

# CH 204 – Introduction to Chemical Practice

## Spring 2008

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**E-mail:** banderson@cm.utexas.edu

**Office hours:** Monday 9:00 – 10:30 or by appointment – don't hesitate to ask!

**Web Site:** <http://courses.cm.utexas.edu/banderson/ch204/>

The course web site has announcements and useful information, pdf versions of my lectures (posted the weekend before the lecture), and pdf versions of all handouts given out in class. It also has copies of the unknown summary sheets, a TA list with e-mail addresses, a listing of TA office hours, grading information, and an ever-growing course FAQ.

**Teaching Assistants:** Not available at press time.

<http://courses.cm.utexas.edu/banderson/ch204/TAs.html>

**TA office hours:** Cubicle C (1st floor of WEL building).

Hours TBA. <http://courses.cm.utexas.edu/banderson/ch204/officehours.html>

**Storeroom:** Tiffany Murray WEL 4.134

**Undergraduate Chemistry Office:** WEL 2.212 **Phone:** (512) 471-1567, (512) 471- 4983

Address all questions regarding registration, adds, drops, etc. to this office.

The last date to drop this course without possible academic penalty is **Feb 11, 2008**.

The last day to drop this course for academic reasons is **March 24, 2008**.

### Required course materials and supplies

1. Leytner, S. *General Chemistry Lab Manual*; McGraw-Hill Higher Education, **Spring 2008 edition** (available through the University Co-op).
2. A bound laboratory notebook with duplicate numbered pages (sold at the Duplicating Office in WEL 2.228 or at the Co-op).
3. Combination lock.
4. Calculator.

### What to expect in this class

This is a hands-on course designed to teach you a variety of laboratory skills, including the proper use and handling of glassware, techniques and processes common to many scientific labs, and standard methods for recording observations and data. The course consists of a weekly one-hour lecture immediately followed by a four-hour lab. Most labs won't take all four hours, but a couple of them will. We start late in the semester (because the Monday holiday throws off our weekly meeting schedule) and finish early, so the full semester's workload gets smushed into about ten weeks. During those ten weeks, expect a workload that is a lot heavier than normal for a measly two credit class.

The lab reports sometimes take students five or six hours to complete. Don't wait until the night before they're due to start. Get started early when TA and instructor help is readily available. None of us are as easy to reach on weekends as we are during the week.

## Lectures

The lectures each week will cover the theoretical background for the experiment being performed, and also provide practical tips for carrying out the experiment and sample calculations to help get you started on the write-up. You are strongly encouraged to take notes during the lectures since some of the material covered will not be in the CH302 textbook or the laboratory manual. There will also be short quizzes given at the end of most lecture sessions which will cover the previous week's material, so if you work on your lab report in class instead of paying attention to the lecture, you end up getting your butt kicked on the quiz a week later.

## Quizzes

Quizzes will typically be 3 – 4 questions and you will have about 15 minutes to complete them. The quizzes will cover material related to the experiment you performed the week prior in lab. Questions are drawn from the previous week's lecture, the lab manual introduction to the experiment, the pre-lab and post-lab problems, and experimental procedures and calculations required for the previous week's lab. There will be a total of 9 quizzes (there is no class meeting, and therefore no quiz, the week after Experiment 10). The lowest quiz grade will be dropped and the rest will count towards 30% of your grade. If you do the math, this means that the 8 quiz grades you keep each amount to 3.75% of your overall course grade.

Sometimes calling them “quizzes” has the effect of trivializing their importance to your overall grade, so consider the quizzes as a comprehensive final exam that is given in weekly installments to make them easier to study for. If you would study for a comprehensive final exam that is worth 30% of your grade, then take some time each week and review the material for the quiz. **No make-up quizzes will be offered for students who miss class.** If you miss a quiz for any reason, that will be the one you drop.

