



DEPARTMENT OF SCIENCE

COURSE OUTLINE – FALL 2018

CH2110 (A2): Analytical Chemistry – 3 (3-0-4) 105 Hours for 15 Weeks

INSTRUCTOR: Melissa Gajewski **PHONE:** 780 539 2985
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OFFICE HOURS: Monday, Wednesday, & Friday: 12:30 – 14:00 or by appointment

CALENDAR DESCRIPTION: Principles, methods, and experimental applications emphasizing solution phase equilibria, titrimetry, volumetric laboratory skills, evaluation of experimental data, and experimental applications of electrochemistry. Includes examples of organic and inorganic analysis.

PREREQUISITE(S)/COREQUISITE: CH1030 or equivalent

REQUIRED TEXT/RESOURCE MATERIALS: Recommended text book is D.C. Harris, *Quantitative Chemical Analysis*, 9th edition. A copy is available in the library on reserve, through the instructor, or may be purchased through amazon.ca. 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/discussions. Laboratory provides hands-on experiences.

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.

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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.transferalberta.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 – 5%

Lab Work – 35%

Final Exam – 40%

Mid-Term Exam: This will be a 45-minute exam written in class. It will cover assigned readings, lectures, suggested problems and experiments. Sample mid-term exams are posted on Moodle. Weight is 20% of course grade.

In-Class Activities and/or Quizzes: There will be 4-8 in-class activities and/or quizzes during the term. Activities will include practice follow-up lab reports and group activities. The dates for these will be announced a week beforehand, including an explicit statement of the degree of collaboration that will be allowed.

Final Exam: This will be a three-hour written exam. It will cover the entire course material. Sample exams are posted on Moodle. Weight is 40% of course grade.

Note: Practice midterm and final exams are available on Moodle.

GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade		4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+		4.0	90-100		C+	2.3	67-69
A		4.0	85-89		C	2.0	63-66
A-		3.7	80-84		C-	1.7	60-62
B+		3.3	77-79		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.

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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 provided on a periodic basis and quizzes will be provided with a week’s notice. The solutions to both assignments and quizzes will either be presented in class or will be provided on Moodle. Attendance to all lectures 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 Calendar at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.gprc.ab.ca/about/administration/policies>

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