Angelina College
Science and Mathematics
Chemistry 1411: General Chemistry I (Lecture and Laboratory)
General Syllabus

I. **Basic Course Information**

A. **Course Description**

1. Four hours credit.
2. Topics include: fundamental laws, states of matter, atomic structure, the periodic table, ionization, chemical bonding, stoichiometry, oxidation-reduction, the halogens, gas laws, liquids and solids.
3. Three lecture hours and three lab hours each week.
4. Prerequisite: Math 0320.
5. Lab fee.

B. **Intended Audience**

1. This course is designated for science majors or for students with a major, which requires a four-credit-hour chemistry course beyond introductory chemistry.
2. NOTE: Do not confuse this course with CHEM 1305, Introduction to Chemistry. Both are "freshman" chemistry courses. Verify with you advisor that this is the appropriate course for your degree plan.

C. **Instructor**

Name:	Dr. Kirk Stephenson
Office:	S-122
Office Hours:	as posted on BlackBoard
Phone:	(936) 633-3216
E-mail Address:	kstephenson@angelina.edu or via blackboard messages

II. **Intended Student Outcomes**

A. **Core Objectives Required for this Course**

1. **Critical Thinking**: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
2. **Communication**: to include effective development, interpretation and expression of ideas through written, oral and visual communication.
3. **Empirical and Quantitative Skills**: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
4. **Teamwork**: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

B. **Course Learning Outcomes for all Sections**

1. Define the fundamental properties of matter.
2. Classify matter, compounds, and chemical reactions.
3. Determine the basic nuclear and electronic structure of atoms.
4. Identify trends in chemical and physical properties of the elements using the Periodic Table.
5. Describe the bonding in and the shape of simple molecules and ions.
6. Solve stoichiometric equations.
7. Write chemical formulas.
8. Write and balance equations.
9. Use the rules of nomenclature to name chemical compounds.
10. Define the types and characteristics of chemical reactions.
11. Use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems.
12. Determine the role of energy in physical changes and chemical reactions.
13. Convert units of measure and demonstrate dimensional analysis skills.
14. Use basic apparatus and apply experimental methodologies used in the chemistry laboratory.
15. Demonstrate safe and proper handling of laboratory equipment and chemicals.
16. Conduct basic laboratory experiments with proper laboratory techniques.
17. Make careful and accurate experimental observations.
18. Relate physical observations and measurements to theoretical principles.
19. Interpret laboratory results and experimental data, and reach logical conclusions.
20. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.
21. Design fundamental experiments involving principles of chemistry.
22. Identify appropriate sources of information for conducting laboratory experiments involving principles of chemistry.

III. **Assessment Measures**

A. **Assessments for the Core Objectives**

1. **Critical thinking**: Students will complete a formal laboratory report that assesses inquiry, synthesis, analysis, and results. Evidence of critical analysis will be evaluated using a standardized AC rubric.
2. **Communication**: Students will complete a formal laboratory report that assesses organization, quality of informational sources, and written communication skills. Communication skills and abilities will be evaluated using a standardized AC rubric.
3. **Empirical and quantitative Skills**: Students will complete a formal laboratory report that assesses representation, calculation, interpretation, and application and analysis. Empirical and quantitative skills will be evaluated using a standardized AC rubric.
4. **Teamwork**: Students will complete a formal laboratory report that assesses effective communication with team members, team climate, contributions to a team, and responses to team members. Team members will evaluate the performance of one another. Teamwork will be evaluated using a standardized AC rubric.

