Physics 157 – Introductory Physics for Engineers I **Fall 2019**

Instructors:
Section 101 Dr. Mark Van Raamsdonk MWF 9-10am
Section 102 Dr. Steven Dierker MWF 1-2pm
Section 103 Dr. Fei Zhou TR 2-3:30pm

Brief outline: (*See course Learning Goals for detailed)*:

Thermodynamics:

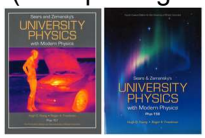
- What is thermodynamics? Energy conservation and temperature.
- Thermometers and temperature scales. Ideal gas law and gas thermometers.
- Thermal expansion. Stress and strain.
- Heat capacity/specific heat, phase changes, latent heat, calorimetry.
- Heat conduction, thermal resistance, R values.
- Convection and radiation, blackbody spectrum, emissivity, thermal equilibrium problems, greenhouse effect.
- Microscopic picture of thermodynamics and the ideal gas law.
- Work, heat, internal energy, and the First Law of Thermodynamics. PV diagrams.
- Types of thermodynamic processes: constant P/V/T/adiabatic
- Heat engines, efficiency and power, refrigerators.
- Entropy and the Second Law of Thermodynamics, TS diagrams, Carnot cycle.

Oscillations and Waves

- Mechanical equilibrium and restoring forces. Oscillation and simple harmonic motion.
- Properties of simple harmonic motion: amplitude, period, (angular) frequency, velocity, acceleration, phase
- Energy in simple harmonic motion. Damped and driven oscillations. Resonance.
- Coupled oscillators, transverse and longitudinal waves.
- Waves on a string, in fluids, and in a solid.
- Mathematical description of traveling waves. Wavelength, wave number. Relation between wave velocity, period, and wavelength.
- Superposition. Travelling waves vs standing waves.

Required Materials:

(book package is used for both Physics 157&158).



• "SEARS & ZEMANSKYS University Physics with Modern Physics" Vol A + B Fourth Custom Edition for the University of British Columbia at UBC Bookstore.
• Access code for Mastering Physics (it is bundled with above text or equivalent purchased code at UBC Bookstore)
You can also buy a used copy of the textbook, but you will still need to purchase a Mastering Physics access code from the bookstore.

•**You will need an iClicker** (available at the UBC bookstore)

Course website:

• Course materials and access to pre-reading quizzes and online homeworks will be posted on Canvas (log in with your CWL at https://canvas.ubc.ca and navigate to the PHYS157 page).

Grading scheme:

	Maximum points
In-class & Homework*	10
Midterm 1	15
Midterm 2	15
Exam**	60
Total	100

*The detailed breakdown is 3% for written homework, 2% for online homework, 1.5% for clicker participation (answer 80% of the questions during the term to get full credit), 1.5% for reading quizzes, and 2% for tutorials

**__Important:__ A minimum of 45% on the final exam must be obtained. If this minimum grade is not obtained, the final grade standing will be an F, and the grade will be your final exam grade. This is to ensure that mastery of the course material is obtained on an individual level.

Midterm exams: Oct 9 at 7:00-8:30PM and Nov 6 at 7:00-8:30PM. Room assignments by activity ID will be posted before each midterm. **If you have another class that conflicts with these times, we will arrange an alternative time for you to write the midterm.**

What to expect:

"**Lecture**" time will consist of a mixture of lecture, clicker questions, discussions, and activities for you to work on with your peers. These learning exercises are designed to encourage you to attempt the new skills you are building in an environment where you can receive feedback. When we ask questions in class, it is not a "test" for evaluating you, but consider it a challenge to yourself. Ask: "Do I know how to apply this concept?", "Did I follow the last activity?", "Would I be able to produce a similar result on an exam?". Being honest with yourself will guide you to the areas you need to work on, and help you gauge your own mastery of the material.

Pre-reading assignments will be given on a weekly basis. These will give you the vocabulary and tools you need to build the skills we will work on in lecture and are an important part of your learning. Pre-reading quizzes on Canvas will provide a check that you have absorbed the information and help you prepare for class. First, reading quiz will be posted Friday Sept 6, 2019 is due Sept 9, 2019 at 9am.

Tutorials will give you a chance to practice problem solving and prepare for your next assignment with your peers and teaching assistants. Tutorials begin the week of September 9th.

Homework assignments provide you with the practice you need to improve your problem solving skills and apply concepts. This practice is essential to your learning! You may discuss concepts and approaches with your peers, but we expect you to submit your own final work: copying someone else's assignment is not allowed! There are two types of homework: Mastering Physics online questions and full written solutions to be handed in .

Midterms and Final Exam questions will be problems of similar style to homework and activity problems. Each midterm will consist of multiple choice conceptual questions and 2-3 written problems. At least one question will be based on either an activity or previous homework question. The final exam will have roughly 10 multiple choice questions and 5-6 written problems.

The learning goals (posted on Canvas) are a good guide to what we expect you to be able to do, so consider using these as a study guide alongside reading and practicing problem solving.

How to get help:

You will almost certainly be confused about some of the course material or stuck on a question at some point (and most likely many points) during the course.

- Discuss things with your peers.
- Ask a question on Piazza, an online discussion forum for our course. Instructions for signing up on Piazza will be provided on Canvas and e-mailed to you.
- Ask questions during class, after class, or in your professor's office hours.
- Ask questions to your TA during the tutorial session.

It's important not to be afraid to admit that you don't understand something – at university, this happens to everyone. If someone asks you for help, try your best to help them understand the concept or the process of understanding the answer, rather than just telling them the answer. Also, be careful to avoid saying things that belittle other people.

Academic Integrity: We take standards of academic integrity and honesty very seriously. This is to ensure that the grades submitted are a meaningful representation of all students' performance and to ensure fairness to you. All exams are to be taken only with the allowed materials, and no communication is allowed during individual exams. Some in-class work and homework may be done with peer discussion, however, the final responses to assignments should reflect your individual effort. Peer discussion can be helpful for learning and we encourage you to discuss general concepts and approaches to problems, but when an assignment is submitted with your name then it must represent *your* work: **copying other people's assignments is not allowed**. In class, we will often have you work in groups and ask you to discuss concepts, however when we ask you to perform an individual task, we again expect this to represent your abilities, in order to gauge your mastery and provide you meaningful feedback.

For more on UBC Academic Honesty policies and standards see: Academic Misconduct:
http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959

Guide to Academic Integrity:
http://learningcommons.ubc.ca/guide-to-academic-integrity/