

Chemistry 201

Elementary Organic Chemistry

Syllabus, Spring 2004

Instructor: Mary C. Setzer E-mail: msetzer@chemistry.uah.edu

Office: WH 342 Telephone: 824-3259 FAX: 824-6349

Office Hours: Tuesday, Thursday 1:00-3:00 or by appointment

Prerequisite: Passing grade in CH 101 or higher level chemistry course.

Meeting Times: Lecture: Tuesday, Thursday 9:35-10:55 WH 149

Lab: Monday 12:45-3:45 WH 305 *or* Wednesday 12:45-3:45 WH 305/307 (You *must* enroll in one of the lab sections!)

Textbook & other materials: *Required:* McMurry, "Fundamentals of Organic Chemistry", 5th Ed. *Strongly Recommended:* A molecular model set such as The Prentice Hall Molecular Model Set for General and Organic Chemistry available in the bookstore, or Molecular Visions Model Kits from **darlingmodels.com** (kits #1, 2, or 3 are good ones). I will make available lecture notes on the UAH WebCT site (see below). These notes will be used during my class lectures; however, please be advised that they are designed to complement lecture attendance and your textbook, and not to replace them. In order to access and print these files you will need Adobe Acrobat Reader (preferably, v 6.0); if you do not have a copy of this program, you can download it program free from <http://www.adobe.com/products/acrobat/readstep2.html>.

Examinations and Grading: There will be four one-hour examinations throughout the term worth 100 points each. The lowest exam score will be dropped (a missed exam constitutes the lowest score). *There will be no special, early, or late exams.* The examinations will be based upon class lectures, textbook reading, assigned homework problems, laboratory experiences and in-class demonstrations. You may be given a seating chart for exam days; in which case you must sit in your assigned seat on exam days.

There will also be a comprehensive multiple-choice final exam worth 100 points, a 100-point special topics term paper, and the laboratory component worth 200 points.

You will be able to access your grades throughout the term by logging into the UAH WebCT site.

Final grades will be based on your performance on the four exams and the final examination.

There are 700 points possible. Grades will be assigned based upon the following breakdown:

>600 500-599 400-499 300-399 <300

A B C D F

Homework Problems: Homework problems have been assigned below. These problems will not be collected or graded but examinations will be based upon them; pop quizzes may be given occasionally throughout the semester for extra credit, which will include the homework problems, or problems much like them. Additional problems may be assigned through the semester. Many of the assigned homework problems have answers in the back of the text, but you are encouraged to work other problems as well. Answers to all of the in-chapter and end-of-chapter problems are available in the Study Guide/Student Solutions Manual. This can be purchased through the bookstore or can be checked out from the reserve desk at the UAH library.

Attendance and General Citizenship: You are expected to show respect for your instructor and your classmates. If you must come to class late or leave early, do so quietly. While you are encouraged to ask questions and participate in class discussions, do not engage in other conversations while lectures are being conducted. *Cell phones* and pagers *must be turned off while you are in class.* You will be required to leave if you do not observe these rules.

Misconduct: Cheating on examinations will not be tolerated. Anyone found cheating (copying another exam or

laboratory report, asking others for answers, or using notes or textbooks during an exam, plagiarism of textbooks and other material, for example) will be dealt with according to the UAH Student Handbook.

Advice: This is an elementary organic chemistry course and as such, is not designed to serve as a pre-requisite for higher courses in chemistry. This course will be presented as an introduction to nomenclature, structure, functional groups, and properties of organic compounds and not as a comprehensive survey. In addition, we will cover topics related to organic chemistry of interest to you so that we develop an understanding of what organic chemistry is and how organic chemistry affects our daily lives. It is hoped that this course will be intellectually stimulating and entertaining. Note, however, that elementary organic chemistry does not mean easy organic chemistry; it will be a labor-intensive course. To do well involves much time and effort. You should expect to spend at least 10 hours per week outside of class studying and doing homework problems. It will be to your advantage to come to all of the lectures (and to come to all of the lectures on time and prepared to cover the material at hand, to ask questions, and to go over problems), to read (and re-read, if necessary,) the textbook, to work all of the homework problems, and not to fall behind. If you find yourself not grasping the material sufficiently, please get help immediately. Office hours are available and I encourage you to come and get help.

