CHEE 420/520: Chemical Reaction Engineering
Chavez Bldg. (Room 110); T/Th 8:00–9:15 (Fall 2017)
Syllabus
(*The information contained in this syllabus is subject to change)*

Description of Course

Study and apply the fundamental principles of chemical reaction engineering to design and analyze basic chemical reactors that contain both homogeneous and heterogeneous reactions.

Course Prerequisites

CHEE 201, CHEE 326, MATH 254

Instructor and Contact Information

Prof. Armin Sorooshian (armin@email.arizona.edu); Harshbarger 108E; 520-626-6769
Office hours: By Appointment
Teaching Assistant: Rachel Braun (rabraun@email.arizona.edu); Office Hours: Monday/Wednesday from 1:00-3:00 PM in Science Library 208
(Email all HW questions to Rachel Braun)

Course Format and Teaching Methods

Lecture format

Course Objectives and Expected Learning Outcomes

Students are expected to knowledgeable and experienced with the following: (i) chemical reactor design equations under both isothermal and non-isothermal conditions; (i) analysis of reaction rate data; (iii) multiple reaction scenarios; (iv) enzymatic reaction fundamentals; (v) catalysis and heterogeneous data analysis.

Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: http://catalog.arizona.edu/2015-16/policies/classatten.htm

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, http://policy.arizona.edu/human-resources/religious-accommodation-policy.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: http://uhap.web.arizona.edu/policy/appointed-personnel/7.04.02

Participating in course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from

their healthcare provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

Course Communications

Course Website: D2L website for ChEE 420/520

Required Textbook

Elements of Chemical Reaction Engineering, H. Scott Fogler, 4th ed. (2006)
*It is fine to use other editions of this book

Assignments and Examinations: Schedule/Due Dates

There will be approximately eight homework assignments, three midterm exams, and a final exam.

Homework: Homework is due at the beginning of class on the scheduled due date. To receive credit, all work must be original and that of the student and not from any other source (e.g., other students, solution manuals, etc). Late homework will not be graded. All work that is not picked up beyond 1 week after the first day a return is attempted will be recycled to ensure students are responsible and up-to-date.

Exams: Exams are open book/notes, and 75 minutes long (final exam though is two hours). You can use calculators and pencils (all other materials you will need for the exam will be provided).

Make-up exams: A make-up exam may be arranged if you notify the instructor before the regularly-scheduled exam. A makeup exam will be scheduled only if the student has a valid reason for missing the regularly scheduled exam.

Final Examination

The date and time of the final exam (also shown in previous table), along with links to the Final Exam Regulations can be found here:
http://www.registrar.arizona.edu/schedules/finals.htm

Grading Scale and Policies

The class will be graded on a straight scale (A = 100-90; B = 89-80; C = 79-70; D = 69-60; E: < 60) based on the assignments and weighting shown in this table:

Grade Item	Percent Weight Towards Final Grade
Problem Sets	10%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final Exam	30%

NOTE: A one letter grade drop will be applied for the first violation of the Code of Academic Integrity (including using a solution manual or other service to assist you with homework) in addition to receiving a zero for that assignment.

Students taking the course as CHEE 520 for graduate credit should speak to the instructor about how the course experience will vary for them.

Requests for incompletes (I) and withdrawal (W) must be made in accordance with University policies which are available at http://catalog.arizona.edu/2015-16/policies/grade.htm#I and http://catalog.arizona.edu/2015-16/policies/grade.htm#W respectively.

Dispute of Grade Policy: Students have 7 days from the day an assignment is graded with a score on D2L to dispute a grade on any graded item during the semester.

Scheduled Topics/Activities

Date			Topic	Reading	Key Events
Aug	T	22	Syllabus/Introduction; Material Balances for Reactors; Conversion	1.1-1.5, 2.1-2.3, 4.1-4.4	
	Th	24	Continue: Material Balances for Reactors & Conversion	1.1-1.5, 2.1-2.6, 4.1-4.4	
	T	29	Review of Thermo/Kinetics; Graphical Representation of Design Equations	1.1, 3.1-3.6, 2.1-2.6, 4.1-4.4	
	Th	31	Continue: Graphical Representation of Design Equations; Design of Isothermal Reactors (N^{th} Order Kinetics)	2.1-2.6, 4.1-4.4	HW 1 Due
Sep	T	5	Reactors in Series and Introduction to Pharmacokinetics	2.1-2.6, 4.1-4.4	
	Th	7	Continue: Reactors in Series/Parallel	2.1-2.6, 4.1-4.4	
	T	12	Pressure Drops in Reactors	4.5	HW 2 Due
	Th	14	Continue: Pressure Drops in Reactors	4.5	
	T	19	Unsteady Operation of CSTRs/semi-batch reactors; Data Analysis in Reactors	4.10, 5.1-5.7	
	Th	21	Continue: Data Analysis in Reactors	5.1-5.7	HW 3 Due
	T	26	Multiple Reactions	6	
	Th	28	Continue: Multiple Reactions; Review	6	
Oct	T	3	Exam 1		Exam 1
	Th	5	Review Exam 1; Continue: Multiple Reactions	6	HW 4 Due
	T	10	Continue: Multiple Reactions	6	
	Th	12	Reaction Mechanisms	7.1	
	T	17	Continue: Reaction Mechanisms	7.2 - 7.3	
	Th	19	Continue: Reaction Mechanisms (Enzymes)	7.2 - 7.3	HW 5 Due
	T	24	Continue: Reaction Mechanisms (Enzymes); Steady State Non-Isothermal Reactor Design	7.2 - 7.5; 8	
	Th	26	Cont: Steady State Non-Isothermal Reactor Design; Review	8	HW 6 Due
	T	31	Steady State Non-Isothermal Reactor Design	8	
Nov	Th	2	Exam 2		Exam 2
	T	7	Continue: Steady State Non-Isothermal Reactor Design	8	
	Th	9	Continue: Steady State Non-Isothermal Reactor Design	8	
	T	14	Substitute Lecture on Catalysis and Catalytic Reactors	10	
	Th	16	Continue: Steady State Non-Isothermal Reactor Design	8	HW 7 Due
	T	21	Continue: Steady State Non-Isothermal Reactor Design	8	
	Th	23	No Class (Thanksgiving)		
	T	28	Cont. Catalysis and Catalytic Reactors	10	
	Th	30	Exam 3	10	Exam 3
Dec	T	5	Review		HW 8 Due
	Th	14	Final Exam (08:00 AM -10:00 AM)		Final Exam

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (i.e. texting, chatting, reading a newspaper, making phone calls, web surfing, etc).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See: http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit http://drc.arizona.edu/.

If you have reasonable accommodations, please plan to meet with me by appointment to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

The University Libraries have some excellent tips for avoiding plagiarism available at: http://www.library.arizona.edu/help/tutorials/plagiarism/index.html.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Additional Resources for Students

UA Academic policies and procedures are available at:
http://catalog.arizona.edu/2015-16/policies/aaindex.html
Student Assistance and Advocacy information is available at:
http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

Confidentiality of Student Records

http://www.registrar.arizona.edu/ferpa/default.htm

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.