Course: CHEM 1111 - General Chemistry I Laboratory  
Semester: 2012 – 2013  
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Dr. Douglas Hensley, Office WSSC 201, Phone 865-774-5846  
E-Mail: Douglas.Hensley@ws.edu

Course Supervisor: Dr. Jeff T. Horner, Dean of Natural Science, Office NSCI 126,  
Contact: Phone: 423-585-6954, E-Mail: Jeff.Horner@ws.edu  
Office Hours: Office Hours are posted on the instructors’ doors  
FAX: 423-318-2762  
Secretary: 423-585-6865 (Sherry Woody)

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

Catalog Course Description:  
A study of fundamental concepts and properties of selected elements and compounds with laboratory experiments and exercises which correspond to lecture material in CHEM 1110. Laboratory periods are three hours. (Corequisite: CHEM 1110) - 1 Credit.

Course Outcomes:  
The course syllabus is built around a common core. The subject content for the core is shown as learning outcomes which are available on e-learn and on the Chemistry Home Page at http://library.ws.edu/mChemistry.

Common Core: (Laboratory Experiments selected from):  

1. Introduction to Chemistry Laboratory: Safety, Check-In, Basic Laboratory Procedures and Techniques
2. Density
3. Chemical Changes and Chemical Formulas
4. Synthesis of Copper Compounds
5. Formula of a Hydrate
6. Naming Inorganic Compounds
7. Percentage Composition of a Compound
8. Percentage of Potassium Chlorate in a Mixture
General Education Course Designation: Natural Science (1 semester hour)

Instructional and Evaluation Methods:
There will be a lab lecture to go over the experiment, with an emphasis paid on safety and proper waste disposal. The students will then conduct an experiment and receive a grade based on technique and experimental results turned in on the data sheet.

There will be Assignments (homework/quizzes) covering three or four experiments. The assignments will focus on activities and results obtained from the laboratory exercises and assess the achievement of the learning outcomes prescribed for this course. There will be a comprehensive final exam and clean-up on the last lab day.

Your attendance is essential to your success. You are required to attend each laboratory session in its entirety; each failure to do so without an acceptable excuse will result in a zero for that lab. If you cannot attend your normal laboratory section you may avoid the 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.

Grading:

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<tr>
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<th>Percentage</th>
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<tr>
<td>Experiment Result</td>
<td>60%</td>
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<tr>
<td>Homework or quizzes</td>
<td>20%</td>
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<tr>
<td>Comprehensive Final</td>
<td>20%</td>
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Grade Scale:

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<th>Grade</th>
<th>Range</th>
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<tr>
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<td>B</td>
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<td>C</td>
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<td>D</td>
<td>60-69</td>
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<td>F</td>
<td>0-59</td>
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Course Ground Rules:

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 (CCEN), Room 262
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 Greeneville Campus, 865-908-5494 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.

Cellular phone use during classroom interaction is prohibited. Cellular phones must be turned to the non-audible mode until after class, at which time calls can be received or checked. (See the Walters State Catalog/Handbook)

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) 774-5800, 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.

Students are required to supply a #2 pencil for each lecture exam.

The wearing of hats and caps in class is not allowed! Students will be asked to remove their hats and caps.

**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.
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 than normal, if pregnant for example, we recommend you consult your physician.

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](http://www.ws.edu/catalog).

Alternative Teaching Plan
In the event of a pandemic or other college declared critical event, the lead faculty member for this course will use eLearn to communicate with the students. If the lead faculty member is affected by this event, another member from the teaching team will assume instruction for the course. The course will continue utilizing an online format of instruction and testing.

**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.
A. Basic Laboratory Procedures and Techniques  
Content:  
Lab Safety Rules  
Significant Digits  
Measurements  
Gas Burners  
Learning Outcomes:  
Students should be able to:  
1. understand the importance of standard laboratory safety.  
2. follow standard laboratory safety guidelines.  
3. record a measurement to the correct number of significant digits.  
4. use proper technique for measuring length, volume, and mass.  
5. use a balance.  
6. identify the parts of a Bunsen burner.  
7. perform proper flame adjustment.  

B. Density  
Content:  
Density determinations  
Learning Outcomes:  
Students should be able to:  
1. determine the density of various materials.  
2. determine the importance of density to characterize materials.  
3. determine the density of materials by water displacement method.  
4. determine the density of materials by geometrical formulas.  
5. apply the concept of %error in evaluating their results.  

