DEPARTMENT OF CHEMISTRY & CHEMICAL TECHNOLOGY
Chemistry (Science Program)

Chemistry of Solutions

202-SN2-RE

Winter 2026

INSTRUCTORS

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SECTION(S): 10 - 11

INSTRUCTOR ACCESSIBILITY

Office hours: refer to the teachers schedule on Moodle or on the Chemistry Department information board.
Out of class communication methods: Omnivox (MIO).
The instructor will respond to students' inquiries during office hours and within a reasonable delay.

COURSE PLATFORM(S)

Course materials can be accessed via Omnivox (LEA) or Moodle.

COURSE OBJECTIVES

This course delves into the study of chemistry components to analyse the properties of solutions and reactions in solutions. In the Science Program, it fulfils competency 0C02 [Analyze chemical systems in solutions]. Although students will have encountered many of the topics in the course in a qualitative manner in Chemistry 504 or Chemistry 202-001, now they will undertake a more complete study of these and other new topics with a strong quantitative bias as shown by the great emphasis on problem solving in this course. Students will find that much of this course provides an introduction to Analytical Chemistry, Physical Chemistry, Instrumental Analysis and Industrial Chemistry.
A complete description of the objectives and standards of this course is provided in the document describing the Dawson College Science Program. It is located at:
https://www.dawsoncollege.qc.ca/programs/science-medical-studies-and-engineering/science

COURSE COMPETENCIES

The following competency is fully achieved.
0C02 - Analyze chemical systems in solutions.

1. Solve problems related to different types of solutions.
2. Solve problems related to the kinetics of reactions in solutions.
3. Carry out the analysis of systems from a chemical equilibrium perspective.
4. Verify, using an experimental method, some properties of chemical systems and reactions.

GENERAL LEARNING OUTCOMES

1. Use appropriate terminology, chemical formalism and units of measurements to solve problems related to different types of solutions.
2. Use factors that control the rate of a chemical reaction to solve problems in solutions.
3. Examine systems from a chemical equilibrium perspective.
4. Use the scientific method and its related laboratory techniques and materials to evaluate in a safe environment some chemical and physical property of chemical systems.

PRE-REQUISITE

202-SN1-RE General Chemistry or 202-NYA-05 General Chemistry

PONDERATION: 2-2-2

Lecture	15 of 2 hours	30 hours
Laboratory work	15 of 2 hours	30 hours
Homework	Minimum 3 hours per week	30 hours

EVALUATION SCHEME AND SCHEDULE

Dawson College is committed to maintaining standards of academic excellence and promoting equitable and effective evaluation of student learning. The Institutional Student Evaluation Policy (ISEP) outlines the roles and responsibilities of students, teachers, and administrators with regard to student evaluation, and sets out the rules about assessment, grades and academic standing. ISEP is available on the Dawson website.
https://www.dawsoncollege.qc.ca/governance/institutional-student-evaluation-policy/

Progress in this course will be evaluated according to ONE of the schemes described below. The particular choice of grading scheme and tentative dates of the class tests and other evaluation activities (quizzes, assignments, etc.) will be announced by your instructor at the beginning of the semester.

Scheme 1			**Scheme 2**			**Scheme 3**	
Theory Components (70%)			Theory Components (70%)			Theory Components (70%)	
1. (2x) Class Tests			1. Evaluation Activities		10 %	1. (4x) Mini Class Tests	
			2. (2x) Class Tests			*See your instructor for the scheduled dates of mini-tests	7.5% each
Test 1 -	February 24	15% each	Test 1	_____	10% each		
Test 2 -	April 21		Test 2	_____			
2. Final Examination		40 %	2. Final Examination		40 %	2. Final Examination	40 %
3. Laboratory Work (20%) 4. Lab Exam (10%)			4. Laboratory Work (20 %) 5. Lab Exam (10%)			3. Laboratory Work (20 %) 4. Lab Exam (10%)	

This course has a scheduled in-person final examination which will take place during the final examination period. The final examination may include at least one question on the lab material.

The passing grade in this course is 60%.

Students must pass the theory component as well as the laboratory component of the course. Students who fail either one of the above components, theory or laboratory, will receive no more than 55% as their final grade for the course. Students who miss more than three laboratory experiments will receive an automatic failing grade in the laboratory component of the course.

Students who miss more than 50% of in-semester class tests for any reason are recommended to request an authorized absence for the course since the instructor cannot assess the attainment of the competencies; the instructor will be obliged to give the student a failing grade.

