

**Analytical Chemistry**  
**CHEM 3310K**  
**Fall 2007**

**Purpose**

This is an introduction to concepts and techniques of modern analytical chemistry.

**Text** "Fundamentals of Analytical Chemistry," by Skoog, West, Holler, and Crouch. 8<sup>th</sup> Ed., Thomson-Brooks/ Cole Publisher.

**Learning Outcomes**

- To develop an appreciation for errors and measurements and how to live with them.
- To learn how to answer both quantitative and qualitative chemical questions.
- To develop problem solving skills and conceptual understanding of equilibria.
- To be introduced to the analytical concepts and applications of electrochemistry, spectroscopy, and chromatography.

<b>Instructor</b>	<b>Office</b>	<b>Office Hours</b>
Douglas A. Stuart, Ph.D.	TLC 2125 678-839-6022 office 773-330-1392 cell dstuart@westga.edu	M 9-11; Th 1-4; F 12-2 Drop-ins are usually ok, Check the door if I am out.

**Laboratory**

The laboratory will have its own syllabus. It will contribute 30% toward the final grade in the course.

**Homework**

Homework will be assigned, collected, and checked for completeness. Your homework must be stapled and legible when turned in.

**Attendance Policy**

You are expected to be present and prepared for each class meeting. Due dates for Homework and examinations are scheduled and will not be moved. No late work will be accepted and no make-up exams will be given.

**Academic Dishonesty**

The Honor Code of the University of West Georgia is in effect. Any infractions will be mediated through this process.

**Grades**

Your course average will be calculated as follows:

$$(\text{Exam Average} \times 0.6) + (\text{Homework Average} \times 0.1) + (\text{Laboratory Average} \times 0.3) = \text{Course Average}$$

$$90\% - 100\% = A; 80\% - 89\% = B; 70\% - 79\% = C; 60\% - 69\% = D; 0\% - 59\% = F$$

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**Fall 2007 Course Lecture Outline**

<b>Class</b>	<b>Date</b>	<b>Chapter</b>	<b>Topic</b>	<b>Readings Due</b>
1	8/16/07	1, 5	Analytical Chemistry, Errors in Chemical Analysis	
2	8/21/07	6	Random Errors in Chemical Analysis	Chapter 1,5, 6
3	8/23/07	7	Statistical Data Treatment and Evaluation	Chapter 7
4	8/28/07	9	Aqueous Solutions and Chemical Equilibria	Chapter 9
5	8/30/07	10	Effect of Electrolytes on Chemical Equilibria	Chapter 10
6	9/6/07	11	Systematic Treatment of Equilibria	Chapter 11
7	9/11/07	12	Gravimetric Analysis	Chapter 12
8	9/13/07		<b>EXAM 1</b>	
9	9/18/07	13	Volumetric Analysis	Chapter 13
10	9/20/07	14	Principles of Neutralization Titrations	Chapter 14
11	9/25/07	15	Titration Curves for Complex A/B Systems	Chapter 15
12	9/27/07	15	Titration Curves for Complex A/B Systems	
13	10/2/07	17	Complexation Reactions and Titrations	Chapter 17
14	10/4/07		<b>EXAM 2</b>	
	<b>10/8/07</b>		<b>Last Day to Drop with W</b>	
15	10/9/07	18	Introduction to Electrochemistry	Chapter 18
16	10/16/07	19	Applications of Standard Electrode Potentials	Chapter 19
17	10/18/07	20	Applications of Oxidation/Reduction Titrations	Chapter 20
18	10/23/07	21	Potentiometry	Chapter 21
19	10/25/07	22	Electrolysis: Electrogravimetry and Coulometry	Chapter 22
20	10/30/07	23	Voltammetry	Chapter 23
21	11/1/07		<b>Exam 3</b>	
22	11/6/07	24	Introduction to Spectrochemical Methods	Chapter 24
23	11/8/07	25	Instruments for Optical Spectrometry	Chapter 25
24	11/13/07	26	Molecular Absorption Spectrometry	Chapter 26
25	11/15/07	27, 28	Molecular Fluorescence & Atomic Spectroscopy	Chapter 27, 28
26	11/20/07	30	Introduction to Analytical Separations	Chapter 30
27	11/27/07	31	Gas Chromatography	Chapter 31
28	11/29/07		<b>Exam 4</b>	
29	12/4/07		Review	
	<b>12/13/07</b>	<b>Final Exam</b>	<b>8 A.M. to 10 A.M.</b>	

The standardized examination for analytical chemistry developed by the American Chemical Society will serve as the final examination. Please remember to bring a #2 pencil.

