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| |  | | --- | | **Welcome!** General Chemistry 1A (3units) is an introduction to matter and energy, atomic structure, nomenclature, chemical equations, stoichiometry, gases, thermochemistry, quantum chemistry, bonding, molecular geometry, oxidation-reduction, liquids and solids, and solutions. This course is designed for all science majors. **Prerequisites:**  1 year of high school intermediate algebra (Algebra II); CHEM V20-V20L or high school chemistry with grades of C or better.  **Who should take this course?** Those students who are preparing for scientific and medical fields usually need a full year of chemistry. It is both challenging and demanding; you should anticipate attending every class and spending **\*8-10 hours a week** for study. | | **How to succeed in this class**  **Show up**: School policy states that students missing two weeks’ worth of class will be dropped. If you are absent, you must catch up on what you have missed or make arrangements beforehand; class information will not be repeated. Absence is not a valid excuse for missing assignments.  **Be engaged:** Focus on the activities in class and avoid distractions like mobile devices. Ask questions, read, practice, and be proactive! All cell phones should be put away unless prior approval is received.  **Write (don’t type!);** Research shows that students who take the time to re-write notes and work calculations and problems by hand perform statistically much higher than those students who do not. Communicate: I’m happy to talk with you about your progress in the class. Please email me or let me know if you have any questions or concerns. | | **Sapling Homework:**  We use an online homework website like most universities. The system we are using starting this fall, is Sapling. You will be using sapling for your entire year of chemistry, from 1A through 1B. You can link to my Sapling site through CANVAS, or [www.saplinglearning.com](http://www.saplinglearning.com). ($45)  It is YOUR RESPONSIBILITY to sign up and begin immediately. You are responsible for checking due dates and staying on top of your assignments. Late work is marked off 25%/day for uncompleted questions.  **Quizzes:**  A short quiz will be given almost every week on the material from the previous week. These will begin at the very start of class and will last only 10-15minutes. If you’re late, you will not receive extra time. Please be prepared. One quiz will be dropped at the end of the semester.  **Exams:**  Exams will be approximately 3 chapters and will be a combination of written calculations, short answers, and/or multiple choice. NO MAKEUP EXAMS will be given, no matter the reason. One exam from Exams 1-3 will be dropped at the end of the semester. | | **Important dates**  **Exam 1 Tuesday Sept 18th**  **Exam 2 Tuesday Oct 16th**  **Exam 3 Thursday Nov 15th**  **Exam 4 thursday Dec 13th 10:15am-12:15pm**  **Last Day to Drop w/out a W: Friday September 7th**  **Last Day to Drop w/ a W: Friday November 23rd**  **Holidays: Mondays September 3rd & November 12th**  **Thursday & Friday November 22-23** | | **ON CAM PUS RESOURCES**  **EAC (Administration Building):** The Educational Assistance Center provides testing and accommodations for students. If you have already established accommodations with the EAC, let me know as soon as possible. If you think you might benefit from the EAC’s services, I’d be happy to go with you and introduce you.  **Tutoring Center (LRC 1st floor)**: All VC students are eligible for free tutoring at the Tutoring Center. You can make an appointment or drop-in for help .  **STEM HARBOR**: Science students can get help from a variety of faculty in Sci 223. Schedule will be posted on CANVAS. | | |  | | --- | | **Contact Info**Instructor: Michelle DavidsonEmail: [mdavidson@vcccd.edu](mailto:mdavidson@vcccd.edu)\*Emails returned M-Th within 24hrs.\*Weekend emails returned MondayWebsite: [www.michelledavidsonchemistry.weebly.com](http://www.michelledavidsonchemistry.weebly.com)Office: Sci 334Drop-in Hours(talk to me in my office or via email):Mon 12:50 – 2:30pmTues/Thurs 8 – 8:30am (Sci 216)Wed 12:50 – 1:50pmThurs 12:50 – 2:10pm | | **materials**Scientific Calculator(No cellphones or graphing calculators allowed) | | **textbook**  1. FREE OER TEXTBOOK ONLINE:   <http://openstax.org/details/books/chemistry>  \*A printed version can be purchased in the bookstore.    \*You may use any other text you like – just follow topic list provided. | | **GRADING**  Please Check canvas often  Homework 10%  Quizzes 20%  Exams 1-3 45%  Exam 4 25%  A 90.000% or higher  B 80.000% - 89.999%  C 70.000% - 79.999%  D 60.000% - 69.999%  F 59.999% or lower  \*Please do not ask for grades to be rounded. One quiz & one exam are already dropped! | | **Student learning outcomes**  1. Balance Chemical equations and solve general Chemistry problems by applying the scientific method including developing hypotheses, hypotheses testing and evaluation. 2. Use Chemical concepts such as enthalpy, VSEPR theory, changes of state, and colligative properties to determine the physical properties of substances. 3. Calculate quantities involving Chemical equations including using Chemical symbols, IUPAC nomenclature, balancing reactions and stoichiometry. | | Please let me know if you have any additional concerns or need EAC accommodations. | |

