# COURSE SYLLABUS

**CLASSES:** Mon, Wed, & Fri @ 11:00 to 11:50 AM, in WA Baker Chemistry Research Building (CRB 114).

**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 11:50-12:40 a.m. on Mon & Wed (unless announced otherwise). Other times can be scheduled by appointment.

E. Important Dates:

August 22, First day of class

September 7, Census day

**November 2, Last day to drop a class.**

November 21-23, Thanksgiving Break

December 4, Last day of class.

**December 7, 2018, 5:30-8:00 p.m., Departmental Final Exam**

## A. COURSE DESCRIPTION:

**CHEM-2322 Organic Chemistry II.** A comprehensive survey of the chemistry of carbon compounds: their structure, properties, bonding, stereochemistry, reactions, and reaction mechanisms. An introduction to mass spectrometry, infra-red and nuclear magnetic spectroscopy and its application in structure determination. A description of carbonyl chemistry and its relevance to biomolecules, amino acids, carbohydrates and lipids. A description of the chemistry of dienes, benzene and aromatic substitution reactions and the chemistry of amines.

## B. POSITION OF THE COURSE IN THE COLLEGE CURRICULUM:

**CHEM-2322** is intended for students who are majoring in chemistry or biology, or who plan to enter a health profession such as medicine, dentistry, pharmacy, or allied health. It is the second half of a one-year course designed to survey the structure, reactivity and synthesis of carbon compounds. This course is a prerequisite for CHEM-5319 General Biochemistry I. Organic I, CHEM-2321 (or equivalent) with a grade of C or higher, is a prerequisite for this course – what this means in reality is that you will need material from this course to successfully navigate Organic II. It is therefore incumbent on you to review and thoroughly understand the material from this earlier course.

## C. LEARNING OBJECTIVES:

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

A. Correctly name any organic compound using IUPAC nomenclature, or, given an IUPAC name, depict the molecular structure.
B. Accurately represent the structure of any organic compound, both on paper and also in three-dimensional space using models or drawings.
C. Account for the physical properties and chemical reactivity of any organic compound on the basis of molecular structure.
D. Predict the outcome of an organic reaction or provide the reagents given the starting materials and products.
E. Recognize important substances and chemical processes, which have practical applications in household, laboratory, industry, and medicine.
F. Use the theoretical concepts of reactive intermediates, molecular orbitals, hybridization, resonance, tautomerism, and polarity in discussing the structure, reactivity and mechanisms of organic compounds.
G. Deduce the structure of an organic compound, given appropriate experimental and/or spectroscopic data.
H. Design short synthetic sequences (2-5 steps) for the preparation of organic compounds.

## D. DEPARTMENTAL GOALS PROMOTED BY THE COURSE

A. Train and prepare chemists and teachers for graduate research, industry, and lecture rooms.
B. Prepare students to enter medicine and other health professions, while adquiring advance chemical knoledge
C. Promote a greater appreciation of the natural world and understanding the scientific method of investigation.

## E. MATERIALS

A. Organic Chemistry, Third Edition by David Klein (Wiley Publisher) (***REQUIRED***)
B. Organic Chemistry, Study Guide and Solutions Manual, Third Edition, David Klein. (***Optional***)
C. Molecular model set (I recommend-Molecular Visions, Darling Models, but any will do).
D. Electronic calculator that is capable of performing trigonometric, logarithmic, exponential, and statistical functions. (***Optional, but you should not need it***)
E. Wiley Plus or Sapling online homework will not be administrated this semester.
F. Online assigments/quizzes will be giving via Blackboard. Therefore, make sure you have access to blackboard. (***REQUIRED***)

