Course: CHEM 1111 - General Chemistry I Laboratory
Semester: Fall 2014, Spring 2015, Summer 2015
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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 the instructors’ doors
FAX: 423-318-2762
Division Secretary: 423-585-6865

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

Catalog Course Description:
Chemistry 1111 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 1110. Laboratory periods are three hours. (Pre-requisite: Students must have completed or tested above Math 1030. Corequisite: CHEM 1110)

Student Learning 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-1110. 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  Introduction to Chemistry Laboratory: Safety, Check-In, Basic Laboratory Procedures and Techniques
2  Density
3  Chemical Changes and Reaction Classification
4  Synthesis of Copper Compounds
5  Formula of a Hydrate
6  Naming and Formulas of Inorganic Compounds
General Education Course Designation: Natural Science (1 semester hour)

Instructional and Evaluation Methods:
There will be a pre-lab lecture to go over the experiment, with an emphasis on safety, proper technique, 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.

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:

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<tr>
<th>Fall and Spring:</th>
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<tbody>
<tr>
<td>Experiment Result</td>
<td>60%</td>
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<td>Homework or quizzes</td>
<td>20%</td>
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<tr>
<td>Comprehensive Final</td>
<td>20%</td>
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<tr>
<th>Summer:</th>
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<tbody>
<tr>
<td>Experiment Result</td>
<td>60%</td>
</tr>
<tr>
<td>Homework or quizzes</td>
<td>40%</td>
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</tbody>
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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/quiz/assignments – maximum grade of “C” is possible for the course.

c. three or more missing labs/quiz/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](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 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.

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 any 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) 774-5800, 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.
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 & bases in terms of Arrhenius definition.

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. Beer’s Law
Content:
- Molarity
- Dilutions
- Graphing
- Calibration curve interpretation

Learning Outcomes:
Students should be able to:
1. Use a stock molarity solution and prepare diluted solutions of known molarity.
2. Obtain absorbance data from a spectrophotometer.
3. Plot a Beer’s law graph.
4. Use a calibration curve to find the concentration of an unknown.

L. 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.

M. Molar Gas Volume
Content:
- Molar Gas Volume
- Ideal Gas Constant
- Boyles Law

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.

N. Specific Heat & ΔH of Reaction
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 a reaction.