

Course Syllabus



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Chemistry 2310 – Organic Chemistry I – Fall 2016

Instructor: Dr. Bradley S. Davidson

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Meeting Time/Place: MWRF 8:30 – 9:20 AM, ENGR 302

Office Hours: M 3:30 – 4:30 PM, W 2:3 – 3:30 PM, Th 9:30 – 10:30 AM

Undergraduate Teaching Fellow (UTF):

Thomas Ditton (dittontr@gmail.com (<mailto:dittontr@gmail.com>))

Materials:

- Text: "Organic Chemistry," Paula Yurkanis Bruice, Prentice Hall, 6th (2011) or 5th (2007) Ed
- Study Guide and Solutions Manual for corresponding edition of "Organic Chemistry"
- Sapling Learning online homework
- iClicker
- Molecular model kit (optional)

Course Description and Goal: First of a two semester sequence covering the chemistry of organic chemicals. Students will gain an understanding of the physical properties, nomenclature, stereochemistry, and chemical reactivities of organic molecules and will be able to describe chemical reactions and step-wise reaction mechanisms.

Tentative Course Outline and Exam Schedule:

Week	Dates	Assignments	Chapter(s)
one	8/28 – 9/1	Pre-Quiz Sapling-intro	Introduction, Chapter 1
two	9/6 – 9/8 (9/4 no class)	Quiz1, Homework1	Chapter 1
three	9/11 – 9/15	Quiz2, Homework2	Chapter 2
four	9/18 – 9/22	Quiz3, Homework3	Chapter 2, Chapter 3
five	9/25 – 9/29	Quiz4, Homework4	Chapter 3, Chapter 4
six	10/2 – 10/6		Exam 1 (10/2) , Chapter 4

seven	10/9 – 10/13	Quiz5, Homework5	Chapter 5
eight	10/16 – 10/19 (10/20 no class; 10/19 Friday schedule)	Quiz6, Homework6	Chapter 5, Chapter 6
nine	10/23 – 10/27	Quiz7, Homework7	Chapter 6
ten	10/30 – 11/3		Exam 2 (10/30), Chapter 7
eleven	11/6 – 11/10	Quiz8, Homework8	Chapter 7, Chapter 8
twelve	11/13 – 11/17	Quiz9, Homework9	Chapter 8, Chapter 9
thirteen	11/20 (11/22 – 11/24 no class)		Chapter 9
fourteen	11/27 – 12/1	Quiz10, Homework10	Exam 3 (11/30), Chapter 10
fifteen	12/4 – 12/8	Quiz11, Homework11	Chapter 11, Chapter 12
sixteen	12/11 (Monday)		Final Exam (7:30 – 9:20 am)

Exams: The exams are meant to test your *understanding* of the topics covered in lecture, not your ability to repeat memorized problems. Expect some questions that require you to *apply* your understanding to new problems. Ultimately, because you are in this course to *learn* chemistry, exams are meant to offer *learning opportunities*. There will be three midterm exams and one comprehensive final exam, which will include material presented in lecture, the textbook, and from the homework and quizzes.

Each midterm exam will include two parts: 1) four free-response questions (100 pt), requiring you to draw structures and justify your answer. This part will be completed in class on the day specified. 2) 25 multiple-choice questions, each worth 4 points (100 pt total) that must be taken on your own time at the USU testing center (<http://testing.usu.edu/> (<http://testing.usu.edu/>)). A during the allotted two and a half day window will be allotted. During the testing window, exam-relevant discussions between students who have completed the exam and those who have not will be considered cheating.

A *self-correcting* approach will be used for the midterm exams. Without knowing which answers you got right, you will have the opportunity, after consulting your notes, textbook, even classmates, to repeat the on-line portion of the exam, revising your answers. Your score for the multiple choice position of the exam will be the average of the two attempts. Your exam score will be the sum of the multiple choice score and the free-response score.

Extra Credit: For each exam, a "Molecule of Interest" will be posted. An extra credit question pertaining to a "Molecule of Interest" worth 5 pt will be offered on each exam. There is also a pre-quiz and a Sapling Learning extra credit exercise, to help you learn the system. Each is worth 5 points, for a total 15 possible extra credit points.

