CHEMISTRY 206A SPRING 2007

GENERAL CHEMISTRY II: ANALYSIS

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Lectures: Tu,Th 10:00 – 11:15 am Pfahler 209

Office Hours: T(most),Th 11:15 am – noon; M,W 1:30 – 2:30 pm; and by appointment

Description: A study of kinetics, equilibria, acid-base chemistry, thermodynamics, electrochemistry and the properties of solutions. This course must be taken concurrently with CHEM 206aQ. Prerequisite: CHEM-105. Three hours of lecture per week. *Three semester hours.*

Required Text: Atkins, Peter; Jones, Loretta. *Chemical Principles – The Quest for Insight,* 3rd Edn., W. H. Freeman & Co., New York, 2004.
ISBN: ISBN 0-7167-5701-X

Optional Text: Selected Solutions Manual to accompany *Chemical Principles – The Quest for Insight.* ISBN: 0-7167-0740-3

Grading:

	Points
Exams (100 points each)	400
Final Exam (comprehensive)	200
Quizzes (5 x 10 points each)	50
TOTAL	650

Approximate Grades:

Grade	%	Points
A	85 – 100	552 – 650
B	75 – 84	487 – 551
C	65 – 74	422 – 486
D	50 – 64	325 – 421
F	0 – 49	0 – 324

Course objectives: The primary goals of this course (taken in the context of the lecture material) are:

• To improve your learning and analytical thinking skills (developing good study habits, time management, the ability to understand and solve problems, reasoning by analogy, sound questioning, and the use of models to visualize the atomic world).

• To develop your problem solving abilities (recognizing what is being asked, evaluating the available information, and conceptualizing how to find a solution, breaking a complex problem down into smaller more manageable components and fine-tuning skills such as dimensional analysis, flowcharts, mathematical algorithms, and chemical intuition).

• To learn to take personal responsibility for your own intellectual development. This requires an open and inquisitive mind, a positive attitude, self-discipline, learning from one's own mistakes, and consistent hard work.

• To learn how scientists use the scientific method to expand one's knowledge of the universe: making careful observations, formulating hypotheses, rigorously testing those hypotheses, drawing conclusions, and developing models (or theories) that can explain the experimental observations.

• To learn the origins, assumptions, limitations, and applications of models as tools to understand nature. It should be realized that models are not intended to be real pictures of the universe and that they are human constructs, subject to error, modification, and testing.

Prerequisites: The only official prerequisite for this course is CHEM-105. It is also assumed by the instructor that each student will have had some exposure to and a reasonable understanding of the following topics:

- algebra, trigonometry, and logarithms
- SI units of measurement and unit conversions
- dimensional analysis (factor label method)
- graphing of functions
- significant figures and their propagation in calculations
- quantum mechanical structure of atoms and molecules
- balancing chemical equations
- moles, molarity, and stoichiometric calculations
- a familiarity with the Periodic Table and its properties
- basic nomenclature for inorganic compounds

Please see me if you do not understand these prerequisites. If you have not used some of these concepts in a while, it is important that you review them during the first few weeks of the semester. I will be happy to help you with this, if necessary.

COURSE POLICIES

Attendance. The following is taken from the 2006 - 2007 Ursinus College Catalog: *...it is important that each student exercise reasonable judgment regarding class attendance at all times. Every student is accountable for all work missed. Instructors, however, are under no obligation to make special arrangements for students who are absent. Any instructor may set attendance regulations for courses...* Regardless of your academic standing you are allowed to miss six (6) class meetings without an excused absence from the Dean's office. Academic warnings may be issued after a fourth, fifth, and sixth absence. After a seventh absence you may be excluded from the course with a grade of F.

Inclement weather may result in cancellation of the class. I will leave a message on my office phone number (ext. 2340). Please do not contact me via e-mail. Also, if you come to class and I do not appear at 10:00 am, please stay in the classroom until 10:15 am. If I do not show up by 10:15 am, then you can assume that class is cancelled.

Exam dates are indicated on the following schedule. <u>These dates will not change</u>. Exams will begin promptly at 10:00 am in **Olin Auditorium** and you will have 90 minutes to complete each exam. The comprehensive final examination (worth approximately 100 points) covers the work of the entire semester along with Exam V (worth approximately 100 points also) that will cover the material of last few weeks of the semester. Should an exam fall on an inclement weather day and I am on campus, then only commuting students will be excused, and only they will be allowed to take the exam on a different date. Five short **quizzes** will be given throughout the semester. I will inform the class a few days before I give a quiz.

