

# COURSE SYLLABUS

(Tentative\*\*)

CHM 238.01

Organic Chemistry I

3 semester credit-hours

Classroom: CFS 123

MWF 10:00-10:50 AM Sect: 02 CFS 123

11:00-11:50 PM Sect: 03 CFS 123

(The Student Acknowledgement Form at the end of the syllabus must be completed, signed, and turned in to the Instructor by Aug. 31, 2007)

Instructor:	Dr. Benny E. Arney	Semester:	Fall 2007
Office Phone:	294-1531 off-campus ext. 41531 on-campus	Email:	CHM_BEA@SHSU.EDU
Office: Check each room	CFS 326 Or CFS 305 Or CFS 323	Office Hours:	TuTh 8:00-10:00 AM TuWTh 1:30-2:30 PM
Website	Blackboard at www.shsu.edu		

**Textbook (required):** John McMurry, "Organic Chemistry", 7th ed., Thomson, Brooks/Cole, 2008, ISBN 0-495-11258-7. Must bring book to every class.

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## Description:

This is the first half of a two-semester course in organic chemistry. Topics include molecular bonding and structure, properties and reactions of alkanes, alkenes, alkyl halides, and alcohols, and the nomenclature of alkanes, alkenes, alkynes, alkyl halides, and alcohols. Other topics will be interspersed throughout the lecture. This is the foundation material for all further work in Organic Chemistry and it is absolutely critical to your success both in this course and in subsequent organic related course-work that the concepts and tools in this first semester be mastered as fully as possible. If you do not learn the first half you can not pass the second half.

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## Prerequisites:

Students in this course must have successfully completed CHM 139 & CHM119 with a grade of C or higher. The students are expected to be proficient in the nomenclature, vocabulary, and principles from General Chemistry as these are the foundations of Organic Chemistry and will be included in testing and course materials.

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## Study Requirements:

Most of the important learning in this class will be SELF-LEARNING or SELF-TEACHING. To discuss all of the necessary important topics in class would leave no time for questions or discussion and not enough material could be covered to justify the class. In order to be effective in this class you must prepare by reading and working problems prior to coming

to class. Class time is best used to work on applying the readings and material. **Attending class and writing notes will NOT be enough for most students to pass the class.** Each student must find the level of interaction with the material necessary to succeed. Study groups may be excellent methods for many students. **Remember you are responsible for your advancement.**

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## **Required Materials:**

You are required to bring your book to class. Requisite material from CHM 138/139 includes, but is not limited to, bonding, structure, equilibria, thermodynamics, and nomenclature of common ions, ionic compounds, binary compounds, and acids. Also, you are expected to attempt to work as many of the problems in each chapter as possible.

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## **Questions in Class:**

If you ask a question in class, I generally will not answer it directly, but will ask you questions to find the source of the question. Most questions arise because of inadequate background or misunderstanding of a prior concept or material. Just providing you an answer to write in your notebook would not solve the problem.

If I ask a question in class, especially one that should be easily answered if a student is keeping up and understanding the material, I will wait for the class to come up with an acceptable answer. You should not consider this class a spectator class where you show up take notes and then study before the test.

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## **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.

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## **Objectives: Skills to be Acquired in This Course:**

This a science major's course and as such will be conducted at a level consistent with the preparation of majors for advanced level work. Regardless of your specific major, the demands of the course will be same for all students as will also the testing. It is an overall goal of this course to improve the problem solving skills and understanding of chemical systems 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 hydrocarbons into alkanes, alkenes, alkynes, aromatics, or composites 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. Ability to name, using IUPAC rules, alkanes, alkenes, alkynes, alkyl halides, and composites.

7. Know the reactions and preparation of alkanes.
  8. Know the reactions and preparation of alkyl halides.
  9. Know the reactions and preparation of alkenes.
  10. Familiar with and functional, at a basic level, in the nature and use of spectroscopic methods.
  11. Understand and utilize the relative acid-base properties of atoms in various functional groups.
  12. Understand and discuss structure-stability trends for reactive intermediates and stable molecules.
  13. Predict the behavior of molecules under reaction conditions.
  14. Predict relative physical and chemical properties of similar molecules based on comparative structure.
  15. Predict possible products of reactions as well as the major product.
  16. 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.
  17. Ability to compose a reasonable synthesis of relatively simple organic compounds based on structure and a knowledge of basic reactions.
  18. Ability to apply structural features of a compound to explain the chemical properties and stabilities observed.
  19. Fluency in the terms and vocabulary of fundamental Organic and Freshman Chemistry.
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## Examinations:

**Examinations will only be given at the times and dates assigned within this syllabus.** Do not ask for an earlier or later exam.

As stated above, it is expected that each student will work through as many of the problems in each chapter as possible as the course progresses. This is important as it is the only way that the understanding, use, and application of the material and skills can be acquired. Additionally, much of each test will be modeled after the problems from the chapters in addition to multiple choice, fill in the blank, etc. Nomenclature and important concepts from CHM138/139 will be included in the tests.

There will be four, in-class, closed-book examinations each worth 100 points. **Any exam that has been missed will be replaced by the final examination percentage grade.** Total possible exam points = 400.

A final, **comprehensive** examination will be given at the University scheduled time. This exam will also be worth 200 points and a grade of 60 points or more on the final examination is required to be eligible to pass the course. 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. Therefore, the total number of points possible is 600. (400 exam, & 200 final).

All tests will be graded and the grades posted on black board as soon as possible, which is usually by the next class meeting. Tests will not be returned, discussed or reviewed in class. Questions about the grading of assignments may be discussed during office hours or by appointment.

