

ANOKA-RAMSEY COMMUNITY COLLEGE
COURSE SYLLABUS

Course:	Chemistry 2062-30: Organic Chemistry II. 5 credits, Spring 2011		
Prerequisite:	CHEM 2061 or equivalent		
Lecture:	T 4:00 pm – 5:50 pm E125		
Laboratory:	T 6:30 pm – 10:00 pm E221		
Instructor:	Professor Andrew (Andy) Aspaas, Office E224		
E-mail:	andrew.aspaas@anokaramsey.edu		
Phone/Voicemail:	763-433-1108		
Course Webpages:	http://www.anokaramsey.edu/onlineProg (D2L: announcements, notes, audio/video, answer keys, discussion boards, grades) http://www.cengage.com/owl/ (Online homework – use login link in D2L course)		
Office Hours:	M 9:00 – 9:50 am	T 9:00 – 9:50 am	
(all are in E224)	W 9:00 – 9:50 am; 2:00 – 3:50 pm	Th 9:00 – 9:50 am	
	(additional office hours available by appointment)		
Lab Manager:	Daniel Harmon, Office E225, 763-433-1813, Daniel.Harmon@AnokaRamsey.edu		

At the conclusion of the course, the student should be able to:

1. Demonstrate the ability to solve problems and demonstrate conceptual knowledge of concepts in the following areas:
 - a. Mass Spectrometry and Infrared Spectroscopy
 - b. Conjugated Compounds and Ultraviolet Spectroscopy
 - c. Benzene, Aromaticity and Chemistry of Benzene (Electrophilic Aromatic Substitution)
 - d. Alcohols and Phenols
 - e. Ethers and Epoxides
 - f. Aldehydes and Ketones
 - g. Carboxylic Acids and Nitriles
 - h. Carboxylic Acid Derivatives: Nucleophilic Acyl Substitution
 - i. Carbonyl Alpha-Substitution Reactions
 - j. Carbonyl Condensation Reactions
 - k. Amines and Heterocycles
 - l. Biomolecules: Selected Topics in Carbohydrates, Peptides, Lipids and Nucleic Acids
2. Demonstrate the following abilities as they relate to labs in the major areas of course content:
 - a. Understanding and proficiency of basic organic chemistry laboratory techniques such as reflux, distillation, extraction, washing, filtration, recrystallization, and chromatography.
 - b. Instrumental techniques such as melting point determination, gas chromatography, and IR spectroscopy.
 - c. Recording, organizing, and analyzing data in tables and graphs.
 - d. Interpreting the results of experiments relative to the objectives and the uncertainties of the data
 - e. Individually and/or collaboratively prepare laboratory reports with proper scientific writing style
 - f. Formulating and testing hypotheses through the use of inquiry-based experiments
 - g. Laboratory and chemical safety and waste disposal
 - h. Working effectively and cooperatively in groups

REQUIRED MATERIALS (same materials as CHEM 2061)

Textbook: Organic Chemistry, 7th edition, John McMurry (Thomson Brooks/Cole)

Lecture Workbook: Organic Chemistry: A Guided Inquiry, 2nd edition, Andrei Straumanis (Thomson Brooks/Cole)

OWL Access: bookstore bundled with text or separately, also available at <http://www.cengage.com/owl/>

Lab Manual: Multiscale Operational Organic Chemistry, 2nd edition, John W. Lehman (Prentice Hall)

Scientific calculator

Bound lab notebook (composition book)

Outside-class access to an internet-connected computer at home or using the ARCC computer labs

Access to school-provided MetNet email address. Instructions at <http://www.anokaramsey.edu/IT/emailmetnet.cfm>

ADDITIONAL OPTIONAL RESOURCES

Study Guides and Solutions Manual (McMurry **highly recommended**, Straumanis optional)

Pushing Electrons, 3rd Edition, Daniel P. Weeks (Brooks/Cole)

Molecular model kit

Website Links: Available at <http://webs.anokaramsey.edu/chemistry> and <http://webs.anokaramsey.edu/aspaas/>

On-Campus Tutoring: Schedule will be posted at http://www.anokaramsey.edu/StudentServices/cr_chemistry.cfm and at the Academic Support Center

