**PHYSICS 151 WFU-2**

2ND SEM, A.Y. 2018-2019

WF 10-11:30AM NIP LP103

R. BANZON

**References:**

[1] Gould, H., and Tobochnik, J. (2010). [*Statistical and thermal physics with computer applications*](https://drive.google.com/file/d/1pqtxVyXnjuxI1oNO7AVsx7wL9drgRHMZ/view?usp=sharing). Princeton University Press.

[2] Reif, F. (1965). [*Fundamentals of statistical and thermal physics*](https://drive.google.com/file/d/1Vn6wiJaDko1wfJR1mQBO37nOzY_5BGmP/view?usp=sharing). McGraw-Hill.

**Midterms (tentative):** 14 March 2019

**Problem sets:**

* Each problem on a separate sheet
* Each sheet w/ name, problem #, and page # of problem
* Class # on top-left corner of 1st page of each problem
* May be handwritten or printed, any paper
* Show neat & complete solutions

**General guidelines:**

* Crib sheet allowed for final exam (may be handwritten or printed, any paper)
* Final rating = ⅓(Probset average + midterms + finals)

# Chapter 1: Introduction

* “Arrow of time”: entropy (increase) - measure of energy distribution
* Increase in entropy associated with loss of ability to do work
* Temperature is not the same as energy (does not depend on system’s COM motion)
* Temperature is equal when 2 systems are allowed to exchange energy with each other
* Heating transfers energy incoherently; work transfers energy coherently
* Chaotic systems and their sensitivity to initial conditions -> indicative of arrow of time
* Meaningful macroscopic variables are statistical averages of microscopic entities
* Ergodic hypothesis: system/ensemble average is equal to the time average (“mixing” essential for validity)

TECHNIQUES

* About 100 particles sufficient to qualitatively account for behavior of macroscopic systems

STATISTICAL MECHANICS

* Object
  + Determine averages of microscopic variables that determine macroscopic properties
  + Microscope basis for laws of thermodynamics
* Reductionist approach
* Applied to other fields -> statistical physics (not necessarily reductionist)