

CHM 244 – Fall, 2008

Instructor – Richard T. Taylor

Office – 246 HUG

Lab lecture – Monday 6PM, 100 Laws

Four lab sections 3-5 M, 10-12 T, 2-4 T, and 2-4R

Hours – during other lab sections and 10-12R; not available W and F

taylorrt@muohio.edu

Textbook - Organic Spectroscopic Structure Determination: A Problem-Based Learning Approach – Douglas Taber

No lab manual. All experiments by electronic handout.

Also required: approved safety eyewear available in bookstore. During checkin the safety regulations for working in the lab will be reviewed. Each lab experiment will also provide detailed safety guidance.

Course objectives. As a two credit separately graded course, the goals of the course are not limited to the simple acquisition of lab skills. While this is indeed one important aspect, it is also intended that the experiments will amplify the content of the lecture. In addition, the use of spectral methods to determine structure will be a focus of the course. Moreover, there will be significant writing component to the course, with the intent of encouraging thoughtful engagement of the material. The culminating experience of the course will be a project requiring the generation and interpretation of new data.

The tentative schedule is shown below. The timing here is realistic but is subject to change. Section switching cannot be permitted in such a heavily enrolled lab. Also note that the final handin of materials is due some time after the end of the experiment, so that there is some opportunity for catch up while a new experiment is starting up. Also note the catch-up week in the middle of the term.

Exams will be given in room 100 Laws during the normal pre-lab time schedule. Students requiring testing accommodations as documented with the Office of Learning Assistance should present documentation during the first two weeks of class so that alternate testing arrangements can be implemented.

Given the limited amount of lecture time, it will be important to use that time efficiently. To that end, a good bit of rote material will be delivered by podcast. You will be responsible for that material on exams and problems will be assigned to allow you to become proficient in these skills. The time saved will allow the lectures to concentrate on higher level topics.

Monday lect	Lab days	Lecture	Lab	Handin due	Special Assignments
8/25	8/25, 26, 28	Intro., modeling, caffeine	checkin		
9/8	9/8, 9, 11	IR, distillation	caffeine	Modeling	
9/15	9/15, 16, 18	IR/TLC, saponification, aspirin	Steam distillation		
9/22	9/22, 23, 25	MS, CNMR	TLC		
9/29	9/29, 30, 10/2	Quiz One	saponification	caffeine	Abstract peer review
10/6	10/6, 7, 9	CNMR, halgenation, dehydration	aspirin	Steam distillation/TLC	Abstract
10/13	10/13, 14, 16	CNMR, experimental	halogenation	saponification	
10/20	10/20, 21, 23	Project	dehydration	aspirin	experimental
10/27	10/27, 28, 30	Quiz Two	Catch up	halogenation	
11/3	11/3, 4, 6	CNMR/HNMR, nitration	Project	dehydration	
11/10	11/10, 11, 13	HNMR	Project		
11/17	11/17, 18, 20	HNMR, chromatography	nitration		
11/24		Project			
12/1	12/1, 2, 4	HNMR	Column chromatography	nitration	
12/8	12/8, 9, 11	HNMR	Check Out	Column chromatography	Project
12/15		Final Quiz			Final 7:45PM

September 15, last day to withdraw, no grade

October 31, last day to withdraw, grade of W

Grading

Regular lab assignments are graded based on a pre-lab handin (due upon entry into the lab the day the experiment starts) and a postlab handin due as scheduled above. Most labs will require a written analysis, a physical product and some other data (IR spectrum, melting point, whatever). The grading criteria for each lab will be detailed in the handout.

The special projects require written work to be turned in. Grading will be based on both the level of understanding the chemistry involved and the quality of writing. Once again, the grading criteria will be provided as the assignment is made.

Exams will require some knowledge of the reactions undertaken and the lecture/podcast material. Problems will be assigned that you will find to be quite exam-like.

Modeling - 10

Caffeine - 10

Steam distillation - 10

TLC - 10

Saponification - 10

Aspirin - 10

Halogenation - 10

Dehydration - 10

Column chromatography - 10

Abstract – 15

Experimental - 15

Project - 30

Exam I - 50

Exam II - 50

Final exam - 100

Total points – 350 points

Tentative Grading scale

A	315-350
B	280-314
C	245-279
D	210-244
F	below 210

The grading scale will not be raised, but can be lowered after examination of the total grade. Similar decision on the +/- scale will be made. The bottom grade cutoff will be for the actual grade, not the – grade.

Chemistry 254 – 2009 Organic Chemistry Lab



Instructor: Dr. Christopher Callam
Office : 380 C Celeste Laboratory
Telephone : 292-0679
E-mail : ccallam@chemistry.ohio-state.edu

Lecture:

Monday	5:30 p.m. - 6:18 p.m.	1000 McPherson Laboratory
Tuesday	5:30 p.m. – 6:18 p.m.	1000 McPherson Laboratory

Office Hours:

Monday, Wednesday and Friday 12:00 p.m.-1:18 p.m. Wednesday and Friday 2:30 p.m.-3:30 p.m. These are just my official office hours you are welcome to stop by at anytime. If I am not in my office I am in one of the labs on the 4th floor of Celeste, feel free to come talk to me. You may also make an appointment by e-mail and suggest times that are convenient to stop by my office

Course Objectives:

The main objective of this laboratory course is for everyone to gain an understanding of the fundamental techniques of organic chemistry and to use these techniques toward the synthesis of interesting organic compounds. The students will be exposed to the techniques of distillation, extraction, recrystallization, and chromatography. Students learn the basic spectroscopy and chromatography that chemists use to determine the structure of unknown compounds, including Infrared Spectroscopy (IR) and Gas Chromatography (GC). Students are also provided the opportunity to learn how to problem solve and have the opportunity to improve their science writing skills. The concept of learning revolves around active and independent thought, questions, and clear communication.

If you have any questions do not hesitate to ask.
My job is to teach you and to help you learn this material.

Prerequisites:

Completion of Chemistry 251 or the Chemistry 231.

Required Materials:

1. Organic Chemistry Laboratory CH 254 Manual – McGraw Hill (ISBN: #007-339505-6)
2. Hayden McNeal - Spiral Bound Lab Notebook with Duplicate Pages; (ISBN: 978-0-7380-3094-4)

Internet Pages:

<https://carmen.osu.edu>

Answers to the suggested homework problems and your grades are available on this web pages. To view them, you will need the Adobe Acrobat reader installed on your computer. If you do not have it, you can download it for free from:

<http://www.adobe.com/products/acrobat/readstep.html>

All your grades for this course will be posted to Carmen on a regular basis. If you find an error in the grades that have been posted for you, please let your TA or Dr. Callam know immediately.

If you need help accessing materials from within the course page:

Contact me at ccallam@chemistry.ohio-state.edu

Chemistry 254 Laboratory Experiments and Exams Schedule

Week	Period 1 Lab Experiment	Period 2 Lab Experiment
1	-----	CHECK - IN Recrystallization (6)
2	Extraction: Caffeine (7)	Extraction: Caffeine (7) (continued)
3	Distillation and GC (8)	Distillation and GC (8) (continued)
4	Dehydration of Alcohols (12) QUIZ 1	Dehydrohalogenation of Alkyl Halides (13)
5	TLC (9)	MIDTERM EXAM I
6	Synthesis of Aspirin (16)	Nitration of Veratrole (15)
7	Isopentyl Acetate (19) IR Unknown (handout) QUIZ 2	Isopentyl Acetate (19) (continued)
8	REEL MODULE	REEL MODULE
9	REEL MODULE	REEL MODULE
10	REEL MODULE	REEL MODULE

Chemistry 254 Lecture and Reading Schedule

Date	Topics	Assigned Reading
1	No MONDAY LECTURE	-----
2	Recrystallization Extraction of Caffeine	CH 1, 2, 3, 4, 5, 6, 7
3	Distillation and GC	CH 8
4	Elimination Reactions (E_1/E_2)	CH 12, CH 13
5	Thin Layer Chromatography Midterm I Review I	CH 9
6	Synthesis of Aspirin Nitration of Veratrole	CH 16, CH 15
7	Isopentyl Acetate IR Spectroscopy	CH 19 / Handout
8	REEL MODULE	Digital Handout
9	REEL MODULE	Digital Handout
10	REEL MODULE	Digital Handout

Lecture and Reading Assignments

I expect that you attend all lectures and come prepared ready to participate. The lecture will prepare you to do that week's experiments in the laboratory. We will go over important safety issues as well as talk about the theory and mechanism pertaining to that week's series of experiments. The portions of the lecture that are covered via PowerPoint will be made available on Carmen prior to the lecture, the topics covered in these sections will be the experimental procedure details for the experiment. The reaction mechanisms and important principles will be discussed on the **blackboard**. It is imperative to your success that you take notes on the material covered in lecture.

Suggested Homework Problems

Organic chemistry is best learned by working out problems; this means working the problem and then looking at the answer, not reading the questions and agreeing with the answer. I advise you to work as many problems as possible. All suggested study problems within the sections should be worked. I advise that you work out all of the practice problems from the textbook for each experiment performed. I will post the answers to these problems on the Carmen page at the end of each week. These homework assignments will not be graded or collected they are for your own benefit and should be worked out as practice and review.

