Chemistry 1415 Course Outline, Fall 2011
Course Website – Desire to Learn (D2L) @ learn.ou.edu

**Description:** Chemistry 1415 is the second semester of a two-semester sequence of general chemistry for students in the physical sciences, engineering, health sciences, biological sciences, and related fields.

**Prerequisite:** Grade of C in Chemistry 1315 or satisfactory score on the chemistry placement examination. This class is a continuation of Chemistry 1315.

**Text:** Chemistry 2nd Ed. – Burdge, McGraw-Hill 2011.

**Online problem solving program:** WebAssign – McGraw-Hill [www.WebAssign.net] for Homework & Quizzes

**In-class extra credit assessment (optional):** HITT TX3200 RF Clicker (http://www.h-itt.com)

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**Preparation for Lectures & Exams**

Students should consult the syllabus calendar, located on the last page of the syllabus, to prepare for each lecture. The readings identified below are keyed to the current text and learning objectives for the course. The order of the readings does not necessarily reflect the order of topics covered in lecture. Students may find that reading the textbook chapters in the order written by the textbook author to be more natural.

Extra credit homework problem sets (EC HW-#) have been assigned to each unit of study and are due on the dates indicated on the course calendar at the end of this syllabus. These problems will be done via WebAssign, a computer-based problem-solving program. Extra credit homework problem sets are minimum assignments representative of the question types you will be expected to be able to answer on examinations and quizzes. You should also attempt appropriate additional problems in your textbook as part of your preparation.

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**Learning Objectives, Reading Assignments**

**Unit 1 - Kinetics - Chapter 14**

1.1. Express and compare rates of chemical reactions in terms of the concentration changes of the reactants and products (or factors proportional to concentration) per unit time. [Readings 14.1]

1.2. Use collision theory to explain how chemical reactions occur and how rates are affected. [Readings 14.4]

1.3. From experimental kinetics data, derive the rate law, order, and rate constant for a chemical reaction. [Readings 14.2]

1.4. For a zero, first or second order reaction, determine the exact rate constant and half-life for a chemical reaction from time/concentration data. [Readings 14.3]

1.5. From a reaction profile, determine ΔH & E_a for a chemical reaction. [Readings 14.4]

1.6. Explain the role of catalysts, what they are, how they work, and how they affect a reaction profile. [Readings 14.6]

1.7. From kinetic data, determine the relationship between E_a, k, and the temperature of both catalyzed and uncatalyzed chemical reactions. [Readings 14.4, 14.6]

1.8. Determine the relationship between the rate law and the mechanism of a simple chemical reaction. [Readings 14.5]

**Unit 2 - Equilibrium - Chapter 15**

2.1. Characterize chemical reactions in terms of reversibility and relative concentrations of reactants and products. [Readings 15.1]

2.2. Determine equilibrium expressions for homogeneous and heterogeneous chemical reactions from stoichiometry. [Readings 15.2, 15.3]

2.3. Determine the stoichiometric relationship between initial and equilibrium concentrations of reactants and products. [Readings 15.2]

2.4. Determine the relationship between K_{eq, old} and K_{eq, new} when a chemical reaction is reversed or multiplied by a constant factor of n or two reactions are added to form a third reaction. [Readings 15.3]

2.5. Determine the relationship between K_C and K_P for a chemical reaction involving gaseous components. [Readings 15.3]

2.6. Determine value for K from equilibrium concentrations of reactants and products in a chemical reaction. [Reading 15.2]

2.7. Determine the equilibrium concentrations of reactants and products of a chemical reaction from initial concentrations and value of K. [Readings 15.4]

2.8. Determine if equilibrium has been reached in a chemical reaction; determine the direction the reaction will shift if equilibrium has not been reached. [Readings 15.4]

2.9 Use Le Châtelier’s Principle to predict the direction a reaction at equilibrium will shift as a result of changes in conc., pressure/volume, and temperature as it approaches a new equilibrium. [Readings 15.5]

