## Minnesota State University, Mankato
### Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU’s curricular process for recommendations and decisions.

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<th>College:</th>
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<tr>
<td>Program:</td>
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<td>CIP #</td>
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<tr>
<td>Type of Change:</td>
<td>COURSE PROPOSALS</td>
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<tr>
<td>Proposed:</td>
<td>Change in Course—Other</td>
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### Proposal # 02

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<th>Effective Date of Change:</th>
<th>Academic Year: 05-06</th>
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<th>Course Designator and Number</th>
<th>Number of Credits</th>
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<td>CHEM 320</td>
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(if applicable)

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

Introduction to organic structure, bonding, chemical reactivity, reactions as acids and bases, mechanisms, and stereochemistry. The chemistry of alkanes, alkyl halides, alkenes, alkynes, alcohols, aldehydes and ketones, carboxylic acids and their derivatives, and amines will be covered. Laboratory illustrates synthetic techniques and the preparation and reactions of functional groups discussed during lecture.

### Rationale or Justification:

Quantity of material too large to be effectively covered in a single semester. Selected topics will be removed and will be covered in an expanded CHEM 321.

### For General Education or Cultural Diversity Courses Only

#### General Education Course:

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<th>GE Category #</th>
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* For Writing Intensive Courses, attach a description of the kind and quantity of writing.
* For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:

a. Syllabus or course outline.
b. Course's student learning outcomes associated with each GE competency or CD designation.
c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

### For New Courses

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<td>X Course is elective.</td>
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<tr>
<td>X Course is required for program</td>
<td>Chem &amp; Biochem Majors, Chem Minor, PreProfessional</td>
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<tr>
<td>X Pre- or Co-requisites:</td>
<td>CHEM 202</td>
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<tr>
<td>X Other courses are being changed or eliminated. (Explain.)</td>
<td>CHEM 321-Material will be moved from CHEM 320 into CHEM 321</td>
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* Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)

Attach paper copies of the following:

a. Syllabus or course outline.
b. Course's student learning outcomes.
c. A list of resources required to offer and support this course.
d. A description of how teaching this course will affect department staffing.
e. If 400/500 level course, an explanation of added expectations of graduate students.

**Received Oct 31, 2002**

**Revised September, 2002**
### For Program Proposals

Attach paper copies of the following:

- a. Student learning outcomes for the program.
- b. Minutes from department and college curriculum meetings in which action was taken on this proposal.
- d. List of program requirements for New programs, or a list of Current and Proposed program requirements for Redesigned programs.
- e. A list of resources required to offer and support this program.
- f. A description of how offering this program will affect department staffing.
- g. A list of additional library holdings required for this program.

Please include rationale for any proposed changes in number of program credits.

### For Programs Requiring MnSCU Approval

If any of the following changes are proposed, please fill out and attach MnSCU Program Approval Forms, which are available on the Academic Affairs Web site: [http://www.mnsu.edu/acadaf/html/currformsprocesses.htm](http://www.mnsu.edu/acadaf/html/currformsprocesses.htm)

1. Creation of an entirely new program.
2. Redesign of existing programs, which takes any of the following forms:
   - Addition or deletion of a program option. Options are part of program design in which 30-50% of the courses are required as part of a common core for all students, and which offers curriculum alternatives greater than 30% of the total number of credits in the major. Options are appropriate to baccalaureate or masters programs.
   - Addition or deletion of a program emphasis. Emphases are part of program design in which more than 50% of the courses are required as part of a common core for all students, and which offers curriculum alternatives with a minimum of nine credits. Emphases are appropriate to associate and baccalaureate programs.
   - Change in program name.
   - Change in program CIP #.
   - Change in TOTAL program credits.
   - Change in degree award. For example, changing a B.A. to B.S.
   - Creation of a new degree award in a related academic area. Examples include creation of a certificate program from an existing degree program, or a new degree program from an existing degree program (e.g., Art History BA from Art BA.)
3. Relocation of an existing program. This is a proposal to move an existing program from one site to be exclusively offered at another site, and requires closing the program offered at the original site. For example, a program offered both on-campus and through extended campus is to be offered only at the extended campus site.
4. Replication of an existing program. This is a proposal to offer an existing program at a new site, which may be an existing MnSCU-approved site, or another campus of the same institution. Replicated programs are offered at both the original site and the new location.
5. Suspension or reinstatement of a program. This proposal suspends admission of students into an existing program, and is good for three years. Reinstatement proposals request the reopening of student admissions into a given program.
6. Closure of a program. This proposal requests closure of an existing program and its from an institution's official inventory of academic programs. Unless a department seeks to re-open a suspended program, it should be closed within three years of suspension.

