CHEM 160 Chemistry and Materials, 2002, Quarter 2

Instructor

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Texts

Rosenberg, JL & Epstein, LM. 1997. **College Chemistry**, 8th Edn. Schaum's Outlines.

Budinski, KG & Budinski, MK, 2002. **Engineering Materials** Properties and Selection, 7th Edn. Prentice-Hall.

Timetable

Lectures: Monday 14:30-16:20, Tuesday 08:30-10:20
Laboratory: Friday, 12:30:14:30 Alternate weeks (***Everyone*** comes on Friday, January 4, 2002)

Learning outcomes: to meet the accreditation requirements.

- Use the Lewis model of the atom in conjunction with the periodic table to predict the chemical and physical properties of elements, including chemical bonding and the formation of compounds.
- Write balanced chemical equations for chemical reactions including reduction-oxidation reactions, and determine stoichiometric quantities of reactants in those reactions.
- Determine properties of pure chemicals and of mixtures of chemicals based on solid, liquid and gaseous phases, and interpret solid and liquid phase diagrams for engineering materials.
- Apply the principles of thermodynamics to determine rates of chemical reaction, chemical equilibrium, and energy changes in chemical transformations.
- Apply the principles of electrochemistry to determine corrosion potential and inhibition, and electrolytic processes.
- Apply the principles of organic chemistry to the structure and naming of organic compounds, in particular polymers, and identify properties associated with specific functional groups.

Lab. Manual: Provided on course web site.

Evaluation **Grading as in calendar**

Laboratory (4)	14%
Quizzes (4)	16%
Midterm	20%
Final	50%
Total	**100%**

Detailed outline:

Date	Day	Activity
1/4/2002	Friday	Lab safety, introduction, registration
1/7/2002	Monday	Matter, atoms, molecules, Lewis structures
1/8/2002	Tuesday	Periodic Table, Ionic and covalent bonding
1/11/2002	Friday	Group 1 Lab 1 Stoichiometry
1/14/2002	Monday	**Quiz 1**; Polar bonds, molecular shape, polar molecules
1/15/2002	Tuesday	Chemical reactions, mole, stoichiometry
1/18/2002	Friday	Group 2 Lab 1 Stoichiometry
1/21/2002	Monday	Gases, liquids, solids
1/22/2002	Tuesday	Mixtures, solutions
1/25/2002	Friday	Group 1 Lab 2 Distillation **Full report required**
1/28/2002	Monday	**Quiz 2**; States of matter, phase changes
1/29/2002	Tuesday	Phase changes
2/1/2002	Friday	Group 2 Lab 2 Distillation **Full report required**
2/4/2002	Monday	Thermochemistry, thermodynamics, ΔH, ΔS, ΔG
2/5/2002	Tuesday	Rates of reaction, equilibrium
2/8/2002	Friday	Group 1 Lab 3 Heat of combustion
2/11/2002	Monday	**Midterm**
2/12/2002	Tuesday	Aqueous equilibrium
2/15/2002	Friday	Reading Break College closed
2/18/2002	Monday	Oxidation/reduction, Electrochemistry
2/19/2002	Tuesday	Corrosion
2/22/2002	Friday	Group 2 Lab 3 Heat of combustion
2/25/2002	Monday	**Quiz 3**; Metals
2/26/2002	Tuesday	Organic chemistry, functional groups
3/1/2002	Friday	Group 1 Lab 4 Electrochemistry
3/4/2002	Monday	Polymers
3/5/2002	Tuesday	Polymers
3/8/2002	Friday	Group 2 Lab 4 Electrochemistry
3/11/2002	Monday	**Quiz 4**; Ceramics
3/12/2002	Tuesday	Composites
3/15/2002	Friday	Final review
3/18-22/2002	Exam Period	Final Exam