Grading

Grade Distribution

100-93% = A
92-90% = A-
89-87% = B+
86-83% = B
82-80% = B-
79-77% = C+
76-73% = C
72-70% = C-
69-67% = D+
66-60% = D
59-0% = E

Quizzes

There will be two quizzes that are indicated on the course schedule. The quizzes will cover the principles learned in the prior weeks lab experiments or the prelab for that week. The quiz will be held during the first 10 minutes of lab. **There will be no make-up quizzes.**

Midterm Exam

Two written midterm examinations will be given in the lab on the date indicated in the above schedule. These examination will focus on the experiments and techniques you have performed. The exam will last for the first 120 minutes of the laboratory period. A study guide for the exam is provided in the back of this course packet.

Experimental Reports

A schedule for submitting reports is given below. It is important that reports be turned in on time such that evaluation of your progress can be monitored by your teaching assistant in a timely manner. Late reports will be penalized 10 pts per day late unless your instructor or TA is given an acceptable reason on or before the experiment due date. Report sheets for non-preparative experiments can be found in this course book. Reports for several “preparative” experiments will require independent writing on your part. These reports should consist of a heading, an equation that describes the experiment you performed, a reference, a narrative of the procedure you followed written according to the style accepted by American Chemical Society journals, and a brief discussion.

Notebooks

You are required to keep a notebook for this class. You must use the designated Hayden-McNeil duplicate-page spiral bound notebook . Each experiment entry must begin on a new page in the notebook.

There are two parts to the notebook entry: the pre-laboratory write-up (done before you come to the lab), and a narrative of the experimental procedure that you write as you perform the experiment in the lab.

No credit will be given for pre-labs submitted late. Pre-labs are due at the beginning of the lab period. Narratives should be kept in your notebook and will be randomly check by your TA during the quarter for completeness and quality.

An appropriate pre-laboratory write-up will include the following: the experiment title, the date, a reference, and all of the items listed on the lab manual pre-lab instruction sheet. A **brief** plan of procedure (complete sentences not needed), and the answers to one or more experiment-specific questions.

You will tear out the duplicate page(s) from your pre-lab notebook entry to submit to your teaching assistant at the beginning of the laboratory period. This pre-lab write-up is usually worth 5-10 of the points per report .

The narrative of the experimental procedure is written **in the laboratory as you perform the experiment**. Begin this entry on a new page. Write the title of the experiment and date at the top. You should record what you do as well as what you observe throughout the experiment. Quantities, time periods, and the order in which you do things are particularly important. You should also include percent yields, melting points or any other measurements you take in the lab.

If well-written, this narrative will serve as the rough draft of your final report (for experiments that require you to submit a preparative write-up instead of a fill-in-the-blank report sheet). The narrative should be written in past tense in complete sentences. When you are completely done with an experiment, initial the last page at the bottom.

Examples for both the notebook entry (pre-lab and narrative portions) and the preparative report write-up are shown in the lab manual.

Lab Technique Evaluation

This portion of your grade will be based upon your proficiency in the lab and how clean you keep your bench, your drawer, and the lab. **You are awarded this portion of your grade (50 points total) at the beginning of the course and, unless you lose it as explained below, it is yours to keep.**

Some of the penalties you could incur are:

- (a) not keeping your lab bench, glassware and drawer clean;
- (b) not being prepared for the lab;
- (c) how many times you had to repeat an experiment due to mistakes on your part;
- (d) repeated tardiness;
- (e) breakage of glassware or other equipment as explained elsewhere;
- (f) consistently falling behind schedule in completing the experiment;
- (g) unsafe practices (for example, not wearing safety goggles in the lab or inappropriate handling or disposing of dangerous chemicals).

Of course, if you are unsure about something, we encourage you to seek the assistance of your TA. At the same time, you need to make an effort to become as **independent** as possible, as this will make it easier to complete the experiments. It is important that you arrive to class on time as important announcements are usually given at the beginning of the lab period. *If you are repeatedly late for lab you will receive a 5-point deduction from your technique grade for each occurrence.*

Grading Consistency

Given the number of assignments in this class, most of the grading is done by the TAs. We realize that every TA has a slightly different grading scale and we have taken steps to ensure that there is as much consistency as possible between sections. This is achieved as follows:

1. The TAs are given detailed instructions as how to grade reports. This includes the number of points to be assigned to each aspect of the report.
2. We monitor section averages throughout the course of the term. If a particular section is consistently below the average, we talk with the TA of that section to determine why their scores are below the average.
3. At the end of the term, we again look at section averages of all the reports for each TA. If the average of a section is significantly lower than the mean, we occasionally will add points to that section to bring it in line with the others. We do not, however, take points away from those sections with averages higher than the mean.

General Rules and Guidelines

1. Attendance at all laboratory periods is mandatory.
 - A. An unexcused lab absence will result in a zero for that experiment.
 - B. If the experiment is a two day experiment and you have an unexcused absence for either day of the experiment you will also receive a zero for that experiment.
 - C. Students who have excused absences can make arrangements with the course instructor to complete the make up work during the catch up period.
 - D. Students are not permitted to do make-up work in other sections.
 - E. Please communicate any lab absences due to illness or family emergency to your professor by email or phone; as soon as possible.
 - F. Please provide your professor with the documentation for absences due to illness or family emergency, and consult with him regarding due dates for work completed during catch-up periods.
2. Everyone is expected to keep their lockers and equipment clean and orderly. If you do not, deductions from your grade will result as follows:
 - A. Your teaching assistant will inspect your hood at the end of each class. A messy hood (glassware not put away, chemicals on the working surface, steam bath and aspirator not in working order, ring stands and their contents messy, rubber tubing not returned to boxes, etc.) will result in a warning the first time and a 5 pt deduction upon each occurrence thereafter.
 - B. Your teaching assistant will inspect the instrument room after each class. A messy instrument room (community equipment not returned to its proper place, chemicals left on surfaces, centrifuge not clean, balances dirty) will result in a warning the first time and a 5 pt deduction for every person in the class upon each occurrence.
3. ***Attendance at the last laboratory period is mandatory.*** At check-out your lockers are to be clean and contain precisely the contents on the locker list (nothing less and nothing more). This will be inspected by your instructor after check-out. **Non-compliance will result in a deduction of one letter grade for the course (e.g. A- would become a B-).**
4. The glassware and equipment you use in the laboratory are expensive. Therefore, it is expected that you will treat this equipment with care and respect and that you will keep it clean. Equipment breakage will be reflected in the “technique” portion of your grade. Loss or breakage of a kit item will result in a warning the first time, and a 5 pt deduction for each subsequent loss/breakage. There is no limit on the amount of points that can be deducted for this. If you lose all of your technique points due to excessive loss/breakage, any additional losses/breakages will result in 5 pts being deducted from your point total at the end of the course. If you lose or break your entire kit, you will automatically lose all 50 technique points.
5. *Repeating a lab experiment for a better yield.* If you wish to repeat an experiment to obtain a better yield you will be penalized 10 points for repeating the experiment. You can only repeat an experiment on the scheduled day for the experiment.

Academic Misconduct

Academic misconduct of any type will not be tolerated and will be dealt with severely, according to University guidelines.

- 1. Know Your Rights.** Do not let other students in your class diminish the value of your achievement by taking unfair advantage. Report any academic dishonesty you see.
- 2. Acknowledge Your Sources.** Whenever you use words or ideas that are not your own when writing a paper, use quotation marks where appropriate and cite your source in a footnote, and back it up at the end with a list of sources consulted. Avoid the appearance of plagiarism.
- 3. Protect Your Work.** In examinations, do not allow your neighbors to see what you have written; you are the only one who should receive credit for what you know.
- 4. Avoid Suspicion.** Do not put yourself in a position where you can be suspected of having copied another person's work, or of having used unauthorized notes in an examination. Even the appearance of dishonesty may undermine your instructor's confidence in your work.
- 5. Do your own work.** The purpose of assignments is to develop your skills and measure your progress. Letting someone else do your work defeats the purpose of your education, and may lead to serious charges against you.
- 6. Never falsify a record** or permit another person to do so. Academic records are regularly audited and students whose grades have been altered put their entire transcript at risk.
- 7. Never fabricate** data, citations, or experimental results. Many professional careers have ended in disgrace, even years after the fabrication first took place.
- 8. Always tell the truth** when discussing your work with your instructor. Any attempt to deceive may destroy the relation of teacher and student.

<http://www.northwestern.edu/uacc/8cards.html>

Disabilities: If you have a university-documented disability, you should see me as soon as possible. If your disability requires that quizzes or examinations be taken outside regularly scheduled times, see the Office of Disability Services, Room 150 Pomerene Hall (292-3307)

NOTE: YOU ARE RESPONSIBLE FOR ALL CHANGES TO THIS SYLLABUS MADE IN CLASS WHETHER OR NOT YOU ARE IN ATTENDANCE.

