CHEMISTRY 107
General Chemistry for Engineering Students
Fall 2012 — Sections 501 & 502

Instructor: Dr. Larry Brown
Office: 1048 Heldenfels (Enter through door marked 104, next to the elevator.)
Office Hours: Monday, Wednesday, Friday, ~10:15—11:15 AM (between my 2 lectures)
            Monday, 1:00—2:30 PM
            Tuesday, 2:30—4:00 PM
Phone: 845-3755
E-mail: lsbrown@tamu.edu
Website: http://chem107.chem.tamu.edu/brown

Course Objectives

This course is intended to provide engineering students with a background in important concepts and principles of chemistry. (A few non-engineering majors, including physics and geophysics, also require this course.) Emphasis will be placed on those areas considered most relevant in an engineering context, and practical applications in engineering and technology will be examined.

In designing this course, we considered carefully the various reasons why engineering students should learn chemistry, and tried to express them as specific learning objectives. Many of these objectives deal with particular topics or skills, and a detailed listing can be found online at http://chem107.chem.tamu.edu/brown/reading.htm. Some of the most important objectives, though, are more “global” in nature. These goals deal with the overall relationship between chemistry (or science in general) and engineering rather than with the details of any particular chemical principle. The list below summarizes my general aims for the course. I will try to keep these overall objectives in mind throughout the course, and you should, too.

Students successfully completing CHEM 107 should be able to:

- use your knowledge of molecular structure and properties in describing and solving real technological problems.
- explain and appreciate the relationship between experiment and theory in science in general and chemistry in particular.
- demonstrate quantitative problem solving skills in many aspects of chemistry, including stoichiometry, thermochemistry, chemical equilibrium, and reaction kinetics.
- describe the modern theoretical basis for understanding important areas of chemistry, including atomic structure, chemical bonding, and molecular structure.

Relationship to CHEM 117 Lab

Since Fall 2009, CHEM 107 has been a 3-credit lecture only course. The lab component is CHEM 117, a separate 1-credit course. Most of you will be required to take both classes, and my advice is that you try to take them during the same semester. If you have questions about whether or not you are required to take CHEM 117 lab, please check with me or with your advisor.
Required Textbook & Supplies

  - Traditional hardcover textbook (ISBN 9781439047910, available from bookstores in town, Amazon, etc.)
  - Looseleaf textbook, including e-book access and OWL access code (ISBN 9781133544224, available online at http://www.cengagebrain.com/micro/tamuchem (Priced at $80 on the CengageBrain site. May also be available in local bookstores.)
  - E-book only (no paper copy) with OWL access code (Priced at $75, and available only online at http://www.cengagebrain.com/micro/tamuchem)

The last two options both include an OWL access code, which you will NOT need for my class. But those options are both much less expensive than a new hardcover book, and maybe less expensive than a used copy of the hardcover book. You should choose whichever format you believe will work best for you. You will have an option of using OWL to do additional practice problems, but those will not count for course credit.

- iClicker2 classroom responder, usually called a “clicker” (ISBN #1429280476). This is a small electronic device, similar to a remote control. These should be available at the various bookstores in town, or you can also find them online. You will need to bring your clicker to class each day. You are also urged to carry a spare set of batteries for the clicker.

Class Information and Announcements

Announcements regarding schedule changes or other developments will be made in class at the earliest possible time. Information will also be available electronically via e-mail and the web.

Website: http://chem107.chem.tamu.edu/brown

The class website can be found at the above URL. This site offers a broad array of class information, including copies of the slide files used in class, old exams, and announcements.

Electronic Mail

I will often distribute class announcements by e-mail. The only simple way to do this is through the TAMUDirect system, which lets me send mail to the entire class roster. So any message I send out concerning class announcements will always go to your TAMU address. Please be sure to check that account regularly, or to set up a forwarding instruction if you prefer to read a different account.

Grading

Grades will be determined based on the following criteria.

- 3 Hour exams @ 100 pts. each = 300 pts.
- 1 Final exam @ 150 pts.
- In-class “clicker” questions = 30 pts.
- Homework = 60 pts.
- total = 540 pts.

Please notice that things other than exams (i.e., homework and clicker questions) account for nearly 20% of your grade. Failure to do homework assignments or to attend class and respond to
the clicker questions can drastically lower your course grade! Conversely, good scores on homework and clicker questions can also raise your course grade substantially.

