CCBC Spring 2013

School: Math & Science
Department: Physical Science
Campus: Catonsville

CHEM 108 Fundamentals of Chemistry Laboratory
Section CD1

Course Description
This course serves as a lab course to accompany CHEM 107, and as a prerequisite to CHEM 121 and CHEM 146; examines how to make & record observations & accurate measurements in an investigative lab setting.
3 hours of laboratory per week, 1 credit

Prerequisite
Minimum grade of C or concurrent enrollment in CHEM 107
(Note: If you withdraw from CHEM 107 you must withdraw from CHEM 108 as well since you would no longer be enrolled concurrently.)

I. Basic Course Information
A. Instructor: Crystal Yau, Ph.D.
B. Office: D-105B
Contact Information:
    Phone: (443) 840-5932
    Email: mailto:cyau@ccbcmd.edu (Be sure to include “Chem 108” in the Subject Line or your message may be deleted as Junk Mail.)
C. Office Hours: Mon 1:00-2:00 PM
    Tues & Thurs 8:30-9:30 AM
    Tues 1:00-2:00 PM
    Wed 9:00-10:00 AM
    and at other time by appointment arranged preferably by email.
    You are also welcome to drop by any time, and if I am available I would be happy to help you.
D. Department/School Phone Number: 443-840-4560
E. Class Times, Days, and Location:
    Sec CD1 Wed 10:10 AM – 1:05 PM in D-106
F. Statement of Student Out-of-Class Work Expectations: You should plan on spending 3 to 6 hours of work per week outside class. You will be spending at least 1 hour preparing for the experiment (including studying for the pre-lab quiz). Additional time will be needed to do post-lab assignments. Some experiments require more time for analysis. For experiments where typed formal lab reports are required even more time will be needed. If your background chemistry or writing skill is weak, you should expect to be spending more time than other students.

G. Required Materials:
3. APPROVED splash-proof safety goggles (available at the Catonsville bookstore). If you wear prescription glasses, goggles must be worn over them. You will NOT be permitted to work in the lab without these safety goggles.
4. A non-programmable scientific calculator is required, such as but not limited to the “Casio fx260” or “Casio fx300 MSplus” (both available at the CCBC Catonsville
bookstore). TI-34 is not recommended because it does not have log and ln functions. Each student must bring his/her own calculator to all class meetings. It cannot be shared. You are also not allowed to use a cell phone in class at any time, for any purpose. A graphics calculator is not allowed even if you delete the memory before a quiz or exam. If you forgot to bring an appropriate calculator, we can lend you one for the period, but you must make the arrangement at the Chemistry Prep Room (D-104) before class.

5. Pen with non-erasable ink to record data.
6. Pencil and eraser for doing calculations.
7. Extra notebook paper to take notes in class and to do calculations.
8. Easy access to a computer outside class to do Internet research and to write lab reports.

II. Course Goals
A. Overall Course Objectives
Upon completion of this course the student will be able to:
1. make and record observations and accurate measurements in an investigative laboratory setting;
2. perform various tasks in a safe and accurate manner, using standard laboratory equipment such as the lab burner, electronic balance, thermometer, metric ruler, buret, graduated cylinder, volumetric pipet, and filtration apparatus;
3. prepare and make use of a calibration graph;
4. work independently and cooperatively in laboratory activities;
5. reach meaningful conclusions based on data obtained; and
6. communicate the results of laboratory investigations orally and in writing in a thorough and accurate manner.

B. Major Topics
I. Measurement
II. Exploration using the Scientific Method
III. Physical Properties of Matter
IV. Separation and Identification of Components of a Mixture
V. Chemical Reactions
VI. Geometric Structure of Molecules: Molecular Models
VIII. Acid-Base Titration

C. Rationale
This course allows students to have first-hand experience in the collection and analysis of experimental data and observations. It enhances what is learned in CHEM 107 and therefore concurrent enrollment in CHEM 108 will be of tremendous help in your understanding of the lecture material. This course together with CHEM 107 may be used to fulfill 4 credits of the General Education requirement in Physical and Biological Sciences; however, nonscience majors are recommended to take CHEM 100 and 102 instead. Chem 107/108 are much harder courses and will take considerably more time and work. The topics covered are not as suitable for nonscience majors.

III. Evaluation
A. Requirements
1. Students should plan on spending at least 3-6 hours per week outside the class preparing for the class. If your background mathematics or writing skill is weak, you should expect to be spending more time than other students.
2. One laboratory experiment is scheduled per lab period. All scheduled labs are to be performed. (None will be "dropped.") See details provided under “Attendance Policy.”

