

Introduction to Instrumental Analysis
CHMC11H3

Syllabus

1. Atomic spectroscopy

- a. Introduction to atomic spectroscopy
- b. Instruments for atomic spectroscopy
- c. Techniques:
 - i. Absorption spectroscopy and its applications
 - ii. Emission spectroscopy and its applications
 - iii. X-ray spectroscopy and its applications
- d. Which technique to choose(?): comparison of absorption, emission and x-ray spectroscopes

2. Molecular spectroscopy

- a. Introduction to molecular spectroscopy
- b. Ultra-violet (UV-Vis) spectroscopy
 - i. Instrument design
 - ii. Techniques and applications
- c. Infrared and Raman spectroscopy
 - i. Instrument design
 - ii. Techniques and applications

3. Resonance techniques

- a. Nuclear magnetic resonance
 - i. Instrument design
 - ii. Techniques and applications
- b. Introduction to electron resonance spectroscopy

4. Chromatographic separation techniques

- a. Introduction to chromatography
- b. Gas chromatography
 - i. Instrument design
 - ii. Experimental set-up
- c. High Performance Liquid Chromatography
 - i. Instrument design
 - ii. Experiment set-up

5. Introduction to electroanalytical chemistry

6. Miscellaneous techniques and combination of techniques

The suggested textbook for this course:

Skoog, D. A., F. James Holler, and Stanley R. Crouch. (2007).
"Principles of Instrumental Analysis." 6th ed. Brooks/Cole.

The textbook should be available in the UTSC bookstore.

The other important source will be the lecture notes. The lecture notes will be available on CHMC11 intranet site in pdf format. Occasionally, attritional material will also be available (for example, some sample problems and further explanations) so check the intranet frequently. It is also advisable to review the material from other courses (CHMC10, CHMB16 and CHMB21) if you need to refresh your knowledge of physical principles behind the techniques (for example, electronic structure of the atom for atomic spectroscopy).

Marking Scheme

2 problem sets (assignments)	20% each = 40%
Term tests	20%
Final exam	40%

Problem sets are non-cumulative. You will find them on CHMC11 intranet site as pdf files. Each is due in 7 days in class according to the following schedule:

Problem set	Distributed	Due Date
1	Thurs. Sept. 30	Thurs. Oct. 7 in class
2	Thurs. Nov. 18	Thurs. Nov. 25 in class

The first term test is going to be in late October (date/place TBA) and will cover all material from lecture 1 up to the week of the test.

The final exam is going to be cumulative placing emphasis on the material after the term test: about 1/3 of the questions on the final will cover the material before term test while 2/3 will concentrate on the material covered in the lectures after term test.

In each case (problem sets, term test and final exam) the questions will be combination of calculations and theory. The questions will be based on both the assigned readings from the textbook and material from the lectures.

Good Luck to all and see you soon!