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**Fall 2007 Homework Assignments**

All homework is assigned from Skoog, West, Holler, & Crouch, 8<sup>th</sup> Edition. If you have a different edition of this textbook, it is your responsibility to convert these assignment numbers to your edition. **All assignments are due in the main office of the Department of Chemistry by 5 P.M. on the due date posted.**

HW	Ch	Assigned Problems	Due Date
1	4	1(a)(c), 3, 4(a)(c)(e), 5, 9(a), 11(a), 13(a), 14(a), 15(a), 16(a)(c), 17(c), 18(a), 19(a), 21, 23, 25, 27, 29(a), 31, 33, 35, 37.	8/21
2	5	1(a)(c), 2, 3, 5, 7, 8(a)(c), 9(a)(c), 10(a)(c), 11(a)(c).	8/28
	6	1, 2, 3, 5, 7(a)(c), 8(* only), 9(a)(c)(e), 11(a)(c), 13, 15.	
	7	1, 3, 4(a)(c)(e), 5(* only), 6, 7, 9, 11, 13(a), 15, 17, 23.	
3	9	1, 2, 3, 4(a)(c)(e), 5(* only), 6(a)(c), 7(a)(c)(e), 8(a)(b)(c), 9(* only), 10(b)(d), 13, 15, 17, 20(a)(c)(e)(g), 23, 25, 27, 29.	9/11
	10	1, 3, 5, 7(a)(c), 8(a)(c), 10(a)(c), 11, 12, 13, 14(a)(c)(e).	
	11	3, 4(a)(c)(e)(g), 6(a)(c), 7(a)(c), 8, 10(a), 11, 13, 15, 17.	
4	12	1, 2, 3, 5, 6, 7, 9(a)(c)(e), 10, 12, 14, 18, 20, 22, 24, 26, 30, 32.	9/18
	13	3, 5(a)(c), 8, 10, 12, 13, 15, 16, 18, 21, 23, 26, 27, 29.	
5	14	1, 3, 5, 6(a)(c), 7(a)(c), 9, 11, 12(a), 13, 15, 18, 19, 21, 23, 25, 27, 29, 32, 34(a)(c)(e)(g), 37(b), 39, 45.	10/2
	15	1, 2, 4, 6(a)(c)(e)(g), 7(a)(c)(e), 8(a)(c)(e), 9(a)(c)(e), 10, 12, 14, 16, 18, 20, 22.	
	17	13, 15(a)(c)(e), 17, 19, 21, 23, 25, 29.	
6	18	4, 7(a)(c)(e), 8(* only), 9(a)(c)(e)(g)(i), 11, 13, 16, 18, 20, 22, 25.	10/16
	19	8, 9(a)(c), 11(a)(c)(e)(g), 14.	
	20	28, 30, 32, 35, 48.	
7	21	1, 2, 5, 11, 15, 17(b)(d), 19(a)(c), 22, 26.	10/30
	22	1, 2, 13, 14, 17(a)(c), 18, 20, 22, 24, 28, 30.	
	23	1, 10, 13, 18.	
8	24	1, 3, 6(a)(c)(e), 7(a)(c), 9, 10, 12(a), 14(a)(c)(e), 15(a)(c)(e), 18(a)(c)(e)(g)(i), 19, 21, 22, 24.	11/13
	25	1, 3, 9, 11, 13, 14, 15, 21.	
9	26	5, 7, 9(a)(c), 10(b)(d), 16, 18, 21, 22(a)(c), 25.	11/27
	27	1, 3(a), 5, 8, 12.	
	28	1, 2, 3, 15.	
10	30	1, 3, 5, 7, 9, 11, 13, 15, 19, 23, 25, 27.	12/4
	31	1, 3, 5, 7, 9, 11, 19.	

Homework will be scored as check-plus (100%=A), check (85%=B), check minus (75%=C), and zero.

Homework will constitute 10% of your final grade.

**Analytical Chemistry Lab  
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Fall 2007**

<b>Instructor</b>	<b>Office</b>	<b>Office Hours</b>
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**Tentative Lab Schedule**

<b>Lab Dates (Week of)</b>	<b>Title of Laboratory Analysis</b>
August 20	Introduction to Glassware and Calibration
August 27	Gravimetric Determination
September 10	Preparation and Standardization of Sodium Hydroxide Solution
September 17	Titration of a Weak Acid
September 24	Titration of a Diprotic Acid
October 1	EDTA Lab
October 15	Redox Back-Titration
October 22	TBD
October 29	TBD
November 5	KMnO <sub>4</sub> Colorimetry Lab
November 12	pKa Determination using Colorimetry
November 26	TBD – no report. Attendance counts = 1 homework

**Grading**

Lab reports are due at the beginning of the next lab period no exceptions. You will be graded on accuracy of lab results and calculations. Your lab grade comprises 30% of the overall course grade.