Exam I (9/15, Wednesday)
Review Outline

Chapter 1: 1.1-7 (1.4 not covered in lecture gives a good methodology for solving problems)
- Basic Equations of Heat Transfer from Day 1
- Conservation of Energy

Chapter 2: 2.1-5
- Conduction Rate Equation (Fourier's Law)
- Thermal Properties of Matter k(T), c_p, thermal diffusivity (α)
- Heat Diffusion Eqn
- Boundary & Initial Conditions for Problem Solving

Chapter 3: 3.1,3,4 (3.5, 3.6 to a small degree- know where energy generation would fit into the energy balance & the concept of how finned surfaces work). We skipped 3.1.4
- 1 Dimensional, Steady State, No Heat Generation/Consumption, Constant k problems
- Temperature Distributions
- Thermal Resistance
- Composite Materials
- Planar, Radial and Spherical Systems
- We will return to 3.7 The Bioheat Equation later in the semester

Chapter 4: 4.1,2,4
- 2 Dimensional, SS, No gen/consumpt/constant k
- Sect. 4.2 offers an illustration of exact solutions to partial differential equations- but was fairly complicated for even a simple problem, so little focus in 306.
- Temperature Distributions by Finite Divided Differences (Node analysis)

Chapter 5: 5.1,2,3
- Transient Heat Conduction --- unsteady state problems
- The Lumped Capacitance Model
- The Biot Number
- Theta = Ts - Tinf
- Temperature Profiles if Lumped Capacitance Doesn't Work (qualitative)

Test will be ~ 30-40 % closed book/closed notes/closed HW
60-70 % open book/open notes/open HW. Bring a calculator.

Closed book will be general concepts-

e.g.,
- What is the driving force for heat transfer?
- Explain the difference between forced and free convection
- What does the Fourier Number represent?
- Instead of solving partial differential equations, what alternate method can be used to give approximate 2-D temperature profiles?

Open book will be problems similar to those in the homework, but workable in less time.