## Laboratory

The laboratory is the backbone of the course, and accounts for 70% of your grade. Most of the experiments will be performed individually; the last three will be performed in groups of two. Do not hesitate to ask me or your TA whenever you have questions or are not sure how to perform certain tasks. You will not be penalized for asking questions.

*Be prepared for lab before you arrive.* Complete the pre-lab and a preliminary experimental write-up (both explained below). Make sure you understand the purpose of the experiment and are familiar with the procedure. If you slowly bumble your way through the experiment because you are unprepared, it will be obvious to your TA, who will be annoyed because you are wasting his or her time by showing up unprepared, and you will lose points.

Lab reports are comprised of four sections: Pre-Lab, Report, Discussion Questions, and Post-Lab. These should all be written out in your lab notebook, and each one should start on a new page. Tear out the COPY page from your notebook to turn in each assignment. In addition, some labs will have an unknown summary sheet that must be filled out (these are explained below). All of these assignments should be turned in to your TA at the beginning of your lab session the week after you perform the experiment.

1. **Pre-lab** – Each experiment in the Lab Manual includes five Pre-Lab questions. These should be done before coming to class and are due during the first 5 minutes of lab on the day the lab is performed. Each Pre-lab is worth 5 points. A late penalty of 10% (that's only half a point) per day (excluding weekends and school holidays) will be assessed for pre-labs turned in after the deadline. Don't wait to do your pre-lab in class during the lecture or you will miss out on the wonderful and enlightening education that all your better-prepared peers are getting, then when you graduate you will be unable to compete with them for jobs and you will end up living under a bridge and eating out of Dumpsters and spending all day standing on a street corner with a cardboard sign. And when I see you there, I won't even roll down my window to say “Told you so.” (But I'll still be thinking it.)

2. **Report** – The report includes the title of the experiment, the objectives of the experiment (written in your own words), chemical equations for any chemical reactions that will be carried out as part of that experiment, all data and collected during the experiment and any observations made, and conclusions, such as identification of unknowns. There is a sample report with discussion questions on the Freebies page of the course web site to show you what this should look like.

3. **Discussion Questions** – These questions should be answered in a couple of complete and well thought out sentences. Don't just provide simple one-word answers, and don't write a long, rambling essay that you hope contains the correct answer in there somewhere. Even though the Discussion Questions are not numbered in the lab manual, you should number your answers in your lab notebook to make it easier for your TA to grade. (Happy TA's grade easier. It's a proven fact of psychology.) The Report and Discussion Questions combined are worth 40 points. A late penalty of 10% (4 points) per day (excluding weekends and holidays) will be assessed for reports that are not turned in at the beginning of the lab period.

4. **Post-lab** – Each experiment in the lab manual also includes a Post-lab page of five problems relating to the chemistry covered in that experiment. Answers to the Post-lab problems are due with your Report one week after the experiment is performed. Every Post-lab is worth 10 points. Remember to always show your work. A late penalty of a 10% (1 whole point) per day (excluding weekends and holidays) will be assessed for the Post-labs turned in after the deadline. The Post-lab for Experiment 7 is due one week after completing the first part of the lab. You do not have to do the experiment in order to do the Post-lab problems. Since I often include quiz questions that are similar to the Post-lab problems, you should do the Post-lab problems during their regularly scheduled week, even if you miss that week's lab.

4. **Unknown Summary Sheet** – As part of some experiments (2, 3, 4, 7, and 8), you are required to identify an unknown compound or calculate the concentration of an unknown solution. These results are reported on an Unknown Summary Sheet, which is turned in along with your Report one week after finishing the experiment. Every Unknown Summary Sheet is worth 20 points, and will be graded solely on accuracy. The usual late penalty of 10% (2 points) per day (excluding weekends and holidays) will be assessed for late Unknown Summary Sheets.