C. Chemical Changes & Chemical Formulas  
Content:  
Chemical Changes  
Determination of a Chemical Reaction  
Ionic Chemical Formulas  
Learning Outcomes:  
Students should be able to:  
1. recognize key indicators of a chemical reaction by various observations.  
2. become familiar with handling chemical reagents in the laboratory.  
3. write chemical formulas.  

D. Synthesis of Copper Compounds  
Content:  
Chemical Changes  
Introduction to Different Chemical Reactions  
Recycleability of Chemical Reactions  
Learning Outcomes:  
Students should be able to:  
1. demonstrate proper filtration methods.  
2. record qualitative observations about a chemical reaction.  
3. apply stoichiometric principles to a chemical reaction.
E. **Formula of a Hydrate**

Content:
- Properties of a Hydrate
- Heating to Constant Weight
- Gravimetric Analysis

Learning Outcomes:
Students should be able to:
1. know the formation of and importance of hydrates.
2. determine the percentage of water in an unknown hydrate of a salt.
3. employ the process of heating to constant weight to determine the completeness of the decomposition.

F. **Naming Inorganic Compounds**

Content:
- Inorganic Nomenclature

Learning Outcomes:
Students should be able to:
1. name inorganic ionic compounds.
2. name inorganic covalent compounds.
3. name inorganic acid compounds.

G. **Percent Composition of a Compound; Relative Atomic Weights**

Content:
- Percent Composition
- Relative Atomic Weights

Learning Outcomes:
Students should be able to:
1. calculate the percent composition of a compound based on atomic weights.
2. calculate the mass of oxygen needed for the synthesis of a given amount of magnesium oxide from a given amount of magnesium by the Law of Conservation of Mass.
3. perform a stoichiometric calculation from a chemical equation.
4. convert a metal oxide into a metal hydroxide by the addition of water to the oxide.

H. **Percentage of Potassium Chlorate in a Mixture**

Content:
- Decomposition Reaction
- Stoichiometric Calculation
- Gravimetric analysis

Learning Outcomes:
Students should be able to:
1. know the fundamentals of a decomposition reaction
2. write a balanced equation for the decomposition of potassium chlorate.
3. perform a mass to mass stoichiometric calculation.
4. determine the percent of potassium chlorate in a mixture of NaCl.

I. **Electrolytes: Acids, Bases, and Salts**

Content:
- Electrolytes
- Acids
- Bases
- Salts
Learning Outcomes:
Students should be able to:
1. recognize potential electrolyte solutions
2. describe the strength of an electrolyte using electrical conductivity.
3. predict the effect of electrolyte concentration on solution conductance.
4. describe acids in terms of Arrhenius, Bronsted/Lowry, and Lewis acids.
5. describe bases in terms of Arrhenius, Bronsted/Lowry, and Lewis acids.

J. Molarity, Standard Solutions and Titrations
Content:
Molarity
Normality
Acid/Base Titration
Volumetric Analysis
Learning Outcomes:
Students should be able to:
1. calculate the molarity of a solution given mass of solute and solution volume.
2. calculate the normality of a solution
3. standardize a sodium hydroxide solution.
4. use a standardized base and perform an acid/base titration to determine the percent acetic acid in an unknown sample.

K. Avogadro’s Number
Content:
Significance of Avogadro’s number.
Estimating a Molecular Area
Learning Outcomes:
Students should be able to:
1. relate a lab bench experiment to the nanometer scale of molecules.
2. relate a ball/stick molecular model to a macroscopic observation.
3. use metric conversions.
4. use molar mass and surface area to estimate Avogadro’s number.

L. Molar Gas Volume
Content:
Molar Gas Volume
Ideal Gas Constant
Learning Outcomes:
Students should be able to:
1. calculate the percentage by weight of oxygen in potassium chlorate.
2. predict the density of oxygen gas.
3. determine the volume of 1 mole of any gas at STP.
4. calculate the ideal gas constant, R.

M. Chromatography
Content:
Mixture
Paper Chromatography
Retardation Factor
Thin-Layer Chromatography
Learning Outcomes:
Students should be able to:
1. know the importance of chromatography.
2. define the stationary and moving phases.
3. describe the concept of “partitioned”.
4. perform a paper chromatography experiment.
5. calculate retardation factor by measuring the both distance the compound and solvent travel along the stationary phase.
   explain the process of TLC

N. **Heat of Neutralization**
Content:
Calorimeter
Law of Conservation of Energy
ΔH of Reaction

Learning Outcomes:
Students should be able to:
1. understand the fundamental principles of a calorimeter.
2. apply the Law of Conservation of Energy in calculating heat transfer.
3. determine the ΔH (kJ/mole) value for heat of neutralization reaction.
4. apply graphical methods to determine experiment parameters.