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**EXAM 1 - Thursday, September 15, 7:30 – 9:00 p.m. (Rooms to be announced)**
Unit 3 - Acid/Base - Chapter 16
3.1. Relate [H\(^+\)], [OH\(^-\)], and \(K_w\) in an aqueous solution. [Readings 16.2]
3.2. Determine the pH and/or pOH of an aqueous solution from the [H\(^+\)] (or [OH\(^-\)]) and v.v. [Readings 16.3]
3.3. Define acids and bases in terms of Arrhenius, and Brønsted-Lowry theories. [Readings 16.1]
3.4. Recognize and construct conjugates of acids or bases. [Readings 16.1]
3.5. Determine the [H\(^+\)], [OH\(^-\)], pH and/or pOH of a strong acid or strong base solution. [16.4]
3.6. Determine and relate equilibrium concentrations, [H\(^+\)], [OH\(^-\)], pH and/or pOH with \(K_a\) values for weak acids (also, same for \(K_b\) values for weak bases). [Readings 16.5, 16.6]
3.7. Determine the [H\(^+\)], [OH\(^-\)], pH and/or pOH for weak acids or weak bases from initial concentrations. [Readings 16.5, 16.6]
3.8. Construct an ordered list of strongest to weakest (or v.v.) for acids or bases. [Readings 16.5, 16.6]
3.9. Determine the \(K_a\) for a weak base, given the \(K_b\) value of its conjugate acid (v.v.). [Readings 16.7]
3.10. Determine the [H\(^+\)], [OH\(^-\)], pH and/or pOH of a salt solution. [Readings 16.10]
3.11. Qualitatively determine the acidic, basic, or neutral properties of a salt. [Readings 16.10]
3.12. Identify acids and bases using Lewis theory. [Readings 16.12]
3.13. Determine the [H\(^+\)], [OH\(^-\)], pH and/or pOH of weak and strong polyprotic acids. [Readings 16.8]

Unit 4 - Aqueous Equilibrium - Chapter 17
4.1. Define and make buffer solutions from (1) a weak acid and its conjugate base, (2) a weak base and its conjugate acid, (3) a weak acid and a strong base, and (4) a weak base and a strong acid. [Readings 17.1, 17.2]
4.2. Determine the pH of a buffer solution from concentrations and v.v. [Readings 17.1, 17.2]
4.3. Make a buffer with a specific pH. [Readings 17.2]
4.4. Determine the conjugate pair best suited to make a buffer of desired pH. [Readings 17.2]
4.5. Analyze a strong acid/strong base titration (including polyprotic) (determine end point location and entire pH curve, including pH at beginning, pH at end point, and pH at all other points). [Readings 17.3]
4.6. Analyze a titration of a weak acid or base with a strong base or acid (determine end point location and entire pH curve, including pH at beginning, pH at end point, and pH at all other points). [Readings 17.3]
4.7. Determine the \(K_{sp}\) equilibrium expression for a partially soluble salt. [Readings 17.4]
4.8. Determine the \(K_{sp}\) value, given the solubility of a salt (v.v.). [Readings 17.4]
4.9. Determine the effect of a common ion on the solubility of a partially soluble salt. [Readings 17.5]

EXAM 2- Thursday, October 13, 7:30 - 10:00 p.m. (Rooms to be announced)

Unit 5 - Chemical Thermodynamics - Chapters 18 (& 5)
5.1. Apply Hess’ Laws to thermodynamic quantities. [Readings 18.5]
5.2. Determine \(\Delta H^\circ\) for a chemical reaction from \(\Delta H^\circ_f\) values of reactants and products. [Readings 18.6]
5.3. Predict the qualitative change in enthalpy for various chemical reactions. [Readings 18.5]
5.4. Predict and compare the qualitative change in entropy for various chemical reactions and physical processes. [Readings 18.1, 18.2]
5.5. Determine \(\Delta S^\circ\) for a chemical reaction from \(S^\circ\) values of reactants and products. [Readings 18.3, 18.4]
5.6. Determine \(\Delta G^\circ\) for a chemical reaction from the Gibbs equation. [Readings 18.5]
5.7. Determine \(\Delta G^\circ\) for a chemical reaction from \(\Delta G^\circ_f\) values of reactants and products. [Readings 18.5]
5.8. Determine \(\Delta G\) for a chemical reaction from \(\Delta G^\circ\) and the reaction quotient, Q. [Readings 18.6]
5.9. Predict whether a chemical reaction, as written, is spontaneous, non-spontaneous, or at equilibrium. [Readings 18.6]
5.10. Calculate the standard free energy for a chemical reaction from the equilibrium constant (v.v.). [Readings 18.6]
5.11. Determine the equilibrium temperature, \(T_e\), for a chemical reaction from \(\Delta H^\circ\) and \(\Delta S^\circ\) (v.v.). [Readings 18.5]

Unit 6 - Electrochemistry - Chapters 19 (&4)
6.1. Assign oxidation numbers (oxidation states) to individual elements in a chemical compound or complex ion. [Readings 19.4]
6.2. Recognize redox reactions; distinguish from reactions not involving oxidation/reduction. [Readings 19.4, 19.1]
6.3. Stoichiometrically balance both half-reactions and cell reactions involving redox. [Readings 19.10]
6.4. Draw a diagram of a voltaic (galvanic, spontaneous) cell and explain how it works, predicting changes which will occur during discharge. [Readings 19.2]
6.5. Define and identify anode, cathode, oxidation process, reduction process, oxidizing agent, and reducing agent for a redox reaction. [Readings 19.1, 19.2]
6.6. Calculate \(E^\circ\) for a chemical reaction using a standard reduction potential table. [Readings 19.3]
6.7. Predict the products of a redox reaction. [Readings 19.3]
6.8. Calculate and relate values of \(E^\circ\), \(\Delta G^\circ\), and K for an oxidation-reduction reaction. [Readings 19.4]
6.9. Calculate $E$ for a redox reaction under non-standard conditions of constituent concentrations and/or pressures. [Readings 19.5]