Revised September 2002
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<th><strong>Senior Vice President and Vice President for Academic Affairs</strong></th>
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<td>Comments:</td>
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Organic Chemistry 320 Curriculum Proposal

C. Resources required to offer and support this course (Chem 320).

Additional resources needed in support of this course include:
   a. a one time expense of $1600 to equip lab drawers for an additional 24 students.

D. A description of how teaching this course (Chem 320) will affect department staffing.

The changes in this course proposal will add a total of two additional contact hours of load to the faculty teaching this lecture and laboratory. This additional two hours of load, in combination with the load increases (two hours) proposed in the Chem 321 and 331 changes can be accommodated by rearranging laboratory assignments within the department and by hiring student or adjunct help to cover the combined total of four hours between all three course proposals.
Present: Clement, Groh, Hadley, Hoppie, Losh, Lusch, Pomije, Pribyl, Quirk-Dorr, Rambo, Rife, Salerno, Swart, Thoemke, Vorlcek

Meeting was called to order at 9:03 a.m.

There were no minutes to approve.

Announcements:

The Dept. of Physics plans to change its two-semester calc. based physics (221&222) to three semesters at 4 credits each. This could impact physical chemistry which would put the chem. major off course to 5 years.

Reminder about the career fair on Tues. Oct. 11

The blueprints for the Traflon addition are in C-126. All are encouraged to make comments in the log book until the end of the month. The architects are aware of the concerns about office windows.

Chem. 407 name change: Vorlcek discussed changing the name of Water Chemistry to Environmental Chemistry. There will be no change in content, but the name change would better reflect the course content.

Hadley discussed the revised advising sheets. Motion to approve the changes passed. Swart discussed putting it on the website in pdf.

Chem. 320 Groh discussed moving some content out of 1st semester, moving some of it to 2nd semester and extending 2nd semester to 3 credits. He also discussed having a 1 hour meeting time for prelab. Motion to draw up the paperwork and get it to Pomije by C-SET deadlines passed.

Chem. 495 Quirk-Dorr requested a change from P-F to grades. Motion to approve passed.

Tenure and promotion policy: there were concerns about the 8-hour turnaround for voting. Changed to a 2-day voting window. Alternate accommodations can be made if a faculty member is unavailable at the time of the voting. Motion to approve the changes passed.

Reminder to encourage students to attend the Ford Lectureship Oct. 24.

Meeting adjourned at 9:47 a.m.

Respectfully submitted
Patricia L. Rambo
From: Marg, Gregg A  
Sent: Tuesday, October 18, 2005 11:43 AM  
To: Groh, Brian L  
Subject: RE: organic course changes

Brian,

I presented the proposed changes in the organic chemistry curriculum at our department meeting on Oct 7. There were no objections raised to the proposal. The general consensus was that the changes were very reasonable and would not have a negative impact on our students. We would like you to advertise the changes aggressively to the students, perhaps with a combination of posters in the hallways and announcements to your classes. We will make similar efforts to inform our students. While there was no formal motion of support made, I would characterize our response as one of general support for a very logical change.

Gregg

gregg.marg@mnsu.edu
507-389-5731

-----Original Message-----
From: Groh, Brian L  
Sent: Tuesday, October 18, 2005 11:35 AM  
To: Marg, Gregg A  
Subject: organic course changes

Gregg,

Here are the changes proposed to the organic curriculum:

1. Organic I (Chem. 320) will be offered only in the fall. The spring offering of Organic I in 2006 will be the last. We will offer organic chem. I (Chem 320) at two separate times in the fall. One section of lecture at 9 am and the other at 10 am (the same time it has been offered in the past). Annually we will be able to serve at least as many Chem 320 students as we have in the past.

