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Class time and room: Mon & Wed & Fri, 8:45-10:00, room HC-157 LOY
Office hours: (to be discussed in class)

Course Description

Chemistry 217 is an introduction to the theories and concepts of analytical chemistry. Based on your prerequisite knowledge on stoichiometry and acids/bases, the course material covers basic statistics, acid-base equilibria, volumetric analysis, complex formation, gravimetry, as well as introductory spectroscopy and chromatography. Following a theoretical introduction and background information, a wide range of applications are discussed, including problem sets to be solved mathematically & lab experiments. Examples have direct relevance for work in professional and academic labs (e.g., statistics, buffer preparation, pH calculations, EDTA titrations and chromatography).

Lecture Topics

- Introduction to the Laboratory
- Review of Stoichiometry, Concentration Terms and Equilibrium Constants
- Statistical Treatment of Data
- Acid/Base Equilibria and Titrations
- Complexometric Equilibria and Titrations
- Solubility Products, Common-Ion Effect, Diverse Ion Effect and Activities
- Precipitation Separations and Gravimetric Factors
- Introduction to Spectroscopy and to Chromatography

Laboratory Experiments

- As described in the laboratory manual
- **All** experiments must be completed
- A passing grade for the lab (60%) must be obtained to receive credits for CHEM217

Assignments

The development of an ability to perform quantitative calculations is an essential part of this course. To solve problems effectively, it is absolutely essential that you understand the theoretical principles of analytical chemistry. Solution of numerical problems will constitute the **major** part of the mid-term and final examination. Take home assignments have to be handed in (**on time!**). Assignments handed in after the posted deadline will receive a 20% deduction. If more than one week late, the grade will be zero.

Exam Schedule and Grading

- | | | |
|----------------|----------|----------------------|
| → Midterm Exam | ?? | 25% |
| → Final Exam | December | 40% (comprehensive!) |
| → Assignments | | 10% |
| → Laboratory | | 25% |
- Attendance to the Seminar on Academic Practices is mandatory!

IMPORTANT: A passing grade is required in both theory (50%) and laboratory (60%) components of the course to obtain credits for CHEM 217!

Textbook

→ Chemistry 217/218 Laboratory Manual

→ QUANTITATIVE CHEMICAL ANALYSIS, 9th edition, by D.C. Harris (8th edition also ok)



Chapter 0: The Analytical Process

Chapter 1: Chemical Measurements (required reading)

Chapter 2: Tools of the trade (required reading)

Chapter 3: Experimental Error

Chapter 4: Statistics

Chapter 5: Quality Assurance and Calibration Methods

Chapter 6: Chemical Equilibrium (excerpts)

Chapter 7: Let the Titrations Begin (excerpts)

Chapter 8: Activity and Systematic Treatment of Equilibrium

Chapter 9: Monoprotic Acid-Base Equilibria

Chapter 10: Polyprotic Acid-Base Equilibria

Chapter 11: Acid-Base Titrations

Chapter 12: EDTA Titrations

Chapter 13: Advanced Topics in Equilibrium

Chapter 23: Introduction to Analytical Separations (excerpts)

Chapter 24: High-performance Liquid Chromatography (excerpts)

Chapter 21: Mass Spectrometry (excerpts)

Chapter 27: Gravimetric Analysis (excerpts)

Appendix F and Appendix G

STUDY GUIDE and some GOOD ADVICEDO's

→ do all questions on distributed assignments

→ do questions in text pertaining to topics discussed in class

→ keep up with the reading

→ seek assistance well before the exams

DON'Ts

→ don't underestimate the theory component of this course

→ don't underestimate the lab component of this course

→ don't wait until the last minute to study (practice, practice, ...)