All lab assignments are due during the first 5 minutes of lab. Turn in any late papers directly to one of the CH204 TA's, to me, or to Tiffany in the stockroom (4.134) as soon as possible. *Do not* wait until the next week to turn in late papers. The penalty is assessed daily, so each day you wait to turn it in means more points are lost.

### **What you should do BEFORE you come to lab**

It is important that you prepare for each week's experiment in advance so that you don't waste time in lab or make costly mistakes:

- Read and understand the experimental procedure before coming to class. Relevant pages from your CH301/302 textbook are listed at the end of every experiment for additional reading. You can also e-mail me or your TA or just Google the topic if you have questions after reading the lab manual.
- Complete the **Pre-lab** assignments listed in the manual at the end of each experiment before coming to class. Write down the answers in your laboratory notebook. Write down the title "Pre-lab Problems for Experiment # \_\_" at the top of each page used for pre-lab answers for easier identification.

- Complete the **Preliminary Experimental Write-up** before coming to class. The Preliminary Experimental Write-up is a head start on your lab Report. It will save you time and make you less likely to make mistakes. Your Preliminary Experimental Write-up should include:
  - Your name, unique #, your TA's name, and a date
  - Title of the experiment
  - Objective of the experiment (formulated in your own words!)
  - Equations for chemical reactions carried out that week
  - Blank tables ready for data collection (example data tables are provided in the manual, just copy them into your notebook).
  - Blanks for writing down any other data you will collect (such as temperature, sample weights, etc.)

You do not have to copy the whole experimental procedure from the manual into your notebook.

As you collect data in lab, write it directly into the tables in your Preliminary Experimental Write-up. Enter all of your experimental observations **directly into your notebook**. *Do not* record data in your Lab Manual, on scraps of paper towel, on your hands, or on disposable plastic weighing boats. At the end of the laboratory period, have your TA **sign your data** collected during the lab session in your laboratory notebook. Do not leave the lab without your TA's signature in your lab notebook.

Your Laboratory Report is a continuation of the Preliminary Experimental Write-up. Your Laboratory Report must include:

- Your Preliminary Experimental Write-up
- Data organized into tables; experimental observations
- Sample calculation(s)
- Graphs if applicable
- Answers to Discussion Questions.

Make sure to clearly identify all the different components of your laboratory report (e.g. "Discussion Questions for Experiment #\_\_").

Complete the **Post-lab** for the previous week's experiment before coming to class. These should be done in your laboratory notebook, and always show your work. Write down the title "Post-lab Problems for Experiment #\_\_" at the top of each page used for Post-lab answers for easier identification.

### **Laboratory notebook**

- Use your laboratory notebook for pre-lab assignments, data collection and observations, laboratory reports, and post-lab assignments. Everything you turn in for this course except the quizzes will come from pages in your lab notebook.
- Always use ink in your notebook.
- Never tear out original pages from your notebook. Always turn in the COPY page.
- If you made a mistake, cross it out with a single line. If there is any unused space left on the page, cross it out with a single diagonal mark.
- Write neatly and legibly. If your TA can't read it, he or she can't grade it. (Actually, your TA will still grade it, they will just give you a big fat 0 because they have 36 lab reports to grade every week and can't waste time deciphering your illegible scrawl after you were told in no uncertain terms to write neatly and legibly.)
- At the top of EVERY page of your notebook write down your name, your TA's name, date, and the section number (unique #).

- Always start the Pre-lab assignment for every experiment on a new page.
- Always start your laboratory Report for every experiment on a new page.
- Number the answers for your discussion questions. Answers should generally be a sentence or three long.
- Always start the Post-lab assignment for every experiment on a new page.
- At the end of the semester you will have to submit your laboratory notebook to your TA for grading. The notebook should be a complete record of everything you did in the lab, and should include copies of any graphs you made for the experiments.

