

Villanova University – Department of Chemistry  
CHM 8325-001, CRN 31847 and CHM 4325-100, CRN 31823

Chemistry 8325–001      Introductory Polymer Chemistry  
and Chemistry 4325-100

Spring 2019

*Instructor:* Dr. Deanna L. Zubris  
*Office:* 300E Mendel Hall  
*Phone:* (610) 519-4874  
*E-mail:* deanna.zubris@villanova.edu  
*Office hours:* MW 4:30–5:30 pm and by appointment

*Required Text: Polymer Chemistry, An Introduction, 3<sup>rd</sup> Edition, Malcolm P. Stevens, Oxford University Press, 1999, ISBN-13: 978-0-19-512444-6*

*Required Text: Plastic: A Toxic Love Story, S. Freinkel, Houghton Mifflin Harcourt, 2011.*

*Lectures:* MW 6:00–7:15 pm, Mendel 215E (Chemistry Conference Room)

*Course Content and Learning Objectives:* Polymer science is a highly interdisciplinary field that is of interest to chemists, chemical engineers, and materials scientists alike. In this course, we will focus on the preparation and characterization of synthetic polymers (manmade polymers). Currently, more than 100 billion pounds of synthetic polymers is produced annually in the United States – this amounts to 300 pounds per person. While biopolymers (naturally occurring polymers, such as DNA and proteins) are equally significant, they will not our major focus. In this course we will study the fundamentals of polymer chemistry so that we may gain insight into current research efforts. We will discuss topics such as step- and chain-type polymerizations, polymerization mechanisms, molecular weight determination, polymer testing and characterization, and current advances in polymer chemistry (as time permits). The following chapters from the *Polymer Chemistry* textbook will provide the core content for the course: 1-13.

*Grading:*

In-class Examinations:	40%
Final Examination:	30%
Graded Homework Problems:	15%
Final presentation:	15%

*Grading System:* grading is consistent with College of Liberal Arts and Sciences and University grading policies as found on the following webpages:

<https://www1.villanova.edu/villanova/artsci/graduate/policies-and-resources/policies/gradingsystem.html>

<https://www1.villanova.edu/villanova/enroll/registrar/policies.html>

*General Policies:*

1. There will be two in-class 75-minute exams (Exam I and II). The dates for the exams are tentatively listed below. If there is a date change for an in-class exam, it will be announced in class and via email (note: if you have a preferred email address that *is not* your Villanova address, please let me know). Exam I will focus on polymer synthesis and Exam II will focus on polymer characterization. Exam II will be cumulative, but will concentrate on the material following Exam I. If you anticipate an excused absence for a scheduled exam, please let me know as soon as possible so that alternate arrangements can be made.
2. The final exam will be a take-home examination. It will be cumulative, but will concentrate on the latter third of the course (special topics and final presentations). More details regarding the take-home final exam will be given later in the course.

**Villanova University – Department of Chemistry**  
**CHM 8325-001, CRN 31847 and CHM 4325-100, CRN 31823**

*General Policies:*

3. Problem sets will be distributed periodically throughout the course. For each problem set, I will designate one page of homework problems for you to submit for a grade by a specified deadline. While you may use your book and class notes to help you to solve these problems, I ask that you work independently to solve them. Some questions related to the *Plastic: A Toxic Love Story* textbook will be addressed in these graded problems. Occasionally, chemical literature-based exercises may take the place of more traditional graded problems.  
The bulk of the problem set *will not* be collected and graded. For these other problems, feel free to work with a classmate(s) if you choose. These problems are intended to reinforce concepts from class so I suggest that you give them your best effort. Some of these problems will be similar in difficulty and content to the problems on the exams. Answer keys (PDF files) will be posted on Blackboard.
4. By March 27<sup>th</sup>, you will choose a current paper from the chemical literature to be the subject of an in-class presentation. Your presentation will be approximately 15 minutes in length with time afterwards for questions from the audience. Participation in the question/answer session will be considered for extra credit. The presentation must provide pertinent background information and highlight findings from the paper (and related papers, especially if you chose a communication or similarly short paper). The presentation is intended to explain the current research to someone with no prior knowledge in the specific research area. PowerPoint™ slides will be collected and distributed to the whole class; this material will appear on the final exam. PowerPoint™ slides must be submitted *two days prior to your presentation via Blackboard*. I will provide further details regarding these presentations as the course progresses.
5. Aside from in-class announcements, e-mail will be my primary form of communication with you. Please check your Villanova email address (or a different email address that you share with me) regularly. If you want to get in touch with me, you can reach me by email, during office hours, or by appointment. I'll do my best to respond to emails within 24 hours during the week and 48 hours during the weekend and breaks. (FYI, I'm early-to-bed-early-to-rise, so I typically won't see late night emails until early the next morning.)
6. I will use Blackboard to post handouts from class and answer keys for problem sets and exams. Typically I will update our Blackboard site on a weekly basis.

*Important dates:*

- Our class begins: Monday, January 14
- Martin Luther King Jr. Day (no class): Monday, January 21
- Exam I: Monday, February 25
- Semester Recess (no class): Monday, March 4 and Wednesday, March 6
- Exam II: Monday, April 1
- Easter Recess (no class): Monday, April 22
- In-class presentations: Wednesday, April 24; Monday, April 29; Wednesday, May 1
- Take home final exam distributed: to be determined
- Take home final exam due: Monday, May 6, 6:00 pm

*Other textbooks that I find useful:*

- *Principles of Polymerization*, 4th Edition, G. Odian, John Wiley and Sons, 2004.
- *Contemporary Polymer Chemistry*, 3rd Edition, H.R. Allcock, F. W. Lampe, J. E. Mark, Pearson Education, Prentice Hall, 2003.

**Villanova University – Department of Chemistry**  
**CHM 8325-001, CRN 31847 and CHM 4325-100, CRN 31823**

*Journals where you'll find polymer manuscripts:*

- Macromolecules (ACS)
- ACS Macro Letters (ACS)
- Polymer Chemistry (RSC)
- Polymer (Elsevier)
- Polymer Bulletin (Springer)
- Journal of Polymer Research (Springer)
- Biomacromolecules (ACS)
- and many others...

The Villanova University library has many books that discuss various aspects of polymer chemistry. You might want to keep this in mind for your final presentation.

*Academic Integrity:*

All students are expected to uphold Villanova's Academic Integrity Policy and Code. Any incident of academic dishonesty will be reported to the Dean of the College of Liberal Arts and Sciences for disciplinary action. For the College's statement on Academic Integrity, you should consult the *Enchiridion*. You may view the university's Academic Integrity Policy and Code, as well as other useful information related to writing papers, at the Academic Integrity Gateway web site: <http://library.villanova.edu/help/academicintegrity>

*Office of Disabilities (ODS) and Learning Support Services (LSS):*

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. Go to the Learning Support Services website (<http://learningsupportservices.villanova.edu>) for registration guidelines and instructions. For physical access or temporarily disabling conditions, please contact the Office of Disability Services at 610-519-4095 or email [Stephen.mcwilliams@villanova.edu](mailto:Stephen.mcwilliams@villanova.edu). Registration is needed in order to receive accommodations.

*Absences for Religious Holidays:*

Villanova University makes every reasonable effort to allow members of the community to observe their religious holidays, consistent with the University's obligations, responsibilities, and policies. Students who expect to miss a class or assignment due to the observance of a religious holiday should discuss the matter with their professors as soon as possible, normally at least two weeks in advance. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the absence. <https://www1.villanova.edu/villanova/provost/resources/student/policies/religiousholidays.html>