2. Organic I will move some content to spring semester to ensure that the material can be covered during the fall semester. This will include moving the pre-lab meeting to a single time in each 320 lecture section for all students to attend. (There will be a total of two pre-lab meetings, one for each course.) We are looking for a time that will not conflict with any courses that biology students are enrolled. These two sections will meet separately, one at 1 pm on Wednesdays and the other at 1 pm on Thursdays.

3. Organic II (Chem. 321) will add one contact hour to the lecture. It will meet M, W, F rather than M, W. This course is only required in the toxicology major.

4. Organic II lab (Chem 331) will also have a separate pre-lab meeting time once a week at a time that will minimize conflicts with any biology courses. A time has not yet been set.

5. Chem 423 will move to spring semester from fall semester. I do not believe this last change impacts any of the biology programs.

These are the course changes we are proposing. Please let me know if these meet with your department's approval. Thank you for your help.

Brian Groh

******************************************************************************
Dr. Brian Groh, Chairperson
Department of Chemistry and Geology
Minnesota State University, Mankato

10/18/2005
Chemistry 320 – Organic Chemistry I
Course Proposal

Attached are:

1. A copy of the table of contents of the text, indicating the material to be covered, since existing syllabi are not detailed enough to reflect the changing content of the course.

2. A copy of the existing syllabus.

3. Course student learning outcomes.

4. List of resources required and impact on departmental staffing.

5. Department of Chemistry and Geology Meeting Minutes noting the proposed course changes.

6. Department of Biology email from Greg Marg supporting the proposed changes.
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CHEM 320 – Organic Chemistry I
Student Learning Outcomes

1. Acquire a knowledge of the preparation, properties, and reactions of different kinds of organic compounds as covered in lecture and laboratory.

2. Acquire a mechanistic understanding of organic reactions.

3. Acquire a fundamental knowledge of the organic functional groups needed to comprehend biochemistry.

4. Master basic organic laboratory skills such as recrystallization, determination of melting point, distillation, liquid–liquid extraction, and drying of organic liquids.
Chemistry 320 - Organic Chemistry I
Fall Semester, 2005
Course Policies & Syllabus

Instructor: Dr. Michael J. Lusch
Office: Trafton N354 (across from TR N362)
Phone: 389-2906 (or Chem. Dept., 389-1963)
E-Mail: michael.lusch@mnsu.edu

Lecture: MTWF 10:00-10:50 AM, Trafton C124.

Laboratory Sections: All Labs in Trafton N362.
Section 01 Thursday (R), 8:00-10:50 AM
Section 02 Tuesday (T), 2:00-4:50 PM
Section 03 Wednesday (W), 2:00-4:50 PM
Section 04 Thursday (R), 2:00-4:50 PM
Section 05 Monday (M), 2:00-4:50 PM

Instructor:
Mr. Rob Johnson
Prof. Michael J. Lusch, TR N354
Dr. Eric Woller
Prof. Michael J. Lusch, TR N354
Prof. Michael J. Lusch, TR N354

Office Hours: MTWRF 11:00-11:50 AM; MTWR 5:00-5:50 PM,
OR by appointment (or by drop-in).
Optional Tutorial/Help Sessions (1 hr each week): To be announced.

Lecture Text and Course Materials:
3. A set of molecular models is highly recommended. It is often difficult to visualize a molecular structure in three dimensions when it is drawn in two dimensions. Molecular models will almost certainly help.
4. See Laboratory Syllabus for additional Course Materials for the Lab.

Prerequisites:
Successful completion of a full year of General Chemistry (two semesters, Chem 201 and 202 or equivalent; or the three quarter equivalent sequence).

Course Objectives:
The acquisition of an understanding of carbon-containing compounds, their structure, bonding, naming, three-dimensional shape, the major functional groups they contain, and the chemical changes they undergo. This knowledge will include some of the basic methods of preparation of major functional groups, and the major transformations these compounds may experience. These reactions will be characterized by the reagents and conditions that cause them to occur, and by the step-by-step processes of bond-making and bond-breaking that describe the pathways by which the reactions take place (their mechanisms). A knowledge of Organic Chemistry is critical to the comprehension of the organic chemistry of biological systems in fields such as Biochemistry, Microbiology, Genetics, Cell Biology, Molecular Biology, Physiology, and Medicine, as well as the roles that organic substances play in other areas of our daily existence.

