CHEM 215 General Chemistry II – Quantitative Applications Spring 2009

Instructor	**Dr. Andrew S. Ichimura**
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Office Hours	Tuesday 11-12; Wednesday 11:30-1pm
Course Time & Place	Tuesday and Thursday 9:35 – 10:50, Science 101
Course Structure	3 Unit Lecture Course
Correspondence	For all class correspondence, sfsu.edu email addresses will be used. If you prefer to use a different account, it is your responsibility to set up a forwarding address to an email account you use regularly. For instructions on forwarding email, see: http://www.sfsu.edu/~doit/account.htm#forward
Course Description	CHEM 215 examines in a quantitative fashion the four areas of essential chemistry concepts introduced in CHEM 115: Properties of Atoms; Interactions of Atoms; Reaction Chemistry and Stoichiometry; and Chemical Dynamics. These concepts are applied and used to solve quantitatively a wide range of chemical problems. OWL homework assignments enable students to develop and demonstrate their ability to apply these chemical concepts to solve problems. There will be two midterms and a final exam.
Prerequisites	**C or better in CHEM 115 and C- or better in two of the following courses: PHYS 111, PHYS 121, PHYS 220, PHYS 230, PHYS 240, MATH 226, and MATH 227, or consent of instructor.**
Lecture Schedule	The Spring 2009 schedule identifies lecture topics, textbook references, and examination dates.
Lecture Outline	Lecture materials will be made available through the iLearn website. (iLearn.sfsu.edu)
Required Materials	1. Kenneth W. Whitten, Raymond E. Davis, M. Larry Peck, George G. Stanley, Chemistry, 8th Edition, Thomson - Brooks/Cole, 2007. The text is also available as an e-book, or as e-chapters. The webpage listed above for the third edition has links to the electronic versions. 2. Scientific calculator, non-programmable. 3. Personal access code for OWL, an online homework system. To purchase an OWL access code, select any six-month OWL ecode from the OWL Access Code Online Website. (Any access code can be used for any course; the only distinction is the time period; either 6-month or 12-month access can be purchased.) http://owl1.thomsonlearning.com/partners/brookscole/epin.html
Graded Homework	Graded homework assignments will be assigned and will be delivered and graded using the OWL online web-based homework system. Check the OWL website for updates on current homework assignments.
Grading	1. There will be two midterms (5 Mar and 16 Apr) worth 300 points each and a cumulative final exam (21 May) worth 300 points. OWL homework assignments will be worth a total of 100 points. OWL scores will be scaled by dividing the number of OWL points earned by the possible OWL score and multiplying by 100. There are two categories of OWL assignments, required and optional. Only required assignments will be used to determine student grades. 2. Evaluation of student work will be based upon SFSU's grading policy. There is no curve; every student who does excellent work will earn an A. The points required for each grade are: A>881; A- 880-800; B+ 799-751; B 750-700; B- 699-651; C+ 650-601; C 600-551; C- 550-501; D+ 499-451; D 450-401; D- 400 331; F<330.
Exam Dates	**Exam I, 3 March; Exam II, 16 April; Normal Class time, 9:35 - 10:50.** **Final Exam, 21 May 2009, 8:00 - 10:30 AM (Comprehensive)**