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## Test Format & Content:

Every test will be comprehensive, approximately 60% new material and 40% old material. Every new topic will be built upon older material because its understanding requires fluency in the previous material. Studying and working the problems at the end of each chapter is the best way to study and evaluate your progress in this course. If you cannot work the problems without the book or study guide you are not ready to move on to new material or take the next test.

There are five main types of testing formats in each test.

1. Multiple choice: May be over any new or prior material.
2. Matching: covers terminology, concepts, reagents, reactions, etc.
3. Filling the blank: supply the appropriate term for the context.
4. Give missing component for a reaction (A, B, or C):  $A \xrightarrow{B} C$  : supply the correct starting material, reagent, or product to complete the given reaction.
5. Random types of problems taken from the Ends of Chapters.

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## Make-up Tests:

There are none. Do not ask about them.

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## Grading:

If a student earns  $\geq 60$  out of 200 on the final, a letter grade will be assigned based on their total accumulated points:

4 (A)	510 - above
3 (B)	450 – 509
2 (C)	390 – 449
1 (D)	330 – 389
0 (F)	329 or below

IF the final examination is not taken or a grade of less than 60 out of 200 is earned on the final, an F will be awarded regardless of previous points.

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## 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.

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## ADA Policy:

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 Counseling Center and to talk with me about how I can best help you. All

disclosures of disabilities will be kept strictly confidential. NOTE: no accommodation can be made until you register with the Counseling Center.

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## 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.”*

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## 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.”*

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## 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, it is at the instructor’s discretion whether or not the visitor will be allowed to remain in the room.”*

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## Schedule for Lectures: CHM238

Date	Topic	Reading Assignment
Aug 20	Atomic Orbitals, Molecular Orbitals, Bondings	Chap 1
22	Atomic Orbitals, Molecular Orbitals, Bondings	
24	Molecular Structures, Polarity, Resonance, Acid-base	Chap 2
27	Polarity, Resonance, Acid-base	
29	Polarity, Resonance, Acid-base	
31	Polarity, Resonance, Acid-base, Functional Groups.	Chap 3
Sept 5	Alkane nomenclature and properties ( <b>Last day to drop w/o grade of “Q” &amp; receive 100% refund</b> )	

7	Conformations	
10	Conformations, Cycloalkanes	
12	Cycloalkane nomenclature, cis/trans isomerism	Chap 4
14	<b>Exam 1</b>	
17	Stability and Conformation of cycloalkanes and cyclohexanes	
19	Polycyclic alkanes	
21	Types of Reactions, mechanisms, Radical, Polar, Arrow pushing.	Chap5
24	Equilibria, rates, energy changes, Bond dissociation energies, and transition states	
26	Intermediates.	
28	Alkenes, sources, Degrees of Unsaturation, and nomenclature.	Chap6
Oct 1	E/Z isomerism, stabilities, electrophilic addition to alkenes, Markovnikov's Rule	
3	Carbocations, Hammond Postulate, Carbocation Rearrangements	
5	<b>Exam 2.</b>	
8	Alkenes: reactions with Halogens, hypohalous acids, and hydration.	Chap 7
10	Addition of carbenes, hydrogenation, epoxidation and hydroxylation <b>(Last day to drop w/o grade of "F". Last day to Resign w/o mark of W. Degree applications to be filed in Registrar's office by students expecting to graduate in May 2008.)</b>	
12	Cleavage of alkenes, polymerization, Nomenclature of alkynes.	Chap 8
15	Preparation and reaction of alkynes	
17	Reactions and use of alkynes in synthesis	
19	Stereochemistry, enantiomers, diastereomers, R/S configurations.	Chap 9
22	Meso compounds, isomerism overall, resolution of enantiomers, stereochemistry of reactions.	
24	Chirality in other atoms, prochirality, and chirality in nature.	
26	<b>Exam 3</b>	
29	Nomenclature and properties of alkyl halides, free-radical halogenation	Chap 10
31	Allylic bromination and allylic radical, preparation of alkyl halides from alcohols	
Nov 2	Grignard reagents, Organometallic coupling, oxidation & reduction	

5	Nucleophilic Substitution, S <sub>N</sub> 1 and S <sub>N</sub> 2	Chap 11
7	Elimination Reactions, E1, E2 and E1cb	
9	Overall reactions of Alkyl halides	
12	Mass Spectrometry, interpreting mass spectra.	Chap 12
14	Infrared Spectroscopy, interpreting IR	
16	<b>Exam 4</b>	
19	MS and IR interpretation and problems.	
26	Nuclear Magnetic Resonance Spectroscopy, FT-NMR, Chemical Shifts, <sup>13</sup> C NMR	Chap 13
28	Uses of <sup>13</sup> C NMR, DEPT, <sup>1</sup> H NMR & <sup>1</sup> H NMR chemical shifts.	
30	Integration, spin-spin splitting, more complex spin-spin splitting.	
3	<b>Spectroscopy Problems</b>	
5	<b>General Organic Problems</b>	
6	<b>(Last Day for Resignation)</b>	
	<b>!!!!!! FINAL EXAMINATIONS !!!!!!!</b>	

## 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 and outlining 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?

\*\* 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.

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## Student Acknowledgement of Syllabus:

I, \_\_\_\_\_ (*your name*) having SHSU ID# \_\_\_\_\_, have printed the syllabus for CHM 238 (Fall 2007). 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: \_\_\_\_\_