3. Students are expected to have studied carefully, the “Purpose,” “Introduction,” “Procedure,” and “Calculations” sections of the experiment to be performed that day and be ready for a pre-lab quiz (see details in lab manual pp. 7-8).

4. Students are expected to prepare their lab notebooks prior to arrival at the lab (see details in lab manual pp. 9-12).

5. During the lab period students will carry out the specified laboratory activities and carefully record their observations and measurements into their lab notebooks.

6. After carrying out the laboratory activity students will do calculations and write conclusions on the “Calculations & Results” pages in the lab manual. These pages are perforated and can be torn out neatly from the lab manual. Generally, post-lab questions are to be typed and are due at the beginning of the next lab period.

7. **AT THE END OF THE LAB PERIOD, ALWAYS HAVE YOUR LAB NOTEBOOKS SIGNED AND ALWAYS TURN IN THE CARBON COPIES FROM YOUR LAB NOTEBOOK BEFORE YOU LEAVE. THIS IS TAKEN VERY SERIOUSLY AND YOU WILL BE PENALIZED IF YOU WALK OFF WITHOUT TURNING IN YOUR CARBON COPIES. THIS IS REGARDLESS OF WHETHER OR NOT YOU FINISHED THE EXPERIMENT ON TIME.**

8. Most experiments will require only a short lab report and your instructor will specify what has to be handed in. Completed short lab reports are to be turned in at the end of the laboratory period. This includes all the carbon copies from the lab notebook, the “Calculations & Results” pages from the lab manual, and any extra pages (such as graphs) that might be required for that experiment as specified by your instructor. If calculations cannot be completed in time, your instructor may allow you to turn them in within a designated time period, not to exceed one week. No report will be accepted beyond the next lab period.

9. **Two experiments** will require formal, typed lab reports and are indicated with an asterisk on the Lab Schedule. They are generally due one week after the experiment has been scheduled. Details on lab reports are described in your lab manual (pp. 13 thru 19).

10. **Classroom Conduct and Safety:** You are expected to follow the conduct and safety rules described in detail in the lab manual. Any time you are in the lab, you must be wearing closed-toed shoes and be dressed appropriately according to the rules stated. Safety goggles must be worn at all times during lab periods that require them according to the lab manual. No food or drinks are allowed in the room. If you fail to abide by these rules, you will be asked to leave and you will receive a zero for the experiment of the day.

B. **Instructor’s Grading Policy**

Grades will be awarded on the basis of performance and demonstrated knowledge, and will be based on the following: Lab Quizzes, Lab Reports, Formal Lab Reports and the Lab Final.

**No credit will be given for just performing an experiment** without doing the required calculations and analysis of the data. It is a waste of time to perform an experiment and not show an understanding of the analysis of the data in a written form.
The final course score in CHEM 108 will be based on the following:

- Lab quizzes (average) 10%
- 11 Lab reports (average) 60% (approx. 5.5% per lab report)
- 2 Formal Lab Reports 15% (7.5% per lab report)
- Lab Final Exam 15%
- TOTAL 100%

*Note that experiments requiring formal lab reports are worth more points as the rest of the experiments. Be sure you do not miss performing these experiments and turning in these reports!

**FINAL COURSE GRADE**

= 0.10 x Average Quiz Grade + 0.60 x Average Lab Grade + 0.15 x Average Formal Report Grade + 0.15 x Lab Final

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
<th>Letter</th>
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<tbody>
<tr>
<td>A</td>
<td>90 - 100</td>
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<tr>
<td>B</td>
<td>80 - 89</td>
<td></td>
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<tr>
<td>C</td>
<td>70 - 79</td>
<td></td>
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<tr>
<td>D</td>
<td>60 - 69</td>
<td></td>
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<tr>
<td>F</td>
<td>Below 60</td>
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</tbody>
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**I do NOT “curve.”**

**Lab Quizzes:** Quizzes are given at the beginning of every lab period. They will cover the experiment to be performed during that day’s lab session to see how prepared you are to perform the experiment. You are also expected to have learned any topics covered in the previous experiments. The lowest quiz grade will be dropped. **Do not come late! If you come late, you will get a zero. No make up quizzes will be given!**

**Formal Lab Reports:** As mentioned previously, in addition to the lab assignments to be turned in for each experiment you are expected to also write two typed, formal lab reports. The purpose of this requirement is to show you how scientific discoveries are documented and published. You are to follow a format similar to what is expected for a professional chemical journal. Detailed explanations and a sample of a formal lab report are provided in your lab manual. The deadlines will be given. 10% of the grade will be deducted from the formal lab report grade, per day late. If you arrive late, your lab report will be considered late. **COME ON TIME!**

Each formal lab report will be graded on a 100-point scale and be partitioned approximately as follows:

- Preparation of lab notebook (purpose & tables, see p. 9) 5%
- Data, observations, calculations, results & discussion 70%
- Answers to Post Lab Questions 20%
- Conclusions 5%

*These percentages may vary ± 10% depending on the nature of the experiment.*

Experiments that require these formal lab reports count more than the other experiments. Do not miss these experiments or miss turning in these lab reports!

