CHE 101 + 101L: Conceptual Chemistry
Section: 001 and 020
Meeting Time: M 1-2:50, WF 1-1:50
Bldg/Room: Math 126

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>CHE 101 + 101L: Conceptual Chemistry</th>
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<tbody>
<tr>
<td></td>
<td>Chemistry &amp; Biochemistry</td>
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<tr>
<td>Email</td>
<td><a href="mailto:kwiatkowc@sfasu.edu">kwiatkowc@sfasu.edu</a></td>
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<tr>
<td>Phone</td>
<td>936-468-2175</td>
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<tr>
<td>Office</td>
<td>Math 110</td>
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<td>Office</td>
<td>MWF 9:30-10:30</td>
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<td>Hours</td>
<td>TTh 1:30-3:00</td>
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**COURSE DESCRIPTION:**
Conceptual Chemistry is an introductory course for non-science majors. CHE 101 is an overview of the field of chemistry and its impact on science, technology, society, and environment. This conceptual approach involves a minimum of mathematics and investigates the chemistry found in the world around us that impacts you and your immediate and extended environment. This course utilizes an integrated lecture/lab format. Lab fee required.

The course is organized to investigate chemistry within the body, in the home, and in the community (social and industrial).

**TEXT AND MATERIALS:**
None. Please print out notes or ppts.

**GRADING POLICY:** (Grades are kept current on D2L) – CHE101 is a 3 hour chemistry course which requires 3 hours per week

3 exams (20%) – Exams are take-home exams and consist of short answer and essay. Plagiarism will result in a zero.

Quizzes (20%) – With the exception of 2 in-class quizzes, quizzes are on D2L. They are multiple choice and/or T/F. Lowest quiz will be dropped. If you have computer issues or you missed a quiz (excused absences only), you may make up the quiz within the week on paper, in my office, closed book.

Two Oral Presentations (10%) – Powerpoint must have a minimum of 6 slides, must be 5-10 minutes, and will be accompanied by a written paper that follows a rubric (to be passed out in class.)

Two student presentations on either one of the following topics:
1) Choose a chemist (past or present), explain his discovery/contribution to science and its impact on society.
2) Choose a controversy that is focused around a chemistry topic (such as an environmental issue or health issue) and present both sides of the argument…OR
3) Choose a current/future chemical product that is being developed, describe it in detail, and explain the potential benefit (and potential problem, if relevant.)

Assignments and Discussions (20%) - Assignments and online discussions, done either as homework or in class.

Laboratories (30%) - Labs are on Mondays. Late lab reports earn a maximum of 70%.
Teamwork rubric and evaluation is included under this category.

This course is for 3 credits and typically meets for 100 minutes for lecture and 3 hours for laboratory each week for 15 weeks plus meets for a 2-hour final examination. The lecture portion will receive 3 hours of credit and the co-requisite lab will receive 0 hours of credit. The grades for the lecture and lab portions of the course are combine as a composite grade. Students have significant weekly reading and homework assignments involving critical thinking and quantitative reasoning for lecture and lab. Students are tested over the material via quizzes and several exams during the semester including a comprehensive final exam. Students are expected to prepare prior to each lab (literature and concepts), attend lab hours (conduct experiments), and report results (lab reports). Students have required academic components and deliverables: written work (daily notebook and lab reports). These activities, inclusive of lab expectations, average at a minimum 10 hours of work each week beyond classroom lecture hours.

Classroom Behavior Expectations:
- Come to class prepared (spend at least 2 hours working problems and reviewing previous material before each class period) and be on time and in your seat.
- Computer Use: Not allowed because of past abuse. Print your notes. (Special accommodations approved by disability services allowed.)
- No headphones in your ears during lecture.
- Absences may be assigned to anyone that disrupts class, sleeps in class, or consistently comes in late or leaves early. Read Attendance Policy Section for how this can affect grades.
- Turn off and put away cell phones; NO text messaging during class. Anyone caught using a cell phone during class can have an absence assigned to them.
- Be courteous and respectful of other students and instructor.
- Make-up quizzes and tests are only given to students with an excused absence. If there are computer issues with D2L quizzes, an alternative on-paper quiz can be taken during my office hours.
- Cheating…not allowed or respected.
- Students who violate these rules will be asked to leave. Repeat offenders will be subject to disciplinary action in accordance with University policies as described in the Code of Student Conduct.

Academic Integrity (A-9.1):
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a
component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/4.1-student-academic-dishonesty.pdf

Any student found cheating will be subject to the penalties as stated in the Student Code of Conduct handbook; including but not limited to a score of zero on exam, expulsion from the class or expulsion from the University.

WITHHELD GRADES SEMESTER GRADES POLICY (A-54):
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

STUDENTS WITH DISABILITIES:
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

CLASSROOM BEHAVIOR POLICY:
Acceptable Student Behavior: Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed. To read the entire code of conduct, click here: http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf
CORE OBJECTIVES AND RESOURCES

General Education Core Curriculum Objectives: The Texas Higher Education Coordinating Board has identified six core learning objectives: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, Teamwork, Personal Responsibility, and Social Responsibility. SFA is committed to the improvement of its general education core curriculum by regular assessment of student performance on these six objectives. Although this chemistry course develops the first four core-learning objectives, it only submits assessment assignments to the University Core Assessment Committee every even Spring for the Teamwork general education core curriculum requirement. If this is an even spring semester, another, “shell” course has been created to collect student artifacts to meet this state requirement. You will see this course on your D2L list.

