DAWSON
COLLEGE

**Mathematics Department**
**Integral Calculus**
201-SN3-RE Section 2
Winter 2026

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| **Instructor:** | Yann Lamontagne |
| **Office:** | 7B.16 |
| **Office Hours and Encadrement:** | Office hours are posted outside the office 7B.16 and on the website. If there is a time conflict with the posted office hours, then to schedule an in-person meeting send an e-mail with your availability. |
| **Telephone:** | (514) 931-8731 #4137 |
| **E-mail:** | `ylamontagne@dawsoncollege.qc.ca` |
| **Website:** | `http://www.obeymath.org` The solutions to the evaluations as well as announcements and additional examples are posted on the website. The material of previously taught courses is also available. |
| **Teacher Accessibility:** | For assistance with class material, see me during my office hours. You can also communicate with me via email, under normal circumtances a reply can be expected within 48 hours. |
| **Term Work:** | *Term work is worth 25% or 50% of final grade, see Grading Policy.* |

| | *Percent of term work grade:* | *Tentative schedule:* |
|---|---|---|
| Quizzes | 100% | **on Thursday Jan. 29, Feb. 12, 26, Mar. 12, 31, Apr. 16, 30, May 14 unless announced otherwise** |

Each quiz is equally weighted for the term grade. Each quiz is usually between 30 and 60 minutes in duration at the end of class. The students' quiz with the lowest grade does not count towards the final grade.

**Important:**

- Students who are absent for health-related reasons for a period of less than 5 days are required to declare their absences through a module on Omnivox, failure to do so will result in a grade of zero on the missed assessment. For absences longer than 4 days appropriate medical documentation is required. Unless alternative arrangements are approved by the teacher, students will be required to write a make-up assessment immediately upon their return. The make-up assessment will take place during the first scheduled class time following a student's return from a health-related absence.

- Students who will be absent for any predictable reason on a quiz day must inform the instructor in writing within the first two weeks of the semester of their intent to be absent so that alternative arrangements can be made. The written notice must be given even when the exact date is not known until later.

- Please note that I do **not** use Omnivox MIO, and messages sent to MIO are unfortunately ignored.

DAWSON COLLEGE

# MATHEMATICS DEPARTMENT

**Science Program**

**Science, Computer Science and Mathematics Program**

## Integral Calculus
## 201-SN3-RE

## Course Objectives

Students will expand their knowledge of Calculus through this course covering the core elements of Integral Calculus. The topic of antidifferentiation will be expanded upon. Students will be introduced to the topics of the Riemann sum and the definite integral and learn how they relate to the area beneath a curve. Students will learn how to compute integrals using a variety of common rules and techniques. Students will be introduced to sequences and series as well as the concept of convergence that will be applied in the context of the representation of functions as power series. Students will apply techniques of Integral Calculus in applications such as: computing areas and volumes, computing improper integrals, and Maclaurin series expansions. Students wishing to pursue the study of Calculus can do so in the optional course called Multivariable Calculus.

## Course Competencies

For the student in the Science Program, this course contributes to the full achievement of the competency:

0M03: Analyze problems by applying integral calculus.

1. Evaluate limits presenting indeterminate forms.
2. Determine the indefinite integral of a function.
3. Determine the definite integral of a function over an interval.
4. Expand functions into power series.
5. Use the methods of integral calculus in mathematical applications.
6. Carry out the analysis of problems related to science.

## Pre-requisites

Differential Calculus (201-SN2-RE)

## Ponderation

2-2-2 (2 hours of lecture, 2 hours of labs, and 2 hours of work outside class for each 4 hours of class time)

## Evaluation

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. https://www.dawsoncollege.qc.ca/governance/institutional-student-evaluation-policy/

## Term Work

A minimum of 3 hours of in class testing is required.

## Final Examination

The final examination will be a supervised, comprehensive examination held during the formal examination period.

## Evaluation Policy
The grading scheme will be the best of:

- Option 1:
  - 50% term work
  - 50% final examination
- Option 2:
  - 25% term work
  - 75% final examination

In order to pass the course, students must obtain a final grade of at least 60%, calculated according to the evaluation scheme above.

## Required Text and Materials
***Required text:*** *Single Variable Essential Calculus (Early Transcendentals), 2nd Edition* by James Stewart. (Instructions on how to obtain print copies will be provided by your teacher.)

***References:*** *Calculus of a Single Variable (8th Edition)* by Larson, Hostetler & Edwards, *Calculus* by Edwards & Penney, or any standard text book on Calculus of a single variable.