Chemistry II – Syllabus

Chemistry 111-02

Mercy College

Fall 2008

Lecture: T/R 2:00 – 3:20 pm J 3111
Laboratory: R 3:30 – 6:20 pm J 3301

Instructor: Treasure Sucheck, Ph.D. Chemistry
Office Hours: W/R/F 11:00 am - 1:00 pm

Phone: (419) 251-8924
E-Mail: Treasure.Sucheck@mercycollege.edu
Faculty Office: M 3804

COURSE OVERVIEW

- A. Lecture Text: *General, Organic and Biological Chemistry: Structures of Life*, 2nd Edition, Timberlake (required)
- B. Lab Text: *Laboratory Manual for General, Organic and Biological Chemistry: Structures of Life*, Timberlake (required)
Oxazolidinone Research Module, Sucheck (required)
- C. Prerequisite: High School Chemistry or an equivalent within the last seven years.
- D. Course Description:
- CHM 111- Chemistry II – 4 hours (3-3)
 - This course is a one semester introduction to organic, and biochemistry. The intention of the course is to provide a good background for subsequent science classes. Topics that will be covered include; organic chemicals (alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides), the structure and function of biomolecules (carbohydrates, lipids, amino acids, proteins, nucleic acids) and metabolism.
- E. Course Objectives:
1. Analyze molecular polarity and relate polarity to physical properties such as boiling points and solubility for hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides.
 2. Identify functional groups, draw structural formulas of organic molecules from the chemical name and write correct IUPAC names of molecules from their structural formulas for hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides.
 3. Predict reaction products given the reactants and reaction conditions for hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides.
 4. Analyze the results of basic laboratory operations applicable to organic and biochemistry.
 5. List characteristics, draw structures, describe structure-function relationship for biomolecules: carbohydrates, lipids, amino acids, proteins and nucleic acids.

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Chemistry 111-02

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6. Explain the processes of cell respiration including glycolysis, the citric acid cycle, and electron transport.

GENERAL EDUCATION PORTFOLIO REQUIREMENTS:

Based on the faculty's beliefs regarding the knowledge and skills of graduates of their programs, the mission of the college, and the organizational framework, philosophy and goals of their specific programs, the faculty believes that the integration of general education throughout the curriculum is integral to student's success. Faculty believe that experiences in the curriculum designed to assist the student in meeting the general education competencies also help the student reach their specific program outcomes.

Students should go to <http://www.mercycollege.edu>, "current students," "campus resources," "student success center." There you will find "Student Portfolios" (PDF) and "Portfolio Instructions" (PDF)

Achieving the general education competencies is not necessarily accomplished through a single course. It is achieved through a more inclusive, integrated approach that is reinforced through out the entire curriculum. While there are opportunities in each course to assist the student in meeting many general education competencies; each course focuses specifically on 2 or 3. This approach to general education demonstrates the significant and complementary relationship between program specific and general education competencies.

General Education Core Abilities Addressed:

1. **Communication:** To develop fundamental literacy in reading, writing, speaking and listening in order to communicate effectively. This will be addressed through group work and lab assignments. Specifically, the oxazolidinone research project will incorporate information retrieval skills via Ohio Link along with oral and written communication skills.
2. **Critical Thinking:** To reason logically, using data from appropriate disciplines in the process of problem solving and decision-making. This core ability will be addressed using case studies and the analysis of unknown compounds in lab.
3. **Science:** To understand scientific concepts, the scientific method, contemporary issues in science and technology, and apply these concepts to healthcare. This core will be demonstrated by conducting lab experiments and discussing current articles related to chemistry, technology and healthcare.

COURSE STRUCTURE

Lecture:

- Lecture sessions are designed to clarify the concepts covered in this course and provide examples of what is expected of you.
- Attendance is expected and you are responsible for all material, and problems covered in class.
- It is recommended that you *read the text before the lecture*.
- Lecture outlines will be available for each chapter.
- The attached schedule will inform you regarding which parts of the text you should read.
- In consideration for your fellow students, please arrive on time and **turn off your cell phone**.

Homework:

- A detailed listing of non-graded homework assignments from the lecture text will be at the beginning of each lecture outline. These should be viewed as a *minimum*. The answers to most of these questions are at the end of each chapter. You should try to solve homework problems yourself before looking at the solution.

Quizzes:

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- The quizzes will be 10-15 minutes and will be taken at the beginning of the lecture period.
- There will not be any make-up quizzes. The lowest quiz score will be dropped.

Examinations:

- Make-up exams will not be given for any circumstance. Excused absences will be given only to students who miss an exam under the conditions listed below. If an excuse is acceptable, your score on the excused exam will be an average of the other exam scores. The final exam cannot be excused. You will not be permitted to use a calculator nor have a cell phone on your desk.
 - ⇒ There will be 3 lecture examinations (100 pts each) on **9-23-2008, 10-30-2008, and 12-4-2008.**
 - ⇒ The **comprehensive final exam** (200 pts) will be administered on **Tuesday, December 16, 2008** from 1:00-3:00 p.m., the time scheduled by Mercy College.

Exam Absence Policies

Students who do not take an exam due to illness, car accident or similar **extreme** circumstance should inform their instructor of their difficulties as soon as possible. These difficulties must also be **documented** by a physician's note, an accident report, etc.

Study Hints:

- Students who have questions or problems with lecture or laboratory material are invited and urged to come to the regularly schedule office hours. I am also generally available for questions immediately following the lecture. Alternatively at other times, a conference appointment can be made with me.
- To obtain a high grade in this course, you should plan to spend at least 2 -3 hours of study outside of class for each hour you spend in class.

COURSE GRADES AND GRADING POLICIES

Course Points The following is the distribution of possible points in the course:

Laboratory Component	200 pts
3 Lecture Exams (100 pts each)	300 pts
6 Quizzes (20 pts each)	100 pts (The lowest quiz will be dropped)
6 Writing Assignments (20 pts each)	100 pts (The lowest WA will be dropped)
<u>Final Exam</u> (Comprehensive)	<u>200 pts</u>
Total	900 pts

Grading Scale:

- A = 90-100 %
- B = 80-89 %
- C = 65-79 %
- D = 55 – 64%
- F = 54% and below

Drop, Withdrawal and Incomplete Grades

Course drop and withdrawal procedures have been set by the college. The deadline for dropping with 100% refund is **August 31st**. The deadlines for dropping with 80% and 25% refunds are **September 7th** and **September 21st** respectively. You may *withdraw* from the course and receive a grade of **W**. The deadline for withdrawal is **October 12th**. For both dropping the course or withdrawing you should go to the Registrar's Office. Please note that course registration changes might change your **financial aid**.

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A course grade of **Incomplete** is given only to those who have completed all but a small percentage of course requirements for an acceptable reason.

ADDITIONAL INFORMATION

1. *ADA Statement:* "College students with documented disabilities have the right to 'reasonable accommodation' under section 504 of the Rehabilitation Act of 1973 and the ADA. If you require special accommodations, please notify your instructor during the first week of the term."
2. *Plagiarism Statement:* "Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com site."
3. *Attendance policy:* You are expected to attend class every day. Lecture will supplement the textbook and a significant amount of time is spent working problems.
4. *Appropriate Classroom Behavior:* Appropriate classroom behavior can be summed up by the following rule: Show respect for the instructor and your fellow students. The following guidelines are to give an idea of what is and what is not acceptable behavior. It is not meant as an all inclusive list.
 - No cell phone use during class.
 - Do not talk while someone else is talking. Please raise your hand before asking/answering a question.
 - If you finish a quiz while others are still working, you may leave the room quietly or remain quietly at your desk. DO NOT talk. DO NOT open your notes or text.
 - No electronic earpieces can be worn during a quiz or exam.

ACADEMIC INTEGRITY

The purpose of education is to advance one's own intellectual skills and knowledge and to demonstrate the outcomes of these efforts. An essential and shared value in higher education is presenting one's own work and properly acknowledging that of others. Any violation of this principle constitutes academic dishonesty and is liable to result in disciplinary action. Forms of academic dishonesty include but are not necessarily limited to the following:

- *Plagiarism:* submitting all or part of another's work as one's own in an academic exercise, such as an examination, computer file, or written assignment. This includes, but is not limited to, submitting papers written by someone else, such as a family member or friend, or downloading parts of, or entire term papers from the internet, and then submitting them as your own work. It also includes use of another's words as one's own, be that paraphrasing or direct quotation, without proper citation.
- *Cheating:* Using or attempting to use unauthorized materials on an examination or assignment, such as using unauthorized texts or notes or improperly obtaining or attempting to obtain, copies of an examination or answers to an examination. This also includes sharing or receiving content, from exams or quizzes, by way of another student.
- *Facilitating Academic Dishonesty:* helping another to commit an act of academic dishonesty, such as substituting for an examination, completing an assignment for someone else or sharing of computer files.
- *Fabrication:* altering or transmitting, without authorization, academic information or records.

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- *Multiple Submissions*: submitting the same paper/project for credit in multiple classes, without permission of the instructors involved.

Reporting Cases of Academic Integrity: Each case of academic dishonesty will be reported to the appropriate Division Director in a formal written charge by the faculty member with firsthand knowledge of the violation within 15 class days* after the incident occurs. The faculty member will have a face-to-face discussion with the student, which will be documented on the Academic Counseling form. Finally, the faculty member must inform the student of the charge via certified mail delivery. The written charge must contain the following:

The particular allegation;

The names of other participants or witness(es) where appropriate;

The date and time, location, and relevant circumstances of the incident; and

A copy of the relevant sections of the College Catalog concerning academic dishonesty and the appeal process.

Penalty for Academic Dishonesty: During a student's entire academic career at Mercy College, each incident of academic dishonesty will be reported in writing to the appropriate Division Director. A disciplinary notation for academic dishonesty will be entered in the student's academic record.