Previous Final Examinations with their solutions may be found at the Chemistry Department Home Page:
https://www.dawsoncollege.qc.ca/chemistry/previous-final-exams

SUBMISSION OF MATERIAL FOR EVALUATION

Laboratory reports and home assignments must be completed and handed in no later than the time specified by the teacher. A grade of zero will normally be given for any report or assignment that is not submitted by the deadline.

Laboratory reports, including data sheets, must be written in INK. All other materials submitted for grading (i.e., tests, quizzes, assignments, etc.) must be written in INK to preserve the student's right to grieve. Student's work will be validated by the end of the period by the instructor.

Only persons whose names appear on the attendance sheet for an experiment will have their report for that experiment marked.

REQUIRED TEXT AND MATERIALS

1. (a) Complete Learning Package of Zumdahl, Chemistry, 11th Edition, Brooks/Cole (CENGAGE Learning), 2024 (Hardcover textbook or e-book, Electronic Solutions Manual)
   (b) Dawson College Laboratory Manual for Chemistry of Solutions (202-SN2-RE). Electronic version provided by your instructor.
   (c) Online documents are accessible from LEA, Moodle, etc. according to the teacher's instructions.
2. (a) Students will find a calculator essential. The use of programmable calculators is not allowed during quizzes, tests and the final exam.
   (b) Safety glasses and a lab coat must be worn in the laboratory at all times and are available for purchase in the bookstore.

TEACHING METHODS

Lectures, laboratory work and reports, home problem-solving and self-study, quizzes, and progress tests are among the methods used in this course.

ATTENDANCE AND COURSE PARTICIPATION REQUIREMENTS

Students should refer to the Institutional Student Evaluation Policy (ISEP section IV-C) regarding attendance. Attendance is compulsory for all laboratory sessions, class tests, quizzes, and the final examination. Unjustified absence will result in an automatic grade of zero.

LITERACY STANDARDS

In accordance with College policy, all materials submitted for evaluation must demonstrate proper use of the English language.

LABORATORY SAFETY REGULATIONS

Students enrolling in this course will be exposed to chemicals which may be irritating or hazardous. For those persons with a sensitive medical condition such as allergies, additional precautions beyond the normal laboratory requirements of wearing safety glasses and laboratory coats are recommended. Such precautions may include wearing supplementary accoutrements such as additional eye protection or garments.

Exposure to certain chemicals during the first trimester of pregnancy, in particular, should be avoided. Please consult with your doctor and then communicate with your professor in writing about continuing in the course or other options available to you.

The following safety rules will be enforced starting on the first laboratory period:

1. WEARING SAFETY GLASSES AND LAB COAT IS OBLIGATORY. Students without safety glasses or lab coats will be asked to leave the laboratory area and will be considered absent for that period.
2. No smoking, eating, or drinking is permitted at any time in the laboratory.
3. Keep your coats, textbooks, and other bulky personal items out of the working area.
4. Report any accident, however minor, to your instructor at once.
5. Non-compliance with any of these safety regulations will result in expulsion from the Lab. Consequently, the student will receive a zero grade for that lab exercise.

ISEP STATEMENT

The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning and is therefore a crucial policy to read and understand. The policy describes the rights and obligations of students, faculty, departments, programs, and the College administration with regard to evaluation in all your courses, including grade reviews and resolution of academic grievance. ISEP is available on the Dawson website. (Link to ISEP)

INTENSIVE COURSE CONFLICTS STATEMENT

If a student is attending an intensive course, the student must inform the teacher, within the first two weeks of class, of the specific dates of any anticipated absences.

POLICY ON RELIGIOUS OBSERVANCES STATEMENTS

Students observing religious holidays must inform their teachers, in writing, as prescribed in the ISEP Policy on Religious Observances, no later than the end of the second week of the impacted semester or term. This applies both to the semester or term, as well as to any final examination period. (ISEP Section IV-D)

ACADEMIC INTEGRITY POLICY

Students are expected to familiarize themselves with the Dawson College policy on Cheating and Plagiarism which is contained in the Institutional Student Evaluation Policy (ISEP). According to ISEP, every instance of cheating or plagiarism leading to a resolution that impacts a student's grade must be reported, with explanation, in writing, to the appropriate Dean. (ISEP Section V-A) Cheating and plagiarism are serious offenses and may result in a grade of zero for the piece of work in question, or a grade of zero in the course if circumstances warrant.