B. **Assessments for Course Learning Outcomes**

1. Students will demonstrate their ability to identify and quantify fundamental properties of matter by answering directed lecture questions and/or exam questions.
2. Students will demonstrate their ability to identify matter with respect to the four major classifications; classify compounds according to bonding characteristics, and designate reactions as belonging to appropriate reaction types by answering directed lecture questions and/or exam questions.
3. Students will demonstrate their ability to determine the basic nuclear and electronic structure of atoms by working in-class exercises, and by answering directed lecture questions and/or exam questions.
4. In light of the periodic chart, students will identify trends in chemical and physical properties (e.g., electronegativity, atomic size) by answering directed lecture questions and/or exam questions.
5. Using the concept of Lewis Dot Structures, students will describe the bonding in, and the shapes of simple molecules and ions by working in-class exercises, and by answering directed lecture questions and/or exam questions.
6. Students will demonstrate their ability to solve stoichiometric problems ("chemical calculations") by answering directed lecture questions and/or exam questions.
7. Students will demonstrate their ability to write chemical formulas by answering directed lecture answering directed questions and/or exam questions.
8. Students will demonstrate their ability to write and balance chemical equations by responding to lecture prompts and/or answering exam questions.
9. Students will demonstrate their ability to use the rules of nomenclature by responding to lecture prompts and/or answering exam questions, which usually take the form of identifying correct or incorrect chemical names.
10. Students will demonstrate their ability to define the types and characteristics of chemical reactions by answering directed lecture questions and/or exam questions.
11. Students will demonstrate their ability to use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems by answering directed lecture questions and/or exam questions.
12. Students will demonstrate their ability to assess the role of energy in physical changes and chemical reactions by answering directed lecture questions and/or exam questions.
13. Students will demonstrate their ability to convert units of measure, and to apply the problem-solving technique of dimensional analysis, by answering directed lecture questions and/or exam questions.
14. Students will demonstrate their ability to use basic apparatus and apply experimental methodologies used in the chemistry laboratory by physically performing assigned activities; answering directed questions during lab; answering questions assigned prior to, and following, the lab.
15. Students will demonstrate their ability to demonstrate safe and proper handling of laboratory equipment and chemicals, by physically performing assigned activities; answering directed questions during lab; and completing a quiz on the subject.
16. Students will demonstrate their ability to conduct basic laboratory experiments with proper laboratory techniques by physically performing assigned activities; answering directed questions during lab; answering questions assigned prior to, and following, the lab.
17. Students will demonstrate their ability to make careful and accurate experimental observations by submitting data sheets for critique; physically performing assigned activities; answering directed questions during lab; answering questions assigned prior to, and following, the lab.
18. Students will demonstrate their ability to relate physical observations and measurements to theoretical principles by providing a report for the relevant experiments; answering directed questions during lab; answering questions assigned prior to, and following, the lab.
19. Students will demonstrate their ability to interpret laboratory results and experimental data, and reach logical conclusions by providing a report for the relevant experiments; answering directed questions during lab; answering questions assigned prior to, and following, the lab.

20. Students will demonstrate their ability to record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports by providing a report for the relevant experiments; and by responding to directed questions.
21. Students will demonstrate their ability to design fundamental experiments involving principles of chemistry by physically performing assigned activities; answering directed questions.
22. Students will demonstrate their ability to identify appropriate sources of information, for conducting laboratory experiments involving principles of chemistry, by providing a report for the relevant experiments, which require information other than that immediately provided in the written procedure.

IV. **Instructional Procedures**

A combination of in-class chemistry demonstrations, molecular models, laboratory demonstrations and supplemental information (both printed and digital) augment lecture presentations. Audio-visual materials and Internet resources are also employed.

V. **Course Requirements and Policies**

A. Required Textbooks and Recommended Readings, Materials and Equipment.
   1. Chemistry by OpenStax College (https://openstax.org/details/chemistry)
   2. Experiments in General Chemistry by Barrett and Stephenson, (Rhaeadr Publishing) 2nd Edition.
   3. Access to Blackboard (www.angelina.blackboard.com)
   4. Calculator capable of scientific notation
   5. For exams: (a) "Scantron" forms and (b) #2 pencil