REDUCED SEAT TIME/WEB-ENHANCED LECTURE

This course has 50% seat time compared to a totally in-person course with the same number of credits. Our lectures (100 min per week) will only cover the material that students typically have the most problems with. **You must read ahead in the textbook in order to get the most out of lecture! Have the entire chapter read before it is covered in class!** The rest of the material will be your responsibility to learn through the use of the textbook reading assignments, textbook problems, OWL online homework assignments, audio/video lectures made available online, practice worksheets, and D2L discussion boards. You should plan to spend a considerable amount of time each week independently studying and learning the material. If you are not a self-motivated learner or if you have problems with procrastination, perhaps a full-seat-time lecture section would be better for you.

LECTURE

The majority of lecture time in this class will consist of group work using the **POGIL** (Process-Oriented Guided Inquiry Learning) method using the Straumanis workbook Organic Chemistry: A Guided Inquiry. A short POGIL quiz (3 points) will be administered at the beginning of each lecture, covering the previous week's activity. Additionally, groups will usually have to complete a short exercise to be handed in at the end of class (3 points).

Students will work in instructor assigned groups of 3 - 4 people with each member of the group assigned a different role – manager, scribe, reflector, and speaker.

Manager: The manager is responsible for leading the group discussions, deciding when to move on, and having the final say on the exercises. The manager is the only group member allowed to ask the instructor for help. If you have a question or something is unclear, first ask your manager, then the manager will speak with the instructor on behalf of the group.

Speaker: Typically at the end of the exercise, the instructor will ask each group to briefly share what they thought was the most important thing they learned from the lesson. The speaker will speak to the class on behalf of the group.

Scribe: While everybody is filling out the worksheets, the scribe has the official record and will write the most complete answer in his/her book. If you didn't write something down, you can contact the scribe to make sure you get the information. The scribe is also responsible for filling out a short assigned exercise to be handed in at the end of class.

Reflector: (only in groups of 4) The reflector is responsible for the group dynamic. Is everybody participating? Is everybody on the same question? Has somebody fallen behind? Is one group member dominating the conversation? It is up to the reflector to make sure everybody contributes equally and everybody gets the most they can out of the exercise.

The assigned exercises at the end of an activity can be completed by the group if the group finished the activity early. Otherwise, complete the exercises on your own or with your group sometime outside of class. A quiz in the upcoming period will have questions similar to the exercise questions, so it is to your advantage to complete them all. Answers to the exercises are in the POGIL solutions manual, available in the bookstore.

This is a recommended studying schedule that will help you keep up in this course:

- Thu-Fri:**
- **Review notes, worksheets, and exercises** from Wednesday’s lecture and complete any sections we didn’t do in class.
 - **Re-read** any sections of chapter in the textbook that were unclear. Consult lecture videos as necessary.
 - Complete the assigned **end-of-chapter practice problems** and **POGIL exercises** from the material covered in Wednesday’s lecture. Check your answers with a solutions manual.
 - Begin the **online homework** in OWL.
- Sat-Sun:**
- **Print** next week’s **blank lecture notes**.
 - Read next week’s **textbook chapter**. Follow along with the blank notes and fill in the parts when you can.
 - Begin watching or listening to the **audio/video lessons** for next week’s chapter available on the web. Fill in the blank notes as you go along.
 - Complete the assigned **in-chapter practice problems** as you are reading the sections and begin the assigned **end-of-chapter practice problems** when you’re done reading. Check your answers with the back of the book.
 - Continue the **online homework** in OWL.
- Mon-Tue:**
- **Complete the audio/video lessons** and **blank lecture notes**. Refer to posted completed lecture notes as necessary.
 - Continue the assigned **end-of-chapter practice problems**.
 - Complete the **online homework** in OWL (due every Wednesday at 2:00 pm)
 - Complete the **pre-lab assignment** in your lab notebook.
- Wednesday:**
- Review for POGIL quiz and lab quiz.
 - **Lecture and lab**
- Any days:**
- Post on the **D2L discussion boards** if you have any questions about the material. If you don’t have questions, see if you can answer somebody else’s questions. You are required to make at least one thoughtful post (question or comment) per week.
 - Visit instructor **office hours** (M, T, W, or Th) if you need help.
 - Meet with a **study group**.

