



DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2020

CH2110 (A3): Quantitative Analysis I – 3 (3-0-4)

105 Hours over 15 weeks

INSTRUCTORS: A3: Melissa Gajewski **PHONE:** 780 539 2985

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OFFICE HOURS: Appointment or walk-in as needed

CALENDAR DESCRIPTION*: The course includes the principles, methods and experimental applications emphasizing solution phase equilibria, titrimetry, volumetric laboratory skills and evaluation of experimental data. Includes examples of organic and inorganic analysis.*Dr. Charles Lucy, University of Alberta

PREREQUISITE(S)/COREQUISITE: CH1020 or equivalent

REQUIRED TEXT/RESOURCE MATERIALS: Recommended text book is D.C. Harris, *Quantitative Chemical Analysis*, 9th edition. Two copies are available in the library on reserve and one copy is available for use through the instructor. The required Lab manual is *Quantitative Analysis*, published by the University of Alberta, 2018/2019 edition, available through instructor.

DELIVERY MODE(S): Lecture style presentation of material followed by practice problems/discussion in seminar. Laboratory provides hands-on experience.

COURSE OBJECTIVES*: This course enables students to strengthen their understanding of chemistry through the study of

- Begin to identify a problem (a question).
- Considerations in identifying the best way to answer the question (what analysis will give the desired answer?).
- How to prepare a sample and associated equipment (glassware, etc.) such that the best answer can be obtained.
- How to perform measurements using proper quantitative analysis techniques.
- How to analyze, present and report data using valid statistical principles.
- How to draw conclusions based on the experimental evidence.

*Dr. Charles Lucy, University of Alberta

LEARNING OUTCOMES*:

What we want the students of CH2110 to appreciate:

- Being careful, clean, diligent, and meticulous matter! No matter how small the resulting error may seem, the actual error may be quite large.
- Consistency matters! Perform analysis the same way every time.
- Details matter! We are learning to be analytical.
- Being careful is better than being fast (within reason). Work on developing proper lab technique first, then work on being fast.
- Efficiency matters. Having a plan, and sticking to it, will allow more work to be completed.
- The physical meaning behind the analysis, this way the results make sense.

*Dr. Charles Lucy, University of Alberta

TRANSFERABILITY: CH2110 transfers to UA, UC, UL, BU, AU, CU, GMU, KUC.

***Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferralberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>

**** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions.**

Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability

EVALUATIONS:

Midterm – 20%
In Class Activities/Quizzes – 15%
Lab Work – 35%
Final Exam – 30%

GRADING CRITERIA:

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100		C+	2.3	67-69
A	4.0	90-94		C	2.0	63-66
A-	3.7	85-89		C-	1.7	60-62
B+	3.3	77-84		D+	1.3	55-59
B	3.0	73-76		D	1.0	50-54
B-	2.7	70-72		F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

CH2110 Topics*

Lecture Subject Outline: Analytical Balance (1-2 lectures)

Volumetric Equipment (2-4 lectures)

Statistics of Small Numbers (1-2 lectures)

Ionic Equilibria (2-3 lectures)

Volumetric Analysis (1-2 lectures)

Acid-Base Equilibria (1-2 lectures)

Titration of Strong and Weak Monoprotic Acids and Bases (1-2 lectures)

Buffers and Acid-Base Indicators (2-3 lectures)

Titration of Polyprotic Acids, Bases and Mixtures (1-2 lectures)

Complexation in Analysis (1-2 lectures)

Oxidation-Reduction in Analysis (1-2 lectures)

Potentiometric Analysis (1-2 lectures)

Sampling and Sample Preparation (if time permits)

Discussion of Experiments (throughout the term)

Detailed lecture-by-lecture schedules will be posted on Moodle at the beginning of the month.

*Dr. Charles Lucy, University of Alberta

STUDENT RESPONSIBILITIES:

A student must pass the laboratory portion to receive a passing grade in this course. A “repeat” final exam is not available in this course.

Assignments will be electronically distributed on a roughly weekly basis. Complete solutions will be available a short while later. Solutions to quizzes will be posted a few days after the quiz is completed.

Attendance to all lectures and seminars is strongly recommended. Laboratory attendance to each specific experiment is compulsory. A doctor’s medical note is required for all excused absences. Students must maintain an overall average of 50% or better to pass this course. You are encouraged to participate in class discussions and ask questions. Help is available outside the classroom on an “as needed” basis.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Admission Guide at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <http://www.gprc.ab.ca/about/administration/policies/>

****Note:** all Academic and Administrative policies are available on the same page.