***Calculators:*** Students are only permitted to use the Sharp EL-531** calculator during tests and examinations.

## Teaching Methods
Lectures and problem sessions.

## Attendance & Course Participation Requirements
Attendance is recommended for the successful completion of the course.

For additional information regarding attendance, students should refer to the Institutional Student Evaluation Policy (ISEP section IV-C).

## Literacy Standards
Problem solving is an essential component of this course. Students will be expected to analyze problems stated in words, to present their solutions logically and coherently, and to display their answers in a form corresponding to the statement of the problem, including appropriate units of measurement. Marks will be deducted for work which is inadequate in these respects, even though the answers may be numerically correct.

## Student Obligations
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).

1. Students have an obligation to arrive on time and remain in the classroom for the duration of scheduled classes and activities.
2. Students have an obligation to write tests and final examinations at the times scheduled by the teacher or the College. Students have an obligation to inform themselves of, and respect, College examination procedures.

3. Students have an obligation to show respectful behavior and appropriate classroom deportment. Should a student be disruptive and/or disrespectful, the teacher has the right to exclude the disruptive student from learning activities (classes) and may refer the case to the Director of Student Services under the Student Code of Conduct.
4. Electronic/communication devices (including cell phones, mp3 players, etc.) have the effect of disturbing the teacher and other students. All these devices must be turned off and put away. Students who do not observe these rules will be asked to leave the classroom.

## Academic Integrity

***Cheating in Examinations, Tests, and Quizzes:*** Cheating includes any dishonest or deceptive practice relative to formal final examinations, class tests, or quizzes. Such cheating is discoverable during or after the exercise in the evaluation process by the instructor. Such cheating includes, but is not limited to:

1. copying or attempting to copy another's work.
2. obtaining or attempting to obtain unauthorized assistance of any kind.
3. providing or attempting to provide unauthorized assistance of any kind.
4. using or possessing any unauthorized material or instruments which can be used as information storage and retrieval devices.
5. taking an examination, test, or quiz for someone else.
6. having someone take an examination, test, or quiz in one's place.

***Unauthorized Communication:*** Unauthorized communication of any kind during an examination, test, or quiz is forbidden and subject to the same penalties as cheating.

***Plagiarism on Assignments and the Comprehensive Examination:*** Plagiarism is the presentation or submission by a student of another person's assignments or Comprehensive Examination as his or her own. Students who permit their work to be copied are considered to be as guilty as the plagiarizer.

***Penalties:*** Cheating and plagiarism are considered extremely serious academic offences. Action in response to an incident of cheating and plagiarism is within the authority of the teacher. Penalties may range from zero on a test, to failure in the course, to suspension or expulsion from the college.

According to ISEP, the teacher is required to report to the Sector Dean all cases of cheating and plagiarism affecting a student's grade. (See ISEP section V-A.)

## Intensive Course Conflicts & Policy on Religious Observance

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.

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 the impacted semester or term. Alternative arrangements convenient to both the student and the teacher must be made at the earliest opportunity. In the event that the date of a religious observance has yet to be determined, students must submit the name of the observance to their teachers and provide them with the specific date(s) as soon as it becomes available. This applies both to the semester or term, as well as to any final examination period. Students who make such arrangements will not be required to attend classes or take examinations on the designated days, nor be penalized for their absence.

It must be emphasized, however, that this College policy should not be interpreted to mean that a student can receive credit for work not performed. It is the student's responsibility to fulfill the requirements of the alternative arrangement. (ISEP Section IV-D)

A form for this purpose is available here: https://www.dawsoncollege.qc.ca/mathematics/religious_observance_and_intensive_courses_form/

## Additional Help

The Mathematics Department and the College offer several services for assisting students outside of the classroom. The up-to-date list of such services is available on the department website: https://www.dawsoncollege.qc.ca/mathematics/additional-help/