Complaint Procedure: If you have difficulties or complaints related to this course, your first action should be to discuss them with your instructor. If such a discussion would be uncomfortable for you or fails to resolve your difficulties, you should contact Professor James K. Baird, Chair of the Chemistry Department. His telephone number is 824-2416. If you still are unsatisfied, you should discuss the matter with Dr. Debra Moriarity, Associate Dean of the College of Science. Dean Moriarity's phone number is 824-6605.

Special Needs Students: If you have special needs for this class which require a modification of seating, testing, or other class procedures you must discuss them fully with the instructor during the first two weeks of class.

**Chemistry 201
Elementary Organic Chemistry
Calendar, Spring 2004**

(Be sure to keep track of any possible changes to the schedule!)

Tuesday	January 13	Introduction
Thursday	January 15	Chapter 1 - Structure and Bonding, Review of Fundamentals
Tuesday	January 20	Chapter 2 - Alkanes
Thursday	January 22	Chapter 2 - Alkanes □ January 26: Last day to drop with refund □
Tuesday	January 27	Chapter 3 - Alkenes
Thursday	January 29	Chapter 4 - Reactions of Alkenes & Alkynes
Tuesday	February 3	Chapter 5 - Aromatic Compounds
Thursday	February 5	EXAM I (Chapters 1, 2, 3, 4, 5) □ February 9: Deadline to change credit to audit □
Tuesday	February 10	Chapter 6 - Stereochemistry (we'll skip sections 6.4-6, 6.10, 6.11)
Thursday	February 12	Chapter 7 - Alkyl Halides
Tuesday	February 17	Chapter 8 - Alcohols, Phenols, Ethers
Thursday	February 19	Chapter 8 - Alcohols, Phenols, Ethers
Tuesday	February 24	Chapter 12 - Amines
Thursday	February 26	EXAM II (Chapters 6, 7, 8, 12)
Tuesday	March 2	Chapter 9 - Aldehydes and Ketones
Thursday	March 4	Chapter 9 - Aldehydes and Ketones
Tuesday	March 9	Chapter 10 - Carboxylic Acids and Derivatives
Thursday	March 11	Chapter 10 - Carboxylic Acids and Derivatives
Tuesday	March 16	Chapter 11 - Carbonyl α-Substitution and Condensation Reactions
Thursday	March 18	EXAM III (Chapters 9, 10, 11)
Tuesday	March 23	Spring Break - NO CLASS!
Thursday	March 25	Spring Break - NO CLASS!

Tuesday	March 30	☐March 29: LAST DAY TO WITHDRAW ☐ Chapter 14 - Carbohydrates
Thursday	April 1	Chapter 14 - Carbohydrates
Tuesday	April 6	Chapter 16 - Lipids
Thursday	April 8	Chapter 16 - Lipids

Tuesday	April 13	Honors Day - NO CLASS!
Thursday	April 15	Chapter 15 - Amino Acids, Peptides, and Proteins
Tuesday	April 20	EXAM IV (Chapters 14, 15, 16)
Thursday	April 22	Special Topics
Tuesday	April 27	Special Topics, Term Papers Due
Tuesday	May 4	Final Exam 8:00 A.M. (Note time!)

**Chemistry 201
Elementary Organic Chemistry
Spring 2004
WebCT Login Instructions
for Students**

[online version at <http://classweb.uah.edu/login.htm>]
WebCT ID and Password

To login to a WebCT course, you will need two pieces of information: a WebCT ID (or user name) and a password. Your WebCT ID is the first part of your UAH e-mail address, the part before the "@" symbol. Your initial WebCT password is the last four digits of your student number. For example, John Doe has the e-mail address doejohn@email.uah.edu and his student number is 555-77-9999. John Doe's WebCT user name and password is:

User Name: doejohn Password: 9999

If you do not know what your UAH e-mail address is, go to the student registration website at <http://register.uah.edu> and then login to Student Services. Under Personal Information, click View E-mail Addresses to find your UAH e-mail address. Alternatively, you can search for your e-mail address at <http://www.uah.edu/email.html>. If you are still unable to determine your UAH e-mail address, contact the Information Services help desk at 824-HELP or Charger Central at 824-7777. Neither the help desk nor Charger

Central will know your WebCT ID, so only ask for your UAH e-mail address.

