Course Outline

COURSE: CHEM 30A  DIVISION: 10  ALSO LISTED AS:

TERM EFFECTIVE: Fall 2017  CURRICULUM APPROVAL DATE: 11/14/2016

SHORT TITLE: ELEM CHEMISTRY L/L
LONG TITLE: Elementary Chemistry

<table>
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<tr>
<th>Units</th>
<th>Number of Weeks</th>
<th>Type</th>
<th>Contact Hours/Week</th>
<th>Total Contact Hours</th>
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<td>4</td>
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<td>Lecture</td>
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<td>Lab</td>
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<td>Total</td>
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COURSE DESCRIPTION:

This is a first semester college chemistry course designed for majors preparing to take Chemistry 1A, nursing and allied health students, as well as general education. The course will cover the principles of chemistry including properties of matter, energy, atomic theory, the Periodic Table, stoichiometry, elements and compounds, the properties of bonding, molecular structure, chemical reactions, states of matter, acidity, solutions and gases, as well as an introduction to organic chemistry. PREREQUISITE: Mathematics 430; eligible for English 250 and English 260.

PREREQUISITES:

Completion of MATH 205, as UG, with a grade of C or better.
OR
(Completion of MATH 205A, as UG, with a grade of C or better.
AND Completion of MATH 205B, as UG, with a grade of C or better.)
OR
Completion of MATH 206, as UG, with a grade of C or better.
OR
Completion of MATH 233A, as UG, with a grade of C or better.
OR
Completion of MATH 430, as UG, with a grade of C or better.
OR
Score of 17 on Elementary Algebra
OR
Score of 15 on Intermediate Algebra
OR
Score of 2500 on Accuplacer Math
COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES
   L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:
   02 - Lecture and/or discussion
   03 - Lecture/Laboratory
   04 - Laboratory/Studio/Activity

STUDENT LEARNING OUTCOMES:
1. Derive and apply the fundamental organization of the atom.
2. Develop strategies to approach, solve and comprehend problems that involve stoichiometry.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
  ILO: 2, 1, 7
  GE-LO: B1, B3, B5, B6, A6
  Year assessed or anticipated year of assessment: 2014

3. Identify the major classes of reactions, balance equations, and predict their products.
4. Use the gas laws to quantitatively describe gaseous behavior.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
  ILO: 2, 1, 7
  GE-LO: B1, B3, B5, B6, A6
  Year assessed or anticipated year of assessment: 2014

5. Compare and contrast the concept of pH, and the quantitative aspects of acid-base strength.
6. Demonstrate proficiency in using scientific notation, significant figures, and measurement units.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
  ILO: 2, 1, 7
  GE-LO: B1, B3, B5, B6, A6
  Year assessed or anticipated year of assessment: 2014

7. Design strategies to approach and solve problems using dimensional analysis.
8. Describe the various different classes and states of matter.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:

11/18/2016
9. Distinguish between exothermic and endothermic reactions and relate to the heat flow in a chemical change.
10. Use the periodic table to gain information about the elements and predict their properties and reactivities.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6
Year assessed or anticipated year of assessment: 2015

11. Describe the formation and properties of ionic and molecular compounds.
12. Demonstrate understanding and analyze the concepts of grams, moles and molarity.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6
Year assessed or anticipated year of assessment: 2015

13. Demonstrate knowledge of the formation and properties of solutions.
14. Evaluate the reactions and chemical properties of electrolytes, acids and bases.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6
Year assessed or anticipated year of assessment: 2016

15. Describe conceptually what the equilibrium state represents, and identify factors that affect equilibrium reactions.
16. Demonstrate understanding and distinguish between chemical and nuclear reactions, and describe the various types of nuclear decay.

Measure: Homework, Group activities, Quizzes, and Exams.
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6
Year assessed or anticipated year of assessment: 2016

17. Demonstrate knowledge of, as well as compare and contrast simple organic molecules and functional groups.

Measure: Homework, Group activities, Quizzes, and Exams.

11/18/2016
18. Collect and analyze laboratory experimental data and solve related chemical problems.
19. Examine chemical concepts through peer interaction and written laboratory reports.
20. Relate classroom and laboratory experiences to phenomena outside the classroom.

Measure: Homework, Group activities, Quizzes, and Exams.

PROGRAM LEARNING OUTCOMES:
Employing the scientific method as a basis for evaluation theoretical and laboratory derived information, students will gain an understanding of the biological and/or physical worlds. Students will also gain a working familiarity with mathematics and an understanding of mathematics as it applies to modeling in the sciences.

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS
Curriculum Approval Date: 11/14/2016

WEEK 1 6 HOURS
Chapter-1 Goals, Methods, and Measurements
Laboratory Experiment: Locker Check-In and Safety.
Demonstrate proficiency in using scientific notation, significant figures, and measurement units.
Design strategies to approach and solve problems using dimensional analysis.

WEEK 2-3 12 HOURS
Chapter-2 Matter and Energy
Laboratory Experiment: Measurement of Volume.
Laboratory Experiment: Measurement of Mass.
Describe the different classes and states of matter.
Distinguish between exothermic and endothermic reactions and relate to heat flow in a chemical change.

WEEK 4-5 12 HOURS
Chapter-5 Quantitative Relationships in Chemical Reactions
concentration. Preparing dilute solutions from concentrated solutions.

Homework problems from text and instructor.

Laboratory Experiment: Mass Relations in Chemical Changes.

Exam # 1

Identify the major classes of reactions, balance equations and predict products.

Develop strategies to approach, solve and comprehend problems involving stoichiometry.

Demonstrate and analyze the concepts of moles and molarity.

WEEK 6  6 HOURS

Chapter-3  Atomic Theory and the Periodic Table


Homework problems from text and instructor.

Laboratory Experiment: Effect of Limiting the Concentration of a Reactant.

Derive and apply the fundamental organization of the atom.

Use the periodic table to gain information about the elements and predict their properties and reactivities.

WEEK 7-8  12 HOURS

Chapter-4  Chemical Compounds and Chemical Bonds

Electron transfer and ionic compounds. Oxidation-reduction reactions.

Electron sharing and molecular compounds. Lewis structures and the octet rule. Writing Lewis structures of molecules and polyatomic ions.

Geometry of molecules and polarity.

Homework problems from text and instructor.

Laboratory Experiment: Reactions of Acid with Magnesium.

Laboratory Experiment: Partial Pressure of Oxygen in Air.

Describe the formation and properties of ionic and molecular compounds.

WEEK 9-10  12 HOURS

Chapter-6  States of Matter and the Kinetic Theory


Homework problems from text and instructor.

Laboratory Experiment: Molecular Models and Molecular Structure.

Exam # 2

Use the gas laws to quantitatively describe gaseous behavior.

WEEK 11  6 HOURS

Chapter-7  Solutions and Colloids

Types of homogeneous mixtures. Aqueous solutions and how they form.

Solubilities of gases. Expressions of percentage concentration.

Osmosis and dialysis.

Homework problems from text and instructor.
Laboratory Experiment: Popcorn and the Effect of Water Vapor. Demonstrate the formation and properties of solutions.

WEEK 12-13  12 HOURS
Chapter-8  Acids, Bases, and Ionic Compounds.
Homework problems from text and instructor.
Laboratory Experiment: Predicting Reactions Using Solubility Rules. / Testing Various Ions. Laboratory Experiment: Determination of pH.
Evaluate the chemical properties of electrolytes, acids and bases.

WEEK 14-15  12 HOURS
Chapter-9  Reaction Kinetics and Chemical Equilibria. Acid-Base Equilibria
Homework problems from text and instructor.
Laboratory Experiment: Acid-Base Titrations.
Exam # 3
Describe conceptually what the equilibrium state represents, and identify factors that affect equilibrium.
Compare and contrast the concept of pH, and the quantitative aspects of acid-base strength.

WEEK 16  6 HOURS
Chapter-10  Radioactivity and Nuclear Chemistry
Homework problems from text and instructor.
Laboratory Experiment: Acid-Bas Titrations (continued).
Distinguish between chemical and nuclear reactions and describe the various types of nuclear decay.

WEEK 17  6 HOURS
Chapter-11  Organic Chemistry. Saturated Hydrocarbons and Selected Topics
Homework problems from text and instructor.
Laboratory Experiment: Locker Check-Out.
Compare and contrast simple organic molecules and functional groups.

11/18/2016  6
WEEK 18   2 HOURS
Final Examination (cumulative).
Comprehensive over the entire course with evaluation of each of the areas previously encountered.

METHODS OF INSTRUCTION:
Instruction is by lecture, class discussion, lecture demonstration, small group problem solving, laboratory work projects, homework and exams.

METHODS OF EVALUATION:
CATEGORY 1 - The types of writing assignments required:
Percent range of total grade: 20 % to 30 %
Written Homework
Lab Reports
Other: Extra credit report on a chemistry topic.
CATEGORY 2 - The problem-solving assignments required:
Percent range of total grade: 70 % to 80 %
Homework Problems
Lab Reports
Quizzes
Exams
CATEGORY 3 - The types of skill demonstrations required:
Percent range of total grade: 0 % to %
CATEGORY 4 - The types of objective examinations used in the course:

REPRESENTATIVE TEXTBOOKS:
Required:
1.) J. McMurry, 1.) "Fundamentals of General, Organic, and Biological Chemistry." 8th ed.
D.S. Ballantine, C.A. Hoeger, V.E Peterson
2.) D. Clark, G. Burce, E. Kilby
Or other appropriate college level text.
Recommended:
D.S. Ballantine, C.A. Hoeger, V.E Peterson
1.) Pearson/Prentice 1.) 2016
1.) Pearson/Prentice 1.) 2016
1.) Pearson/Prentice 1.) 2016
Hall Publishing
Hall Publishing
Hall Publishing
978-1-634-34141-7
978-0-321-77616-7
Reading level of text, Grade: 12 Verified by: D. Clark
Other textbooks or materials to be purchased by the student: None

ARTICULATION and CERTIFICATE INFORMATION
Associate Degree:

11/18/2016
GAV B1, effective 201370
GAV B3, effective 201370

CSU GE:
   CSU B1, effective 201370
   CSU B3, effective 201370

IGETC:
   IGETC 5A, effective 201370
   IGETC 5C, effective 201370

CSU TRANSFER:
   Transferable CSU, effective 201370

UC TRANSFER:
   Transferable UC, effective 201370

SUPPLEMENTAL DATA:
Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN: CHEM6
CAN Sequence: CHEM SEQ B
CSU Crosswalk Course Department: CHEM
CSU Crosswalk Course Number: 30A
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000288847
Sports/Physical Education Course: N
Taxonomy of Program: 190500