Course Syllabus - CHEM 450

Course Number:	CHEM 450
Course Name:	Physical Organic Chemistry - Kinetics
Quarter:	SP
Year:	2018
Start Date:	03/27/2018
End Date:	06/01/2018
Credits:	3.0
Last Date To Add This Course:	04/10/2018
Last Date To Drop This Course:	04/10/2018
Last Date To Change Grading Option:	04/10/2018
Minimum Class Size:	5

Meeting Days and Times

Day	Start	End	Location	Description
T	10:00 am	11:30 am	CA Campus	KECK
T	1:00 pm	2:30 pm	FL Campus	B387
TH	10:00 am	11:30 am	CA Campus	KECK
TH	1:00 pm	2:30 pm	FL Campus	B387

Course Managers

Role	Last Name	First Name	Department	Mail Code	Phone	Email	Organization Name (non-TSRI personnel)
Course Director	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
Admin	Gassert	Joseph		BCC-157	(858) 784-2709	joeyg@scripps.edu	
TA	Chen	Yanqiao	TSRI Graduate Program	TRY-10	(858) 784-8469	yanqchen@scripps.edu	
TA	Hill	David	TSRI Graduate Program	TRY-10	(858) 784-8469	dhill@scripps.edu	

Course Description

The course covers selected special topics pertinent to current research in physical organic chemistry with an emphasis on kinetics and mechanisms of catalytic reactions. Lectures are accompanied by examples from the current literature as well as case studies significant to the historical development of the field. Problem solving is required throughout. The course is a useful companion to specialized classes in chemical synthesis, organometallic chemistry, and physical chemistry.

Background Preparation (Prerequisites)

Papers will occasionally be assigned for reading in preparation for a class or as a follow-up: reading of these materials is required.
Students are strongly encouraged to review background material relevant to each class; sources will be provided at the beginning of each topic.
Satisfactory completion of an undergraduate course in organic chemistry is required, but previous exposure to physical organic chemistry is not.

Texts and Journal References

Type	Title	Author	Date	ISBN/ISSN
Useful To Consult	Determination of Reaction Mechanisms	Barry K. Carpenter		
Useful To Consult	Mechanism & Theory in Organic Chemistry	T.H. Lowry & K.S. Richardson		
Useful To Consult	Modern Physical Organic Chemistry	Eric V. Anslyn and Dennis A. Dougherty		

Course Learning Outcomes

By the end of this course, students will be able to:
1. Understand the factors that contribute to observed chemical kinetics from a molecular perspective.
2. Predict experimental rate equations from proposed mechanisms, and create and evaluate mechanistic proposals from experimental kinetic observations.
3. Propose reasonable explanations for observed reactions.
4. Propose informative and incisive experimental tests to distinguish between mechanistic proposals.
5. Be familiar with chemical and physical models to rationalize the emergence of biological homochirality.
6. Understand how to evaluate the advantages and disadvantages of carrying out organic reactions in flask vs flow operation.

Course Requirements and Assignments

1. 20%: Midterm exam.
2. 20%: Final Exam
3. 30%: In-Class Quizzes
4. 30%: Class Presentations
5. Students are required to attend every lecture or to present a valid doctor's excuse.

Other Information

Attendance Statement

Students are expected to attend all classes. Students who are unable to attend class must seek permission for an excused absence from the course director or teaching assistant. Unapproved absences or late attendance for three or more classes may result in a lower grade or an “incomplete” for the course. If a student has to miss a class, he or she should arrange to get notes from a fellow student and is strongly encouraged to meet with the teaching assistant to obtain the missed material. Missed extra-credit quizzes will not be available for re-taking.

