COURSE SYLLABUS

CLASSES: MWF @ 10:00 10:50 AM, in Science Hall (SH 315).

INSTRUCTOR: Alejandro Bugarin Ph.D.

A. Office: CRB 205

B. Telephone: (817) 272-9399

C. E-mail: bugarin@uta.edu, web page http://www.uta.edu/faculty/bugarin

D. Office Hours: Students are welcome to consult me informally without appointment after class during the hours of 11:00-12:00 a.m. on MWF (unless announced otherwise). Other times can be scheduled by appointment.

E. Important Dates: August 25, First day of classes

September 12, Census day

November 02, Last day to drop a class (by 4:00 PM).

November 24 - 25, Thanksgiving holidays

Dec 07, Last day of class.

Dec 12, 2016, 9:00-11:30 a.m., Final Exam

A. COURSE DESCRIPTION:

CHEM-5309 Advance Organic Chemistry. Chemistry 5309 investigates the relationship between structure and reactivity of organic compounds. We will study advanced bonding theories, physical properties, structural conformations, stereochemistry, reaction kinetics, substituent effects, isotope effects, solvent effects, linear free energy relationships, substitution reactions, orbital symmetry and pericyclic reactions. In general, a comprehensive survey of the chemistry of carbon compounds: their structure, properties, bonding, stereochemistry, reactions, and reaction mechanisms.

B. LEARNING OBJECTIVES:

As a result of participating in this course, you should be able to:

A. Identify the general reactivity of compounds.
B. Account for the physical properties and chemical reactivity of any organic compound on the basis of its structure.
C. Understand conformational and electronic effects on stereochemical reactions.
D. Use the theoretical concepts of reactive intermediates, molecular orbitals, hybridization, resonance, tautomerism, and polarity in discussing the structure, reactivity, and mechanisms of organic compounds.
E. Predict and evaluate the three-dimensional structure of organic molecules.
F. Construct Molecular Orbitals from the combination of atomic orbitals for simple organic species.
G. Employ Hückel MO theory to describe electronic structure of linear and cyclic polyenes.
H. Elucidate reaction mechanisms from empirical kinetic data.
I. Predict the outcome of pericyclic reactions.

C. MATERIALS

A. Advance Organic Chemistry: Part A, Fifth Edition by Francis A. Carey and Richard J. Sundberg (Springer Publisher) (***REQUIRED***).
B. March's Advance Organic Chemistry, Seventh Edition by Michael B. Smith (Wiley) (***Recommended***).
C. Organic Chemistry By Inquisition. General Reactions: By Kevin Burgess (***REQUIRED***).
D. Advance Organic Chemistry: Part B, Fifth Edition by Carey and Sundberg (Springer Publisher) (***Recommended***).
E. Molecular model set (I recommend-Molecular Visions, Darling Models, but any will do).

D. COURSE REQUIREMENTS AND POLICIES

A. **Lectures**:
Attendance at class meeting is not required but strongly encouraged (excessive absences will lower the final grade), but attendance alone is not sufficient.