Letter grades will be assigned based on the percentage of the total course points earned, using the following scale. Note that your grade depends only on your scores, and not on class averages.

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\begin{align*}
\geq 86 &= A \\
62 - 73 &= C \\
50 - 61 &= D \\
< 50 &= F
\end{align*}
\]

**Hour Exams**
Exams will be given on Fridays, September 21, October 19, and November 16 in our regularly scheduled lecture time. Each exam will focus primarily on material from the 4-week period since the previous exam. All exams may include questions or problems in any format: multiple choice, short answer, numerical problems, etc.

**Missed Exams**
There will be no regularly scheduled make-up exams. In the event that you miss an exam due to a university-approved absence, you should consult with me as soon as possible to discuss your situation. If possible, you should discuss your absence with me before the exam is given.

**Final Exam**
The Final Exam will be a two-hour, 150-point test covering all material taught during the semester. Final exams are scheduled at the following times.

- **Section 501:** Monday, December 10, 8:00 AM – 10:00 AM
- **Section 502:** Wednesday, December 12, 10:30 AM – 12:30 PM

**Homework**
Homework assignments will be given approximately weekly throughout the semester, and will be handled by the LON-CAPA electronic homework system. (LON-CAPA will be demonstrated in class during the first week.) The homework points to be added to your grade will be determined by calculating the percentage of the assigned problems for which you have received credit. If you have done all the problems, you will receive 60 homework points. Doing half of the problems will get you 30 points, and so on. Please note that the homework counts for slightly more than 10% of your grade, so if you don't do any of the problems, it will probably cost you a letter grade! More importantly, if you are not working problems regularly you are unlikely to be prepared to do well on exams.

**Clicker Questions**
Starting the week of September 3, most classes will include one or more clicker questions. Most of these questions will be designed to start our discussion of a topic or check to see how well the class understands something we have been working on. Credit for such questions will be awarded to everyone who registers a response. Some clicker questions may act as mini-quizs, for which credit will be awarded to all those registering a correct response.

The number of points added to your final grade will be based on the fraction of the clicker questions for which you receive credit. In order to allow for a reasonable number of class absences, you will receive the full 40 points if you receive credit for at least 80% of the clicker
questions over the course of the semester. Those who receive credit for less than 80% of the questions will earn points as determined by the following formula:

\[
\text{pts. awarded} = \frac{\# \text{ clicker questions for which you have credit}}{(0.8) \times \text{total} \# \text{ of clicker questions}} \times 30 \text{ pts}
\]

**Reading Assignments and Class Coverage**

A detailed calendar showing reading assignments associated with each day’s class is posted on the class website, and can be accessed directly at [http://chem107.chem.tamu.edu/brown/reading.htm](http://chem107.chem.tamu.edu/brown/reading.htm).

**Absences**

You are responsible for all material presented in class, even if you should happen to be absent. The slide files from the website and/or notes from a classmate can help you to be sure you know what you might have missed.

If you miss an exam, you will be required to provide suitable documentation that your absence should be excused according to University rules and regulations (Student Rule 7). Whenever possible, you should discuss any upcoming absences with me in advance.

**Course Materials and Copyright Issues**

The handouts and other materials used in this course are copyrighted. Here “handouts” means all materials generated for this class, including but not limited to syllabi, quizzes, exams, lab material, class slide files, learning objectives, problem sets, and assorted materials appearing on the class website. Because these materials are copyrighted, you do not have the right to copy them for any purpose other than your own personal academic use unless I expressly grant permission. In particular, course materials are not to be given or sold to any profit-seeking enterprise.

**Academic Honesty**

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).

**Students with Disabilities**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, Cain Hall, Room B-118 or call 845-1637. The Disability Services office is very busy every fall, so please make an appointment with them today if you feel you require assistance.
CHEMISTRY 117
General Chemistry for Engineering Students Lab
Fall 2012

Laboratory Coordinator: Dr. Amber Schaefer, HELD 412
aschaefer@chem.tamu.edu

TA: ___________________________ Section: ___________________________
TA Office Hours in #116 HELD: __________ Laboratory Room: __________
TA Email: ___________________________  

Chemistry 117 is a one-credit laboratory course designed for students who are now or have already been enrolled in Chemistry 107.

