General Chemistry Laboratory CHE 133L
Laboratory
Spring, 2020

Instructor: Dr. A.S. Frantzen  
Office: M 119  
Phone: 468-2338  
e-mail: afrantzen@sfasu.edu

Student Hours: T 3:00-4:00pm; T 5:00-6:00; W 12:00-1:00 pm; W 9:00-11:00 am; F 10:00-11:00 am;  
other times by appointment; if my door is open, I am generally available.

Class Hours: TR 9:30-10:50 pm; TR 11:00-12:15 pm; T 3:00-4:00pm; T 5:00-6:00pm; W 12:00-1:00 pm; W 2:00-5:00 pm; F 1:00-3:50 pm

Instructor: Dr. Barngrover  
Office: M 124  
Phone: 468-1568  
e-mail: barngrovbm@sfasu.edu

Student Hours: W 11:00 am – noon, W 3:00 – 4:00 pm, MT 1:30 – 3:00 pm; by appointment

Class Hours: TR: 8:00-9:15am; TR 11:00-12:15 pm; MWF 10:00-10:50 am; T 5:00-5:50 pm; R 2:00-4:50 pm

CATALOG DESCRIPTION: Laboratory techniques and applications. Spectroscopy, quantitative experiments.

PREREQUISITES: MTH 138

CO-REQUISITES: CHE 133

Chemistry Laboratory Notebook with duplicate pages.
Scientific Calculator

SUPPLEMENTARY READINGS: Brown, T., LeMay, H. E., Bursten, B. E., Murphy, C. J., Woodward, P. M., Stoltzfus, M. W.  

COURSE GOALS: The student should learn basic laboratory techniques and be able to apply them in a practical chemistry setting.

PROGRAM LEARNING OUTCOMES: There are no specific program learning outcomes for this major addressed in this course.  This course is a general education core curriculum course.

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. General Chemistry is a general education core curriculum course and fulfills the Teamwork general education core curriculum requirement. 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 this 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 General Chemistry dropbox and the Teamwork dropbox. Please note that this only applies to the specific assignment listed in the matrix below. 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.

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 and uploaded to the D2L Teamwork dropbox this semester, and the date the assignment(s) should be uploaded to the D2L Teamwork dropbox. Not every assignment will be submitted for core assessment every semester. Your instructor will notify you which assignment(s) must be submitted for assessment in the D2L Teamwork dropbox.
<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>Course Assignment Topics</th>
<th>Experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 1 -- Critical Thinking Skills</td>
<td>To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.</td>
<td>Stoichiometry, Significant Figures</td>
<td>All Labs</td>
</tr>
<tr>
<td>CO 2 -- Communication Skills</td>
<td>To include effective development, interpretation and expression of ideas though written, oral, and visual communication.</td>
<td>Written Lab Reports</td>
<td>Densities and Project Reports</td>
</tr>
<tr>
<td>CO 3 -- Empirical and Quantitative Skills</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
<td>Stoichiometry, Significant Figures</td>
<td>All Labs</td>
</tr>
<tr>
<td>CO 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>
<td>Group Work, all experiments</td>
<td>All Labs are performed in groups. Assessed through Project.</td>
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**Student Outcome Objectives:** Upon completion of this course students will:
- Understand and apply method and appropriate technology to the study of natural sciences.
- Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
- Demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
- Demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.

**Hour Justification:** This course is for 1 credit and spans 15 weeks. The course contains extensive content requiring students to prepare pre-laboratory purposes and procedure. Students have to prepare for laboratory by completing weekly pre-laboratory reading assignment and worksheets. Students are tested over the material via weekly laboratory reports, a comprehensive final exam, and/or weekly quizzes. These activities average at a minimum 2 hours of work each week to prepare outside of time spent engaging with the content.

**Course Requirements:** Grading is on a 300 point scale. Each experiment counts 12 points. The lowest experiment grade will be dropped. Reports will count a total of 50 points. No report grades will be dropped. Each dry lab counts 10 points; no dry labs will be dropped. Quizzes will be given during the recitation. Quizzes are worth 7 points each. The top five quizzes will be counted towards the final grade. The nomenclature quiz is worth 20 points. The final exam is worth 50 points. The final exam will be given during recitation on April 28th. Failure to take the final will result in a failing grade for the course. Teamwork assessment will count 7 points. You will be provided with the template.

**Course Content:** Please see attached schedule
METHOD OF EVALUATION:
Grading scale -  A ≥ 270; B ≥ 234; C ≥ 196; D ≥ 150; F = below 150

MAKE-UP POLICY: There will be no make-ups in this class. This refers to both recitation and laboratory. Please make the instructor aware of any university related absences well in advance.

