A. Course Information

<table>
<thead>
<tr>
<th>COURSE</th>
<th>SECTION</th>
<th>DAY/TIME</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM1412</td>
<td>890,891,894,895</td>
<td>TR 09:30-10:45 am</td>
<td>RFEB-106</td>
</tr>
<tr>
<td>CHEM1412</td>
<td>892,893,896,897</td>
<td>TR 12:30-01:45 pm</td>
<td>RFEB-106</td>
</tr>
<tr>
<td>CHEM1412</td>
<td>003</td>
<td>TR 02:00-03:15 pm</td>
<td>RFEB-104</td>
</tr>
</tbody>
</table>

B. Instructor Information

Instructor: Jessica Lopez
Office location: CS 130 G
Office hours: TBA
Email: Jessica.lopez@tamucc.edu

C. Course Description

This course describes chemical equilibrium; phase diagrams and spectrometry; acid-base concepts; thermodynamics; kinetics; electrochemistry; nuclear chemistry; an introduction to organic chemistry and descriptive inorganic chemistry. Basic laboratory experiments supporting theoretical principles; introduction of the scientific method, experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports. This course counts toward the natural science component of the University Core Curriculum.

D. Prerequisites and Co-requisites

Prerequisites: CHEM 1411 and MATH 1314 or equivalent math competency
Co-requisites: All students must be registered for an associated CHEM1412 laboratory course and SMTE0093

E. Required Textbooks and Supplies

Textbook: Chemistry: The Molecular Nature of Matter and Change, 8th Edition, Silberberg and Armateis, McGraw-Hill (with the ALEKS Access Code). Note: the university bookstore packages include a Connect access code. This Connect code is unnecessary for the course, but is free with the bookstore package. Do not purchase a separate Connect access code.

Online Homework Access Code: You must have the ALEKS access code that accompany the text to enroll in the online homework. You can also buy the e-version of the text and the code online. All students are required to start ALEKS the first week of class. Failure to obtain access may result in a negative impact on your grade. Specific due dates for each assignment can be found online within the ALEKS program. Access codes bought for this course previously may be reused provided it has not expired. Students are responsible for determining the expiration date and purchasing a new code, if necessary.

Link for online homework:

ALEKS: [https://www.aleks.com/](https://www.aleks.com/) Course code: TBA

Instructions on how to set up the account, or switch an existing account to this course can be found on Blackboard.

Top Hat: We will be using the Top Hat ([www.tophat.com](http://www.tophat.com)) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message.

You can visit the Top Hat Overview ([https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide](https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide)) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.
Top Hat may require a paid subscription, and a full breakdown of all subscription options available can be found here: www.tophat.com/pricing.

**Online technical support**
TAMUCC accounts (Email, Blackboard, etc.)  ithelp@tamucc.edu
ALEKS  http://support.aleks.com/
Top Hat  support@tophat.com

**Necessary supplies:** A nonprogrammable scientific calculator. Students will not be permitted to use programmable calculators during exams. I recommend a two-line TI-30.

**F. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to improve learning. Assessment is essential for effective learning because it provides feedback to students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning. By the end of this course, students should be able to:

- Calculate heating and cooling curves and demonstrate Classius-Cleperon equation
- Understand chemical kinetics and equilibrium and show how to use Reaction Tables.
- Know how to use Rate Laws
- Describe and understand the various acids and bases and demonstrate calculations of reactions, buffers
- Recognize REDOX reactions, show how to balance REDOX equations
- Describe and calculate electrochemical half-cell reactions and determine voltaic cell voltage
- Demonstrate knowledge of Energy, Enthalpy, Entropy, and Gibbs Free Energy, determine if a reaction is exothermic or endothermic. Calculate equilibrium constants from thermochemical parameters
- State the characteristics of liquids and solids, including phase diagrams and spectrometry.
- Articulate the importance of intermolecular interactions and predict trends in physical properties.
- Identify the characteristics of acids, bases, and salts, and solve problems based on their quantitative relationships.
- Identify and balance oxidation-reduction equations, and solve redox titration problems.
- Determine the rate of a reaction and its dependence on concentration, time, and temperature.
- Apply the principles of equilibrium to aqueous systems using LeChatelier's Principle to predict the effects of concentration, pressure, and temperature changes on equilibrium mixtures.
- Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
- Discuss the construction and operation of galvanic and electrolytic electrochemical cells, and determine standard and non-standard cell potentials.
- Define nuclear decay processes.
- Describe basic principles of organic chemistry and descriptive inorganic chemistry
- Recognize and describe intermolecular forces and how they affect solubility

