Cheme 160/260: Important Concepts, Lectures 1-8

**Lecture 2:**
Constitutional: head to tail etc.
Configurational: meso vs. racemic
Conformational: g+, g-, t
Relationship between end to end distance, Rg, molecular weight,

**Lecture 3:**
Step Growth Polymerization
- Number fraction distribution
- Carother’s Equation
- Weight distribution
Molecular Weight
- Number average and weight average
- Calculated from weight distribution or number distribution
- Integral expressions
Polydispersity/Variance of Distribution

**Lecture 4:**
Chemical Potential and activity: effect of solvent, pressure, temperature on these quantities
Van’t Hoff Equation -> higher order correction terms
2nd virial coefficient: effect of solvent on this quantity.
Zimm Plot: Understand how it is obtained, see pg 94-95 in sperling
Light scattering (relatively less important)

**Lecture 5:**
Definitions and interrelationships between viscosities
Chain expansion and relationship to chain effective volume and viscosity
Mark Houwink Eqn, relating molecular weight to viscosity
GPC Calibration
SUMMARY OF USEFUL EQUATIONS

**Lecture 6:**
Stabilization of a free radical center: effects of monomer molecular structure
Initiation, Propagation, Termination (coupling, disproportionation)
Rate Equations, Rate constants (have idea of values)
Kinetic Chain Length
Chain Transfer
- to polymer (backbiting), monomer, solvent, transfer agent
- effects on degree of polymerization
- molecular structure as it effects ability of molecule to “receive” a radical
Rate and rate constant energetics
- effect on polymerization rate
- effect on degree of polymerization
Autoacceleration (I’d suggest supplementing lecture notes in this area with outside reading)
Lecture 7:
Lots of probability
Conditional Probability of different orders:
- how much of a sequence effects the next monomer added?
- 1,2,3 monomers back? (bernuoillion, terminal, penultimate)
Chi = Interaction Parameter
Average Lengths of A/B runs

Lecture 8:
Composition of copolymers:
- Propagation reactions and rates
- Ratios of rates (r values)
- Instantaneous composition
- Effects of feed-rate, relationship between feed-rate and composition
- Special Cases of r values: ideal case, azeotropic, alternating
- Q-e- scheme
Relating observed compositions to conditional probabilities
Calculation of interaction parameter