On-line homework: There will be 11 on-line homework sets, administered through Sapling Learning (accessed through Canvas) that must be completed on your own time. Each homework set, which is worth 10 points, will be available from Monday, 9:30 AM, until the following Monday, 8:30 AM. The homework sets will involve a variety of interactive questions. They will be open-book, you can have

as many attempts as necessary for each problem, but 5% will be deducted for each incorrect answer. Your best 10 out of 11 scores will apply to your course grade. You have an entire week, 24/7, to take the quizzes. **Do not ask for an extension.**

Sapling Learning is accessed through the link on the class homepage. During the initial registration, you can choose access for one semester (\$36) or for two semesters (\$54). Sapling Learning will also be used in CHEM 2320.

On-line quizzes: There will be 11 on-line quizzes that will be offered through Canvas that must be completed on your own time. Each quiz will be available from Monday, 9:30 AM, until the following Monday, 8:30 AM. Each 10 point quiz will consist of ten multiple choice type questions, drawn at random from a larger bank of questions. You may repeat the homework as many times as you want, with only your highest score being recorded. You will benefit the most from the homework if you prepare and try to take them without help from the book or your notes. Your best 10 out of 11 scores will apply to your course grade. You have an entire week, 24/7, to take the quizzes. **Do not ask for an extension.**

iClicker Questions: A single iClicker question will be given at the beginning of each class period, except review days and exam days. These questions must be answered individually, but discussions with your classmates are encouraged. Each question will be worth 2 pt for a correct answer and 1 pt for an incorrect answer.

You can answer iClicker questions using a smartphone, a tablet, or a laptop using the REEF app (www1.iclicker.com/students-get-started/) (<https://www1.iclicker.com/students-get-started/>) or with an iClicker2. For both, you will need to establish a REEF account (app.reef-education.com/#/login) (<https://app.reef-education.com/#/login>). If using the REEF app, you will be required to purchase a subscription that allows you to answer questions and view past results (\$14.99 for 6 months, \$23.99 for one year). If using an iClicker, you will not need to purchase anything else. It is your responsibility to bring your chosen device, in working order, to class each day. At the end of the semester, everyone's five lowest clicker scores will be dropped.

Class Notes: Pre-lecture notes for each chapter will be posted on this website prior to class. Annotated post-lecture notes, as well as lecture recordings will then be available subsequently.

Assessment:

Assessment involves measuring student progress as well as teaching effectiveness. The following assessment strategies have been incorporated into this course.

– A pre-test/post-test approach will be used to measure comprehension and teaching of important concepts. The pre-test will be administered through Canvas and must be taken on your own time. The ten multiple choice questions of the pre-test will reappear in the final, in slightly altered form, to assess teaching and learning progress during the semester. If weaknesses are observed in specific subject areas, teaching methods will be reevaluated. If you take the pre-test, you will receive 5 points.

– Standardized questions: A further measure of teaching efficacy will be obtained by embedding appropriate questions from the American Chemical Society (ACS) standardized exam on Organic Chemistry into the final exam. This will allow class results to be compared to national standards.

– IDEA Evaluations: Student evaluations will be used to evaluate course/instructor strengths and weaknesses. Constructive suggestions are welcome anytime. The on-line IDEA evaluation system provides a way for you to self-assess how well the course has helped you achieve the following general objectives.

- Have you gained factual knowledge about Organic Chemistry, including terminology, methods, and trends, as further described in the Detailed Learning Objectives, shown below?
- Have you learned fundamental principles, generalizations, and theories that describe and explain chemical reactions and chemical properties?
- Have you further developed your ability to analyze and critically evaluate ideas, arguments, and scientific models.

General Learning Objectives for 2310:

After successfully completing this course, students will be able to:

- Describe atomic and molecular structure and bonding, and properly represent organic molecules.
- Classify organic compounds by structure, use the IUPAC nomenclature, and identify conformational effects in organic compounds.
- Predict the products of reactions of alkenes and to write the mechanisms showing how the products are formed.

- Draw and interpret reaction coordinate diagrams, and be able to relate the energetic changes associated with chemical reactions to equilibrium constants and rate; be able to differentiate kinetic versus thermodynamic control of reactions.
- Identify the types of isomerism in organic compounds, to identify and classify chiral centers, and explain the physical and chemical consequences of chirality.
- Correctly represent the structures and bonding of alkynes, and be able to write the mechanisms for reactions of alkynes and predict the products of such reactions.
- Identify compounds in which resonance is important, to predict the effect of resonance on the stability of compounds and reactive intermediates, and be able to draw resonance structures.
- Identify conjugated pi systems and to explain the effect of conjugation on molecular structure and reactivity; be able to predict the products of reactions of dienes.
- Write mechanisms for substitution and elimination reactions, and to predict the effect of nucleophile, leaving group, and solvent on the relative rates of S_N1 versus S_N2 reactions, and E1 versus E2 reactions, as well as on the relative rates of substitution versus elimination.