6.10. Draw a diagram of an electrolytic (non-spontaneous) cell and explain how it works, predicting changes which will occur during operation. [Readings 19.7]

6.11. Construct a line notation for an electrochemical cell from information concerning the anode, cathode, oxidation process, reduction process, oxidizing agent, and/or reducing agent (v.v.). [Readings 19.2]

6.12. Relate the amount of product(s) produced and/or reactant consumed in an electrolytic cell to the current used, time involved, and moles of electrons associated with the corresponding half-reaction. [Readings 19.7]

**EXAM 3 - Thursday, November 10, 7:30 - 10:00 p.m. (Rooms to be announced)**

**Unit 7 - Nuclear Chemistry - Chapter 20 (&2)**

7.1. Identify the number of protons and neutrons found in the nucleus of any atom. [Readings 2.3]

7.2. Identify the symbols representing various subatomic particles. [Readings 2.3, 20.1]

7.3. Using $N$ and $Z$ relationships for individual nuclides, predict stability/instability (non-radioactivity/radioactivity). [Readings 20.2]

7.4. Write balanced equations for nuclear reactions including decay, transmutation, fission, & fusion. [Readings 20.1, 20.4, 20.5, 20.6]

7.5. Identify missing nuclear particles in a nuclear reaction. [Readings 20.1]

7.6. Determine the half-life, beginning amount, final amount, or elapsed time in a radioactive decay reaction. [Readings 20.3]

7.7. Use radioactive (e.g. carbon-14) dating techniques to calculate the age of a substance. [Readings 20.3]

7.8. Determine the mass defect, binding energy, and binding energy per nucleon for a nuclear particle. [Readings 20.2]

7.9. Determine the energy absorbed or released in a nuclear reaction. [Readings 20.2]

**Unit 8 - Coordination Chemistry - Chapter 22 (&6)**

8.1. Determine the electronic configurations of transition metals and metal ions. [Readings 6.9]

8.2. Recognize and identify coordination compounds and their components. [Readings 22.1]

8.3. Determine oxidation number, coordination number, orbitals used in bonding, and geometry of the central metal atom in coordination compounds and complexes. [Readings 22.1]

8.4. Describe the bonding effects of polydentate ligands. [Readings 22.1]

8.5. Given their formulas, name coordination compounds and complexes (and v.v.). [Readings 22.1]

8.6. Recognize, describe, and identify structural isomers (coordination & linkage) and stereoisomers (geometrical and optical) of coordination complexes. [Readings 22.2]

8.7. Explain spin state and the magnetic and color properties of transition elements. [Readings 22.3]

8.8. Relate and predict electronic structure, field strength ($\Delta$), spin state, and magnetic and color properties of coordination complexes in octahedral, tetrahedral, and square planar environments. [Readings 22.3]

8.9. Relate and predict electronic structure, field strength ($\Delta$), spin state, and magnetic and color properties of coordination complexes based on ligand strength. [Readings 22.3]

**EXAM 4 - Monday, December 12, 7:30 - 10:00 p.m. (Rooms to be announced)**
Evaluation (grading)

A total of 685 points are possible for CHEM 1415.

Letter grades will be assigned based on the cut-offs listed in the table to the right.

The 685 points possible in CHEM 1415 are distributed as shown (detailed description of each follow table):

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Point distribution</th>
<th>Total point contribution to final grade</th>
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<tbody>
<tr>
<td>Examinations</td>
<td>Eight units @ 50 pts each</td>
<td>400 pts</td>
</tr>
<tr>
<td>Laboratory Reports</td>
<td>Eleven lab reports @ 15 pts each</td>
<td>165 pts</td>
</tr>
<tr>
<td>Recitation Scores</td>
<td>Ten recitation scores recorded, best eight used toward final grade @ 10 pts each</td>
<td>80 pts</td>
</tr>
<tr>
<td>Online Quizzes</td>
<td>Eight quizzes, one per unit, @ 5 pts each</td>
<td>40 pts</td>
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<td></td>
<td><strong>Total points possible = 685</strong></td>
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Examinations: The course content in CHEM1415 is divided into eight units. Each unit on an examination will consist of ten multiple-choice questions, each worth 5 points. The chapters of the text covered on each exam are listed by the reading assignments within each learning objective. One or more questions per examination may cover laboratory concepts, one or more questions may be based upon the extra credit homework problem sets, and one or more questions may reflect online quiz content.

