Chem 3110 : 0001 – Analytical Chemistry I – Fall 2015
Prof. Natalia Alexeeva (Instructor) MWF 10:30 – 11:20 AM in W128 CB

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<tr>
<th>Office:</th>
<th>W315 Chem Bldg</th>
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<tr>
<td>Email:</td>
<td><a href="mailto:natalia-alexeeva@uiowa.edu">natalia-alexeeva@uiowa.edu</a></td>
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<tr>
<td>Phone:</td>
<td>(319) 471-2781</td>
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<tr>
<td>Office Hours:</td>
<td>M 11:30A-12:30P, W 9:00A – 10:00A, Th 10:00A- 11:00A, or by appointment</td>
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**Course Objectives**
Analytical Chemistry I is intended for undergraduate students pursuing a degree in chemistry, pharmacy, medicine, biology, and related fields. The focus of the course is modern theory and practice of chemical analysis including titrations and electrochemical methods. Specifically, the skills needed to appreciate and parameterize solution equilibria and calculate analyte concentration are emphasized. Electrochemical systems are included in these parametrizations through introduction of the Nernst equation. Applications of potentiometry, coulometry, voltammetry, and ion selective electrodes will be discussed. In addition, various methods for visualizing information about solutions and titrations (acid-base, EDTA, redox and precipitation) will be presented.

**Course Content**

**Content:** analytical process, measurement and experimental error, systematic treatment of equilibrium, mono- and polyprotic acid-base equilibria and titrations, fundamentals of electrochemistry, redox titrations, electroanalytical techniques, EDTA and precipitation titrations, gravimetric and combustion analysis.

**Prerequisites / Co-requisites**
The background needed for successful completion of this course includes first-year chemistry, algebra, spreadsheet skills, and ability to interpret chemical information in various formats. CHEM:1120, and MATH:1460 or MATH:1850, and PHYS:1511 or PHYS:1611 or equivalents are recommended as pre-requisites.

**Course Components and Instructors**
Analytical Chemistry I consists of three components: lecture (with in-lecture quizzes), homework, and exams. Attendance is expected during lecture but will not be taken. Students should also expect to devote at least 6 hours per week to out-of-class studying for this course (3 credits x 2 hours out-of-class time/credit).

(1) **Lecture and In-lecture Quizzes** – Dr. Natalia Alexeeva
    natalia-alexeeva@uiowa.edu

(2) **Homework Grading** – Thiranjeewa Lansakara Mudiyanselage
    thiranjeewa-lansakaramudiyanselage@uiowa.edu
    Office hours for Thiranjeewa: 4:30P – 6:30P T in E208 CB

(3) **Exams** – Dr. Natalia Alexeeva
    All questions about lecture material, quizzes, and exams should be sent to Prof. Alexeeva. Questions about homework grades should be routed to Thiranjeewa.

**Course Materials**


You are expected to obtain access to the textbook in some form, in print and/or online.

**Required online homework:** *Sapling Learning* one-semester access for $45 (see details below).

**Optional materials:** *Solutions Manual for Quantitative Chemical Analysis, 8th or 9th edition*, is available in the bookstores on campus and online.
Course Outline

1. Introduction and Review
   a) The Analytical Process
   b) Chemical Measurements
   c) Experimental Error

2. Chemical Equilibrium, Part 1 (Fundamentals, Acids, and Bases)
   a) Chemical Equilibrium
   b) Activity and the Systematic Treatment of Equilibrium
   c) Monoprotic Acid-Base Equilibria
   d) Polyprotic Acid-Base Equilibria
   e) Acid-Base Titrations

3. Electrochemistry
   a) Fundamentals of Electrochemistry (and Appendix D)
   b) Electrodes and Potentiometry
   c) Redox Titrations
   d) Electroanalytical Techniques

4. Chemical Equilibrium, Part 2
   a) EDTA Titrations,
   b) Precipitation, Gravimetry, and Combustion
   c) Advanced Topics

Detailed chapter-by-chapter breakdown of course content in Harris QCA textbook for both 8th and 9th editions will be available on ICON.