**The Topic Order We Will Follow…**

<http://openstax.org/details/books/chemistry>

* **Essential Ideas** 
  + Introduction
  + 1.1. Chemistry in Context
  + 1.2. Phases and Classification of Matter
  + 1.3. Physical and Chemical Properties
  + 1.4. Measurements
  + 1.5. Measurement Uncertainty, Accuracy, and Precision
  + 1.6. Mathematical Treatment of Measurement Results
* **Atoms, Molecules, and Ions** 
  + Introduction
  + 2.1. Early Ideas in Atomic Theory
  + 2.2. Evolution of Atomic Theory
  + 2.3. Atomic Structure and Symbolism
  + 2.4. Chemical Formulas
  + 2.5. The Periodic Table
  + 2.6. Molecular and Ionic Compounds
  + 2.7. Chemical Nomenclature
* **Composition of Substances and Solutions** 
  + Introduction
  + 3.1. Formula Mass and the Mole Concept
  + 3.2. Determining Empirical and Molecular Formulas
  + 3.3. Molarity
  + 3.4. Other Units for Solution Concentrations
* **Stoichiometry of Chemical Reactions** 
  + Introduction
  + 4.1. Writing and Balancing Chemical Equations
  + 4.2. Classifying Chemical Reactions
  + 4.3. Reaction Stoichiometry
  + 4.4. Reaction Yields
  + 4.5. Quantitative Chemical Analysis
* **Gases**
  + Introduction
  + 9.1. Gas Pressure
  + 9.2. Relating Pressure, Volume, Amount, and Temperature: The Ideal Gas Law
  + 9.3. Stoichiometry of Gaseous Substances, Mixtures, and Reactions
* **Thermochemistry**
  + Introduction
  + 5.1. Energy Basics
  + 5.2. Calorimetry
  + 5.3. Enthalpy
* **Electronic Structure and Periodic Properties of Elements**
  + Introduction
  + 6.1. Electromagnetic Energy
  + 6.2. The Bohr Model
  + 6.3. Development of Quantum Theory
  + 6.4. Electronic Structure of Atoms (Electron Configurations)
  + 6.5. Periodic Variations in Element Properties
* **Chemical Bonding and Molecular Geometry**
  + Introduction
  + 7.1. Ionic Bonding
  + 7.2. Covalent Bonding
  + 7.3. Lewis Symbols and Structures
  + 7.4. Formal Charges and Resonance
  + 7.5. Strengths of Ionic and Covalent Bonds
  + 7.6. Molecular Structure and Polarity
* **Advanced Theories of Covalent Bonding**
  + Introduction
  + 8.1. Valence Bond Theory
  + 8.2. Hybrid Atomic Orbitals
  + 8.3. Multiple Bonds
  + 8.4. Molecular Orbital Theory
* **Liquids and Solids**
  + Introduction
  + 10.1. Intermolecular Forces
  + 10.2. Properties of Liquids
  + 10.3. Phase Transitions
* **Solutions and Colloids**
  + Introduction
  + 11.1. The Dissolution Process
  + 11.2. Electrolytes
  + 11.3. Solubility
  + 11.4. Colligative Properties

**Course Objectives:**

Upon successful completion of this course, the student will be able to demonstrate the following measurable skills and abilities:

* Apply the scientific method to chemistry data and problems, including hypothesis development, testing, and evaluation.
* Write balanced chemical equations including net ionic and oxidation-reduction equations.
* Assess the different models of the atom.
* Use standard nomenclature and notation.
* Calculate the formula weight, mass percentages, and empirical formula.
* Evaluate mole and limiting reactant stoichiometry calculations.
* Analyze the ideal gas law and predict deviations from ideal behavior.
* Calculate enthalpies of reaction using bond energies.
* Determine the relative strengths of acids, bases, and electrolytes.
* Diagram hybridization, geometry, and polarity for simple molecules.
* Evaluate bonding in compounds and ions.
* Differentiate between solids, liquids, gases, and phase changes.
* Evaluate metallic bonding and semiconductors.
* Analyze concentration units for solutions and solving solution stoichiometry problems.
* Evaluate colligative properties of solutions.
* Carry out various calculations involving particles, moles, grams, unit conversions, scientific notation, multi-variable equations, etc., using a scientific calculator.