General Chemistry I and General Chemistry II
Mediasite Lecture List
(in order of presentation of topics)

Unit 1: Foundational Aspects of Chemistry

Foundations of Chemistry
FA-1-0  Foundations of Foundations
FA-1-1  A Mindmap for General Chemistry
FA-1-2  Matter
FA-1-3  Properties
FA-1-4  Elements, Compounds, and Mixtures
FA-1-5  Measurements and Units
FA-1-6  Numbers
FA-1-7  Significant Figures
FA-1-8  Scientific Notation
FA-1-9  Unit Conversions
FA-1-10  Unit Conversion Example
FA-1-11  Density
FA-1-12  Heat and Temperature
FA-1-13  Moles

Chemical Formulas & Composition Stoichiometry
FA-2-1  Atoms
FA-2-2  Formulas
FA-2-3  Mass and Moles
FA-2-4  Percent Composition

Chemical Equations & Reaction Stoichiometry
FA-3-1  Equations Basics
FA-3-2  Limiting Reactant & Percent Yield
FA-3-3  Concentration

Unit 2: Structure & Bonding

Atomic Structure
SB-1-1  Fundamental Particles
SB-1-2  The Nuclear Atom
SB-1-3  Mass Number & Isotopes
SB-1-4  Atomic Weight Scale
SB-1-5  Electromagnetic Radiation
SB-1-6  Atomic Spectra
SB-1-7  The Quantum Mechanical Atom
SB-1-8  Quantum Numbers
SB-1-9  Atomic Orbitals
SB-1-10 Electrons & Magnetism
SB-1-11 Electron Configurations

**Interlude: Oxidation and Reduction (Oxidation Numbers)**
SB-I-1 Introduction to Redox
SB-I-2 Assigning Oxidation Numbers, Part 1
SB-I-3 Assigning Oxidation Numbers, Part 2

**Periodicity**
SB-2-1 A Map of the Periodic Table
SB-2-2 Atomic Radii
SB-2-3 Ionic Radii
SB-2-4 Electron Affinity
SB-2-5 Ionization Energy
SB-2-6 Electronegativity

**Chemical Bonding**
SB-3-1 Types of Bonds
SB-3-2 Lewis Dot Structures
SB-3-3 Ionic Refresher
SB-3-4 Forming Ionic Compounds
SB-3-5 Covalent Bonds
SB-3-6 Covalent Lewis Structures
SB-3-7 The Octet Rule
SB-3-8 Resonance
SB-3-9 Formal Charge
SB-3-10 Polar & Nonpolar Bonds
SB-3-11 Dipole Moment & Molecules

**Molecular Structure**
SB-4-1 Introduction to Molecular Structure
SB-4-2 VSEPR Theory
SB-4-3 Using VSEPR Theory
SB-4-4 Geometry and Polarity
SB-4-5 Valence Bond Theory
SB-4-6 Visualizing Geometries
SB-4-7 Visualizing Multiple Bonds

**Unit 3: Chemical Reactions**

**The Basics of Chemical Reactions**
CR-1-1 Types of Elements: A Quick Review
CR-1-2 Electrolytes & Nonelectrolytes
CR-1-3 Strong and Weak Acids
CR-1-4 Strong and Weak Bases
CR-1-5 Solubility Rules
PM-2-10 Atomic Radii
PM-2-11 Band Theory

Solutions
PM-3-1 Dissolution
PM-3-2 Solids in Liquids
PM-3-3 Liquids & Gases in Liquids
PM-3-4 Dissolution Rates & Saturation
PM-3-5 Temperature & Pressure Effects on Solubility
PM-3-6 Molality & Mole Fraction
PM-3-7 Colligative Properties
PM-3-8 Vapor Pressure Lowering & Raoult's Law
PM-3-9 Boiling Point Elevation
PM-3-10 Freezing Point Depression
PM-3-11 Osmotic Pressure
PM-3-12 The van't Hoff Factor
PM-3-13 Colloids