Exam Policies	1. Exams will test your conceptual understanding of the class material and will consist of multiple choice, written, and problem-solving questions based on the lecture material and OWL homework. In general, make-up exams will not be given. However, in extraordinary situations, with written, verifiable, and legitimate causes, exceptions may be granted. 2. Complaints about exams or exam grade changes will only be considered during the first week after the exam is handed back to the class! No exceptions. The instructor reserves the right to re-grade the entire exam if a question is raised. 3. A blue book, SCANTRON form, #2 pencil, and scientific calculator are required for the exams.
Ethics	All work submitted for evaluation must be your own. Group work, when specifically allowed, must be identified as such. All sources used must be specifically identified. Any suspected incident of cheating or plagiarism will be reported to the Student Discipline Officer. (See SFSU's Student Code of Conduct for a discussion of cheating, plagiarism, fabrication, and academic misconduct.) http://www.sfsu.edu/%7Ehelpdesk/docs/rules/conduct.htm
Courtesy	The class meets from 9:35 to 10:50 on Tuesday and Thursday. Students are expected to arrive on time, and to wait until the end of class to pack up. If you do arrive late, please enter from the rear door. Turn off all cell phones and pagers. When the entire class is engaged in group discussion, please do not engage in side discussions.
Students with Disabilities	Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in SSB 110, can be reached by telephone 338-2724 (voice/TTY), by e-mail at dprc@sfsu.edu, or online at http://www.sfsu.edu/~dprc.
Assistance with course material	1. Office Hours: Personal attention is available from the Instructor during office hours. You can also e-mail questions to the Instructor. Responses are usually made within 48 hours, weekends excluded. 2. SCI supplemental instruction courses. Organized by the Center for Science and Mathematics Education at SFSU (http://csme.sfsu.edu/%7Eseo), these one-unit classes are offered for several biology, chemistry, and physics courses, and require a full semester commitment from you. SCI 215-01, meets on Thursdays from 11:30 - 12:45 in Trailer P-3. Taught by Mr. Chris Bernt (cbernt@sfsu.edu), this course is coordinated with CHEM 215. To enroll, go to trailer P (behind TH and HH) or to the first class meeting. 3. The Learning Assistance Center (LAC) provides skills-based tutoring and academic support referrals. Location: HSS 348; Telephone: 415 338 1993; E-mail: lac@sfsu.edu 4. The Community Access and Retention Program (CARP) offers tutorial and other academic support services tailored to student learning needs, particularly students who are underrepresented, first generation college students, and/or are impacted by Executive Order 665. Location: HSS 344; Telephone: 415 405 0316 for information; 415 405 0971 for appointments; E-mail carp1@sfsu.edu

Lecture Schedule (Tentative) Spring 2009

Lecture Number	Date (T & Th)	Topics Text sections refer to Whitten, et al., Chemistry, 8th Ed. 2007
1	27 January	Lecture 1 - Introduction to CHEM 215; Nuclear Chemistry 26.1: The Nucleus 26.2: Protons and Neutrons, Nuclear Stability 26.4-26.8: Radioactive decay
2	29 January	Lecture 2 - Nuclear Chemistry Continued 26.9, 26.11, 26.12: Detection and Applications of Radionucleotides 26.13-26.16: Fission, Fusion, and the Environment
3	3 February	Lecture 3 - Gases and Kinetic Molecular Theory, Greenhouse Effect 12.1: Liquids, and Gases 12.2: Common Properties of Gases 12.3: Pressure 12.4: Boyle's Law - Volume-Pressure Relationship 12.5: Charles's Law - Volume-Temperature; Absolute Temperature Scale 5.10: Electromagnetic Radiation 5.11: Photoelectric Effect
4	5 February	Lecture 4 - Gas Laws and the Ideal Gas Equation 12.6: Standard Temperature and Pressure 12.7: Combined Gas Law Equation 12.8: Avogadro's Law and Standard Molar Volume 12.9: Ideal Gas Equation 12:10: Molecular Weight and Formula Determination
5	10 February	Lecture 5 - Properties of Gases 12.11: Dalton's Law of Partial Pressures 12.12: Mass-Volume Relationships 12.13: Kinetic-Molecular Theory - Influence of Temperature 12.15: Real Gases, van der Waals equation
6	12 February	Lecture 6 - Transition Elements and Coordination Chemistry 25.1, 25.2: Coordination Compounds 25.3, 25.4: Important Terms and Nomenclature 25.5: Structures
7	17 February	Lecture 7 – Bonding in Coordination Compounds and Acid-Base Reactions A. Bonding in Coordination Compounds 25.8: Crystal Field Theory 25.9: Color and the Spectrochemical Series B. Acid-Base Reactions 10.1: Properties of Aqueous Acids and Bases 10.3: Hydronium Ion (H+) 10.4: Bronsted-Lowry Theory, Conjugate Acids and Bases 10.5: Autoionization of Water
8	19 February	Lecture 8 - Acid and Base Reactions 10.6: Amphoterism 10.7: Strengths of Acids 10.8: Acid-Base Reactions in Aqueous solutions 10.9: Acidic and Basic Salts 10.10: Lewis Theory of Acids and Bases 18.1: Strong Electrolytes

