Chemistry 641 – *Advanced Organic Chemistry: Physical-Organic Chemistry* (3 credit)
Fall 2018

Course Meets: MWF 12:05 – 12:55 pm, Room 121, Psychology

Instructors:

Prof. Robert J. McMahon
6209 Chemistry
608-262-0660
robert.mcmahon@wisc.edu

Prof. Shannon S. Stahl
6132 Chemistry
608-265-6288
stahl@chem.wisc.edu

Office Hours:
By appointment, please contact via email.

Course catalog description: Topics in physical organic chemistry
Additional course information:
Chemistry 641 is a one-semester, survey course in physical-organic chemistry. It will provide background concepts and information regarding a wide variety of topics. It will not completely cover all of physical-organic chemistry, which is much broader and deeper than a single semester of study. The course is divided into two segments taught by two different instructors. In many ways the halves of the course are distinct but should complement one another. Bob will teach the first half of course focusing on structure, bonding, orbitals, stereochemistry and stereoelectronic effects, and photochemistry. Shannon will teach the second half of the course focusing on the kinetics and thermodynamics of organic reactions.

As a graduate level-course, there is a high expectation of independent learning and motivation by the student. This course is placed at the start of the graduate school sequence in which you are transitioning from a master learner to an independent scientist.

Catalog requisites: none
Recommended requisites: Graduate student standing or CHEM 345 and CHEM 562

Course design and attributes: Advanced level, physical science breadth, counts as L&S credit

How credit hours are met: This class meets for three 50-minute class period each week over the fall/spring semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of classroom for every class period. The syllabus includes additional information about meeting times and expectations for student work.

Textbook:
Modern Physical Organic Chemistry (978-1891389313)
Eric V. Anslyn and Dennis A. Dougherty
University Science Books: Sausalito, CA; 2006

Student Solutions Manual to accompany Modern Physical Organic Chemistry (978-1891389368)
Michael B. Sponsler, Eric V. Anslyn, and Dennis A. Dougherty
University Science Books: Sausalito, CA; 2006

Learning Outcomes:
Students in Chemistry 641 will:

1. Develop an understanding of modern computational quantum chemistry and its use in interpreting chemical bonding, analyzing potential energy surfaces, and rationalizing reactivity in organic chemistry.
2. Understand fundamental principles of stereochemistry, conformational analysis, and stereoelectronic effects and apply these principles to rationalize structure and reactivity.
3. Understand principles of thermodynamics, chemical equilibrium, and kinetics as applied to organic reaction mechanisms. Develop familiarity with bond energies, kinetic rate laws, catalysis, linear free energy relationships, kinetic isotope effects.
4. Develop familiarity with acidity / basicity of typical organic functional groups. Understand the effects of solvation on organic structure and reactivity.
5. Understand basic principles of photophysics and organic photochemistry.
6. Demonstrate growth as reflective, self-directed learners through assessing your work, identifying misconceptions, and critically evaluating information from a variety of sources.
7. Articulate the rationale behind experimental results and answers to conceptual problems in verbal communications and written assessments using scientifically appropriate language.

Exams:
The first half of the course will have two graded midterm exams.
Exam 1 (McMahon, 100 pts) Mon Oct 1, 7:00 pm
Exam 2 (McMahon, 100 pts) Mon Oct 22, 7:00 pm
Exams will last approximately 2 - 3 hours and are not intentionally cumulative.

During the second half of the course, there will be approximately four graded problem sets related to the current topics. These will be comprehensive and take the place of exam assessments during that portion of the course.

Homework:
During the first half of the course, recommended homework problems will be assigned, but not collected or graded. Students will present solutions to homework problems on Piazza. Instructors and other students will provide feedback on the solutions and their presentation.

Grades:
Your final grade in this course will be an average of your performance in each half of the course and determined at the end of the semester:

Homework	4 problems sets at 50 pts each
Exams	2 exams at 100 pts each
Total	400 pts

Grading Errors: Any graded assignment may be submitted for regrading if you believe an error has been made. The request must be made within two school days of the date the work is returned. Do not mark on the graded exam or problem set if you plan to submit for regrading.

Grading Scale:
This course is graded as a graduate course. Graduate students are expected to maintain a GPA of at least 3.0 for satisfactory standing in the program. Your final grade for the course will be determined using the following scale, with the meaning of each grade paraphrased below:

A	Excellent performance shown consistently in all aspects of the course
AB	Good performance with high achievement in most of the course
B	Adequate performance reflecting a basic understanding of the material
BC	Adequate performance with some deficiencies
C	Minimal performance with serious deficiencies
D	Unsatisfactory performance
F	Very unsatisfactory performance

Academic Integrity:
Adherence to University policies concerning academic integrity and intellectual honesty is expected: https://www.students.wisc.edu/doso/academic-integrity/

Additional Support:
The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodation for students with disabilities is a shared faculty and student responsibility. Students [you] are expected to inform instructors [us] via email of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty will work either directly with the student or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. https://mcburney.wisc.edu/