**Science Learning Community Student Learning Outcomes:**
- Integrate interdisciplinary knowledge with real world applications.
- Effectively read, comprehend, and evaluate information related to science.
- Collaborate effectively by understanding, identifying, and participating in team processes.
- Communicate effectively in diverse contexts.
- Demonstrate personal and professional growth.
G. INSTRUCTIONAL METHODS

We will meet face-to-face and I will present lectures in the style of PowerPoint slides, and some classes will involve an activity. PowerPoint slides will be made available to students on Blackboard prior to lectures, and it is the responsibility of the student to download and/or print these materials prior to class. The pace of the class is set with the expectation that the student has the lecture slides in his/her possession. Occasionally, in-class activities may replace a traditional lecture – please refer to section J for further details regarding in-class activities. Course grades will be determined based on a student’s completion and scores received on three mid-term exams (exams 1 – 3), a final exam, online homework (ALEKS), learning community research project and the associated laboratory course.

Learning Community Integrated Research Experience
All students enrolled in the spring science learning communities will complete a collaborative integrative research experience. This project has been designed by your learning community professors to increase your science abilities. Science is rigorous so please understand this project is challenging and requires higher order critical thinking. In this assignment your learning community professors ask you to do much more than just remember facts or understand how to do problems. You will apply knowledge, analyze data, evaluate information, create new science knowledge, and persuasively share it in hopes of making an “Islander Impact”. The learning community assignment is facilitated primarily through seminar. Successful completion requires the synthesis of knowledge and skills from all of your courses.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Final Grades
Final grades will be calculated according to the grade distribution in the table, and a corresponding letter will be assigned for each numeric grade. Final grades are non-negotiable, and are assigned according to the distribution to the right to assess your mastery of the material. Final grades will not be assigned on a need or want basis.

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Percentage</th>
<th>Final Letter Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>12.5%</td>
<td>A &gt; 90%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>12.5%</td>
<td>B 80 - 89%</td>
</tr>
<tr>
<td>Exam 3</td>
<td>12.5%</td>
<td>C 70 - 79%</td>
</tr>
<tr>
<td>Final exam</td>
<td>12.5%</td>
<td>D 60 - 69%</td>
</tr>
<tr>
<td>ALEKS</td>
<td>10%</td>
<td>F &lt; 60%</td>
</tr>
<tr>
<td>Top Hat</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>LC Project</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Laboratory</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Exam Format

All exams will be given in class on the scheduled exam date. Students will complete all exam independently using a non-programmable scientific calculator. Exams will be closed-book and consist of a combination of multiple choice and free-response questions.

Online Homework

Online homework (ALEKS) will be used to assess a student’s knowledge of the concepts learned in this course. These programs allow the student to practice and master the material on their own. Utilization of such programs have shown to improve students’ overall class performance. Due dates for these assignments can be found within the online program.

ALEKS is an artificial intelligence program that evaluates your current level of knowledge for the material presented in this course, and you will complete objectives to help master the material. The more you already know about the course, the fewer objectives you have to complete. The less you know, the more objectives. Students should expect to spend a minimum of 3 hours per week on ALEKS objectives, and most students will spend more than 3 hours per week. Half of the ALEKS grade is based on completing objectives according to the timeline (the average of the individual objectives scores), and half is for completing all objectives throughout the semester (overall pie progress). The overall pie progress score will be assessed at the end of the semester only.

