Introductory Chemistry II Laboratory
CHE 112L Sections: -020,-021
Time of Meeting:
Place of Meeting: Bush Bldg 130
Semester: Spring 2020
(Students must be enrolled in CHE 112 Lecture)
Sec 20 Lab room 209
Sec 21 Lab room 210

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Email</th>
<th>Phone</th>
<th>Office</th>
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<tbody>
<tr>
<td></td>
<td>Chemistry and Biochemistry</td>
<td><a href="mailto:kwiatkowc@sfasu.edu">kwiatkowc@sfasu.edu</a></td>
<td>936-468-2175</td>
<td>Bush Bldg 110 (Math Bldg)</td>
</tr>
</tbody>
</table>

| Student Hours             | M 9:30-10:30                             | T: 8:00-10:00    | W: 1:00-2:00 | Th: 8:00-9:00afternoon by appointment (please email) | F 9:30-10:30 |

**Course Description:** Introductory laboratory experiments.

This lab course is for 1 credit and typically meets for 120 minutes a week for 15 weeks plus meets for a 2-hour final examination. Students have significant weekly reading to prepare for lab each week and lab reports involving critical thinking and quantitative reasoning. Students are tested over the material via quizzes and 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, pre-lab assessments, and lab reports). These activities, inclusive of the lab expectations and academic components, average a minimum of 4 hours of work each week.

**Number of Credit Hours:** 1 semester hour. The grade is separate from the lecture grade.

**Course Prerequisites and Co-requisites:** Co-requisite: CHE 112. Lab fee required.

**Course Objective:** To provide students with an explanation of the basic principles of chemistry as illustrated through laboratory experiments and to apply these principles to laboratory work involving critical thinking.

**Class location:**

<table>
<thead>
<tr>
<th>lab section</th>
<th>pre-lab lecture location</th>
<th>lab location</th>
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<tbody>
<tr>
<td>020</td>
<td>Bush-130</td>
<td>C-209</td>
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<tr>
<td>021</td>
<td>Bush-130</td>
<td>C-210</td>
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**Text and Materials:**

**GRADING POLICY:** Grades are based on the total number of points earned out of 290 points total

**Laboratory quizzes (100 pts)**

Quizzes are on D2L and are assigned on the day of lab and are due before the next lab (1 week). No lab quizzes will be dropped. Missed quizzes are a 0.
Laboratory experiments (80 pts)
Nine laboratory experiments will be performed. Each report sheet for the experiment is worth 10 points. The lowest experiment/assignment will be dropped, and the best 8 experimental grades will be kept. A total of 80 points from experiments is possible. Lab reports are due the following week at the next lab meeting, or may be turned in earlier.

Teamwork Rubric (10 pts)
Completion of Teamwork Core Assessment Rubrics for all lab partners at the end of the semester. The rubric is submitted to both the instructor and to a dropbox set up to receive Core Assessment Rubrics.

Midterm and Final Exam (100 pts):
- A midterm exam will be assigned on D2L before Spring Break and will be due the Monday upon return.
- The final exam will be given during the week before finals, when lab is regularly scheduled. This test will be administered in Bush Bldg, Room 130.
- The midterm and the final are worth 50 points each.

Make-up Policy: NO make-up labs will be given since the lowest experiment grade will be dropped (and the lab materials are no longer available).

ATTENDANCE POLICY:
Attendance of class is mandatory.

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.

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 class projects/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.

Please review the entire code of conduct here: [http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf](http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf)

- Come to lab prepared (spend at least ONE HOUR reading over *entire* lab before lab period AND reviewing the previous week’s lab) and on time.
- Bring a **NON-programmable**, scientific calculator. Cell phones and programmable calculators may NOT be used on quizzes.
- Turn off and put away cell phones; NO texting during lab.
- Come dressed as described in the safety rules that will be given: (Clothes to the ankles, no mid-drift shirts, closed-toe shoes. Shoes MUST completely cover feet. Anyone not dressed appropriately for lab will be sent home.)
- Follow all safety rules and good laboratory practices at all time:
- Wear safety glasses/goggles when anyone in the lab is working on an experiment. If you are finished, go to room C106 to finish the lab report.
- One warning concerning safety glasses/goggles will be given. A person will be sent home for a second offense and be will earn a zero that may NOT be dropped.
- NO horseplay in laboratory
- Be courteous and respectful of other students, laboratory assistants, and stockroom personnel.
- Learn your section number and your laboratory assistant's name.
- Work with assigned lab partner unless otherwise instructed by the lab assistant.
- Students are responsible for any answer they report on a lab, assignment, or quiz. Laboratory teaching assistants are students and sometimes may make an error or misunderstand a question. You can NOT claim the lab assistant told you the wrong answer and get points back.
- Significant figures are required on all answers given in lab on laboratory report sheets, assignments, quizzes, and exams.
- Absences may be assigned to anyone that disrupts class, sleeps in class, or consistently comes in late or leaves early. Any assigned absence will result in a zero for the day which can NOT be dropped.