## **Safety**

- The biggest safety concern we have in lab is that any lab surface may be contaminated with chemicals. It's easy to pick up chemical contamination on your hands without even realizing it, and then something as simple as absently rubbing your eye can result in excruciating pain and permanent damage to the eye. Always wear goggles in the lab. Besides protecting your eyes from broken glass or chemical splashes, wearing goggles also prevents you from absently rubbing an eye. Make sure you wash your hands before touching anywhere near your eyes in lab, and always wash your hands before you leave lab.

- The second biggest safety concern we have in our laboratories is broken glass. Glass breaks every week. Small pieces may fly through the air (so always wear goggles) and large pieces fall downward (so wear long pants and shoes and socks, not sandals).

- On the first day, your TA will show you around the lab and point out various pieces of safety equipment, which include a safety shower, eyewash fountain, fire blanket, and fire extinguishers. Make sure you know the location of the nearest emergency exits. In the event of an accident, do not panic. Call your TA, the instructor, or storeroom personnel immediately for assistance. They will help you resolve the situation.

- Wear safety goggles provided by the Chemistry Department at all times while you are in the laboratory. If you wear glasses, you still need to wear safety goggles (they will fit over your glasses). If you persistently refuse or "forget" to wear goggles, the TA will kick you out of lab and you will get a 0 for the experimental part of that lab.

- Wear appropriate clothing to the laboratory. No shorts or short skirts. Pants and skirts have to go all the way to the ankle. No bare-belly shirts – the lab benchtops are at belly level, and that's where many spills end up, so your belly must be covered. Wear shoes that cover your feet completely. Sandals, clogs, and open-toe shoes are prohibited. If you want to wear shorts, keep a pair of sweat pants in your lab drawer. If you dress inappropriately, you will have to wear a Tyvek bunny suit from the stockroom. You will lose points for this and the Tyvek bunny suit will make your butt look big.

- Keep coats and backpacks off the bench tops and the floor. There are coat hooks on the wall that can be used to hang coats and backpacks.

- No eating, drinking, or chewing gum is allowed in the laboratory at any time. Never put anything in your mouth while in the lab because you may have chemicals on your hands without realizing it.

- The use of cellular phones, tape, radio, CD, or MP3 players (including the use of headphones) is not allowed in the lab.

- Dispose of all the chemical waste into the designated waste containers located in the hood.

- Always wash your hands when you leave the laboratory at the end of the lab period.

## **Storeroom**

The storeroom is room 4.134, located in the middle of the lab hallway near the clock and the stairs. For some experiments, you will need to obtain an unknown sample from the storeroom. Any time you need a piece of equipment, you will get it from the storeroom. Make sure you sign your name on the checkout list when you check out the equipment and cross your name off the list when you return it back to the storeroom. Clean any borrowed equipment before you return it. You are financially responsible for any equipment checked out to you, including the equipment in your lab

drawer. To receive an unknown from the storeroom, you will need to fill out an unknown request slip that includes your name, unique number, and drawer number.

If you drop the class after checking in to a drawer, you are required to check out your equipment drawer before the end of the semester. If you fail to check out on time, you will be charged a \$15 checkout fee in addition to the charges for any missing or damaged equipment.

### **Restrooms**

There is a men's room in the 4<sup>th</sup> floor hallway next door to room 4.124 (next to the stairs). The nearest women's restrooms are directly upstairs and downstairs from the men's room, on the 3<sup>rd</sup> and 5<sup>th</sup> floors. (I am told that there's a couch in the 5<sup>th</sup> floor women's restroom, but I don't know for sure because I'm not allowed to go in there. There is no couch in the 4<sup>th</sup> floor men's room, but don't go in there just to verify this, because it's pretty horrible in there.)

