

Fall 2019

# CHE 612-101: Chemical Kinetics and Reactor Design

Nellone Reid

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# ChE 612: Chemical Kinetics and Reactor Design

## Fall 2019

**Instructor:** Dr. Nellone Reid, Senior University Lecturer

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**TA:**

**Class:** Tuesday, 6:00 - 8:50 PM; Room: Cullimore Hall Lect 1

**Office Hours:** Tuesday, Friday: 10:00 AM - 12:00 PM

### Course Description and Requirements

Elements of optimum design introduced for reactor types, series and parallel reactor systems, multiple reactions, and temperature effects. Introduction to non-ideal reactor design. Study of various models for catalytic and non-catalytic solid-fluid reactions.

**Prerequisite:** undergraduate course in chemical engineering kinetics, or equivalent.

### Course Objectives

- Provide the student with principles and kinetic tools useful in analyzing the rates of chemical reactions for both homogeneous and heterogeneous reactions
- Increase the student's ability to do chemical reactor design by providing the knowledge and tools required to obtain, evaluate, and improve rate equations for use in design, operation and optimization of chemical reactors.

### Learning Materials

**Textbook Required:** Elements of Chemical Reaction Engineering (5th ed), H. Scott Fogler, Prentice Hall, ISBN: 0-13-388751-0

**Calculator:** A high-end calculator (TI-83, TI-84 or TI-84SE) is required for solving exam problems

**Software:** Matlab, Polymath, Microsoft Excel

### Assessment and Grading

Two Midterm exams, One Final exam, One Term Project

Exams are open book/open notes. Exams are cumulative.

The exams and the term project each count for 25 % of the final grade.

<b>Grading:</b>	100 - 90%: A	85 - 89%: B+	75 - 84%: B
	65 - 74%: C	55 - 64%: D	< 55%: F

<b>Date</b>	<b>Lecture Topic</b>
3-Sep	Introduction and review of undergraduate material
10-Sep	Introduction and review of undergraduate material
17-Sep	Steady-state energy balance
24-Sep	Unsteady-state energy balance
1-Oct	PFR energy balances
8-Oct	Exam 1 Review
15-Oct	Exam 1
22-Oct	Segregated flow, mixing, dispersion
29-Oct	Non-ideal reactors
5-Nov	Non-elementary reactions
12-Nov	Enzyme/bio reactors
19-Nov	Exam 2 Review
26-Nov	Exam 2
3-Dec	Diffusion and mass transfer in catalysis
10-Dec	Last Day of Classes; Final Exam Review

## Policies

**NJIT Honor Code:** The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.

**Special Needs:** If you need accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services, Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.