***Detailed learning objectives for each chapter are available [here](#).

Online links to chemistry materials:

- Bruice textbook website (4th edition). Do the tutorials for each chapter. wps.prenhall.com/esm_bruice_organic_4/ (http://wps.prenhall.com/esm_bruice_organic_4/)
- Reaction quizzes for Bruice textbook (4th edition): www.stolaf.edu/depts/chemistry/courses/toolkits/247/practice/medialib/data/quiz.htm (<http://www.stolaf.edu/depts/chemistry/courses/toolkits/247/practice/medialib/data/quiz.htm>)
- ChemTube3D has interactive animations and reaction mechanisms: www.chemtube3d.com/index.html (<http://www.chemtube3d.com/index.html>)
- ChemWiki – Virtual textbooks of organic chemistry: <http://chemwiki.ucdavis.edu> (http://chemwiki.ucdavis.edu/Textbook_Maps/Organic_Chemistry_Textbook_Maps/Reusch%3A_%22Virtual_Textbook_of_OChem%22)
- Web-sters' Organic Chemistry is a site that has numerous organic chemistry study aids and links to other helpful sites: www.chemconnections.org/Websters/ (<http://www.chemconnections.org/Websters/>)
- Los Alamos Periodic Table Site: periodic.lanl.gov/index.shtml (<http://periodic.lanl.gov/index.shtml>)

Grading Scheme:

Three one-hour exams (3 x 200 pt)	600 pt
Best ten out of eleven Sapling Learning homework assignments (10 x 10 pt)	100 pt
Best ten out of eleven Canvas quizzes (10 x 10 pt)	100 pt
In-class iClicker questions	~75 pt
Comprehensive Final (300 pt)	300 pt
Total Points:	1175 pt

Grade Breakdown:

The grade received in the course is based on your performance on the exams, quizzes, and homework. Grades are guaranteed as given below for overall percentage score on all exams. Actual grade ranges may be curved somewhat lower, depending on the overall class average.

A, A-	89% or higher
B+, B, B-	78% or higher
C+, C, C-	66% or higher
D+, D	53% or higher

Procedures:

- There will be no make-up exams. It is possible to take an exam in advance, but only with a valid excuse and prearrangement with

me. If you miss an exam without prearrangement, then you will receive a zero.

- Addition mistakes or questions over exam grading should be discussed with me within one week following the return of the exam. No point adjustments will be made after this time.
- Class notes, lecture recordings, answer keys, practice tests, lists of assigned problems, etc. will be posted on the course Canvas site. Answer keys and practice tests will be available in pdf format, which will require you to have Adobe Acrobat Reader on your computer.
- The main function of office hours is to discuss and solve problems that you may be having with the course materials, assigned problems, and concepts presented during lecture. Try to formulate questions in advance. Do not expect a mini review session.
- The administration of Chemistry 2310 will adhere strictly to the academic regulations stipulated in the most recent USU General Catalog. The complete code of Policies and Procedures for Students can be viewed at:
www.usu.edu/student-services/studentcode/ (<http://www.usu.edu/student-services/studentcode/>).
- It is official University policy that unless you have three exams on the same day, you must take the final exam in this course at the officially scheduled time. Permission to take a final at any other time for any other reason can only be obtained from the Course Instructor.
- The University add/drop schedule can be found at: www.usu.edu/registrar/. The University policy on giving a grade of Incomplete will be strictly followed.
- Students with ADA-documented physical, sensory, emotional, or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435) 797-2444 voice, (435) 797-0740 TTY, or toll free at (800) 259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.
- All individuals are responsible for understanding the contents of this document.

Suggestions:

- Try not to simply memorize. You will be more successful if you strive to understand the underlying principles.
- Organize your reactions. Categorize them by reacting functional group, reagent, and product functional group. Look for similarities in mechanism.
- Make up flash cards with reagents on one side and products on the other and with organic and inorganic reagent on one side and organic reagent and product on the other. Drill yourself.
- Keep up with lecture and reading materials.
- Make sure to do the on-line homework problems! Although not quite the format of the exams, they will help with your overall comprehension and exam performance.
- Work the problems! Work the problems! Work the problems! (practice makes perfect)
- Use the web sites listed above.
- Study in groups, but make sure everyone contributes.
- Use molecular models and/or the textbook website to visualize the three-dimensional nature of organic molecules.