B. **Course Policies** – This course conforms to the policies of Angelina College as stated in the Angelina College Handbook.
   1. **Academic Assistance** – If you have a disability (as cited in Section 504 of the Rehabilitation Act of 1973 or Title II of the Americans with Disabilities Act of 1990) that may affect your participation in this class, you may fill out the Educational Accommodations application within your AC Portal, under the "Student Services" tab. A Student Success team member will contact you once the application is received. At a post-secondary institution, you must self-identify as a person with a disability in order to receive services; for questions regarding the application process you can visit the Office of Student Success and Inclusion in the Student Center (205A); text 936.463.8078; or email access@angelina.edu. To report any complaints of discrimination related to a disability, you should contact Mr. Steve Hudman, Dean of Student Affairs, in Room 101 of the Student Center. You may also contact Dean Hudman by calling (936) 633-5292 or by emailing hudman@angelina.edu.
   2. **Attendance** – Attendance is required as per Angelina College Policy and will be recorded every day. Any student with three (3) consecutive absences of four (4) cumulative absences may be dropped from the class. Records will be turned in to the academic dean at the end of the semester. **Do not assume that non-attendance in class will always result in an instructor drop.** You must officially drop a class or risk receiving an F. This is official Angelina College Policy. The last day to drop the class with a "W" is November 5, 2018.
   3. **Additional Policies Established by the Instructor**
      a. Be prepared to begin class on time and do not prepare to leave before class is over.
      b. No eating or drinking is allowed in class.
      c. Cell phones should be turned off during class time.
      d. Children and other guests are not permitted in the classroom. Children are not allowed to wait in the hall unsupervised. See Student Services for child-care problems.
      e. Students are expected to participate in the instruction through courteous, relevant comments and questions during class. Behavior that interferes with the learning environment will not be tolerated. Conferences outside of class are available by appointment during the instructor's office hours.

VI. **Course Outline**

Description of the course activities including: due dates, schedules, and deadlines.

Class	Day	Date	Chapter	Description
1	M	27-Aug	1.1-1.3	Matter, Physical and Chemical Properties
2	W	29-Aug	1.4-1.6	Measurements, Accuracy/Precision, Dimensional Analysis
	M	3-Sep		Labor Day Holiday
3	W	5-Sep	2.1-2.3	Atomic Theory and Structure
4	M	10-Sep	2.4-2.5	Formulas and the Periodic Table
5	W	12-Sep	2.6-2.7	Molecular and Ionic Compounds, Nomenclature
6	M	17-Sep	3.1	Formula mass and The Mole
7	W	19-Sep	3.2-3.3	Empirical and Molecular Formulas, Molarity
8	M	24-Sep	3.4	Solution Concentrations
9	W	26-Sep		Exam 1
10	M	1-Oct	4.1-4.2	Balancing and Classifying Chemical Eq (not Bal. Redox)
11	W	3-Oct	4.3-4.4	Stoichiometry and Reaction Yields
12	M	8-Oct	4.5	Quantitative Chemical Analysis
13	W	10-Oct	5.1-5.2	Energy and Calorimetry
14	M	15-Oct	5.3	Enthalpy
15	W	17-Oct	6.1	Electromagnetic Energy
16	M	22-Oct	6.2-6.3	Bohr Model and Quantum Theory
17	W	24-Oct	6.4-6.5	Electronic Structure, Periodic Variations
18	M	29-Oct		Exam 2
19	W	31-Oct	7.1-7.2	Ionic and Covalent Bonding
20	M	5-Nov	7.3	Lewis Symbols and Structures
21	W	7-Nov	7.4	Formal Charge and Resonance
22	M	12-Nov	7.6	Molecular Structure and Polarity
23	W	14-Nov	8.1-8.3	Valance Bond Theory, Hybrid Orbitals, and Multiple Bonds
24	M	19-Nov	9.1-9.2	Gas Pressure and The Ideal Gas Law
	W	21-Nov		Thanksgiving Holiday
25	M	26-Nov	9.3-9.4	Stoichiometry of Gases, Effusion/Diffusion of Gases
26	W	28-Nov	9.5-9.6	Kinetic-Molecular Theory and Non-Ideal Gas Behavior
27	M	3-Dec		Exam 3
28	W	5-Dec		Final Exam Review
29		TBA		Final Exam
Note: Schedule is subject to change.				* Last day to drop with a "W": Monday, Nov 5, 2018

VII. **Laboratory Outline**

Description of the course activities including: due dates, schedules, and deadlines.

