Faculty of Science Course Syllabus  
Department of Chemistry

Chemistry 2201A
Introductory Analytical Chemistry  
Fall, 2021

Lecturer: Dr. Peter D. Wentzell  
Room 511, Chemistry  Ph. 494-3708  e-mail: peter.wentzell@dal.ca

Lab Instructor: Dr. Rory Chisholm  
Room 109, Chemistry  Ph. 494-6493  e-mail: roderick.chisholm@dal.ca


Laboratories: Weekly, starting September 16, Chemistry Rooms 111-114P.

Tutorials/Help: Lecture (in-person): M 1:00-2:00, W 1:00-2:00  Chemistry Concept Room  
Lecture (online via Teams): Tu 6:00-7:00 pm, Th 7:00-8:00 pm  
Lab (online via Teams): M 7:00-8:00 pm, Th 6:00-7:00 pm

Course Delivery: Lecture: Blended (in-person coupled with some online material)  
Laboratory: In-person

Course Description (from calendar)
The basic principles of analytical chemistry are presented, including chemical and instrumental methods of analysis. Instrumental techniques covered include chromatography, spectroscopy, and electrochemistry. Laboratory experiments explore all of these topics, and illustrate the techniques with practical examples.

Course Prerequisites
CHEM 1011/1012 or equivalent with a grade of C- or better

Learning Objectives
• To acquire an understanding of the scope and practice of analytical chemistry.
• To develop skills for the treatment and interpretation of chemical measurements, including statistical analysis, error propagation, graphical representation, and linear regression.
• To become proficient in operational skills and calculations associated with volumetric, gravimetric, and instrumental procedures in the laboratory, including titrations and instrument calibration.
• To be able to carry out calculations involving chemical equilibria and appreciate their implications for analytical chemistry, including acid-base, solubility, and complexation equilibria.
• To develop an understanding of the principles and application of key instrumental methods that include spectrophotometry, potentiometry and chromatography.
Course Materials


Laboratory Manual: Available at the Dalhousie Bookstore ($30.86) (required, unless exempt from the lab). Also available on Brightspace.

Laboratory Notebook: For recording details and data during lab meetings (hardcover recommended).

Technology: Laptop/desktop computer with webcam/microphone for online meetings; memory drive for saving laboratory data.

Web Site
Brightspace sites have been established for both the lecture and the lab (separately). There is also a site for the Laboratory Safety Module.

Office Hours
Tutorial/Help sessions will double as Office Hours. See the information at the top of page 1 for lecture (P. Wentzell) and lab (R. Chisholm) help. Individual appointments can also be arranged on request (in-person or by e-mail).

Course Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPA Quizzes</td>
<td>5%</td>
<td>~Weekly</td>
</tr>
<tr>
<td>Term Test #1</td>
<td>10%</td>
<td>Monday, October 4, in class (date subject to change)</td>
</tr>
<tr>
<td>Term Test #2</td>
<td>15%</td>
<td>Friday, November 5, evening (1.5 hr) (date subject to change)</td>
</tr>
<tr>
<td>Term Test #3</td>
<td>10%</td>
<td>Wednesday, December 1, in class (date subject to change)</td>
</tr>
<tr>
<td>Labs</td>
<td>30%</td>
<td>See section on Laboratory Information for more details</td>
</tr>
<tr>
<td>Final exam</td>
<td>30%</td>
<td>Scheduled by Registrar</td>
</tr>
</tbody>
</table>

Note: A passing grade in the laboratory (15/30) is required to pass the course.

Note: Assessment components (dates, weight, and delivery) are subject to change should the course transition to online delivery due to pandemic restrictions.

CAPA Quizzes: Computer-based exercises using CAPA will be used encourage the development of problem-solving skills. Seven CAPA units are scheduled and will be based on problems from the textbook. Within each unit, students will be presented with a new CAPA quiz each day while the unit is active and will have a time limit to solve the problem correctly. Only one quiz per unit needs to be completed correctly to obtain full credit for the unit (5/5). These quizzes are open book, but must be completed independently.