Wed	Thu	Fri	Sat	Sun	Mon	Tue
Review for POGIL quiz	Complete all sections from lecture activity		Read assigned textbook chapter		Pre-lab assignment	
	Consult text and video lessons as necessary		In-chapter problems		End-of-chapter problems	
Study groups?	POGIL exercises from Wed lecture		Watch audio/video lessons			
Lecture and lab	Complete OWL online homework assignment					

LABORATORY

Lab meets the first day! By registering for 2062-30, you have registered for both lecture and lab. Laboratory attendance is mandatory and experiments must be performed at the assigned time. If you must be absent, including for an illness, notify the instructor in advance if possible. Many experiments involve numerous reagents and other equipment requiring lengthy explanation and demonstration. It is inconvenient to make up a lab for just one or two students. Make-up labs may be arranged during other scheduled lab periods during the same week and on a space availability basis by consulting with the professor. A missed lab can also be done during make-up lab week, which will take place on May 4th. Laboratory experiments not made up will receive a ZERO. Laboratory reports or worksheets will usually be due at the beginning of your assigned lab period *two weeks* after the lab is completed. A portion of the total points will be deducted for each day a report is late. Your lowest 10 point laboratory score will be dropped. **Students missing three or more labs will not pass the course.**

Laboratory Notebook: You must keep a laboratory notebook in this course. The lab notebook should be used prior to the experiment to organize the experiment and to summarize the useful information (prelab, described in more detail below). It should be used during an experiment to record quantities, describe observations and summarize operations carried out. All data should be recorded in the notebook at the time they are obtained. There is no reason for recording anything (unless specified) on odd pieces of paper to be transcribed into the notebook later. Record your notes in ink (not pencil) and if corrections are necessary add these and don't erase. Neatness is desirable, but it is less important than having a notebook that is accurate and complete.

Prelab: Before coming to lab you should read the lab and enter the following in your notebook: the **title** and **purpose** of the experiment, a **table of quantities** (mass or volume and moles), and a **brief outline** of the experimental procedure. You may include any other material in your notebook you feel will be helpful during the experiment. I will be coming around in the beginning of the lab to check that you have done your prelab and to make sure you have read the lab and are prepared for the day's experiment. **There will be no lab quizzes this semester.**

Reports and Products: Short reports (2-4 pages) will be required for approximately seven experiments. For the other six you will be required to submit a worksheet that will be passed out the day of the lab (the worksheet will also be made available as a Word document in the D2L course). Since your lab grade is determined mainly by your reports and worksheets, you should be sure to prepare them carefully. As mentioned previously, these **reports and worksheets usually due at the beginning of your assigned lab period two weeks after the lab is completed.** Reports and worksheets will be completed electronically and submitted by uploading to the experiment's dropbox in the D2L course. **Unless indicated otherwise, hard copies of reports or worksheets will NOT be accepted.** Additionally, you may need to turn in your product (if applicable) in a small tared vial at the time you turn in your lab report or worksheet labeled with the following: i) your name, ii) the name of the compound, iii) the melting or boiling point and, iv) the yield (grams) and tare of the vial.

The reports should be written in the following format:

- 1) Your **name, lab partner's name** and the **date** the *experiment is due*.
- 2) **Title** and number of the experiment.
- 3) The **purpose** of the experiment. This should be more than one sentence and it should be a sentence (with a subject, verb, etc.). Your purpose should correlate with the scenario discussed in the background section of the experiment.
- 4) The **balanced equation(s)** for the reaction(s) (if applicable).
- 5) A description of the **procedure using 3rd person, past tense**. The amounts of all reagents used in your experiment should be included here. This section should also include any observations that you made during the experiment (**in 3rd person, past tense**). Your final mass yield should be included at the end of the procedure.
- 6) **Data, calculations and results:** (includes, if applicable)
 - a) The actual yield in grams.
 - b) The theoretical yield in grams. (*You should show your calculations of how you arrived at this number. Use "Insert > Equation" to properly format any equations or fractions.*)

