



PimaCommunityCollege
West Campus

CHM 151 General Chemistry I

Topic Outline

The current textbook for this course is Kotz, John C., Treichel, Paul M., and Townsend, John R., **Chemistry & Chemical Reactivity**, 7th Ed., Thomson-Brooks/Cole, 2009.

This Topic Outline is intended for students who are using the textbook by Brown, Theodore L., LeMay, H. Eugene, Jr., Bursten, Bruce E., **Chemistry: The Central Science**, 10th Ed., Pearson Education, 2006.

This outline is provided as a courtesy to students who may have the Brown and LeMay textbook and do not want to purchase a new textbook. Please note that all topics and problems will be similar to those in the Kotz and Treichel textbook, but there will be differences in topics and material presented in the course.

Lecture Topics	Reading Assignment	Problem Assignment
<p>Pre-Class Assignment Math Review (You should be able to solve these problems to succeed in this course.)</p> <p>Significant Figures, Exponents, and Scientific Notation</p>	<p>Math Review (on web site)</p> <p>Significant Figures, Exponents, and Scientific Notation (on web site)</p>	<p>Math Review All problems</p> <p>Significant Figures, Exponents, and Scientific Notation All problems</p>
<p>1. Introduction and History</p> <p>a) Chemistry, life, and the universe b) Scientific method c) Measurement and the SI system d) Dimensional Analysis problem solving e) Temperature f) Significant figures g) Scientific notation h) Matter and its properties i) Density j) Elements, compounds, and mixtures k) Element symbols</p> <p>Note: This information will be treated as a review in class as it is part of the prerequisites for this course</p>	<p>Chapter 1 pages 1-30</p> <p>Metric System (on web site)</p> <p>Temperature (on web site)</p> <p>Problem Solving by Dimensional Analysis (on web site)</p> <p>Element Symbols (on web site)</p>	<p>Chapter 1 pages 30-35 1.1-1.7, 1.9-1.23 (odd nos.) 1.24, 1.25, 1.27, 1.29, 1.32, 1.37-1.39, 1.41, 1.45, 1.47, 1.51, 1.55, 1.59, 1.61, 1.62- 1.65, 1.67-1.71, 1.79-1.83</p> <p>Temperature All problems</p> <p>Problem Solving by Dimensional Analysis All problems</p>
<p>2. Atoms, Molecules and Intro to Nuclear Chemistry</p> <p>a) A History of Chemistry to 1800 b) The Atomic Theory c) Laws of definite composition and multiple proportions d) Dalton and atomic mass e) The electron f) The proton g) Rutherford and the nuclear atom h) The neutron i) Isotopes j) Atomic weights k) Atomic numbers l) History of the periodic classification m) The periodic law n) The periodic table o) Radioactivity p) Radioactive decay q) Nuclear stability r) Rates of radioactive decay s) Radioisotope dating t) Nuclear transformations u) Extending the periodic table v) Effects of radiation w) Applications of radioisotopes x) Intro to inorganic compounds y) Names and formulas of compounds z) Intro to organic compounds aa) Intro to functional group compounds</p>	<p>Chapter 2 Pages 36-70</p> <p>Chapter 21 Pages 900-930</p> <p>Formula Writing and Nomenclature (on web site)</p> <p>Chapter 25 Pages 1062-1091</p> <p>Prospects for Further Considerable Extension of the Periodic Table (on web site)</p> <p>Web Elements Periodic Table http://www.webelements.com</p>	<p>Chapter 2 Pages 70-77 2.1-2.6, 2.7-2.13 (odd nos.) 2.14, 2.15-2.29 (odd nos.), 2.30, 2.32, 2.34, 2.35-2.79 (odd nos.), 2.80, 2.86, 2.91</p> <p>Chapter 21 pages 931-935 21.1-21.3, 21.7-21.41 (odd nos.), 21.53, 21.65</p> <p>Formula Writing and Nomenclature All problems</p> <p>Chapter 25 pages 1109-1115 25.1, 25.6, 25.11, 25.13, 25.17, 25.21, 25.22, 25.39, 25.41</p>