Prerequisite: The prerequisite for CHEM 117 is concurrent registration in or credit for CHEM 107. “Credit for” means credit recorded on the transcript for passing this course with a passing grade or passing appropriate tests to obtain credit. If you are registered for CHEM 117 and do not have the proper prerequisites you must drop this course. **If you drop the co-requisite lecture course, CHEM 107, during the semester, you no longer meet the requirements to be enrolled in this laboratory course. Therefore, CHEM 117 must be dropped at the same time.** Student Rule 1.16.4 includes the statement: “If lecture and companion labs are dropped at the same time, this will count as one Q-drop rather than two.” **Do not attempt this course without the proper prerequisites**

Required Materials:
- Lab notebook, 8.5” x 11”, perforated, numbered, with duplicate (carbonless) copy pages is included with the laboratory manual
- Approved eye protection: Chemical splash goggles (the full face goggles with four indirect vents). These are the ONLY approved eye protection. **No other goggles will be allowed.**

Learning Outcomes: Experiments in the course will demonstrate fundamental chemical principles taught in the CHEM 107 lecture course and to introduce students to modern topics in chemistry. This laboratory course is also designed to emphasize data analysis and comparisons between observed data and theoretical models.

Safety: Student safety is a top priority in the Texas A&M Department of Chemistry. Protective eyewear, appropriate clothing and shoes that completely cover your feet are required at all times in the laboratory. Appropriate clothing includes pants or long skirts which come all the way down to the ankles so that no parts of the legs or feet are exposed. All Chemistry 111 students are required to accept the Lab Safety Acknowledgement (LSA) on Howdy, pass a safety quiz and sign a safety contract given at the conclusion of the first class meeting. **Any student who does not view the safety video, pass the safety quiz and accept the lab safety acknowledgment on HOWDY will not be permitted to continue in Chemistry 111.** The safety guidelines associated with individual experiments are highlighted at the beginning of each experiment. Prelab quiz questions regarding safety aspects specific to each experiment should be expected. Failure to adhere to any safety regulation while in the laboratory will result in a reduced performance score and/or expulsion from the laboratory.

Eating, drinking, and smoking are prohibited in the lab at all times. Chewing gum is also prohibited.

Long hair must be held in place to the back of your head. You are responsible for bringing the bands or clips to hold back your hair. Only full-length pants or skirts are allowed in the labs. If you do not comply with the attire
rules, you will be asked to leave the lab to get appropriate clothing. If you do not make it back to complete the lab, you will receive a zero for that particular lab.

All personal belongings are to be placed in the back of the room and any food/drink should be inside a backpack.

Further details on appropriate lab attire and other safety regulations are provided in the lab manual and will be explained during the first class meeting.

**Personal Electronic Devices:** Cell phones, pagers and other personal electronic devices are NOT permitted in lab. If you continue to use them after being told not to, you will be asked to leave the lab and you will receive a zero for the missed lab.

**Questions:** If you have any questions regarding the laboratory course or specific experiments, e-mail your TA or go to the help desk in room 116 HELD. General questions regarding lost and found or other non-technical issues can be sent to chemfyp@chem.tamu.edu.

**Electronic Communications:** All electronic communications with your TA, IA, the FYP office, and the Laboratory Coordinator must be conducted from a *tamu email account*. All emails should include the student’s first and last name, UIN, and the course and section number. Students are responsible for checking their *tamu email* on a regular basis to receive messages regarding the laboratory course. Students are responsible for verifying that their *tamu email* on record is correct.

**elearning:** Your grades for this lab will be posted on the course elearning page, which can be accessed via: elearning.tamu.edu. All supplemental information and/or handouts for experiments not included in your lab manual will be posted or elearning. Furthermore, all prelab quizzes will be conducted as assessments on elearning. For more information regarding these assessments, see the prelab quizzes section under Laboratory Assignments.

**Absences and Make-up Labs:** All students with absences due to University-approved excuses as defined by Student Rule 7 (see http://student-rules.tamu.edu/rule07.htm), will be allowed to make-up missed laboratory work provided the requirements outlined in the student rules are met. In cases where advanced notice of an approved absence cannot be given, students must contact the FYP office *by the end of the second working day after the end of the absence*. All excused absences from lab and make up lab requests must be reported to and processed by the First Year Program office in 412 HELD. Your TA does not have the authority to approve a request for a make-up lab or to schedule a make-up experiment. In accordance with student rules, in cases where advanced notice of an approved absence cannot be given, students must contact the FYP office or the laboratory coordinator *by the end of the second working day after the end of the absence*.