9	24 February	Lecture 9 - Oxidation-Reduction Reactions 4.4: Oxidation Numbers 4.7: Oxidation-Reduction Reactions 11.4: Balancing Redox Reactions 11.5: Balance Redox Reactions by Adding H+, OH-, or H2O 21.1, 21.2, 21.8: Galvanic Cells 21.9: Zinc/Copper Cell - Daniell Cell
10	26 February	Lecture 10 - Redox Reactions and Relevance to Electrochemical Cells 21.11 - 21.16: Standard Electrode Potentials ...
11	3 March	Lecture 11 - Rates and Rate Expressions 16.1 The Rate of a Reaction 16.2 Nature of Reactants 16.3 Rate-Law Expressions
12	5 March	**EXAM 1 on material covered in Lectures 1 to 10**
13	10 March	Lecture 13 - Chemical Equilibrium 16.3 Rate-Law Expressions 16.4 Integrated Rate Equation 16.8 Temperature Dependence of Reaction Rates
14	12 March	Lecture 14 - Reaction Mechanisms and Catalysis 16.5: Collision Theory 16.6: Transition State Theory, 16.7: Reaction Mechanisms 16.9: Catalysis
15	17 March	Lecture 15 - Chemical Kinetics, Chemical Equilibrium 17.1 - 17.3: Basic concepts and the equilibrium constant 17.4: The Reaction Quotient 17.5 - 17.11: Calculations involving the equilibrium constant
16	19 March	Lecture 16 - Chemical Equilibrium 17.5 - 17.13: Solving Equilibria Problems
	23 – 27 March 31 March	Spring Break - No Classes Cesar Chavez Day – No Classes
17	2 April	Lecture 17 - - Acid-Base Equilibria 18.3: pH and pOH Scales 18.4: Ionization constants for weak acids and bases 18.5: Polyprotic Acids 18.6 - 18.11: Equilibria involving salts of strong and weak acids and bases
18	7 April	Lecture 18 - Acid/Base Equilibria, Buffers, and Titrations 19.1 - 19.3: Equilibria and buffer solutions of weak acids/bases and their salts 19.4 - 19.8: Titrations
19	9 April	Lecture 19 - Solubility and Equilibria 20.1: Solubility Product 20.2: Determination of Solubility Product 20.3: Examples and uses of equilibria involving solubility product 21.19 - 21.20: Nernst Equation, Concentration Cells
20	14 April	Lecture 20 - Thermodynamics 15.1 - 15.2: Heat and Energy, 1st Law of Thermodynamics 15.3 - 15.4: Enthalpy and Calorimetry 15.5: Thermochemical Equations 15.6 - 15.7: Standard States, Standard Enthalpy of Formation, Enthalpy Changes 15.8: Hess's Law

21	16 April	EXAM 2 – Material will include Lectures 11-19
22	21 April	Lecture 22 - Chemical Thermodynamics 15.6 - 15.7: Standard States, Standard Enthalpy of Formation, Enthalpy Changes 15.8 - 15.9: Hess's Law and Bond Energies 15.10 - 15.11: Internal Energy and Enthalpy 15.12 - 15.15: Spontaneity of Physical and Chemical changes, Entropy
23	23 April	Lecture 23 - Thermodynamics 15.16: Gibbs Free Energy Changes 15.17: Relationship between G, H, S and Temperature 17.12: Equilibrium Constant and Gibbs Energy 17.13: Temperature Dependence of Equilibrium Constant
24	28 April	Lecture 24 - Electrochemistry and Electrolysis - April 28 21.3 - 21.7: Electrochemistry in action, Electrolysis 21.21: Electrochemistry and Gibbs Energy
25	30 April	Lecture 25 - Real Gases, Liquids and Solids 12.13 and 12.15: Real Gases 13.1: Kinetic Theory of Liquids and solids 13.2: Intermolecular Forces and Phase Changes 13.3 - 13.5: Liquids 13.6 - 13.7: Evaporation and Vapor Pressure
26	5 May	Lecture 26 - Liquids and Solids 13.6 - 13.7: Evaporation and Vapor Pressure 13.8 - 13.9: Boiling Point and Heat of Vaporization 13.10 - 13.11: Melting Point and Heat of Fusion 13.12: Sublimation
27	7 May	Lecture 27 - Liquids and Solids 13.13: Phase Diagrams (P vs.T) 13.14 - 13.15: Crystalline Solids, Structures, X-ray Diffraction 13.16: Bonding in Solids
28	12 May	Lecture 28 - Electromagnetic Radiation 5.12: Atomic Spectra and the Bohr model 5.13: Wave nature of the Electron 5.14: Quantum Mechanical Picture of the Atom 5.15: Quantum numbers
29	14 May	Lecture 29 - TBD
30	21 May	FINAL EXAM - May 21, 2009 8:00 - 10:30 AM, Science 101; Comprehensive