PimaCommunityCollege
West Campus

CHM 152 General Chemistry II
Topic Outline

The current textbook for this course is Brown, Theodore L., LeMay, H. Eugene, Jr., Bursten, Bruce E., **Chemistry: The Central Science**, 12th Ed., Pearson Education, 2011 **NOTE:** There are several Pima C.C. Versions used at the different campuses. At the West Campus, the edition contains additional material by David A. Katz. The versions at the other campuses have missing chapters. **Any version is acceptable for this course.** This textbook is used for both CHM 151 and 152.

The West Campus uses the **Mastering Chemistry** program. Mastering Chemistry is active for 2 years from the date of activation.

The previous textbook for this course was 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 that textbook from a previous semester and do not want to purchase a new textbook. Please note that all topics and problems will be similar to those in the Brown, LeMay Kotz and Bursten textbook, but there will be differences in topics and material presented in the course.

Lecture Outline

The following outline presents topics and subtopics in the order they will be discussed in class along with reading assignments and problem assignments. The course content is integrated by topic and does not necessarily follow the book in a chapter by chapter and page by page order.

Problem assignments list the problem sections at the end of each chapter.

Problem assignments using the Mastering Chemistry program ar from the Brown, LeMay, and Bursten textbook.

Lecture Topics	Reading Assignment	Problem Assignment
1. States of Matter and Intermolecular Forces (Some of this material is review, some may be new) a) Gases vs. liquids vs. solids b) The Kinetic-Molecular Theory c) Intermolecular forces m) Surface tension n) Viscosity 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) Unit cells w) Phase changes and phase diagrams	Chapter 11 pages 514-545 Chapter 12 Pages 554-581 Chapter 13 Pages 588-610 Gases, Liquids and Solids (on web site) Notes on Intermolecular Forces (on web site) Review: Nomenclature of Organic Compounds (on web site)	Chapter 11 pages 546-553 1-51 (odd nos.), 57, 59, 63, 65, 67, 81 Chapter 12 pages 581-587 1-33 (odd nos.), 36, 37-47 (odd nos.) Chapter 13 Pages 610-615 3-11 (odd nos.), 19-25 (odd nos.)
2. Solutions a) Intermolecular forces and solutions b) Types of solutions c) Nonelectrolytes vs electrolytes d) The solution process e) Heat (enthalpy) and the solution process f) Temperature and solubility g) Pressure and solubility h) Concentration units: %, ppt, ppm, ppb i) M, m, X j) Colligative properties k) Freezing point depression l) Boiling point elevation m) Osmotic pressure n) Colloids	Chapter 14 pages 616-648 Notes on Solutions and Colloids (on web site)	Chapter 14 pages 648-656 1-79 (odd nos.)
3. Kinetics and Equilibrium a) Reaction rates b) Factors affecting rate c) Rate laws d) Concentration and rate e) Order of a reaction f) Reaction half-life g) Effects of temperature h) Collision theory i) Activation energy j) The Arrhenius equation k) Catalysis i) Reaction mechanisms m) The dynamics of the equilibrium condition n) The Law of Mass Action o) The equilibrium constant	Chapter 15 Pages 670-712 Chapter 16 Pages 724-751 Notes on Kinetics (on web site) Notes on Equilibrium (on web site)	Chapter 15 Pages 712-723 1-65 (odd nos.) Chapter 16 Pages 752-759 1-61 (odd nos.)

Lecture Topics	Reading Assignment	Problem Assignment
3. Kinetics and Equilibrium (continued) p) What the equilibrium quotient tells us q) K_p vs K_c r) Equilibrium calculations s) Heterogeneous equilibria t) Le Châtelier's Principle		
4. Acids, Bases, and Ionic Equilibria a) Properties of acids and bases b) The Arrhenius theory c) The Brønsted Theory d) Conjugate acid-base systems e) K_W f) pH and pOH g) Strong and weak acids and bases h) Dissociation of weak acids and bases i) K_a and K_b j) Polyprotic acids k) Acid-base properties of salts l) The leveling effect m) The Lewis theory n) The common ion effect o) Buffers p) The Henderson-Hasselbalch Equation q) Acid-base titrations r) Indicators s) Precipitation reactions t) Ksp u) pH and solubility v) Complex ions	Chapter 17 pages 760-800 Chapter 18 Pages 810-850 Notes on Acids and Bases, Parts 1 and 2 (on web site)	Chapter 17 pages 801-809 1-101 (odd nos.) Chapter 18 Pages 850-859 1-91 (odd nos.)
5. Thermodynamics a) Spontaneous changes b) Reversible and irreversible processes c) The Second Law d) Entropy e) The Third Law f) Free energy g) Free energy and equilibrium	Chapter 19 Pages 860-887 Notes on Thermodynamics (on web site)	Chapter 19 Pages 887-895 1-49 (odd nos.)
6. Electrochemistry a) Metallic and electrolytic conduction b) Oxidation-reduction b) Half reactions and redox c) Electrochemical cells d) Voltaic cells e) Standard cell potentials f) The Nernst equation g) Free energy and electrical work h) Electrolysis i) Commercial cells and batteries j) Corrosion	Chapter 20 Pages 896-940 Notes on Oxidation-Reduction and Electrochemistry (on web site)	Chapter 20 Pages 940-947 1-11 (odd nos.), 12, 13-47 (odd nos.)

Lecture Topics	Reading Assignment	Problem Assignment
(If time permits) **7. Nuclear Chemistry** a) Radioactivity b) Radioactive decay c) Nuclear stability d) Kinetics of radioactive decay e) Radioisotope dating f) Nuclear transformations g) Extending the periodic table h) Effects of radiation i) Applications of radioisotopes j) Nuclear reactors k) Making a nuclear device	Chapter 23 Pages 1060-1090	Chapter 23 Pages 1091-1095 Problems to be assigned in class