E. TOPICS TO BE COVERED AND SCHEDULE

Class	Day	Date	Lecture Topic	Problem Set Due
1	Fri	Aug 26	Class Overview; A Review of Organic Chemistry	
2	Mon	Aug 29	Chapter 1: Chemical Bond and Molecular Structure	
3	Wed	Aug 31	Chapter 1: Chemical Bond and Molecular Structure	
4	Fri	Sep 02	Chapter 1: Chemical Bond and Molecular Structure	
5	Mon	Sep 05	***No Class; Labor Day Holiday***	
6	Wed	Sep 07	Chapter 1: Chemical Bond and Molecular Structure	
7	Fri	Sep 09	Chapter 8: Aromaticity	Chapter 1
8	Mon	Sep 12	Chapter 8: Aromaticity	
9	Wed	Sep 14	Chapter 8: Aromaticity	
10	Fri	Sep 16	Chapter 8: Aromaticity	
11	Mon	Sep 19	Chapter 8: Aromaticity	
12	Wed	Sep 21	Chapter 2: Stereochemistry (Principles)	Chapter 8
13	Fri	Sep 23	Chapter 2: Stereochemistry (Principles)	
14	Mon	Sep 26	Chapter 2: Stereochemistry (Principles)	
15	Wed	Sep 28	Chapter 2: Stereochemistry (Principles)	
16	Fri	Sep 30	Chapter 2: Conformational and Stereoelectronic Effects	Chapter 2A
17	Mon	Oct 03	**Exam # 1 (Chapters 1, 8, & 2)**	
18	Wed	Oct 05	Chapter 2: Conformational and Stereoelectronic Effects	
19	Fri	Oct 07	Chapter 2: Conformational and Stereoelectronic Effects	
20	Mon	Oct 10	Chapter 2: Conformational and Stereoelectronic Effects	
21	Wed	Oct 12	Chapter 2: Conformational and Stereoelectronic Effects	
22	Fri	Oct 14	Chapter 3: Structural Effects on Stability and Reactivity	Chapter 2B
23	Mon	Oct 17	Chapter 3: Structural Effects on Stability and Reactivity	
24	Wed	Oct 19	Chapter 3: Structural Effects on Stability and Reactivity	
25	Fri	Oct 21	Chapter 3: Structural Effects on Stability and Reactivity	
26	Mon	Oct 24	Chapter 3: Structural Effects on Stability and Reactivity	
27	Wed	Oct 26	Chapter 4: Nucleophilic Substitution	Chapter 3
28	Fri	Oct 28	**Exam # 2 (Chapters 2 & 3)**	
29	Mon	Oct 30	Chapter 4: Nucleophilic Substitution	
30	Wed	Nov 02	Chapter 4: Nucleophilic Substitution	
31	Fri	Nov 04	Chapter 4: Nucleophilic Substitution	
32	Mon	Nov 07	Chapter 4: Nucleophilic Substitution	
33	Wed	Nov 09	Chapter 6: Carbanions and Other Carbon Nucleophiles	Chapter 4
34	Fri	Nov 11	Chapter 6: Carbanions and Other Carbon Nucleophiles	
35	Mon	Nov 14	Chapter 6: Carbanions and Other Carbon Nucleophiles	
36	Wed	Nov 16	Chapter 6: Carbanions and Other Carbon Nucleophiles	
37	Fri	Nov 18	Chapter 6: Carbanions and Other Carbon Nucleophiles	
38	Mon	Nov 21	Chapter 10: Concerted Pericyclic Reactions	Chapter 6
39	Wed	Nov 23	**Exam # 3 (Chapters 4 & 6)**	
40	Fri	Nov 25	***No Class; Thanksgiving Holiday***	
41	Mon	Nov 28	Chapter 10: Concerted Pericyclic Reactions	
42	Wed	Nov 30	Chapter 10: Concerted Pericyclic Reactions	
43	Fri	Dec 02	Chapter 10: Concerted Pericyclic Reactions	
44	Mon	Dec 05	Chapter 10: Concerted Pericyclic Reactions	
45	Wed	Dec 07	Chapter 7: Reactivity of Carbonyl Compounds	Chapter 10
46	Mon	Dec 12	**Final Exam (Chapters covered), 9:00 am – 11:30 am**	

A. Active participation is essential for success. Participation includes advance preparation of reading assignments, coming to class prepared with molecular models and calculators, and involvement with classroom discussions. Questions are always welcomed, I will be happy to re-explain concepts. Successful participation in the classroom will frequently stimulate continuing discussion outside the classroom, both with fellow students and with the instructor. These ongoing interactions will prove valuable and they are to be encouraged. A point to note is that class time is limited and If I don't have time to cover all of the material given as reading assignments (see above), you will be responsible for the uncovered material. **You are also expected to be completely familiar with the material that was covered in *undergraduate Chemistry*, this knowledge will be assumed, including all of the reactions.**

B. **Preparation**:
It is essential that you schedule adequate study time for this course! Experts recommend that you allow three hours of out-of-class preparation for each semester hour of credit. This means a minimum of nine hours per week for lecture material. You should plan a weekly schedule, make a written copy of it, and keep to your plan. Use this study time for

reading, reviewing class notes, doing the assigned exercises, and preparing for examinations. "YOU MUST KEEP UP". You will not be successful and pepared if you study the night before the test/exam.

C. **Examinations**:

Three mid terms (50 min.) and one final (2 ½ hours) will be administrated as schedule above. Each mid term will emphasize the material discussed since the previous test. However, you should realize that chemistry is a cumulative subject in which new material builds on previous material. Therefore, if you simply memorize the indicated chapters for a test, you will not do well. Some knowledge from previous chapters will normally be necessary. Examinations have been tentatively scheduled on the dates depicted on section E of this syllabus and will be given at class time. These exam dates may change depending upon our progress through particular chapters. You will be given a week's notice if an exam is to be held on a different day (note exams will only be postponed and not brought forward). Only exams, which are missed due to prior, **excused absences for genuine, documented emergencies** may be made up. If you otherwise miss an exam you will receive zero.

Examinations will be graded within 2-3 days after they are administered. Please refrain from requesting test scores the same day the test is given. No grades will be reported over the telephoneor email. Results of exams will be distributed at a regularly scheduled class meeting as soon as they are available.

A descriptive answer key for each exam will be posted in the display case outside of my office (CRB 205). It will be your responsibility to review the answer key, and to re-work questions which you have missed, until you understand the material thoroughly. Seek guidance from me if you still have difficulty answering a question **after** the key is posted and you have attempted to rework the problem. I will not assist you if I don't see evidence that you have re-worked the problem. **Any item that is missed by a significant number of students may be re-tested on a subsequent examination**.

