WALTERS STATE COMMUNITY COLLEGE  
Course Syllabus

Course: CHEM 1121 – General Chemistry II Lab  
Semester: Fall 2014, Spring 2015, Summer 2015  
Instructors:  
Dr. Lawrence Kennard, Office NSCI 124, Phone 423-585-6878  
E-Mail: Lawrence.Kennard@ws.edu  
Dr. Matthew Smith, Office NSCI 119, Phone 423-585-6881  
E-Mail: Matthew.Smith@ws.edu  
Dr. Douglas Hensley, Office WSSC 203, Phone 865-774-5846  
E-Mail: Douglas.Hensley@ws.edu

Course Supervisor: Dr. Jeff T. Horner, Dean of Natural Science, Office NSCI 125  
Contact: Phone: 423-585-6954, E-Mail: Jeff.Horner@ws.edu  
Office Hours: Office hours are posted on instructor’s office door  
FAX: 423-318-2762  
Division Secretary: 423-585-6865

Required Textbook and Supplementary Materials:  
In-house manual provided on elearn.  
Additional Materials: Safety glasses (required); apron and rubber gloves, paper towels, towels, matches and "Sharpie" pen (recommended).

Catalog Course Description:  
Chemistry 1121 is a study of fundamental concepts and properties of selected elements and compounds utilizing laboratory experiments and exercises which correspond to lecture material in CHEM 1120. Laboratory periods are three hours. (Corequisite: CHEM 1120).

Course Outcomes:  
The course is designed around a common core of interactive laboratory activities that relate to and reinforce the student learning outcomes listed for the lecture course, CHEM-1120. Topic content for the core is shown below as learning outcomes which are also available on the Chemistry Home Page at http://library.ws.edu/mChemistry.

Common Core: (Laboratory activities to be selected from the following Learning Outcome topics):

1. Molecular Shapes & Bonding
2. Organic Chemistry & Aspirin
4. Chromatography & Intermolecular Forces
5. Solutions & Colligative Properties
6. Study of Nitrogen Chemistry
7. Study of Carbonates & Carbon dioxide
8. Chemical Kinetics
9. Chemical Equilibrium
10. pH, Acids/Bases & Buffer
11. Ka & Buffers
12. pH & Titration Curves
13. Oxidation/Reduction Reactions
14. Qualitative Analysis – Ca$^{2+}$, Ba$^{2+}$, K$^+$, NH$_4^+$ & Anions
15. Qualitative Analysis of Group IA
16. Analysis of Bleach

**General Education Course Designation:** Natural Science (1 semester hour)

**Instructional and Evaluation Methods:**
There will be a prelab lecture to discuss the laboratory activity, with an emphasis on safety and proper chemical recovery. The students will then do the experiment and submit a laboratory report before leaving the laboratory area.

In addition to the laboratory reports, there will be homework (assignments and/or quizzes) covering the experiments. Lastly, there will be a clean-up on the last day of lab along with a comprehensive lab final for fall and spring sections.

**Grading:**

**Fall and Spring:**
- Experiment Result  60%
- Homework or quizzes  20%
- Comprehensive Final  20%

**Summer:**
- Experiment Result  60%
- Homework or quizzes  40%

**Grade Scale:**
A  =  90-100
B  =  80- 89
C  =  70- 79
D = 60-69
F = 0-59

Attendance is essential to your success. You are required to attend each laboratory session in its entirety; failure to do so without an acceptable excuse will result in a zero for that laboratory. If you cannot attend your normal laboratory section you may avoid a penalty by arranging in advance to attend a different section that week; however, this requires the advance consent of both lab instructors. It is your responsibility to make sure your regular lab instructor is aware that you attended a different section.

Your instructor will discuss his/her specific laboratory make-up policy for an absence on the first day of class. In most cases the policy is only ONE make-up laboratory for an unexcused absence for the term. Other missed laboratory periods that are not accompanied with a documented excuse will result in a “0” for those laboratories. For unexcused absences the following will result:

a. one missing lab/quiz/assignment – maximum grade of “B” is possible for the course.
b. two missing lab/quizzes/assignments – maximum grade of “C” is possible for the course.
c. three or more missing labs/quizzes/assignments – fail the course.
d. failure to take the lab final will result in a failure of the course.

Course Ground Rules:

WSCC Catalog Notification Statement:
All students attending Walters State Community College, regardless of the time and location of the class, must abide by the rules and regulations outlined in the current Walters State Catalog/Student Handbook and the current Walters State Timetable of Classes. A copy of the Catalog/Handbook and the Timetable of Classes may be obtained from the admissions office on the main campus or at any of our off-campus sites. You may also access the Catalog/Handbook on-line at the following web address: http://www.ws.edu/catalog

Students should attend the first day of class or contact the instructor prior to the first class. Failure to do this may result in being dropped from the class.

