

COURSE SYLLABUS

(Tentative**)

CHM 2323.01

Organic Chemistry I

3 semester credit-hours

Classroom: CFS 101

Sect 01 MWF 10:00-10:50

Instructor:	Dr. Benny E. Arney	Semester:	Spring 2017
Office Phone:	294-1531 off-campus ext. 41531 on-campus	Email:	CHM_BEA@SHSU.EDU
Office:	CFS 326 (office) Or CFS 305 (Lab) or CFS 323(instrument)	Office Hours:	TuTh 9:00-11:00 AM MoWe 10:00-11:30 AM

Textbook (required): Joel Karty, "Organic Chemistry: Principles and Mechanisms", W.W. Norton & Company, Inc., New York, NY, 2014, ISBN 978-0-393-91904-2. Must bring book to every class.

Description:

This is the first half of a two-semester course in organic chemistry. Topics include the nomenclature of, molecular bonding and structure of, properties and reactions of alkanes, alkenes, alkynes, and alkyl halides. Spectroscopy of organic compounds will be interspersed throughout the lecture. **You must put in at least 3-4 hours of study and problem solving for every hour of class in order to be considered somewhat dedicated in your studies.**

Prerequisite:

Students in this course must have successfully completed CHM 1411 with a grade of C or higher. Material and concepts from General Chemistry, as it pertains to this class **is assumed as common knowledge** and is relevant for discussion and testing.

Cell Phones must be turn off during class.

If your cell goes off in class, you **will** be ejected from the classroom. No ear mounted phones or ear phones are allowed in class. **During tests you are not allowed to have a cell phone at your desk.** You will be ejected from the test if you have one in your possession or if your cell-phone goes off. **NO use of electronic devices is allowed during class without the written documentation from the Office of Student with Disabilities.**

NO recording of lectures is allowed. To be caught doing so is an automatic "F" for the course.

Critical Learning Techniques:

Before each class meeting, it will be essential for you to complete the assigned reading and homework so that lectures might be supplemented with appropriate questions and valuable discussion. **If you are having difficulty with any of the assignments, it is your responsibility to make regular visits to my office and/or the chemistry tutors.**

Attendance Policy:

It will be essential for you to attend class regularly if you desire to perform well. Class attendance will not be used, however, as a criterion for evaluating student performance.

Objectives: Skills to be Acquired This Course:

It is an overall goal of this course to improve the problem solving and mathematical skills of all students enrolled. In addition, students successfully completing this course should be able to:

1. To build on the foundations of General Chemistry.
2. Grasp and explain the concept of atomic geometry as a result of electronic orbitals.
3. Understanding of molecular structure and geometry as the result of atomic electronic geometry (hybridization).
4. Ability to distinguish the classes into organic compounds (alkanes, alkenes, alkynes, aromatics, ...) based on structure.
5. Ability to distinguish the major functional groups; alcohols, ethers, amines, amides, nitriles, ketones, aldehydes, esters, carboxylic acids, acid halides, and acid anhydrides based on structure.
6. To understand and apply the fundamental concepts of mass spectrometry and nuclear magnetic resonance spectroscopy.
7. Ability to utilize the spectroscopic data acquired for a substance to determine structural information about its molecules.
8. Ability to name, using IUPAC rules, members of the major classes of organic compounds.
9. Understand and apply nucleophilic (S_N1 & S_N2) substitution reactions.
10. Understand and apply elimination ($E1$ & $E2$) reactions.
11. Understand Electrophilic Addition reactions of nonpolar pi bonds.
12. Understand orbital interactions in structure and reactions.
13. Understand and utilize the relative acid-base properties of atoms in various functional groups.
14. Understand and discuss structure-stability trends for reactive intermediates and stable molecules.
15. Predict the behavior of molecules under reaction conditions.
16. Predict relative physical and chemical properties of similar molecules based on comparative structure.
17. Predict possible products of reactions as well as the major product.

18. Ability to derive an acceptable mechanism for a reaction based on an understanding of the structure and properties of the starting materials, the reagents, and the products.
 19. Ability to compose a reasonable synthesis of relatively simple organic compounds based on structure and a knowledge of basic reactions.
 20. Ability to apply structural features of a compound to explain the chemical properties and stabilities observed.
 21. Fluency in the terms and vocabulary of fundamental Organic and Freshman Chemistry.
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Examinations:

There will be four 50 minute, in-class, closed-book examinations each worth 100 points. These are based on the problems at the end of the chapters covered. The format will be 35% multiple choice, 35% short answer and matching, and 30% short answer. If an exam has been missed, the percentage correct on the final examination will also count for the missed examination. Any additional missed exams will be recorded as zeroes.

A final, **comprehensive** examination will be given at the University scheduled time. This exam will also be worth 200. All students must take this exam (the score obtained will not be dropped). A missed final will generate a grade of F for the course. The total number of points possible is 600.

There are no make-up exams, or the possibility of early exams, or extra-credit so do not even ask.

Grading:

If the student has completed the final examination, a letter grade will be assigned based on their total accumulated points:

4 (A)	510 – above ($\geq 85\%$)
3 (B)	450 – 509 ($\geq 75\%$)
2 (C)	390 – 449 ($\geq 65\%$)
1 (D)	330 – 389 ($\geq 55\%$)
0 (F)	329 or below

Writing Standards:

Students enrolled in this course are expected to use literate and effective English in their speech and in their writing. All papers submitted must be well-written; grades on written work (including examinations) will be based on expression as well as on content.

STUDENTS WITH DISABILITIES POLICY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu).

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can or will be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:

<http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf>

Academic Dishonesty (Cheating) Policy:

“All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.”

Inappropriate Classroom Conduct Policy:

“Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Cellular telephones and pagers must be turned off before class begins. Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.”