During the even spring semester, you will receive an assignment in the laboratory portion of the course that fulfills both the requirements of the lab and the needs of Stephen F. Austin State University’s Core Curriculum Assessment Plan with the Texas Higher Education Coordinating Board. When you complete this one assignment, you need to upload the assignment to both the Chemistry dropbox and the Teamwork dropbox. Please note that this only applies to the specific teamwork assignment given in the lab section of this course. All other assignments should be submitted according to regular class operations. If you have any questions, please see your instructor or contact the University Assessment Specialist at (936) 468-1267 or jstringfield@sfasu.edu.

Below is a description of each Core Objective, followed by a chart that shows the topics covered in this course with their corresponding core objectives.

**Core Objective 1: Critical Thinking: to include creative thinking, innovation, inquiry and analysis, evaluation and synthesis of information.**

Definition of **CRITICAL THINKING**: disciplined thinking that is clear, rational, open-minded, and informed by evidence.


**Critical thinking** involves the use of a group of interconnected skills. The skills needed can be broken down into six steps.

**Six Steps of CRITICAL THINKING**

1. **Knowledge** means a student must have basic knowledge about the subject.

2. **Comprehension** requires understanding of the subject. Students that comprehend the new knowledge are able to relate the new knowledge to what they already know. Comprehending goes beyond simply parroting material back.

3. **Application** requires both knowledge and comprehension. Students must be able to carry out a task or apply their knowledge and comprehension to an assigned task.
4. **Analysis** involves breaking the knowledge down into smaller parts so it become clear how the smaller parts are related to other ideas.

5. **Synthesis** involves the ability to put together the parts you analyzed with other information to create something original.

6. **Evaluation** occurs once we have understood and analyzed what is said or written and the reasons offered to support it. Then we can appraise this information in order to decide whether you can give or withhold belief, and whether or not to take a particular action.

Adapted from: [http://www.mhhe.com/socsicence/philosophy/reichenbach/m1_chap02studyguide.html](http://www.mhhe.com/socsicence/philosophy/reichenbach/m1_chap02studyguide.html) (accessed May 23, 2013)

**Core Objective 2: Communication Skills: to include effective development, interpretation and expression of ideas through written, oral, and visual communication.**

**COMMUNICATION SKILLS in the sciences**

For an excellent resource in scientific communication from a highly reputable source see the information provided on the Nature website link shown below.

[http://www.nature.com/scitable/topic/scientific-communication](http://www.nature.com/scitable/topic/scientific-communication) (accessed May 31, 2013)

Three especially informative links within the link shown above are:

- Effective Communication
- Effective Writing
- Audience/Purpose

**Core Object 3: Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.**

**EMPIRICAL AND QUANTITATIVE SKILLS**

Chemists rely on observations to explain the nature of the substances they study. There are two types of observations exist: qualitative and quantitative. A **qualitative observation** is an observation made with the senses and is usually expressed using words instead of numbers. Qualitative observations about a person sick in the hospital might include that the person is breathing rapidly, has a high temperature, and is very thin.

A **quantitative observation** is an observation that requires a numerical measurement and describes something in terms of “how much”. The quantitative observation that a person has a temperature of 103.6 °F is much more useful information than just knowing that the person has a fever. Quantitative observations are preferred by scientists. Often quantitative data is acquired in lab.

One or more measurement is always a part of any quantitative observation. A **measurement** determines the dimensions, capacity, quantity, or extent of something. The most common types of measurements made in chemical laboratories are those of mass, volume, length, temperature, pressure, and concentration.
Measurements always consist of two parts: a number, which tells the amount of the quantity measured, and a unit, which tells the nature or kind of quantity measured. A measured number without a unit is meaningless.

Once quantitative data is obtained, chemists then mathematically manipulate and analyze data.

Adapted from saplinglearning.com; accessed May 31, 2013

**Core Objective 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.**

Definition of **TEAMWORK**: work done by several associates with each doing a part but all subordinating personal prominence to the efficiency of the whole.


