



**Credit Chemistry Honors**  
**Detailed Lecture Syllabus (Six, two-hour Labs)**

\*All areas are accelerated\*

**Matter & Measurement**

Significant figures, unit conversions

Types of matter (elements, compounds, mixtures)

Memorize symbols and names of common elements (Properties of substances: density, melting point, and boiling point)

**Atoms, Molecules, and Ions**

Atomic theory: history of discovery of electron, proton, & neutron

Determining the number of protons, neutrons, & electrons for atoms and ions

Molar mass of molecules, concept of mole and molarity

**Chemical Formulas and Stoichiometry**

Percent composition: from formula to percent and vice-versa

Nomenclature: memorize polyatomic ions and charges (handout)

Writing and balancing equations: from names to formulas to reactions

Mass relations: Stoichiometry

Mole-mole relations, mole-mass relations, mass-mass relations

Limiting reactant problems and theoretical yield

**Thermochemistry**

Calorimetry, Definitions: endothermic & exothermic, reaction enthalpy ( $L'.H_{rxn}$ )

Thermochemical equations; Laws of Thermochemistry

Stoichiometric relations in thermochemistry

Hess' Law and heats of formation ( $D.H_{rxn} = L'.H_{products} - L'.H_{reactants}$ )

**Behavior of Gases**

Boyle's Law, Charles' Law, Ideal Gas Law, Dalton's Law, Graham's Law

Stoichiometry using gas laws

**Electronic Structure**

History and Bohr model

Quantum numbers: definition of each number, drawings of orbitals

Pauli Exclusion Principle

Electron configurations: atoms and ions



Orbital diagrams and Hund's Rule, (exceptions: Cr and Cu)

### **Periodic Law**

Atomic radii, ionization energy, including exceptions  
Electron affinity, metallic character

### **Covalent Bonding**

Lewis structures: simple molecules and polyatomic ions, resonance forms  
Exceptions to the octet rule: B and Be compounds, odd-electron species  
Bond energies, bond lengths, bond polarity, polarity in molecules

### **Molecular Structure**

Hybridization: sp, sp<sup>2</sup>, sp<sup>3</sup>, expanded octets: sp<sup>3</sup>d, sp<sup>3</sup>d<sup>2</sup>  
Molecular polarity, sigma and pi bonds

### **Liquids and Solids**

Intermolecular forces of attraction; dispersion, dipole, and hydrogen bonding  
Types of solids: covalent network, ionic, molecular, and metallic

### **Acid-Base Equilibria**

Titration curve problems (mixtures)  
Hydrolysis of salt solutions: determine pH

### **Electrochemistry**

Oxidation - Reduction; balancing redox equation  
Galvanic cells and electrolysis (faraday)