ATTENDANCE POLICY: Attendance is required at both recitation and laboratory.

ACADEMIC HONESTY POLICY: 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 assignment, expulsion from the class or expulsion from the University. The University Policy can be found at: http://www.sfasu.edu/policies/4.1-student-academic-dishonesty.pdf.

SEMESTER WITHDRAWALS: Last day to withdraw from the course without obtaining WP or WF grade is March 18th.

ACADEMIC DISABILITIES POLICY: Students with Disabilities—To obtain disability related accommodations and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, 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.

CLASSROOM BEHAVIOR POLICY:
The student code of conduct can be found at: http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf
   1) Come to lab and recitation prepared and on time
   2) Come dressed as described in the safety rules that will be given or you will not be allowed to participate in lab.
   3) Follow all safety rules and good laboratory practices at all time
   4) Do not begin an experiment with out a teaching assistant present
   5) Wear safety glasses/goggles when anyone in the lab is working on an experiment
   6) Be courteous and respectful of other students, laboratory assistants, and stockroom personnel
   7) Learn your section number and your laboratory assistant's name
   8) Work with assigned lab partner unless otherwise instructed by the lab assistant
   9) Stay in assigned sections
  10) 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. You cannot claim the lab assistant told you the wrong answer and expect to get points back
  11) Significant figures are required on all answers given in lab
  12) No make up quizzes will be given if a student comes in late and misses the quiz.
  13) Using material from previous semesters is considered cheating and will result in an assigned grade of zero (0) for the assignment in question
  14) Questions concerning grades must be asked within one week of receiving the graded material.

RECITATION: During the recitation session the concepts and calculations for the laboratory experiment will be covered. To be prepared for recitation, the student should have an outline of the procedure for the experiment completed in the laboratory notebook. The format for outlining the experiment is given below. The outlines will be checked at recitation. Quizzes will also be given during the first 15 minutes of the recitation period. No make-up quizzes will be given.

SAFETY: The student must comply with safety rules at all times in the laboratory. Goggles or approved safety glasses must be worn at all times. Failure to follow the outlined safety rules will result in expulsion from the laboratory for the day and a grade of zero (0) for that experiment. Subsequent infractions can result in removal from this course.

Instructor reserves the right to change the syllabus at any time.
LAB NOTEBOOK:
The laboratory notebook must be a permanently bound book with alternating white and yellow quadrille ruled sheets. The yellow sheets will be used to make carbon copies of the original white sheets. The carbon copy sheets are to be handed in as the lab report.

RULES FOR LAB NOTEBOOK
a.) ALL DATA IS TO BE RECORDED IN BLACK INK DIRECTLY IN THE NOTEBOOK!!!!
b.) Label and date all entries.
c.) An error should be lined through with a single horizontal line, initialed and briefly explained.
d.) A single diagonal line should be drawn across any page that is to be ignored, initialed and briefly explained. This includes completely blank pages.
e.) The backs of the yellow pages may be used for scratch work BUT, measurements and readings are to be recorded as DATA.
f.) Number all the pages in the notebook in the upper right hand corner of the page. The yellow carbon copies must bear the same number as the white originals.
g.) Use page 1 for a TABLE OF CONTENTS. This should be maintained on a current basis at all times.
h.) Use page 2 for a PREFACE and a table of abbreviations. Include your name, social security number, classification, major, course title, number, section, semester, year, and instructor.
i.) BE SURE TO WRITE HARD ENOUGH SO THE CARBON SHOWS UP!!!!! If I can’t read it, I can’t grade it.
j.) Do not tear pages out of your lab notebook.

NOTEBOOK FORMAT - Begin each experiment on a new page. – The Format of your laboratory notebook counts two (2) points towards every experiment grade.

1.) Purpose: (done before recitation)
Give the title of the experiment and a 1 or 2 sentence description of the purpose of the experiment. This should be written in a complete sentence in 3rd person (that means not using I, we, you). Your purpose should also describe the technique used to accomplish the experiment. This should be done in your own words -- do not copy from the manuals. Important chemical reactions and mathematical equations should also be included here.

2.) Procedure: (done before recitation)
Outline the procedure of the experiment. This can be as simple or as extensive as you wish. Remember, this procedure should be complete enough so that you could complete the experiment without your laboratory manual. If you don’t include a direction, how will you finish the experiment?

3.) Questions/Data Tables: (done before recitation)
You should have any data tables that are in your lab manual reproduced in your notebook. All you should have to is gather data and put it in the table. If there are questions or calculations to be completed, make sure you write these out before you come to class. Be sure to leave enough room on the paper to answer the questions.

