immediate responses, however, if I do not reply within 48 hours, you should send me a reminder e-mail - as my Inbox can get rather full. Always include PHYA21 in the subject and your full name and student number at the end of the e-mail.

PRACTICALS

Practicals start in Week 2.

Students registered in the course are expected to enrol in one practical session. These are 3 hours in duration. Unlike the lectures, attendance at the practicals is mandatory and unexcused absences will result in a penalty to your grade (see below for more details). Moreover, you must attend the practical that you are enrolled in, you can and will be asked to leave practicals classes that you are not enrolled in. Some Practical will be like traditional labs where you have an experiment to perform and you must submit a formal report. Many, however, will be based on group exercises covering conceptual material in the course.

Throughout the semester your TA will be observing how you, as an individual, perform in the Practical on an ongoing basis. Your TAs will evaluate your preparedness, the way you approach and organise experimentation and record-keeping, and your ability to work effectively with your team members. Also considered will be your ability to estimate errors (rather than calculating each one exactly), your ability to distinguish the essential from the inessential, your willingness to try something, to make a mistake, and to learn from it, and how often you seek advice and ask questions.

PRACTICAL :

There will be ten (10) weeks of Practical. Two of those weeks will be Lab based and will require you to produce a formal lab report. The first Lab formal report will be worth 4% of your final grade. The final Lab formal report will be worth 6% of your final grade. Please make sure you submit original work ! If you are caught plagiarising, the situation will be dealt with.

All Practical work, including the labs, will be done in groups (two or three students per group, not more not less). Lab reports will be submitted one per group. A consistent style is important ! So make sure you get organised early and hand in a report that is 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 reads uniformly and is polished.

The non-Lab Practical 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 Practical, 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 Practical 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 Practical. This penalty will be the cube of the number of absences, as a percent. If you miss 4 Practical, 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 (before your group has handed in their work) you will also be counted as absent.

PRACTICAL QUIZZES :

Every other week a list of suggested problems from the textbook will be posted on blackboard. During alternating practical sessions 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.

TERM TESTS & FINAL EXAM :

Both the term tests and final exam will draw from the lectures, practicals, textbook, and Mastering-Physics homework. 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" aid-sheet, double sided, and hand-written (no photocopies) to the midterm and exam. This aid sheet can feature whatever you wish. The same size restrictions apply for the midterm and exam - **one sheet only** - so you will have to redo your aid sheet for each test. Also you must clearly write your full name and student number on that sheet, which you will hand-in with the test or the exam.

There will be no make-up midterm. If you miss the test for an excusable reason (usually medical) the weighting of the missed test will be added to the formal labs and exam (each increased by 10%).

EVALUATION

	-FINAL EXAM	40%
	2 TERN TESTS (2 × 14%) on Feb. 1 st & March 15 th	28%
- PRACTICALS (2 reports 8%, Practical notebook 15%, TA impression 2%)		25%
- HOMEWORK (ABOUT 10 WEEKLY ASSIGNMENTS)		4% in total & more practice
- LECTURE PARTICIPATION (CLICKER USE)		3% in total
	TOTAL	100%

— The Tests : There will be two term-test in this course (please, refer to the course calendar for details).

— The Final Exam will be three hours long, some time during the month of April. The exact date, time and place will be announced.

The term-tests and the final exam will draw from the lectures, tutorials 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 or even question pre-class work.

The exam will cover all the material, including material that was on the term test. You will be permitted to bring a hard-copy translation dictionary to the test and exam.

— Lecture Participation : During lectures, Clicker questions will be asked. These are multiple choice questions. You get marks for participating ; you do not need to get these correct.

If you would like to opt-out of this component, you have to e-mail me by January 17th, and the

weigh of this component will be added to that of the final exam.

The participation grade will be based on the number of questions you answer. There will be a 10% forgiveness policy. The following example illustrates the situation : if there are 80 Clicker questions, then 90% of 80 is 72, and your grade is computed as if there were only 72 questions. So if you answered 70 out of 80 questions, your grade would be 70 out of 72. You cannot get more than 100% credit though ; if you answered 75 questions in the previous example, your grade would be a perfect score, not 75 out of 72.

You may not use someone else's Clicker to vote. This is giving them marks which they did not earn, hence is academic fraud ! Appropriate use of the Clickers will be checked during randomly chosen lectures. If you are caught with another student's Clicker, or if you are caught getting credit without being in the lecture, all students involved risk severe academic sanctions.

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. The university has many resources to provide us the best chance to help you succeed.

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.

ACADEMIC HONESTY & PLAGIARISM

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 student's 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 else's 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 unauthorised assistance on any assignment.
- On tests and exams : Using or possessing unauthorised aids ; looking at someone else's 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>).

PHYA21H3S -Winter 2018 - Tentative Course Schedule

Week	Practicals	Dates	Lectures	Reading
			Topics	
Week 1	No Practical	Jan. 9 & 11	The Wave equation Power, Intensity, Doppler Effect, Standing waves Interferences & Beats	16.2, 16.3, 16.4 16.8 and 16.9 17.1 - 17.4 and 17.8
Week 2	Practical 1	Jan. 16 & 18	Electric Charges and Forces The Electric Field	Chap. 22 Chap. 23
Week 3	Practical 2	Jan. 23 & 25	The Electric Field (cont.) Gauss' Law	Chap. 23 & 24
Week 4	Practical 3	Jan. 30 & Feb. 1 st	The electric potential TEST 1	Chap. 25
Week 5	Practical 4	Feb. 6 & 8	Current & Resistance Fundamentals of Circuits	Chap. 27 Chap. 28
Week 6	Practical 5	Feb. 13 & 15	The Magnetic Field & Ampère's law	Chap. 29
Reading Week (no classes between Feb. 17 th and Feb. 23 rd)				
Week 7	Practical 6	Feb. 27 & Mar. 1 st	Electromagnetic Induction & Faraday's Law	Chap. 30
Week 8	Practical 7	Mar. 6 & 8	Electromagnetic Fields & Waves - Maxwell's equations	Chap. 31
Week 9	Practical 8	Mar. 13 & 15	Wave Optics TEST 2	Chap. 33
Week 10	Practical 9	Mar. 20 & 22	Galilean Relativity, Einstein's Postulate	36.1 - 36.5
Week 11	Practical 10	Mar. 27 & 29	Time Dilation, Length Contraction Lorentz Transformations	36.5 - 36.8
Week 12	Practical 11	Apr. 3 & 5	Relativistic Momentum and Energy	36.9 - 36.10

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