## F. TOPICS TO BE COVERED AND SCHEDULE

| Class | Day | Date | Lecture Topic | Assignments Due |
|---|---|---|---|---|
| **1** | Wed | Aug 22 | Class Overview; A review of Organic Chemistry I | |
| **2** | Fri | Aug 24 | Class Overview; Chapter 12 and 13 | Quiz 1 |
| **3** | Mon | Aug 27 | Chapter 14: Infrared Spectroscopy and Mass Spectrometry | |
| **4** | Wed | Aug 29 | Chapter 14: Infrared Spectroscopy and Mass Spectrometry | |
| **5** | Fri | Aug 31 | Chapter 14: Infrared Spectroscopy and Mass Spectrometry | Quizzes 2 to 4 |
| **6** | Mon | Sept 03 | ***No Class; Labor Day - Holiday*** | |
| **7** | Wed | Sept 05 | Chapter 14: Infrared Spectroscopy and Mass Spectrometry | |
| **8** | Fri | Sept 07 | Chapter 15: Nuclear Magnetic Resonance Spectroscopy | HW 1, CH 14 |
| **9** | Mon | Sept 10 | Chapter 15: Nuclear Magnetic Resonance Spectroscopy | Quizzes 5 to 7 |
| **10** | Wed | Sept 12 | Chapter 15: Nuclear Magnetic Resonance Spectroscopy | |
| **11** | Fri | Sept 14 | Chapter 15: Nuclear Magnetic Resonance Spectroscopy | Quizzes 8 to 9 |
| **12** | Mon | Sept 17 | Chapter 16: Conjugated Pi Systems and Pericyclic Reactions | HW 2, CH 15 |
| **13** | Wed | Sept 19 | Chapter 16: Conjugated Pi Systems and Pericyclic Reactions | |
| **14** | Fri | Sept 21 | Chapter 16: Conjugated Pi Systems and Pericyclic Reactions | Quizz 10 |
| **15** | Mon | Sept 24 | Chapter 17: Aromatic Compounds | HW 3, CH 16 |
| **16** | Wed | Sept 26 | **Exam # 1 (Chapters 14 – 16)** | |
| **17** | Fri | Sept 28 | Chapter 17: Aromatic Compounds | |
| **18** | Mon | Oct 01 | Chapter 17: Aromatic Compounds | |
| **19** | Wed | Oct 03 | Chapter 18: Aromatic Substitution Reactions | HW 4, CH 17 |
| **20** | Fri | Oct 05 | Chapter 18: Aromatic Substitution Reactions | |
| **21** | Mon | Oct 08 | Chapter 18: Aromatic Substitution Reactions | |
| **22** | Wed | Oct 10 | Chapter 18: Aromatic Substitution Reactions | |
| **23** | Fri | Oct 12 | Chapter 19: Aldehydes and Ketones | HW 5, CH 18 |
| **24** | Mon | Oct 15 | Chapter 19: Aldehydes and Ketones | |
| **25** | Wed | Oct 17 | Chapter 19: Aldehydes and Ketones | |
| **26** | Fri | Oct 19 | Chapter 19: Aldehydes and Ketones | |
| **27** | Mon | Oct 22 | Chapter 19: Aldehydes and Ketones | |
| **28** | Wed | Oct 24 | Chapter 20: Carboxylic Acids and Their Derivatives | HW 6, CH 19 |
| **29** | Fri | Oct 26 | **Exam # 2 (Chapters 17 – 19)** | |
| **30** | Mon | Oct 29 | Chapter 20: Carboxylic Acids and Their Derivatives | |
| **31** | Wed | Oct 31 | Chapter 20: Carboxylic Acids and Their Derivatives | |
| **32** | Fri | Nov 02 | Chapter 20: Carboxylic Acids and Their Derivatives | |
| **33** | Mon | Nov 05 | Chapter 21: Alpha Carbon Chemistry: Enols and Enolates | HW 7, CH 20 |
| **34** | Wed | Nov 07 | Chapter 21: Alpha Carbon Chemistry: Enols and Enolates | |
| **35** | Fri | Nov 09 | Chapter 21: Alpha Carbon Chemistry: Enols and Enolates | |
| **36** | Mon | Nov 12 | Chapter 21: Alpha Carbon Chemistry: Enols and Enolates | |
| **37** | Wed | Nov 14 | Chapter 22: Amines | HW 8, CH 21 |
| **38** | Fri | Nov 16 | Chapter 22: Amines | |
| **39** | Mon | Nov 19 | Chapter 22: Amines | |
| **40** | Wed | Nov 21 | ***No Class; Thanksgiving Break*** | |
| **41** | Fri | Nov 23 | ***No Class; Thanksgiving Break*** | |
| **42** | Mon | Nov 26 | **Exam # 3 (Chapters 20 – 22)** | HW 9, CH 22 |
| **43** | Wed | Nov 28 | Chapter 23: Introduction to Organometallic Compounds | |
| **44** | Fri | Nov 30 | Chapter 24: Carbohydrates | |
| **45** | Mon | Dec 03 | Chapter 25: Amino Acids, Peptides, and Proteins | HW 10, CH 23 |
| **46** | Wed | Dec 05 | Chapter 26: Lipids; Chapter 27: Synthetic Polymers | |
| **47** | Fri | Dec 07 | **Final Exam (Chapters 14 – 27), 5:30 pm – 8:30 pm** | |

## G. COURSE REQUIREMENTS AND POLICIES

A. **Lectures**:

Faithful attendance is mandatory (excessive absences will lower the final grade), but attendance alone is not sufficient. 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 I will not have time to cover all of the material given as reading assignments (see above). **You are responsible for all of the material covered in the lectures, the assigned text, and the problems.**

B. **Supplemental Instruction:**

Each week supplemental instruction sessions will be held *at time and a location* to be announced in class and posted at the class web site.

