Materials 100A Fall 2015 Final Exam TA Review Session Notes
9 December 2015

The final exam is not cumulative. Only the second half of the class will be covered, starting with polymers. However, you will likely need to use what you learned in the first half of the class in order to answer questions on the final.

In general, everything covered in class and on the problem sets since the midterm (including polymers) is fair game for the exam. Below is a brief, non-inclusive outline to aid your studying:

Chapter 14: Polymers
1. Basic hydrocarbon chemistry and how monomers come together to form polymers
2. Types of bonds between monomers
3. Working with mol. weights, degree of polymerization, etc. of polymers
4. Structure of polymers (e.g. linear vs. branched, vs. cross-linked, vs. networked and the different types of isomerism.
5. Thermoplastic vs. thermosetting polymers

Chapter 18: Electrical Properties of Materials
1. Concepts of resistivity, conductivity, charge carriers (electrons and holes)
2. Electronic structure of extended solids
   a. Concepts of bands, valence band and conduction band, band gap, Fermi energy
   b. metals vs. semiconductors
   c. electron mobility
3. Influence of temperature, impurities, etc. on electronic properties
4. Doping semiconductors
5. Electronic properties of intrinsic and doped semiconductors
6. $p–n$ junctions
7. Dielectrics and ferroelectrics

Chapter 21: Optical Properties of Materials
1. Transmission, reflection, absorption, emission, and refraction
2. Why materials are colored (or not colored)
3. Photoconductivity
4. LEDs
5. Photovoltaics

Chapter 19: Thermal Properties of Materials
1. Heat capacity
2. Thermal expansion
3. Thermal conductivity
4. Thermal behavior of different types of materials (polymers, metals, semiconductors, etc.)