Course Evaluation

Grades will be calculated based on total points obtained on three 2-hour midterm exams, a final exam, online homework, and in-lecture quizzes.

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<tr>
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<th>Grade</th>
<th>% of Points</th>
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<tr>
<td>3 Mid-term Exams</td>
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<td>450 points (45%)</td>
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<tr>
<td>Final Exam</td>
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<td>200 points (20%)</td>
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<tr>
<td>In-Lecture Quizzes</td>
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<td>100 points (10%)</td>
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<tr>
<td>Online Homework</td>
<td></td>
<td>250 points (25%)</td>
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<tr>
<td>Total</td>
<td></td>
<td>1000 points (100%)</td>
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The limits for letter grades may be adjusted but will never be raised. For example, the A range for final grades may be 88 - 100%, but will not be 95-100%. Plus and minus grades will be assigned. Those grades will not necessarily be evenly split among the three categories (for example, number of B+ ≠ number of B ≠ number of B-). The grade of A+ may be assigned to reward exceptional achievement.

Examinations

There will be three 120-minute exams and a final exam:

**Exam 1 – Thursday, September 17th at 6:30P – 8:30P in LR1 VAN**

**Exam 2 – Thursday, October 15th at 6:30P – 8:30P in LR1 VAN**

**Exam 3 – Thursday, November 19th at 6:30P – 8:30P in LR1 VAN**

The time and location for the final exam will be announced.

Students should bring a writing utensil, their University ID, and a scientific calculator, such as a TI30X or TI30Xa, to each lecture and exam. Graphing calculators, programmable calculators, or data transmitting devices (e.g., PDA, laptop, cell phone) will NOT be allowed at the exams. The specific chapters tested on each exam, changes to location and times will be announced on the ICON website.
Conflicts and Make-Up Examinations

A student who has two final examinations scheduled for the same period or more than three examinations scheduled for the same day may file a request for a change of schedule before the published deadline at the Registrar’s Service Center, 17 Calvin Hall, 8:00A - 4:30P M-F, (384- 4300).

Attendance is mandatory for all exams and quizzes. In the case of an excusable absence (e.g. illness, mandatory religious obligation, certain University activities, or unavoidable circumstances), the student should contact the instructor and provide an Explanatory Statement of Absence in advance of foreseeable absences or within 72 hours of unforeseeable absences. Proper written documentation such as a doctor’s note must also be submitted to the course instructor. Penalties to be assigned by the instructor, up to and including a zero score on the exam, will apply for absences not meeting these requirements. Makeup exams and quizzes will be arranged individually with the student. There will be no make-up for the final exam.

In-Lecture Quizzes

There will be 5 in-class quizzes on dates to be announced. Quizzes will test student knowledge of definitions, central concepts, and ability to synthesize information. They will not include extensive computational problems but will test student’s conceptual understanding of the course material prior to exams. Students should still bring a scientific calculator to every lecture. For each quiz, the maximum of 24 points can be earned up to 100 points total for five quizzes.

Course Website

Chemistry 1070 (4:007), Iowa Courses Online (ICON) website URL = http://icon.uiowa.edu/. Use your Hawk ID and Hawk ID password to log in to ICON. Selected lecture handouts, practice exams, course announcements, and other pertinent information will be posted on ICON. You should check ICON often during the semester.

Although the schedule and policies given in this syllabus are expected to accurately outline the course, in the event that modifications are necessary, the modifications will be posted on the ICON course website. Such posting on ICON will take precedence.

Homework

Homework is designed to both build your skills and provide an opportunity for the instructor to assess broader learning than can be done in an exam. A homework set will include two parts: chapter assignments in Sapling Learning (SL) online homework system and a multistep Excel spreadsheet-based problem. The Excel problems will be submitted to the Dropbox on ICON by their due dates, reviewed and graded by the grader. The due dates and times for all homework assignments will be announced on ICON.