Unit 5: Thermodynamics & Kinetics

Chemical Thermodynamics
TK-1-1 Thermodynamic Terms
TK-1-2 The First Law of Thermodynamics
TK-1-3 Enthalpy Changes
TK-1-4 Calorimetry
TK-1-5 Thermochemical Equations
TK-1-6 Standard States
TK-1-7 Hess’s Law
TK-1-8 Bond Energies
TK-1-9 Entropy
TK-1-10 Spontaneity & Gibbs Free Energy

Chemical Kinetics
TK-2-1 Kinetics Terms
TK-2-2 Reaction Rates
TK-2-3 Factors Affecting Reaction Rates
TK-2-4 Nature of Reactants
TK-2-5 Concentrations of Reactants
TK-2-6 Integrated Rate Equation & Half-life
TK-2-7 Determining Reaction Order
TK-2-8 Collision Theory
TK-2-9 Transition State Theory
TK-2-10 Determining Reaction Mechanisms
TK-2-11 Temperature & Rate
TK-2-12 Catalysts
Unit 6: Chemical Equilibrium

The Basics of Chemical Equilibrium
EQ-1-1 Basic Equilibrium Concepts
EQ-1-2 The Equilibrium Constant
EQ-1-3 $K_c$ and Equation Form
EQ-1-4 The Reaction Quotient
EQ-1-5 Le Châtelier’s Principle
EQ-1-6 The Equilibrium Constant & Pressure
EQ-1-7 Heterogeneous Equilibria
EQ-1-8 Gibbs Free Energy & Equilibrium
EQ-1-9 $K_c$ & Varying Temperature

Acid-Base Equilibria
EQ-2-1 Strong & Weak Acids & Bases
EQ-2-2 Autoionization of Water
EQ-2-3 The pH and pOH Scales
EQ-2-4 Acid and Base Ionization Constants
EQ-2-5 Polyprotic Acids
EQ-2-6 Solvolysis
EQ-2-7 Salts, Part 1
EQ-2-8 Salts, Part 2
EQ-2-9 Summary of Salient Points About Salts
EQ-2-10 Hydrolysis of High Charge Density Cations

Buffers & Titrations
EQ-3-1 Buffers & the Common Ion Effect
EQ-3-2 Weak Acid-Soluble Salt Buffers
EQ-3-3 Weak Base-Soluble Salt Buffers
EQ-3-4 The Henderson-Hasselbach Equation
EQ-3-5 Acid-Base Indicators
EQ-3-6 Strong Acid-Strong Base Titration Curves
EQ-3-7 Weak-Strong Titration Curves
EQ-3-8 Weak-Weak Titration Curves

Solubility Product Equilibria
EQ-4-1 The Solubility Product Constant
EQ-4-2 Miscellaneous $K_{sp}$ Concepts
EQ-4-3 Dissolving Precipitates
EQ-4-4 The Dissociation Constant

Unit 7: Other Topics

Electrochemistry
OT-1-1 Introduction to Electrochemistry
OT-1-2 Electrolysis & Electrolytic Cells
OT-1-3 Coulometry & Faraday’s Law
OT-1-4 Applications of Electrolysis
OT-1-5 Voltaic Cells
OT-1-6 Standard Electrode Potentials
OT-1-7 Using Standard Potentials
OT-1-8 Corrosion
OT-1-9 The Nernst Equation
OT-1-10 \( E^\circ, \Delta G, \text{ and } K \)
OT-1-11 Primary Voltaics
OT-1-12 Secondary Voltaics
OT-1-13 Fuel Cells

**Nuclear Chemistry**
OT-2-1 Comparing Chemical and Nuclear Reactions
OT-2-2 The Nucleus
OT-2-3 Nuclear Stability
OT-2-4 Radioactive Decay
OT-2-5 Detecting Radiation
OT-2-6 Rate of Decay
OT-2-7 Disintegration Series
OT-2-8 Radioactive Dating
OT-2-9 Transmutation
OT-2-10 Nuclear Fission
OT-2-11 Nuclear Fusion

**Coordination Chemistry**
OT-3-1 d-Block Metals
OT-3-2 d-Block Metal Ions
OT-3-3 Coordination Chemistry Terminology
OT-3-4 Nomenclature
OT-3-5 Structures
OT-3-6 Structural Isomerism
OT-3-7 Stereoisomerism
OT-3-8 Crystal Field Theory
OT-3-9 Color