General Chemistry Laboratory CHE 133L  Fall 2017
Instructor: Dr. Darrell R. Fry  Office: M 120
Lab Meeting Times: F 1-3:50pm  e-mail: frydr@sfasu.edu
Office Hours: MWF 10-11; MF 11-12; TR 12-1; other times by appointment

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

PREREQUISITES: MTH 138

CO-REQUISITES: CHE 133

REQUIRED TEXTS AND OTHER MATERIALS:
2. Scientific calculator
3. 10 Blue Books measuring 8.5 inch by 11 inch.
4. Invisible tape ¾ in by 1000 in
5. Scissors
6. Ruler
7. Live Text account (used later in the semester)


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

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.
- Demonstrate good record keeping in a laboratory setting.

COURSE CONTENT: Please see attached schedule

MAKE-UP POLICY: There will be no make-ups in this 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.

SEMESTER WITHDRAWALS: Last day to withdraw from the course without obtaining WP or WF grade is October 22nd.

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.
**METHOD OF EVALUATION:**

Grades are based upon performance; the table below details the points available. Students will be held accountable for showing mastery of all skills used in the lab **as individuals**. Partners (or larger groups) will be assigned for each experiment; however, the lab practical(s) will be performed by individual students.

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
<th>Points each</th>
<th>Total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Dry Labs</td>
<td>2</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>B Hand written lab reports</td>
<td>6</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>B Projects</td>
<td>3</td>
<td>20</td>
<td>60</td>
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<tr>
<td>C Formal Laboratory Reports</td>
<td>3</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td>D Lab practical</td>
<td>1</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>E i-assign</td>
<td>10</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>F Teamwork Assessment</td>
<td>1</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>F Live Text access by due date</td>
<td>1</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>G written final</td>
<td>1</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>H Nomenclature quizzes</td>
<td>4</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

**During DEADWEEK you will take exam 5 for the course during lab time.**

Grading scale -  A ≥ 90%; B ≥ 80%; C ≥ 70%; D ≥ 60; F less than 60 percent

A. **Dry Labs:** We will have two dry labs at the beginning of the semester. They are designed to acclimate you to the laboratory.

B. **Hand written lab reports and Projects:** are worth ~25% of your course grade. They are the single largest percentage of your points available. These tasks are designed to teach you about the Laboratory Note Book which is your tool for understanding and communicating your work. We spend a lot of time (and red ink) teaching young scientists how to keep a good laboratory note book because **we know** (from experience) that the laboratory note book is the indispensable tool used by scientists to answer important questions. In the sections below, we outline how to keep a good lab note book. While some of the items may be particular to this laboratory, keep in mind that the lab note book is the most important tool you have for reaching and understanding of nature and communicating this understanding to other people. Specifics are provided in the laboratory through a PowerPoint Presentation.

Students will produce high quality hand written lab reports for each laboratory and project. Instead of the traditional duplicate page laboratory note book students will use Blue Books. Each laboratory and project will be done in an individual Blue Book.

Individual students will maintain their own laboratory note book. When making a measurement in a group, each person should verify the measurement and record their own number into their own laboratory notebook in real time.

Laboratory note books are the permeant record of the lab. As such, the lab note book must capture your purpose, your experimental plan, what you actually did, measurements and observations from those actions, your understanding of the data (through the discussion) and your conclusions. Take some time to
internalize the guidelines below—they will aid in your developing good lab note books skills. If you do not
follow the guidelines below, you will be penalized.

a.) The Blue Book must be neat and legible.
b.) All data is to be recorded **directly** into the Blue Book in black ink. (Separate sheets of paper
are not allowed.)
c.) Label and date all entries.
d.) An error should be lined through with a single horizontal line, initialed and briefly explained.
e.) A single diagonal line should be drawn across any page that is to be ignored, initialed and
briefly explained. This includes completely blank pages.
f.) Number all the pages in the notebook in the upper right hand corner of the page.
g.) When printed material is included into the Blue Book it must be neatly taped in using
invisible tape. The tape must.
h.) Obtain TA’s or instructor's initials in Blue Book before leaving lab each day.
i.) Well label graphs, tables and pictures are a must. Captions must be included.
j.) All lines (for underlining, charts, graphs, section breaks) in the notebook should be made
with a straight edge.
l.) Include data file names and locations.