Grading: In order for you to pass this course, you must complete all course requirements. Final grades will be determined as follows:

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<th>Components of Your Grade</th>
<th>Point Values</th>
<th>Grading Guidelines</th>
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<td>In-Class Exams (4; 100 pts each)</td>
<td>400 pts (53.7 %)</td>
<td>90–100 % A</td>
</tr>
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<td>Quizzes (10; 10 pts each)</td>
<td>100 pts (13.4 %)</td>
<td>80–89 % B</td>
</tr>
<tr>
<td>Laboratory Questions (12, 10 pts each)</td>
<td>120 pts (16.1 %)</td>
<td>70–79 % C</td>
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<tr>
<td>Laboratory Safety &amp; Technique</td>
<td>25 pts (3.4 %)</td>
<td>60–69 % D</td>
</tr>
<tr>
<td>Final–Pt 1, Mandatory (New Material)</td>
<td>100 pts (13.4 %)</td>
<td>Less Than 60 % F</td>
</tr>
<tr>
<td>Final–Pt 2, Optional (Comprehensive)</td>
<td>(100 pts)</td>
<td>(review; substitute for lowest In-Class Exam)</td>
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<tr>
<td>Total</td>
<td>745 pts</td>
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1
Hourly Exams. Four 50-minute in-class exams (100 pts each) will be given during the semester. Exams will be based on the lectures, readings, and assigned problems, and will be designed so that the instructor can physically write out all of the correct answers in 20 min. or less. Hourly Exams will be returned to students to be used for subsequent study.

Final Exam. A two-hour final exam will be given during the final exam period. The final exam will consist of two parts:

Part 1 – a mandatory exam (100 pts) covering material covered since the last in-class exam (new material). This part of the final exam must be taken by all students, and cannot be replaced by the optional part of the final exam.

Part 2 - an optional exam (100 pts) which will be a comprehensive review of the material covered on the four in-class exams (review material). The grade on this optional part may be substituted for the lowest of the in-class exam grades (if higher; if not higher than any of the in-class exam grades, it will simply be ignored). If a student does well enough on all four of the hourly exams to get the grade with which they are satisfied, they do not have to take the optional part of the final exam. Whether or not to take the optional part of the final exam must be the decision of each individual student.

Both parts of the final exam will be handed out at the beginning of the final exam period, and the amount of time devoted to each part is to be determined by each student, keeping in mind that the grade on the mandatory part cannot be replaced, and will be counted in all cases.

Missed exams. It is each student's personal responsibility to be present for all exams. In cases of serious illness or a legitimate emergency, it is the student's responsibility to consult with the instructor as soon as possible about the possibility of scheduling a make-up exam. The student must notify the instructor on the exam day (or before), and any make-up exams must be taken before the graded exams are returned to the class. If a make-up exam is not taken, the optional Part 2 of the final exam must be taken, and that grade will replace the missed exam grade. (This therefore requires that each of the other exam grades must count toward your grade as well; if a make-up exam is not taken for a missed exam, there will be no opportunity to make up for any other poor exam.)

In the event of a cancellation of class on an exam or quiz date (primarily as a result of inclement weather or other emergency), the exam will be given during the next class meeting.

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<th>Quiz and Exam Schedule (Highly Approximate and Tentative):</th>
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The instructor reserves the right to modify the exam and quiz schedule and adjust the grading guidelines accordingly.
Quizzes. Quizzes worth 10 pts each will initially be take-home, open-book, open-notes, collaborative efforts, in which groups of up to 3 students may jointly work to answer the quiz questions, and will turn in one answer sheet per group. Each group member will receive the same grade for the quiz. Take-home quizzes will be handed out at the end of approximately every 4th or 5th lecture and will be due at the next lecture.

