



University of Guelph

Department of Chemistry/CPES/ Guelph Campus:

Semester of Offering: Winter 2015: CHEM*3430: 0.5 CREDITS

INSTRUMENTAL ANALYSIS:ANALYTICAL CHEMISTRY 3430

This course is designed to introduce *modern* methods in instrumental analytical chemistry. The focus is *trace analysis*, and therefore methods for the identification, separation and quantitation of trace substances will be described. This will include analysis of solids, liquids and vapours.

Course Professor: Mark Baker MACN 122 Ext 58637 mbaker@uoguelph.ca
My research (summary) <http://www.chemistry.uoguelph.ca/baker/>

Lab Supervisor: Dr. Kate Stuttaford SSC 3113A : X 54861 : kstuttaf@uoguelph.ca

Lab Instructors: Jadwiga Lyczko SSC 1204-A X 56138 and Jake Henkie: MACN 129 X 58013

jhenkie@uoguelph.ca and jlyczko@uoguelph.ca

They will set office hours to meet with you and to answer lab-related questions.

Lectures:

These will be held in **ROZH 105** MWF 10.30 - 11.20: **Lecture notes will be emailed to you. Previous exams will be available during the semester**

Office Hours:

Monday mornings. My door is usually open! You can also email me to make an appointment. **email is the official communication channel for the course.** [E-mail Communication](#)
 As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

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 designated person, such as a 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.](#)

Laboratory:

Lab sessions are held in **SSC 3105**: Starts Jan 5th (sections are Mon, Tue and Thurs.2.30 -5.20: and Tue.8.30 – 11.20 check your section.

Check in: First week is check in/safety, but attendance is **mandatory**. Expect to stay ~1 hour.

SPECIAL LECTURE: JAN 9: HOW TO PREPARE LAB REPORTS: MANDATORY ATTENDANCE

No goggles or lab coats required for first week ***Check your lab section.*** For the introductory lab, you should bring the copy of the lab manual. During check-in you will meet the TA's, review lab safety procedures, be assigned a lab partner, and get the schedule of experiments so you will know which experiment to prepare for the following week.

Lab. Manual. for sale *Jan 5-9* : lab manual sales are posted in the hallways SSC and MACN as 10h00-15h30 (price is roughly \$10)

Pre-Requisite CHEM* 2400 / 2480 **co-requisite** CHEM* 2070

Text: "Principles of Instrumental Analysis" Skoog and Holler and Crouch. (Any edition from 4th on is fine) Saunders College Publishing. 6th edition is on library reserve (2 copies).

Evaluation

MID TERM	25%
LABORATORY	40%
FINAL EXAM	35%

Exam Schedule:

Mid-term Exam : Week 7: Wednesday Feb. 23rd: In class

Final Exam : April 6. 7 to 9 pm Room : TBA

Drop Day

March 6(40th day)

Professor Evaluation

As part of the faculty evaluation process, students are reminded that written comments on the teaching performance of the lecturer may be sent to the Chair, Department of Chemistry, at any time. Such letters must be signed; a copy will be made available to the instructor after submission of final grades. As usual you will also have the opportunity near the end of the course to evaluate me, the course, labs etc.

COURSE CONTENT

Introduction

Aims of the course. Instrumental methods why do we use them? Description of common terms in instrumental analysis. Selectivity and Sensitivity. Trace quantities (how to describe them). Input and Output "transducers" Detection Limits, Signal to noise.

Electroanalytical Methods

Brief review of electrochemistry. Standard electrode potentials. Effect of concentration on cell emf. Potentiometric methods . Reference electrodes. Ion selective electrodes. Membrane electrodes. Sensors. Hydrodynamic Voltammetry. Cyclic Voltammetry

Spectroscopic Methods

Review of emr. Beer's Law. UV-VIS spectroscopy. Sources and Monochromators. AA. AE. ICP.

MID TERM EXAM

Chromatography

Principles of chromatography. Types of chromatography used in modern labs. Partition coefficients. Plate theory - optimization of performance. Van Deemter curves. Retention times.

Gas Chromatography: Supports, detectors, examples of use. Types of columns. Liquid Chromatography:

HPLC Principles and applications. Chiral columns. Ion-chromatography. Capillary Electrophoresis. Gel Permeation and Filtration

OTHER INFO:

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 the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: 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.

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>