4.) Calculations
Give one example of each type of calculation used in the experiment that has not been included in the previous section. In general, this section will deal with the calculation of the final results. Be sure to include a set-up with all appropriate units. Whenever multiple samples of the unknown are analyzed, the average and the average and standard deviation (s) should be calculated.

5.) Conclusion
Report your final results. Final results will be graded on quantitative/qualitative basis, depending on the experiment. You should include your results and state if you accomplished the purpose of the experiment. Your results should support your conclusion. This should also include an error analysis/problems associated with the experiment.
# Course Content:

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<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Activity</th>
</tr>
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<tbody>
<tr>
<td>January</td>
<td>14</td>
<td><strong>No Recitation</strong></td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td><strong>No Lab</strong></td>
</tr>
</tbody>
</table>
|         | 21    | Recitation  
Miller Science Building room 137                                      |
|         | 23-24 | Significant Figures Dry Lab  
Meet in Chemistry Building Room 106                                       |
|         | 28    | Recitation  
Miller Science Building room 137                                      |
|         | 30-31 | Factor Label Method Dry Lab  
Meet in Chemistry Building room 106  
Check-In, Chemistry Building room 101, 102, or 105                           |
| February| 4     | Recitation Experiment #1, Identification of an Unknown Solid  
Miller Science Building room 137                                           |
|         | 6-7   | Experiment #1, Identification of an Unknown Solid                         |
|         | 11    | Recitation Experiment #2, Chromatography of M&M Candies  
Miller Science Building room 137                                          |
|         | 13-14 | Experiment #2, Chromatography of M&M Candies  
Written Report #1 (From Experiment #1), **DUE**                           |
|         | 18    | Recitation Experiment #3, Measuring Liquid Volumes  
Purpose statement for experiment 3 must be in Lab Notebook                |
|         | 20-21 | Experiment #3, Measuring Liquid Volumes                                    |
|         | 25    | Recitation Written Report (Experiment #3)  
Quiz                                                                      |
|         | 27-28 | **NO LAB**                                                                |
| March   | 3     | Recitation Experiment #4, Formula of a Hydrate and #5A, Preparation of Sodium Hydroxide  
Procedure for experiment 4 must be written in Lab Notebook  
Purpose statement for experiment 5A (Preparation only) must be written in Lab Notebook  
Purpose statement for experiment 5B must be written in Lab Notebook  
Procedure for experiment 5B must be written in Lab Notebook  
This will utilize a Macroscopic Technique for the Standardization          |
|         | 5-6   | Experiment #4, Formula of a Hydrate  
Experiment #5A, Preparation of Sodium Hydroxide  
Written Report #2 (From Experiment #3), **DUE**                            |
|         | 9     | **NO RECITATION SPRING BREAK**                                            |
|         | 12-13 | **NO LAB SPRING BREAK**                                                   |
|         | 17    | Recitation for Experiment #5A, Standardization of Sodium Hydroxide  
Purpose statement for experiment 5A must be written in Lab Notebook  
This will utilize a Macroscopic Technique for the Standardization          |
|         | 19-20 | Experiment #5A, Standardization of NaOH Solution, Macroscopic Technique    |
|         | 24    | Recitation for Experiment #5B, Standardization of Sodium Hydroxide  
Purpose statement for experiment 5B must be written in Lab Notebook  
This will utilize a Microscopic Technique for the Standardization.         |
|         | 26-27 | Experiment #5B, Standardization of NaOH Solution, Microscopic Technique    |
|         | 31    | Recitation for Project, Analysis of Juices  
Experiment #6, Sugar Content of Juices  
Purpose statement must be written in Lab Notebook  
Procedure must be written in Lab Notebook                                    |
| April   | 2-3   | Experiment #6, Sugar Content of Fruit Juices  
Nomenclature Dry Lab, **DUE**                                               |
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Nomenclature Quiz</td>
</tr>
<tr>
<td>9-10</td>
<td>NO LAB EASTER HOLIDAY</td>
</tr>
</tbody>
</table>
| 14    | Experiment #7 Total Acid Content of Fruit Juice  
|       | Purpose statement must be written in Lab Notebook  
|       | Procedure must be written in Lab Notebook    |
| 16-17 | Experiment #7 Total Acid Content of Fruit Juice |
| 21    | Recitation for Project, Experiment #8, Vitamin C Content of Juice  
|       | Purpose statement must be written in Lab Notebook  
|       | Procedure must be written in Lab Notebook    |
| 23-24 | Experiment #8, Vitamin C Content of Juice    
|       | Check Out                                    |
| 28    | Lab Final 5-7pm  
|       | Written Report Project, **DUE**               |
| May   | **NO LAB**                                    |
| 30-1  | **NO LAB**                                    |
| 8-12  | **NO LAB**                                    |
|       | Final Exam Week                              |