Logging in to WebCT

Once you have your WebCT ID and password, you are ready to login to WebCT.

- 1. Go to <http://classweb.uah.edu>**
- 2. Click the Login to WebCT link.**
- 3. Enter your WebCT ID (user name) and password and click OK.**
- 4. On the my WebCT page, click on the course that you want to enter (under Courses). You may notice that if you have multiple courses that use WebCT, they all show up here on the myWebCT page.**

WebCT Technical Requirements

Since you will access WebCT over the web, your computer must be able to connect to the Internet. You must use either Microsoft Internet Explorer version 4 or higher or Netscape Communicator (or Navigator) version 4 or higher with Java and JavaScript enabled. WebCT does not currently support Netscape version 6. AOL users should connect normally, then minimize the AOL window and open either the Internet Explorer or Netscape browser. For more information about setting up your web browser for use with WebCT, go to <http://classweb.uah.edu/browser.htm>

Troubleshooting

If you do not see any courses listed on your myWebCT page, contact your instructor to make sure he/she has added your name to the course.

For other information regarding WebCT, go to <http://classweb.uah.edu/> and look under Student Support and/or Frequently Asked Questions. For other questions, you may contact the WebCT Administrator at webct@classweb.uah.edu. If you e-mail the WebCT Administrator, please provide sufficient information to describe your problem.

**Chemistry 201
Elementary Organic Chemistry
Homework Problems**

These are the assigned homework problems, some are in the chapter and some are end-of-chapter problems. Many of the in-chapter problems have answers in Appendix C of your book. The answers to all homework problems are available in the Study Guide/Student Solutions Manual. This

can be purchased through the bookstore or can be checked out from the reserve desk at the UAH library. There are more problems that have not been assigned, feel free to try them as well... remember: practice, practice, practice.

Chapter 1 Structure and Bonding

4, 5, 7, 9, 12, 14, 17, 26, 27, 35, 36, 40, 41, 42, 44, 48, 49, 51, 61, 62

Chapter 2 Alkanes

1, 3, 4, 5, 8, 9, 10, 12, 16, 18, 19 b & c, 21, 23, 27, 29, 31, 33, 35, 39, 40, 43, 44, 50, 51, 58, 65

Chapter 3 Alkenes

1, 3, 4, 5, 6, 8, 11, 12, 15, 26, 28, 29, 32, 41, 43, 51, 58, 60

Chapter 4 Reactions of Alkenes & Alkynes

2, 5, 8, 9, 11, 13, 16, 18, 26, 33 a & c, 42, 52, 53

Chapter 5 Aromatic Compounds

3, 5, 6, 11, 12, 18, 26, 27, 43

Chapter 6 Stereochemistry

2, 4, 13, 21, 26, 28, 30, 57, 58, 59

Chapter 7 Alkyl Halides

1, 2, 3, 4, 8, 14, 18

Chapter 8 Alcohols, Phenols, Ethers

1, 2, 3, 4, 5, 7, 9, 10, 11, 19, 22, 26, 27, 33 a, 47

Chapter 12 Amines

1, 2, 3, 5, 6, 7, 22, 24, 26, 27, 29

Chapter 9 Aldehydes and ketones

1, 2, 3, 4, 5, 7, 12, 21, 25, 26, 30, 32 a b & e

Chapter 10 Carboxylic Acids and Derivatives

1, 2, 3, 5, 6, 9, 11, 12, 13, 18, 20, 26, 28 b, 35, 37, 40, 60

Chapter 11 Carbonyl Alpha-substitution and Condensation Reactions

1, 2, 6, 7, 13, 14, 18, 25

Chapter 14 Carbohydrates

1, 2, 4, 5, 7, 13, 14, 24, 26, 33, 34, 35, 46, 37

Chapter 15 Amino Acids, Peptides, and Proteins

1, 3, 8, 9, 23, 30, 31, 34, 46, 47

Chapter 16 Lipids and Nucleic Acids

2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15

Strategies for College Success

Remember, you're not in high school any more. Things are different: expectations are much higher and the pace is faster. Help is out there, but you have to realize you need it and ask for it.