Attendance at all examinations and quizzes is required. Make-up examinations and quizzes will NOT be administered. Anyone who is absent from an examination will receive the grade zero for that exam, except in the case of an excused absence. The student who is legitimately ill must present a physician's excuse, stating not only that the student was seen by the physician but also that the student's illness made it impossible for her or him to sit for the examination. If a death in the immediate family occurs, documentation must be provided. In cases of excused absence, the final exam will be weighted more heavily. For example, if you miss an exam your final will be scaled up to 300 points. Illness before an exam is generally not considered to be a legitimate excuse as you are expected to keep up-to-date with the material and not allow the bulk of your studying to be done immediately before the exam.

Regrades for all exams will be handled by Dr. Price. Regrades will only be considered during the five days after the exam has been distributed to the class.

Individual exams will not be curved. Instead, you will be assigned two approximate grades based on your <u>cumulative total</u> during the semester. After Exam II, your grade will be based on 200 points (Exams I and II), and before the final exam you will be given an approximate grade based on 450 points. This will give a much better idea of your performance in the course throughout the semester. Please feel free to discuss your grade with Dr. Price at any time during the semester.

Suggested Homework problems will be given on a regular basis. It has been my experience that students who do not attempt homework problems will not do well in the course! Quite often, I may include a homework problem, or a similar type of problem, on an exam. Solutions and answers to most of the problems may be found in the student solutions manual which accompanies the textbook.

Academic Honesty: (from pages 10–11 of the Ursinus College Student Handbook) Ursinus College is a small community, which functions on a social contract among students, faculty, administration, and alumni. In order for the spirit of community to endure and thrive, this agreement, based upon shared values and responsibilities and a sense of mutual respect, trust, and cooperation, must be preserved. Students have an obligation to act ethically concerning academic matters and the faculty has a responsibility to require academic honesty from students and to be vigilant in order to discourage dishonesty. Lying, cheating, stealing, plagiarism, and other forms of academic dishonesty violate this spirit of mutual respect and collaboration and corrode the atmosphere of openness and free inquiry upon which the educational process is based. Such activities are demeaning and potentially damaging to those who undertake them. Moreover, academic dishonesty is damaging to the student body as a whole, in that it cheapens the achievements of the honest majority of students and subverts the integrity and reputation of the institution with which they will be identified for the rest of their lives. Students should be aware that there are many legitimate sources of help available on campus. Several departments, s provide help sessions. There is a writing center run by the Department of English, and the Library provides research help. Tutorial services are coordinated through the Unity House for all disciplines and peer mentoring services are arranged by the Dean's office. The student body, faculty, and administration of Ursinus College therefore unanimously condemn academic dishonesty in all its forms and affirm that it is the responsibility of all members of the college community to prevent such activity.

STATEMENT ON PLAGIARISM

Plagiarism is the act of taking the words--written or spoken-- or the ideas of someone else and passing them off as one's own. You are plagiarizing if you copy exactly a statement by another and fail to identify your source. You are plagiarizing if you take notes from a book, an article, or lecture, express those materials in your own words, and present the result as your work without identifying your source. You are plagiarizing if you copy part or all of a paper written by a friend, another student, or a writing service and offer it as your own work. You are plagiarizing if you take material verbatim from a source (even though the source is acknowledged) without identifying it as quoted material by means of quotation marks. Plagiarism is easy to avoid by using common sense and following the advice and directions for acknowledging sources. Such forms and methods are available from professors and style sheets provided by departments as well as by a composition textbook. Never take notes verbatim or in your own words
without using appropriate quotation marks and noting exact sources, including page number of the material. It is the policy of Ursinus College to reject and punish the act of plagiarism. The above has been adapted from, and credit is given to Millward, *Handbook for Writers*, pp. 354-355.

For example, you are cheating if you:
1. Copy answers or use information from a fellow student's paper during a quiz, test, or examination.
2. Divulge answers or information, or otherwise give improper aid to another student during a quiz, test, or examination or accept such aid.
3. Relay or receive any improperly obtained or confidential information concerning a quiz, test, or examination. (Example: if one sees the test before it is to be given and transmits information concerning its contents or whereabouts to other students.)
4. Use or refer to any unauthorized notes, books, calculators, problem solving aids such as "cheat sheets" during a quiz, test, or examination.
5. Collaborate improperly with another student on an open-book or take-home quiz, test or examination; or obtain information from an unsuspecting fellow student during such an exercise.
6. As a proctor or student assistant, divulge confidential information or aid any student in an improper manner during a laboratory exercise, quiz, test, or examination.