Corrections/ Regrades:
Exams and quizzes will be returned to students to be used for subsequent study. Please check your exams and quizzes carefully against the posted answer keys. If you think you deserve a regrade, you must see me within one week of the day the exam or quiz was returned. Later requests will not be granted. If an exam is accepted for regrading, the entire exam, and not just a single question, will be regraded. Addition and recording errors will be gladly corrected and are exempt from this regrading policy.

Homework Problems:
Homework problems will be assigned from the text. These are to be completed and checked against the answers in the Solutions Manual. They are not to be handed in.

Dropping the Course or Withdrawal from the University:
Students wishing to drop this course must do so by November 16, 2005; students wishing to withdraw from all courses for the semester must do so by December 2, 2005. The student is responsible for filing the necessary paperwork in a timely fashion. The grade of Incomplete is reserved only for those students who have been doing passing work in the course but who are unable to complete all of the course requirements by the end of the semester due to some extenuating circumstances (usually an illness or serious emergency). Doing poorly in the course is not an extenuating circumstance.

Academic Honesty:
Academic dishonesty will not be tolerated. Academic dishonesty includes plagiarism, cheating, and collusion, as defined in the student handbook:
http://www.mnms.edu/supersite/administration/basic-stuff/policies.html
Students found guilty of academic dishonesty will receive a failing grade in the course.

Disabilities:
Students with disabilities (physical or learning), please let me know (in private) and/or contact the Disabilities Services Office (ML 132, V/TTY ext. 1819 or 2825), or the Center for Academic Success (ML 132 ext. 1791), so that appropriate arrangements can be made.

Suggestions for Succeeding in Organic Chemistry:

1. Attendance (The world is run by those who show up). Show Up!! and take detailed notes. Although attendance is not mandatory, there is a good correlation between class attendance and academic performance. There may also be some material presented in class, or extra study sheets or problem sets handed out, which are intended to supplement material in the text.

2. Read the Text Before Lecture. Reading the appropriate chapter of the textbook at the beginning of class will make the lecture material less strange and more understandable. Knowing what is in the book will also mean that you can take notes that will supplement the material in the text. Reading the text or doing problems for the first time the night before exams will most likely lead to minimal understanding and poor performance on the exams.

3. Take Notes in Lecture. Taking detailed notes is a relatively painless way to help your self remember the material in this course. Just the act of writing something down, which requires concentration and attention to detail as well as the exercise of focused mechanical action, begins to pattern your mind to recall and reproduce that which is written. Also, please do not hesitate to ask questions in lecture if something is unclear. Most of the material is completely new to you and additional examples in lecture may aid in the understanding of some concepts.

4. Compare Text and Notes. After lecture, compare your lecture notes with the text material, and review each to comprehend the material they cover. Take note of the material emphasized in the
lecture, and the way its presentation is similar to or different from that in the text. Looking at a concept from more than one perspective can frequently enhance your understanding of it.

5. Homework Problems. WORK LOTS OF PROBLEMS. On quizzes and exams you will be required mainly to apply your knowledge of organic chemistry to new (but analogous) examples of compounds and situations rather than regurgitate memorized definitions, principles, reactions, and mechanisms. To learn how to do this, do the suggested problems, consulting your notes and the text to determine the concepts or reactions that need to be applied to answer a given question. These problems will help you learn some of the ways in which information can be applied, and whether you understand the principles involved and their application to a variety of situations. Problems in the body of the text tend to exemplify the application of principles discussed in the section immediately preceding the questions; problems at the end of the chapter can embody any of the topics in the chapter, but tend to start with less difficult, more straightforward questions and proceed to more demanding questions.

Check your answers with those in the Solutions Manual. If your answer is correct, try a few more problems of the same type. If it seems you understand the application of a given concept or principle, go on to a new type of question (although the last examples in multi-part questions sometimes add some new twist; or additional complexity, it is unnecessary to do every example of a given type of problem before going on to other questions; save the remainder for additional practice just prior to an exam). If your answer is incorrect initially, try to understand from the correct answer how to do other problems of the same type and try other examples. If after 15 minutes or so you still cannot figure out what you should be doing to get the correct answers for a given type of question, you need additional input (from other students, lab instructors, the course instructor, or a tutor), and you should stop banging your head against this wall until you get further explanation. Go on to the next type of problem; sometimes other problems will provide clues to answering previous questions. Be aware that there are probably a few typographical mistakes in the Solutions Manual. There is also the possibility that more than one answer is correct in some cases, which is common among synthetic problems.

