EFFECTIVE: MAY 2003
CURRICULUM GUIDELINES

A.	Division:	**Academic**	Effective Date:	**May 2003**
B.	Department / Program Area:	**Science and Technology**	Revision	

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M: Course Objectives / Learning Outcomes

The student will be able to:

1. Define or explain any of the chemical terms used in the course (e.g. anode, state function, Lewis acid).
2. Draw the unit cells for the three cubic lattices.
3. Given the unit cell of an ionic compound, predict the simplest formula.
4. Describe the experimental method for obtaining the dimensions of the unit cell.
5. Explain the differences between cubic and hexagonal closest packing of spheres.
6. Describe (or draw) the crystal structures of NaCl, diamond, graphite, CsCl, ZnS.
7. Describe the types of possible defects in crystalline material.
8. Describe the method of calculating lattice energies using the Born-Haber cycle.
9. Solve problems of the following types, given a list of selected equations and log tables;
   a) determination of the amount of material produced in an electrolytic cell
   b) calculation of the e.m.f. of a galvanic cell
   c) calculation of ΔG from electrochemical data
   d) calculations involving use of the First Law of Thermodynamics
   e) enthalpy changes in a chemical or physical process
   f) Hess's Law
   g) relationship between bond energies and ΔH
   h) calculation of ΔS from absolute entropies
   i) calculation of ΔG for a chemical reaction
   j) calculation of K from $\Delta G°$
   k) equilibria in gaseous systems
   l) equilibria in aqueous acid-base systems (pH, weak acids, hydrolysis, buffers)
   m) equilibria involving slightly soluble salts, and coordination complexes
   n) order, rate constant and activation energy of a chemical reaction
   o) amounts of material involved in redox reactions based on gram equivalent weights
10. Calculate the oxidation of an atom in any ion or molecule
11. Identify any changes in oxidation number of an atom in a chemical equation.
12. Balance redox equations for reactions occurring in acid or basic solutions.
13. Determine the gram equivalent weight of a substance involved in a redox reaction.
14. State Faraday's Law of Electrolysis.
15. Determine whether chemical reactions will occur spontaneously under standard conditions, given a table of standard electrode potentials.
16. Using a table of standard electrode potentials, compare the relative strengths of oxidizing agents or reducing agents.
17. Discuss the electrochemical basis of the lead-acid storage battery.
18. Distinguish between the various types of heats of reaction and be able to write the corresponding chemical equation.
19. Interpret the signs of enthalpy changlexe 4(i)4(Tw 72BDC BT/T20 1 Tf-0.0018 TcDescr.02 b5(terpretact)4(-50.003

8. **Acids and Bases**
   (Review: Arrhenius and Bronsted-Lowry theory, auto-ionization of water and K_w, pH, strong/weak acids and bases, K_a, K_b, qualitative hydrolysis of salts) quantitative hydrolysis of salts, polyprotic acids, common ion effect, buffer solutions, titration curves (strong and weak acids/bases), indicators, solubility product (K_{sp}).

Lab Course Content

1. Redox Reactions
2. Solids
3. Electrochemistry
4. Thermodynamics
5. Equilibrium
6. Spectrophotometric determinations
7. Thermochemistry
8. Quantitative analysis
9. Kinetics
10. Inorganic chemistry: preparation of a coordination compound
11. Acids and bases.

O: Methods of Instruction

The course will be presented using lectures, problem sessions and class discussions. Films and other audio-visual aids as well as programmed material will be used where appropriate. Problems will be assigned on a