### **Grading**

Quizzes given during the lecture periods will make up 30% of your final grade. The lowest quiz grade will be dropped. Laboratory work will account for the remaining 70% of your grade. The breakdown for the laboratory work as a percentage of your overall course grade is approximately the following:

Report/Discussion Questions 40%

Pre-labs 5%

Post-labs 10%

Unknown Summary Sheets 10%

TA Lab Safety/Technique Evaluation and Notebook Grade 4%

A lab safety/technique evaluation score of 0 to 3 points each week will be assigned to you by your TA at the end of every laboratory period. This score is based on your TA's evaluation of your preparedness, appropriate dress, ability to work competently, and whether or not you clean up your lab space before you leave. You will have to submit your lab notebook to your TA for grading at the end of the semester. The TA will be checking to make sure the notebook is a complete record of the work done during the semester, and may recheck any data or conclusions that came into question after a particular lab was graded and returned.

There is no end of semester final exam in this class. There will be no curve. The grade breakdown is as follows:

90% and higher A

80% - 89.9% B

70% - 79.9% C

60% - 69.9% D

For a complete grading breakdown, see the Grading page of the course web site.

### **Regrades**

You can request a regrade of your work within TWO WEEKS after you get it back from your TA. To be considered for a regrade, you must submit the original assignment in question (for example, quiz, unknown summary sheet, lab report, etc.) accompanied by a written specific explanation of why you think you deserve a regrade. When submitted for regrade, the entire assignment (e.g. entire report or entire quiz) will be reviewed, which can possibly result in a lower grade. Regrades will not be considered for quizzes written in pencil. Unknown summary sheets submitted for a regrade must be accompanied by the corresponding lab reports.

You can always submit an Unknown summary sheet for a regrade if you discover that a calculational error led to an incorrect result, but you will not be granted a regrade based on mistakes

you made during the actual lab procedure itself. So if the problem is in the data itself, you're stuck with it, but if you multiplied instead of dividing, you can show us your mistake and get a regrade.

#### **Attendance and make-up policy**

- Laboratory attendance is mandatory. The TA's will record attendance each week.
- You are allowed to miss ONE laboratory session during the semester for any reason, such as late registration, illness, any type of emergency, observance of religious holy days, going out of town for any reason, oversleeping, opting to study for another class, etc.
- **If you know ahead of time that you will miss a lab, notify Dr. Anderson via e-mail as soon as you know you will miss.** It may be possible to schedule a same-week make-up time so that you do not fall behind, but these make-up spaces are limited and will be filled in the order that Dr. Anderson receives notice. If you notify Dr. Anderson at the last minute, do not expect a same-week make-up time, and expect instead to make up the experiment during the make-up week at the end of the semester (April 21 – 23).
- If you miss a week, the report and post-lab that were due that week will instead be due when you return one week later, without a penalty. This free extension is granted once per semester. If you miss lab a second time, all late penalties will apply. If you know ahead of time that you will miss lab, you can turn your papers in early to the stockroom.
- *No make-up quizzes will be given for missed classes. None, I say.*

**NOTE:** Experiments 5 through 7 are designed to be performed in sequence. In Experiment 5, you will synthesize an inorganic compound, and in Experiments 6 and 7 you will analyze the compound you created. If you miss Experiment 5, the stockroom will provide you with a sample to use in Experiments 6 and 7 so that you can continue in sequence with the rest of the class, and you will make up Experiment 5 at the end of the semester. If you miss Experiment 6, you will filter and dry your sample left over from Experiment 5, and then carry out Experiment 7. You will make up Experiment 6 at the end of the semester.