6. DON'T GET BEHIND! Keep up with the material being presented in the lecture and with the corresponding homework problems in the textbook (see suggestion 5). Reading the text or doing problems for the first time the night before exams will most likely lead to minimal understanding and poor performance on the exams. Plan to spend AT LEAST 2-3 hours of study for each 1 hour of lecture.

7. Study Techniques. Organic chemistry is a demanding course, but it is not impossible. Each piece of material you will be exposed to is not particularly difficult, but the volume of material is considerable and the pace of the course is rapid. Memorization of material is required, but rote memory alone will not suffice. You need to relate apparently isolated pieces of information to one another, such as by comparison or contrast, in order to assist your memory, and to understand common ideas and principles in seemingly unrelated situations.

For example, sometimes there are several reactions beginning with the same type of starting compound that result in the same type of product using different reagents and conditions: in what way(s) are these reactions similar and how do they differ? Are their mechanisms similar or different, and can this result in different products with starting materials having some specific structural characteristics? What are the advantages and disadvantages of each reaction (experimental ease, cost or hazards of reagents, yield, control of product structure, etc.)? Sometimes a number of reactions have the same or similar mechanisms, even though they use vastly different starting compounds and yield considerably different types of products. Or an array of reactions can all produce the same type of compound (perhaps by different mechanisms) even though they begin with a variety of different types of starting materials and reagents. Correlation, Comparison/Contrast, Similarities/Differences, Advantages/Disadvantages, etc., can help you remember the features of a vast array of seemingly isolated reactions by relating them to one another.

Once you think you understand a given body of information and its applications, you should try to organize the material (in writing) in as logical a fashion as you can. Write down relevant terms and definitions, and write out a roster of the reactions covered and general examples of the mechanisms discussed. Once all of your understanding is organized and written down (remember, writing helps memory), then you can proceed to memorize the necessary material as a final preparation for an exam.
Chemistry 320 - Organic Chemistry I
Fall Semester, 2005
Laboratory Schedule

Text and Course Materials:
2. Safety glasses or goggles (purchased from the ACS Chemistry Club or elsewhere) (required).
3. Organic Chemistry Laboratory Notebook, by Brooks Cole or Chemistry Education Resources (CER). This is an NCR carbonless copy notebook to allow copies of laboratory notes to be turned in for each lab (required).
5. A pair of rubber gloves, and a lab coat or plastic or rubberized apron, would also be beneficial.

Laboratory Course Objectives:
The laboratory is designed to illustrate a variety of typical organic reactions; exemplify some of the reagents, conditions, and catalysts used in these reactions; reveal the physical and chemical properties of molecules containing a range of organic functional groups; demonstrate and give students experience using typical organic laboratory apparatus, and techniques or procedures for separation, purification, and determination of purity, such as melting point range determination, recrystallization, distillation and boiling point determination, extraction, and drying.

List of Experiments:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date (T,W,R; M)</th>
<th>Experiments (Microscale unless otherwise stated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Aug 29–31, Sept 1</td>
<td>Check-In, Lab Orientation, &amp; Safety</td>
</tr>
<tr>
<td>2.</td>
<td>Sept 6–8; 12</td>
<td>Exps 1 &amp; 2. Exp 1: Purification by Crystallization (Chap 3, pg 57-59)</td>
</tr>
<tr>
<td>4.</td>
<td>Sept 20–22; 26</td>
<td>Exp 3: Simple and Fractional Distillation (Chap 5, pg 89-91)</td>
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<tr>
<td>5.</td>
<td>Sep 27–9; Oct 3</td>
<td>Exp 4: Alkenes from Alcohols: Cyclohexene (Chap 19, pg 287-90)</td>
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<tr>
<td>6.</td>
<td>Oct 4–6; 10</td>
<td>Exp 5: Catalytic Hydrogenation: Transfer Hydrogenation of Olive Oil (Chap 24.5, pg 349-51); Hydrolysis to Soap (Chap 40.6, pg 496-97)</td>
</tr>
<tr>
<td>8.</td>
<td>Oct 18–20; 24</td>
<td>Exp 7: Oxidative Coupling of Alkynes: 2,7-Dimethyl-3,5-octadiyn-2,7-diol (Chap 24, pg 335-37)</td>
</tr>
<tr>
<td>11.</td>
<td>Nov 8–10; 14</td>
<td>Exp 10a: Oxidation: Cyclohexanol to Cyclohexanone (Ch 22.3, pg 317-19) Exp 10b: Oxidation: Cyclohexanone to Adipic Acid (Ch 22.6, pg 322)</td>
</tr>
<tr>
<td>15.</td>
<td>Dec 5–8</td>
<td>Check-Out; Make-up Lab (if needed)</td>
</tr>
</tbody>
</table>
La! Views Website: http://www.intech.mnsu.edu/groh/MasterLabPage.htm
Images of the steps in many of the experiments (Courtesy of Dr. Brian Groh).