Top Hat We will be using the Top Hat (www.tophat.com) classroom response system in class. Top Hat will keep track of in class attendance, participations and in class questions. Student responses to Top Hat discussions can be graded for correctness and/or participation. Attendance will be taken and included in the overall Top Hat grade. The final Top Hat grade will include questions, participation and attendance to be calculated into the final course total.
Laboratory

The lab portion of the course makes up 25% of the course grade. Lab is meant to complement topics learned in lecture; however, on occasion, you may be required to learn concepts for the lab that have not yet or will not be reviewed in lecture. It is the student’s responsibility to become familiar with the pertinent information prior to each lab. The lecture instructor and SI leaders can help with the understanding of concepts as they relate to the lab, but specific questions regarding lab reports, lab grades, and lab policy should be directed toward the lab instructor.

I. COURSE CONTENT & SCHEDULES

This course schedule is tentative. It is the student’s responsibility to keep up with changes. Effective methods for keeping up with schedule changes include, but are not limited to, 1) coming to class, 2) checking Blackboard regularly, and 3) checking your Islander email regularly. You should read the specified textbook chapters before attending class. Lectures are a supplement (not replacement) for the textbook.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topics</th>
<th>*Exam Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Intermolecular Forces: Liquids, Solids, and Phase Changes</td>
<td>Exam 1 (CH 12, 13)</td>
</tr>
<tr>
<td>13</td>
<td>The Properties of Mixtures: Solutions and Colloids</td>
<td>2/13 (Thursday)</td>
</tr>
<tr>
<td>16</td>
<td>Kinetics: Rates and Mechanisms of Chemical Reactions</td>
<td>Exam 2 (CH 16, 17,18)</td>
</tr>
<tr>
<td>17</td>
<td>Equilibrium: The Extent of Chemical Reactions</td>
<td>3/26 (Thursday)</td>
</tr>
<tr>
<td>18</td>
<td>Acid-Base Equilibria</td>
<td>Exam 3 (CH 19, 20,21)</td>
</tr>
<tr>
<td>19</td>
<td>Ionic Equilibria in Aqueous Systems</td>
<td>4/30 (Tuesday)</td>
</tr>
<tr>
<td>20</td>
<td>Thermodynamics: Entropy, Free Energy and Reaction Direction</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Nuclear Reactions and Their Applications</td>
<td>Final Exam(CH 12-13, 16-20,24)</td>
</tr>
</tbody>
</table>

*Exams 1 – 3 will be taken during regular class time and location

See official University Final Exam Schedule

J. COURSE POLICIES

Attendance: The student is expected to be on time and attend every class. Attendance will be taken. Absences are not excusable for any reason. It is the responsibility of the student to obtain missed class materials from Blackboard. Attendance is required for in-class activities. No makeups will be given for missed activities, but the materials for the activity will be made available on Blackboard.

Cell phone use: Set to silent (not vibrate), please. Any student with an excessively disruptive cell phone will be asked to leave, and this includes exam days.

Electronic devices during exams: The use any electronic device besides an approved calculator is prohibited on exams. Any attempt to use such a device will be considered an attempt at cheating, and will result in a grade of 0 and the student will be subject to any actions consistent with honor code violations.

Emailing the instructor: I want an open line of communication with my students. However, I ask that you first check this syllabus and any information I have shared on Blackboard before sending me an email to avoid asking questions that I have already answered. Additionally, asking direct questions and providing me with as much information as possible will help me to answer your question more quickly. It will likely take more time to respond to open-ended or unclear questions that require lengthy responses. Please be patient with responses. If you do not receive a response to your question within 48 hours, then please feel free to kindly remind me about it.

