

CHEMISTRY C317: EQUILIBRIA AND ELECTROCHEMISTRY

Spring, 2009

Instructor

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Associate Instructor

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Textbook

Skoog, D. A.; West, D. M.; Holler, F. J.; Crouch, S. R. *Fundamentals of Analytical Chemistry*, eighth edition, Brooks/Cole–Thomson Learning, Belmont, California, 2004.

Class Meetings

10:10 to 11:00 a.m., Tuesday and Thursday, in Chemistry CH 033.

Examinations

As indicated in boldface in the schedule below, there will be three examinations. Each of the first two examinations will be on a Tuesday evening (February 17 and April 7) from 7:00 to 9:00 p.m., and the third examination will be on Thursday, May 7, from 12:30 to 2:30 p.m. Rooms will be announced at a later time. Each examination will be worth 100 points.

Problem Sets

During the semester there will be 6 problem sets, coming every other week. These problem sets must be handed in at the beginning of the lecture designated as the due date. Solutions to the problem sets will be posted electronically at the same time. No late problem sets will be accepted for credit. Each problem set will be worth 20 points, and only selected problems for each problem set will be graded; the problem set with the lowest score will not be counted, so the total value of the problem sets will be 100 points.

Quizzes

During the semester there will be 6 in-class, multiple-choice quizzes, each worth 20 points; the quiz with the lowest score will not be counted, so the total value of the quizzes will be 100 points.

Grades

Final course grades will be based on the total of 500 points obtainable on examinations (300 points), problem sets (100 points), and quizzes (100 points).

Schedule of Lectures and Examinations

January 13	Oxidation and reduction (Section 18A)
January 15	Galvanic cells (Section 18B)
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January 20	Electrode potentials (Section 18C)
January 22	Nernst equation (Section 18C)
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January 27	Thermodynamics (Section 19A); equilibrium constants (Section 19C)
January 29	Redox titrations (Section 19D)
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February 3	Potentiometry (Sections 21A to 21D-2)
February 5	Ion-selective electrodes (Sections 21D-3 to 21D-8)
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February 10	Direct potentiometry (Section 21F)
February 12	Applications of ion-selective electrodes
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February 17	Electrolytic cells and current–voltage curves (Section 22A)
February 17	Examination 1 (material from January 13 to February 12)
February 19	Coulometric methods (Section 22D)
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February 24	Voltammetry (Sections 23A and 23B)
February 26	Voltammetry (Sections 23A and 23B)
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March 3	Pulse voltammetric methods (Section 23C)
March 5	Cyclic voltammetry (Section 23D)
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March 10	Applications of voltammetry
March 12	Stripping analysis (Section 23E)
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March 17	(Spring Break)
March 19	(Spring Break)
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March 24	Ultramicroelectrodes (Section 23F)
March 26	Chemically modified electrodes
March 31	Errors in chemical analysis (Sections 5A and 5B)
April 2	Normal distribution and standard deviation (Sections 6A and 6B)
April 7	Standard deviation and probability (Section 6B)
April 7	Examination 2 (material from February 17 to March 26)
April 9	Propagation of errors (Section 6C)
April 14	The t distribution and confidence limits (Section 7A)
April 16	Significance and hypothesis testing (Section 7B)
April 21	Analysis of variance (Section 7C)
April 23	The F test; the Q test (Section 7D)
April 28	Standardization and calibration (Section 8C)
April 30	Signal-to-noise ratios; detection limits (Section 8D)
May 7	Examination 3 (material from March 31 to April 30)