

**CHM 1104S – Separation Science
Winter/Spring 2020**

Course Staff:

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Office Hours: Tue. 4:00-5:00 PM, Thu. 4:00-5:00 PM or by appointment
(in LM629 unless otherwise posted)

Lecture Schedule and Format:

Lectures are held on Tuesdays and Thursdays from 3:00-4:00 PM in LM115, beginning on Jan 7th and ending on April 2nd. Course notes (corresponding to the lectures) will be posted on the course website prior to each lecture – you are advised to bring either a hard copy or a digital copy and a reader (laptop or tablet, etc.) to each lecture.

Topics:

1. General Separations Concepts and Principles
2. Liquid Chromatography Instrumentation
3. Liquid Chromatography Modes
4. Gas & Supercritical Fluid Chromatography
5. Capillary & Gel Electrophoresis
6. Miscellaneous Techniques (TLC, LLE, SPE, FFF, and others)

The six topics listed above correspond to six sets of lecture notes, which will be posted to the course website prior to the lectures. Each group of two topics constitutes a "module" that will be addressed chronologically throughout the semester – specifically, module 1 (topics 1-2) in January-February, module 2 (topics 3-4) in February-March, and module 3 (topics 5-6) in March-April. Each module is associated with a written test (a term test or a final exam), a problem set, and a virtual laboratory exercise (described below).

Texts:

- *Principles of Instrumental Analysis*, Skoog, Holler and Crouch, 6th Edition (Thomson & Brooks/Cole) or 7th Edition (CENGAGE Learning)
- *Introduction to Modern Liquid Chromatography*, Snyder, Kirkland, Dolan, 3rd Edition (Wiley) – available electronically at the library

Course Website:

The course website can be found by logging in to your "quercus" account at <https://q.utoronto.ca>. You are advised to check the course website often, as content will be updated regularly. Content to be posted on the course website is summarized below:

- Syllabus
- Course schedule
- Announcements
- Lecture notes
- Problem Sets and Keys
- Virtual Lab Assignments

Marking Scheme:

Your mark in this course comes from three virtual laboratory exercises and three written tests (two term tests and one final exam). The three virtual laboratory exercises (together) constitute 10% of your final mark. The remaining 90% of your final mark comes from the tests/exam, each of which has (nominally) the same 'weight' or 'importance.' But because anyone can have a bad day (and can make a bad mark on that day), the text/exam marks for this course will count as a weighted average of your two highest scores at 37.5% each, and your lowest score at 15%. So, for example, if you collect 10 marks for the virtual laboratory exercises, and bomb the first term test with a 40, but make an 80 on the second term-test and a 75 on the final exam, your final mark for the course will be $(10) + (0.375)(80) + (0.375)(75) + (0.15)(40) = 74$, or a B. The marking scheme is summarized in the table below.

Item	Weight
Virtual Laboratory Exercises (total score from 3)	10%
Highest score among two term tests and the final exam	37.5%
Middle score among two term tests and the final exam	37.5%
Lowest score among two term tests and the final exam	15%

The two term tests will be held outside of regular lecture time (**February 4, 6:00-8:00 PM & March 10, 6:00-8:00 PM**, both in the Haultain Building, room 316), and the final exam will be held after the end of lectures (location and time TBD). You are advised to mark these dates and times in your calendar and make every effort to attend them, as *alternate dates (and makeup tests) will not be offered*. If an emergency or other unavoidable circumstance causes you to miss an assignment, appropriate arrangements should be made with the instructor, in advance.

Problem Sets:

There are three problem sets, each corresponding to one of the course modules. The problem sets will not be collected or marked, but working them is the best method to prepare for the tests and exam.

Virtual Laboratory Exercises:

There are three virtual laboratory exercises, each corresponding to one of the course modules. The first two exercises use the "HPLC Simulator" software package (<http://www.multidlc.org/hplcsim/hplcsim.html>), and the third uses the "PeakMaster" software package (<https://web.natur.cuni.cz/~gas/peakmaster.html>). Each exercise includes instructions, a series of questions to answer (via quercus) and a due-date. Responses that are submitted on time will be marked (generously) as 'pass/fail,' and represent "easy" opportunities to collect points toward your final mark. Don't miss the opportunity to get them, as late submissions (or no submissions) will receive zero points. Last-minute technical glitches (e.g., computer problems or internet outages) are not acceptable excuses, so aim to submit early instead of waiting until the last minute! All together, the three exercises are worth 10 points toward your final mark in the course (1/3 for each exercise).

Absences:

Students are advised to attend and participate in course lectures, but attendance will not be marked or collected. On the other hand, ***participation in the term tests and the exam is mandatory***; absences are only excusable because of illness or other medical emergency. In such a case, you must submit a "Verification of student illness" form completed by the medical professional(s) with whom you consulted (<http://www.illnessverification.utoronto.ca/>) before the (due) date of the assignment. If you need to submit this form for more than one course, contact your college registrar's office for assistance.

Plagiarism:

Plagiarism is a serious offense. Any materials found to be plagiarised will be given a zero. More information about what constitutes plagiarism and how to avoid it can be found at: <http://www.chem.utoronto.ca/undergrad/plagiarism.php>.