The instructions for creating the Sapling Learning account can be found at http://bit.ly/saplinginstructions. Use your University of Iowa official email when setting up the account. Access rights to our course can be purchased on the website for $45 after you have created your account. If a student already has a Sapling account they can use it to log in and purchase the access rights to this course. SL offers a grace period on payment: 14 days from the first day of the term. The grace period may be helpful in case a student decides to drop the course. During sign up or throughout the term, if students have any technical problems or grading issues, they should send an email to support@saplinglearning.com explaining the issue.

Overall, there will be 6 graded homework sets worth 45 points each. The homework score will be capped at 250 points even though the built-in points will add up to 270. The ‘extra’ 20 points serve as protection against point loss due to typos, software errors etc.

In addition to graded homework, the list of recommended practice end-of-chapter problems will be posted on ICON. These problems will not be collected or graded and will not affect your overall score. They are provided to help you with understanding major concepts and studying for the exams.

Re-Grading/Extra Credit

Adjustments to grades will only be considered within one week after an assignment or exam is returned. The Re-grade Request must be accompanied by a written, detailed description of the grading concern. Re-grading will involve re-assessment of the entire assignment and may increase or decrease of the grade.

Any extra credit will be given at the discretion of the instructor. Extra credit opportunities may appear in the form of classroom participation, pop-quizzes, or exam questions.
Classroom Etiquette
Students are expected to be prepared for class to start at 10:30AM sharp. Cell phones may not be used during lecture for any reason. All personal devices must be silenced prior to the start of class. Students may not use the internet or personal laptops in class, unless instructed. Students are expected to be prepared to participate in class activities, having read the assigned textbook chapter(s), and should have a calculator, writing utensils, and class notes.

Students must conduct themselves in a manner that will not disrupt the learning of other students. Disruptive behaviors are a violation of the Code of Student Life. When disruptive activity occurs, an instructor has the authority to determine classroom seating patterns and to request that a student exit the classroom, or other instructional area immediately for the remainder of the period. One-day suspensions are reported to Departmental, Collegiate, and Student Services personnel (Office of the Vice President for Student Services and Dean of Students).

Homework Authorship
The homework for this course is designed to help you master your knowledge related to the topics covered during lecture. As such, you may work on the homework problems with others or use online resources. However, the work that you turn in must be your own. Keep in mind:

a. You may not copy from one another.
b. For Excel-based assignments, each student is responsible for generating and developing their own files. (For example, one spreadsheet generated in collaboration by two individuals does not constitute individual work and is not acceptable.) Any questions about what constitutes acceptable student collaboration should be directed to the instructor.

Course Administration
Complaints, suggestions, and appeals regarding the course, instructor, or grader can be filed with Professor Dann Quinn, Chemistry Department Chair, at the Dept. of Chemistry administrative office, Room E331 CB (335-1350). Students are encouraged to first meet with their professor with their concerns about course aspects, grader, lectures, or exams.

Resources for Students
1. Chemistry Center, Room E225 CB, The Chemistry Center Coordinator is Ellie Keuter, 335-1341 or chemistry-center@uiowa.edu.
2. Chemistry Resource center, E208 CB. All chemistry TAs hold office hours in this center. These office hours offer walk-in assistance to students seeking help to strengthen their chemistry knowledge and problem solving skills.
4. Tutor Center, http://tutor.uiowa.edu
College of Liberal Arts and Sciences Policies and Procedures

Administrative Home
The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at http://clas.uiowa.edu/students/handbook.

Electronic Communication
University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences (Operations Manual, III.15.2, k.11).

Accommodations for Disabilities
A student seeking academic accommodations should first register with Student Disability Services and then go to the chemistry center (E225) to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty
All CLAS students have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies
The final examination schedule for each class is announced around the fifth week of the semester by the Registrar. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the dates and times of each final exam, the complete schedule will be published on the Registrar's web site.

Making a Suggestion or a Complaint
Students with a suggestion or complaint should first visit with the instructor (and/or the course supervisor) and then with Dean Raul Curto, Associate Dean of the College of Liberal Arts, 240 SH. Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).

Understanding Sexual Harassment
Sexual harassment subverts the mission of the University and threatens the well being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather
In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.

*These CLAS policy and procedural statements are available on the following web page: http://clas.uiowa.edu/faculty/teaching-policies-resources-syllabus-insert