Plagiarism, cheating, and other forms of academic dishonesty are prohibited.

Students with disabilities must register with Student Support Services in the Student Services Building, Room U134 (phone 423-585-6892) if they need any special facilities, services, or consideration.

Students in need of tutoring assistance are encouraged to contact the Office of Student Tutoring located in the Student Services Building, Room L107 at phone number 423-585-6920 or 423-798-7982 for the Greenville Campus, 865-286-2787 for the Sevierville Campus, 423-851-4762 for the Claiborne Campus.

Students receiving any type of financial aid or scholarship should contact the Financial Aid Office before making any changes to their schedule. Schedule changes without prior approval may result in loss of award for the current term and future terms.

Students who have not paid fees on time and/or are not correctly registered for this class and whose names do not appear on official class rolls generated by the Admissions and Records Office will not be allowed to remain in class or receive credit for this course.
Electronic devices must not disrupt the instructional process or college-sponsored academic activity. Use of electronic devices is prohibited unless use of the device is relevant to the activity and use is sanctioned by the faculty member in charge. Electronic devices that are not relevant to the activity or sanctioned by the faculty member in charge should be set so that they will not produce an audible sound during classroom instruction or other college-sponsored academic activity.

For information related to the cancellation of classes due to inclement weather, please check the college’s Web site at www.ws.edu or call the college’s student information line, 1-800-225-4770, option 1; InfoConnect, (423) 581-1233, option 1045; the Sevier County Campus, (865) 774-5900, option 7; or the Greeneville/Greene County Center for Higher Education, (423) 798-7940, option 4. Also, please monitor local TV and radio stations for weather-related announcements. For additional information on this policy see the college catalog.

In the event of a pandemic or other college declared critical event that impacts the college’s ability to proceed with academic course activities as planned, the college reserves the right to alter this course plan. In the event of a pandemic or other event, please refer to the college’s home web page, www.ws.edu or call InfoConnect, (423) 581-1233 for further information.

Regular class attendance is a student’s obligation. (See the Walters State Catalog/Student Handbook) If for some reason a student misses class, it is his or her responsibility to see the instructor regarding missed assignments and/or activities and to be prepared for the next class. Excessive absences may substantially lower the semester grade. The college requires the instructor to keep accurate records and to report when students are not attending class.

STAY AWAKE IN CLASS. Your mere presence in class is not sufficient—you must be able to actively process the information presented! Sleeping in class is disruptive in two ways: the student who is snoozing is not interested and not participating in the classroom discussion; secondly, sleeping in class is considered to be disrespectful to the teacher and other students. The penalty for sleeping in class may range from the student being requested to leave the class with a following conference with the instructor, to notification of the Vice-President of Academic Affairs (in the cases of habitual sleepers). If you have a medical condition that prevents you from staying awake in class, please discuss this with the instructor.

CLASSROOM COURTESY. Being in a college environment it is expected that classroom courtesy will be given to your instructor and classmates in limiting unnecessary talking and communication during class lecture or student presentation. An academic misconduct form will be completed and filed for those who have difficulty following this policy and disrupt class.

Safety:
1. There will be NO food, drink or tobacco products in the laboratory.
2. NO opened-toe shoes can be worn during lab. You will not be allowed to stay in the laboratory if the lab exercise uses any sort of glassware or chemicals.
3. NO purses, bags or coats on top of the student tables.
4. NO visitors in the laboratory without prior approval of the instructor.

Your Right to Know:
Tennessee Law requires that you are provided notice that some of the laboratory exercises involve contact with chemicals which have been identified with potential health hazards. These chemicals include, but are not limited to: acetone, chloroform, formalin, acids and bases. While every effort has been made to make the materials as safe as possible these chemicals are toxic
and you must be responsible for their safe handling. If you feel you may be at a higher risk then normal, if pregnant for example, we recommend you consult your physician.

**ATTENTION:** The Natural Science faculty members are concerned with proper academic advising of students in **ALL** Pre-Professional programs. It is our explicit desire to help you with any advising problems you may encounter.

The last day to drop a course or withdraw from the college-full term for Fall 2014 term is November 5, 2014.

The last day to drop a course or withdraw from the college-full term for Spring 2015 term is April 2, 2015.

Attachment “A”

A. **Molecular Shapes & Bonding**
   Content:
   - Lewis structures
   - VSEPR
   Learning Outcomes:
   Students should be able to:
   1. derive correct Lewis structures.
   2. derive observed shapes.
   3. determine bond angles.
   4. determine molecular polarity.

B. **Organic Chemistry & Aspirin**
   Content:
   - Nomenclature of simple organic compounds.
   - Common organic functional groups
   - Reaction stoichiometry
   Learning Outcomes:
   Students should be able to:
   1. name simple organic compounds.
   2. recognize & name common organic functional groups.
   3. calculate amounts in a limiting reagent stoichiometry problem.
   4. synthesize a sample of aspirin.

