

A First Course on Kinetics and Reaction Engineering

Unit 36. Lesson Plan

Before Class

- Provide the redacted slides to the students
- Tell the students to print the worksheet for Activity 36.1 and bring it to class
- Tell the students to print the equations from Unit 17 or, preferably, the AFCoKaRE Exam Handout and bring it to class

During Class

- Introduce today's topic and where it fits in the course
 - Slides 1 and 2
- Review of Unit 36 (5 minutes)
 - Slides 3 and 4
 - Remind them that Unit 11 defined the age function and described how to generate one from stimulus-response data
 - Emphasize the difference between micro-mixing and macro-mixing
- Answer any questions, slide 5
- Learning Activity 36.1 (~40 minutes)
 - Slides 6 through 17: Tell the students to use the worksheet for Activity 36.1 as they progress through the activity
 - Go over the problem statement and answer any questions
 - Go through the slides by putting up one that tells them to do something. Answer any questions or provide any guidance/hints you deem appropriate and then give them some time to perform the task while you circulate, observing and answering questions. After they've had enough time for that task, put up the next slide that shows the answer and gives them the next task. Keep repeating until done.
 - At the end, note that Example 36.1 stated that only first order kinetics lead to the same answer for the ideal CSTR model and the late-mixing segregated flow model using the ideal CSTR age function. This activity shows that for first order reactions the models give the same result, while Example 36.1 shows that for second order kinetics they do not
- Summary
 - Slide 18: Put the material covered in this class into the overall context of the course.

After Class

- Make the complete slides available to the students
- Optionally assign the completion of the PFR problem as homework.

Variations

- The activity could be shortened to about 20 minutes and a second activity could be conducted where the age function takes the form of discrete values instead of a continuous function (as in Example 36.2)