Lecture Topics	Reading Assignment	Problem Assignment
<p>3. Chemical Formulas, Reactions, and Moles</p> <ul style="list-style-type: none"> a) Formula mass b) The Mole and Avogadro's number c) Percent composition d) Empirical and molecular formulas e) The meaning of a chemical equation f) Balancing equations g) Mass relationships in reactions h) Limiting reagents i) Theoretical and percent yields j) Reactions in solution k) Water as a solvent l) Electrolytes m) Solution terminology n) Percent o) Molarity p) Dilution q) Solution stoichiometry r) Types of reactions s) Intro to redox reactions t) The activity series u) Titrations 	<p>Chapter 3 pages 78-110</p> <p>Chemical Formulas and Formula Mass Calculations (on web site)</p> <p>Writing Chemical Equations (on web site)</p> <p>Chapter 4 pages 120-157</p>	<p>Chapter 3 pages 110-119 3.1-3.8, 3.9-3.101 (odd nos.)</p> <p>Chemical Formulas and Formula Mass Calculations All problems</p> <p>Writing Chemical Equations All problems</p> <p>Chapter 4 pages 157-165 4.1-4.10, 4.11-4.23 (odd nos.) 4.24, 4.25-4.87 (odd nos.) 4.90-4.92, 4.95, 4.98. 4.100, 4.103, 4.107, 4.110, 4.113</p>
<p>4. Electronic Structure of Atoms and the Periodic Table</p> <ul style="list-style-type: none"> a) Electromagnetic radiation b) Atomic spectra c) The quantum theory d) The photoelectric effect e) The Bohr model f) Electron waves g) The uncertainty principle h) The quantum mechanical atom i) Quantum numbers j) Energy levels and orbitals k) Electron distributions l) Magnetic susceptibility m) Hund's rule n) The periodicity of electron configurations o) The periodic table p) Atomic Size q) Effective nuclear charge r) Ionization energy s) Ionic radii t) Electron affinity u) Atomic structure and reactivity 	<p>Chapter 6 pages 218-251</p> <p>Chapter 7 pages 260-291</p>	<p>Chapter 6 pages 251-259 6.1-6.13, 6.15-6.77 (odd nos.) 6.78, 6.84, 6.90</p> <p>Chapter 7 pages 291-299 7.3-7.5, 7.7-7.11, 7.13-7.27 (odd nos.) 7.28-7.31, 7.33- 7.81 (odd nos.) 7.91, 7.94, 7.96</p>

Lecture Topics	Reading Assignment	Problem Assignment
<p>5. Chemical Bonding and Molecular Geometry</p> <ul style="list-style-type: none"> a) Lewis dot symbols of elements b) The ionic bond c) The covalent bond d) Multiple bonds e) The octet rule f) Bond distances and bond strength g) Bond polarity h) Electronegativity i) The metallic bond j) Lewis structures k) Bond energies from Lewis structures l) Molecular shapes m) VSEPR Theory n) Polarity of molecules o) Valence Bond Theory p) Hybrid orbitals q) Intro to Molecular orbital theory 	<p>Chapter 8 Pages 300-336</p> <p>Chapter 9 pages 344-388</p> <p>Chapter 23 Pages 992-1018</p>	<p>Chapter 8 pages 336-343 9.1, 9.4-14 (even nos.) 9.17, 9.20-9.30 (even nos.) 9.34, 9.39-9.45 (odd nos.) 9.48-9.58 (even nos.)</p> <p>Chapter 9 pages 388-397 9.1-9.11, 9.13-9.73 (odd nos.) 9.76, 9.79, 9.82, 9.84, 9.85</p>
<p>6. Gases, Liquids, Solids and Intermolecular Forces</p> <ul style="list-style-type: none"> a) Gases vs. liquids vs. solids b) Pressure c) Boyle's Law d) Charles' Law e) The combined gas law f) The Ideal Gas Law g) Density and Molar mass calculations h) Avogadro's Law: Stoichiometry in gas reactions i) Dalton's Law j) Graham's Law k) The Kinetic-Molecular Theory l) Real gases m) Intermolecular forces n) Surface tension o) Evaporation p) Heat of vaporization q) Vapor pressure r) Boiling and freezing points s) Crystal structure t) X-ray diffraction u) Types of crystals v) Phase changes and phase diagrams 	<p>Chapter 10 pages 398-432</p> <p>Chapter 11 Pages 442-476</p>	<p>Chapter 10 pages 432-441 10.1-10.13, 10.15-10.79 (odd nos.) 10.80, 10.81-10.87 (odd nos.) 10.95-10.97, 10.102</p> <p>Chapter 11 pages 476-485 11.1-11.8, 11.10, 11.11-11.21 (odd nos.), 11.22, 11.23-11.67 (odd nos.) 11.71-11.85 (odd nos.) 11.88</p>
<p>7. Thermochemistry (As time permits)</p> <ul style="list-style-type: none"> a) Definitions and units b) Heat and work c) Law of Conservation of Energy (The First Law) d) Enthalpy e) ΔE and ΔH f) Calorimetry g) Specific heat h) Hess's Law i) Standard heats of formation j) Heat of reaction k) Bond energies l) Fuels and fuels 	<p>Chapter 5 pages 167-204</p> <p>Chapter 8 pages 328-334</p>	<p>Chapter 5 pages 204-215 5.3-5.8, 5.27-5.39 (odd nos.), 5.49-5.57 (odd nos.), 5.61-5.64, 5.67-5.85 (odd nos.) 5.96-5.98, 5.111</p> <p>Chapter 8 page 339 8.65-8.71 (odd nos)</p>