- c) The percent yield.
 - d) The melting or boiling point of the product.
 - e) Results of any spectroscopic data obtained on the product – see handout
 - f) Any other calculations or data required for your report.
- 7) **Discussion and conclusion.** In this section, for example, discuss issues such as whether you were successful in carrying out the experiment's purpose (*e.g.* obtaining the correct product), whether the product was pure, how you know it was pure, and why you obtained so little or so much of it, etc. Restate any key data or results here to strengthen your assertion. Always use *cited* literature values for comparison whenever possible. Also, you should include in this section a *discussion* of any spectroscopic or instrumental data you obtained of your product and how it supports your belief that you have the correct product.
- 8) **Answers to the assigned questions** for the lab.

ORGANIC MINI-SEMINAR

Lab on March 2 will consist of presentations made by you and your classmates on current or historical topics in organic chemistry. Presentations may be made individually (~10 minutes) or in pairs (~20 minutes). Your grade for this project will be a combination of the instructor's grade and peer evaluations. More information on this, including a list of example topics and evaluation criteria, will be presented in lab soon.

ASSIGNMENTS AND QUIZZES

Reading assignments are given later in this syllabus. You must have each of the reading assignments completed *before* the class period where that material is covered.

A small number of short **quizzes** will be administered at the start of class, and may be unannounced. Quizzes are generally worth 6 points each. No quiz scores will be dropped, however the instructor may allow make-ups if notified in advance. Groups will usually need to complete a short **exercise** at the end of class worth 3 points. The one lowest in-class exercise score will be dropped at the end of the semester.

Textbook practice problems will also be assigned. You should plan to work on these assignments around the time the related topics are covered in class. Practice is **crucial** for many of the skills and concepts learned in this class. These problems will **not be collected**. You have college-level expectations in this course, so therefore I will not "hold your hand" and collect and grade daily work each period. Students should take the initiative to keep up with their work in order to prepare themselves for quizzes and exams. Additional practice worksheets for certain concepts will be posted on the course webpage.

Online homework problems in OWL will be assigned for every chapter. There will be one assignment every week consisting of several questions on topics that were covered in the previous class, as well as a few tutorials to prepare you for the next class. Each weekly assignment is worth 6 points. The one lowest online homework score will be dropped at the end of the semester.

If you purchased OWL access as part of your textbook bundle last semester, your same username and password should still work. If you purchased one-semester access on your own, you will need to purchase an additional semester now. A link to the OWL login as well as registration instructions for new users will be posted in the D2L course.

Online participation will be assessed through your informal participation on the D2L discussion boards, an online collaboration environment where you can converse with your classmates and the instructor by posting messages. I think you'll find this to be a very useful way to get clarifications or alternative explanations on difficult concepts presented in this class. The online message boards will be separated into discussions for each chapter. For full credit on these participation points, **you must contribute at least one thoughtful post (question, answers, or comments) every week**. These will be counted every two weeks so if you miss one week you can post extra the next week, but you will lose points if you go two weeks without posting. Approximately 15 points may be awarded over the course of the semester for this participation. More information on this will be presented in class.

EXAMS

There will be three midterm exams (100 points each) **plus one comprehensive final exam** (150 points). Topics covered in lecture, laboratory, the reading assignments, or the problem assignments may appear on the exams. Exams must be taken at the scheduled time. **Make-up exams may be available in the case of documented school activities, illness, emergencies, or other serious situations (but not family vacations).** **Except in the case of documented emergencies, make-up exams are only available if you contact the instructor by email, phone, or voicemail before the exam.** **The make-up exam must be completed before the exams are returned to the class (usually 1 class period following the exam).** **Put the exam dates on your schedule now.** The instructor has the right to refuse a make-up exam. Some exams may be arranged to be taken early, see the instructor as soon as possible if you may need this option. Make-ups may be allowed for excused absences from the final exam **but only if the instructor has been consulted in advance.**

As an incentive to do well on the final exam, **your lowest midterm exam score will be replaced by your final exam percentage score (if it is an improvement).** If you miss one exam, its score will be replaced by your final exam percentage score. You should try your very best for each exam, since you never know when unplanned events may prevent you from taking a future exam. In order to pass the course, you must take at least two of the three midterm exams, and you must take the final exam.