**NOTE BOOK FORMAT** – Each experiment will be in a separate Blue Book.

ONLY part 3) procedure and Data may be written in first person. Otherwise, the lab must not be
written in first person

I.  Title  (done before class and checked by TA)
II. Purpose Statement  (done before class and checked by TA)
III. Introduction  (done before class and checked by TA)
IV.  Experimental Plan  (done before class and checked by TA)
V.   Procedure and Data
VI.  Calculations
VII. Discussion
VIII. Conclusion

For details on each section see the Introductory PowerPoint for the laboratory.

C. **Formal Lab Reports.** You will have three Formal Lab Reports due throughout the semester. Your Hand
Written Lab Reports are essential in preparing these more formal reports. The report should be of
publication quality in content, writing and style of presentation. All reports must conform to the following
guidelines.
• The report should have a cover page listing the title of the experiment, the name of the student,
the course number and date (first day of execution)
• **Only typed reports report will be graded.** Use subscripts, italics and Greek symbols as
appropriate. Do not use shorthand notation, computer notation or slang. For example, use $\alpha$
instead of alpha, $1.5 \times 10^{-5}$ not $1.5E-5$, $K_a$ not $Ka$, $x$ not $x^2$. Do not write special characters by
hand. Learn to create the necessary symbols and notation using computer software. All
equations must be generated with an equation editor (e.g. Microsoft equation).
• All tables should contain a caption and should be numbered sequentially (do not use Roman
numerals). Tables should be generated with an appropriate software (Word, Excel, etc).
• All figures should contain a caption and should be numbered sequentially. Graphs should be generated with appropriate software.
• Tables and figures may be included within the text or may be placed on a separate page.
• All sources should be cited using the format employed in the Analytical Chemistry Journal.

The grading scheme for lab reports will be as follows:

I. Abstract - 5%
II. Introduction - 5%
   Write, in your own words, a brief introduction to the experiment, clearly stating the purpose of the experiment at the closing of the introduction.
III. Experimental Section - 5%
   Describe the main experimental setup. Roughly sketch the setup and label the components. Reference the Lab Manuals and other for the Procedures.
IV. Results - 40%
   a) Raw data: present raw data in a suitable format. Be sure to title the tables properly.
   b) Clearly list your results. Sample calculations and error analysis should be shown.
   c) Include all plots and printouts. Spectra, chromatograms, etc. should be placed at the end of the report.
V. Discussion and Questions - 30%
   Discuss any results as required by the handout. Answer all questions listed in the handout. Rewrite every question using the numbering in the experiment handout.
VI. Conclusion – 5%
   Comparisons to known values should always be made whenever possible. Estimation of errors should be discussed including possible sources of errors. Suggest any possible improvements in the experiment.
VII. References - 5%
   (i) Include references using the ACS format used in the journal Analytical Chemistry; i.e.: number all references consecutively in parentheses and include them at the end of your report in a section titled references. At least 3 journal articles must be cited. The journal articles must be within ±10 years from September 1, 2015. UNLESS THE JOURNAL ARTICLE IS A MAJOR ARTICLE IN THE FIELD
   (ii) No university websites are to be cited.
   (iii) No websites or Wikipedia citations.