The average mark for the CAPA quizzes will be calculated, with the lowest three scores being dropped.
Tests: Three term tests will be administered, two within the class period and one in the evening. These will emphasize both problem solving and qualitative material.

Labs: The laboratory component of the course is worth 30% of your grade and a passing grade in the laboratory is required to pass the course. More details on the components of the laboratory grade are included under “Laboratory Information”.

Final Exam: The final examination (three hours) is scheduled by the Registrar and is comprehensive. There is no supplemental examination.

Grade Scale
Conversion of numerical grades to final letter grades follows the Dalhousie Common Grade Scale.

<table>
<thead>
<tr>
<th>A+, A, A-</th>
<th>B+, B, B-</th>
<th>C+, C, C-</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>85+</td>
<td>80+</td>
<td>77+</td>
<td>73+</td>
</tr>
</tbody>
</table>

A+, A, A- Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.

B+, B, B- Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.

C+, C, C- Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from his/her university experience.

D Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of ‘C’ or “C+” is required).
Lecture Information

This section contains information related to the lecture component of the course.

**Lecture**

Lectures for this course will be in-person (unless circumstances warrant otherwise) and will be complemented by online material. Lectures will follow the textbook closely. An approximate schedule of lecture material will be provided separately.

**Online Components**

Currently the course is expected to have the following components available online:

1. **Online lectures.** Online video lectures will be available for at least part of the course material. These are divided into short segments corresponding to topic and aligned with the textbook. Printed versions will also be available.

2. **Exercise Solutions.** Video solutions will be available for in-chapter exercises, along with PDF versions of the solutions.

3. **CAPA Quizzes.** Online quizzes will be delivered approximately weekly through the CAPA platform (see above for more information).

4. **Online Help Sessions.** To facilitate greater scheduling flexibility and accessibility, online Help Sessions will be scheduled to allow students to ask specific questions. Individual online meetings can also be scheduled. These will use Microsoft Teams.

**Course Policies (Lecture)**

**Absences.** If students are unable to complete a graded requirement (test, exam, laboratory) at the scheduled time due to illness or other valid reasons, they are responsible for notifying the Professor or Laboratory Instructor as soon as possible (phone, e-mail or in person).

For missed tests due to short-term circumstances (<3 days), students should complete the Student Declaration of Absence Form (in Brightspace) within three days following the last day of absence.

For tests and exams, the option of a make-up test or prorating of marks is at the discretion of the professor. For CAPA quizzes, which are administered online over a period of several days, there are no make-ups available (the lowest mark is dropped, however).

**E-mail.** Use e-mail for issues related to administrative matters or short queries related to content. PDW will not reply to e-mails asking how to solve problems or asking to repeat information from the lecture.

**Electronics.** Cell phones should be turned off while in lecture and lab.

**Academic Integrity.** A large component of this course is related to problem solving and students are permitted to work on textbook exercises together if that enhances their learning. All other aspects of assessed classwork, including quizzes, tests, and exams, are expected to be completed independently. Suspected violations of academic integrity will be treated in accordance with university policy.
Laboratory Information

This section contains information related to the laboratory component of the course.

Laboratories
The analytical laboratories are located in Rooms 111-114P. Laboratories (4 hours) will be held weekly beginning Sept. 16. A schedule of laboratory experiments will be provided separately.

Laboratory Teaching Assistants
Jessica Nickerson, Hammam Said, Teresa McMillen, Ziheng Dang, Sammy Hanuka

Course Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Reports</td>
<td>25/30</td>
<td>Weekly</td>
</tr>
<tr>
<td>Lab Meeting Participation</td>
<td>5/30</td>
<td>Weekly</td>
</tr>
</tbody>
</table>

Lab Reports

All seven experiments are graded through written lab reports (10 points each). The report grades are weighted equally and constitute 25% of your CHEM 2201 grade (25/30 of lab grade). Reports are due one week (by 11:59 pm) after completing your regularly scheduled lab meeting. If completed before the due date, reports may be submitted earlier. Only electronic copies of the report will be accepted via the Brightspace Dropbox.