**Collaborative Work:** There will be times when students work in pairs or larger groups. Regardless of whether you work alone or in a group, you are expected to work independently when writing up lab assignments. **NOTE: Plagiarism will not be tolerated.** A grade of zero will be given to **both parties** where plagiarism is observed. **Do not allow others to copy your work.**
Late Papers: Anything handed in after the pre-lab discussion has begun is considered late. Penalty is 10% off per day late (not per week). It is best to hand late papers directly to your instructor, but if he/she is not available, you may drop it in the locked Security Drop Box in the hallway of D-105. Be sure your instructor's name, your name, course name and section number is clearly written on the first page of your paper. If your pages are not stapled, this information must be on every page you submit. Do NOT put it in your instructor’s mailbox. We are NOT responsible for any paper left in your instructor’s mailbox. Your paper will be retrieved from the Drop Box and given to your instructor the next morning. Leave a note in your instructor’s mailbox to notify him/her what you have done.

Papers turned in electronically: Your instructor will let you know if he/she allows you to turn in anything electronically. It should not be done on a regular basis. You may be given permission to send documents as an attachment if you were unable to get to the campus and want to avoid an extensive late penalty. A hard copy still needs to be turned in as soon as possible. You are responsible for anything lost in transit or documents that your instructor cannot open. If you don’t hear from your instructor within 24 hours, it means the document did not arrive. Magnitude of late penalty is based on when the entire document arrives in an acceptable, legible condition.

C. Instructor’s Attendance Policy
You are expected to attend all labs and on time. You are allowed to miss and make up only one lab, and only for a dire emergency, with documented proof. First you must contact your instructor within 24 hours of the missed lab, by phone or email, to get approval and arrange for a makeup. You cannot just show up the following week. A missed lab can be made up ONLY with prior approval from your instructor, at the Catonsville campus, within one week, preferably during a section that is performing the same experiment. If that is not possible, you would be working on your own without much help from the instructor who will be busy with the rest of the class doing a different experiment. Note that at the beginning of the semester, most labs are too full for makeup’s. You may find it very difficult to make up a lab because of the time constraint. It is YOUR responsibility to make adjustments to your other commitments in order to make up a lab.

You are expected to arrive on time at the lab. By arriving late any assignments due will be counted as late with 10% deducted. If your tardiness causes you to miss a significant portion of the pre-lab discussion, it will be counted as a “missed lab” that cannot be made up except for documented dire emergency. (See the previous paragraph on what happens when you miss a lab.)

Course Meeting Days and Times of All Chem 108 Sections on the Catonsville Campus:

<table>
<thead>
<tr>
<th>Section</th>
<th>Day</th>
<th>Time</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1A</td>
<td>M</td>
<td>5:45 PM – 8:40 PM (evening)</td>
<td>D-106</td>
<td>Mr. Wishart</td>
</tr>
<tr>
<td>CM1</td>
<td>Tu</td>
<td>11:10 AM – 2:05 PM</td>
<td>D-106</td>
<td>Ms. Rice</td>
</tr>
<tr>
<td>CD1</td>
<td>W</td>
<td>10:10 AM – 1:05 PM</td>
<td>D-106</td>
<td>Dr. Yau</td>
</tr>
<tr>
<td>CH1</td>
<td>W</td>
<td>2:30 PM – 5:25 PM</td>
<td>D-106</td>
<td>Dr. Osborne</td>
</tr>
<tr>
<td>C3A</td>
<td>W</td>
<td>7:45 PM – 10:40 PM (evening)</td>
<td>D-106</td>
<td>Mr. Norris</td>
</tr>
<tr>
<td>CM2</td>
<td>Th</td>
<td>11:10 AM – 2:05 PM (evening)</td>
<td>D-106</td>
<td>Ms. Rice</td>
</tr>
<tr>
<td>CG1</td>
<td>F</td>
<td>1:25 PM – 4:30 PM</td>
<td>D-106</td>
<td>Dr. Osborne</td>
</tr>
</tbody>
</table>
You are not allowed to switch from lab section to lab section at will. A grade of zero is given to any missed lab that is not made up for whatever reason. **Missing more than two labs regardless of whether you have made up a lab will result in an automatic F for the course.**

D. Instructor’s Audit Policy

It is inappropriate to enroll as an audit student for this lab. You must satisfy the prerequisite requirements to remain in the class: You must either have passed CHEM 107 with a grade of C or better, or be CONCURRENTLY enrolled in it. If you should withdraw or change to AU status for CHEM 107 you would no longer fulfill the prerequisites and cannot remain in CHEM 108.