From time to time errors are made during the grading process either in arithmetic or in the number of points awarded for a particular question. It is your responsibility to ensure that your points have been totaled accurately. In the event that this has not occurred, please bring this to my attention. This should be done after the class during which the tests are returned, but prior to the next scheduled class meeting. In the event that you perceive that insufficient credit has been awarded for a question then you have until the next scheduled class to bring it to my attention. However, there are rules regarding re-grades.

1. Only answers written in ink will be considered for re-grading (multiple choice excepted)
2. If a re-grade is requested, then all of the exam will be re-graded. This could result in your grade going up or down.
3. All multiple choice and random write-outs will be photocopied.

The **final examination** is an exception to some of the foregoing policies. No answer key will be published, and no exam booklets or student responses will be returned, although they can be examined in my office. The final examination will be given on the day indicated on the schedule section (E); it will be **comprehensive** in nature.

D. **Quizzes**:

During the course of the semester a few 10-min. pop-up quizzes will be administered during the class time. Quizzes will figure into your final grade. No make-up quizzes will be given.

E. **Problems set (homework)**:

Problems from the textbook will be assigned for every covered chapter, although these will not be fully graded, **you are responsible for working them out**. Similar problems will appear on exams, therefore if you do the assigned problems you are going to be better prepared for the exam problems. I will be happy to assist you with any difficulties that may arise during office hours. Please note, assistance will only be given if you provide evidence that you have attempted these problems, I am not going to do them for you!

F. GRADING

A. Each examination will receive a numerical grade expressed as a fraction of the maximum grade. Numerical grades cannot be easily translated to letter grades. Historically, we often provide a "curve" for examination scores; ***however, letter grades on a curve are estimates only, and they do not guarantee that you will receive the same final grade***.

B. Individual grades will contribute to the final total as follows:

Quizzes and Problem Sets	20%
Three midterms	60%
Final comprehensive	20%

C. Final letter grades will be awarded on the following basis:

Final Total	**Letter Grade**
89% or higher	A
76% or higher	B
65% or higher	C
52% or higher	D

Any individual whose final total is borderline between two letter grades will receive the higher grade if his/her attendance and homeworks record is excellent.

G. ACADEMIC INTEGRITY:

First of all, let us remind ourselves that the real purpose of this course is to help you acquire problem-solving skills, and a detailed knowledge of organic chemistry. Presumably, you would also like to acquire good scores in examinations. However, please remember that grades are not the goal; grades are merely evidence of your progress toward the goal. Your grades cannot be a valid measure of your learning unless the papers you submit represent your own work. *In general help others, but not give your work or do their work.*

All students are expected to pursue their scholastic careers with honesty and integrity. Academic dishonesty will not be tolerated by the Department of Chemistry and Biochemistry. Academic dishonesty includes (but is not limited to) cheating, falsification of date, plagiarism, and contracting/collusion with others to take your tests or do your work. Cheating is the use or acquisition of information (data, constants, formulas, textual material, etc.) from either unauthorized sources or in an unauthorized manner. Examples include but are not limited to:

- *exchanging information during a test or quiz*
- *looking at another student's paper during a test or quiz*
- *bringing information in any form into a test or quiz other than personal knowledge. This includes written notes (crib sheets) and digitally stored information (formulas, constants, textual, etc.) on calculators, cell phones, pagers etc.*
- *looking at a book or other unauthorized source during the test or quiz.*
- *accessing information by any electronic means (cellular phone, pagers, personal stereos, etc.)*
- *processing data or information in an unauthorized manner using a programmable calculator or computer. In other words, unless you have received authorization, you are not to use any computer program. This includes specialty computers or calculators in which the programming is "built in" to the computer. You are permitted to use simple calculators, which perform arithmetical, logarithmic, and trigonometric functions.*

In the event that a test proctor or instructor determines that a student is cheating, the following actions will be taken:

- *the student will be notified and, if the situation merits, asked to explain their actions*
- *the source of the unauthorized information will be removed during the remainder of the test period and returned to the student following the test, if appropriate.*
- *the student may be removed to a different location to complete the test.*
- *calculator/computer memory will be cleared of the stored information and programs as appropriate. In some cases the proctor will need to temporarily examine the calculator to verify unauthorized use. The calculator will be returned to the student to finish the test.*
- *a record of the events and actions surrounding the alleged act of cheating will be submitted to the Associate Vice Provost for Student Affairs for further action. See Undergraduate Catalog for further information.*

The following statement is a summary of University policy on cheating-"*Students who violate University ruled on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced."*

All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Bomb Threat Policy: In the event of a bomb threat to a particular facility, the University Police will evaluate the threat. If required, the exams may be moved to an alternate location, but they will not be postponed. UT-Arlington will prosecute phoning in bomb threats to the fullest extent of the Law.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located at your front-right corner. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Student Feedback Survey: At the end of each term, all students enrolled in this shall complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to through your MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

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Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the **Office for Students with Disabilities (OSD).** Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:
The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.
Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671.

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Campus Carry: The Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in selected buildings. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/

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Title IX: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit* www.uta.edu/titleIX*, or calling the Vice President and Title IX Coordinator at (817) 272-7091.*

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Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381