Visitors to the Classroom:

“Unannounced visitors to the class must present a current, official SHSU identification card to be admitted in the classroom. They must not present a disruption to

the class by their attendance. If the visitor is not a registered student for the course, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the room."

Schedule for Lectures: CHM2323

Date	Topic	Chapter/Sections	Pages
Jan 18	Covalent Bonds, Lewis Structures, Electronegativity, polarity	1.1-1.7	1-18
20	Ionic bonds, formal charge, oxidation state, resonance	1.8-1.12	18-35
23	Functional groups, proteins, carbohydrates, nucleic acids	1.13-1.15	35-46
25	Nomenclature of Alkanes, Cycloalkanes, Haloalkanes, Nitroalkanes, and Ethers, Last day to Register and Process Schedule Changes	Nomenclature 1	54-75
27	VSEPR, dash-wedge notation, molecular models	2.1-2.3	76-84
30	Molecular polarity, physical properties, intermolecular interactions		
Feb 1		2.4-2.6	84-97
3	Solubility, ion-dipole interaction, protic and aprotic solvents, soaps/detergents, lipids (Last day to drop w/o grade of "Q" & receive 100% refund, Feb 2)	2.7-2.12	98-120
6	Nomenclature of Alkenes, Alkynes and Benzene Derivatives	Nomenclature 2	163-175
8	AOs, orbital interactions, MOs, hybridization, Valence Bond theory	3.1-3.5	128-145
10	Test#1		
13	Pi bonds, bond rotation, hybridization and effective electronegativity	3.6-3.12	143-158
15	Conformational isomers, Newman projections, conformational analysis, cycloalkanes, ring strain	4.1-4.5	176-191
17	Cyclohexane, chair conformations, substituted cyclohexanes, cis/trans isomers, Haworth projections	4.6-4.10	192-203
20	Constitutional isomers, degree of unsaturation, isomerism in amino acids and saccharides, saturation in fats and oils	4.11-4.16	203-216
22	Nomenclature of Functional groups	Nomenclature 4	398-419
24	NMR spectroscopy, shielding, chemical shift, number of signals	16.1-16.8	757-774
27	Integration, splitting, complex splitting	16.9-16.12	774-787
Mar 1	C-13, DEPT, Structure elucidation	16.13-16.15	787-796
3	Mass Spectrometry, isotopes, molecular formula	16.16-16.20	797-806
6	Chirality, Enantiomers, and Diastereomers, R/S Configurations of Tetrahedral Centers and E/Z Configurations of Double Bonds	5.1-5.4, Nomenclature 3	228-242, 276-294
8		5.5-5.9	242-257
10	Test#2		
13-17	Spring Break	5.10-5.15	257-267
20	Proton Transfer Reaction: Introduction to Mechanisms, Thermodynamics, and Charge Stability	6.1-6.4	295-312
22		6.5-6.6	312-329
24		6.7-6.11	329-341
27	Overview of Most Common Elementary Steps	7.1-7.5	351-365
29		7.6-7.10	365-377

31	Introduction to Multi-Step Mechanisms: S _N 1 and E1	8.1-8.3	420-427
Apr 3		8.4-8.5	427-446
5	Test#3		
7		8.6-8.7	446-456
10	Competition among S _N 1, S _N 2, E1, and E2 reaction	9.1-9.3	466-480
12	Last Day to drop Courses	9.4-9.6	480-493
14	State Religious Holiday		
17		9.7-9.10	493-506
19		9.11-9.14	507-515
21	Electrophilic Addition to Nonpolar π-Bonds I: Addition of Brønsted Acid	11.1-11.5	570-583
		11.6-11.12	583-603
26	Electrophilic Addition to Nonpolar π-Bonds II: Reactions Involving Cyclic Transition States	12.1-12.4	610-627
28		12.5-12.8	627-638
May 1	Test#4, Last to Resign from Course.		
3			
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Homework Problems:

Though you will not hand in the problems for a grade, your grade in the course is easily predicted by the number of problems your work (without assistance) and the ease that you develop for solving them. You need to work out the solutions to as many of these exercises as is necessary to understand the concepts being addressed by each and to learn the “Language of Organic Chemistry” which is structure, preparations, and reactions. You may wish to try additional exercises after finishing those in your book in order to fully re-enforce and test your comprehension of the material. It is also very important that you periodically review the problems from earlier chapters in order to reinforce the retention of the material and to refresh forgotten material. **Remember that getting an answer is meaningless if it does not come from understanding and solving the problem.**

Do you want to do well in this course?

If your answer to this question is yes, you should frequently ask yourself the following questions:

1. Have I prepared for class by completing the assigned reading before coming to lecture?
2. Have I made notes during my reading of the points which are confusing or difficult so that I may ask questions about them during lecture?
3. Have I kept a neat and complete notebook of homework problems and sought help from a tutor or faculty member for those problems I did not fully understand?
4. Have I prepared for the exams by working on assignments daily and not waiting until two or three days before the exam?
5. **Most importantly, have I gone back and reviewed the previous older problems to make sure that I am still able to understand and do them?**

** This document is tentative in that changes may be made as deemed necessary by the Professor in order to achieve the objectives of the course.

Student Acknowledgement of Syllabus:

I, _____ (*your name*)
having SHSU ID# _____, have printed the syllabus for CHM 2323
(Spring 2017). I further acknowledge that I have read said syllabus and that I am familiar
with its contents. I also recognize that my continuance in this course requires that I agree
to its content and requirements and that changes to this syllabus are only possible if they
further the aims of the course as deemed appropriate by the professor.

I am also aware that questions and/or problems with the course must be addressed to the
instructor. If these problems are not part of the day's scheduled material, it should be
addressed after class, during office hours, or by appointment.

Signed : _____

Date: _____