OFF-CAMPUS COURSE/ACTIVITY POLICY (IF APPLICABLE)

Students should refer to the Institutional Student Evaluation Policy (ISEP section IV-G) regarding rules governing off campus courses/activities.

STUDENT CONDUCT

Everyone has the right to a safe and non-violent environment. Students are obliged to conduct themselves as stated in the Student Code of Conduct and in the ISEP section on the roles and responsibilities of students. (ISEP section II-D)

STUDENT OBLIGATIONS

Students are expected to be familiar with the general policies and guidelines of the Department of Chemistry & Chemical Technology regarding laboratory and classroom comportment (page 5 of this Outline), as well as with the College Policies on students' rights and obligations, cheating and plagiarism, and literacy, as outlined in the College's Institutional Student Evaluation Policy (ISEP).

1. Students must not talk to or communicate with their classmates when the classroom or pre-lab lecture is in progress. The lecture begins precisely at the assigned time or as soon as the lecturer enters the classroom.
2. Students must remain in their seats during classroom lectures and give their full attention to the lecturer.
3. Students must not leave the classroom before the lecture is completed without notifying the teacher at the beginning of the class. The full lecture period is required for your teacher to do an effective job of presenting the course objectives.
4. Students must be on time for a lecture unless there is a valid reason. Any student who does arrive late must be seated as soon as possible near the door of the classroom with minimum disruption. At the end of the lecture, this student must speak to the teacher about the late arrival.
5. For late arrivals at the laboratory sessions, the student must see the teacher immediately after entering the lab. The teacher may refuse to allow the student to carry out the experiment.
6. A student may leave the laboratory with permission for very short periods of time only if his or her partner is tending to the experimental set-up.
7. During laboratory sessions all students should remain, as much as possible, near their workstations, and work in a quiet non-disruptive fashion.
8. Classroom or laboratory assignments or reports must be submitted on or before the deadline dates.
9. Students are expected to write all tests, quizzes and final exams at the times scheduled by the teacher or the College. Teachers are not obliged to re-schedule tests, quizzes or examinations to satisfy individual student preferences.
10. There will be no make-up classroom tests or quizzes. In such cases where a student misses a test or quiz with valid reason, the teacher may arrange an alternative marking scheme for the student in question.
11. Students are responsible for all course material and announcements missed when they take an intensive course or for any other reason.
12. Your teacher has the right to ensure order and safety in the classroom and lab, and will take appropriate action to remedy any situation which arises because of non-compliance with the above regulations. Dismissal from the classroom or the laboratory is a legitimate option on the part of the teacher. The student will then be required to meet with the Chairman of the Department of Chemistry & Chemical Technology who will decide on any future action to be taken.
13. The use of cell phones and unauthorized electronic devices are forbidden in the classroom and laboratory.

USEFUL LINKS

https://www.dawsoncollege.qc.ca
The Dawson College website gives access to several useful information like the academic calendar, the library database or class cancellations.

https://dawsoncollege.omnivox.ca
The Omnivox platform centralized several computer services available at Dawson. The student can access LEA to get course documents, communicate with their teacher or check their grade online.

https://www.dawsoncollege.qc.ca/programs/science-medical-studies-and-engineering/science
A complete description of the objectives and standards of this course is provided in this document describing the Dawson College Science Program.

https://www.dawsoncollege.qc.ca/chemistry/previous-final-exams/
Previous Final Examinations with their solutions from the Chemistry Department.

https://www.dawsoncollege.qc.ca/governance/institutional-student-evaluation-policy/
The Dawson College Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning.

COURSE CONTENT & SCHEDULE **REFERENCE: Zumdahl / Zumdahl, 11th Ed.**

Chap. 11 - PROPERTIES OF SOLUTIONS (1.5 LECTURES)

	Class topic	Suggested problems
11.1	Solution Composition	19, 21, 23, 54, 55, 57
11.5	Boiling-Point Elevation and Freezing-Point Depression	83, 87, 89, 131
11.7	Colligative Properties of Electrolyte Solutions	99, 101, 109, 111

Chap. 12 - CHEMICAL KINETICS (2.5 LECTURES)

	Class topic	Suggested problems
12.1	Reaction Rates	31, 37
12.2	Rate Laws: An Introduction	
12.3	Determining the Form of the Rate Law	39, 46
12.4	The Integrated Rate Law (1st and 2nd only)	51, 52, 61, 62, 66
12.5	Reaction Mechanisms	15, 17, 74, 77
12.6	A Model for Chemical Kinetics	83, 85, 89, 91
12.7	Catalysis (Brief in class, expand in lab)	97, 103