Due to safety issues, as an audit student you would not be allowed to perform any of the experiments but weekly attendance for the full 3 hours would be required, during which you would be requested not to chat with the students in the class. Failure to attend all sessions will result in your grade of AU being replaced with W. Attendance will be taken. Legitimacy of any absences due to dire emergencies must be established by documented proof. And, as an audit student you are not allowed to take the Final Exam. There is really no point in auditing this course.

If you are registered for credit and for some reason wish to change to the audit status, this must be done no later than the deadline established by the college (Fri Feb 15 before 4 PM). Note that a student auditing the course is not allowed to change back to the credit status.

IV. Course Procedures

A. Course-Related Policies and Procedures

**Course Website:** http://faculty.ccbcmd.edu/~cyau1

You must familiarize yourself with my course website. It contains course announcements, assignments, useful tutorials, some answers to your work, as well as useful links to other websites related to the study of chemistry. *(To instructors: Substitute with information on your BlackBoard. You are REQUIRED to post this syllabus on your BlackBoard.)*

**Care of Equipment:** At the beginning of the semester, each student will be assigned a drawer which contains most of the equipment needed for carrying out subsequent experiments. You are held responsible for this equipment. Most of the equipment in this locker is expensive, and students are advised to be especially careful in the handling and storage of equipment, making sure all the equipment is safely locked in the drawer at the end of the lab period, and the drawer key is returned to the key cabinet. In addition, your bench top and the common areas (such as the side benches, balance areas and sinks) are to be kept clean. Failure to keep your equipment and common areas clean and neat will be noted, and/or failure to check out of your drawer properly at the end of the semester will result in a deduction of up to 5% of your course grade.

B. College-Wide Syllabus Policies:

For college wide syllabus policies such as the Code of Conduct related to Academic Integrity and Classroom Behavior or the Audit/Withdrawal policy, please go to the ‘MySyllabiPolicies’ Tab on the MyCCBC page, which can be accessed from the CCBC Homepage: http://www.ccbcmd.edu/

Please pay particular attention to the following sections of MySyllabiPolicies:

- Attendance Policy
- Code of Conduct for Academic Integrity
- Grades – AU
Other policies include the following:

- Academic Advising
- Clinical Counseling Services
- Code of Conduct
- Disability Support Services
- Grade Appeals
- Grades and Grading Policy
- Religious Holidays
- Repeated Courses
- Student Concerns Policy
- Testing Center
- Tutoring Policy
- Weather Policy
- Withdrawal Policy
- Writing Policy

**Below are clarifications of some of the policies as they pertain specifically to this course:**

**Policy on Cheating:** Any student observed to be cheating on an exam or quiz (such as obtaining aid from or providing aid to another student, possessing a “cribsheet,” operating a programmable calculator, etc.) will receive a grade of zero for that exam or quiz. The incident will be reported to the Judicial Affairs Committee. If there is a previous record of cheating, the committee may impose a more severe penalty such as expulsion from the college.

Be careful when you work with a partner, your reports and answers to post-lab questions cannot be identical. It is your responsibility that others do not try to copy your answers and reports. If plagiarism is noted, **both parties will receive a zero for the assignment**. If plagiarism continues, **both parties will receive an F for the course**.

There will be no further warnings. Any student observed cheating a second time will automatically receive a failing grade for the course. When taking an exam or quiz, it is your responsibility to keep your exam answers from any wandering eyes of your neighbors. Allowing your neighbors to see your answers constitutes cheating.

**Course Withdrawal:** To withdraw, YOU must officially drop the class by submitting the appropriate form at the registrar’s. The deadline for withdrawing from a course or changing to an audit for the Spring 2013 semester is **Monday Apr 8, 2103 (after Spring Break)**. Failure to officially withdraw from a class you have stopped attending will result in an “F” grade. I do **not** deviate from this schedule. The prerequisite for CHEM 108 is that you must either have previously passed CHEM 107 with a grade of C or better or be enrolled in CHEM 107 concurrently. If you withdraw or change to audit status for CHEM 107 you should withdraw from CHEM 108.

