

CHE501 Organic Chemistry (Core Graduate Level Course)

Fall 2016

Date and Time: Tuesdays and Thursdays, Clemens 17, 11 am - 12:20 pm

Instructor: Dr. Sherry R. Chemler (Office: 618 Natural Science Complex,
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Office hours: Wednesday, 12 noon – 1:30 pm or by appointment, NSC618

Required Textbook (available at UB's bookstore and from Amazon.com): Advanced Organic Chemistry, David E. Lewis, ISBN: 978-0-19-975897-5.

UBLeads: Additional Class Notes and messages will be posted on UBLeads.

Schedule

Date	Topic	Assignment
8/30	Lewis structures, formal charge, resonance, acid base, arrow pushing, pKa	Read Chaps 1 & 2 Do Problems (below) HW1
9/1	Reaction coordinate, stereochemistry, conformational analysis	
9/6	Orbitals and their impact on reactions and reactivity	Read Chaps 4 & 5 Do Problems (below) HW2
9/8	Cont.	
9/13	Pericyclic reactions	Read Chaps 6 & 7 Do Problems (below) HW3
9/15	aromaticity	
9/20	<i>HW due in class</i>	<i>HW due in class</i>
9/22	Test 1	Test 1
9/27	Reaction mechanisms, rates, isotope effects	Read Chaps 8 Do Problems (below) HW4
9/29	Cont.	Cont.
10/4	Carbocations	Read Chaps 9 & 10 Do Problems (below) HW5
10/6	carbanions	Read Chaps 11 & 12 Do Problems (below) HW6
10/11	Cont.	Cont.
10/13	Cont.	Cont.
10/18	<i>HW due in class</i>	<i>HW due in class</i>

10/20	Test 2	
10/25	Radicals, Carbenes, arenynes, nitrenes	Read Chaps 13 & 14 Do Problems (below) HW7
10/27	Cont.	Cont.
11/1	aldol, Wittig	Read Chaps 16 Do Problems (below) HW8
11/3	Organometallic reactions	Read Chaps 17 Do Problems (below) HW9
11/8	Cross-coupling	
11/10	Cont.	
11/15	<i>HW due in class</i>	<i>HW due in class</i>
11/17	Test 3	Test 3
11/22	Reductions	Read Chap 18 & 19 Do Problems (below) HW10
11/29	Reductions	
12/1	Oxidations and Reductions	Read Chap 20&22 Do Problems (below) HW11
12/6	Larger main group atoms	
12/8	HW due in class	HW due in class
12/13 11:45 am – 2:45 pm	Comprehensive Final Exam	Final Exam

Grade: 3 Tests: 20% each; 1 Comprehensive Final Exam 30%; Class Participation: 10% (homework: check, check+, check-, and solving problems in class). 1000 pts total possible.

Assignments: Keep up with the assigned chapter reading. The assigned problems will be the topic of class discussions (problems to be solved on the board by students in class—*participation credit applies*). Your progress on the assigned problems will be tracked (see above schedule for hand-in dates) and count toward participation credit (grades of check, check+, check- and zero). HW is due in class. You cannot get full participation credit without also solving problems during class on the board during discussions.

Assigned Problems: Detailed feedback on your responses to assigned problems is available during office hours and during problem solving times in class or otherwise spontaneously scheduled sessions. Homework checks (when you hand in the

homework) are a measure of your effort/participation grade but will not provide you with corrections or answers.

Chap. 1: 1-3,1-4,1-5,1-6,1-7,1-8,1-9,1-10,1-11,1-16,1-17,1-23,1-24,1-27.

Chap. 2: 2-1 (proj. formulas A and D only), 2-2, 2-3, 2-4, 2-7, 2-12, 2-13, 2-16, 2-17, 2-19, 2-20, 2-21, 2-22, 2-24, 2-26, 2-27, 2-33, 2-34, 2-36.

Chap. 4: 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-11, 4-13, 4-14, 4-15, 4-16, 4-19, 4-20.

Chap. 5: 5-1, 5-2, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-14, 5-16, 5-17, 5-19, 5-20.

Chap. 6: 6-1, 6-2, 6-5, 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 6-12, 6-13, 6-14, 6-15, 6-16, 6-17, 6-18, 6-21, 6-22, 6-23a, b, c, d, g, i, k, l, n, o, q, s, t, u, x, 6-24, 6-26, a, c, d, e, f, g, 6-27

Chap. 7: 7-1a, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7, 7-13, 7-17, 7-22.

Hand in all homework for Chaps 1-7 on Sept. 20. HW will be returned the morning of the following day in your mailboxes (or come to my office if its not there).

Chap. 8: 8-1, 8-2, 8-3, 8-4, 8-5, 8-6, 8-7, 8-8, 8-9, 8-10, 8-11, 8-12, 8-13, 8-14, 8-15, 8-16, 8-17, 8-18, 8-19, 8-20, 8-21, 8-22, 8-23, 8-24, 8-25, 8-27, 8-28, 8-29, 8-30, 8-31, 8-32, 8-33, 8-34, 8-35, 8-38, 8-39, 8-40, 8-41, 8-43.

