

202-574 Polymer Reaction Engineering

Course Syllabus

1. **Faculty** Engineering **Department** Chemical Engineering

2. **Course ID** 202-574 **Course name** Polymer Reaction Engineering
3 Credits

Section 1	Th	14.30-16.00	Room 1508
	F	13.00-14.30	Room 1508

3. Course description

Concepts in polymer engineering, principles of polymer reaction engineering, step-growth and chain growth polymerization, copolymerization, polymerization processes, polymer stability and degradation.

4. Course objectives

After this course, students should clearly understand the concepts of polymer reaction engineering. Students should be able to develop (1) chemical equations for describing chemical reactions involving polymers (i.e., polymerization, chemical modification, and polymer degradation) and (2) mathematical equation for describing reaction kinetics and resulting polymer chain microstructures. Moreover, students should understand the effect of reaction parameters on the resulting products and should be able to specify appropriate conditions for reaction.

Activities in this course intend to help students develop critical thinking skills in reviewing and critiquing researches in the area of polymer reaction engineering.

5. Course outline

- Concepts in polymer engineering
- Principles of polymer reaction engineering
- Polymerization: Reactions and kinetics
 - Step-growth polymerization
 - Chain growth polymerization
 - Copolymerization
 - Various polymerization processes
- Chemical modification of polymers: Reactions and kinetics
- Polymer degradation: Reactions and kinetics

6. Method

Lectures, Self-study, Article review/Article critique

7. Lecture tools

PowerPoint slide, Whiteboard, Lecture note, Handouts

8. Course marking scheme

Midterm exam	40%
Final exam	40%
Article review/critique	
Term paper	10%
Oral exam	10%

9. Course evaluation (Tentative)

Summation of adjusted marks will be used to evaluate students' performance.

A	= 80+	B+	= 72.5+
B	= 65+	C+	= 57.5+
C	= 50+	D+	= 42.5+
D	= 35+	F	= 35-

10. Office hour

Office: 1409-B

Office hours: Tu 14.30-16.00 and W 10.30-12.00

E-mail: fengsia@ku.ac.th

11. References

1. Rudin, A., The Elements of Polymer Science and Engineering, 2nd edition, Academic Press, 1999.
2. Painter, P.C., Coleman, M.M., Fundamentals of Polymer Science, 2nd edition, Technomic, 1997.
3. Odian, G., Principles of Polymerization, 3rd edition, Wiley-Interscience, 1991.
4. Dotson, N.A., Polymerization Process Modeling, VCH Publishers, Inc., 1996.
5. Polymer Reaction Engineering, Edited by Asua, J.M., Blackwell Publishing, 2007

12. Tentative schedule

Week	Lecture topics
1	- Concepts in polymer engineering
2	- Principles of polymer reaction engineering
3	- Step-growth polymerization
4	- Step-growth polymerization
5	- Step-growth polymerization
6	- Chain growth polymerization
7	- Chain growth polymerization
8	- Chain growth polymerization
9	Midterm Exam
10	- Copolymerization
11	- Copolymerization
12	- Various polymerization processes
13	- Chemical modification of polymers: Reactions and kinetics
14	- Polymer degradation: Reactions and kinetics
15	- Kaset fair
16	- Polymer degradation: Reactions and kinetics
17	- Oral presentation
18	Final exam

13. Instructor

Asst.Prof.Dr. Siripon Anantawaraskul

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