A student found to have committed an act of academic dishonesty will not have the option to withdraw from the class in which the first incident occurred. A second finding of academic dishonesty shall exclude a student from consideration for academic honors.

The penalty for the first incident of academic dishonesty will be a score of zero on the particular item being submitted and a written warning. The second incident of academic dishonesty in the same course as the first incident occurred or any other course will result in a failing grade for the course in which the second infraction occurred. A third incident of academic dishonesty will result in disciplinary dismissal, unless appealed. This may be appealed as outlined in the "Student Academic Appeal Process" in the *Student Handbook*. The Division Director shall then notify the Registrar to enter the notation "dismissed for academic dishonesty" on the student's academic record.

**Note: A college class day is defined as any day that the college holds classes including final examination week.*

LECTURE SCHEDULE (TENTATIVE)

The table below will give you a general idea of our pace throughout the course. Be sure to note announcements which may revise this schedule. **BE SURE THAT YOUR TRAVEL AND EMPLOYMENT PLANS DO NOT CONFLICT WITH THIS SCHEDULE – INCLUDING THE FINAL EXAM.**

Week	Date	Chapter: Topic	Exam/Quiz
1	August 26	Chapter 11: Organic Chemistry	
	August 28	Chapter 11: Alkanes	
2	September 2	Chapter 12: Alkenes	
	September 4	Chapter 12: Alkynes and Aromatic Compounds	Quiz 1
3	September 9	Chapter 13: Alcohols and Ethers	
	September 11	Chapter 13: Alcohols and Ethers	WA 1
4	September 16	Chapter 14: Aldehydes and Ketones	Quiz 2
	September 18	Chapter 14: Aldehydes and Ketones	WA 2
5	September 23	Exam 1 (Chapters 11-14)	Exam 1
	September 25	Chapter 15: Carbohydrates	
6	September 30	Chapter 15: Carbohydrates	
	October 2	Chapter 15: Carbohydrates	
7	October 7	Chapter 16: Carboxylic Acids and Esters	WA 3
	October 9	Chapter 16: Carboxylic Acids and Esters	Quiz 3
8	October 14	<i>No Class – Fall Break</i>	
	October 16	Chapter 17: Lipids	
9	October 21	Chapter 17: Lipids	WA 4
	October 23	Chapter 18: Amines and Amides	Quiz 4
10	October 28	Chapter 18: Amines/Amides	
	October 30	Exam 2 (Chapters 15-18)	Exam 2
11	November 4	Chapter 19: Amino Acids	

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	November 6	Chapter 19: Proteins	
12	November 11	Chapter 20: Enzymes	WA 5
	November 13	Chapter 21: Nucleic Acids	Quiz 5
13	November 18	Chapter 21: Nucleic Acids	
	November 20	Chapter 22: Metabolism	
14	November 25	Chapter 22: Carbohydrate Metabolism	WA 6
	November 27	<i>No Class - Thanksgiving</i>	
15	December 2	Chapter 23: The Citric Acid Cycle	Quiz 6
	December 4	Exam 3 (Chapters 19-22)	Exam 3
16	December 9	Chapter 23: The Citric Acid Cycle	
	December 11	Chapter 23: Oxidative Phosphorylation	
-----	December 16	Final Exam (Chapters 11-23)	Final Exam

Chemistry II – Syllabus

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LABORATORY

General Information

- Attendance at laboratory sessions is mandatory. Excused absences from lab will be given only in the event of illness, car accident or other extreme circumstances. Should this happen to you, notify the instructor as soon as possible by email and provide written documentation from your physician, traffic officer etc.
- Students are expected to come to the lab prepared. Each experiment has prelab questions which are to be answered prior to the lab time.
- Each lab report has data sheets and post lab questions. Data sheets are to be completed in blue or black ink. Any mistakes are to be crossed out with one line and the correct value placed above or beside the error.
- Lab reports are due at the end of the lab period in which the experiment was completed. All lab assignments must be done in your own words to receive credit. Cheating on any assignment will result in a grade of zero.
- The laboratory grade will determine 20% (200 pts) of the overall course grade.

Lab Grading Policy

Prelab questions/lab reports:	130 pts
Lab problem set	20 pts
<u>Lab final exam:</u>	<u>50 pts</u>
Total	200 pts

Lab Guidelines and Lab Safety

1. Safety goggles and proper attire (pants/skirt and closed shoes) are required at all times while lab work is in progress.
2. No eating, drinking or smoking in the chemistry lab.
3. The time period for each lab section is strictly maintained. If you are unable to complete the assigned work during your lab period, you will not be able to complete it later and points will be deducted accordingly.
4. Your lab area and common work areas are to be cleaned before leaving the room.
5. Violation of safety rules will result in a point penalty which is proportional to the seriousness of the violation. A serious violation of safety rules may result in removal from the laboratory resulting in a score of zero for the experiment.

LABORATORY SCHEDULE (TENTATIVE)

The table below will give you a general idea of our pace throughout the course. Be sure to note announcements which may revise this schedule. **BE SURE THAT YOUR TRAVEL AND EMPLOYMENT PLANS DO NOT CONFLICT WITH THIS SCHEDULE**

Week	Date	Experiment (number)
1	August 28	Experiment 21: Lab Safety and Properties of Organic Compounds
2	September 4	Experiment 23: Reactions of Hydrocarbons
3	September 11	Experiment 24: Alcohols and Phenols
4	September 18	Experiment 25: Aldehydes and Ketones
5	September 25	Case Studies: Diabetes and Digestible Carbohydrates
6	October 2	Experiment 29: Synthesis of Aspirin
7	October 9	Experiment 29: Thin Layer Chromatography – Analysis of Analgesics
8	October 16	Experiment 34: Synthesis of Acetaminophen
9	October 23	Experiment 34: TLC and Melting Point Analysis of Acetaminophen
10	October 30	Oxazolidinone Research Module
11	November 6	Oxazolidinone Research Module
12	November 13	Oxazolidinone Research Module
13	November 20	Oxazolidinone Research Module
14	November 27	<i>No Class – Thanksgiving</i>
15	December 4	Problem Set
16	December 11	Lab Final Exam

Note: The instructor reserves the right to make changes to the syllabus.

Chemistry 255 – 2009 Organic Chemistry Lab



Instructor: Dr. Christopher Callam
Office : 380 C Celeste Laboratory
Telephone : 292-0679
E-mail : ccallam@chemistry.ohio-state.edu

Lecture: Monday 4:30 pm - 5:18 pm McPherson 1000

Office Hours:

Monday, Wednesday and Friday 12:00 p.m.-1:18 p.m. Wednesday and Friday 2:30 p.m.-3:30 p.m. These are just my official office hours you are welcome to stop by at anytime. If I am not in my office I am in one of the labs on the 4th floor of Celeste, feel free to come talk to me. You may also make an appointment by e-mail and suggest times that are convenient to stop by my office

Course Objectives:

The main objective of this laboratory course is for everyone to gain an understanding of the fundamental laboratory techniques of organic chemistry and to use these techniques toward the synthesis of interesting organic compounds. The students will be exposed to a wide variety of reactions such as Aldol, Diels-Alder, Electrophilic Aromatic Substitution, and Fisher Esterification. Students are also provided the opportunity to learn how to problem solve and have the opportunity to improve their scientific writing skills. The concept of learning revolves around active and independent thought, questions, and clear communication.

If you have any questions do not hesitate to ask.
My job is to teach you and to help you learn this material.

Prerequisites:

Completion of Chem 245 or 254; and Chem 252.

Required Materials:

1. Organic Chemistry Laboratory CH 255 Manual – McGraw Hill (ISBN: #007-339504-8)
2. Hayden McNeal - Spiral Bound Lab Notebook with Duplicate Pages; (ISBN: 978-0-7380-3094-4)

Internet Pages:

<https://carmen.osu.edu>

Answers to the suggested homework problems and your grades are available on this web pages. To view them, you will need the Adobe Acrobat reader installed on your computer. If you do not have it, you can download it for free from:

<http://www.adobe.com/products.acrobat.readstep.html>

All your grades for this course will be posted to Carmen on a regular basis. If you find an error in the grades that have been posted for you, please let your TA or Dr. Callam know immediately.

If you need help accessing materials from within the course page:

Contact me at ccallam@chemistry.ohio-state.edu

Chemistry 255 Laboratory Experiments and Exams Schedule

Week	Period 1 Lab Experiment	Period 2 Lab Experiment
1	Column Chromatography	Benzoin Condensation
2	Benzoin Condensation (continued) Aldol Condensation – Synthesis of Tetraphenylcyclopentadienone	Luminol
3	Benzynes- Synthesis of Tetraphenyl-naphthalene	Benzynes- Synthesis of Tetraphenyl-naphthalene (continued)
4	Column Chromatography	Soaps and Polymers
5	Benzocaine	Benzocaine (continued)
6	Reduction of Vanillin	Benzil Quinoxaline
7	REEL PROJECT	REEL PROJECT
8	REEL PROJECT	REEL PROJECT
9	REEL PROJECT	REEL PROJECT
10	REEL PROJECT	REEL PROJECT

Chemistry 255 Lecture and Reading Schedule

Week Of	Topics Monday Lecture	Assigned Reading
1	-----	CH 1, CH 2, CH 3, CH 4, CH 5, CH 12
2	Course Overview, Benzoin Condensation Aldol Reaction and Luminol	CH 14 and CH 19
3	Diels Alder Reactions and Benzyne Chemistry	CH 15
4	Soap and Polymers Column Chromatography	CH 9, CH 17, CH 18
5	Isopentyl Acetate	CH 20
6	Reduction of Vanillin Benzil Quinoxaline	CH 10 and CH 11
7	REEL Project Lecture	Digital Handout
8	REEL Project Lecture	Digital Handout
9	REEL Project Lecture	Digital Handout
10	REEL Project Lecture	Digital Handout

Lecture and Reading Assignments

I expect that you attend all lectures and come prepared ready to participate. The lecture will prepare you to do that week's experiments in the laboratory. We will go over important safety issues as well as talk about the theory and mechanism pertaining to that week's series of experiments. The portions of the lecture that are covered via PowerPoint will be made available on Carmen prior to the lecture, the topics covered in these sections will be the experimental procedure details for the experiment. The reaction mechanisms and important principles will be discussed on the **blackboard**. It is imperative to your success that you take notes on the material covered in lecture.

