Sign and print your name at the bottom to indicate that you have read this document.

Why am I being asked to initial and sign this document?

FERPA (The Family Educational Rights and Privacy Act), also known as the Buckley Amendment, was passed by Congress in 1974 to protect the privacy of student education records.

- By initialing the following course policies you are agreeing to partially wave some of your FERPA rights.
- Read each statement carefully. If you understand and accept the course policy described, **indicate this by initialing the statement**.
- Accommodations will be made for students who do not wish to initial one or more statements.

_____ **If you ask the instructor for a letter of recommendation, assumed in this request is permission to divulge personal information, such as your course grade, to the readers of this letter of recommendation.**

_____ **Graded quizzes and exams will often be returned via the group folder. This introduces the possibility of students in your group viewing your grades.**

_____ **I (student) understand that I am expected to read the syllabus, and that the professor will assume I have read the syllabus by next class.**

_____

Signature **Date**

_____

Printed Name

ORGANIC CHEMISTRY I - CHEM 2411
Fall 2007; TR 12:30-1:45; TLC 1103/1104

Instructor: Dr. Vickie Geisler
Email: vgeisler@westga.edu
Office: TLC 2120
Office Hours: M 1-5; T 8:15-11:15; W 1-2; R 3-5
Office Phone: (678) 839-6025
Teaching Assistant: Bette' Ford
Email: bford3@my.westga.edu
Problem-Solving Sessions: TBA
Required Material: *Organic Chemistry*, John McMurry, 6th Ed.
2 or 3 inch 3-ring binder
Recommended Material: Molecular Models

Course Description: The first course of a two semester sequence which provides a broad introduction to the basic principles, theories and applications of the chemistry of carbon compounds. This course will emphasize the relationship between structure and reactivity. Topics will include modern structural theory, organic nomenclature, stereochemistry, reaction mechanisms and kinetics, and an introduction to functional group chemistry.

Learning Objectives: To learn the language of organic chemistry; to educate students to think independently about organic chemistry; to reason and think analytically in solving problems and making decisions in matters involving organic chemistry. To look for patterns and recognize qualitative similarities between seemingly unrelated facts. To develop a practical understanding for the causes of chemical change; to predict reactivity from structure; and to learn to predict the outcome of a reaction never seen before and to communicate organic chemistry with clarity.

Classroom and Outside-of-classroom Expectations:

- This course will be taught using the Process Oriented Guided Inquiry Learning (POGIL) method I will not lecture.
- The majority of class time will be spent working in self-managed groups of three or four. I will assign group membership and reshuffle groups on a regular basis.
- Each group must collectively ensure….
  1. there is agreement on each question before moving on
  2. no one is going ahead or falling behind
  3. no one dominates the discussion and everyone feels comfortable speaking up, especially if they are frustrated, confused or behind.
- Each class will begin with a 5.0-minute quiz, individually taken, covering material from the previous class.
- The quiz is followed by group work on a ChemActivity. During this time I will walk around class, observe, ask and answer questions. You must bring your notebook to class every day. During class periods, group work may be interrupted for group reports, brief whole-class discussions, or mini-lectures. You must pause group work for these discussions.
- The POGIL material is designed to use leading questions to guide you towards the formulation of your own knowledge.
- I will serve as a coach to help students in learning the material.

- In many instances, I may not answer a question directly but may ask you a question that will lead you to discovering the answer for yourself.
- You must complete each day's ChemActivity sheet, including the exercises at the end of the activity and the assigned readings and problems in McMurry before the next class period, as they will form the basis of the 5.0-minute quiz.
- You are strongly encouraged to work outside of class in groups. Studies show that most successful students do much of their homework in a productive group environment and that most students who fail are working alone.
- It is highly suggested that you use your binder to store and organize all classroom-related materials. A suggested organization might be to group each day's work as follows: worked out ChemActivity exercises, worked out problem sets, worked out problems from McMurry, and notes from McMurry. These might be ordered in chronological or reverse chronological order.
- During the last five minutes of class, I will stop group work to give you time to prepare your group's recorder's and reflector's reports.

