

**Chemical Engineering 3Q03**  
**Introduction to Polymer Science**  
**Term II 2012**

- Instructor:** Dr. Emily Cranston  
JHE A412  
Extension 24369  
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- Teaching Assistant:** Daryl Sivakumaran  
JHE 133  
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- Textbook:** Polymer Science & Technology, 2<sup>nd</sup> edition by Joel R. Fried (available in bookstore and library)
- Class Day & Time:** Monday, 10:30-11:30 am  
Wednesday, 9:30-11:30 am
- Course Location:** Preliminary Laboratory Building (T13 Building), room 125
- Office Hours:** Wednesdays 1-3 pm in JHE A412, after class and by appointment
- TA Office Hours:** Thursdays 10:30 – 11:30 am in JHE 133

**Course Objectives:**

- Introduce polymer science for advanced polymer courses (Polymer Processing, Polymer Reaction Engineering...)
- Develop a tool box of knowledge for the workplace.
- Reinforce industrially important organic and physical chemistry within the context of polymer science.
- Acquire an intuition for how polymer structure relates to material properties.

**Website:** This course has an Avenue to Learn site which will be used as the primary location for posting lecture notes (notes only – solutions to in-class example problems will *not* be posted), practice problems (questions only), assignments, and solutions to both assignments and midterm tests. Marks will also be disseminated through Avenue to Learn. A discussion board is available to post questions about the course and will be monitored regularly by the TA and the instructor. Questions regarding course material should be posted on the discussion board, *not* e-mailed individually to the professor, so the entire class can benefit from the answers given.

Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

### Course Schedule (tentative)

In general, assignments will be handed in during class. When reports are to be submitted electronically the deadline is 11:59 pm, the day of the class. A penalty of 20% per day (including weekend days) applies. In other words, an assignment due Wednesday, handed in on Friday would receive 40% off.

| Week (Date)                              | Monday Class (1 hr)         | Wednesday Class (2 hr)                             | Chapter | Assignment due (Wed)              |
|--|-----------------------------|--|---------|-----------------------------------|
| 1 (Jan. 2/4)                             | No Class                    | Introduction                                       | 1       |                                   |
| 2 (Jan. 9/11)                            | Polymer Classification      | Polymer Molecular Weight/Size                      | 1 & 3   |                                   |
| 3 (Jan. 16/18)                           | Polymer Thermodynamics      | Molecular Weight Determination                     | 3       | Assignment 1                      |
| 4 (Jan. 23/25)                           | Polymerization Types        | Organic Review & Step-Growth                       | 2       | Avenue quiz                       |
| 5 (Jan. 30/Feb. 1)                       | Step-Growth                 | Step-Growth (& literature activity)                | 2       | Avenue quiz                       |
| 6 (Feb. 6/8)                             | Chain-Growth (Free Radical) | Chain-Growth (Free Radical)                        | 2       | Assignment 2                      |
| 7 (Feb. 13/15)                           | Midterm Review Tutorial     | Midterm (Covers week 1-6)                          |         | Groups/polymer chosen for project |
| NO CLASSES READING WEEK (February 20-25) |                             |  |         |                                   |
| 8 (Feb. 27/29)                           | Copolymerization            | Chain-Growth (Ionic/Coordination)                  | 2       | Assignment 3                      |
| 9 (Mar. 5/7)                             | Polymerization Techniques   | Midterm Solutions<br>Polymerization Techniques     | 2       |                                   |
| 10 (Mar. 12/14)                          | Polymer Morphology          | Glass Transition Temperature & Class Presentations | 4       | Group project (written report)    |
| 11 (Mar. 19/21)                          | Thermal Properties          | Mechanical Properties & Class Presentations        | 4, 5    | Avenue quiz                       |
| 12 (Mar. 26/28)                          | Hydrogels and Biopolymers   | Final Review                                       | 8       | Assignment 4                      |
| 13 (April 2/4)                           | Polymer Composites          | Polymer Recycling & Class Presentations            | 7       | Avenue survey                     |

**Assessment:** The final mark in the course will be calculated as follows:

- Participation            3%
- Assignments            12%
- Group Project           10%
- Midterm                25%
- Final Exam             50%

- All handwritten notes and presentation material will be permitted for the midterm and the final exam.
- No textbooks will be permitted.
- Any calculator may be used in the midterm and final exam.

- Assignments that are late will be reduced in mark by 20% for every day late, including weekends.
- Assignments or midterms written in pencil will not be considered for re-grading.
- Final exam papers will not be returned.
- Absence without a valid excuse will result in a grade of zero for a test, exam or class presentation. If you have a legitimate medical/personal reason you *must* complete the McMaster Student Absence Form and forward it to the instructor to receive consideration for waived tests.
- NO make-up midterm exams will be arranged and therefore the final mark will be calculated as 25% assignments & participation and 75% final exam.
- Statistical adjustment of final grades will not normally be used; however, the instructor reserves the right to adjust the grades using statistical methods if appropriate. The final numeric grades will be converted to letter grades as per the Registrar's recommended procedure.

**Electronic Communication:** Each class member is expected to have a McMaster e-mail address. Occasionally, important information to the class will be transmitted by e-mail or by announcement postings on Avenue to Learn. Hotmail, Gmail, and other e-mail services are often blocked by university servers due to spam/virus filters – you are responsible for regularly checking your e-mail and Avenue for important announcements issued to the class.

***No recording devices are allowed in the lecture hall and use of phones (including texting) during class is prohibited.***

**Policy Reminders:**

1. The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact the Departmental Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.
2. Students are reminded that they should read and comply with the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available in the Senate Office.

**Academic Integrity:**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <http://www.mcmaster.ca/academicintegrity>.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

In this course we also will be using the web-based service Turnitin.com to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must hire a professional and have it certified that it has been checked for plagiarism, before the due date. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line searches, etc.). [Class ID: 4676420, Password: cellulose]