Suggested Homework Problems

Organic chemistry is best learned by working out problems; this means working the problem and then looking at the answer, not reading the questions and agreeing with the answer. I advise you to work as many problems as possible. All suggested study problems within the sections should be worked. I advise that you work out all of the practice problems from the textbook for each experiment performed. I will post the answers to these problems on the Carmen page at the end of each week. These homework assignments will not be graded or collected they are for your own benefit and should be worked out as practice and review. The type and level of difficulty on the quizzes and exams will reflect the homework assignments.

Grading

Grade Distribution –

100-93% = A

92-90% = A-

89-87% = B+

86-83% = B

82-80% = B-

79-77% = C+

76-73% = C

72-70% = C-

69-67% = D+

66-60% = D

59-0% = E

Midterm Exams

One written midterm examinations will be given in the lab on the dates indicated in the above schedule. These examination will focus on the experiments and techniques you have performed. The exam will last for the first 120 minutes of the laboratory period. A study guide for the exam is provided in the back of the lab manual.

Return and Re-grading of Exams

Midterms will be returned in the first lab period meeting following the exam. You will have that laboratory period to review your exam. If you wish for your exam to be re-graded, you should write a note on the front of the exam. The entire exam will be re-graded by me. All exams must be returned to your TA before leaving the class period in which you receive it back. Failure to turn in the exam after review will result in a 0 for that exam score.

Experimental Reports

A schedule for submitting reports is given below. It is important that reports be turned in on time such that evaluation of your progress can be monitored by your teaching assistant in a timely manner.

Late reports will be penalized 10 pts per day late unless your instructor or TA is given an acceptable reason on or before the experiment due date.

Report sheets for non-preparative experiments can be found in the lab manual. Reports for several “preparative” experiments will require independent writing on your part. These reports should consist of a heading, an equation that describes the experiment you performed, a reference, a narrative of the procedure you followed written according to the style accepted by American Chemical Society journals, and a brief discussion.

Students should not collaborate with others on their pre-labs and laboratory reports. We will refer all cases of suspected collaboration to the Committee On Academic Misconduct. Do your own work!

Notebooks

You are required to keep a notebook for this class. You must use the designated Hayden-McNeil duplicate-page spiral bound notebook . Each experiment entry must begin on a new page in the notebook.

There are two parts to the notebook entry: the pre-laboratory write-up (done before you come to the lab), and a narrative of the experimental procedure that you write as you perform the experiment in the lab.

No credit will be given for pre-labs submitted late. Pre-labs are due at the beginning of the lab period. Narratives should be kept in your notebook and will be randomly check by your TA during the quarter for completeness and quality.

An appropriate pre-laboratory write-up will include the following: the experiment title, the date, a reference, and all of the items listed on the lab manual pre-lab instruction sheet. A **brief** plan of procedure (complete sentences not needed), and the answers to one or more experiment-specific questions.

You will tear out the duplicate page(s) from your pre-lab notebook entry to submit to your teaching assistant at the beginning of the laboratory period. This pre-lab write-up is usually worth 5-10 of the points per report .

The narrative of the experimental procedure is written **in the laboratory as you perform the experiment**. Begin this entry on a new page. Write the title of the experiment and date at the top. You should record what you do as well as what you observe throughout the experiment. Quantities, time periods, and the order in which you do things are particularly important. You should also include percent yields, melting points or any other measurements you take in the lab.

If well-written, this narrative will serve as the rough draft of your final report (for experiments that require you to submit a preparative write-up instead of a fill-in-the-blank report sheet). The narrative should be written in past tense in complete sentences. When you are completely done with an experiment, initial the last page at the bottom.

Examples for both the notebook entry (pre-lab and narrative portions) and the preparative report write-up are shown in the lab manual.

Lab Technique Evaluation

This portion of your grade will be based upon your proficiency in the lab and how clean you keep your bench, your drawer, and the lab. **You are awarded this portion of your grade (50 points total) at the beginning of the course and, unless you lose it as explained below, it is yours to keep.**

Some of the penalties you could incur are:

- (a) not keeping your lab bench, glassware and drawer clean;
- (b) not being prepared for the lab;
- (c) how many times you had to repeat an experiment due to mistakes on your part;
- (d) repeated tardiness;
- (e) breakage of glassware or other equipment as explained elsewhere;
- (f) consistently falling behind schedule in completing the experiment;
- (g) unsafe practices (for example, not wearing safety goggles in the lab or inappropriate handling or disposing of dangerous chemicals).

Of course, if you are unsure about something, we encourage you to seek the assistance of your TA. At the same time, you need to make an effort to become as **independent** as possible, as this will make it easier to complete the experiments. It is important that you arrive to class on time as important announcements are usually given at the beginning of the lab period. *If you are repeatedly late for lab you will receive a 5-point deduction from your technique grade for each occurrence.*

Grading Consistency

Given the number of assignments in this class, most of the grading is done by the TAs. We realize that every TA has a slightly different grading scale and we have taken steps to ensure that there is as much consistency as possible between sections. This is achieved as follows:

1. The TA's are given detailed instructions as how to grade reports. This includes the number of points to be assigned to each aspect of the report.
2. We monitor section averages throughout the course of the term. If a particular section is consistently below the average, we talk with the TA of that section to determine why their scores are below the average.
3. At the end of the term, we again look at section averages of all the reports for each TA. If the average of a section is significantly lower than the mean, we occasionally will add points to that section to bring it in line with the others. We do not, however, take points away from those sections with averages higher than the mean.
4. If you have problems with the way things are being graded please bring them to my attention as soon as possible.

General Rules and Guidelines

- Attendance at all laboratory periods is mandatory.
 - An unexcused lab absence will result in a zero for that experiment.
 - If the experiment is a two day experiment and you have an unexcused absence for either day of the experiment you will also receive a zero for that experiment.
 - Students who have excused absences can make arrangements with the course instructor to complete the make up work during the catch up period.
 - Students are not permitted to do make-up work in other sections.
 - Please communicate any lab absences due to illness or family emergency to your professor by email or phone; as soon as possible.
 - Please provide your professor with the documentation for absences due to illness or family emergency, and consult with him regarding due dates for work completed during catch-up periods.
- Everyone is expected to keep their lockers and equipment clean and orderly. If you do not, deductions from your grade will result as follows:
 - Your teaching assistant will inspect your hood at the end of each class. A messy hood (glassware not put away, chemicals on the working surface, steam bath and aspirator not in working order, ring stands and their contents messy, rubber tubing not returned to boxes, etc.) will result in a warning the first time and a 5 pt deduction upon each occurrence thereafter.
 - Your teaching assistant will inspect the instrument room after each class. A messy instrument room (community equipment not returned to its proper place, chemicals left on surfaces, centrifuge not clean, balances dirty) will result in a warning the first time and a 5 pt deduction for every person in the class upon each occurrence.
- Attendance at the last laboratory period is mandatory.*** At check-out your lockers are to be clean and contain precisely the contents on the locker list (nothing less and nothing more). This will be inspected by your instructor after check-out. **Non-compliance will result in a deduction of one letter grade for the course (e.g. A- would become a B-).**
- The glassware and equipment you use in the laboratory are expensive. Therefore, it is expected that you will treat this equipment with care and respect and that you will keep it clean. Equipment breakage will be reflected in the "technique" portion of your grade. Loss or breakage of a kit item will result in a warning the first time, and a 5 pt deduction for each subsequent loss/breakage. There is no limit on the amount of points that can be deducted for this. If you lose all of your technique points due to excessive loss/breakage, any additional losses/breakages will result in 5 pts being deducted from your point total at the end of the course. If you lose or break your entire kit, you will automatically lose all 50 technique points.
- Repeating a lab experiment for a better yield.* If you wish to repeat an experiment to obtain a better yield you will be penalized 10 points for repeating the experiment.

Academic Misconduct

Academic misconduct of any type will not be tolerated and will be dealt with severely, according to University guidelines.