**TEAMWORK** General Rules

Each team member needs:

- all ideas evaluated critically;
- treat others in the group with respect
- everyone needs to pull their weight, meet deadlines, and contribute equally;
- actions need to be followed through;
- reporting needs to be accurate and comprehensive;
- problems with under-performing team members need to be discussed openly and resolved quickly; and
- peer assessment should be given fairly

Summary:

<table>
<thead>
<tr>
<th>Core Objective 1: Critical Thinking Skills</th>
<th>To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.</th>
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<tbody>
<tr>
<td>Core Objective 2: Communication Skills</td>
<td>To include effective development, interpretation and expression of ideas though written, oral, and visual communication.</td>
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<tr>
<td>Core Objective 3: Empirical and Quantitative Skills</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
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<tr>
<td>Core Objective 4: Teamwork</td>
<td>To include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.</td>
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*This Core Objective is Strongly Emphasized in Lab.*

**Student Learning Outcomes**: Upon completion of this course, the students are expected to

- apply chemistry concepts using critical thinking skills and the scientific method to analyze and evaluate information to reach conclusions within problem sets and lab experiments. (COs 1 & 3)
- use communication skills to demonstrate their interpretation and analysis of scientific data. (CO 2)
apply logic, quantitative reasoning, and pattern recognition to analyze and evaluate
numerical data/observable facts to reach conclusions within problem sets and lab
experiments. (COs 1 & 3)
demonstrate the ability to cooperate within groups to gather results of an experiment,
analyze data, and draw conclusions using communication skills. (COs 2 & 4)

How Laboratories meet the Core Objectives:

<table>
<thead>
<tr>
<th>Core Objective 1: Critical Thinking Skills</th>
<th>Every lab will require a collection of data in which you must analyze the information. Each lab has objectives that are achieved by manipulating chemicals and equipment which involves inquiry skills.</th>
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<tbody>
<tr>
<td>Core Objective 2: Communication Skills</td>
<td>Communication with your lab partner is absolutely essential in order to perform the experiment, take data, and analyze the results.</td>
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<tr>
<td>Core Objective 3: Empirical and Quantitative Skills</td>
<td>Each lab will include the manipulation and analysis of numerical data or observable facts from which an informed conclusion will be drawn.</td>
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<tr>
<td>Core Objective 4: Teamwork</td>
<td>When working with a partner in a lab setting, it is important to work as a team, considering different points of view and working effectively to meet the objectives set forth in the lab manual. This Core Objective is Strongly Emphasized in Lab.</td>
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Course Topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Core Objective</th>
<th>Specifics…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of Chemistry Scientific Method/Processes</td>
<td>Core Objective 1: Critical Thinking Skills</td>
<td>Analyzing and Interpreting data from a scientific investigation. Inquire about the natural world.</td>
</tr>
<tr>
<td>Measurement</td>
<td>Core Objective 3: Empirical and Quantitative Skills</td>
<td>In problem solving, learn to apply significant figures and apply the terms accuracy and precision to measurements.</td>
</tr>
<tr>
<td>Atoms and Periodic Table; Classifying Matter; Physical and Chemical Properties and Changes; Energy</td>
<td>Core Objective 2: Communication Skills Core Objective 4: Teamwork</td>
<td>Identify and justify as a class classification of matter and types of changes.</td>
</tr>
<tr>
<td>Parts of the Atom (subatomic particles); Ions and Isotopes</td>
<td>Core Objective 1: Critical Thinking Skills</td>
<td>Analyze composition of ions after gaining or losing electrons.</td>
</tr>
<tr>
<td>Writing and Naming Chemical Compounds</td>
<td>Core Objective 1: Critical Thinking Skills Core Objective 2: Communication Skills Core Objective 4: Teamwork</td>
<td>Analyze and communicate with class both molecular vs. ionic compounds; construct proper formulas and discuss and justify names of compounds.</td>
</tr>
<tr>
<td>Types of Reactions</td>
<td>All Core Objectives</td>
<td>Identify type of reaction; analyze reactants and determine products; balance reactions</td>
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<tr>
<td>Lewis Dot Structures and 3-D Molecular Geometry of Molecules. Lewis Dot Structures of Ionic Solids. Polarity.</td>
<td>Core Objective 1: Critical Thinking Skills; Core Objective 3: Empirical and Quantitative Skills</td>
<td>Analyze and construct a 3-D model of a molecule given valence electrons. Determine the overall polarity of molecules by evaluating polar bonds within the molecule.</td>
</tr>
<tr>
<td>Gas Behavior Given Various Conditions and Changes.</td>
<td>Core Objective 1: Critical Thinking Skills; Core Objective 2: Communication Skills; Core Objective 3: Empirical and Quantitative Skills</td>
<td>Communicate the effect on a gas when either volume, pressure, or temperature of a gas is changed.</td>
</tr>
<tr>
<td>Intermolecular Forces</td>
<td>Core Objectives 1-3</td>
<td>Communicate how intermolecular forces determine state of matter, volatility, and viscosity.</td>
</tr>
<tr>
<td>Solution Concentration, Types of Solutions, Titrations, and Colligative Properties</td>
<td>All Core Objectives</td>
<td>Analyze how solute particles affect vapor pressure, melting point, boiling point, and osmotic pressure. Discuss the effect of hyper-, hypo- and isosmotic solutions on cells.</td>
</tr>
<tr>
<td>Acid and Base Definitions and Properties</td>
<td>Core Objective 1: Critical Thinking Skills; Core Objective 3: Empirical and Quantitative Skills</td>
<td>Identify acid and base properties. Calculate pH.</td>
</tr>
<tr>
<td>Nuclear Chemistry</td>
<td>Core Objective 2: Communication Skills</td>
<td>Learn the types of radioactive decay; be able to finish an equation with a decay element.</td>
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