Welcome:
Welcome to Introductory Chemistry. I hope that you will enjoy this semester of chemistry 1405 and will carry that enjoyment of chemistry beyond the end of this class. This syllabus contains the course policies, useful information to help you get acquainted with the course procedures, and expectations for this chemistry course. Please peruse these pages, as they represent an agreement between us, me, your instructor, and you, the student.

Instructor:
Paul Clemens
Office Hours: by appointment
Phone: 713.492.8310
E-mail: paul.clemens@hccs.edu
Learning Web: http://learning.hccs.edu/faculty/paul.clemens

Time and location (CRN 46152)
Missouri City Campus
Lecture 11:00 am – 2:00 pm; T, Room 213
Lab 11:00 am – 2:00 pm; Th, Room 217

Textbook
Introductory Chemistry: Concepts and Critical Thinking, by Charles H. Corwin

Laboratory Manual
Supplied online at: http://learning.hccs.edu/faculty/paul.clemens/chem35306/lab-experiments. Please print and bring to lab.

Scientific Calculator
You will need an inexpensive scientific calculator. Be aware that programmable and internet accessible calculators are not allowed for the exams.

Course Catalog Description: CHEM 1405 Introductory Chemistry
Prerequisites: MATH 0312
Credit: 4 (3 lecture, 3 lab)

Course Description: ACGM or WECM
A general introduction to the field of chemistry, with an emphasis on the impact of chemistry in our everyday lives and our environment. Laboratory experiments are designed for hand-on chemistry activities with real life applications. Core curriculum course.

THIS COURSE WILL REQUIRE A CONSIDERABLE TIME INVESTMENT BY YOU - - - PLEASE BE PREPARED!

Plan on dedicating around 20-25 hours per week studying for this course (and probably a little bit more initially while you are becoming familiar with the course materials) This works out to around 4-5 hours every five to six days out of a 7 day week. You will need to structure your life where you can dedicate this time to the class. Use TIME MANAGEMENT TOOLS such as a scheduler / planner to ORGANIZE YOUR TIME! THIS IS THE MOST IMPORTANT SECRET TO YOUR SUCCESS IN THIS COURSE. You will get out of the class what you put into in……it is all up to you!
### Academic Discipline Program Learning Outcomes

1. To appreciate that chemistry is an interesting and relevant subject. Describe the modern practices of chemistry.
2. Understand the importance of instrumental measurements. Express measurements in metric and English units to gain a practical awareness of metric sizes.
3. Classification of matter, elements in the periodic table and properties of a substance as chemical or physical.
4. Describe models of atoms proposed by different scientists. Calculate atomic mass of an element. Explain the relationship between energy levels in an atom and lines in an emission spectrum.
5. State the original periodic law and the modern periodic law. Predict the physical properties of an element and chemical formula of a compound given the information in the periodic table.
6. Write balanced chemical equations and distinguish different types of chemical reactions.
7. To relate the moles of a substance to the number of particles. Calculate the molar mass, molar volume, chemical formula and percent composition of a compound.
8. To interpret the coefficients in a balanced equation as a mole ratio. Perform mass-mass, volume-volume and mass-volume stoichiometry calculations.
9. Learn properties of gases, variables affecting gas pressure and calculate pressure, volume or temperature of a gas after a change in conditions.
10. Explain how valence electrons create a chemical bond. Formation of different types of chemical bonds. Draw electron dot and structural formula of a molecule. Determine shape of a molecule considering the repulsive force of valence electrons.

### Course Student Learning Outcomes (SLO)

1. To appreciate that chemistry is an interesting and relevant subject. Describe the modern practices of chemistry.
2. Understand the importance of instrumental measurements. Express measurements in metric and English units to gain a practical awareness of metric sizes.
3. Classification of matter, elements in the periodic table and properties of a substance as chemical or physical.
4. Describe models of atoms proposed by different scientists. Calculate atomic mass of an element. Explain the relationship between energy levels in an atom and lines in an emission spectrum.
5. State the original periodic law and the modern periodic law. Predict the physical properties of an element and chemical formula of a compound given the information in the periodic table.
6. Write balanced chemical equations and distinguish different types of chemical reactions.
7. To relate the moles of a substance to the number of particles. Calculate the molar mass, molar volume, chemical formula and percent composition of a compound.
8. To interpret the coefficients in a balanced equation as a mole ratio. Perform mass-mass, volume-volume and mass-volume stoichiometry calculations.
9. Learn properties of gases, variables affecting gas pressure and calculate pressure, volume or temperature of a gas after a change in conditions.
10. Explain how valence electrons create a chemical bond. Formation of different types of chemical bonds. Draw electron dot and structural formula of a molecule. Determine shape of a molecule considering the repulsive force of valence electrons.
1.1 To describe the early practice of chemistry.
1.2 To describe the modern practice of chemistry
1.3 To appreciate that chemistry is an interesting and relevant subject.