- More than one make-up lab will be allowed only under extreme circumstances. Those instances will be considered on a case-by-case basis. All make-up requests must be made to Dr. Anderson within one week of the missed laboratory session. It is to your advantage to inform Dr. Anderson as early as possible (like today, right now) if you know you will miss any labs during the semester. For scheduled university events, you must give at least 14-day advanced notice. If you must miss more than one laboratory session due to observance of religious holy days, it is the policy of UT that the student must notify the instructor at least 14 days in advance. No make-up quizzes will be given.
- Any absence after the first one is considered an unexcused absence unless you notified Dr. Anderson at least 14 days in advance.
- An unexcused absence from the laboratory will result in a zero credit for the laboratory report and unknown summary sheet (if applicable) for the experiment performed on the missed day. In addition, a late penalty of 10% grade reduction per day for all of the assignments that were due on the missed day will apply.
- If you are more than 30 minutes late to the lab, you will not be permitted into the lab and will receive an unexcused absence for the missed laboratory with all the implications that come with it.
- If you leave the lab early without the permission from your TA, you will be given an unexcused absence for that laboratory and will receive zero credit for the laboratory report for the experiment performed on that day.
- Make-up labs are allowed only for missed labs. We do not have the resources to allow students to redo labs they have already done in order to get better data and a higher grade.

## **Scholastic Dishonesty**

Scholastic dishonesty and plagiarism will not be tolerated. Examples of scholastic dishonesty include copying pre-labs, post-labs, or any parts of a report or quiz from somebody else's work, providing your own pre-labs, post-labs, or any parts of a report or quiz to somebody else to copy, making up data, changing data, falsifying data, or presenting somebody else's work as your own. Altering any graded paper and resubmitting it for a regrade is also scholastic dishonesty. We take considerable efforts to dissuade students from engaging in these practices, and to catch them if they do it anyway. Don't be a cheating scumbag. You can have a lot more respect for yourself for getting a B honestly than for getting an A you know you didn't earn. All student grades are recorded in duplicate to minimize the chance of accidental mistakes in the record, and student papers may be photocopied at random or with cause at any point throughout the semester. Any student who is found to have cheated will be reported to the Student Judicial Office with a recommended grade of F for the course.

## **Special note**

If you require special assistance because of a physical or learning disability please notify Dr. Anderson immediately. Arrangements and necessary accommodations will be made in compliance with UT policy and the American Disabilities Act. For more information contact Student Dean's Office (471-6259, 471- 4641 TTY). All notifications and accommodations will be handled with utmost respect and confidentiality.

## **Brief Summaries of the Experiments we will do this semester:**

### **Lab 1 Are the Densities of Coke and Diet Coke Different?**

In this experiment we will measure the mass of a known volume of Coke or Diet Coke to calculate the density of each liquid, and will compare the results. Are the densities of Coke and Diet Coke different, and if they are, is the difference large enough that we can measure it using the equipment we have in lab? The main purpose of this experiment is to familiarize you with the lab glassware and analytical balances you will be using this semester, and also to review significant digits and the reporting of experimental error. We will use standard deviation as a measure of experimental error throughout the semester, so get it down early.

### **Lab 2 Separation and Recovery of the Components of a Mixture**

In this experiment you will be given a mixture of sand, chalk dust, and salt, and will have to use chemical and physical means of separating and recovering the three solids. We will use differences in chemical properties and physical properties to separate them. You will have to report the composition of your mixture as weight percents of each component, and will be graded on the accuracy of your results.

### **Lab 3 Qualitative Chemical Analysis**

In this experiment you will react a series of eleven chemical solutions with one another and record the observable results of the reactions (precipitations). You will then be given a set of five unknown solutions, and by reacting them with one another and comparing your results with those obtained for the eleven known solutions, you will determine the identity of your unknowns. You will be graded on the correctness of your determinations.



**Lab 4 Acid-Base Titration**

In this experiment you will make and standardize a solution of NaOH and use that to titrate a series of acidic solutions to determine their acid content. As part of this, you will have to determine the identity and concentration of an unknown acid, and will be graded on your accuracy.

**Lab 5 Synthesis and Analysis of a Complex Iron Compound. *Part 1: Synthesis***

In this experiment you will be given an inorganic iron salt and will have to carry it through a series of reactions to convert it to a different crystalline compound containing iron and oxalate. The crystals you obtain will be analyzed in the next two experiments to determine the chemical formula and the purity of your crystals.