Grading:

- **Quizzes:** After the first week there will be a five minute quiz at the beginning of almost EVERY class period except exam days. When you enter class, sit at your group table and be ready to start the quiz. If you are late, you will not get extra time for the quiz. The three lowest quiz scores will be dropped. Quizzes will be on material covered in previous class. You will not be excused from any quizzes; there are no make-up quizzes. A quiz missed for any reason will count as one of your "dropped" quizzes. The average of the remaining quizzes will count the same as an exam. Preparing for the quiz will be most effective if you do it in the context of a regular and productive study group, or with a study partner. Successful students report spending at least 3 hours preparing for each quiz. This entails:
  - Completing the ChemActivities (including exercises),
  - doing the assigned problems in McMurry and
  - reading the selected sections in McMurry.

- **Exams:** There will be four exams given on September 11th, October 4th, November 1st, November 29th. No make-up exams will be given. Each exam will specifically test class material covered since the previous exam. However, since the nature of chemistry is cumulative I will assume that you have mastered past material.

- **Final Exam:** The final exam will be a multiple choice exam. It is a comprehensive exam over the entire course. The exam will be give on Thursday, December 13th from 11-1.

- **Homework**- problems from the book and problems sets will be assigned on a regular basis. Students are permitted and encouraged to work together. Problem sets will be the basis for the problem sessions.

- **Problem Sessions: (Attend PS and earn up to two dropped quizzes)**
  - PS is a fun and interactive way to enhance your understanding of the material.
  - During PS you will work on the problem sets. This can earn you "PS points".
  - Earn 1 PS point for each PS you attend and participate. You will earn a dropped quiz for your 4th and 9th PS point earned.

- **Academic Honesty:**
  - All exams and quizzes will be closed book/closed notes, and will be taken individually (unless otherwise instructed).
  - During exams you may not use your own paper or other materials except your pen or pencil.
  - Academic dishonesty will not be tolerated. Academic dishonesty includes unauthorized use of any materials, notes, sources of information, or study aids or tools during a quiz or exam. It also includes the unauthorized assistance of any person other that the course instructor during a quiz or exam, the unauthorized viewing of another person's work during a quiz or exam, or the unauthorized securing of all or part of any quiz or exam before submission by the instructor.
  - Violation of academic honesty will generate disciplinary action that may include a course grade of F. A student who is suspected of cheating must confess to all wrong doing at the first opportunity (when first confronted), or risk a harsher penalty. If you believe that there are situations in the course that foster academic dishonesty, please bring them to my attention. Likewise, if you have observed cheating, bring the details to my attention as soon as practical. Insofar as it is possible, your anonymity will be protected.

- **Calculation of Overall Average:**
  - Method 1. The quiz average, each hour exam score, and the final exam score will be added together and the total will be divided by 6.
  - Method 2. The lowest exam score is dropped from the calculation. The final exam counts twice. The quiz average, the three best exam scores, and double the final exam score will be added together and the total will be divided by 6.

- **Grading Scale:** A: 100-85; B: 84-75; C: 74-60; D 59-50; F: 49-0%

- **Note:** Last day to withdraw with a "W" is October 8th.

Additional Policies:

- Students are expected to attend all classes. A large part of the learning process in this course is based on the in-class activities. If you are not here you will not have a chance to participate in those activities. There will be no makeup quizzes – if you miss a quiz it will simply be one of the three that is dropped from the calculation. If you miss a class it is your responsibility to get class notes from another student in the class.
- If you must bring your cell phone to class, make sure the ringer is **OFF** during class. Any cells phones seen during an exam will result in an automatic F for the exam.
- This syllabus outlines the policies for the course. You are responsible for understanding them. Any changes in course policy will be announced in class or on the class WebCT site.
- Qualified students with disabilities should contact me as soon as possible to ensure that appropriate accommodations can be made.

Course Outline:

Chapter 1 and 2	Review: Valence bond theory and molecular orbital theory, hybridization, Lewis structures, formal charges, resonance, polarity, acids and bases
Chapter 3	Alkanes and Cycloalkanes: Functional groups, nomenclature, isomerism

Exam 1

Chapter 4	Stereochemistry of Alkanes and Cycloalkanes: conformations, Newman projections, cyclohexane, equatorial and axial
Chapter 5	An Overview of Organic Reactions: Mechanisms, Radical and polar reactions, curved arrows, nucleophiles and electrophiles
Chapter 6	Alkenes: DBE, Nomenclature, isomerism, structure, reaction mechanisms and electrophilic addition, Markovnikov's rule, reaction energy diagrams

Exam 2

Chapter 7	Alkenes: Reactions of alkenes
Chapter 8	Alkynes: Structure, nomenclature, properties, acidity, alkylation, preparation, preparation, reactions, and organic synthesis
Chapter 9	Stereochemistry: Enantiomers, chirality, (R) and (S), optical activity, Fisher projections, diastereomers, meso, optical activity and stereochemistry of reactions