# Course Content & Tentative Schedule

** = enriched or theoretical question*

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|---|---|---|
| **DETERMINE THE INDEFINITE INTEGRAL OF A FUNCTION**<br>**DETERMINE THE DEFINITE INTEGRAL OF A FUNCTION OVER AN INTERVAL** | | |
| *CHAPTER 4 - APPLICATIONS OF DIFFERENTIATION* **(1 HOUR)** | | |
| § 4.7 | ANTI-DERIVATIVES | p.252 – 253 #(1 – 9, 12 – 36) [**REVIEW**], 39 – 47, 50 |
| REVIEW | CHAPTER 4: APPLICATIONS OF DIFFERENTIATION | p.254 #51 – 58 [**REVIEW**] |
| *CHAPTER 5 – INTEGRALS* **(8 HOURS)** | | |
| § 5.1 | AREAS AND DISTANCES | p.266 #3a, 4a, 5a, 13 – 17 |
| § 5.2 | THE DEFINITE INTEGRAL | p.279 # 2, 5, 15 – 26, 29 – 42, 48, 49, 52, 53* |
| § 5.3 | EVALUATING DEFINITE INTEGRALS | p.289 #1 – 18, 21 – 32, 37 – 38, 44 – 48, 69* |
| § 5.4 | THE FUNDAMENTAL THEOREM OF CALCULUS | p.298 #1 – 20, 23* – 25*, 27*, 31* |
| § 5.5 | THE SUBSTITUTION RULE | p.307 #(1 – 20, 22 – 36) [**REVIEW**], 37 – 56, 65* – 66* |
| REVIEW | CHAPTER 5: INTEGRALS | p.308 True-False Quiz* #1 – 18, exercises #2 – 29, 31, 32, 35 – 38, 39, 42, 46, 50* |
| *CHAPTER 6 – TECHNIQUES OF INTEGRATION* **(7 HOURS)** | | |
| § 6.1 | INTEGRATION BY PARTS | p.316 #1 – 20, 22 – 30, 31*, 32*, 33*(a)(b), 44* – 46* |
| § 6.2 | TRIGONOMETRIC INTEGRALS AND SUBSTITUTIONS | p.326 #1 – 36, 42 – 60, 61 – 64* |
| REVIEW | CHAPTER 6: TECHNIQUES OF INTEGRATION | p.363 #2 – 5, 7 – 12, 15 – 17 20 – 24, 26, 27, 29 – 30, 32 – 40 |
| **USE INTEGRAL CALCULUS IN MATHEMATICAL APPLICATIONS** **(17 HOURS)** | | |
| § 3.7 | INDETERMINATE FORMS AND L'HOSPITALS RULE [**REVIEW**] | p.197 #1 – 38 |
| REVIEW | CHAPTER 3: INVERSE FUNCTIONS [**REVIEW**] | p.201 #61 – 64, 66 – 76 |
| § 6.6 | IMPROPER INTEGRALS | p.360 #1, 2, 5 – 18, 20 – 32, 47* – 49* |
| REVIEW | CHAPTER 6: TECHNIQUES OF INTEGRATION | p.362 p.362 True-False Quiz* # 6, 10 – 14 exercises 41 – 47, 49 -50 |
| *CHAPTER 7 – APPLICATIONS OF INTEGRATION* | | |
| § 7.1 | AREAS BETWEEN CURVES | p.369 #1 – 17, 18* – 20*, 35* –36* |
| § 7.2 | VOLUMES | p.378 #1 – 8, 13, 14, 27, 28, 31 |
| § 7.3 | VOLUMES BY CYLINDRICAL SHELLS | p.384 #1 – 14, 21a, 33 – 37, 39 |
| § 7.7 | DIFFERENTIAL EQUATIONS | p.412 – 414 (READ) p.418 #1 – 4, 8 – 13 |
| REVIEW | CHAPTER 7: APPLICATIONS OF INTEGRATION | p.422 #1 – 6, 10, 13ab, 14 |
| **EXPAND FUNCTIONS INTO POWER SERIES** **(19 HOURS)** | | |
| *CHAPTER 8 – SERIES* | | |
| § 8.1 | SEQUENCES | p.434 #1 – 31, 32* |
| § 8.2 | SERIES | p.443 #1 – 24, 26, 28, 31 – 34, 38*, 45*, 49* |
| § 8.3 | THE INTEGRAL AND COMPARISON TESTS | p.452 #3, 4, 6 – 30, 31* |
| § 8.4 | OTHER CONVERGENCE TESTS | p.463 #3 – 8, 18*, 19 – 31, 37* – 38*, 44* |
| § 8.5 | POWER SERIES | p.468 #3 – 20 |
| § 8.7 | TAYLOR AND MACLAURIN SERIES | p.487 #3, 5 – 8, 43 – 46 |
| REVIEW | CHAPTER 8: SERIES | p.497 – 498<br>True-False Quiz* #1, 2, 4 – 12, 14 – 15, 17 – 22 exercises #1 – 15, 17 – 25, 27 – 29, 36 – 40, 43 – 48, 51 |

[1] *The number of hours allotted to each section is approximate.*