Course Mechanics – Hand-Out
Course Overview – Book Chapter Details

Motivation – How many here excited?
- New frontiers in single molecules
- Move towards "putting it all together"
  ↳ thermo, kinetics

Questions to Ponder

Predicting protein structure and function
—Genomics

Chapter 1 –
Easy reading – DO IT!

Chapters 2 & 3 – Review of Gen Chem

Chapter 2 →

1ST Law → You can't win.
Energy is conserved

2ND Law → You can't break even
Entropy of the universe increases

3RD Law → You can't get out of the game
Entropy of a pure, perfect, crystal at 0K is 0 (ONLY!)

or Energy of universe is constant

1ST Law - Energy of an isolated system is constant

Backup, Define

System ≡ where we choose to focus (we define)
Surroundings = everything else (Universe − System)

Isolated ≡ no exchange of energy (heat + work + matter) between system and surrounding (a thermos bottle tries to be this)

Closed ≡ no exchange of matter (heat, work, OK) (eppendorf tube)
Open ≡ NOT closed

Energy exchange ↑ Joules (calories, ergs)

Hook's Law extending a spring ↑

1) Work ≡ classical physics = force × displacement

Convention ⇒ For this book, but be careful
$w > 0$ surroundings do work on system
$w < 0$ system does work on surrounding

Hook's Law - extending a spring

$f = -k(x - x_0)$ ∴ $w = \int f\,dx$

force varies w/ distance ↑

$= \int k(x - x_0)\,d(x - x_0)$