Chemistry 1409 Syllabus, Fall 2019
El Centro College

Instructor Information
Name: Celyna Rackov
Phone: 214-8602382
Email: celyna.rackov@dcccd.edu
Office Location: A723

Course Information
Course Title: Chemistry for Engineers
Course & Section Number: CHEM1409 - 51001
Semester/Year: Fall 2019
Credit Hours: 4
Class Meeting Time/Location: Lecture: TR - A743 2:30 – 3:50 pm
                      Lab:      TR – A721 4:00 – 5:20 pm

Course Prerequisites
MATH 1314 College Algebra
College Algebra or equivalent academic preparation
High school chemistry or equivalent preparation

Course Description
Fundamental principles of chemistry for engineering majors; topics include measurements, fundamental properties of matter, states of matter, chemical reactions, acid-base concepts, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, phase-diagrams, introduction to chemical equilibrium, chemical thermodynamics, electrochemistry, and an introduction to descriptive inorganic chemistry and organic chemistry.

Coordinating Board Approval Number 4005015803

Statement of Purpose and Core Objectives
Statement of Purpose
Through the Texas Core Curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world, develop principles of personal and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning.

Core Objectives
This course supports, develops, and assesses the following Core Objectives:
Chemistry 1409 develops the following Core Objectives:

**Critical Thinking** - to include creative thinking, innovation, inquiry, and analysis, evaluation, and synthesis of information.

**Communication** - to include effective development, interpretation, and expression of idea through written, oral, and visual communication.

**Teamwork** - to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

**Empirical and Quantitative Skills** - to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

**Student Learning Outcomes**

Upon successful completion of this course, students will be able to:

(Lecture)

Upon successful completion of this course, students will:

1. Define the fundamental properties of matter.
2. Classify matter, compounds, and chemical reactions.
3. Convert units of measure and demonstrate dimensional analysis skills.
4. Determine the basic nuclear and electronic structure of atoms.
5. Identify trends in chemical and physical properties of the elements using the Periodic Table.
6. Describe the bonding in and the shape of simple molecules and ions.
7. Solve stoichiometric problems.
8. Use the rules of nomenclature to name chemical compounds.
9. Write chemical formulas.
10. Write and balance equations.
11. Define the types and characteristics of chemical reactions including acids and bases.
12. Use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems.
13. Articulate the importance of intermolecular interactions and predict trends in physical properties.
14. State the characteristics of liquids and solids, including phase diagrams and spectrometry.
15. Apply the principles of equilibrium to chemical systems using Le Chatelier’s Principle to predict the effects of concentration, pressure, and temperature changes on equilibrium mixtures.
16. Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
17. Discuss the construction and operation of galvanic and electrolytic electrochemical cells, and determine standard and non-standard cell potentials.
Upon successful completion of this course, students will:
1. Use basic apparatus and apply experimental methodologies used in the chemistry laboratory.
2. Demonstrate safe and proper handling of laboratory equipment and chemicals. Conduct basic laboratory experiments with proper laboratory techniques.
3. Make careful and accurate experimental observations.
4. Relate physical observations and measurements to theoretical principles.
5. Interpret laboratory results and experimental data, and reach logical conclusions.
6. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.
7. Design fundamental experiments involving principles of chemistry and chemical instrumentation.
8. Identify appropriate sources of information for conducting laboratory experiments involving principles of chemistry.

**Required Course Materials**


Chemistry for Engineering Students - Online web learning (OWLv2), Cengage.


Note: A student of this institution is not under any obligation to purchase a textbook from a university-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

**Course Activities:**

Discussions of readings during lectures.
Homework assignments using concepts studied during lecture.
Participation in lab activities (Pre-lab, the experiment, and post lab).
Exams

**Grade Policy:**

Exam 1, 2 and 3: 40%
Final Exam: 15%
Lab Exams and Lab Reports: 20%
Assessment (Blackboard): 15%
Quizzes (at home): 10%
Grading Scale:

A = 90 – 100%
B = 80 – 89.9%
C = 70 – 79.9%
D = 60 – 69.9%
F = Below 60%

CHEM -1409-53001 - Tentative Course and Exam Schedule – Spring 2019

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture Material &amp; Exams</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/26</td>
<td>Course Orientation; Introduction to Chemistry</td>
<td>Safety Rules</td>
</tr>
<tr>
<td>09/02</td>
<td>Atoms and Molecules</td>
<td>Density, Accuracy, Precision and Graphing</td>
</tr>
<tr>
<td>09/09</td>
<td>Molecules, Moles, and Chemical Equations</td>
<td>Classification of Chemical Reactions</td>
</tr>
<tr>
<td>09/16</td>
<td>Stoichiometry</td>
<td>Empirical Formula</td>
</tr>
<tr>
<td>09/23</td>
<td>Gases, Review for Exam 1, Exam 1</td>
<td></td>
</tr>
<tr>
<td>09/30</td>
<td>The Periodic Table and Atomic Structure; Chemical Bonding and Molecular Structure</td>
<td>Lab Exam 1</td>
</tr>
<tr>
<td>10/07</td>
<td>Energy and Chemistry</td>
<td>Spectroscopy</td>
</tr>
<tr>
<td>10/14</td>
<td>Entropy and the Second Law of Thermodynamics</td>
<td>Thermochemistry</td>
</tr>
<tr>
<td>10/21</td>
<td>Review for Exam 2, Exam 2</td>
<td></td>
</tr>
<tr>
<td>10/28</td>
<td>Chemical Kinetics</td>
<td>Rates and Mechanisms reactions</td>
</tr>
<tr>
<td>11/04</td>
<td>Chemical Equilibrium</td>
<td>Acids and Bases: pH, pKa measurements</td>
</tr>
<tr>
<td>11/11</td>
<td>Electrochemistry</td>
<td>Electrochemistry</td>
</tr>
<tr>
<td>11/18</td>
<td>Nuclear Chemistry</td>
<td>Lab Exam 2</td>
</tr>
<tr>
<td>11/25</td>
<td>Functional Groups (Thanksgiving Holydays begin 11-28)</td>
<td></td>
</tr>
<tr>
<td>12/02</td>
<td>Review for Exam 3, Exam 3</td>
<td></td>
</tr>
<tr>
<td>12/09</td>
<td>Comprehensive Final Exam</td>
<td></td>
</tr>
</tbody>
</table>

Institutional Policies

Institutional Policies relating to this course can be accessed using the following link: Institutional Policies (http://www.elcentrocollege.edu/syllabipolicies).