An absence for a non-acute medical service (*such as a doctor’s appointment*) does not constitute an excused absence. *Missing lab for not having goggles or other required safety attire is not an excused absence.*

**Assignment Due Dates and Late Policy:** All assignments (DRA sheets or other written assignments) will be due at the beginning of each lab meeting. A three point deduction per day beginning on the due date will be applied to any late assignments. Assignments submitted more than one week after the due date will not be graded.

**Switching Sections:** Once you have registered for a laboratory section, you are NOT at any time allowed to switch sections later in the semester unless we have proof that there is a conflict with an exam or you need special accommodations. You have to notify the First Year Program office in 412 HELD before the conflict occurs so that we can make arrangements.

**Punctuality:** Arrive to lab on time. Lab sessions begin with important information concerning the procedures to be followed and safety considerations. If you arrive significantly late and if the TA perceives that time to be very
late, he/she may decide not to let you in for that lab session as you will not be able to properly follow the procedures and the safety instructions discussed while doing your lab work.

**Academic Integrity:** The Aggie honor code states that "An Aggie does not lie, cheat, or steal or tolerate those who do." Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or processes of the Honor System. For additional information visit: [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/)

Each student has to turn in his or her own pre-lab, post-lab and data sheets. **Even though laboratory data is collected in pairs all submitted work must be completed individually.** Copying of the prelab, post-lab and data sheets instead of turning in your own original work, written using your own words, is considered cheating. Changing experimental data after leaving lab, making up or borrowing data that you did not obtain in class is also a violation of the honor code. All students found to be in violation of the honor code will be given a grade of 0 for the assignment and a report of the violation will be filed with the Aggie Honor System Office. If any two reports are alike in their entirety or in part, it is considered cheating. Turning in a post-lab and data sheets for a lab you did not complete is also considered cheating.

**Disabilities:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, Cain Hall, Room B-118 or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

Students wishing to receive accommodations for disabilities for CHEM 111 must submit the appropriate paperwork to the FYP office in HELD 412. Note that we are not responsible for providing any accommodations until the paperwork has been submitted to the office.

**Laboratory Assignments:** Assignments associated with 10 laboratory experiments comprise the majority of the Chemistry 117 course grade. The points for each experiment are divided into as many as four categories, including: quizzes, performance and safety, and data reduction and analysis and reports. The other grade component in Chemistry 117 is the final exam. A brief description of each of the course components is given below. A schedule of experiments and a point breakdown for all assignments is listed in the schedule found on the last page of this syllabus.

1. **Pre-lab Quizzes:** A prelab quiz will be administered for each experiment, or portion of an experiment for multi-week projects, in the course. All quizzes are administered as a BlackBoard Vista assessment. (Available through: [elearning.tamu.edu](http://elearning.tamu.edu)) Each prelab quiz is due prior to the beginning of the class meeting in which the experiment is scheduled to be performed. Although use of the laboratory manual cannot be restricted you are required to complete the quizzes individually. Successful completion of the quizzes will require adequate preparation. The quizzes have a strict 30 minute time limit, and must be submitted prior to the expiration of this allotted time. Each new quiz will be made available after 6:00 PM on the day your lab section meets. Since each quiz is available for approximately one week and can be completed at any time, make up quizzes will not be allowed even if a student has a university approved excuse for the day the assessment is due. As this is graded course work, all rules and policies regarding the Aggie Honor Code apply to prelab quizzes. Students are responsible for taking and submitting each quiz. **Neither your TA nor the FYP office will submit a quiz for you if you fail to do so.**

The prelab quizzes are designed to test a student’s preparedness for the upcoming experiment. Quiz questions are derived from the reading materials found in the lab manual and may cover but are not limited to the following topics: basic calculations; experimental aim; ecological/environmental issues; analytical
techniques; basic chemical concepts; experimental procedure; and equipment and reagents. A comprehensive reading of the lab materials should sufficiently prepare students to answer all quiz questions. At least one general safety question will be included in each quiz. Answer keys to individual quizzes will be available through list of assessments on elearning, however the keys will not be released until the end of the week each quiz is due.

