# Introductory Chemistry Class Syllabus

**Department of Chemistry and Biochemistry**

**Dr. Darrell Fry**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall 2019</th>
<th>Fry’s email</th>
<th><a href="mailto:frydr@sfasu.edu">frydr@sfasu.edu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Number</td>
<td>CHE 111.008</td>
<td>Fry’s Office Location</td>
<td>Math 120</td>
</tr>
<tr>
<td>Meeting Times</td>
<td>MWF 11-11:50</td>
<td>MWF: 12:00 – 12:50</td>
<td></td>
</tr>
<tr>
<td>Course Location</td>
<td>Room Math-132</td>
<td>TR: 10:00-10:50</td>
<td></td>
</tr>
<tr>
<td>Mastering Chem Code</td>
<td>MCFRYFall2019</td>
<td>F: 2:00-3:00 &amp; by appointment</td>
<td></td>
</tr>
</tbody>
</table>

**Course Description:**
Introductory Chemistry. Introduction to the principles and concepts of chemical thought. Co-requisite: CHE 111L. Prerequisite: eligibility for MTH 138. (Algebra). This course is intended for non-chemistry majors. Chemistry majors need to take CHE 133.

**Course Objective:**
The course objective is for students to gain competency (in recognizing concepts and problem solving) in basic areas of general chemistry as suited for the non-science major.

This course is for 3 credits and typically meets for 150 minutes a week for 15 weeks plus meets for a 2-hour final examination. Students have significant weekly reading and homework assignments involving critical thinking and quantitative reasoning. Students are tested over the material via quizzes and several exams during the semester including a comprehensive final exam. These activities average at a minimum 6 hours of work each week to prepare outside of classroom hours.

**Required Text and Materials:**
   a. Loose-leaf versions are available at the local bookstores that contain access codes to Mastering Chemistry, the required on-line homework
   b. An e-book option is available to you when you sign up for your Mastering Chemistry account.
2) Mastering Chemistry Homework Account
   a. [https://www.pearsonmylabandmastering.com/northamerica/](https://www.pearsonmylabandmastering.com/northamerica/)
   b. Course Code: MCFRYFall2019
   c. Begin you’re the assignments ASAP. You have a free trial for a week to give you time to find money.
   d. **All Mastering Chemistry are due 12/9/2019 without exception!**

**Grading Policy:**
**GRADES ARE BASED UPON PERFORMANCE.** The table below details how the points available in the course. The 10 points scale will be used to assign letter grades (i.e. ≥ 90% = A; etc.)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DATE</th>
<th>Time allotted</th>
<th>Point Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam I</td>
<td>9/6</td>
<td>50 minutes</td>
<td>100</td>
</tr>
<tr>
<td>Exam II</td>
<td>9/27</td>
<td>50 minutes</td>
<td>100</td>
</tr>
<tr>
<td>Exam III</td>
<td>10/16</td>
<td>50 minutes</td>
<td>100</td>
</tr>
<tr>
<td>Exam IV</td>
<td>11/1</td>
<td>50 minutes</td>
<td>100</td>
</tr>
<tr>
<td>Exam V (take-home)</td>
<td>12/6</td>
<td>~3 days</td>
<td>100</td>
</tr>
<tr>
<td>Comprehensive Final</td>
<td>See final exam schedule</td>
<td>See final exam schedule</td>
<td>100</td>
</tr>
<tr>
<td>On-line homework</td>
<td>12/9/2019</td>
<td>the entire semester</td>
<td>100</td>
</tr>
</tbody>
</table>

**TOTAL POINTS**

700

**On-line homework**—Instructions for Mastering Chemistry web site are provided on D2L. All on-line homework is due 12/9/2019 without exception. Approximately 2 homework assignments will be dropped.

**Exams**—The exams may be multiple choice, short answer, problems and/or essay. When you are instructed to show your work, then you must show your work for any credit. Partial credit may or may not be assigned. All exams are comprehensive; however, they tend to focus on the most recent material. You must be prepared to finish the exam in the allotted time period—this will require you to practice the material multiple times. If you
miss an exam, you must provide a documented excuse—Dr. Fry decides if the excuse is valid (not you). In the rare event you miss an exam, the comprehensive final exam will replace your missed exam.

**Final Exam** – the final exam will be comprehensive and multiple choice.

**Attendance Policy:**
Class attendance is mandatory (and necessary); however, I keep attendance only to prevent a handful of students who will miss a bunch and then complain about their grade to me or to my superiors. My tactic is moderately successful. Attendance will be kept by either passing around a role sheet, calling individual names, or the instructor visual checking each student’s assigned seat.

*Out of politeness*, tell instructor if there are circumstances in which you may arrive late or leave early.

**Classroom Behavior Expectations:**
- Learn the material
- Do the homework until you understand the material
- Sit in your assigned seat
- Come to class prepared by spending at least 2 hours working problems and reviewing previous material before each class period and be on time and in your seat.
- No Cell Phones--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.
- **No Computer Use** During Class
- **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.
- Bring a scientific calculator to class. Cell phones may NOT be used on quizzes or exams. If you have to use the facilities during a test, turn in your cell phone while away.
- Be courteous and respectful of other students, SI leader, and instructor.
- Significant figures are required on all answers given on quizzes, assignments and exams.
- Cheating…not allowed or respected. Will result in a zero with no chance of making up assignment.
- 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.
- Do not email fry through the d2l system. Do not email fry through the advising software. Instead email me directly.