Make up/Retake of Exams: Students who miss an exam or those who are dissatisfied with their performance have an opportunity to make up an exam or to improve their score by retaking individual units, respectively, on a succeeding exam. Exams 2, 3, and 4 contain questions from the last two units covered on the previous exam. For example, Exam 2 covers new units 3 & 4 and repeats units 1 & 2. At any exam, you may answer the questions for any unit offered that you desire. You do not have to take all of the units offered if you are satisfied with your previous unit attempts. The higher of the two attempts, not the second attempt, is used in the final grade calculation. Please note: Units 7 & 8 are only offered once (exam 4). Your final grade for examinations will be calculated by taking the highest score you received on each of the 8 units.

Alternate exam time (Exams 1 – 3 only): Students who cannot attend scheduled exams 1-3 because of a job or class conflict or other University approved activity may take an alternate exam to be given earlier in the day on the day of the exam [time/location to be announced]. Students who qualify to take an alternate exam must register in advance by providing all of the following information by noon on Monday of the exam week: Name, I.D., Lecture Instructor, Lab Instructor, Reason why you cannot attend the scheduled exam, Name and phone number where excuse can be verified. Submit registration by email to Dr. Clifford, the coordinator for general chemistry courses [lclifford@ou.edu]. Include “CHEM 1415 alternate exam” in the subject line of the email. You must submit a registration for each exam where the alternate exam time is needed.

Laboratory: Laboratory grades will be based on eleven laboratory reports worth 15 pts each. See the attached calendar (last page of syllabus) for a schedule of laboratory activities corresponding to your laboratory manual. Make-ups for laboratories will require an appropriate and verifiable excuse. See your laboratory instructor for appropriate make-up procedures.

Recitation: Ten recitation grades will be recorded with the best eight out of the ten applied to the final grade calculation. Recitation grades will be based on group activities and computer laboratory activities performed in recitation. Recitation meets every week; however, see the attached calendar (last page of syllabus) for a schedule of when recitation/discussion activities will be recorded for grade. There are no make-ups for recitation as students can miss two recitation grades with no effect on their grade.

Online quizzes: Wait for detailed instructions from your lecture instructor before registering to use WebAssign. Online quiz scores will be assessed for each of the eight units covered. These quizzes are designed to help students prepare for the examinations and will be available on the WebAssign website for the course [https://www.webassign.net/login.html]. Quizzes are worth five points per unit and cover the content of the course learning objectives. Each online quiz may be repeated up to 5 times while it is available on WebAssign. Please note: only the score on the last quiz submitted will count. This is a quirk of the WebAssign quizzes that we cannot control. The entire quiz must be submitted as a whole for each attempt in order to best simulate the exam setting. Online quiz scores will not count unless submitted by the deadlines (date and time) indicated on WebAssign. Since your computer and/or the net are not guaranteed to work at the last minute, we STRONGLY recommend that you not wait until the last minute to complete online quizzes. The WebAssign server time may differ from your clock, so submit your quiz well in advance of the due date time. There are no make-ups for online quizzes.
**Important exam information:**
You must bring your I.D. or some other form of photo identification to all exams. Scantrons and adequate paper to work problems will be provided at each exam within the exam packet. You may not bring your own scratch paper to the test.

Electronic communication devices including but not limited to cellular phones, pagers, FM receivers, headphones, music devices of any sort, etc. are banned from examination rooms. Individuals for whom circumstances make the possession of such devices necessary must inform their laboratory instructor prior to an examination to make arrangements. Students found with an unauthorized communication device at an examination will be charged with academic misconduct, whether or not the device was in use at the time it was discovered.

Calculators with programmable functions and/or alphanumeric storage/recall capability (this includes graphing calculators) are not allowed for quizzes and examinations. An approved list of calculators can be found on the website for the course [https://learn.ou.edu]. You will be expected to use only an approved calculator on all quizzes and examinations. Students using calculators that have not been approved may be charged with academic misconduct.

Make sure you know where your assigned testing site is before the exam. Exam room assignments will be sent by email and will be posted to the course website. Students who arrive more than ten minutes late to an exam, or arrive after another student has left, will not be allowed to take the examination.

**General notes on grading & grade discrepancies:** Grades may be viewed on the D2L website for the course (learn.ou.edu). Please note that grades will not appear immediately on D2L as they will be intermittently updated during the term. Students will be notified via email by either the General Chemistry Coordinator or your instructor when grades are ready to be reviewed on D2L.

Save all graded lab reports and any other documents returned to you for comparison with our records. In the event of a discrepancy, you will need to provide us with the graded lab or recitation assignment. Discrepancies in lab report grades or recitation assignments should be reconciled with your laboratory/recitation instructor. Discrepancies with exam grades should be resolved by bringing your student ID and your exam paper (blue/pink/tan/gold exam) to request a hand-grade of the scantron from the Undergraduate Program Assistant, Ms. Kristie Tevault (1000 SLSRC, 8 a.m. – 5 p.m.). Discrepancies in quiz grades should be reported to the Gen. Chem. Coordinator.