Results of a study by Landis, California State, 1995:

Students with GPA > 3.7

Students with GPA <

- **Study > 30 hrs/wk out of class.**
- **Reviewed material before class.**
- **Stayed 1-2 chapters ahead.**
- **Reviewed notes after class.**
- **Visited the professor/instructor.**
- **Studied in groups of 3-5 several times per week.**
- **Asked many questions.**
- **Study 8-10 hrs/wk out of class.**
- **Didn't review material before class.**
- **Stayed 1-2 chapters behind.**
- **Didn't look at notes after class.**
- **Rarely discussed class work with others.**
- **Rarely asked questions.**
- **In effect, they are still in high school.**

Take steps to succeed:

- ♦ **Go to class, arrive on time, sit up front, and stay awake.**
- ♦ **Talk with your teachers in and after class, during office hours.**
- ♦ **Recopy lecture notes**
 - **Group effort (make sure you get all the information, teaching others will help you learn)**
 - **Correlate your notes with the book**
- ♦ **Go over old exams and sample tests. Don't just memorize the answers. Do learn how to work them.**
- ♦ **Group Study**
 - **You learn by teaching**
 - **You'll get more done because you won't get stuck on specific problems.**
 - **You won't miss important stuff.**
 - **You will identify the material you don't know.**
- ♦ **Remember: You always know the answer until someone asks you the question.**

If you don't know it, it WILL be on the exam.

- ♦ **Practice, practice, practice! Math problems require repetition. Exam requires rapid recognition of solution strategy - practice helps. Put practice problems on note cards and work them at odd times.**
- ♦ **Get help early on in the semester**
 - **Utilize office hours**
 - **Visit the tutorial room**

- Do not procrastinate
- ♦ Learn to manage and schedule your time.
 - Prioritize
 - Schedule. Keep track of what will be done when and where; account for all of your activities.
 - NOTE: 10 pm – 2 am are not the best study hours.
- ♦ Intense Study Session
 - 2-5 min: Set goals for the next 40 min.
 - 20-40 min: Read selectively, highlight important information, write notes in the margins, create mnemonics and concept maps, do problems, do problems, do more problems.
 - 5 min: Review what's just been studied.
 - 10 min: Take a break.
 - Repeat
- ♦ Be smart on Exam Day
 - Get up early
 - Shower
 - "Dress for Success"
 - Eat a good meal
 - Avoid stress

Periodic Table of the Elements

1	2	3	4	5	6	7	8
1.008 H 1							
6.941 Li 3		9.012 Be 4		10.811 B 5		11.996 C 6	
22.990 Na 11		24.305 Mg 12		26.982 Al 13		28.086 Si 14	
39.0983 K 19	40.08 Ca 20	44.956 Sc 21	47.90 Ti 22	50.9415 V 23	51.996 Cr 24	54.938 Mn 25	55.845 Fe 26
85.468 Rb 37	87.62 Sr 38	88.906 Y 39	91.22 Zr 40	92.9064 Nb 41	95.94 Mo 42	98.906 Tc 43	101.07 Ru 44
132.906 Cs 55	137.33 Ba 56	138.906 La 57	178.49 Hf 72	180.948 Ta 73	183.85 W 74	186.2 Re 75	190.23 Os 76
(223) Fr 87		226.025 Ra 88		(227) Ac 89		(257) Rf 104	

140.12 Ce 58	140.908 Pr 59	144.24 Nd 60
232.038 Th 90	231.031 Pa 91	238.029 U 92

CH 201
Elementary Organic Chemistry
SPRING 2004

Instructor: Office:

e-mail: Office hours:

Textbooks: Required: Setzer & Setzer, "The Organic Chemistry Laboratory Experience"; Recommended: Fessenden, Fessenden, & Feist, "Organic Laboratory Techniques", 3rd Ed.

