Syllabus for
CHE 300--Quantitative Analysis Lecture
2.0 Credit Hours
Spring 2011

I. COURSE DESCRIPTION

A study of inorganic and organic analyses based on chemical equilibrium as applied to chromatography, solubility, titrimetry, spectrophotometry, and electrochemistry.
Prerequisites: CHE 112 Lecture and Lab
Corequisite: CHE 300 Lab

II. COURSE GOALS

The primary goal of this course is to enable the student to understand the chemical principles behind various analytical methods. The course will discuss methods that will allow students to solve problems in elementary statistics, solubility equilibria, acid-base equilibria, oxidation-reduction reactions, complexiometric titrations, and visible spectrophotometry.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

Terminal Objectives
As a result of successfully completing this course, the student will be able to do the following:

A. Solve simple and intermediate problems in equilibria, spectrophotometry, electrochemistry, and titrations.

B. Define key concepts and terms in the major areas of analytical chemistry.

C. Discuss the theoretical chemical principles which form the basis for laboratory methods.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Materials
Textbooks
Harris, D. C. Quantitative Chemical Analysis; 7th ed.; W. H. Freeman & Company: New York, NY, 2007. ISBN: 9780716770411.

B. Optional Reading Materials

1. Koltoff, I. M. In *Treatise on Analytical Chemistry*

2. Koltoff, I. M.; Elving, P. J.; Sandell, E. B. Eds., *Interscience Encyclopedia*: New York, NY, 1959.

3. Wilson, C. L. In *Comprehensive Analytical Chemistry;* Wilson, C. L.; Wilson, D. W., Eds., Elseiver Publishing Co.: New York, NY, 1959.

4. Laitinen, H. A.; Harris, W.F. *Chemical Analysis, 2nd ed*.; McGraw Hill: New York, NY, 1975.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
   a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
   b. Failing to meet group assignment or project requirements while claiming to have done so;
   c. Failing to cite sources used in a paper;
   d. Creating results for experiments, observations, interviews, or projects that were not done;
   e. Receiving or giving unauthorized help on assignments.

   By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding the Whole Person Assessment requirements. Students should consult the Whole Person Assessment handbooks for requirements regarding general education and the students' majors.
   a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
   b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. School and /or Department Policies and Procedures

1. The department adheres to the Assessment policy concerning plagiarism as described in the University Catalog, "Written assignments using sources must demonstrate ethical and accurate use of source material. Plagiarism and any unethical or inappropriate use of sources are not tolerated."
2. The following assessment actions will be taken in the of event of documented instances of plagiarism on written assignments, copying of homework

assignments, or cheating during examinations:

a. An automatic zero will be given for the assignment or exam.

b. The original assignment or exam will be kept in the student file and a copy will be given to the student. This could have a negative impact on letters of reference and admission to graduate schools and other postgraduate programs.

c. The department will take repeated offences as grounds for further action.

3. Any Whole Person Assessment activity required in this course must be completed and assessed prior to the end of the semester to receive credit for that assignment, otherwise the assignment will receive a grade of zero.

C. Course Policies and Procedures

1. Evaluation Procedures

The semester's grade will be based on the following:

3 Hourly Exams	60%
Quizzes	10%
Homework	10%
CPS	5%
Attendance	1%
Excel Project	4%
Final	10%

A student should have a background in the solution of algebraic problems. Most of the problems in the course are algebraic manipulations as applied to chemical principles.

2. Whole Person Assessment Requirements

a. An Excel project will be used for the Whole Person Assessment requirement. It will involve incorporating chemical equations into an Excel function, which will then be used to generate a precipitation titration curve.

b. Artifacts not submitted electronically or incorrectly submitted receive a zero for that assignment. Refer to the Department of Chemistry handbook for more information at http://eportfolio.oru.edu.

VI. COURSE CALENDAR

WEEK	WEEK OF	TOPIC	ASSIGNMENT
1	Jan 3	Chemical Equilibria	Chapter 6
2	Jan 10	Titrations – precipitation	Chapter 7
3	Jan 17	Monoprotic Acid-Base Equilibria	Chapter 9
4	Jan 24	Monoprotic Acid-Base Equilibria	Chapter 9
5	Jan 31	Measurements and Concentrations **(EXAM 1)**	Chapter 1
6	Feb 7	Experimental Error	Chapter 3

WEEK	WEEK OF	TOPIC	ASSIGNMENT
7	Feb 14	Statistics Calibration	Chapter 4 Chapter 5
8	Feb 21	Calibration Activities Charge and Mass Balance	Chapter 5 Chapter 8
9	Feb 28	Polyprotic Acid-Base Equilibria **(EXAM 2)**	Chapter 10
10	Mar 7	Acid-Base Titrations EDTA Titration	Chapter 11 Chapter 12
	Mar 14	**SPRING BREAK**	
11	Mar 21	EDTA Titrations Fundamentals of Spectroscopy	Chapter 12 Chapter 18
12	Mar 28	Fundamentals of Spectroscopy	Chapter 18
13	Apr 4	Electrochemistry	Chapter 14
14	Apr 11	Electrochemistry **EXAM 3**	Chapter 14
15		Electrodes	Chapter 15 (secs. 1-6)
16	Apr 25	**FINAL** examination week	

Course Inventory for ORU's Student Learning Outcomes

CHE 300 Quantitative Analysis Lecture
Spring 2011

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1 **Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A Biblical knowledge				X
1B Sensitivity to the Holy Spirit			X	
1C Evangelistic capability				X
1D Ethical behavior		X		
2 **Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A Critical thinking	X			
2B Information literacy		X		
2C Global & historical perspectives			X	
2D Aesthetic appreciation			X	
2E Intellectual creativity	X			
3 **Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A Healthy lifestyle			X	
3B Physically disciplined lifestyle				X
4 **Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A Communication skills		X		
4B Interpersonal skills		X		
4C Appreciation of cultural & linguistic differences			X	
4D Responsible citizenship		X		
4E Leadership capacity			X	