**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/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

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.

Outline of Topics (approximate course time):
Methods and Measurements (5-15%)
Composition and Structure of the Atom (5-15%)
Elements, Atoms, Ions, and the Periodic Table (5-15%)
Structure and Properties of Ionic and Covalent Compounds (5-15%)
Calculations and the Chemical Equation (5-15%)
States of Matter (5-15%)
Reactions and Solutions (5-15%)
Chemical and Physical Change: Energy, Rate, and Equilibrium (5-15%)
Charge-Transfer Reactions: Acids and Bases and Oxidation-Reduction (5-15%)
Nucleus, Radioactivity, and Nuclear Medicine (0-15%)
Introduction to Organic Chemistry: Alkanes (0-15%)
Unsaturated Hydrocarbons: Alkenes, Alkynes (0-15%)

Student Learning Outcomes:
The student is expected to recognize and apply the following concepts to problem solving:
- Units of measure and significant figures, unit conversion, density and definitions of matter.
- Basics of atomic theory applied to the atom, basics of the periodic table, correct use of terms, and the basics of nuclear chemistry.
- Writing correct formulas of compounds and inorganic nomenclature as well as electron configuration, Lewis structure, and VSEPR theory.
- Determination of atomic and molecular masses, mole calculations, Avogadro's number, mole and mass calculations in chemical formulas and chemical reactions, writing balanced chemical reactions.
- Principles of the gaseous state, gas laws (Boyles, Charles, Gay-Lussac, Ideal, Dalton's) as well as intermolecular forces in liquids and solids and properties of solutions.
- Principles of acid/base theories, pH, buffers, acid-base indicators, and titration.
<table>
<thead>
<tr>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/2 CH 2: Measurement &amp; Problem Solving</td>
<td>9/4 CH 2: Measurement &amp; Problem Solving</td>
<td>9/6 <strong>EXAM I</strong> (CH 1-2)</td>
</tr>
<tr>
<td>9/23 CH 5: Molecules &amp; Compounds</td>
<td>9/25 CH 5: Molecules &amp; Compounds</td>
<td>9/27 <strong>EXAM II</strong> (CH 3-5)</td>
</tr>
<tr>
<td>9/30 CH 6: Chemical Composition</td>
<td>10/2 CH 6: Chemical Composition</td>
<td>10/4 CH 7: Chemical Reactions</td>
</tr>
<tr>
<td>10/7 CH 7: Chemical Reactions</td>
<td>10/9 CH 8: Quantities in Chemical Reactions</td>
<td>10/11 CH 8: Quantities in Chemical Reactions</td>
</tr>
<tr>
<td>10/14 CH 8: Quantities in Chemical Reactions</td>
<td>10/16 <strong>EXAM III</strong> (CH 6-8)</td>
<td>10/18 CH 13: Solutions</td>
</tr>
<tr>
<td>10/28 CH 14: Acids &amp; Bases</td>
<td>10/30 CH 14: Acids &amp; Bases</td>
<td>11/1 <strong>EXAM IV</strong> (CH 6-8,13 &amp; 14)</td>
</tr>
<tr>
<td>11/4 CH 9: Electrons in Atoms &amp; the Periodic Table</td>
<td>11/6 CH 9: Electrons in Atoms &amp; the Periodic Table</td>
<td>11/8 CH 9: Electrons in Atoms and the Periodic Table</td>
</tr>
<tr>
<td>11/18 CH 11: Gases</td>
<td>11/20 CH 11: Gases</td>
<td>11/22 CH 12 Intermolecular Forces</td>
</tr>
<tr>
<td><strong>11/25 Thanksgiving</strong></td>
<td><strong>11/27 Thanksgiving</strong></td>
<td><strong>11/29 Thanksgiving</strong></td>
</tr>
<tr>
<td>12/2 Ch 15: Thermodynamics</td>
<td>12/4 CH 17: Radioactivity</td>
<td><strong>12/6 Exam V due (cumulative and take-home)</strong></td>
</tr>
</tbody>
</table>

**All Mastering Chemistry assignments are due 12/9 at midnight regardless of the reason.**

**See the final exam schedule for the date & time of the final; final is held in the classroom we have met all semester.**

You will have the take home exam due during finals week (the Friday of Finals).
All of your Mastering Chemistry is due the Monday of Finals Week.
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 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.

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

CRITICAL THINKING is the 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.

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

For an excellent resource in scientific communication see the information provided on the Nature website link [http://www.nature.com/scitable/topic/scientific-communication-14121566](http://www.nature.com/scitable/topic/scientific-communication-14121566)

Three especially informative sections of 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.

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.

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

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

**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)

**General Education Core Curriculum Objectives:**

- To understand and apply method and appropriate technology to the study of natural sciences.
- To 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.
- To demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
- To demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.
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 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>Date Due in D2L</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>Skills developed in this course</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>Skills developed in this course</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>Skills developed in this course</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>Skills developed and assessed in lab every even spring</td>
</tr>
</tbody>
</table>