In order to keep track of your overall grade, use the charts below to record your grades as they are earned during the term:

<table>
<thead>
<tr>
<th>Exams (50 pts. possible per unit)</th>
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<tbody>
<tr>
<td>Unit 1</td>
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<tr>
<td>Exam 1</td>
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<td>Exam 2</td>
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<td>Exam 3</td>
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<td>Exam 4</td>
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<table>
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<tr>
<th>Laboratory Grades (Each worth 15 pts)</th>
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<tbody>
<tr>
<td>Lab</td>
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<tr>
<td>Scores</td>
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<table>
<thead>
<tr>
<th>WebAssign Online Quiz Grades (Each unit is worth 5 pts)</th>
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<tbody>
<tr>
<td>Quiz</td>
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<tr>
<td>Scores</td>
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**Extra Credit:** In addition to the course points assigned above, extra credit points are available for ONLY (1) in-class lecture activities and (2) the WebAssign extra credit homework problem sets (designated as EC HW-# on the syllabus calendar). These extra credit homework problem sets are not to be confused with the online quizzes that are also available through WebAssign. Online quizzes are for points, not for extra credit. Deadlines for extra credit homework problem sets are available on the syllabus calendar and on WebAssign. Other details about the extra credit will be explained by your lecture instructor.
Policies & Notes

The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Disability Resource Center prior to receiving accommodations in this course. The Disability Resource Center is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.

Each student should acquaint her or his self with the University's codes, policies, and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap.

The instructor reserves the right to change any items contained in this syllabus. This includes, but is not limited to: course content, scheduled dates, and fraction(s) of final grade assigned to individual components of the course.

Email communication: In order to aid communication, the University has established email as an acceptable means of official communication. All University students are assigned an official University email account and your instructor and/or the General Chemistry Coordinator will be communicating with you through this account periodically. Email sent to this account is expected to be read by you in a timely fashion. For convenience, you can arrange to have your email forwarded to another email account (go to https://webapps.ou.edu/pass); however, the University warns that you do so at your own risk. Failure to receive or read the communications sent to you via your official email account in a timely manner does not absolve you from knowing the information sent to you. Any correspondence with your instructor should include your name, section number, and the phrase “CHEM 1415” in the subject line.

Academic misconduct: Students engaging in academic misconduct (including cheating, plagiarism, and any other action that may improperly affect evaluation) will be subject to sanctions in accordance with the Norman Campus Academic Misconduct Code. Cheating of any kind will not be tolerated. Cheating is defined as an act performed so as to give a relative or unfair advantage to any person on an exam or assignment. Cheating of any kind will be dealt with by official University channels and will be punishable by penalties including receiving a grade of “F” for the course and/or expulsion from the University. Any papers, writings, or materials that are deemed suspicious by the instructor or the exam proctors will be confiscated and/or documented for misconduct procedures as considered appropriate (e.g. photographs of writing on surfaces). You should understand that your instructors take these matters seriously. Students who are caught in any form of academic misconduct should expect extremely severe penalties.

General notes: Students are expected to be attentive during course and lab/discussion lectures and to remain seated until the end of the period. Disruptive behavior in lecture, laboratory, or recitation will not be tolerated.

Laboratory and recitation will begin the first week of class. You should bring paper, pencil, lab or recitation manuals, and a calculator to laboratory and recitation meetings. Students who do not check into laboratory during the first scheduled laboratory class may lose their space and be dropped from lab. All students enrolled in the lecture portion of the course must also be enrolled in a Chem 1415 laboratory/recitation section. Appropriate attire is required in the laboratory at all times (safety goggles, appropriate clothing and shoes, etc.), and will be explained by your lab instructor.

Placement exams: Advanced placement exams for general chemistry courses will be given on Saturday, August 27, 2011 at 8:30 am in PHSC 224. Contact the Department of Chemistry and Biochemistry Advisor, Mr. Lance Goins, for additional information (email ldg123@ou.edu or phone 325-4121).

Last day to withdraw: The final day to withdraw from the course is Friday, October 28, 2011. Students who stop attending but who do not officially withdraw from the course will be assigned a final course grade.

Repeating CHEM 1415: Students who are repeating the course may be eligible to be excused from laboratory. Students must register to be excused from the laboratory during the first week of class (see course instructor for qualification and procedures).

Need Additional Help?

Besides normal class attendance in the lecture and laboratory, students have several opportunities available to enhance their level of learning in the course. Some of these items are indicated below.

