**Honors Chemistry Syllabus 2009–2010[QAS]**
**Instructor: Mr. Xu Duan**
**Textbook: Introductory Chemistry / A Foundation *by Zumdahl* (6th edition)**

| Theme / Mega-Topic | Topic | Lab | Chapter |
|---|---|---|---|
| **Math Building** | Scientific notation & calculator usage<br>Common units<br>Uncertainty in measurements<br>Significant figures<br>Conversion & equations<br>Algebraic manipulations | | **2** |
| **Chemistry Composition** | Matter<br>Elements & compounds & mixtures & molecules+<br>Atom & subatomic structures<br>Isotopes<br>The periodic table & states of elements<br>Ions & charges & periodic table | | **3&4** |
| **Nomenclature & Chemical Equations** | Compounds with a metal and a nonmetal<br>Compounds with 2 nonmetals<br>Compounds with polyatomic ions<br>Acids & other special molecules | | **6** |
| **Typing & Balancing Equations** | Introduction<br>Typing & classification<br>Balancing | | **6&7** |
| **Aqueous Chemistry & Net Ionic Equation** | Solubility rules<br>Net ionic equation<br>Activity series | | **7** |
| **Chemical Computation** | Avogadro's' # & atomic mass & mole & molar mass conversions<br>% composition of a compound<br>empirical & molecular calculation | | **8** |
| **Stoichiometry: Solid & Aqueous** | Mole ratio<br>Mass & mole conversion<br>Limited reactants<br>Percentage yield<br>Molarity<br>Dilution & solution mixture<br>Ion rankings in a reaction<br>Titration: neutralization & REDOX<br>Mass percent & normality | | **9&14** |

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| **Acids & Base** | pH scale<br>pH & pOH computation<br>Buffer solution | | **15** |
| **Atomic Theory & The Periodic Trends** | Modern theories<br>Electron configuration<br>Periodic trends | | **10** |
| **Chemical Bonding & Intermolecular Forces** | Ionic & covalent<br>Polarity & dipole moments<br>Lewis dot structure<br>VAEPR model & molecular shapes<br>Intermolecular forces in solids & liquids | | **11&13** |
| **Gas Law & Stoichiometry** | Kinetic molecule theory<br>The ideal gas law & its derivatives<br>Gas stoichiometry | | **12** |
| **Equilibrium** | Definition & condition<br>Equilibrium constant K: conversion & heterogeneity<br>K manipulation in multiple equilibria<br>Le Chatelier's Principle<br>Solubility equilibria | | **16** |
| **Electrochemistry** | REDOX reaction<br>Electrolysis<br>Battery<br>Corrosion | | **17** |
| **Organic Chemistry** | Alkane series: naming & isomerism<br>Alkenes, alkynes & aromatic compounds<br>Functional groups<br>Alchols, aldehydes & ketones<br>Caboxylic acids & esters<br>Polymers | | **19** |
| **Biochemistry** | Carbohydrates & food<br>Proteins & level of organizations<br>Lipids & functions<br>Nucleic acids & inheritance | | **20** |
| **Nuclear Chemistry** | Types of radioactive decays<br>Nuclear transformations & equations<br>Half-life & carbon dating<br>Nuclear energy: fission & fusion | | **18** |