To pass the course students must submit 6 of the 7 reports from Experiments 1 through 7. Please note that all reports will be graded, and we will not drop the lowest report grade in determining the final grade (i.e., if you only complete 6 reports, you will receive a grade of zero for the 7th report). If you only hand in 5 reports, you will not be allowed to pass this course). See “Missed Labs/Illness” for more information.

Data. All data collected within a group for a given experiment must be fully shared among all members of the group, regardless of the workload shared in lab.

Collaboration. Students are welcome (and encouraged) to collaborate with any other members of this class to complete their reports. However, the report must exclusively present the results collected within the student’s own group. Reports must be submitted individually.

Feedback. Written reports can only be returned to the student once the entire class has completed and submitted the report for that particular experiment. General feedback will be posted through the course website on your report, and/or discussed during the course tutorials.

Late Report Policy. Late labs (anywhere from 5 minutes overdue to 1 week late) will receive a grade of zero. Illness does not grant further extension of reports. Students will submit an electronic copy of the report via Brightspace Dropbox together with a Student Declaration of Absence at the same time.
Lab Meeting Participation

Participation in Lab Meetings constitutes 5% of your CHEM 2201 grade (5/30 of lab grade). Lab Meetings are held at the beginning of each lab experiment. Each student is expected to be engaged and contribute to the Lab Meeting conversation/discussion. To receive full participation marks, a student must complete the prelab questions and make a meaningful contribution. Not attending a Lab Meeting will result in zero for participation marks for that lab. No make-up Lab Meetings will be held if a meeting is missed.

Course Policies (Lab)

Missed Labs/Illness. All missed Lab Experiments require a Student Declaration of Absence. Prelab questions are still due prior to the scheduled Lab Meeting and the Report is still due at the scheduled due date (1 week after the remote Lab Meeting). Students who miss the Lab Experiment will be provided with an alternative online version of the experiment. A remote Lab Meeting will be scheduled (Friday evening 7-8 pm) where you will meet with your instructor via Teams and discuss the prelab questions/activities. Your instructor will then outline the experiment and the online format. The report for this remote Lab Experiment will be due in 1 week. Please note the report is different as it is associated with the online format. A grade of zero will be given for participation marks if the remote Lab Meeting is missed. The student who missed the lab will not be given opportunity to make up that lab.

Students must attend 6 of the 7 in person experiments to be eligible to pass the laboratory component of CHEM 2201.

Lab Exemptions. Lab exemptions will be granted to those who have already completed CHEM 2201 (with a letter grade of A-F) and a lab grade of 15/30 or better on the lab component of the course. You must contact the roderick.chisholm@dal.ca to apply for a lab exemption. Lab exemptions will not automatically be granted. No lab exemptions will be granted from the remote 2020 term.
Faculty of Science Course Syllabus (Section B)
Fall/Winter 2021-22
Chemistry 2201A

University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity
At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.
Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility
The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).
Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct
Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don’t follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can’t be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Diversity and Inclusion – Culture of Respect
Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness
Statement: http://www.dal.ca/cultureofrespect.html

Recognition of Mi’kmaq Territory
Dalhousie University would like to acknowledge that the University is on Traditional Mi’kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).
Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)
https://www.dal.ca/academics/important_dates.html

University Grading Practices
https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html
Faculty of Science Course Syllabus (Section C)
Fall/Winter 2021-22
Chemistry 2201A

Student Resources and Support

Advising

General Advising: https://www.dal.ca/campus_life/academic-support/advising.html
Science Program Advisors: https://www.dal.ca/faculty/science/current-students/academic-advising.html
Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html
Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html
International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: https://libraries.dal.ca/
Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html
Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html
Copyright Office: https://libraries.dal.ca/services/copyright-office.html

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html
Student Advocacy: https://dsu.ca/dsas

Safety

Biosafety: https://www.dal.ca/dept/safety/programs-services/biosafety.html
Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html
Radiation Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety.html
Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html