

**University of Guelph**  
**Department of Chemistry**  
**Chem 2400/2480 Analytical Chemistry I**

# Course Outline Winter 2016

## General Information

**Instructor:** Dr. Kate Stuttaford, SC 3113A  
**email:** kstuttaf@uoguelph.ca (Please include course number in subject line)  
**Office hours:** Tu 10:00-11:00, Th 11:00-12:00  
**Lectures:** Tu/Th 1:00 - 2:20, MCKN 223  
**Lab Co-ordinator:** Dr. Kate Stuttaford

## Course Description

Quantitative analysis of important inorganic species in solution by volumetric, gravimetric and spectrophotometric techniques. Spreadsheet applications to solution equilibria and data analysis. This course is intended to build the foundations of good analytical laboratory practice. Credit weighting = 0.75 (2400), 0.50 (2480).

**Prerequisites:** Chem 1050

## Course Materials

1. D.C. Harris, "Quantitative Chemical Analysis", 8th ed., W.H. Freeman and Co., 2007 and solutions manual. (on reserve at the library).
2. Course Notes and Chem 2400/2480 Lab Manual (purchase from the chemistry department at the start of the semester)
3. Problem sets, spreadsheets, on Courselink.

## Assessment

Assessment Item	2400	2480	Date/Details
Computer Assignments	6%	6%	See Courselink
Online Homework	10%	10%	See below
Midterm Exam(Units 1-3)	17%	22%	Sat. Feb 27, 2:30-4:30 pm, MCLN 102
Final Exam (Units 4-6)	17%	22%	Wed., Apr 13 <sup>th</sup> , 8:30-10:30 am
Laboratory	50%	40%	See lab manual

*Students must pass the lecture and laboratory parts of the course independently to obtain credit for the course. To pass the lecture portion, an overall grade of 50% must be achieved on the lecture parts of the grades, and a grade of 50% must be achieved on at least one of the two exams. Otherwise a mark of 47% or the mark calculated from the above distribution, whichever is lower, will be the reported grade.*

## Online Homework ([www.saplinglearning.ca](http://www.saplinglearning.ca))

The coursework in Chem 2400/2480 involves extension use of problem solving skills. Development of these skills and understanding of the material is facilitated by the use of interactive homework assignments. You can choose to complete the online assignments, worth

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10% of your final grade, and your midterm and final exam weights are 17% each for Chem 2400 and 22% each for Chem 2480. If you choose not to complete the online assignments, 5% will be added to each of your midterm and final, 22% each for Chem 2400 and 27% each for Chem 2480. If an assignment is not attempted, a grade of zero will be assigned. Details on how to register with Sapling can be found on Courselink.

### Course Content

Each unit is approximately two weeks in duration

1. Measurements	Concentration Evaluation of analytical data Statistics Spreadsheets
2. Equilibria	Ionization of water Strengths of acids and bases Relation between $K_a$ and $K_b$ Mass and charge balance
3. Acids and Bases	Monoprotic acid-base equilibria Buffers Polyprotic acid-base equilibria Acid-base titrations
4. Solubility Equilibria	$K_{sp}$ Solubility and pH Precipitation Titrations
5. Complex Formation Titrations	Metal-chelate complexes EDTA titrations
6. Electrochemistry	Cells The Nernst equation Redox titrations

### Laboratory

Chem 2400: Labs are conducted in Sci 3103 and consist of two three-hour labs per week.

Chem 2480: Labs are conducted in Sci 3104 and 3103 and consist of one three-hour lab per week.

Labs start the week of January 11<sup>th</sup>. Expect to be in lab for the entire three hours for your first and every subsequent lab period. Students should bring with them: the lab manual, a lab coat, goggles, closed shoes (not sandals), a breakage card (available from the chemistry lab manual sales at a cost of \$10), and a bound laboratory notebook.

The lab co-ordinator uses Courselink to post grades, lab information, and for a lab discussion group. In case students don't have time to purchase the lab manual before their first lab, the intro part of the lab manual and Expt. No 1 are available on Courselink

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## **Other Information**

### **E-mail Communication**

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students. Forwarding your uoguelph email to another account is not an acceptable method of doing this. Emails can get lost or bounce. You are expected to check your uoguelph email directly on a daily basis.

### **When You Cannot Meet a Course Requirement**

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or teaching assistant) in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

### **Drop Date**

The last date to drop one-semester courses, without academic penalty, is March 11<sup>th</sup>. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

### **Copies of out-of-class assignments**

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### **Accessibility**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website: <http://www.uoguelph.ca/csd/>

### **Academic Misconduct**

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community - faculty, staff, and students - to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

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Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

**Recording of Materials**

Presentations which are made in relation to course work-including lectures-cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

**Resources**

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>