Physics 157 – Introductory Physics for Engineers I **Fall 2018**

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

Topics:

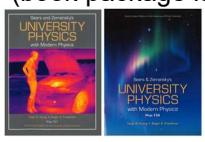
Thermodynamics
Heat & temperature, heat transfer, phases of matter, work & energy, entropy, ideal gas processes and heat engines

Periodic motion and Waves
Periodic motion, simple harmonic motion (including springs, pendulums, and other systems), wave motion, superposition of waves, sound.

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

Week 1: Concepts of thermodynamics. Zeroth law of thermodynamics. Temperature scales. Gas thermometers.
Week 2: Absolute temperature scales. Thermal expansion, thermal stress. Heat capacity, specific heat, latent heat. Calorimetry.
Week 3: Heat conduction, convection, radiation. Thermal resistances, R values.
Week 4: Ideal gas law and isotherms. Phase changes, phase diagram, critical point, triple point.
Week 5: Kinetic theory. Equipartition theorem. Maxwell Boltzmann distribution. Van der Waals equation.
Week 6: First law of thermodynamics. Internal energy. Free expansion of gas. Adiabatic expansion, work done on gas.
Week 7: Efficiency of heat engine. Heat pump. Entropy.
Week 8: Simple harmonic motion, angular frequency, velocity, acceleration.
Week 9: Kinetic and potential energy in simple harmonic motion. Damped oscillation and critical damping. Forced harmonic motion, resonance.
Week 10: Driven periodic motion, resonance.
Week 11: Traveling waves, energy transmitted. Standing waves.
Week 12: Adding waves. Beats.
Week 13: Doppler effect. Speed of sound.

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)
• iClicker
• Materials and pre-reading quizzes will be posted on Canvas (log in with your CWL at https://canvas.ubc.ca)
    • Materials: PHYS 157 101/102/103 Introductory Physics for Engineers I

Grading scheme:

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

* **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 10 at 7:00-8:30PM and Nov 7 at 7:00-8:30PM. Room assignments by activity ID will be posted before each 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 7, 2018 is due Sept 10, 2018 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 Sept 10, 2018.

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. There are two types of homework: Mastering Physics online questions and full written solutions to be handed in during tutorials.

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

Ultimately the learning goals (posted on Canvas) are a 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.

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. 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/