Help Lab: The General Chemistry Help Lab is located in PHSC 303 and will be available by the second week of class. The Help Lab is staffed General Chemistry Teaching Assistants and is available on a walk-in basis [operational hours and staff to be posted to the course website after the start of the term]. Students can ask questions regarding any course content (lecture, lab, recitation, etc.). An honest effort must have been made on assignments/problems so that the TA’s can adequately help to clarify concepts.
**Action Center:** The Chemistry 1415 Action Center is an active and collaborative forum in which students work on problems together and receive assistance from instructors and Peer Learning Assistants in order to understand and master general chemistry concepts. Participation in the Chemistry 1415 Action Center is strongly recommended for all students, whether you need assistance or you want to ensure your mastery of the concepts. Regular participation has been shown to lead to positive results in class performance. The Action Center is open in PHSC 303 on a walk-in basis during the operation hours [to be announced and posted to the course website]. Bring your OU ID, text and notes. The Action Center will not begin until the second week of class.

**University College’s Action Tutoring:** The University College’s Action Tutoring is another source of possible help to all CHEM 1415 students. This UC’s Action Tutoring will be available on a drop-in basis during evening hours at a location and times to be announced. To view the location and schedule, go to [http://uc.ou.edu/action.htm](http://uc.ou.edu/action.htm). University College Action Tutoring begins the second week of class.

**Study Groups:** Self-organized and independent meetings of small groups of students on a regular basis (weekly or semi-weekly, for example) to discuss homework and previous exam problems serves as another possible way to help many students discover misunderstandings and improve their performance on examinations.

**Course Website:** A course website is available for CHEM1415 at learn.ou.edu. The CHEM1415 instructors may make lecture notes available on the course website (download and print with Adobe® Reader). Check with your lecture instructor about this. If you are printing out the lecture notes at a computer lab, please be certain to print to the correct printer. In the past, course notes have ended up being printed out all over campus.

**Office Hours:** Laboratory and lecture instructors have office hours to help students. Students may either attend office hours or make an appointment to see an instructor at other times. You may attend any Chem 1415 instructor’s office hours.

**Tutoring list:** The Undergraduate Program Assistant in the Department of Chemistry & Biochemistry office, Ms. Kristie Tevault (ktevault@ou.edu or 325-4811), and Departmental Advisor, Mr. Goins (ldg123@ou.edu or 325-4121), maintain a list of tutors for private hire who may be interested in tutoring individual students or groups of students in chemistry courses. This is done only for the convenience of students and the Department of Chemistry and Biochemistry does not recommend the relative merits of the individuals who have requested to tutor students. Students interested in the tutor list are encouraged to consult with previous students for references and recommendations.

**Previous Exams:** Copies of recent exams are available online at the course website at [https://learn.ou.edu](https://learn.ou.edu). Students should try to answer the questions on past examinations under testing conditions – i.e., without access to any book, notes, another student, or instructor. Students should be aware that past exams were not necessarily written by the current instructors and may be based on a different textbook from the one being used this semester. However, for the most part the topics will be comparable to the current syllabus. Please note that old exams are posted without corrections.

**Homework:** Extra credit homework problem sets are available through WebAssign. You will have multiple attempts at each question. Extra credit points will be available to students who correctly complete homework problem sets.

Additional practice problems (not for credit) can also be found at the end of the chapters in your textbook. The answers to many of these problems in the text are in the back of the textbook. Worked out answers for these problems are available in the solutions manual on reserve in the Main Library (ask for the CHEM 1415 Solution Manual). These solutions should only be examined after working/attempting the problem. Also available are practice quizzes (not for credit) on D2L.

**Computer lab resources:** The University has computer laboratories at six locations: 232 PHSC, Dale Hall Tower, Walker Tower, Couch Tower, Bizzell Memorial Library, and the Oklahoma Memorial Union. These facilities are open for student use seven days a week at hours posted in each lab. Both IBM and Macintosh computers are available.

Contact information relevant to CHEM 1415:

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<thead>
<tr>
<th>Name</th>
<th>Function</th>
<th>email</th>
<th>Office</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Clifford</td>
<td>Gen. Chem. Coordinator</td>
<td><a href="mailto:lclifford@ou.edu">lclifford@ou.edu</a></td>
<td>119 CHBA</td>
<td>325-3314</td>
</tr>
<tr>
<td>Dr. Abraham</td>
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<td>Lab Coordinator</td>
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<td>Mr. Lance Goins</td>
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<td><a href="mailto:ldg123@ou.edu">ldg123@ou.edu</a></td>
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<td>325-4121</td>
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CHEMISTRY 1415
LABORATORY OUTLINE
Fall 2011

The following outline is a guideline for all sections of Chemistry 1415. Each teaching assistant may have some more specific instructions and requirements in certain areas. Please fill in the blanks that follow in order for you to have the correct information about your laboratory section. A directory of teaching assistants and other personnel will be posted on the bulletin board outside of CHBA 116 and on the course web site.