- 1. Know Your Rights.** Do not let other students in your class diminish the value of your achievement by taking unfair advantage. Report any academic dishonesty you see.
- 2. Acknowledge Your Sources.** Whenever you use words or ideas that are not your own when writing a paper, use quotation marks where appropriate and cite your source in a footnote, and back it up at the end with a list of sources consulted. Avoid the appearance of plagiarism.
- 3. Protect Your Work.** In examinations, do not allow your neighbors to see what you have written; you are the only one who should receive credit for what you know.
- 4. Avoid Suspicion.** Do not put yourself in a position where you can be suspected of having copied another person's work, or of having used unauthorized notes in an examination. Even the appearance of dishonesty may undermine your instructor's confidence in your work.
- 5. Do your own work.** The purpose of assignments is to develop your skills and measure your progress. Letting someone else do your work defeats the purpose of your education, and may lead to serious charges against you.
- 6. Never falsify a record** or permit another person to do so. Academic records are regularly audited and students whose grades have been altered put their entire transcript at risk.
- 7. Never fabricate** data, citations, or experimental results. Many professional careers have ended in disgrace, even years after the fabrication first took place.
- 8. Always tell the truth** when discussing your work with your instructor. Any attempt to deceive may destroy the relation of teacher and student.

<http://www.northwestern.edu/uacc/8cards.html>

Disabilities: If you have a university-documented disability, you should see me as soon as possible. If your disability requires that quizzes or examinations be taken outside regularly scheduled times, see the Office of Disability Services, Room 150 Pomerene Hall (292-3307)

NOTE: YOU ARE RESPONSIBLE FOR ALL CHANGES TO THIS SYLLABUS MADE IN CLASS WHETHER OR NOT YOU ARE IN ATTENDANCE.

CHEM 2470 – Organic Chemistry Laboratory II

University of Toledo
Spring 2008

Lab Coordinator: Professor James Zubricky
Office: WO 3205B
Phone: 419.530.2566
Fax: 419.530.4033
E-mail: james.zubricky@utoledo.edu
Office Hours: or by appointment
TA Information:

Welcome to Organic Chemistry! The purpose of this laboratory course is to introduce students to the techniques that organic chemists (as well as biochemists, physical chemists, etc.) use in their daily routines. After learning and understanding those techniques, students will apply their knowledge to new situations to understand synthesis reactions, organic structure analysis, and analysis of (un)known compounds.

Course Goals: Organic chemistry laboratory is important for several reasons. It introduces students to many different laboratory practices and concepts that will be used in subsequent chemistry laboratory classes and in other laboratory situations in biology, pharmacy, and chemical engineering (just to name a few!). It is anticipated that by the completion of this course, students will be familiar with all of the following topics and techniques:

- Safety in the laboratory
- Interpreting and following scientific directions
- Keeping a proper lab notebook
- Names and proper usage of lab instruments
- Understanding of general properties of compounds (including solubility, miscibility, acid/base chemistry, etc.)
- Proper usage of glassware
- Isolation and purification techniques (including filtration, solvent removal, drying solutions, distillations, chromatography (thin-layer, column, and gas) and crystallization/recrystallization)
- Characterization techniques including spectroscopy and melting point determination
- Interpretation of scientific results including percent yield and recovery, melting point, boiling point, IR and NMR spectra, and R_f values

Pre- (and Co-) requisites: Students must have completed Organic Chemistry I (2410) and its lab course (2460 or 2480) and either be enrolled (or have finished) CHEM 2420: Organic Chemistry II. Please note that *withdrawal from CHEM 2420 during the*

semester will necessitate withdrawal from CHEM 2470. If you are considering to pursue the BA or BS degree program in Chemistry, please talk to Professor Zubricky as soon as possible!

Required and Recommended Materials:

The following materials are **required** for this course:

- Introduction to Organic Laboratory Techniques: A Microscale Approach by D.L. Pavia, G.M. Lampman, G.S. Kriz and R.G. Engel. 4th edition (2007), published by Thomson; ISBN: 0-495-01630-6
- A laboratory notebook with carbon(less) pages (available at the bookstore)
- An Introduction to Organic Spectroscopic Techniques by J.R. Zubricky III. 1st edition (2007), published by Thomson; ISBN: 1-4266-3003-4
- The REEL Project: Preparation of 1,2,3-Triazole Oxazolidinone Derivatives by S.J. Sucheck, T.J. Sucheck, J.R. Zubricky III, and X. Huang, published by Thomson (available at bookstore); ISBN: 1-426-63668-7
- Approved safety goggles.

The following materials are **recommended** for this course:

- Practical Organic Synthesis: A Student's Guide by R. Keese, M.P. Brändle, and T.P. Toubé. 1st edition (2006), published by Wiley. ISBN: 0-470-02966-8
- A towel and dish soap may be useful in cleaning glassware
- The Demon Under the Microscope by T. Hager. 1st edition (2007), published by Random House; ISBN: 978-1-4000-8214-8 [This may come in handy for the REEL Project]

Laboratory Attendance Policy: Attendance is **MANDATORY**. Except in extreme circumstances, no make up laboratory experiments will be permitted.

If you know *in advance* that you will miss a lab session, you **must** let the laboratory coordinator know in advance. Any kind of absence requires a valid, **written** excuse (i.e., written medical documentation). In a case where a valid written excuse is presented to the laboratory coordinator, your lab report (and any samples for that day) will be dropped from your final grade. Any unexcused absence will result in a score of zero for all assignments for that day (including samples, lab report(s), and/or quiz). All documentation for excused absences must be presented to the laboratory coordinator by the final day of classes (Friday, 25 April 2008). Consult the 2006-2008 UT Catalogue for the definitions of what an excused and unexcused absence is.

Please note that if you are more than 30 minutes late for a laboratory session, you will not be permitted to attend that session. During the first 30 minutes, your TA will cover the basic information necessary to complete that day's experiment, safety issues, precautions, and locations of chemicals and other materials. After the experiment has begun, for safety purposes, your TA needs to be working with all students, not covering the information for those students who are late. Therefore, if you are more than 30 minutes late, you will not be permitted to attend the laboratory and it will be counted as an unexcused absence.

You are **strongly** encouraged to obtain the missed information from other students in the laboratory, but you will not be permitted to submit laboratory reports for sessions in which you were counted absent.

Safety Requirements:

1. Eating, drinking, and smoking are **NOT PERMITTED** in the laboratory.
2. Non-registered persons are not permitted in the laboratory.
3. Appropriate laboratory apparel including footwear is required (i.e.: jeans, cotton shirts, no loose clothing, etc.). If students are wearing inappropriate clothing, they will be asked to leave class in order to change their clothes.
4. Safety goggles **MUST BE WORN BY EVERYONE** while experiments are being conducted. Your TA will determine and announce when goggles may be removed. The appropriate eyewear must be splash goggles, which are available for purchase from the UT bookstore.

Students should consult the handout from the UT Chemistry Stockroom concerning additional rules and guidelines for laboratory work. ANY violation of the safety rules/guidelines will result in a loss of technique points (see the “Laboratory Evaluation” section below for more information). If a student repeatedly violates these safety rules, the laboratory coordinator has the right to remove the student from the laboratory room (and, if behavior is warranted, expel from the course).

Student Responsibilities:

1. Read the laboratory assignment and appropriate lecture material prior to each laboratory session. It is required that a laboratory notebook be kept to record observations and experimental results.
2. Be on time and use the full laboratory period.
3. Ask questions and participate in each activity.
4. Turn in all work as assigned.
5. **Clean up:** Be certain that your area of the laboratory table is properly cleaned after use. Wash and return all glassware and other instruments to the proper areas. Check the sink to be sure that it is clear of all glassware and trash.
6. **Follow all safety policies set forth by the Department of Chemistry and laboratory coordinator.**

Laboratory Evaluation:

The grade for this course is based upon the following components:

Notebook / laboratory reports	35%
REEL Project paper	15%
Samples	10%
Technique points	5%
Quizzes (3)	15%
Final Examination	20%

The grading scale for this class is:

A	=	100 – 90%	C	=	78.99-70.00%
A-	=	89.99-89.50%	C-	=	69.99-69.50%
B+	=	89.49-89.00%	D+	=	69.50-69.00%
B	=	88.99-80.00%	D	=	68.99-60.00%
B-	=	79.99-79.50%	D-	=	59.99-59.50%
C+	=	79.49-79.00%	F	=	59.50-0.00%

Extra credit will not be given in this class.

In order to compensate for differences in grading among TAs, different grading scales may be used in order to ensure that fair grade assignments are made for each lab section.

Notebook: The most important part of a chemistry laboratory is the notebook, and this is reflected in the percentage assigned to the notebook. A handout entailing what is expected in the laboratory notebook will be distributed during the first session. In general, lab reports will be due one week after performing the lab. Late assignments will receive a 10% grade deduction for each day late. Any assignments over 1 week late will receive a zero (0) grade.

REEL Project paper: One experiment (the REEL Project) will require a full-blown laboratory report with abstract, introduction, procedure, data analysis, and conclusion. A handout will be given to students when these experiments start.

Quizzes and Final Examination: Three quizzes and a final examination will be given in class. The dates are:

	Tuesday	Thursday	Friday
Quiz 1	Feb. 5 th	Feb. 7 th	Feb. 8 th
Quiz 2	Mar. 11 th	Mar. 13 th	Mar. 14 th
Quiz 3	Apr. 8 th	Apr. 10 th	Apr. 11 th
Final Exam	Apr. 22 nd	Apr. 24 th	Apr. 25 th

The quizzes will be brief and will consist primarily of short answer/essay questions. The final exam will have both a standardized (multiple choice) and subjective (essay, short answer) sections. A review sheet will be distributed the week before each quiz and exam. If you miss a quiz or the final exam, and have an excused absence with documentation, you will be allowed to take the quiz/final exam, but it will be completely in essay format. The final examination will be *cumulative* over all labs and readings.