2.1 To identify typical instruments in a chemistry laboratory and explain why an instrumental measurement is never exact.
2.2 To identify the number of significant digits in a given measurement.
2.3 To round off a given value to a stated number of significant digits.
2.4 To explain the concept of exponents and specifically powers of 10.
2.5 To describe the three steps in the unit analysis method and apply this method of problem solving.
2.6 To explain the concept of percent and apply percent as a unit factor.

3.1 To list the basic units and symbols of the metric system.
3.2 To express a given metric measurement with a different metric prefix
3.3 To describe the technique of determining the volume by displacement.
3.4 To explain the concept of density and perform calculations that relate density to mass and volume
3.5 To state the values for the freezing point and boiling point of water on the Fahrenheit, Celsius and Kelvin scales

4.1 To describe the motion of particles in the solid, liquid, and gaseous states of matter
4.2 To classify a sample of matter as an element, compound, or mixture.
4.3 To distinguish between the properties of metals and nonmetals
4.4 To explain the law of definite composition of a compound.
4.5 To classify a property of a substance as physical or chemical.
4.6 To apply the conservation of mass law to chemical changes.
4.7 To distinguish between potential and kinetic energy.
4.8 To apply the Conservation Of Energy Law to physical and chemical changes.

5.1 To describe the Dalton, Rutherford, and Thompson’s models of the atom.
5.2 To explain the concept of relative atomic mass.
5.3 To explain the way nature of light and state the relationship of wavelength, frequency, and energy of light.
5.4 To explain the quantum concept applied to matter and energy.
5.5 To describe the Bohr model of the atom and explain the relationship between energy levels in an atom and lines in an emission spectrum.
5.6 To write the predicted electron configurations for selected elements.
5.7 To describe the quantum mechanical model of the atom and compare the relative sizes and shapes of “s” and “p” orbitals.

6.1 To state the original Periodic Law proposed by Mendeleev and modern Periodic Law proposed by Mosley.
6.2 To classify the elements according to their groups and periods in the periodic table.
6.3 To describe the trend in atomic size and metallic character within a group or period of elements.
6.4 To predict a physical property for an element given the value of other elements in the same group
6.5 To predict the number of valence electrons for any representative element
6.6 To draw the electron dot formula for any representative element.
7.1 To classify a compound as a binary ionic, ternary ionic, or a binary molecular compound.
7.2 Write chemical formulas for compounds composed of monoatomic ions and polyatomic ions
7.3 To write names and formulas in binary and ternary oxyacids.

8.1 To state observation that are evidence for a chemical reaction.
8.2 To write balanced chemical equations.
8.3 To distinguish five types of chemical reactions
8.4 To write a balanced chemical equation for the reaction of an acid and a base.
9.1 To state the value of Avogadro’s number
9.2 To relate the moles of the substance to the number of particles
9.3 To relate the mass of the substance to the number of particles.
9.4 To state the value for the molar volume of any gas at STP.
10.1 To relate the coefficients in a balanced chemical equation to:
10.2 To relate the number of moles of two substances in a balanced chemical equation
11.1 To list properties of a gas
11.2 To state standard atmospheric pressure in different units
11.3 To identify variables that affect the pressure of a gas
11.4 To state whether gas pressure increases or decreases for a given change in volume, temperature, or the number of moles of gas
11.5 To explain the concept of vapor pressure
12.1 To explain how valence electrons create a chemical bond and formation of different types of chemical bonds
12.2 To draw the electron dot formula for a molecule
12.3 To determine the shape of a molecule by applying VSEPR Theory

SCANS and/or Core Curriculum Competencies
Reading, Writing, Speaking/Listening, Critical Thinking, Computer/Information Literacy
Methods of Instruction - The method of instruction will include, but is not necessarily limited to: directed and independent readings, homework, discussions, and laboratory exercises.

Grading –

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Quiz / Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Laboratory Exercises</td>
<td>20%</td>
</tr>
<tr>
<td>Exam I</td>
<td>15%</td>
</tr>
<tr>
<td>Exam II</td>
<td>15%</td>
</tr>
<tr>
<td>Exam III</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The following grade distribution scale will determine your course grade:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100 %</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89 %</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79 %</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69 %</td>
</tr>
<tr>
<td>F</td>
<td>59 % AND BELOW</td>
</tr>
</tbody>
</table>

The student is encouraged to keep track of their daily grade!