Clothing: Students must provide the following safety clothing; these items **are not furnished**. Eye protection is required *at all times* while in the laboratory; **safety glasses** or prescription glasses that provide *adequate* protection of the eyes are acceptable (clear lenses only). If there is a question as to adequate coverage, please consult the Laboratory Manager. Contact lenses are extremely dangerous in a chemistry laboratory and are strongly discouraged. If you insist on wearing contact lenses, you must wear face-fitting goggles and you must identify yourself to your lab instructor. Rubber or latex **gloves** should be worn while carrying out experimental work, handling chemicals, etc. A **laboratory coat or apron** is required. If an apron is used, you must also have *long sleeves*. Long hair must be pulled back or otherwise restrained. Closed-toe shoes must be worn; sandals or any other types of open shoes are prohibited. No roller blades or skates are allowed in the lab. It is also recommended that students bring a roll of **paper towels** for their own use.

General Information: Each laboratory procedure should be carefully studied *before* the lab session. The pre-lab assignment must be completed prior to the experiment. You will not be allowed to begin an experiment without first completing the pre-lab. If you have not completely read the lab instructions and precautions, you are a hazard to yourself and those around you. The instructor will cover the overall purpose and principles of the experiment at the beginning of the laboratory. If there is anything about the experiment you do not understand, feel free to ask questions at any point. Some equipment must be signed out from the stockroom. This equipment *must be returned* at the end of your lab period. Report any injuries or chemical spills to your instructor immediately.

Attendance and General Citizenship: You are expected to show respect for your instructor and your classmates. Cell phones and pagers must be turned off while you are in lab. You will be required to leave if you do not observe these rules.

Glassware: Laboratory glassware is expensive. When experiments are carried out using glassware, some things will get broken and we expect that. However, excessive breakage, or breakage resulting from carelessness are unacceptable laboratory practices---poor laboratory technique, and will be graded accordingly. When you break glassware be sure to dispose of it correctly in *the broken glass container, not just in a trash can*. For broken thermometers, be sure to clean up the any mercury mess as well as the glass.

Safety: Because flammable liquids and corrosive and health-damaging chemicals are frequently encountered in the laboratory; unsafe laboratory practices cannot and will not be tolerated. Anyone observed violating safety rules, which may result in damage to their own health (for example, not wearing safety glasses, handling noxious chemicals outside the hood, etc.), will be reprimanded and graded down on technique. No food or drinks are

allowed in the laboratory. All books, coats, backpacks, etc. must be placed on the shelves in the front area of the laboratory. If the safety

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violation threatens the health or safety of others, the violator will be asked to leave the laboratory. Student refusing to leave will be removed by campus police. Know where the fire extinguisher, safety shower, and eyewash fountain are located.

Chemical Waste Disposal: In order to avoid environmental contamination, laboratory chemicals must be disposed of properly. All wastes should be placed in appropriately labeled containers. If you are not sure where to dispose of any waste ask your instructor. Do not pour anything down the sink without explicit instructions to do so. Solid chemical waste is placed in the appropriate chemical waste bucket, **NOT IN THE TRASH CAN**. Broken glass is placed into the broken glass container, place only broken glass in the broken glass container. Never put solids, organic wastes, or heavy-metal salts down the drain!

Grading: There are 2000 total points possible, assigned on the following basis:

1200 points - Experimental write-ups. These are the points you receive from the written part of your experiment; how well you convince me that you understand the experiment and the chemistry involved. See below for details. All laboratory reports are due one week following the completion of the experiment. Late papers will be graded down according to the following scheme: -10% per day late. We will accept no lab reports more than 10 days late. We will accept **NO EXCUSES** for late laboratory reports.

600 points - Experimental results (yields, purity, etc.). These are the points from your products that you turn in.