Session	Week Of	Quiz	Exp	Experiment Description
1	27-Aug		1	Equipment Check-in, Safety/Lab Rules
2	3-Sep	A	2	Density of Liquids and Solids
3	10-Sep	B	3	Freezing and Melting Points
4	17-Sep	handout		Separation Techniques
5	24-Sep	D	21	Calculations Worksheet
6	1-Oct	E	6	Synthesis of Alum* ***Begin writing Formal Written Report**
7	8-Oct	F	7	Metal Activity Series
8	15-Oct	G	8	Acid-Base Titrations* ***Formal written report 1st Draft Due**
9	22-Oct	H	4	Calorimetry: Endo and Exo Reactions
10	29-Oct	I	10	Qualitative Analysis: Ions and Compounds* ***Formal written report Final Draft Due**
11	5-Nov	J	9	Molecular Modeling and VSEPR Theory
12	12-Nov	K	11	Determination of the Standard Molar Volume of a Gas
	19-Nov			Thanksgiving
13	26-Nov			**Lab Final Exam**

VIII. **Evaluation and Grading**

A. **Grading Criteria**

Course grades are assigned in light of a numerically determined course score (see subsection "B" for details), according to the following table

Course Score	Course Letter Grade
90-100	A
80-89	B
70-79	C
60-69	D
<60	F

B. **Course score will be determined according to the following percentages.**

1. 25% from the Final Exam; 50% from the average of Exams 1, 2, and 3; 25% from the Laboratory score (see subsection "C" for details)
2. The four components are weighted according to the equation:

Course Score = 0.25 (Final Exam Score) + 0.50 (average of all midterm exams) + 0.25 (Laboratory Score)

C. **Overall Laboratory Score (a component of the overall Course Score)**

1. 70% from the average score of the assigned laboratory experiments (see subsection "D" for details); 10% from the formal written lab report; 20% from the written laboratory final exam.
2. The three components are weighted according to the equation:

Laboratory Score = 0.70 (average individual exp score) + 0.10 (formal written report) + 0.20 (laboratory Final Exam Score)

D. **Scoring of Individual Experiments**

1. A student must be physically present during the laboratory period, and actively participate in the experiment, to receive credit for any of the two scored components that follow.
2. 30% from the on-line pre-lab quiz; 70% from the experiment report form and post-lab questions
3. The two components are weighted according to the equation:

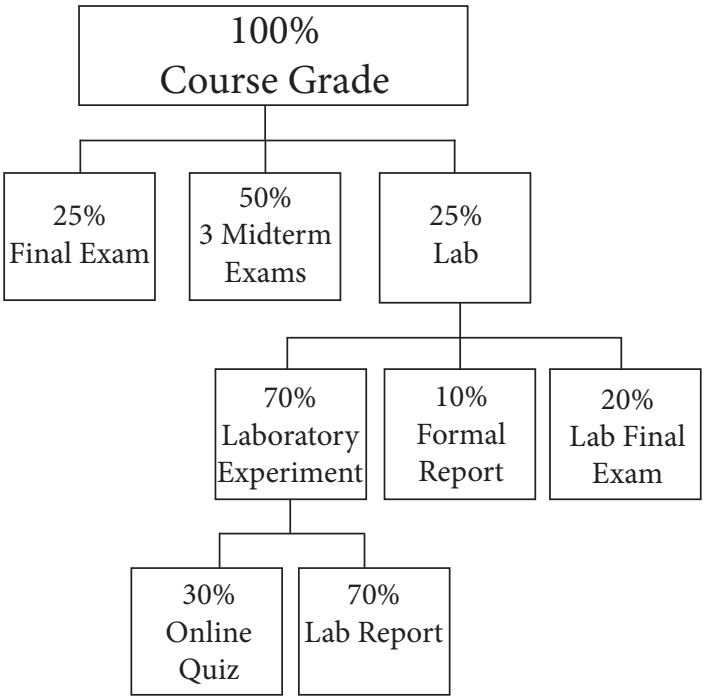
Individual Experiment Score = 0.30 (on-line quiz score) + 0.70 (report form/post lab questions)

E. **Make-up exams**

1. There are NO make-up exams; however, an exception *may* be approved if requested *prior* to test date.
2. If the request to take a make-up exam is approved, then the make-up exam must nevertheless be taken *within six days* of the original test date, after which permission is automatically rescinded.

F. **Changes to Curriculum**

1. The instructor may modify the provisions of the syllabus to meet individual class needs by informing the class in advance as to the changes being made.


100%
Course Grade
25%
Final Exam
50%
3 Midterm
Exams
25%
Lab
70%
Laboratory
Experiment
10%
Formal
Report
20%
Lab Final
Exam
30%
Online
Quiz
70%
Lab Report