Classroom Environment

Students will respect the classroom environment. Students will not intentionally obstruct, disrupt or interfere with the teaching and learning that occurs in the classroom. Students will not engage in any activity that demeans any student, instructor, or administrator. Such activities include, but are not limited to, oral and written communication that is ethnically derogatory, sexist, or racist in nature; unwanted sexual advances or intimidation; profane communication in any manner.

- **Please turn off cell phones and computers during class.**
  Failure to comply may result in removal from class.

- **Sleeping (including resting head on desk or labtop) is not allowed. You are free to stand at any point during the class.** Failure to comply may result in removal from class.

Schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, Jan 20, Lecture</td>
<td>Introduction, Syllabus Review, Learning Web Introduction, Lab Safety Video</td>
</tr>
<tr>
<td>Thursday, Jan 22, Lab</td>
<td>Chapter 1 – Introduction to Chemistry (*First ½ Chapter 1 – HCC Text)</td>
</tr>
<tr>
<td>Tuesday, Jan 27, Lecture</td>
<td>Chapter 2 – Scientific Measurements (*Second ½ Chapter 2 – HCC Text)</td>
</tr>
<tr>
<td>Thursday, Jan 29, Lab</td>
<td>Experiment 01 - Measurements (prelab questions due before lab)</td>
</tr>
<tr>
<td>Tuesday, Feb 3, Lecture</td>
<td>Chapter 3 - The Metric System (*Chapter 2 – HCC Text)</td>
</tr>
<tr>
<td>Thursday, Feb 5, Lab</td>
<td>Experiment 02 – Separation of a mixture (prelab questions due before lab)</td>
</tr>
<tr>
<td>Tuesday, Feb 10, Lecture</td>
<td>Chapter 4 – Matter and Energy (*Chapter 3 – HCC Text)</td>
</tr>
<tr>
<td>Thursday, Feb 12, Lab</td>
<td>VCL - Density Lab</td>
</tr>
<tr>
<td></td>
<td>VCL - Fractional Crystallization</td>
</tr>
<tr>
<td></td>
<td>VCL - Specific Heat</td>
</tr>
<tr>
<td>Tuesday, Feb 17, Lecture</td>
<td>Exam I (Ch 1-4) (*Chapter 1-3 – HCC Text)</td>
</tr>
</tbody>
</table>
**Disability Support Services (DSS)**

"Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Services Office at the respective college at the beginning of each semester. Faculty is authorized to provide only the accommodations requested by the Disability Support Services Office."

For questions, contact Donna Price at 713-718-5165 or the Disability Counselor at each college. Also visit the ADA web site at: [http://www.hccs.edu/students/disability/index.htm](http://www.hccs.edu/students/disability/index.htm). If you have any special needs or disabilities which may affect your ability to succeed in college classes or participate in any college programs or activities, please contact the DSS office for assistance.

**Academic Honesty**

Students are responsible for conducting themselves with honor and integrity in fulfilling course requirements. Disciplinary proceedings may be initiated by the college system against a student accused of scholastic dishonesty. Penalties can include a grade of "0" or "F" on the particular assignment, failure in the course, academic probation, or even dismissal from the college. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion. In this class, the penalty for willful cheating on exams is a grade of F in the course. This is the standard policy of the Physical Sciences department at Southwest College.

**Laboratory Policy**

On the first day of lab a safety video will be shown (about 35 min long) and a safety "quiz" will be given and reviewed. Each student will then sign a statement affirming his or her commitment to following safe procedures in the laboratory, and turn the form in to the instructor. You should be especially aware of the need for adequate eye protection in the laboratory. **Protective glasses or goggles must be worn at all times during the laboratory period.** Any student not wearing protective glasses or goggles after the experiment has begun may be given a zero for that experiment!

**Exams and Make-up Policy**

Examinations will consist of three non-cumulative regular exams plus a comprehensive final. Make-up exams will not be given, so make every effort to take the exams on their scheduled dates. Remember that the final exam will be comprehensive (meaning that it will cover all of the material from the whole semester). Please note that all students are required to take the final exam.
Email Procedures
I check my email frequently and strive for a less than 48-hour response time to your messages, but please be patient. In order to manage the great many emails I receive from students, I am asking that you include the following information in each email:
1. Identify the course number and course title.
2. Identify yourself stating your full name as you registered for this course.
3. Identify the assignment and date due or the subject of your message/question.

Attendance Policy
Students are expected to attend classes regularly. Students are responsible for materials covered during their absences, and it is the student's responsibility to consult with instructors for missed assignments. Class attendance is checked daily by instructors. Although it is the responsibility of the student to drop a course for nonattendance, the instructor has full authority to drop a student for excessive absences. A student may be dropped from a course for excessive absences after the student has accumulated absences in excess of 12.5% of the hours of instruction (including lecture and laboratory time).” If circumstances significantly prevent you from attending classes, please inform me. I realize that sometimes outside circumstances can interfere with school, and I will try to be as accommodating as possible, but please be aware of the attendance policy.