100 points – Pre-laboratory exercises, laboratory techniques, lab preparation, attendance, punctuality, etc. These points are based upon the observations of the instructor as to how you conduct yourself in the laboratory (Are you using your notebook in the laboratory? Did you come to the laboratory on time and prepared to do the experiment? Are you keeping your lab bench tidy? Are you cleaning up the balance area?). In the past, we have observed the following scheme for assigning “technique” points: Each pre-lab exercise turned in at the beginning of the laboratory period is worth 20 points; in addition, +5 points for each “good technique” notation, -5 points for each bad technique notation. Attendance in the laboratory is mandatory! Each unexcused absence will cost you 30 points. Each tardiness = -10 points. If you have an unavoidable absence, **CONTACT THE INSTRUCTOR AS SOON AS POSSIBLE**, so we can make arrangements for making up the experiment.

100 points – Safety. These are points based on general laboratory safety practices (see below). Are you handling noxious chemicals in the fume hood? Are you cleaning up spills on the bench or on the balances? Are you wearing safety glasses? Is your glassware securely clamped? In the past, we have observed the following scheme: Begin with 100 points at the beginning of the semester; -5 points for each “reminder” for wearing safety glasses, -25 points for dangerous behavior or conduct.

The final number of points you earn in lab will be divided by 10, and this will be the number of points added to your total points for the course for the laboratory component (see lecture syllabus). Note that a good grade in the laboratory will require adequate performance in each and every experiment. You will find it easy to get a good final score and enjoy working in Organic Lab if you spend a reasonable time preparing for each

experiment and researching and writing up your reports. If for some reason (bad day, dropped product on floor, wrong phase of the moon,...) your experiment did not work out, it may be possible for you to come in during the other scheduled laboratory period to repeat the experiment. Be sure to check in advance, however. Note that this does not mean that one

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can keep repeating an experiment ad nauseum until enough product is obtained to turn in--this would, of course, constitute bad laboratory technique. Also, it does not mean that it is permissible to skip your normally scheduled laboratory session (see above).

Complaint Procedure: If you have difficulties or complaints related to this course, your first action usually should be to discuss them with your instructor. If such a discussion would be uncomfortable for you or fails to resolve your difficulties, you should speak to Mary Setzer, Chemistry Stockroom Manager, phone: 824-3259, email: <msetzer@chemistry.uah.edu>. If you still are unsatisfied, you should contact Professor James K. Baird, Chair of the Chemistry Department. His telephone number is 824-2416 and his email address is <chemch@email.uah.edu>. If you remain unsatisfied, you should discuss the matter with Professor Debra Moriarity, Associate Dean of the College of Science. Dean Moriarity's telephone number is 824-6605 and her email address is <moriard@email.uah.edu>.

Special Needs Students: If you have special needs for this class, which require a modification of seating or other class procedures, you must discuss them fully with the instructor during the first week of class.

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Schedule:

Week	Experiment
1	Introduction, check in - No experiment. Read S&S, pp iii-xxiv; FF&F, pp 1-22. Turn in Safety Practices sheet (S&S, pp ix-x), Safety Questions (S&S, pp xi-xii), Academic Misconduct Agreement (S&S, p xvii).
2	Properties and Reactions of Hydrocarbons. (S&S, Experiment 1; pre lab exercise, p 3) 100 points for report; no products to turn in.
3-4	Polymerization of Styrene. (Handout) 100 points for report; 100 points for product.
5-7	Isolation of Eugenol from Cloves. (S&S, Experiment 7; pre-lab exercise, p 37) 300 points for report; 100 points for products.

- 8 Isolation of Caffeine from Tea Leaves.
(S&S, Experiment 24; pre lab exercise, p 117)
200 points for report; 100 points for product.
 - 9 Reactions of Aldehydes and Ketones.
(S&S, Experiment 18; pre-lab exercise, p 87)
100 points for report; no products to turn in.
 - 10 Synthesis of Aspirin.
(S&S, Experiment 17; pre-lab exercise, p 83)
100 points for report; 100 points for product.
 - 11 Fermentation of Sucrose.
(S&S, Experiment 27; pre-lab exercise, p 131)
100 points for report; 100 points for products.
 - 12 Activity of the Enzyme Polyphenoloxidase.
(S&S, Experiment 29; pre-lab exercise, p 139)
100 points for report; no products to turn in.
 - 13 Preparation of Soap.
(S&S, Experiment 26; pre-lab exercise, p 125)
100 points for report; 100 points for products.
 - 14 No experiment; clean up & check out.
-