2. **Performance and Safety:** The safety and performance grade includes adhering to safety guidelines (goggles and attire), maintaining a clean workspace, and being organized and prepared for the day’s activities. Safety violations will result in lost points and can lead to dismissal from the laboratory. The performance form asks whether each student a) wore goggles throughout the entire exercise; b) was appropriately dressed; c) maintained a clean environment; d) was prepared; and e) followed directions. **Each violation costs the student 3 points (making negative scores possible). Recognize that the TAs must strictly follow the rules and are not allowed to exercise discretion in any of these criteria.** If the TA is found to be failing these issues during inspections, the TA can lose their job. Students will be allowed to borrow goggles from the stockroom (room 402 HELD), but it will cost 5 points on the safety and performance grade for that experiment. **Students must bring their TAMU ID to the stockroom to be able to check out goggles. Goggles are the only component of safety attire that can be borrowed from the stockroom.**

3. **Data Reduction and Analysis:** The laboratory manual provides a series of directions, calculations and questions after each experiment. These exercises are designed to guide students through the analysis of their experimental data. For the experiments, data reduction and analysis assignments will be posted on elearning and are due at the beginning of the following lab period. Any plots or data tables should be completed using an electronic software package such as Microsoft Excel. Paper copies of all tables and plots should be attached to the data reduction and analysis worksheet. A hand-written sample calculation must accompany any calculations performed with electronic spreadsheet.

4. **Reports:** A full (typed) report will be required for two of the experiments in this course. These experiments are indicated in the syllabus, and the topics to include are provided in the lab manual. Other specific guidelines for lab reports will be provided on elearning. As with other assignments, lab reports will be due at the beginning of the next lab meeting.

5. **Exams:** One 90 minute final exam is given in CHEM 117. The exam may include multiple-choice, true/false and free-response questions. This exam will be administered in lab during your regular lab time the week of November 26.

**There are no opportunities to earn “extra credit” in CHEM 117.**

**Determination of Final Grades:** Student scores from the assignments described above will be summed and grades will be determined using grade dividing lines (cutoffs) that will vary to some extent from section to section. The grade cutoffs will be determined after consultation between your Teaching Assistant and the Laboratory Coordinator. In each laboratory section then grading will be ‘on the curve’, and while ‘the curves’ will be similar in different sections, they will not be identical. Overall section grade averages will be allowed to vary somewhat since every group of students is different, but the Laboratory Coordinator’s policy will attempt to compensate as much as possible for differences in the grading habits of TAs. Grade cutoffs are not determined by any adherence to a 90/80/70/60 rule – students need to be aware that such a rule is not applied. In many cases, the cutoffs will be lower than these numbers, but it is also possible that they will be higher than these numbers. Please refrain from contacting your TA, IA, the FYP office or the lab coordinator with specific questions regarding the final curve in this course; these questions cannot and WILL NOT be answered.

Final grades assignments will be not be released to students by the TAs or the FYP office. Students will learn their final grades in the course after they are released by the University.

**Disclaimer:** Any communications or handouts from your IA, the FYP office or Lab Coordinator take precedence over the contents of this syllabus.

Chemistry 117, Fall 2012
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<thead>
<tr>
<th>Week of</th>
<th>Assignment</th>
<th>Last Day for Make-up Lab</th>
<th>Points</th>
<th>Quiz</th>
<th>Safety and Performance</th>
<th>Data Reduction and Analysis</th>
<th>Report</th>
<th>Total</th>
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<tr>
<td>9/3</td>
<td>Safety (dry lab)</td>
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<td>9/10</td>
<td>Exp. 1: Conservation Laws</td>
<td>9/20</td>
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<td>9/17</td>
<td>Exp. 2: Aqueous Solutions</td>
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<td>Exp. 3: Gas Laws</td>
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<td>Exp. 5: Nanoparticles</td>
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<td>10/8</td>
<td>Exp. 7: From Atoms to Molecules* (Dry Lab)</td>
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<td>Worksheet (45)</td>
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<td>Exp. 9: Intermolecular Forces</td>
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<td>Exp. 15: Conducting Polymers</td>
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<td>11/5</td>
<td>Exp. 10: Colorimetry</td>
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<td>11/12</td>
<td>Exp. 13: Chemical Equilibrium</td>
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<td>11/19</td>
<td><strong>Thanksgiving Week</strong></td>
<td>No labs this week</td>
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<td>11/26</td>
<td>Final Lab Exam</td>
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* Students must report to the FYP office in HELD 412 within two days after the end of an absence to schedule a make-up lab; requests may not be accepted after 3:00 pm on the date indicated.

** Students who miss the safety orientation must make this up BEFORE their next lab meeting.

*** No formal make-up time is scheduled for this week, however, you must schedule a make-up lab with the FYP office within two days after the end of an absence to turn in the assignments for this experiment.