UNIVERSITY POLICIES & PROCEDURES

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. [Faculty Code Policy #403](http://www.usu.edu/hr/files/uploads/Policies/403.pdf) (<http://www.usu.edu/hr/files/uploads/Policies/403.pdf>) further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students.

[The Honor Pledge](http://www.usu.edu/student-services/studentcode/article5.cfm) (<http://www.usu.edu/student-services/studentcode/article5.cfm>): To enhance the learning environment at Utah State

University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code.

Acts of academic dishonesty include but are not limited to:

- **Cheating:** using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
 - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually;"
 - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
 - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
 - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
 - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
 - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

Sexual Harassment

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at (435) 797-1266.

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Students with Disabilities

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC). Please contact the DRC prior to or as early in the semester as possible. Alternate formats for course content are available with advanced notice.

Contacting the Disability Resource Center (DRC):

- On Campus: Room 101 of the University Inn
- Phone: 435-797-2444
- Website: <http://www.usu.edu/drc/> (<http://www.usu.edu/drc/>)

Disability related resources for current students:

- [DRC Student Handbook](http://www.usu.edu/drc/currentstudents/handbook/) (<http://www.usu.edu/drc/currentstudents/handbook/>)
- [Deaf and Hard of Hearing Student Handbook](http://www.usu.edu/drc/currentstudents/DHHHandbook/) (<http://www.usu.edu/drc/currentstudents/DHHHandbook/>)
- [Disability Related Scholarships](http://www.usu.edu/drc/currentstudents/scholarships/) (<http://www.usu.edu/drc/currentstudents/scholarships/>)
- [Campus Resources](http://www.usu.edu/drc/currentstudents/campusresources/) (<http://www.usu.edu/drc/currentstudents/campusresources/>)
- [Documentation Guidelines](http://www.usu.edu/drc/prospectivestudents/docguide/) (<http://www.usu.edu/drc/prospectivestudents/docguide/>)
- [Online Resources for Students with Disabilities](http://www.usu.edu/drc/currentstudents/onlineresources/) (<http://www.usu.edu/drc/currentstudents/onlineresources/>)

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Student Services: <http://www.usu.edu/student-services/> (<http://www.usu.edu/student-services/>), 435.797.1712, studentservices@usu.edu (<mailto:studentservices@usu.edu>), TSC 220
- Student Advocates: <http://www.usu.edu/ususa/legal/> (<http://www.usu.edu/ususa/legal/>), 435.797.2912, TSC 340,
- Access and Diversity: <http://www.usu.edu/accesscenter/> (<http://www.usu.edu/accesscenter/>), 435.797.1728, <mailto:access@usu.edu> (<mailto:access@usu.edu>); TSC 315
- Multicultural Programs: <http://www.usu.edu/accesscenter/multiculture/> (<http://www.usu.edu/accesscenter/multiculture/>), 435-797-1728, TSC 315
- LGBTQA Programs: <http://www.usu.edu/accesscenter/lgbtqa/> (<http://www.usu.edu/accesscenter/lgbtqa/>), 435-797-GAYS, TSC 314
- Provost's Office Diversity Resources: <http://www.usu.edu/provost/faculty/diversity/> (<http://www.usu.edu/provost/faculty/diversity/>), (435) 797-8176

You can learn about your student rights by visiting:

The Code of Policies and Procedures for Students at Utah State University: <http://www.usu.edu/student-services/student-code/> (<http://www.usu.edu/student-services/student-code/>)

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: [Article VII. Grievances](http://www.usu.edu/student-services/student-code/article7.cfm) (<http://www.usu.edu/student-services/student-code/article7.cfm>).

Full details for USU Academic Policies and Procedures can be found at:

- [Student Conduct](http://www.usu.edu/student-conduct/) (<http://www.usu.edu/student-conduct/>)
- [Student Code](http://www.usu.edu/student-services/student-code/) (<http://www.usu.edu/student-services/student-code/>)
- [Academic Integrity](#)
- [USU Selected Academic Policies and Procedures](http://www.usu.edu/provost/faculty/teaching/doc/Syllabus_resources_USU_policies.pdf) (http://www.usu.edu/provost/faculty/teaching/doc/Syllabus_resources_USU_policies.pdf)
- [USU Academic Policies and Procedures](http://catalog.usu.edu/content.php?catoid=4&navoid=546) (<http://catalog.usu.edu/content.php?catoid=4&navoid=546>)
- [Academic Freedom and Professional Responsibility Policy](http://www.usu.edu/hr/files/uploads/Policies/403.pdf) (<http://www.usu.edu/hr/files/uploads/Policies/403.pdf>)

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.