Laboratory Instructor _______________________________ Lab/Office Room # ___________

Section Code_________ Section #__________ Office Hours (PHSC 303)____________________

Office Phone (optional)________________________     Test Room ________________________

Materials to be purchased for laboratory:


(3) Approved safety goggles.

Laboratory Experiments:

Check-in
K-3 Bromination of Acetone
I-5 Iron(III) Nitrate & Potassium Thiocyanate
G-1 Acid & Base Classifications
I-3 Acetic Acid
G-2 Acid & Base Interactions
G-S Acid/Base Systems
D-2 Potassium Hydroxide & Hydrochloric Acid
D-S Heat Laws Systems
J-1 Oxidation-Reduction Reactions/Voltaic Cells
J-2 Electrolysis Reactions
J-S Electrochemical Systems
Make Up Lab
Check-out ($75 penalty if missed!)

Recitation Sections will continue to meet until the end of the semester.
Laboratory Grades
Your laboratory grade will depend on the laboratory reports, which you and your partner submit. Your laboratory instructor will grade these reports using specific criteria including:

1. Was the report submitted on time?
2. Did both students fully attend the laboratory session?
3. Does the work presented reflect the allotted time?
4. Is all the work of the lab exercise attempted?
5. Does the data reasonably reflect good laboratory technique?
6. Do the explanations and conclusions represent a good quantitative understanding of the laboratory exercise?
7. Are the conclusions logically related to the data collected by the students?
8. Was there visible contribution by both students in both collection and interpretation?

These criteria will be applied to the laboratory report as a whole rather than to individual sections of the report. With a few exceptions, laboratory reports are assigned between 0 and 15 points.

Laboratory Reports
In the laboratory you will work in pairs, except on certain exercises. The partnership is expected to complete and turn in one laboratory report for which the partners will receive the same grade. The following regulations will apply to this policy.

1. If one partner is absent or late, the laboratory instructor will assign the attending student to another partner. The laboratory instructor will reassign partnerships at his/her discretion or at a student request. Students are free to work alone if they so desire.
2. Both partners must be present for the whole period to be eligible to receive credit for a laboratory report. The partner who misses a laboratory is solely responsible for making up the activity and will not be allowed to use his/her partner’s data.
3. No more than two students may constitute a partnership except by permission of the instructor.
4. Students are encouraged to finish and submit laboratory reports during the period of the laboratory activity.
5. Students who are unable to submit laboratory reports at the end of the laboratory period should be prepared to submit a copy of their collected data to the instructor in charge before leaving.
6. Partners should submit reports and make conclusions based on their data collected by them, arrived at independently of other groups, and stated in their own words. Any evidence of falsifying data, or copying conclusions from other students (present or past) will be used in academic dishonesty proceedings against the students involved.
7. Both partners are expected to contribute to the collection and interpretation of data and to the writing of the laboratory report. Students who do not do their part may be assigned a new partner or be asked to do their laboratory work independently.

Reasonable Accommodation Policy
Any Student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact their lab instructor personally as soon as possible so they can discuss accommodations necessary to ensure full participation and facilitate their educational opportunities.

Safety
Your lab instructor will point out all the safety features of your lab during check-in. These include exits, fire extinguishers, safety showers, and eye washes. Other safety rules will be explained at that time.

The State of Oklahoma requires you to wear safety goggles in the laboratory at all times. Suitable goggles will be sold during the first two weeks of school in your lab. (Other outlets also sell goggles. Make sure they meet state safety standards for laboratory use before purchase.) Your TA will expect you to wear your goggles OVER YOUR EYES at all times. Repeated disregard to this safety rule is grounds for your dismissal from lab.
Part of safety is good laboratory technique and good housekeeping habits. Your laboratory instructor will teach you laboratory techniques related to the exercises you are performing during the semester. You should also read about the techniques described in the appendices of your laboratory manual. You are responsible for seeing that your laboratory station is kept clean and neat. Store books, backpacks, and personal items in the cubicles provided in the laboratory. Make sure gas jets and water taps are off when not used, and that waste is disposed of properly. Make sure that insoluble materials, paper, and broken glass are kept out of the sinks.

**Instructional Laboratory Safety Rules and Procedures**

In case of an accident, summon the laboratory instructor immediately. If you receive a chemical burn, immediately flush the burned area with cold water. Then ask another student to summon the instructor immediately. Safety showers are available in all labs.