C. **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 will not be successful if you study the night before the test/exam. The study of organic chemistry is a cumulative process, in other words, "what you learned last week will be assumed next week."

D. **Examinations**:

Examinations, mid-terms (50 min.) and the final (2 ½ hours) will consist of mainly multiple-choice and a few short-answer questions. Each midterm 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 scheduled on the dates programmed on table 1 of page 2, and they most likely won't be altered. These exam dates will only change under special circumstances. 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. You must bring **# 2 pencil** and **ScanTron form 882-E** to the test.

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 telephone. 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 on the course web page. 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 regrades.

1. Only answers written in ink will be considered for re-grading (multiple choice excepted)
2. If a regrade is requested, then all of the exam will be re-graded. This could result in your grade going up or down.
3. All of the 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 Friday, December 07, 5:30 pm to 8:00 pm; it will be **comprehensive** in nature and will be written by all faculty that are teaching Organic II this semester. Exam location: to be announced.

E. **Quizzes on Blackboard**:

Also, throughout the course of the semester ten short quizzes will be administered via **Blackboard**, go to your account, https://elearn.uta.edu/. Your ten quizzes will figure into your final grade. No make-up quizzes will be given and deadline extensions will not be granted, under any circumstances. However, if you missed a quiz and want to make up for the grade read the following homework assignments.

F. **Homework Problems (optional)**:

Problems from the textbook (David Klein) will be assigned, 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. A minimum of **15 problems** will be collected, *of your choice,* from each chapter. It is expected that you pick problems from all levels of difficulty. Questions and answers should be on your hand-out. To get credit for your homework, you must follow specific rules (I will ***only*** explain those rules once, the first day of class), if you miss any of those directions you will receive a negative grade (-1 point each time). Regardless, 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! **Additional** on-line quizzes are available through Blackboard, which are linked to this class.

## H. 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. No "curve" for scores will be given. ***Therefore, work hard throughout the semester.*** If you need extra help, please visit the Chemistry Clinic located on SH 318. An alternative is to attend GTA's problem solving sections, which date and time will be announced in class (if available).

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

| | |
|---|---|
| Quizzes on Blackboard | 10% |
| Three midterms | 60% |
| Final comprehensive | 30% |

The grade in the final exam, if greater than one of the midterms, will replace that grade.

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 |
| 50% or higher | D |

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

## Attendance:

At the University of Texas at Arlington, taking attendance is not required. Therefore, I will not take attendance. However, I strongly encourage you to attend class meetings for your own benefit.

## 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.

**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.

## Grade Replacement

Students enrolling in a course with the intention of replacing a previous grade earned in the same course must declare their intention to do so at the Registrar's Office by CENSUS DATE of the semester in which they are enrolled. Please consult the Undergraduate Catalog for the university policy regarding grade replacement.

## Pass/Fail

If P or F is a grade option in this class and you intend to take this class for a pass/fail grade instead of a letter grade, you MUST inform the instructor, through the necessary paperwork, of your intentions BEFORE the census date.

## Drop for NON-PAYMENT of Tuition:

If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office. You may not continue to attend class until your Enrollment Loan has been applied to outstanding tuition fees.

## 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-left 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.

## Title IX:

The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

## Americans with Disabilities Act

In an effort to be certain that students with documented disabilities are reasonably accommodated, I would like to ask your cooperation in informing me of any legitimate needs you might have in this course. Your need for this request will be verified through the appropriate University office to be certain the best accommodation is provided for your particular disability as it relates to this course. It is important for you to understand that this document will be held in the strictest confidence and will not be kept with any of your permanent student records.

Name: SS# or EID:

Course: Section:

Disability:

Suggested Accommodation:

Also, if you do not require an accommodation but would be agreeable to having your class notes duplicated or assist in another manner with a disabled peer, please indicate below.

Name: SS# or EID:

Note Sharing: Other Assistance:

***For accommodations contact: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364.