D. Laboratory Practical: You will have one lab practical in which you will work as an individual. Preparation is key for the lab practical.
E. i-assign: i-assign is a free electronic homework delivery and grading system. Any computer capable of connecting to the internet can assess the homework system at http://i-assign.com. Enter teacher’s 4-digit ID: 0170, course number: 4, your 4-digit ID#: XXXX (see list handed out first day) your student password: XXXXXXXX (see list handed out first day; make certain it is an 8 digit number). First time you log in, identify yourself on Main Menu screen and change password if you desire. PLEASE NOTE YOU WILL HAVE TWO I-assign accounts-one for the lab and one for the lecture.
F. Live-Text: Students are required to have a Live-Text account. On two occasions we will use the Live-Text; the first is a test to see that you have log-in to the account; the second is to upload a team work assessment.
G. Written Laboratory Final- you will have a comprehensive written laboratory final. It will include nomenclature.
H. Nomenclature Quizzes- you will have four periodic nomenclature quizzes. Two are on the schedule; the two others are “POP” quizzes.
**CLASSROOM BEHAVIOR POLICY:**

1) Come to lab prepared and on time
2) Come dressed as described in the safety rules that will be given
3) Follow all safety rules and good laboratory practices at all time
4) Do not begin an experiment without 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:** NO RECITATION IS REQUIRED FOR THIS LABORATORY; HOWEVER, STUDENTS ARE EXPECTED TO PREPARE FOR LABORATORY IN A THOROUGH FASHION.

**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.

**NOTE:** This course may satisfy certain ExCet/TEKS objectives for chemistry and integrated Physics and Chemistry (Physical Science). The correlation between these objectives and the chemistry courses may be obtained from Dr. John Moore, the chemistry certification advisor.

Instructor reserves the right to change the syllabus at any time.
## Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Laboratory</th>
<th>Word Processed Lab Report Due</th>
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<tbody>
<tr>
<td>9/1</td>
<td>Check-in</td>
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<td></td>
<td>Safety Video</td>
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<td></td>
<td>Dry Lab Significant Figures</td>
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<tr>
<td>9/8</td>
<td>Dry Lab Dimensional Analysis</td>
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<tr>
<td></td>
<td>Using the Balance to make Mass Conversion Factors</td>
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<tr>
<td>9/15</td>
<td>Lab #1: ID of an Unknown Solid</td>
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<td>9/22</td>
<td>Lab #2: M&amp;M Chromatography</td>
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<td></td>
<td>Nomenclature Quiz 1: i-assign 1-6</td>
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<tr>
<td>9/29</td>
<td>Lab #3: Measuring Liquid Volume</td>
<td>Written Report #1 due 9/29</td>
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<tr>
<td></td>
<td></td>
<td>over Chromatography</td>
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<tr>
<td>10/6</td>
<td>Lab #4: Formula of a Hydrate</td>
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<tr>
<td>10/13</td>
<td>Lab #5A: Standardization of NaOH</td>
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<tr>
<td>10/20</td>
<td>Lab #5B: Microscale Standardization of NaOH</td>
<td>Written Report #2 due 10/27</td>
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<tr>
<td></td>
<td>Nomenclature Quiz 2: i-assign 1-10</td>
<td>over Standardization</td>
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<tr>
<td>10/27</td>
<td>Sugar Content of a Fruit Juice</td>
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<tr>
<td>11/3</td>
<td>Total Acid Content of a Fruit Juice</td>
<td>Written Report #3 due 11/10</td>
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<td>Over your choice of project</td>
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<tr>
<td>11/10</td>
<td>Vitamin C Content of a Fruit Juice</td>
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<tr>
<td>11/17</td>
<td>Lab Practical</td>
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<tr>
<td>11/24</td>
<td><strong>THANKSGIVING</strong></td>
<td></td>
</tr>
<tr>
<td>12/1</td>
<td>Written Lab Final &amp; Check-out</td>
<td>All i-assign due for the laboratory 12/1</td>
</tr>
<tr>
<td>12/8</td>
<td>DEAD WEEK;</td>
<td></td>
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<tr>
<td></td>
<td>Exam 5 for Lecture given during laboratory</td>
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<tr>
<td>12/15</td>
<td>FINALS WEEK-no Laboratory</td>
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