1. Approved safety goggles are to be worn by everyone in the laboratory whenever anyone is working. This is a State Law.
2. All personal belongings (book bags, purses, coats) should be stored in cubbyholes.
3. Shoes that cover your entire foot are to be worn at all times in the laboratory. Sandals and shoes with holes in them (e.g. Crocs) are not allowed.
4. Smoking is forbidden in the laboratory.
5. Eating or drinking in the laboratory is forbidden.
6. Always obtain the instructor’s permission before carrying out any experiment, which is not in the laboratory manual.
7. Students may not work in laboratories unattended. If make-up work is to be done, it must be carried out under supervision.
8. Never pour water into concentrated acids. Always pour acid slowly into water while constantly stirring.
9. Never taste a chemical unless specifically instructed to do so. If you are instructed to smell a chemical, gently fan the vapors toward your face. Never smell a chemical by putting your nose over the container.
10. Never take chemical bottles to your desk. Instead, obtain the material from the bottle in a clean container (beaker, flask, or weighing boat or paper). Do not take more material than you think you will need.
11. Never return unused chemicals to the bottles. Always return chemical bottles to their proper place so others can use them.
12. Always clean off your desktop thoroughly at the end of the period. Make certain that all gas outlets and water faucets are turned off before you leave the laboratory.
13. Spilled chemicals, broken glassware, etc. should be cleaned up carefully and without delay.
14. The floor should be kept free of obstructions or slipping hazards (e.g., spilled ice, pencils, etc.).
15. Insoluble materials (paper, glass, compounds, etc.) falling into a sink or drain should be removed immediately.
16. Under all circumstances, appropriate chemical disposal should be followed. Ask the instructor for specific information.
17. Never fill a pipette by mouth suction.
18. Before removing a chemical from a bottle, read the label carefully.
19. Acts of carelessness or mischief are forbidden. Chemicals and equipment may be handled only in prescribed ways and for prescribed purposes. Such “playful” activities as pushing and shoving, wrestling, chasing, and threatening people with any chemical or piece of equipment are not tolerated.
20. Gloves, rubber aprons, or other protective clothing should be worn when appropriate.

Normal penalty for violation of these rules is prompt dismissal from the class with no privilege of making-up work.

From a University Telephone dial Campus Police (Emergency Calls) at 911. They will contact whatever service is needed, be it fire, ambulance, or poison control. There is a campus emergency phone on the third floor hallway in CHBA.
Check-in and Breakage Policy:

The first laboratory period is designated as check-in. At this time you will be issued a stocked equipment drawer. Check all the equipment in your drawer with the list provided by your TA. All missing, broken, or damaged items should be replaced by the stockroom at this time. When you visit the stockroom please take the time to make a list of needed items to avoid numerous trips. Any equipment that cannot be replaced will be listed as a “check-in shortage” on your record card. During the semester, any equipment that you break or damage will be recorded on the record card. You will be held financially responsible for all equipment issued to you. If this equipment is lost or damaged, the cost of replacement or repair will be BILLED TO YOU THROUGH THE BURSAR’S OFFICE as a “breakage fee.” Please note that this “breakage fee” is not the same as the “service charge” paid with other registration fees. The “service charge” is intended to partially cover the cost of chemicals and other consumable items used in the laboratory.

Keep your equipment drawer locked. You will ultimately be responsible for equipment if it is stolen from you.

Check-out of lab should occur when you withdraw from the course or during the final laboratory period. FAILURE TO CHECK-OUT WILL RESULT IN A PENALTY FEE OF $75.00 for cleaning and inspecting your equipment. This fee will be billed to you through the Bursar’s Office.

Attendance, Late Labs, Makeups

Lab periods are three hours long. Please utilize this time wisely: planning your experiments, collecting data, and writing reports. If you elect to leave lab early, your lab report will be due at that time.

Unless prior arrangements have been made with your TA, or unless a documented health or personal emergency occurs, lab reports not turned in at the designated time will be penalized points up to a week late. Reports more than one week late will not be accepted.

If you miss a lab period for a legitimate reason, see your TA as soon as possible. A make-up slip will be issued to you, which will admit you to another laboratory section in order to make up your work. The make-up slip MUST be signed by the admitting TA and MUST be turned in with your completed report at the earliest opportunity. Under normal circumstances, work should be made up during the week of the missed laboratory. Please be prepared to provide documentation for missing a laboratory period. A make up lab will be also be available at the end of the semester for those who for legitimate reasons could not do make up work in a timely manner during the semester. Students can only use this make up lab by making prior arrangement with their lab instructor.

Unfortunately, there is NO provision for making up laboratory work after the last scheduled laboratory experiment of the semester. This is true no matter what the reason.

Codes and Policies Behavior

Each student should acquaint her or his self with the University’s codes, policies and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap.

Cheating in any form will NOT be tolerated. This includes copying old lab reports, copying other students’ lab reports, and falsifying data. You and your partner are encouraged to discuss your answers and calculations with other students in the lab, or with your lab instructor. However, the report should be written in your own words and based on your own work.

If you are caught cheating, the least that will happen to you is that your grade in laboratory will be lowered. You may also be failed in the course and suspended or expelled from the University. The small gains you might acquire by cheating are not worth the penalties if you are caught.