**POINTS WILL BE DEDUCTED FROM YOUR GRADE FOR NOT FOLLOWING THE COURSE REQUIREMENTS OR THE LABORATORY BEHAVIOR POLICY**

General Education Core Curriculum

- This course has been selected to be part of Stephen F. Austin State University’s core curriculum. The Texas Higher Education Coordinating Board has identified six objectives for all core courses: 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.

- Assessment of these objectives at SFA will be based on student work from all core curriculum courses. This student work will be collected in D2L. The chart below indicates the core objectives addressed by this course, the assignment(s) that will be used to assess the objectives in this course will be uploaded this semester.

<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>Course Assignment Title</th>
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<tbody>
<tr>
<td>Teamwork</td>
<td>To include the ability to consider different points of view and to work effectively with others to support a</td>
<td>Teamwork rubrics</td>
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Definition of CRITICAL THINKING: disciplined thinking that is clear, rational, open-minded, and informed by evidence. [http://dictionary.reference.com/browse/critical+thinking; (accessed May 23, 2013)]

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/soscience/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-14121566 (accessed May 31.2013)]

Three especially informative links within the link shown above are:

- Effective Communication
- Effective Writing
- Audience/Purpose

Scientific communication traditionally includes writing in third person, past tense, passive voice. In formal, scientific writing slang terms and contractions are avoided.

**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

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**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

Every laboratory activity meets all 4 Core Objectives:

<p>| Core Objective 1: Critical Thinking Skills | 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. |
| Core Objective 2: Communication Skills | Communication with your lab partner is absolutely essential in order to perform the experiment, take data, and analyze the results. |
| Core Objective 3: Empirical and Quantitative Skills | Each lab will include the manipulation and analysis of numerical data or observable facts from which an informed conclusion will be drawn. |
| Core Objective 4: Teamwork | 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. |</p>
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<thead>
<tr>
<th>Date</th>
<th>Event</th>
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| Monday Jan 20 | **Watch** safety video: [youtube.com](https://www.youtube.com) *Safety Video by American Chemical Society (1991)*  
**Print** lab manual. Read Le Chatelier’s Principle Lab  
**Take D2L Safety Quiz** (over video content) before first lab meeting. |
| Jan 27     | **Due:** Prelab to Le Chatelier’s Principle Lab  
**Lab:** Le Chatelier’s Principle Lab  
**Read** Determination of Ka / Soil Labs for next week  
*Collect soil samples of interest* |
| Feb 3      | **Due:** D2L Quiz on Le Chatelier’s Principle Lab; Lab report; Soil samples  
Prelab to the Soil Lab (What did you decide to do your experiment on?)  
**Lab:** Determination of Ka / Soil Lab  
**Read** Chemical Kinetics Lab for next week. |
| Feb 10     | **Due:** D2L Quiz on Determination of Ka / Soil Lab; Lab reports  
Chemical Kinetics Prelab Worksheet  
**Lab:** Chemical Kinetics Lab  
**Read** Electrochemistry Lab for next week. |
| Feb 17     | **Due:** D2L Quiz on Kinetics Lab; Lab report (no prelab to Electrochemistry lab)  
**Lab:** Electrochemistry Virtual Lab in library  
**Read** Hess’s Law |
| Feb 24     | **Due:** D2L Quiz on Electrochemistry; Electrochemistry Virtual Lab report  
Hess’s Law Prelab Questions (located after Post Lab Questions)  
**Lab:** Hess’s Law Lab |
| Mar 2      | **Due:** D2L Quiz on Hess’s Law Lab (Mar 30)  
**Lab:** Organic Molecular Model Labs  
*Midterm on D2L available. Due March 16.* |
| Mar 16     | **Lab:** Organic Molecular Model Labs  
**Read** Amylase Lab  
**Midterm Due** |
| Mar 23     | **Due:** D2L Quiz on Molecular Models Lab; lab reports  
Amylase Prelab Questions  
**Lab:** Amylase Lab  
**Read** Water Hardness Lab  
**Watch** youtube video: [https://www.youtube.com/watch?v=giNNqlj4HI](https://www.youtube.com/watch?v=giNNqlj4HI) *“Hard Water Analysis - EDTA Titration for Calcium Content”* |
| March 30   | **Due:** D2L Quiz on Amylase Lab: lab report  
Water Hardness Prelab Questions.  
**Lab:** Water Hardness Lab |
| Apr 6      | **Lab:** Water Hardness Lab |
| Apr 13     | **Due:** D2L Quiz on Water Hardness Lab; lab report  
Qualitative Analysis Prelab Worksheet;  
**Lab:** Begin Qualitative Analysis Lab |
| Apr 20     | **Lab:** Finish Qualitative Analysis Lab (unknown)  
**Check Out** |
<table>
<thead>
<tr>
<th>Apr 27</th>
<th>Due: D2L Quiz on Qualitative Analysis; lab report</th>
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<tbody>
<tr>
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<td>Lab Final Exam in class</td>
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