ChemFinder Website: http://chemfinder.cambridgesoft.com/
Data on the physical properties of organic compounds (MW, Formula, mp, bp, density, refractive index, MSDS and other hazard information)
Data on the physical properties of the organic compounds we use in lab can also be obtained from Sigma-Aldrich and Acros chemical catalogs found in the Lab (TN 362) or in the Chemistry Study Room, TN 247. Looking in these catalogs has the advantage that you can find compounds listed by the common names we tend to use rather than their fully systematic or IUPAC names.

Laboratory Grade:
Your laboratory grade will be based mainly on weekly question sheets (10 pts each) that will deal with the overall reaction or procedure exemplified in each experiment, its extension to other similar molecules (generalization), its mechanism, and practical aspects of techniques and procedures. These answer sheets will be due at the beginning of lab the week after all of the work on a given lab (including weighing and determining the melting point range of solid products after they have dried for a week after initial isolation). Your safety and technique grade will be the instructor's overall subjective assessment of your preparedness in the lab, your pre-lab write-ups and notebook-keeping, and your adherence to safety rules and principles.
Chem 320 - Fall, 2005 - Course Outline

Walk-In Tutoring Available at the Center for Academic Success ML 0132.
CHEM 100, 105, 111, 201, 202
Check their website for hours... http://www.mnsu.edu/learnnc/

[Actually: http://wps.prenhall.com/esm_organic_wade_5  See Instructor Resources (bottom of page) or the “Jump to” bar at the upper left of the window. The companion site for the 6th Edition is not yet as good as the one for the 5th Edition.]

Background:
Chapter 1 - Introduction and Review (pp. 1–38)
Chapter 2 - Structure and Properties of Organic Molecules (pp. 39–80)

Lectures:
Chapter 3 - Structure and Stereochemistry of Alkanes (pp. 81–124)
Chapter 4 - The Study of Chemical Reactions (pp. 125–166)
Chapter 7 - Structure and Synthesis of Alkenes (pp. 279–320)
Chapter 8 - Reactions of Alkenes (pp. 321–381)
Chapter 9 - Alkynes (pp. 382–416)
Chapter 5 - Stereochemistry (pp. 167–211)
Chapter 19.1–19.7 - Amines: Nomenclature, Structure, Properties, Basicity, Salts (pp. 870–882)
Chapter 6.1–6.6 - Alkyl Halides: Nomenclature, Uses, Structure, Properties, Preparations (pp. 212–224)
Chapter 6.7–6.21 - Alkyl Halides: Nucleophilic Substitution and Elimination (pp. 225–278)
Chapter 10 - Structure and Synthesis of Alcohols (pp. 417–459)
Chapter 11 - Reactions of Alcohols (pp. 460–507)
Chapter 18 - Ketones and Aldehydes (pp. 805–869)
Chapter 20 - Carboxylic Acids (pp. 935–977)
Chapter 21 - Carboxylic Acid Derivatives (pp. 978–1040)