Chap. 13 - CHEMICAL EQUILIBRIUM (2.5 LECTURES)

	Class topic	Suggested problems
13.1	The Equilibrium Condition	15
13.2	The Equilibrium Constant	33, 35, 37
13.3	Equilibrium Expressions Involving Pressures*	41, 43, 61, 63, 77
13.4	Heterogeneous Equilibria	47, 51
13.5	Applications of the Equilibrium Constant	23, 67, 73
13.6	Solving Equilibrium Problems	78, 105
13.7	Le Châtelier's Principle	65, 91, 109

Chap. 14 - ACIDS AND BASES (3.5 LECTURES)

	Class topic	Suggested problems
14.1	The Nature of Acids and Bases	43, 44, 45
14.2	Acid Strength	47, 49, 51
14.3	The pH Scale	57
14.4	Calculating the pH of Strong Acid Solutions	63, 65, 69
14.5	Calculating the pH of Weak Acid Solutions	77, 83, 85, 87, 89, 92
14.6	Bases	95, 97, 99, 103, 111
14.8	Acid-Base Properties of Salts	129, 130, 133, 135, 141, 143, 145

Chap. 15 - ACIDS AND BASES (1.5 LECTURES)

	Class topic	Suggested problems
15.1	Solutions of Acids or Bases Containing a Common Ion	31, 33
15.2	Buffered Solutions	43, 49, 51, 59, 139
15.3	Buffering Capacity	53, 61, 71, 73
15.4	Titrations and pH Curves	75, 77, 81, 91, 122

Chap. 16 – SOLUBILITY AND COMPLEX ION EQUILIBRIA (1.5 LECTURES)

	Class topic	Suggested problems
16.1	Solubility Equilibria and the Solubility Product	29, 39, 45, 55, 57, 62
16.2	Precipitation and Qualitative Analysis *(up to Qualitative Analysis)*	63, 65, 73

DAWSON COLLEGE

DEPARTMENT OF CHEMISTRY & CHEMICAL TECHNOLOGY
LABORATORY SCHEDULE: Winter 2026
202-SN2-RE Chemistry of Solutions

Instructor: ___ Daniel Baril _____ Lab section: ___ 10 - 11 ____

week	Lab date (Thursday)	Experiment title
1	Jan. 22	See instructor: Check-in / Sig. Fig. revision
2	Jan. 29	Laboratory safety / Logger-pro review
3	Feb. 5	Colligative Properties
4	Feb. 12	The Rate Law in Chemical Kinetics
5	Feb. 19	Activation Energy in Chemical Kinetics (with short discussion of catalysts)
6	Feb. 26	Entropy Activity
7	March 5	Spectrophotometry (in lab written discussion)
8	March 12	Chemical Equilibrium I: The Equilibrium Constant
	March 19	Study Break - No lab
9	March 26	Volumetric Analysis of an Acid Solution and Indicators discussion
10	April 2	Friday schedule, no lab
11	April 9	Titration Curves (Weak Acid) + Indicators discussion
12	April 16	Chemical Equilibrium II: The Solubility Product
13	April 23	Problem solving
14	April 30	Laboratory exam (10%)
15	May 7	Free energy activity
16	May 14	Problem solving

No experiments require a full lab report. Students only have to submit a complete data sheet with sample calculations and answers to the questions. Additional submissions may be required by your instructor.

Noncompliance to any of the following safety regulation will result in expulsion from the lab:

- Safety glasses and lab coat must be worn in the laboratory at all times.
- No eating or drinking (not even water from a bottle) is permitted at any time in the laboratory.
- Keep your personal belonging (bag, coat, etc.) out of the working area.
- Report any accident, even minor, to your instructor.

RELIGIOUS OBSERVANCE FORM

Students observing religious holidays must inform each of their teachers, in writing, of the specific dates as soon as possible, but no later than the end of the second week of classes. This applies both to the semester or term, as well as to any final examination period. As prescribed in the ISEP Policy on Religious Observances. (ISEP Section IV-D).

Your teacher will inform you of any modifications to planned course activities resulting from the teacher's own religious commitments.

Name of the student: _____

Student number: _____

Course: 202-SN2-RE (Chemistry of Solutions)

Section: _____

Teacher: _____

Date of Holiday	Description of the Holiday