Assignment Policy
Students are responsible for all information covered in the course. It is your responsibility to complete and submit all assignments and tests by their respective due dates. No late work will be accepted. No deadline extensions will be granted. No modifications will be made to the course schedule.

Class Quiz/Attendance (5%)
At the beginning of every lecture there may be a pre-lecture quiz on the assigned reading. The quiz will also account for your attendance. This assignment will be complete and graded during the beginning of each lecture. Notes are allowed for the quiz.

Homework Sets (10%)
After reading the chapter you need to work the homework sets. This assignment should be completed before start of next lecture. The exams will be modeled directly from the homework assignments, thus it is in your best interest to completely understand these problem sets.

Laboratory Exercises (20%)
Each assignment should be clearly titled and the answers to each exercise complete. Before you leave the lab, be sure to show me your report so I can review and initial it. Each student should arrive at the lab on time, with his or her lab manual. Laboratory reports are due one week after the experiment. Each report must be done individually, but of course you can work with your lab partners on it. Each report will be graded on a 10-point basis. Come to lab prepared. Read through the experiment beforehand, and answer the pre-lab questions in the lab manual.

Unit Exams (45%)
The student is expected to understand the assigned materials before the test is administered. The tests have a 2-hour time limit. Exams I, II, and III will consist of 25 multiple choice questions. Students may use calculators for the exams. CELLULAR PHONES, PROGRAMMABLE/INTERNET ACCESSIBLE CALCULATORS, AND COMPUTERS ARE NOT ALLOWED. Students need to bring a scantron to the exams.

Final Exam (20%)
The student is expected to understand the assigned materials before the test is administered. The final exam has a 2-hour time limit. The comprehensive final exam will consist of multiple choice and short answer questions. Students may use calculators for the exams. CELLULAR PHONES, PROGRAMMABLE/INTERNET ACCESSIBLE CALCULATORS, AND COMPUTERS ARE NOT ALLOWED. Students need to bring a scantron to the exams.

Extra Credit
Extra credit opportunities may be offered throughout the semester, at the sole discretion of the professor. EXTRA CREDIT IS NOT GUARANTEED.

Disclaimer
To accommodate emergent circumstances, the instructor reserves the right to make reasonable changes in the syllabus while the course is in progress. Any question of interpretation of course requirements or of understandings between a student and the instructor will be at the discretion of the instructor and/or the Chair of the Science Department.

Homework Problems Chapter 1-12
(Note, from Corwin 6th edition – not HCC Custom text)

CH 1 HW: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19
CH 2 HW: 1, 5, 7, 11, 15, 19, 21, 23, 25, 27, 29, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 65, 67, 69, 73, 85, 89, 93
CH 3 HW: 1, 3, 5, 9, 17, 19, 23, 25, 27, 29, 31, 35, 37, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 67, 69, 75, 83, 85, 87
CH 6 HW: 9, 11, 15, 17, 21, 29, 35, 41, 43, 45, 47, 49, 51, 53, 55, 57, 65, 67, 71, 73, 75, 87
CH 7 HW: 5, 7, 9, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 65, 67, 71, 73, 75
CH 8 HW: 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 69, 71, 73, 75, 77, 81, 87
CH 9 HW: 3, 7, 9, 11, 13, 15, 17, 21, 23, 29, 31, 33, 39, 41, 43, 45, 47, 49, 53, 59, 63, 71, 79
CH 10 HW: 3, 5, 7, 9, 11, 19, 21, 23, 25, 27, 29, 31, 37, 47, 49, 51, 53, 55, 59, 61, 63, 65, 67, 73, 75, 77, 83, 89
CH 11 HW: 5, 7, 9, 11, 17, 19, 23, 25, 29, 31, 33, 37, 41, 43, 45, 47, 57, 63, 65, 75, 79, 81
CH 12 HW: 1, 5, 11, 13, 15, 19, 23, 25, 33, 35, 37, 39, 41, 43, 45, 49, 55, 57, 63, 65, 71, 73, 75, 77, 81, 89, 91, 95, 99

VCL’S and In Class Exercises:

Density Lab
Fractional Crystallization Lab
Specific Heat Lab
Solubilities Within a Family
Relative Reactivities of Metals
Gas Compression Lab
Charles Law

Course Syllabus and Materials @ HCC Central Learning Web:

- Chem 1405 – INTRODUCTORY CHEMISTRY I Spring 2015 Syllabus
- Lecture Slides
- Virtual Chemistry Labs
- Unit Analysis Document
- Lab Safety Video
- Lab Experiments