Exam 3

Chapter 10	Alkyl Halides: Structure, nomeclature, properties, halogenation, preparation, organometallic compounds and oxidation and reduction
Chapter 11	Nucleophilic Substitution and Elimination: S_N2, S_N1, E_1, E_2, and nucleophility
Chapter 14	Conjugated Dienes: MO, electrophilic addition, Diels Alder reaction

Exam 4

Useful web sites
McMurry: http://chemistry.brookscole.com/mcmurry6e
Organic Chemistry flash cards and tutorials: www.ochem.com
Virtual Textbook http://www.cem.msu.edu/~reusch/VirtualText/intro1.htm

HOW TO STUDY ORGANIC CHEMISTRY

Most students consider organic chemistry to be one of the most difficult courses that they take during their college career. Some consider it to be challenging but fun (much like a game of chess can be) but others find it to be impossibly difficult. The material can be mastered and is, in fact, not conceptually difficult.

The first difficulty that students encounter is the amount of information that they are expected to learn. Organic chemistry is a very vigorous field and much has already been discovered about organic compounds and their reactions. Many organic textbooks are now about 1200 pages long. You cannot expect to learn all this material without investing considerable time and effort in studying. The pace of the course is brisk and allowing yourself to fall behind in your studying will spell doom for most students.

Unlike general chemistry, the introductory organic courses (2411 and 2422) contain little math. What then, does this vast volume of information consist of? What are organic chemists interested in knowing and what they do know?

First, organic chemists are interested in the structure of organic molecules. Your previous study of bonding (particularly covalent bonding) will be reviewed and used extensively in this course. Organic chemists are also very interested in the three dimensional shapes of molecules. The branch of organic chemistry that deals with three-dimensional shape is called stereochemistry and will be a very important part of the course.

Second, organic chemists are very interested in the chemical reactions. By the end of the second course 2422, you will have learned hundreds or even thousands of reactions. In learning these reactions, you will want to know what products will be obtained if two compounds are mixed under a given set of conditions and also what kinds of reagents can be used to cause certain types of reactions to occur.

Third, for many reactions we will study, the details of how the reactions occur are known. When a reaction occurs one must first know what reagents were used as starting materials and what the final products are. The conversion of the starting materials to the products will involve either breaking bonds, making bonds or both. The detailed sequence of which bonds are broken and formed, in what order, and the stereochemical relationships of these bonds is called a mechanism for the reaction.

Understanding mechanisms is the key to modern organic chemistry. Although we will be studying hundreds or even thousands of reactions, these reactions occur via only a few fundamental mechanistic pathways. It is the recognition of the mechanistic similarities between different reactions that allows organic chemistry to be readily understood. Many students who find organic chemistry impossibly difficult never appreciate this. It is as if you were given a copy of the New York City phone book that had been cut into pieces containing one name each and asked to put the names in the order in the book. Based on experience with some students in organic chemistry, a surprising number would get a complete phone book, attempt to memorize it, and then attempt to put the names in the order of the list they had memorized. This is the reason that a surprising number of students find organic chemistry impossibly difficult. Just as learning the alphabet and the rules of

alphabetization will help in assembling the phone book, understanding the mechanisms will help make sense of the thousands of facts that comprise organic chemistry.

Your textbook is organized primarily by types of compounds. Each type of compound will contain a specified functional group. For example, all the compounds of the type called alcohols contain an -OH group (the functional group for alcohols) bonded to a carbon atom. As we study each type of functional group, you will find that each reacts by only a few mechanistic paths and hence has a chemical "personality" of its own. Do not treat mechanisms as just another thing to memorize. Organic chemistry is a vast field and you must be able to see the forest for the trees. Mechanism and structure provide a way of doing this.

Now let us suppose that you have learned the structures of organic compounds, what reactions various compounds undergo, what reagents cause certain types of reactions and have a good grasp of known mechanisms. Have you mastered organic chemistry? Are you now an organic chemist? Do you deserve an "A" in the course? Not yet! Working organic chemists do not just repeat what is known. They use that knowledge to solve problems and discover new chemistry.