Scientific and Professional Ethics

The work you do in this course must be your own. Feel free to build on, react to, criticize, and analyze the ideas of others but, when you do, make it known whose ideas you are working with. You must explicitly acknowledge when your work builds on someone else's ideas, including ideas of classmates, professors, and authors you read. If you ever have questions about drawing the line between others' work and your own, ask the course professor who will give you clear guidance. Exams must be completed independently. Any collaboration on answers to exams, unless expressly permitted, may result in an automatic failing grade and possible expulsion from the Graduate Program.

Course Grading Statement

Letter Grade Descriptions

Letter Grade	Grade Point	Description	Learning Outcome
A	4.00	Outstanding achievement. Student performance demonstrates full command of the course subject matter and evinces a high level of originality and/or creativity that far surpasses course expectations.	
A-	3.67	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.	
B+	3.33	Very good work. Student performance demonstrates above-average comprehension of the course subject matter and exceeds course expectations on all tasks as defined in the course syllabus. There is notable insight and originality.	
B	3.00	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.	
B-	2.67	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.	
C+	2.33	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.	
C	2.00	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.	
P	0.00	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.	
F	0.00	Unacceptable work/Failure. Student performance is unacceptably low level of knowledge and understanding of course subject matter. Course will not count toward degree. Student may continue in program only with permission of the Dean.	
I	0.00	Incomplete is assigned when work is of passing quality but is incomplete for a pre-approved reason. Once an incomplete grade is assigned, it remains on student's permanent record until a grade is awarded.	
W	0.00	Withdrew from the course with Dean's permission beyond the second week of the term.	

- All courses will be recorded and maintained in the student's permanent academic record; only courses that apply towards the degree will appear on the academic transcript. Non-credit or audited courses will not appear on the transcript.
- 4 core courses taken for a letter grade (pass = A or B for a core course)
- 2 elective courses taken pass/fail (pass = A, B, C for an elective)
- Because students are encouraged to take electives outside their area of expertise, a "C" letter grade is passing.
- Grading will be based on general attendance/participation, student presentations of the classic and contemporary publications, and

Course Schedule

Date	Type	Topic or Lecture Title	Presenter Last Name	Presenter First Name	Presenter Department	Presenter Mail	Presenter Phone	Presenter Email	Organization Name (non-TSRI personnel)
03/27/2018	Lecture	Topic 1: Introduction to Catalytic Reaction Kinetics	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
03/29/2018	Lecture	Topic 1: Introduction to Catalytic Reaction Kinetics Continued							
04/03/2018	Lecture	Asymmetric Catalytic Hydrogenation	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
04/05/2018	Lecture	Mass Transfer/Stirring Speed/Pressure Effcts in Hydrogenation	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
04/10/2018	Lecture	Asymmetric Catalytic Hydrogenation	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
04/12/2018	Lecture	Michaelis-Menten kinetics: simulations FL Classroom: B382							
04/17/2018	Lecture	Organic Reactions in Flow	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
04/19/2018	Practical	Preparation for Presentations							
04/26/2018	Student Presentations	Presentations							
05/01/2018	Lecture	Reaction Progress Kinetic Analysis	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/03/2018	Lecture	Reaction Progress Kinetic Analysis	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/08/2018	Lecture	Literature Examples of Kinetic Analysis	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/10/2018	Lecture	Literature Examples of Kinetic Analysis	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/15/2018	Lecture	Kinetic Isotope Effects	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/17/2018	Lecture	Nonlinear Effects in Asymmetric Synthesis, Catalysis, and Autocatalysis	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/22/2018	Lecture	The Principle of Microscopic Reversibility FL Classroom: B382	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/24/2018	Lecture	Modeling in Asymmetric Catalysis	Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/29/2018	Lecture		Blackmond	Donna	Department of Chemistry	BCC-157	(858) 784-2128	blackmon@scripps.edu	
05/31/2018	Lecture		Blackmond	Donna	Department of	BCC-157	(858) 784-	blackmon@scripps.edu	

05/31/2018	Lecture	Blackmond	Donna	Chemistry	BCC-157	2128	blackmon@scripps.edu