7. Commit an act of plagiarism in any form.
8. Borrow under false pretenses, steal or otherwise improperly obtain lecture or research notes, laboratory data, or any information gathered by another student and presents it as your own work (examples: term papers; laboratory reports or experimental yields; computer programs or assignments; English composition themes), or knowingly collaborate with another student by making such material available to him/her.
9. Falsify laboratory data, notes, results, or research data of any type in any course and present it as your own work.
10. Steal or intentionally damage or destroy notes, research data, laboratory projects, library materials, computer software (including the intentional passing of a computer virus), or any other work of another student (or faculty member), out of malice, or for the purpose of sabotaging that person's work and thereby gaining an unfair advantage to yourself.
11. Knowingly and willingly violate any special rules concerning research procedures, group assignments, or inter-student collaboration, which may be established by an instructor in any course.
12. Submit the same work including oral presentations for different courses without the permission of the instructors involved. Since it is expected that different courses offer different learning experiences, students are depriving themselves of an educational opportunity by submitting the same or similar work for more than one course. Examples include but are not limited to submitting a partial or complete paper previously handed into another class, superficially reworking one assignment for submissions to another class. (Example: submitting a sociology paper as an English 100 paper.)
13. Misrepresent yourself to an instructor or an administrator for the purpose of gaining special favors or extensions for academic work missed. Examples include but are not limited to lying about your health or the health of a relative, forging doctor's notes.
14. Forge signatures on forms, documents, or letters pertinent to College business. This may include but is not limited to course of study sheets, drop/add forms, or doctor's notes.

You are an accessory to cheating, and penalties may be applied, if you:
1. Witness or have direct knowledge of any of the aforementioned forms of cheating and fail to inform an authorized person (faculty member, administrator, proctor. or student assistant).
2. You bring unauthorized materials into a testing area and fail to or refuse to remove them when instructed to do so.
3. You fail to or refuse to comply with admonitions from a faculty member or authorized proctor to cease any activity, which might aid other students in cheating.

TENTATIVE SCHEDULE OF LECTURES

Dates		Topics	Chapter and Section
Jan.	T 16	Introduction; Review of Thermodynamics and Enthalpy	6, 7.1 – 7.3
	H 18	Entropy and the 2nd Law	7.4 – 7.11
	T 23	Free Energy	7.12 – 7.16
	H 25	Review of IMFs; Solutions	5.1 – 5.5; 8.8 – 8.9
	T 30	Solubility and Solutions	8.10 – 8.13
Feb.	H 1	Colligative Properties	8.14 – 8.17
	T 6	Equilibrium	9.1 – 9.4
	W 7	Optional Help/Review Session - Noon	
	H 8	**EXAM I – OLIN AUDITORIUM – 10:00 am**	
	T 13	Equilibrium	9.5 – 9.8
	H 15	Equilibrium	9.9 – 9.13
	T 20	Acids and Bases	10.1 – 10.11
	H 22	Acids and Bases	10.12 – 10.19
	T 27	Buffer Solutions	11.1 – 11.13
	W 28	Optional Help/Review Session - Noon	
Mar.	H 1	**EXAM II – OLIN AUDITORIUM – 10:00 am**	
	T 6	**SPRING BREAK**	
	H 8	**SPRING BREAK**	

Dates		Topics	Chapter and Section
	T 13	Titrations	11.4 – 11.7
	H 15	Solubility	11.8 – 11.12
	T 20	Redox Equations; Electrochemistry	12.1 – 12.4
	H 22	Electrochemistry	12.5 – 12.8
	T 27	Electrochemistry	12.9 – 12.12
	W 28	Optional Help/Review Session – Time TBD	
	H 29	**EXAM III – OLIN AUDITORIUM – 10:00am**	
Apr.	T 3	Electrochemistry; Kinetics	12.13 – 12.15; 13.1 – 13.2
	H 5	Kinetics	13.3 – 13.8
	T 10	Kinetics	13.9 – 13.13
	H 12	Catalysis	13.14 – 13.15
	T 17	Nuclear Chemistry	17.1 – 17.4
	W 18	Optional Help/Review Session – Time TBD	
	H 19	**EXAM IV – OLIN AUDITORIUM – 10:00 am**	
	T 24	Nuclear Chemistry	17.5 – 17.8
	H 26	Nuclear Chemistry	17.9 – 17.12
May	M 7	**EXAM V and COMPREHENSIVE FINAL EXAM PFAHLER AUDITORIUM 6:00 – 9:00 pm**	