Exam make-ups: No make-up exams will be given after the original scheduled date of the exam. Certain circumstances may warrant a make-up exam and require official University notification, documentation, and arrangements be made prior (≥1 week) to the exam to be missed. All make-up exams must be taken prior to the original exam date. These situations will be handled on a case-by-case basis and are at the instructor’s discretion. No make-up exams are given due to intentional or unintentional absences.
Exam Substitutions: Option A: The final exam grade may replace one of the three mid-term exams (exams 1-3) if a student unintentionally misses an exam (e.g., overslept, car trouble, illness, etc.), or if a student performs poorly on one of the three mid-term exams (exams 1-3). Option B: If a student performs well on all three of the mid-term exams (exams 1-3), the calculated average of the three exams may replace the final exam grade and warrant the student exempt from taking the final exam. Only one exam substitution is allowed (Option A or Option B).

Food in class: Generally, avoid eating food during class. Water and caffeinated beverages are fine, just keep them under control.

In-class activities: Occasionally, in-class activities will take the place of a traditional lecture. Grade incentives will be offered for each activity. No make-ups are given for a missed in-class activity. Dates for these activities will be announced in class and on Blackboard throughout the semester.

Laptops: Laptops/tablets are permitted during lecture and encouraged to facilitate learning of course-related material. These devices may not be used during exams.

Late arrival on exam day: Any student arriving more than 5 minutes late to an exam will have 5 points deducted from his/her exam grade. Being late on exam day is highly disruptive to all students. No additional time will be given to a student arriving late.

Late work/assignments: Online homework will not be accepted after the set due date. Students should properly manage time spent on online homework assignments to ensure completion by the set deadlines.

Participation: Come to class, participate in the activities, ask questions (politely), and answer questions (politely). Staying engaged will help you to master the material.

SI Leaders: Supplemental instruction leaders are undergraduates who were previously successful in this course. They attend all of the lectures, develop and implement SI sessions (activities pertaining to information covered in lecture), and hold office hours. They serve as an additional resource for help in completing and understanding course materials. A complete schedule of office hours and SI sessions will be posted on Blackboard shortly after the beginning of classes. Studies have shown that students who attend SI sessions earn 0.5 – 1.0 GPA points (a half or whole letter grade) higher than students who do not attend SI sessions.

Blackboard and Islander email account: It is the student’s responsibility to check the course Blackboard site and their Islander email accounts regularly (i.e., every day). Important announcements and changes to the course schedule will be communicated this way.

Tutoring and test-taking strategies: You want you to be successful, and I want you to be successful. It may take you some time to figure out how to be successful, especially in a notoriously challenging course like chemistry. You need to develop good note-taking skills, organization skills, study habits, and test-taking strategies. If you find yourself performing below what you expect, or if you would like to avoid doing so, please come talk to me about your strategies. The earlier you do this, the more likely you are to be successful. Your instructor, SI leaders, and TAs are available to help you, but YOU need to take the initiative. Here are additional resources for those who find chemists unapproachable:

Center for Academic Achievement (CASA): They provide free tutoring for chemistry and math, can help with test-taking strategies, and offer writing services. Please visit http://casa.tamucc.edu/ for their hours of operation and schedules.

University Counseling Center (UCC): (361-825-2703): They can anonymously help with test anxiety, stress problems, or any other mental wellness-related issues for free. Please visit http://counseling.tamucc.edu/ for additional information.

K. COLLEGE AND UNIVERSITY POLICIES

- Academic Integrity (University)
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage
their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.

See Full University Policy at http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity

- **Classroom/Professional Behavior**

  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**

  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state, and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**

  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, **you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class.** Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**

  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**

  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be
guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services Office for assistance at (361) 825-5816. http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane, and classes could not be held on the campus of Texas A&M University-Corpus Christi; this course will continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

In choosing to take this course, you are agreeing to abide by the course rules, regulations, and standards. This includes agreeing to be respectful to your instructors and fellow students. Conduct that is disruptive or disrespectful will not be tolerated and is grounds for dismissal from the class. Should you have concerns or questions, you are to discuss them with the instructor as soon as possible. However, you are bound by these rules, regulations, and standards from the first day of the class throughout the duration of the course.

**GENERAL DISCLAIMER**
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.