

**Korea University International Winter Campus (KU IWC) 2021-2022**

*Join our winter, cherish your winter*

December 27, 2021 ∼ January 14, 2022

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| **IWC000 – Polymerization Reaction Engineering** |
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| **Ⅰ. Instructor** |
| Professor | : | You-Yeon Won |
| E-mail | : | yywon@purdue.edu |
| Home Institution | : | Purdue University |
| Class Time | : | M/T/W/Th/F 8:30 – 11:00 AM  |
| Office | : | Virtual |
| Office Hours | : | By Appointment |
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| **Ⅱ. Textbook** |
| Required Textbook | : | “Polymerization Process Modeling” by N. A. Dotson, R. Galván, R. L. Laurence and M. Tirrell, Wiley-VCH, 1996 |
| Recommended Additional Readings | : | “Principles of Polymerization (4th ed.)” by G. Odian, Wiley-Interscience, 2004“Polymer Synthesis (2nd ed.)” by P. Rempp and E. W. Merrill, Hüthig & Wepf, 1991 |
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| **Ⅲ. Course Description and Objectives** |
| **Title:** Polymerization Reaction Engineering**Prerequisites:** A working knowledge of the concepts taught in Calculus, Differential Equations and Chemical Reaction Kinetics (or equivalent). Course work in Statistics and Polymer Chemistry is helpful but not required.**Course Objectives:** Develop a broad understanding of (i) distinctive features of polymers and polymerization processes, (ii) basic chemistries and kinetic mechanisms of step-growth, chain-growth, living/controlled, nonlinear and heterogeneous polymerizations and copolymerization, (iii) kinetic and statistical techniques for modeling how the properties of polymer products are related to the polymerization processes and mechanisms (see the course outline below for topics that will be covered). |
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| **Ⅳ. Grading** |
| Midterm Exam | : | N/A |
| Final Exam | : | 45% |
| Assignments | : | 45% |
| Participation | : | 10% |
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| **Ⅴ. Class Outline** |
| Date | Topic | Chapter | Remarks |
| Dec 27 (Mon) | Distinctive features of polymers | 1 | Homework #1 announced (due 11:59 PM on 1/2/2022) |
| Dec 28 (Tue) | Condensation polymerization | 2 |  |
| Dec 29 (Wed) | Condensation polymerization | 2 |  |
| Dec 30 (Thu) | Free radical polymerization | 3 |  |
| Dec 31 (Fri) | Free radical polymerization | 3 |  |
| Jan 3 (Mon) | Anionic polymerization | 3 | Homework #2 announced (due 11:59 PM on 1/9/2022) |
| Jan 4 (Tue) | Cationic polymerization | 3 |  |
| Jan 5 (Wed) | Copolymerization | 4 |  |
| Jan 6 (Thu) | Copolymerization | 4 |  |
| Jan 7 (Fri) | Controlled radical polymerization |  | Lecture notes |
| Jan 10 (Mon) | Emulsion/suspension polymerization | 7 | Homework #3 announced (due 11:59 PM on 1/16/2022) |
| Jan 11 (Tue) | Network formation/crosslinking | 5 |  |
| Jan 12 (Wed) | Reactor configuration | 6 |  |
| Jan 13 (Thu) | Reactor configuration | 6 |  |
| Jan 14 (Fri) | Final exam (in class) |  |  |