CHEN 451 - Introduction to Polymer Engineering
CHEN 641 – Polymer Engineering
Fall 2014, MWF 8:00 – 8:50, Brown 112

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Office hours: Tuesdays and Fridays 1-2 PM (or by appointment)

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Office hours: Tuesdays 12-1 pm and Thursdays 2-3 pm (or by appointment)


Notes: Course notes and homework assignments: http://ecampus.tamu.edu

Prerequisites: CHEN 451: Senior classification in chemical engineering or approval of instructor. Basic understanding of thermodynamics and kinetics is suggested. CHEN 641: Graduate classification.

Attendance Policy: Attendance is important and implicitly considered in participation grade. Please come on time.

Learning Objectives:

• To recognize various polymeric structures
• To understand step and radical polymerization
• To understand polymer physics concepts such as polymer solution theory, thermal properties, mechanical properties, rheology, etc.
• To understand polymer characterization techniques related to thermal analysis, mechanical analysis, solution characterization

Course Description: The course will be divided into three sections: synthesis, characterization, and structure-property relationships.

Exams: Mid-semester exams will be given in class, October 13th and November 17th. All students will be provided with an equation sheet designed by the instructor. The exams are
closed book and closed notes. Calculators are allowed. Not allowed: cell phones, iPads/iPods, computers, headphones, and other electronic devices. **Final exam: Friday December 12th from 10:00 AM to 12:00 PM, Brown 112.** Unexcused failure to attend exams will incur a grade of zero. Permission for makeup exams must be approved by Professor Lutkenhaus and will be given only in case of emergency with verification. You must notify Professor Lutkenhaus a minimum of 24 hours of the scheduled exam period. Makeup exams will be oral. CHEN 451 and 641 students may have different exams administered simultaneously.

**Exam and Homework Regrades:** Exams and homeworks will be returned in the beginning of the lecture, and students will have seven days to provide a written appeal of the exam score. Exam and homework regrades will involve a regrading of the entire problem in question. If a request is made for more than one problem, the entire exam will be regraded.

**Homework:** Assignments are on the course webpage. Completed problem sets are to be turned in by the end of class on the due date. Joint discussion of problem solutions is acceptable, however, copying is not (plagiarism!). Late problem sets will not be accepted, and missed problem sets will receive a grade of zero. Full credit (and partial credit) will only be given if all work is shown to demonstrate understanding of applicable principles and logical steps towards solutions. One homework assignment will be dropped.

**CHEN 641 Project:** Graduate students enrolled in CHEN 641 are required to complete a project worth 15% of their grade. All projects will be checked for plagiarism; plagiarism will result in a grade of zero. Students will submit a 10 to 15 page, single-spaced, 12 pt font, Times New Roman, annotated report on one of the topics listed below. The project consists of a written report that should read like a review paper. The report will have an appendix that contains one problem and answer that might be asked on an exam. The problem is expected to draw on concepts taught in class (synthesis, characterization, and/or structure-properties relationships) and presented in the report. The reports will be made available to the undergraduate class participants through elearning.

Topics include:

- Bisphenol A in polycarbonates
- Phthalates as plasticizers
- Atom-transfer radical polymerization (ATRP)
- Reversible-addition-fragmentation chain-transfer radical polymerization (RAFT)
- Ionic polymerization
- Ring-opening polymerization
- Block copolymers
- Conjugated polymers
- Polymers in solar cells
• Polymers for water purification
• Polymers in batteries
• Polymers for drug delivery
• Confinement effects in polymer thin films
• Hydrogels
• Nanocomposites
• Topic of your choice (with instructor’s approval).

The project will be graded on the depth and breadth of the report, the quality of the exam question from the appendix, and the report’s overall quality.

Method of Evaluation for CHEN 451:
• Two mid-semester exams 50%
• One cumulative final 30%
• Homework 20%

Method of Evaluation for CHEN 641:
• Two mid-semester exams 40%
• One cumulative final 30%
• Homework 15%
• Project 15%

Grading Scale
The following grade scale will be employed:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 ≤ final score ≤ 100</td>
</tr>
<tr>
<td>B</td>
<td>80 ≤ final score &lt; 90</td>
</tr>
<tr>
<td>C</td>
<td>70 ≤ final score &lt; 80</td>
</tr>
<tr>
<td>D</td>
<td>60 ≤ final score &lt; 70</td>
</tr>
<tr>
<td>F</td>
<td>0 ≤ final score &lt; 60</td>
</tr>
</tbody>
</table>

The instructor reserves the right to adjust the cut-off points or curve the final score to increase the number of students with higher grades.

Excused Absences: Students may be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade. Examples of legitimate excused absences are available at [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07). Other reasons may be deemed appropriate by the student's instructor. Except in the case of the observance of a religious holiday, to be excused, the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases
where advance notification is not feasible (e.g. accident or emergency), the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class. Accommodations sought for absences due to the observance of a religious holiday can be sought either prior or after the absence, but not later than two working days after the absence.

If needed, the student must provide additional documentation substantiating the reason for the absence that is satisfactory to the instructor, within one week of the last date of the absence.

If the absence is excused, the instructor must either provide the student an opportunity to make up any quiz, exam, or other graded activities – or provide a satisfactory alternative – to be completed within 30 calendar days from the last day of the absence.

**Classroom Policies**

Texas A&M faculty work most directly for Texas residents and taxpayers, who expect Aggie engineers to be of the highest quality and integrity. The following guidelines will help us to meet these obligations efficiently.

**What I expect from students:**

- To treat everyone in the class, including the instructor, sponsors, and visitors with respect.
- To attend every class, give your full attention to the material, and conduct yourself in an appropriate manner.
- To do the work on time.
- To accept that previous academic preparation (e.g., writing skills, communication ability) will affect your performance in this course.
- To realize that your perception of effort is not enough to justify a good grade.
- To not plagiarize or otherwise steal the work of others.
- To not make excuses if you fail or decide not to do what is expected of you.
- To accept the consequences of your actions.

**What students can expect from me:**

- To treat you with respect.
- To not discriminate against you on the basis of your identity or your viewpoints.
- To manage the class in a professional manner; that may include educating you in appropriate behavior.
- To prepare for every class.
- To begin and end class on time.
- To admit to not knowing something, but to search for an answer promptly.
- To conduct research with the aim of making myself a more informed teacher.
- To pursue the maximum punishment for plagiarism, cheating, and other violations of academic integrity.
- To investigate every excuse for nonattendance or incomplete work.
- To make myself available to you for both course and career advice.
- To maintain confidentiality concerning your performance.
- To assign a grade that will reflect the amount of learning you have demonstrated and nothing else.
- To be honest with you.
American with Disabilities Act Policy Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.

Scholastic Dishonesty: As commonly defined, plagiarism consists of passing off one’s own the ideas, work, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

Academic Integrity Statement

*An Aggie does not lie, cheat, or steal or tolerate those who do.*

Honor Council Rules and Procedures
http://www.tamu.edu/aggiehonor

Academic Integrity Task Force, 2004