C. **Chromatography & Intermolecular Forces**
   Content:
   - Compound separation by chromatography & R_f
   - Effects of intermolecular forces on evaporation
   - Strength of hydrogen bonding
   - Heat of hydration
   Learning Outcomes:
   Students should be able to:
1. explain the differences in observed evaporation rates.
2. explain the unique properties associated with water.
3. explain the endothermic or exothermic nature of compounds upon hydration.
4. perform a paper chromatography separation and calculate $R_f$.

D. **Solutions & Colligative Properties**

Content:
- Concentration units & interconverting units
- Freezing point depression

Learning Outcomes:
Students should be able to:
1. determine standard concentration units for a solution.
2. interconvert a given concentration unit into the other standard concentration units.
3. plot a cooling curve from collected data.
4. calculate the molar mass of an unknown using Freezing Point Depression data.

E. **Study of Nitrogen Chemistry**

Content:
- Nitrogen compounds & chemical reactions
- Collecting a gas
- Acidity & basicity

Learning Outcomes:
Student should be able to:
1. balance chemical reactions.
2. predict common chemical reactions.
3. collect a gas over water.
4. test a gas for acidity or basicity using litmus paper.

F. **Study of Carbonates & Carbon dioxide**

Content:
- Carbonates reacting with acids
- Properties of carbon dioxide
- Predict & balance chemical reactions
- Collecting a gas
- Acidity & basicity

Learning Outcomes:
Student should be able to:
1. balance carbon dioxide chemical reactions.
2. predict carbon dioxide chemical reactions.
3. describe the physical & chemical properties of carbon dioxide.
4. collect a gas over water.
5. test an aqueous mixture of a gas for acidity with a pH meter.
G. Chemical Kinetics
Content:
- Rate data
- Rate law
- Rate constant
- Graphing & slope

Learning Outcomes:
Students should be able to:
1. describe how to collect rate data.
2. determine the rate law from rate data.
3. determine the rate constant from the rate law.
4. determine the reaction order from the rate law.
5. determine the rate from the slope of a concentration versus time graph.
6. describe how temperature affects the rate constant and reaction rates.

H. Chemical Equilibrium - Qualitative
Content:
- LeChatelier’s principle

Learning Outcomes:
Students should be able to:
1. apply LeChatelier’s principle to explain equilibrium shifts.
2. add two reactions together as simultaneous equilibria.

I. Chemical Equilibrium – Quantitative
Content:
- Spectrophotometer
- Beer’s law
- Equilibrium constant

Learning Outcomes:
Students should be able to:
1. collect absorbance data from a spectrophotometer
2. calculate dilution concentrations.
3. determine concentrations from Beer’s law.
4. apply reaction stoichiometry to calculate equilibrium concentrations.
5. determine the value of Kc from equilibrium concentrations.

J. pH, Acids/Bases & Buffer
Content:
- pH meter
- Ka & Kb
- Hydrolysis
- Buffer

Learning Outcomes:
Students should be able to:
1. use a pH meter.
2. calculate pH & pOH.
3. calculate the pH from salt hydrolysis.
4. calculate pH of a buffer.

K. Ksp & Kf
Content:
- Law of mass action
- Ksp equilibrium & expression
- Kf equilibrium & expression
- Kc from Ksp & Kf
- Molar solubility

Learning Outcomes:
Students should be able to:
1. write the Kf reaction and expression.
2. write the Ksp reaction and expression.
3. calculate from Kc from Kf & Ksp.
4. calculate molar solubility.

L. pH & Titration Curves
Content:
- pH meter
- Titration of strong acid with strong base
- Titration of weak acid with strong base
- pH titration curve

Learning Outcomes:
Students should be able to:
1. use pH meter to collect pH data.
2. titrate an acid with a base.
3. plot a pH titration curve of pH versus mL base.
4. explain the characteristics of a titration curve.

M. Oxidation/Reduction Reactions
Content:
- Oxidation/reduction half-reactions
- Balancing oxidation/reduction reactions
- Oxidizing & reducing agents

Learning Outcomes:
Students should be able to:
1. identify oxidation & reduction half-reactions.
2. balance oxidation/reduction reactions.
3. identify oxidizing & reducing agents.

N. Analysis of Bleach:
Content:
- Oxidation/Reduction titration
- Stoichiometry

Learning Outcomes:
Students should be able to:
1. balance oxidation/reduction reaction.
2. perform a titration analysis.
3. use stoichiometry to calculate the %concentration

O. **Qualitative Analysis:**
Content:
   Identify composition of an unknown
Learning Outcomes:
Students should be able to:
1. perform various chemical tests to identify the cation of an unknown.
2. perform various chemical tests to identify the anion of an unknown.
3. write the chemical formula of the unknown.