UNIVERSITY of GUELPH
College of Physical and Engineering Sciences
DEPARTMENT OF CHEMISTRY

Course Specifics		Professor & Marking	Laboratory Co-ordinator	
Title:	Analytical Chemistry III	Professor: Paul A. ROWNTREE	Co-ordinator :	Kate Stuttaford
Course:	CHEM 3440	Office: SC-2515	Office :	SC-3113A
Credits:	0.5	E-Mail : Rowntree@uoguelph.ca	E-Mail :	kstuttaf@uoguelph.ca
Pre-req:	CHEM 3430	Phone : 519-824-4120 x53061	Phone :	519-824-4120 x54861
Session:	Fall 2017	https://courselink.uoguelph.ca/d2l/home		
Lectures:	9h30-10h20 Mon-Wed-Fri			
	MCKN-308	Marker : Eric Nicol		
	(McKinnon)	E-Mail : eric@uoguelph.ca		
Lab:	Wed. 14h30-17h20	Mid-Term : Friday, Oct. 13, 19h00-21h00		
	All labs are in SC-3106	Final Exam : Friday Dec 8, 11h30-13h30		

Context for Course

This course focuses on the implementation of instrumentation in chemical analysis. This course focuses on the background principles and various quantification procedures. An introduction to electronics is presented, with a focus on the behaviour of operational amplifiers, their role in instrumentation, and the requirements for interfacing analog electronics with digital systems for computer acquisition, control, and subsequent analysis. We then study the operating principles and practices of some of the more chemically important instruments, such as UV-Visible, FTIR, X-ray, and Raman spectrometers. The course will also provide the students with problem-based activities to develop their skills at using and interpreting statistical data using typical analytical methods: calibration curves, standard addition methods, and internal standards.

Calendar Description

Analytical Instrumentation, data acquisition, processing and applications in Chemistry and Biological Chemistry.

Bibliography

Obligatory Textbook

Principles of Instrumental Analysis 7th Ed. (Skoog, Holler, Crouch, 2018)

Complementary Textbook

Contemporary Instrumental Analysis, (Rubinson and Rubinson, 2000)

A Note Concerning Assignments and Quizzes

An important aspect of the course is a series of assignments that assess the students' understanding of the material. These assignments may be completed by groups of up to 3 students, who will receive a common grade for their collective work unless there is evidence of an uneven distribution of effort within the group.

You will *always* have at least one week to complete the assignment, which will be submitted via CourseLink by (or before) 16h00 on the specified due date, unless indicated otherwise. Submissions will not be accepted after 16h00.

Assignments will be submitted as neatly typed PDF documents via CourseLink. Marks are awarded in proportion to the clarity of the presentation, the accuracy of the work, and the level of understanding

demonstrated by the students. If you must make figures and do not have access to suitable graphics software, neat hand-written diagrams can be photographed, and the image inserted into the document file.

The solutions to these problems will be posted to the course web site as soon as possible after the deadline. Due to the size of the class, not all questions will be marked; the choice of evaluated questions will be made by Prof. Rowntree after the submission of the assignments.

Most of the information and course notes for CHEM*3440 will be communicated via the University of Guelph's CourseLink system.

Content of Lecture Series

Theme	Content	Readings (Principles of Instrumental Analysis, 7th Ed)
0	Principles of Instrumentation (Self-Study)	Chapter 1
1	Basic Electronics, Operational Amplifiers and Digital/Analog Interfaces	Chapters 2, 3, 4
2	Signal-to-Noise Considerations	Chapter 5
3	Spectrometry	Chapters 6, 7
4	UV/Vis Spectroscopy and Instrumentation	Chapters 13, 14
5	Luminescence Spectroscopy	Chapter 15
6	Infrared / Raman Spectroscopy and Instrumentation	Chapters 16, 17, 18
7	Mass Spectroscopy and Instrumentation	Chapters 11, 20
8	X-Ray Spectroscopy and Instrumentation	Chapter 12
9	To be determined according to time available and students' interests	

Pedagogic Methods

1) Lectures (~three hours per week).
2) Questions and exercises during the presentations.
3) Individual and Group work (three-to-six hours per week).
4) Experimental work in laboratory.

Evaluations

1) Mechanisms	One mid-term exam, final exam, ~weekly assignments / quizzes, laboratory work
2) Weighting	15% for the group assignments and individual quizzes
	30% for the laboratory
	25% mid-term examination (Friday Oct. 13, 19h00-21h00, room Thornbrough 1307)
	30% final examination (Friday, Dec 8, 11h30-13h30)

Note : To receive credit for CHEM3440, students must pass both the laboratory and lecture components of the course. Failure to do so will result in a grade of 48% or less.

Additional Notes

1) The class-time that would normally be held Monday, October 9 (Thanksgiving Day) will be held on Friday, Dec. 1.
2) Students that do not submit assignments on-time will receive 0% on that activity, unless an appropriate medical certificate is provided.
3) 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.
4) 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: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml
5) Drop Date
   The last date to drop one-semester courses, without academic penalty, is Friday Nov 3 2017. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar:

   http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml
6) 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.
7) 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 accessibility@uoguelph.ca or see the website https://wellness.uoguelph.ca/accessibility/
8) 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

9) 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 a guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

10) 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

2017 Document Revision History

Sept 6 : created based on 2015 document, updated assignment submission procedures, text, dates
Sept 7 : due dates for assignments may now be any day of the week
Sept 7 : quiz substitutes for assignments removed
Sept 22 : updated mid-term location and date