Chem 561/Chem 465: Polymer Chemistry I: Polymer Synthesis (Fall 2013)

Course Description 561/465: Covers step growth polymerization (including polyesters, polycarbonate, nylon, epoxies, urethanes , and formaldehyde based polymers), step growth kinetics, molecular weight distributions, infinite networks and gelation, techniques of polymerization, ring-opening polymerization, thermodynamics of polymer solutions, biological polymers.

Restrictions for 465:
May not be enrolled in one of the following Program Level(s): Continuing Education
May not have the following Classification(s): Freshman
Pre-Requisites**:** CHEM 242 Minimum Grade: D

Restrictions for 561: Must be enrolled in one of the following Program Level(s): Graduate Quarter
Required Textbook: Allcock/Lampe/Mark, "Contemporary Polymer Chemistry," **3rd Ed,** Prentice-Hall, 2003. **Instructor:** Prof. Lynn S. Penn, 223 Disque; 1-215-895-4970, office hours by appointment.
Meeting Times/Locations: Thursday 6:00 - 9:00 pm;133 Lebow

Course Objectives:
(1) Be able to select from a large list, only those monomers that can be polymerized by a step-growth mechanism
(2) Be able to explain in detail the qualitative difference between the kinetics of polymerization by step-growth and the kinetics of polymerization by chain growth
(3) Be able to compute M_n, M_w, and polydispersity from data on chain size.
(4) Be able to compute the imbalance in monomer ratio needed to desired degree of polymerization in the polymer.
(5) Be able to compute the recipe, in grams, for a polymer with a given degree of polymerization and a given end-capping group.
(5) Be able to compute the weight ratio of monomers, given the monomer chemical structure, for a cross-linked system of infinite molecular weight.
(6) Be able to compute the enthalpy and entropy of mixing for a polymer dissolved in solvent, given the interaction parameter, numbers of moles and densities of each component.
(6) Be able to select the biological polymers from a list of biological and synthetic polymers shown in the form of chemical structures.

Grading Components: There will be two mid-term exams (dates to be announced) and a final exam. The midterms will be averaged together and will count 60% of the grade. The final will count 40% of the grade. For anyone who misses a midterm, there will be no make-up, and the single midterm and the final will each count 50%. The final will be scheduled as per the university final exam calendar, which appears well after the term has started. There will be NO make-up final, so do not make any plans that could interfere with your taking the final. For graduate students, of whom more is required in the course, an additional course component will be announced. If deemed necessary for students' learning, instructor may add out-of-class assignments that will give extra credit to final grade. Note that attendance in class is not taken, but you are responsible for all the material presented or assigned. Classroom rules are as follows: Texting and/or use of cell phones or listening devices of any kind is not permitted; cell phones must be off, and students cannot leave and re-enter the room to take calls. Five points will be deducted from the ***final*** grade of any student who violates these rules.

Grading policy:
A+ = above 96, A = 92 to 96, A− = 88 to 92,
B+ = 84 to 88, B = 80 to 84, B− = 76 to 80,
C+ = 70 to 76, C = 64 to 70, C− = 58 to 64,
D+ = 54 to 58, D = 50 to 54,
F = below 50.

Academic policies:
Plagiarism, cheating, fabrication and other acts of academic misconduct will not be tolerated. Any cheating during an exam will result in a score of zero for the exam. This offense, as well as more serious or repeated offenses, may be reported to the University. For more information, see material in "academic dishonesty" under the "academic policies" tab at the following link: **http://drexel.edu/studentaffairs/community_standards/studentHandbook/**

Students with disabilities should see material under the "health and disability services" tab at the following link: **http://drexel.edu/studentaffairs/community_standards/studentHandbook/**

Drop/withdraw is at the following link: **http://www.drexel.edu/provost/policies/course_drop.asp**