ACCOMODATIONS

Alternative testing situations can be arranged for those students with a documented learning disability. Contact the school's disability services office for more information. Please notify the instructor well in advance of the exam if you elect for this service. *The alternative exam time may not be later than the assigned exam time.*

Every effort will be made to provide accommodations for religious observations. Please notify the instructor as far in advance as possible.

Please notify the instructor if you have any issues with loud noises, small explosions, flames, or other concerns.

ACADEMIC DISHONESTY

Cheating or plagiarism of any kind will not be tolerated. Any incidents of cheating or plagiarism will be arbitrated through the school's administration and may result in the exam, quiz, or assignment in question to be given a grade of zero, which cannot be made up. Extreme cases may result in a grade of F for the course. Care will be taken to discuss proper formats for citing sources in written projects as needed throughout the semester. Many lab reports and group projects involve sharing of data and collaboration between several students; these instances do not constitute plagiarism as long as all contributors are listed on the assignment.

STUDYING

"By failing to prepare, you are preparing to fail." -Benjamin Franklin

It is very important that you *discipline* yourself to become an organized, conscientious student who studies regularly. Set aside some time each day and devote it to studying chemistry. Last-minute cramming for cumulative exams usually results in poorer understanding of concepts and lower exam scores.

Read the assigned text **before** each chapter is covered in lecture. No matter how clearly the material is presented in lecture, you will not retain the information if that is the first time you see it. By reading the material carefully in advance, the lectures will become entirely more valuable by reinforcing and cementing your understanding of the concepts.

Organic chemistry is learned with a pencil and paper. Work the assigned practice problems by yourself, **without resorting to the answer key!** If you're stuck, re-read the relevant section of the text, come back to it later, or ask a friend, a tutor, or the instructor for a nudge in the right direction. The struggle to get a problem solved is an integral part of the learning process. Only **after** you've gotten an answer you're confident with should you check the answer key.

You should also form or join a study group as a **supplement** to your individual studying and practicing. Helping another student with a difficult problem is one of the best ways to reinforce your own learning.

Overall you should try to focus on **underlying concepts, problem solving skills**, and **common themes** more than simply memorizing facts. You should always view difficulty as a challenge to overcome.

KEEPING TRACK OF YOUR PROGRESS IN THIS COURSE

You should always, on your own, keep track of your scores for all work you do in this course. To determine where you stand in the course, divide the total of your points earned by the total number of points possible. Then multiply by 100. This will give you a percentage which you can use to determine your letter grade. All your recorded scores will appear in D2L. Check these regularly to ensure they were entered correctly.

APPROXIMATE COURSE POINTS AND LETTER GRADES

Lab reports and worksheets	~70 points
Biodiesel project report	30 points
Lab presentation	15 points
Field trip or field trip exercise	5 points
Lab notebook/housekeeping	10 points
~12 OWL Homework (1 lowest dropped)	~70 points
Online discussion participation	~15 points
In-class quizzes and activities	~40 points
3 Midterm exams × 100 pts	300 points
(lowest midterm replaced by final exam % if improvement)	
Comprehensive final exam × 150 pts	<u>150 points</u>
Total	approx. 705 points

The course grade will typically be based on a total point system with the following letter grades:

- A** 90.0 % and above
- B** 80.0 - 89.9 %
- C** 70.0 - 79.9 %
- D** 60.0 - 69.9 %
- F** below 60.0 %

Occasionally, at the instructor's discretion, the above letter grade percentages may be lowered, but will never be raised. In other words, if you earn greater than 90% of the points in the course (and haven't missed more than 2 labs), you are guaranteed an A. Your official course letter grade will only be calculated at the end of the semester.