**C. Contact Information for Course-Related Concerns:**

If students have course-related concerns, they should first attempt to take the concerns to the faculty member. Only if no resolution is reached, should they contact Mr. Fred Hickok, Head of the Department of Physical Sciences (443) 840-5935, FHickok@ccbcmd.edu.
D. Additional Procedures:
   CCBC Writing Center: If you have trouble writing complete sentences, writing in passive voice and/or writing an abstract for your formal lab report, you should consider getting help at the Writing Center in Y-121 on the Catonsville Campus. You can make an appointment by calling (443) 840-2760. Appointments are 30 minutes long. The consultants will help you plan and edit your report and help you understand your professor’s comments. However, they will not proofread your papers or write any portion of your papers. Be sure to bring your assignment, graded papers and lab manual with you.

E. Course Calendar/Schedule
   Critical Dates:
   - 100% Refund Period Ends: Jan 25, 2013 (Fri by 4 PM)
   - First Class Meeting: Jan 28, 2013 (Mon)
   - Last day to change to Audit Status: Feb 15, 2013 (Fri by 4 PM)
   - 50% Refund Period Ends: Feb 15, 2013 (Fri by 4 PM)
   - Last Day to Withdraw with a “W”: Apr 8, 2013 (Mon by 7 PM)
   - No withdrawals allowed after Apr 8, 2013

   This syllabus may be changed at any time with notification.

Updated 2013.01.25
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<tr>
<th>Dates</th>
<th>Expt #</th>
<th>Title</th>
<th>Page</th>
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<tbody>
<tr>
<td>1 Week of Jan 28</td>
<td>Introduction</td>
<td>Syllabus, Laboratory Safety, Learning Names of Equipment, Lab Notebook</td>
<td>1-12</td>
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<td></td>
<td>Safety</td>
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<td>21-22</td>
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<td>Expt #1</td>
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<td>Check-in</td>
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<td>2 Week of Feb 4</td>
<td>Expt #2*</td>
<td>Analysis for Percent Water in Popcorn*</td>
<td>23</td>
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<tr>
<td></td>
<td>Lab Report</td>
<td>The Lab Report, Sample of Lab Report</td>
<td>13-19</td>
</tr>
<tr>
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<td>Appendix 6</td>
<td>Writing Exercises</td>
<td>A-25</td>
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<tr>
<td>3 Week of Feb 11</td>
<td>Expt #3</td>
<td>Properties &amp; Changes; Physical vs. Chemical</td>
<td>29</td>
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<tr>
<td>4 Week of Feb 18</td>
<td>Expt #4</td>
<td>Accuracy &amp; Precision in Measurements</td>
<td>41</td>
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<td>Appendix 1, 2</td>
<td>Review &amp; Exercises for Significant Figures</td>
<td>A-1&amp;7</td>
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<td>5 Week of Feb 25</td>
<td>Expt #5</td>
<td>Identification by Paper Chromatography</td>
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<td>6 Week of Mar 4</td>
<td>Expt #6*</td>
<td>Graphical Determination of Density Prep &amp; Interpretation of Graphs</td>
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<tr>
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<td>Lab Report</td>
<td>Graph Paper</td>
<td>A-11</td>
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<td>Appendix 3</td>
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<td>A-19</td>
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<td>Appendix 4</td>
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<tr>
<td>7 Week of Mar 11</td>
<td>Expt #7*</td>
<td>Analysis for Percent Fat in Chips*</td>
<td>65</td>
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<td>Lab Report</td>
<td>Review Lab Report, Sample of Lab Report</td>
<td>13-19</td>
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<tr>
<td>8 Week of Mar 18</td>
<td>Mon-Thurs: Expt#8</td>
<td>Mon-Thurs: Specific Heat of an Unknown Metal</td>
<td>71</td>
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<tr>
<td></td>
<td>(Fri Sec: Expt #9)</td>
<td>(Fri Sec: Chemical Reactions &amp; Equations)</td>
<td>(Fri: 79)</td>
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<tr>
<td>9 Week of Mar 25</td>
<td>Expt #9</td>
<td>Chemical Reactions &amp; Equations</td>
<td>79</td>
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<td>(no lab Fri Mar 29)</td>
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**Spring Break (Friday Mar 29 – Sunday Apr 7, 2013)**

_Last day to withdraw is Mon Apr 8 before 7 PM_

*Formal lab reports are required for experiments marked with an asterisk.*

**Absolutely no late lab assignments will be accepted after the day of your Lab Final.*