

Techniques in Analytical Chemistry — CHMB16H3 Fall 2019

Lectures: Mondays, 9:00–12:00, SW128

Lecture Instructor: Prof. Ruby Sullan, EV566, ruby.sullan@utoronto.ca

Office Hours: Mondays, 14:00–17:00

Lab Instructor: Prof. Kris Kim, EV560, kris.kim@utoronto.ca

Office Hours: Thursdays, 14:30–16:30 and Fridays, 10:00–11:00

Welcome to Techniques in Analytical Chemistry! Analytical Chemistry is an exciting field with far-reaching applications—medicine, forensics, agriculture, environment, engineering, even in space exploration! In this course, you will be taught to *think like* and *act like* an analytical chemist. We will cover both the fundamental and practical aspects of the methodologies and instrumentation—classical and modern—widely used in the field. Topics range from sample preparation to errors and statistics to electrochemistry, spectroscopy, and chromatography. While the lab will give you ample opportunities to act like an analyst, the lecture part will teach you the basic principles of the subject. Our hope is that this course will develop in you an appreciation for the depth and importance of Analytical Chemistry. By the end of the semester, you will have the opportunity to apply what you learn by proposing a short chemical analysis experiment. Whether you are like Sherlock Holmes who solves problems by logical reasoning or MacGyver who saves the world with a duct tape and paper clip, CHMB16 has got you covered.

Method of Evaluation

Course Component	Percentage
Laboratory component*	40%
Midterm Exam	25%
Final Exam**	35%
Total	100%

**To pass the course, you have to pass the Laboratory component. Lab evaluation can be found in page 10 of your Lab Manual. **5% of the Final Exam mark will go towards the short analytical chemistry proposal.*

Textbook

Fundamentals of Analytical Chemistry, 9th Edition, Douglas A. Skoog, Donald M. West, F. James Holler, and Stanley R. Crouch, Publisher: Brooks/Cole, Cengage Learning.

Students Solution Manual for Fundamentals of Analytical Chemistry, 9th Edition, Douglas A. Skoog, Donald M. West, F. James Holler, and Stanley R. Crouch, Publisher: Brooks/Cole, Cengage Learning.

Your textbook is available at the UTSC Bookstore or the Reserves section of the UTSC Library. Note that you have the option to get the physical bundle (textbook + solution manual) or the e-version of the bundle.

Communication: Check Quercus (<https://q.utoronto.ca>) for important announcements, updates to readings, assignment topics, requirements, and evaluation, etc. Students are responsible for checking the course website regularly. Make sure that your "utoronto" emails can accept the course announcements.

Tentative Course Schedule

Week	Date	Topic	Chapter
1	Sept 9	What is Analytical Chemistry?, Tools of the Trade	1, 2
2	16	Errors, Statistics	5, 6, 7
3	23	Sampling, Standardization, and Calibration	8
4	30	Titration	13, 14, 15, 17
5	Oct 7	Electrochemistry	18, 19
6	14	Reading Week	
7	21	Potentiometry	21
8	28	Spectrochemical Methods, Optical Spectrometry	24, 25
9	Nov 4	Molecular Absorption Spectrometry	26
10	11	Molecular Fluorescence Spectroscopy	27
11	18	Atomic Spectroscopy, Mass Spectrometry	28, 29
12	25	Separation Science	31
13	Dec 2	Introduction to Gas Chromatography, HPLC	32, 33
14	3-5	Study Break	

Missed Mid-term Test: The exact date of the midterm test will be announced in class and posted in Quercus. Students who miss the term test will be assigned a mark of zero for the test, unless they can document a compelling reason for missing it. Students in that position must submit a written request to the Course Instructor with appropriate documentation. If a request is accepted for the mid-term test, the weighting of the mid-term will be included in the final exam. There will be no make-up mid-term tests.

Final Examination: The final examination will take place during the UTSC examination period in December following the end of the course. The exact date will be provided when the examination is scheduled.

Cell Phones: During lectures and labs please put your cell phones in silent mode to avoid disruption of the class. If circumstances warrant use of your cell phone and you must receive an emergency call, please inform the Course Instructor at the beginning of the session in advance and then excuse yourself from the session to respond to the call outside the lecture hall or laboratory.

Academic Calendar: Further information about academic regulations and course withdrawal deadlines can be found in the UTSC Calendar. You are encouraged to read this material.

Centre for Teaching and Learning: If you need assistance with effective writing skills, study skills, exam preparation, note taking, or time management, free workshops and advice are available from the Centre for Teaching and Learning, which can be reached at: <https://www.utsc.utoronto.ca/ctl/student-support>

Math & Statistics Learning Centre is now offering students help with any sort of questions they may have related to mathematics and statistics. Our course components involve advanced math skills. If the students are struggling, they are encouraged to drop in at AC312 and use the available general help hours. The schedule can be viewed at the link: <http://ctl.utsc.utoronto.ca/mslc/>

Accessibility: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach us and/or the AccessAbility Services Office as soon as possible, <https://www.utsc.utoronto.ca/~ability/>. We will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in AA142) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

Academic Integrity: Academic integrity is important to maintain our community which honours the values of honesty, trust, respect, fairness and responsibility and to protect you and the value of the degree towards which you are all working so diligently.

It is an offence for students to:

- Use someone else's ideas or words in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks. i.e. to commit plagiarism
- Include false, misleading or concocted citations in their work.
- Obtain unauthorized assistance on any assignment
- Provide unauthorized assistance to another student. This includes showing another student completed work.
- To submit their own work for credit in more than one course without the permission of the instructor.
- To falsify or alter any documentation required by the University.- eg: doctor's notes.
- To use or possess an unauthorized aid in any test or exam.

There are other offences under the Code, but these are the most common. Please respect these rules. Offences will be dealt with according to the procedures outlined in the Code of Behaviour on Academic Matters.