CHEMISTRY 2062 SCHEDULE AND ASSIGNMENTS

Week	Date	Text Chapter (read before class)	In-Class Activity	Homework Problems (work after class)	Laboratory	
1	1/12	Ch 12	CA 17	CA 17 : All exercises CA L1/L2 : All exercises Ch 12 : All in-chapter problems, then 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 27, 30, 31, 32, 33, 34, 35, 41, 42, 43	POGIL L1/L2 IR unknowns	
2	1/19	Ch 14	CA 18	CA 18 : All exercises Ch 14 : All in-chapter problems, then 17, 19, 20, 21, 26, 31, 33, 40, 49, 55, 56	Exp 20 Alkylation of sodium saccharin	
3	1/26	Ch 15	CA 19AB	CA 19 : All exercises Ch 15 : All in-chapter problems, then 13, 14, 15, 16, 18, 19, 20, 21, 25, 26, 29, 31, 32, 33, 35, 36, 37, 38, 39, 40, 44, 45, 46, 47	Nitration of methyl benzoate (handout)	
4	2/2	Ch 16 (Skip 16-7.8)	CA 19CDE	POGIL NW 3 : All CTQs and exercises Ch 16 : All in-chapter exercises (skip 17), then 25, 27, 29, 30, 31, 32, 33, 36, 39, 40, 44, 45, 46, 48, 49, 51, 52, 53, 55, 57, 58	POGIL CA 22 and Q&A	
5	2/9	Ch 12, 14-16	EXAM 1		Exp 30 Grignard synthesis of triphenylmethanol (2 weeks)	
6	2/16	Ch 17	CA 10B CA 16BC	Ch 17 : All in-chapter problems, then 20, 21, 22, 23, 25, 29, 30, 41, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 44, 46, 51, 52, 57, 59, 60, 61, 62, 63, 64, 65, 66, 67 CA 16 : Part B exercises		
7	2/23	Ch 18	CA 20	CA 20 : All exercises CA 10 : Part B exercises Ch 18 : All in-chapter problems, then 19, 20, 23, 24, 25, 26, 27, 28, 29, 32, 33, 36, 39, 48, 50, 51, 52, 54, 55, 57	Exp 29 Reduction of vanillin	
8	3/2	Ch 19	CA 23	POGIL NW 4 : All CA 23 : All exercises Ch 19 : All in-chapter problems, then 27, 28, 30, 32, 33, 34, 35, 36, 37, 40, 41, 42, 45, 48, 52, 53, 65, 66, 68, 69, 70	Presentations	
9	3/9	Ch 20	CA 24A	CA 24 : Part A exercises Ch 20 : All in-chapter problems, then 17, 21, 22, 25, 26, 27, 28, 29, 30, 36, 38, 39, 43, 48, 49, 50, 52, 55, 58, 59, 60.	Exp 42 Wittig reaction of trans- cinnamaldehyde	
	3/16	Spring Break - No Classes				
10	3/23	Ch 17-20	EXAM 2		Biodiesel project (4 weeks)	
11	3/30	Ch 21	CA 24B	CA 24 : Part B exercises Ch 21 : All in-chapter problems, then 28, 29, 30, 31, 32, 33, 35, 36, 37, 38, 39, 42, 43, 44, 46, 49, 55, 56, 63, 67, 68, 69, 70.		
12	4/6	Ch 22	CA 25	CA 25 : All exercises Ch 22 : All in-chapter problems, then 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 36, 41, 43, 44, 46, 47, 52, 54, 55.		
13	4/13	Ch 23	CA 26	CA 26 : All exercises Ch 23 : All in-chapter problems, then 23, 24, 25, 27, 28, 33, 35, 37, 42, 43, 44, 45, 46, 47, 49, 53, 54, 59, 60, 61		
14	4/20	Ch 24	CA 27	CA 27 : All exercises Ch 24 : All in-chapter problems, then 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 50, 51, 55, 63, 64, 68, 72, 73, 74	Exp 47 Synthesis of dimedone	
15	4/27	Ch 21-24	EXAM 3		Minilabs 42 & 43	
16	5/4	Ch 25-28 Selected topics	TBA	TBA	Make-up and Q&A	
17	5/11	Comprehensive	FINAL EXAM		No lab	

A possible field trip opportunity may present itself in the middle of the semester. More information will come. Students unable to attend the field trip will complete an alternative assignment.