

CHEMISTRY 5275  
Fall Semester 2015 – Section 3504  
Tuesdays, Thursdays, 5<sup>th</sup> Period – 11:45PM to 12:35PM  
Leigh Hall Room 242

## THE ORGANIC CHEMISTRY OF HIGH POLYMERS

or

### "Vignettes in Polymer Chemistry"

This is a first course in organic polymer chemistry. I assume you have no background in the subject. I do assume you have taken sophomore organic chemistry, will not be "teaching" the fundamentals of organic chemistry again during lecture. The organic and organometallic chemistry of macromolecules is what we will do, mostly dealing with synthesis and mechanism. Brief lecture forays will venture into polymer structure and morphology, kinetics, and polymer characterization techniques. In addition to me, others will offer lectures.

Being a two-credit course we can only do justice to the basics of polymer synthesis and mechanism, which in itself is vast in scope. Even greater in size is the entire field of polymer science & engineering – we won't go there. However, you must apply yourself in this first polymer graduate course to establish a fundamental framework in polymers – then you can go as far as you like. I learn something new about polymers all the time.

The course is organized around a series of "vignettes" (see below), which are presented from a mechanistic perspective. The text is Malcom Steven's **Polymer Chemistry: An Introduction**, 3rd Edition, certainly dated but correct in science. You will often be required to turn in "one page lectures" on subjects I assign to bring things up to date. The internet becomes your "book" for these assignments.

The key to success? **Read.** Do problems. Attend class. This is not an undergraduate course, is handled differently from what you have known.

<u>Vignette</u>	<u>Description</u>
1	Polymer Concepts & Molecular Weight
2	Polymer Structure & Morphology
3	Step Growth Polymerization
4	Radical Chain Growth Polymerization
5	Ionic Chain Growth Polymerization
6	Stereochemical Analysis in Polymers
7	Ziegler/Natta and Metallocene Polymerization
8	Ring Opening Polymerization
9	Copolymerization
10	Living Polymerization
11	Polyesters and Polyamides
12	Characterization of Polymers

A midterm and a final (50% each) will be given. The "one page lectures" are required to be turned in, and I will look at them but they will not be graded. However, if you miss even just one of them, you will receive an "Incomplete" as a course grade. Class notes, the "one page lectures" plus the text will form the basis for the exams. Office hours will be held on Tuesdays from 1PM to 3PM.

K B Wagener August, 2015