ADDITIONAL CHAPTERS AS TIME PERMITS:
Chapter 14 - Ethers, Epoxides, and Sulfides (pp. 623–662)
Chapter 19.8–19.19 - Amines: Synthesis and Reactions (pp. 882–934)
Chapter 22 - Alpha Substitutions and Condensations of Enols and Enolate Ions (pp. 1041–1096)
Chapter 12 - Infrared Spectroscopy and Mass Spectrometry (pp. 508–558) (Superficial Coverage Only)
Chapter 13 - Nuclear Magnetic Resonance Spectroscopy (pp. 559–622) (Superficial Coverage Only)
Chapter 15 - Conjugated Systems, Orbital Symmetry, and Ultraviolet Spectroscopy (pp. 663–704)
Chem 320 - Fall, 2005
Course Outline and Homework Problems

**Background:**

Chapter 1 - Introduction and Review (pp. 1–38)

**Problems:** 1.1-1.9, 1.14-1.19; 1.23-1.26, 1.28-1.46.

Chapter 2 - Structure and Properties of Organic Molecules (pp. 39–80)

**Problems:** 2.1-2.10; 2.13-2.18; 2.25, 2.26; 2.32-2.41.

**Lecture:** (Read Chapter 2.12-2.14, pp.67–74 as Introduction to Chapter 3)

Chapter 3 - Structure and Stereochemistry of Alkanes (pp. 81–124)

**Problems:** 3.1-3.29, 3.33, 3.34, 3.37(except e), 3.39-3.44; 3.46.

Chapter 4 - The Study of Chemical Reactions (pp. 125–166)

**Problems:** 4.1-4.4; 4.7-4.25; 4.30; 4.35-4.43; 4.49.

Chapter 7 - Structure and Synthesis of Alkenes (pp. 279–320)

**Problems:** 7.1, 7.2, 7.4-7.10, 7.12, 7.16, 7.25, 7.29; 7.31-7.33, 7.35, 7.36, 7.38(a,b,c), 7.40-7.42, 7.44 (a,b,c), 7.46.

Chapter 8 - Reactions of Alkenes (pp. 321–381)

**Problems:** 8.1-8.11, 8.13, 8.15-8.18, 8.21, 8.22, 8.24, 8.27-8.29, 8.32(a,e), 8.34(a,c,e), 8.36, 8.37; 8.47, 8.48(a-d), 8.49, 8.50, 8.55(a,b), 8.58, 8.59(a,b,d).

Chapter 9 - Alkynes (pp. 382–416)

**Problems:**

Chapter 5 - Stereochemistry (pp. 167–211)

**Problems:** 5.1-5.24; 5.25-5.34.

Chapter 19.1–19.7 - Amines: Nomenclature, Structure, Properties, Basicity, Salts (pp. 870–882)

**Problems:**

Chapter 6.1–6.6 - Alkyl Halides: Nomenclature, Uses, Structure, Properties, Preparations (pp. 212–224)

**Problems:** 6.1-6.3, 5.5-6.7, 6.9, 6.10, 6.42, 6.43.

Chapter 6.7–6.21 - Alkyl Halides: Nucleophilic Substitution and Elimination (pp. 225–278)

**Problems:** 6.11-6.27, 6.29-6.40; 6.44-6.56, 6.58-6.66.

Chapter 10 - Structure and Synthesis of Alcohols (pp. 417–459)

**Problems:** 10., 10.2, 10.4, 10.5, 10.9, 10.10, 10.12-10.20, 10.22-10.26;

Chapter 11 - Reactions of Alcohols (pp. 460–507)

**Problems:** 11.1, 11.2, 11.5-11.8, 11.31;
Chapter 18 - Ketones and Aldehydes (pp. 805–869)

Problems:

Chapter 20 - Carboxylic Acids (pp. 935–977)

Problems:

Chapter 21 - Carboxylic Acid Derivatives (pp. 978–1040)

Problems:

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Problems:

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(pp. 559–622) (Superficial Coverage Only)

Problems:

Chapter 15 - Conjugated Systems, Orbital Symmetry, and Ultraviolet Spectroscopy
(pp. 663–704)

Problems:

Chapter 16 - Aromatic Compounds (pp. 705–748)

Problems:

Chapter 17 - Reactions of Aromatic Compounds (pp. 749–804)

Problems: