Class Syllabus
Fall 2013
CHE 101
Conceptual Chemistry

Title: Conceptual Chemistry

Course Description: CHE 101 will be an introductory course that is designed for non-science majors. It will be an elective, but not part of any major or minor (except as a science elective fulfilling the core)

CHE 101 is an overview of the field of chemistry and its impact on science, technology, society and the environment. This conceptual approach involves a minimum of mathematics and investigates the chemistry found in the world around us, especially environmental issues. This course utilizes an integrated lecture/lab format and does not count toward a major or minor in chemistry. Instruction will consist of two hours of lecture and three hours of lab per week. Lab fee required.

TEXT AND MATERIALS:

The Extraordinary Chemistry of Ordinary Things, 4th ed., by Carl H Snyder, John Wiley & Sons, Inc,. 2011.

PREREQUISITES: None

CORE OBJECTIVES: At the end of the course, the student will have attained and met the following key core skills; Critical Thinking Skills, Communication skills, Empirical and Quantitative skills, and Teamwork skills. Proficiency of student will be assessed as stated in the CHE 101 "Assessment Protocol".

STUDENT LEARNING OUTCOMES

1. Students will correctly interpret the chemical behavior of substances using the body of knowledge of chemistry as a foundation. ***(critical thinking skills)***
2. Student will communicate effectively in written reports and oral presentations. ***(communication skills)***
3. Students will correctly assemble laboratory equipment, collect appropriate data, and analyze and interpret the results. ***(empirical and quantitative skills)***
4. Students will cooperate with each other in achieving successful completion of group projects. ***(teamwork)***

COURSE CALENDER (APPROXIMATE TIME):

MATERIAL IN THE COURSE WILL BE COVERED UNDER FIVE THEMES; EARTH, AIR, WATER, ENERGY & BIOTECHNOLOGY.

Chapters from the text will be covered in the following order.

A. EARTH

1. Matter, Classification of matter (1- 3%)
   - What Exactly Is Chemistry?
   - Macroscopic versus microscopic viewpoints

   Lab activity: (a) Demonstration: Burning of magnesium
   (b) Lab Activity: The Collapsing Can
   (c) Separation of the Pigments in a Marker – Paper Chromatography
2. Measurements - Metric System/scientific methods (1- 3%)
   Lab activity: (a) Measurement Lab – mass, length, volume
   (b) Density Lab
   (c)The Rolling Can
   (d) Kinetic and Potential Energy - Poppers
   (e) Measuring Energy – Temperature and Heat
   (f) Hot Stuff Activity – Measuring Temperature versus Time
3. Atoms and Elements, Ions, and the Periodic Table (1- 3%)
4. The Periodic Table Trends (1- 3%)
   Lab activity: Simulator – a Periodic Table Activity
5. The Green Chemistry Beliefs (1- 3%)
   Matter – Solids, Liquids and Gases, Metals, Non-metals, metals and molecules (1- 3%)
6. Structure of the atom and radioactivity (1- 3%)
   Lab activity: (a) Radioactivity and Radioactive Decay
   (b) Half-Lives and Radioactive Dating
   (C) Half-Life of an M&M

7. Electrons, The Bohr Model, Interesting subatomic particles (1- 3%)
8. Isotopes in Science - biology, geology, Chemistry and medicine: Imaging, cancer treatment (1- 3%)
   -Nuclear reactions and uses - Recent nuclear accidents in Chernobyl, Hiroshima and Nagasaki, Fukushima
9. Bonding in Elements and compounds: (Structure and Properties of Ionic and Covalent Compounds) (1- 3%)
   Inorganic and Organic compounds, Names and Formulas (1- 3%)
   Lab Activity: Electrolytes and Electrical Conductivity
10. Structures of solids and Liquids (1- 3%)
11. Shape and geometry affect reactivity in living cells (1- 3%)
12. Toxic effects of CO. (1- 3%)
    (Counting Atoms and Molecules)
13. Atoms, Molecules, Avogadro's number
14. Types of reactions. (1- 3%)
    Lab activity: (a) Reaction in a Bag
    (b) Sugar Cube Catalysis
    (c) Alka Seltzer Kinetics
15. Balancing reactions. (1- 3%)

B. WATER

16. Unique Properties of Water as a chemical substance
17. Bonding in water, shape of water (1- 3%)
18. Physico-chemical properties of water (1- 3%)
19. H-bonding. (1- 3%)
20. Solution chemistry (1- 3%)
21. Acids and bases (1- 3%)
    Lab activity: (a) Properties of Acids and Bases
    (b) Red Cabbage Indicator
    (c) Acid Base Titration
22. Specific heat capacity of water (1- 3%)
23. Environmental pollution (1- 3%)
24. Water Pollution (1- 3%)
    Lab activity: Water Purification Activities

C. AIR

25. Macroscopic view of Air (1- 3%)
26. Description of various gases (1- 3%)
27. Properties of Gases – P, V, T, n (1- 3%)
28. Gas Laws, and acid rain (1- 3%)
    Lab activity: (a) Cartesian Divers
    (b) Air Pressure Activities
29. Composition of the atmosphere (1- 3%)
30. Combustion (1- 3%)

D. ENERGY FOR THE 21ST CENTURY

31. Sources of energy. Types of energy; kinetic, potential, etc, The sun. (1- 3%)
32. Photosynthesis. Autotrophs and energy (1- 3%)
33. Uses of energy (1- 3%)
34. Fossil fuels; Disadvantages of fossil fuels (1- 3%)
35. Harnessing the secrets of the Nucleus - Nuclear energy (1- 3%)
    Lab activity: A simulated experiment to show various types of radioactive particles
36. Global (re)distribution of energy (1- 3%)
37. Energy and environmental pollution (1- 3%)
38. Energy and politics (1- 3%)
39. Entropy (1- 3%)
40. Bond breaking and bond making. (1- 3%)

E. ORGANIC, BIOCHEMISTRY AND BIOTECHNOLGY

41. Polymers, natural and synthetic polymers (1- 3%)
    Lab activity: (a) Making Glue - Crosslinking
    (b) Amazing Pin Cushion
42. Plastics, rubber (1- 3%)
43. Liquid crystals (1- 3%)

44. Natural polymers: carbohydrates and polysaccharides (1- 3%)
45. Nucleic acids and nucleotides (1- 3%)
46. The Chemistry of heredity (DNA) (1- 3%)
47. Cosmetics and Personal care (1- 3%)
48. Medicine and drugs (1- 3%)

INSTRUCTIONAL ACTIVITIES:
This is an integrated lecture and laboratory, assigned reading, virtual demonstrations, video and computer assisted learning each week.

COURSE REQUIREMENTS:

a) *Semester exams.* There will be **four** *semester exams* during the semester, and a **comprehensive Final** cumulative with emphasis on the material covered since the last exam. These exams will consist of discussion questions, and/or multiple choice, true/false, fill-in-blanks or essay type questions. Multiple choice questions will have no partial credit. In addition, homework problems will be assigned. Continuous quizzes will be given in class. These quizzes will test your understanding of material covered in class.
b) *Oral Presentations*: Both oral and written Communication Skills will be assessed. Students will write formal library reports, lab reports, and solutions of problems. Students will be required to make at least one oral presentation in the semester.

METHOD OF EVALUATION:
The grade is a percent of the total points composed of laboratory activities and five exams. The grade composition is as follows:

Laboratory activities and oral presentation (s)	1/3 of course grade	33.33 % of total grade
5 Exams (4 semester exams & one Comprehensive Final Exam)	2/3 of course grade	66.67 % of total grade
TOTAL		100 %

LAB ACTIVITIES
INTEGRATED LAB ACTIVITIES ARE INCLUDED WITH LECTURE AS SHOWN IN COURSE CALENDAR

ATTENDANCE POLICY:
Attendance of class is mandatory as per SFASU policy.

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.

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 or laboratory experiment, expulsion from the class or expulsion from the University.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

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.

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, Human Services Building, Room 325, 468-3004/ 468-1004 (TDD) as early as possible in the semester. Once verified, DS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided.

CLASSROOM BEHAVIOR POLICY: To ensure a classroom environment conducive to learning, any forms of classroom disruptions will not be tolerated (examples but not limited to – talking, use of cell phones/beepers, sleeping, reading other material, eating/drinking). 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.

Note: If you are taking this course in preparation for the TEKS (to become a teacher) you need to contact **Dr. John Moore** in Room 117, Math Building.