Samples: All samples are to be turned in in a properly labeled vial. The format for the label is shown below. Labels must be written in pen, placed securely and straight on the vial, and must not be smeared or covered in chemicals. In addition, a product sheet (found at the front of the lab next to the chalkboard) must be turned in with the sample. Items on the product sheet include percent yield and/or recovery, physical description, and purity. The melting point range or boiling point range listed on the product sheet should be the value you measured, not the value listed in the textbook or any other

reference book. Your sample will be graded on the label, sample sheet, percent yield, calculation of percent yield, and sample homogeneity, dryness, and appearance.

A sample label is as follows:

Your name Name of Compound Amount of sample in vial (g or mL) Tare weight of vial (g)
--

Technique: Technique points are determined by the TA and laboratory coordinator. Components of the technique score include laboratory safety, attitude, demonstration of competent lab techniques, ability to perform routine tasks in a timely manner, and neatness of lab drawer, work area, shared equipment, and chemicals. If the lab is found to be messy at the end of the lab period, either by the laboratory coordinator, TA, or the chemistry stockroom, the entire class will lose technique points.

Finally, if you have any questions or concerns about your grade or want to contest a grade for a certain assignment, you need to present the assignment directly to the laboratory coordinator and that person will regrade the assignment – not your TA. Please remember that there is a two-week window (after you have received your graded assignment back from your TA) in which you can contest the grading of an assignment.

Academic Dishonesty: The academic honesty policies, as stated in the 2006-2007 UT Student Handbook will be STRICTLY ENFORCED. Any student found violating the UT academic honesty policies will be penalized in accordance with these policies.

CHEM 2470 – Organic Chemistry Laboratory II
TUESDAY LABS
University of Toledo
Spring 2008

Please note that this schedule is tentative and may change.

<u>Week</u>	<u>Date</u>	<u>Activities</u>	<u>Reading Assignment</u>
1	1/8	Check-in and introduction; introduction to $^1\text{H-NMR}$	868-905; OS 1-8
2	1/15	Exp. 56: Preparation of a C-4 or C-5 Acetate Ester	498-501
3	1/22	Exp. 38 A: Grignard synthesis of Triphenylmethanol Introduction to molecular formulas	317-327; OS 9-16
4	1/29	Exp. 38A con't	317-327
5	2/5	Exp. 35: An Oxidation-Reduction Scheme; introduction to $^{13}\text{C-NMR}$; QUIZ I	288-302; OS 17-26
6	2/12	Preparation of Nylon 6,6 Part I	Handout
7	2/19	Preparation of Nylon 6,6 Part II; Introduction to Mass Spectrometry	Handout; OS 27-32
8	2/26	Wittig Reaction (TBA)	TBA
9	3/4	Spring Break – Woo hoo!!	
10	3/11	REEL Project: Week 1; introduction to combined Spectra problems	REEL 8-10; OS 33-42
10	3/18	REEL Project: Week 2	REEL 11-14
11	3/25	REEL Project: Week 3; Combined spectra problems due!	REEL 15-16
12	4/1	REEL Project: Week 4;	REEL 17-20
13	4/8	REEL Project: Week 5; QUIZ III	REEL 17-20
14	4/15	Exp. 27: Aromatic Bromination	224-228
15	4/22	FINAL EXAMINATION	

Note: All unlabeled pages come from your laboratory manual, except for the following books: OS = Organic Spectroscopy book; REEL = REEL Project lab manual

CHEM 2470 – Organic Chemistry Laboratory II
THURSDAY LABS
University of Toledo
Spring 2008

Please note that this schedule is tentative and may change.

<u>Week</u>	<u>Date</u>	<u>Activities</u>	<u>Reading Assignment</u>
1	1/10	Check-in and introduction; introduction to $^1\text{H-NMR}$	868-905; OS 1-8
2	1/17	Exp. 56: Preparation of a C-4 or C-5 Acetate Ester	498-501
3	1/24	Exp. 38 A: Grignard synthesis of Triphenylmethanol Introduction to molecular formulas	317-327; OS 9-16
4	1/31	Exp. 38A con't	317-327
5	2/7	Exp. 35: An Oxidation-Reduction Scheme; introduction to $^{13}\text{C-NMR}$; QUIZ I	288-302; OS 17-26
6	2/14	Preparation of Nylon 6,6 Part I	Handout
7	2/21	Preparation of Nylon 6,6 Part II; Introduction to Mass Spectrometry	Handout; OS 27-32
8	2/28	Wittig Reaction (TBA)	TBA
9	3/6	Spring Break – Woo hoo!!	
10	3/13	REEL Project: Week 1; introduction to combined Spectra problems	REEL 8-10; OS 33-42
10	3/20	REEL Project: Week 2	REEL 11-14
11	3/27	REEL Project: Week 3; Combined spectra problems due!	REEL 15-16
12	4/3	REEL Project: Week 4;	REEL 17-20
13	4/10	REEL Project: Week 5; QUIZ III	REEL 17-20
14	4/17	Exp. 27: Aromatic Bromination	224-228
15	4/24	FINAL EXAMINATION	

Note: All unlabeled pages come from your laboratory manual, except for the following books: OS = Organic Spectroscopy book; REEL = REEL Project lab manual

CHEM 2470 – Organic Chemistry Laboratory II
FRIDAY LABS
University of Toledo
Spring 2008

Please note that this schedule is tentative and may change.

<u>Week</u>	<u>Date</u>	<u>Activities</u>	<u>Reading Assignment</u>
1	1/11	Check-in and introduction; introduction to $^1\text{H-NMR}$	868-905; OS 1-8
2	1/18	Exp. 56: Preparation of a C-4 or C-5 Acetate Ester	498-501
3	1/25	Exp. 38 A: Grignard synthesis of Triphenylmethanol Introduction to molecular formulas	317-327; OS 9-16
4	2/1	Exp. 38A con't	317-327
5	2/8	Exp. 35: An Oxidation-Reduction Scheme; introduction to $^{13}\text{C-NMR}$; QUIZ I	288-302; OS 17-26
6	2/15	Preparation of Nylon 6,6 Part I	Handout
7	2/22	Preparation of Nylon 6,6 Part II; Introduction to Mass Spectrometry	Handout; OS 27-32
8	2/29	Wittig Reaction (TBA)	TBA
9	3/7	Spring Break – Woo hoo!!	
10	3/14	REEL Project: Week 1; introduction to combined Spectra problems	REEL 8-10; OS 33-42
10	3/21	REEL Project: Week 2	REEL 11-14
11	3/28	REEL Project: Week 3; combined spectra problems due!	REEL 15-16
12	4/4	REEL Project: Week 4;	REEL 17-20
13	4/11	REEL Project: Week 5; QUIZ III	REEL 17-20
14	4/18	Exp. 27: Aromatic Bromination	224-228
15	4/25	FINAL EXAMINATION	

Note: All unlabeled pages come from your laboratory manual, except for the following books: OS = Organic Spectroscopy book; REEL = REEL Project lab manual

CHEM 2490 / CHEM 2490 (H) – The Systematic Identification of Organic Compounds

University of Toledo
Spring 2008

Lab Coordinator: Professor James Zubricky
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Phone: 419.530.2566
Fax: 419.530.4033
E-mail: james.zubricky@utoledo.edu
Office Hours: or by appointment

TA Information: Virginie Casarotto
Virginiecasarotto@yahoo.fr

Welcome to Organic Chemistry! The purpose of this laboratory course is to introduce students to the techniques that organic chemists (as well as biochemists, physical chemists, etc.) use in their daily routines. After learning and understanding those techniques, students will apply their knowledge to new situations to understand synthesis reactions, molecular structure determination, and analysis of (un)known compounds.

Course Goals: Organic chemistry laboratory is important for several reasons. It introduces students to many different laboratory practices and concepts that will be used in subsequent chemistry laboratory classes (CHEM 2490 and beyond) and in other laboratory situations in biology, pharmacy, and chemical engineering (just to name a few!). It is anticipated that by the completion of this course, students will be familiar with all of the following topics and techniques:

- Safety in the laboratory
- Interpreting and following scientific directions
- Keeping a proper lab notebook
- Names and proper usage of lab instruments
- Understanding of general properties of compounds (including solubility, miscibility, acid/base chemistry, etc.)
- Proper usage of glassware
- Isolation and purification techniques (including filtration, solvent removal, drying solutions, distillations, chromatography (thin-layer, column, and gas) and crystallization/recrystallization)
- Characterization techniques including spectroscopy and melting point determination
- Interpretation of scientific results including percent yield and recovery, melting point, boiling point, IR and NMR spectra, and R_f values

Pre- (and Co-) requisites: Students must have completed Organic Chemistry I (2410) and its lab course (2460 or 2480 and/or 2500) and either be enrolled (or have finished) CHEM 2420: Organic Chemistry II. Please note that *withdrawal from CHEM 2420 during the semester will necessitate withdrawal from CHEM 2490.*

Required and Recommended Materials:

The following materials are **required** for this course:

- Introduction to Organic Laboratory Techniques: A Microscale Approach by D.L. Pavia, G.M. Lampman, G.S. Kriz and R.G. Engel. 4th edition (2007), published by Thomson; ISBN: 0-495-01630-6
- A laboratory notebook with carbon(less) pages (available at the bookstore)
- The REEL Project: Preparation of 1,2,3-Triazole Oxazolidinone Derivatives by S.J. Sucheck, T.J. Sucheck, J.R. Zubricky III, and X. Huang, published by Thomson (available at bookstore); ISBN: 1-4266-3003-4
- The Demon Under the Microscope by T. Hager. 1st edition (2007), published by Random House; ISBN: 978-1-4000-8214-8
- Approved safety goggles.

