

# Physics 115: Heat, Fluids and Electricity and Magnetism

## Overview

Phys 115 is the second of a three-quarter sequence of introductory physics courses targeted for students in life sciences. Upon successful completion of this course, a student will be able to develop algebra-based models to describe the physical world pertaining to thermodynamics, fluids, electricity and magnetism, and apply them to other fields of science and everyday phenomena.

The course consists of lecture (3 per week) and tutorial (Tuesday from 5pm to 6pm) components.

## Textbook

- *College Physics a strategic approach*, Knight Field Jones (Pearson, 4<sup>th</sup> edition, 2018)

## Lecture Topics (Textbook chapters)

- **Ch. 11 (4 lectures):** Energy in the body & First and second laws of thermodynamics
- **Ch. 12 (6 lectures)** Ideal gas law, thermal expansion, calorimetry, heat transfer, and diffusion
- **Ch. 13 (4 lectures):** Pressure, buoyancy, fluid dynamics, and viscosity
- **Ch. 20 (3 lectures):** Electric fields and forces
- **Ch. 21 (4 lectures):** Electrical potential and capacitors
- **Ch. 22 (1 lecture):** Current and resistance, Ohm's law
- **Ch. 23 (3 lectures):** Parallel and series circuits, Kirchhoff's laws, RC circuits, Nervous system
- **Ch. 24 (2 lectures):** Magnetic fields and forces

## Tutorial Topics (7 or 8 of the following)

- First law of thermodynamics
- Ideal gas law
- Pressure
- Buoyancy
- Charge
- Electric potential difference
- Capacitance
- Magnets and magnetic forces
- Magnetic interactions

## Evaluation

The grades are calculated based on the following contributions and based on the scale below.

- **Continuous Assessment (40% overall)**
  - **Pre-lecture Reading Quiz Scores: 25%**
  - **Lecture Questions: 10%**
  - **Tutorial Pre-tests: 5%**
- **Exam Assessment (60% overall)**
  - The exam score will be based on the best of the following two methods:
    - Method 1: 40% of the exam score comes from the average of two midterm exams and 20% from your final exam
    - Method 2: 20% of the exam score comes from your best midterm and 40% from your final exam

The following grading scale will be applied to calculate student's final grade. The grade points and their corresponding final course scores are shown below.

grade point	final course score						
4.0	93	3.0	78	2.0	63	1.0	48
3.9	91.5	2.9	76.5	1.9	61.5	0.9	46.3
3.8	90	2.8	75	1.8	60	0.8	44.6
3.7	88.5	2.7	73.5	1.7	58.5	0.7	42.9
3.6	87	2.6	72	1.6	57		
3.5	85.5	2.5	70.5	1.5	55.5		
3.4	84	2.4	69	1.4	54		
3.3	82.5	2.3	67.5	1.3	52.5		
3.2	81	2.2	66	1.2	51		
3.1	79.5	2.1	64.5	1.1	49.5		