Labs (room SP-210):

→ Lab supervisor: Khalil Rahman (phone: 848-2424, ext. 3357)

→ Labs start on: Monday September 9th

→ Available in bookstore: Lab Manual & Book, Lab coat & glasses, Spatula & Bulb

→ **If you are exempted from the lab, you must see me and Khalil ASAP**

→ Missed experiments require a valid excuse (e.g. medical form) and still require to be performed

Lab Exemptions:

Students who are repeating the course and who have passed the lab component within the last two (2) years may be eligible for a lab exemption and may thus request a lab exemption. Applications for the exemption (forms available in SP201.01) must be submitted by Friday September 7th, 2018 (i.e. prior to the start of the laboratory); late applications will not be accepted. Signed and completed forms are to be returned to Hilary Scuffell, (SP 275.01). Students **MUST** register for the appropriate lab exemption lab/tutorial section (section 56); students registered in any other lab/tutorial sections will be required to complete the lab portion of the course (NO EXCEPTIONS).

Pre-Labs: Pre-labs include two parts:

- 1) A written summary (½ page max.) in your own words describing:
 - (a) the goal of the experiment
 - (b) the experimental procedure
- 2) On a separate page(s), a flowchart of the procedure (**NOTE: No pre-lab → no entry to lab**)

Grading of pre-labs (1 point): Good → 1.0 point; Reasonable → 0.5 point; Yuck → 0.0 point

Grading of the lab work (4 points) is based on the **ACCURACY** of the results

→ Must fill a Lab Report Form (triplicate results, average and deviation)

→ Any rejected value must be explained (Grubbs test, see section 4-5 in Harris)

MANDATORY QUIZ AND SEMINAR

As part of this course, you are **required** to i) attend a Chemistry and Biochemistry Departmental Seminar on the academic conduct code and the appropriate use of information sources and ii) pass the online quiz associated with this seminar (the passing grade for the quiz is 100%). (**Note**: This is **not** the University's quiz you may have been asked to take when you first registered and logged into the myConcordia portal; the one you must take is similar, but graded by the Department of Chemistry and Biochemistry, and you do not have access to it until after you have attended the seminar.) The aim of this seminar is to clarify the academic conduct code in terms of what practices will be considered unacceptable with regards to work submitted for grading in Chemistry and Biochemistry courses. **You are only exempt from repeating the seminar and the quiz if you have done both in Fall 2014 or more recently**,* otherwise you are required to repeat both this term. This short seminar (1 hour) will be held at the following times (note that late-comers will **not** be admitted):

Date (Fall 2019)	Time	Room
Monday, Sept. 16	16:45-17:45	CC 111
Tuesday, Sept. 17	16:45-17:45	CC 308
Tuesday, Sept. 17	20:45-21:45	HB 130
Wednesday, Sept. 18	16:45-17:45	CC 308
Wednesday, Sept. 18	20:45-21:45	HB 130
Thursday, Sept. 19	16:45-17:45	HC 155
Friday, Sept. 20	16:45-17:45	HC 157

As space for each seminar is limited by the room size, please **sign up** to your preferred time as soon as possible. Sign-up sheets are available two weeks in advance of the seminars outside SP 201.01. Only sign up in **available slots**: rooms must not be filled over capacity!

If you do not complete this course requirement, your final grade for the course may be lowered by one full letter grade with an incomplete (INC) notation until such time as this requirement is completed. Please refer to the undergraduate calendar (section 16.3.5) for details on removal of an incomplete notation.

* You are exempt if you can locate your ID in the pdf file located on the Departmental web site (<http://www.concordia.ca/content/dam/artsci/chemistry/docs/Compliance-list.pdf>).

PLAGIARISM AND OTHER FORMS OF ACADEMIC DISHONESTY

The Academic Code of Conduct can be found in section 17.10 of the academic calendar (<http://www.concordia.ca/academics/undergraduate/calendar/current/17-10.html>). Any form of unauthorized collaboration, cheating, copying or plagiarism found in this course will be reported and the appropriate sanctions applied. The mandatory seminar is a clear and fair opportunity to learn what our faculty regards as academic misconduct. Failure to take part in this learning opportunity and thus ignorance of these regulations is no excuse and will not result in a reduced sanction in any case where academic misconduct is observed.