The following materials are **recommended** for this course:

- Practical Organic Synthesis: A Student's Guide by R. Keese, M.P. Brändle, and T.P. Toubé. 1st edition (2006), published by Wiley. ISBN: 0-470-02966-8
- A towel and dish soap may be useful in cleaning glassware
- Introduction to Spectroscopy by Pavia, Lampman, and Kriz. 3rd edition (2001), published by Thomson. ISBN: 0-03-031961-7

Scheduled Meeting Times: There are two meeting times per week for this course. One is on Tuesday, which is divided into a 50-minute lecture and a three hour lab, and is **absolutely mandatory**. The second is on Thursday and is an instructor-supervised open lab, and you are required to be there for some of that time. *Please keep Thursday afternoons from 1-4 open for the open lab period.*

Laboratory Attendance Policy: Attendance is **MANDATORY**. Except in extreme circumstances, no make up laboratory experiments will be permitted.

If you know *in advance* that you will miss a lab session, you **must** let the laboratory coordinator know in advance. Any kind of absence requires a valid, **written** excuse (i.e., written medical documentation). In a case where a valid written excuse is presented to the laboratory coordinator, your lab report (and any samples for that day) will be dropped from your final grade. Any unexcused absence will result in a score of zero for all assignments for that day (including samples, lab report(s), and/or quiz). All documentation for excused absences must be presented to the laboratory coordinator by the final day of classes (Friday, 25 April 2008). Consult the 2006-2008 UT Catalogue for the definitions of what an excused and unexcused absence is.

Please note that if you are more than 30 minutes late for a laboratory session, you will not be permitted to attend that session. During the first 30 minutes, your TA will cover the

basic information necessary to complete that day's experiment, safety issues, precautions, and locations of chemicals and other materials. After the experiment has begun, for safety purposes, your TA needs to be working with all students, not covering the information for those students who are late. Therefore, if you are more than 30 minutes late, you will not be permitted to attend the laboratory and it will be counted as an unexcused absence.

You are **strongly** encouraged to obtain the missed information from other students in the laboratory, but you will not be permitted to submit laboratory reports for sessions in which you were counted absent.

Safety Requirements:

1. Eating, drinking, and smoking are **NOT PERMITTED** in the laboratory.
2. Non-registered persons are not permitted in the laboratory.
3. Appropriate laboratory apparel including footwear is required (i.e.: jeans, cotton shirts, no loose clothing, etc.). If students are wearing inappropriate clothing, they will be asked to leave class in order to change their clothes.
4. Safety goggles **MUST BE WORN BY EVERYONE** while experiments are being conducted. Your TA will determine and announce when goggles may be removed. The appropriate eyewear must be splash goggles, which are available for purchase from the UT bookstore.

Students should consult the handout from the UT Chemistry Stockroom concerning additional rules and guidelines for laboratory work. ANY violation of the safety rules/guidelines will result in a loss of technique points (see the "Laboratory Evaluation" section below for more information). If a student repeatedly violates these safety rules, the laboratory coordinator has the right to remove the student from the laboratory room (and, if behavior is warranted, expel from the course).

Student Responsibilities:

1. Read the laboratory assignment and appropriate lecture material prior to each laboratory session. It is required that a laboratory notebook be kept to record observations and experimental results.
2. Be on time and use the full laboratory period.
3. Ask questions and participate in each activity.
4. Turn in all work as assigned.
5. **Clean up:** Be certain that your area of the laboratory table is properly cleaned after use. Wash and return all glassware and other instruments to the proper areas. Check the sink to be sure that it is clear of all glassware and trash.
6. **Follow all safety policies set forth by the Department of Chemistry and laboratory coordinator.**

Laboratory Evaluation:

The grade for this course is based upon the following components:

For students enrolled in 2490:

Notebook/laboratory reports	30%
The REEL Project paper	15%
Quizzes (3)	15%
Samples	10%
Service-Learning component	10%
Final Examination	20%

For students enrolled in 2490 (H):

Notebook/laboratory reports	20%
The REEL Project paper	15%
Quizzes (3)	15%
Samples	10%
Teaching lesson	10%
Service-learning component	10%
Final Examination	20%

Extra credit will not be given in this class.

Notebook: The most important part of a chemistry laboratory is the notebook, and this is reflected in the percentage assigned to the notebook. A handout entailing what is expected in the laboratory notebook will be distributed during the first session. You will have one week to complete your lab report and will be due at the beginning of the following lab period. Late assignments will receive a 10% grade deduction for each day late. Any assignments over 1 week late will receive a zero (0) grade.

The REEL Project Paper: One of the experiments, the REEL Project, will require a laboratory report with abstract, introduction, procedure, data analysis, and conclusion. A handout will be given to students when this experiment is started.

Quizzes and Final Examination: Three quizzes and a final examination will be given in class. The dates are:

Quiz I	Tuesday, January 29 th (lecture)
Quiz II	Tuesday, February 26 th (lecture)
Quiz III	Tuesday, April 8 th (lecture)
Final Examination	Thursday, April 24 th (lab)

The quizzes will be brief and will consist primarily of short answer/essay questions. The final exam will have both a standardized (multiple choice) and subjective (essay, short answer) sections. A review sheet will be distributed the week before each quiz and exam.

If you miss a quiz or the final exam, and have an excused absence with documentation, you will be allowed to take the quiz/final exam, but it will be completely in essay format. The final examination will be *cumulative* over all labs and readings.

Samples: All samples are to be turned in in a properly labeled vial. The format for the label is shown below. Labels must be written in pen, placed securely and straight on the vial, and must not be smeared or covered in chemicals. In addition, a product sheet (found at the front of the lab next to the chalkboard) must be turned in with the sample. Items on the product sheet include percent yield and/or recovery, physical description,

and purity. The melting point range or boiling point range listed on the product sheet should be the value you measured, not the value listed in the textbook or any other reference book. Your sample will be graded on the label, sample sheet, percent yield, calculation of percent yield, and sample homogeneity, dryness, and appearance.

A sample label is as follows:

Your name Name of Compound Amount of sample in vial (g or mL) Tare weight of vial (g)
--

Technique: Technique points are determined by the TA and laboratory coordinator. Components of the technique score include laboratory safety, attitude, demonstration of competent lab techniques, ability to perform routine tasks in a timely manner, and neatness of lab drawer, work area, shared equipment, and chemicals. If the lab is found to be messy at the end of the lab period, either by the laboratory coordinator, TA, or the chemistry stockroom, the entire class will lose technique points.

Presentation: For those who are enrolled in CHEM 2490 (H), you will be required to present a lab-lecture to your class over an experiment that we will cover this semester. On top of this, you will need to complete a written lesson plan. Please consult with Professor Zubricky during the first week of the semester on this assignment.

Service-Learning Component: A service-learning component has been added for this course. A handout will be provided that will detail your requirements for this component.

Finally, if you have any questions or concerns about your grade or want to contest a grade for a certain assignment, you need to present the assignment directly to the laboratory coordinator and that person will regrade the assignment – not your TA. Please remember that there is a two-week window (after you have received your graded assignment back from your TA) in which you can contest the grading of an assignment.

Academic Dishonesty: The academic honesty policies, as stated in the 2006-2008 UT Student Catalogue will be **STRICTLY ENFORCED**. Any student found violating the UT academic honesty policies will be penalized in accordance with these policies.

**CHEM 2490 / CHEM 2490 (H) – The Systematic Identification
of Organic Compounds**
University of Toledo
Spring 2008

Please note that this schedule is tentative and may change.

<u>Week</u>	<u>Date</u>	<u>Activities</u>	<u>Reading Assignment</u>
1	1/8	Introduction & check-in	
2	1/15*	Molecular Modeling and Introduction to Computational Chemistry	Handout
3	1/22*	Grignard reaction (Exp. 38B)	317-327
4	1/29	An Oxidation Puzzle (Exp. 66); QUIZ I	538-540
5	2/5*	The Aldehyde Enigma (Exp. 62)	527-529
6	2/12*	TBA (Microwave lab?)	
7	2/19	Bromination of Aromatic Compounds (Exp. 27)	224-228
8	2/26	Green Chemistry Wittig reaction; QUIZ II	Handout
9	3/4	No class --- Spring Break	
10	3/11	REEL Project (Step 1)	REEL 8-10
11	3/18	REEL Project (Step 2)	REEL 11-14
12	3/25	REEL Project (Step 3)	REEL 15-16
13	4/1*	REEL Project (Step 4)	REEL 17-20
14	4/8	Instrumentation Labs: GC-MS and HPLC (Exp.'s 53 & 60); Quiz III	441-446; 522-523
15	4/15*	Synthesis of Benzocaine	Handout
16	4/22	Review	
	4/24	FINAL EXAMINATION	