Chap. 9: 9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7, 9-9, 9-10, 9-11, 9-12, 9-13, 9-15, 9-16, 9-17, 9-18, 9-19, 9-21, 9-22, 9-23, 9-24, 9-25.

Chap. 10: 10-1, 10-2, 10-3, 10-4, 10-5, 10-6, 10-7, 10-8, 10-9a, c, d, h, j, 10-10, 10-11, 10-12, 10-13.

Chap. 11: 11-1, 11-2, 11-3, 11-4, 11-5, 11-9, 11-10, 11-12, 11-13, 11-14, 11-15, 11-16, 11-17, 11-18, 11-19, 11-20.

Chap. 12: 12-1, 12-2, 12-4, 12-5, 12-6, 12-7, 12-8, 12-9, 12-10, 12-11, 12-13.

Hand in all homework for Chaps 8-12 on Oct. 18. HW will be returned the morning of the following day in your mailboxes (or come to my office if its not there).

Chap. 13: 13-1, 13-2, 13-3, 13-4, 13-5, 13-6, 13-7, 13-8, 13-9, 13-10, 13-11, 13-12, 13-13, 13-6, 13-17, 13-18, 13-19, 13-20, 13-21, 13-22, 13-24, 13-25, 13-27, 13-28, 13-32, 13-33, 13-35.

Chap. 14: 14-1, 14-2, 14-3, 14-4, 14-5, 14-6, 14-7, 14-8, 14-9, 14-10, 14-12, 14-13, 14-14, 14-15, 14-17, 14-18, 14-19 b, c, e, f, m, r, 14-20, 14-21.

Chap. 16: 16-1 a, c, 16-2 b, c, d, 16-3, 16-4, 16-5, 16-6, 16-7.

Chap. 17: 17-1, 17-2, 17-3, 17-4, 17-5, 17-6, 17-8a, b, c, d, e, g, i, j, k, l, m, n, o, r, t, u, v, w, bb, cc, ee, 17-9 a, h, p, t, u, 17-10, 17-11.

Hand in all homework for Chaps 13, 14, 16, 17 on Nov. 15. HW will be returned the morning of the following day in your mailboxes (or come to my office if its not there).

Chap. 18: 18-2, 18-4, 18-5, 18-6, 18-7, 18-8, 18-9, 18-10, 18-11, 18-15, 18-16, 18-17 a, b, c, g, l, j, k, l, m, n, t, u, aa, cc, dd, 18-18, 18-25, 18-33 b, f, q, r, 18-34, 18-36.

Chap. 19: 19-1, 19-2, 19-3, 19-4, 19-5, 19-6, 19-7, 19-8, 19-9, 19-10 a, b, c, d, h, j, p, s, v, y, z, dd, ff, 19-11.

Chap. 20: 20-1, 20-2, 20-3, 20-5, 20-6, 20-7, 20-8, 20-9, 20-10 a, b, f, h, l, j, p, r, 20-12, 20-17.

Chap. 22: 22-1, 22-2, 22-3, 22-4, 22-5, 22-6 a, c, d, e, g, h, v, w, x, 22-7, 22-13.

Hand in all homework for Chaps 18, 19, 20, 22 on Dec. 8. HW will be returned the morning of the following day in your mailboxes (or come to my office if its not there).

Course Objectives:

This course is the core Organic Chemistry course for chemistry graduate students. It is designed to provide essential information for chemists in all divisions. Important fundamental structure and reactivity topics will be covered. The most common organic reactions that can be used across disciplines will be introduced. Ways to predict reactivity based on sterics and electronics, and ways to study reactivity using physical organic chemistry techniques will be covered.

Learning Outcomes: The object is to become empowered to think about organic reactions on a "graduate" level and potentially to incorporate organic reactions in your own research as needed. A broad range of reactions and their mechanisms are covered. Tools to analyze reaction mechanisms are presented. These basics can serve as the foundation for how to approach organic reactions one may encounter in different settings in your scientific career.

Assessment Tools: Tests, in-class participation, homework checks. See Grade above.

Academic Integrity: Tests will assess individual understanding of the material and are not group activities. All tests will be proctored. Communication between students is discouraged during testing. Homeworks can be group activities, however, individual work, prior to or after group work, usually results in greater comprehension of the material and better development of skills.

Emergencies or schedule conflicts at times of test:

Seeking alternative testing arrangements is strongly discouraged. Excused absences must be accompanied by appropriate documentation (doctor's note, traffic accident report etc) and the professor must be contacted well in advance for planned absences or as soon as possible for emergency absences. Given the ample time to complete homework assignments, homeworks are accepted early, but not late. Partially completed homework is better than none (check or check minus is better than zero).