This course will be just as much about learning to solve problems and apply the knowledge you have gained as it will be about becoming familiar with what organic chemists have learned. An analogy would be a course in the game of chess. In such a course you would be expected to play chess. A simple knowledge of the rules, recognition of the pieces and knowledge of what moves each piece is allowed would not be enough. Similarly, in this course, you will be required to use the knowledge you have gained in new and creative ways (both in the problem sets and in the exams). Organic chemistry is as much or more about learning to think in a chemical context as it is about the context itself. The types of problems that organic chemists encounter are many and varied. However, there are three types of problems that commonly occur and that you will often have to solve.

The first of these is identifying an unknown substance. This can be done by studying the reactions that the compound does or does not do. To solve this type of problem, you must learn chemical reactions in the forward sense. That is, you must know what will happen if two compounds are mixed. A second approach to this type of problem is to identify the compound through spectroscopy. Spectroscopy involves subjecting the molecule to some energy source (there are several types commonly used) and determining how it interacts with the energy.

A second major type of problem encountered by organic chemists is that of preparing (making) a given compound. To work synthesis problems, it is useful to learn chemical reactions in a reverse sense. That is, if you need to make a given type of compound, you must know what types of reactions and what starting materials to use to get it. Often the compound to be synthesized is complicated enough that it cannot be made in a single reaction - rather a series of reactions is needed. In such a multi-step synthesis, it is often useful to work backwards. That is, one first thinks of all the ways of preparing the final product even if they do not use acceptable starting materials (allowed compounds in homework problems or compounds that are available in the laboratory). If none of the routes contains acceptable starting materials, you then devise syntheses of those starting materials. This process is then repeated until you find a route back to acceptable starting materials.

The third major type of problem is explaining how a reaction occurs. The first step is to propose a reasonable mechanism. One then devises tests to check the proposed mechanism. In this course, more emphasis will be placed on proposing a reasonable mechanism than on devising tests to see if

your mechanism is correct. As we study the mechanisms of known reactions, you will note that each functional group has characteristic ways in which it reacts. In most of the problems you will encounter, the individual steps of a proposed mechanism should be consistent with the known types of reactions for the functional group. Although it is possible, that the reaction involves a completely new and different kind of reactivity, it is much more likely that the individual steps are similar to known reactions. This will be true for two reasons: Many homework and test questions will be at least somewhat related to what we have done, and Organic chemists have already discovered many of the fundamental types of reactivity for the types of compounds we will be studying.

To master organic chemistry, you will need to study regularly and systematically. The following technique is useful for many people:

1. Read ahead. When you come to class you should have read the material that will be presented.

2. Work the problems in the chapters (as opposed to those at the end of the chapters) as you read the material. Write out the answers on paper. Even if the answers seem obvious, writing them down will help you remember.

3. When working problems, work several problems before consulting the answer book. If you look up each answer as you do the problem you cannot help catching a glimpse of the answer to the next problem. The result is that you are not really working the next problem.

4. Prepare a set of flash cards to help you remember reactions. Design these cards to help you remember reactions in both the forward and backward sense. Organic chemistry is a very cumulative subject. At the end of the second course (2422) you will need to know the material presented on the first day of the first course (2411) just a much as you will on the first exam. These cards will be invaluable for reviewing. NOTE WELL: Using flash cards prepared by another student will give you some benefits but much of the benefit of the flash cards comes from you having to think about the reaction enough to prepare the card.

5. Solve the more challenging problems at the end of the chapters. The answers to most of these problems will not be obvious to you when you first read the question. Do not give up too quickly. Do not consult the answer book without making a determined effort to solve the problem on your own. Many people can read an answer and understand it. Do not be fooled into thinking you can solve problems because you understand the answers when you seen them. Write the solutions out on paper.

6. Regular study will pay off better than last minute cramming. You will get much better results by studying an hour each and every day as opposed to several hours once or twice a week.

Before exams review your flash cards and problems. Get a good night sleep. You will be expected to solve new problems on the exams. If you have studied regularly, being alert and relaxed will be more important than last minute cramming. If you haven't studied regularly, you will be in trouble either way.

Schedule

Date	Chemactivity/Topic	McMurry Sections	Relevant Problems in McMurry
August 16	Structure and Bonding	1-1.6	1.5-7, 21, 23, 24, 26, 27
August 21	Orbitals and Hybridization	1.7-1.12	1.25, 30-32, 37, 39, 40, 45-47
August 23	Molecular Shape and Formal charges	2-2.3	
August 28	Resonance	2.4-2.6	
August 30	Acids and Bases	2.7-2.13	
September 4	Isomers	3-3.3, 3.6, 3.8	
September 6	Nomenclature	3.4-3.7	
September 11	Exam I		