**Lab 6 Synthesis and Analysis of a Complex Iron Compound. *Part 2. Oxalate Content by Redox Titration***

In this experiment you will analyze the iron crystals you synthesized the week before to determine their oxalate content. The amount of oxalate present is determined by redox titration using potassium permanganate.

**Lab 7 Synthesis and Analysis of a Complex Iron Compound. *Part 3. Spectrophotometric Determination of Iron Content***

In this experiment you will dissolve the crystals you created in Experiment 5 and convert the iron to a colored complex ion, and will then use a spectrophotometer to determine the amount of iron present based on how much light the solution absorbs at 510 nm.

This experiment will be done in two parts, spread across two weeks. The first week we will do parts 2 and 3 of the experimental procedure (working with the standard), and the second week we will do parts 1 and 4 of the procedure (working with the sample).

By the end of the second week you will have analyzed your iron crystals for both iron and oxalate, and should be able to calculate the chemical formula for your compound. You will report the iron and oxalate results and will be graded on accuracy.

**Lab 8 Thermochemistry**

In this experiment you will carry out a series of experiments in a styrofoam coffee cup calorimeter, and will measure the amount of heat that is generated by each reaction. Knowing the amount of heat generated, you will be able to determine the heats of reactions for some chemical reactions and the identity of an unknown solid metal. You will be graded on the accuracy of your results.

**Lab 9 Acid-Base Equilibria**

Previously (experiment 4) you have done an acid-base titration using a strong base to titrate a strong acid. This week we will use a strong base to titrate a weak acid, and will determine the ionization constant ( $K_a$ ) of the weak acid by titration and through the use of a pH meter, and will compare the results.

**Lab 10 Chemical Kinetics Discovery Lab: *Determination of Reaction Mechanism***

In this experiment you will be presented with an unknown reaction involving unknown reactants, and without ever knowing what the overall chemical reaction is, you will have to determine the individual steps by which the overall reaction proceeds. You will accomplish this in part by varying the concentrations of each reactant and measuring the effect on the rate of the reaction.

## Spring 2008 Schedule

MON	TUE	WED	THURS	FRI
January 14 <b>Lecture only (no lab)</b>	15 <b>No meeting</b>	16 <b>No meeting</b>	17	18
21 <b>MLK Day No Classes</b>	22 <b>Check-In</b>	23 <b>Check-In</b>	24	25
28 <b>Lab 1 followed by Check-in</b>	29 <b>Lab 1</b>	30 <b>Lab 1</b>	31	February 1
4 <b>Lab 2</b>	5 <b>Lab 2</b>	6 <b>Lab 2</b>	7	8
11 <b>Lab 3</b>	12 <b>Lab 3</b>	13 <b>Lab 3</b>	14	15
18 <b>Lab 4</b>	19 <b>Lab 4</b>	20 <b>Lab 4</b>	21	22
25 <b>Lab 5</b>	26 <b>Lab 5</b>	27 <b>Lab 5</b>	28	29
3 <b>Lab 6</b>	4 <b>Lab 6</b>	5 <b>Lab 6</b>	6	7
10 <b>S P R I N G</b>	11 <b>B R E A K</b>	12	13	14
17 <b>Lab 7a</b>	18 <b>Lab 7a</b>	19 <b>Lab 7a</b>	20	21
24 <b>Lab 7b</b>	25 <b>Lab 7b</b>	26 <b>Lab 7b</b>	27	28
31 <b>Lab 8</b>	April 1 <b>Lab 8</b>	2 <b>Lab 8</b>	3	4
7 <b>Lab 9</b>	8 <b>Lab 9</b>	9 <b>Lab 9</b>	10	11
14 <b>Lab 10 / Check-Out</b>	15 <b>Lab 10 / Check-Out</b>	16 <b>Lab 10 / Check-Out</b>	17	18
21 <b>Make-Up</b>	22 <b>Make-Up</b>	23 <b>Make-Up</b>	24	25