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Office Hours: Office hours are posted outside the office 7B.16 and on the website.
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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 out of class communication please see me during my office hours.
Term Work: *Term work is worth 25% or 50% of final grade, see Grading Policy.*

| | <i>Percent of term work grade:</i> | <i>Tentative schedule:</i> |
|----------|------------------------------------|-------------------------------------------------------------|
| Quizzes* | 80% | on every Thursday unless announced otherwise |
| WeBWorKs | 20% | due every Sunday at 22h00 unless announced otherwise |

* Each quiz is usually between 15 and 30 minutes in duration at the end of class. The students' two quizzes with the lowest grades do not count towards the final grade.

Important:

- There will be no make-up quizzes or WeBWorKs. If appropriate medical documentation is presented the weight of the test or WeBWorK will be transferred proportionally to the remaining evaluations of the semester.
- WeBWorKs questions cannot be submitted late. Questions that are not answered by the due date receive a mark of zero.
- 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.
- Students who are interested in the completing the Comprehensive Evaluation(CE) are required to meet with the instructor within the first two weeks of the semester. In addition, an agreement on the Comprehensive Evaluation(CE) must be reached within the first month of the semester. Any student wishing to complete the Comprehensive Evaluation(CE) must meet the above two conditions.
- Please note that I do **not** use Omnivox MIO, and messages sent to MIO are unfortunately ignored.

Course Objectives

This course introduces the student to Integral Calculus, to the techniques of integration and to some of the applications of integration to physical problems. Another look at limits and an introduction to the topic of infinite series are included. For more details, see pages 44 to 49 of the Dawson Science Program.

Course Competencies

This course will allow the student to fully achieve the competency:

00UP: To apply the methods of integral calculus to the study of functions and problem solving.

1. To determine the indefinite integral of a function.
2. To calculate the limits of indeterminate forms.
3. To calculate the definite integral and the improper integral of a function on an interval.
4. To express concrete problems as differential equations and solve simple differential equations.
5. To calculate volumes, areas and lengths and draw two- and three-dimensional representations.
6. To analyze the convergence of series.

This course also contributes to the partial achievement of the competency:

00UU: To apply acquired knowledge to one or more subjects in the sciences.

1. To recognize the contribution of more than one scientific discipline to certain situations.
2. To apply the experimental method.
3. To solve problems.
4. To use data-processing technologies.
5. To reason logically.
6. To communicate effectively.
7. To show evidence of independent learning in their choice of documentation or laboratory instruments.
8. To work as members of a team.
9. To make connections between science, technology and social progress.

Pre-requisites

Calculus I (201-NYA-05), preferably the Science version or equivalent.

Ponderation

3-2-3 (3 hours of lecture, 2 hours of labs, and 3 hours of work outside class for each 5 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 3.5 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

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/

Mathematics Tutorial Room

Volunteer math teachers are available for help in room 7B.1 from 10:00 to 16:00 (Monday through Friday) and from 17:00-18:00 (Monday through Thursday).

COVID-19

For all Covid-related questions, please refer to Dawson College's FAQ page at <https://www.dawsoncollege.qc.ca/current-semester/return-to-campus-fall-2021/>

Course Content & Tentative Schedule

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| <p>[R] Antiderivatives Reimann Sums The Fundamental Theorem of Calculus</p> | <ul style="list-style-type: none"> • Area under a simple curve using Reimann Sum. • Definite integral as the limit of a Riemann Sum. • Proof of the Fundamental Theorem of Calculus. • Substitution Rule • Average value of a function • Mean Value Theorem for integrals | <p>Chapter 5: 3 WEEKS [R] §4.7: Antiderivatives (p. 252) 1 –9, 12 –36, 39 –47, 50</p> <p>[R] Chapter 4 Review (p.254) 51–58 §5.1: Areas and Distances (p. 266) 1, 3, 5, 13 –17 §5.2: The Definite Integral (p. 279) 1, 3, 5, 11 –26, 29 –42, 48, 49, 51, 53 §5.3: Evaluating Definite Integrals (p. 289) 1–18, 21–32, 37–40, 44–50, 69 §5.4: The Fundamental Theorem of Calculus (p. 298) 1–20, 23* –25*, 27*, 31* [R] §5.5: The Substitution Rule (p. 306) 1 –20, 22 –36 §5.5: The Substitution Rule (p. 307) 37 –56, 65* –69*</p> <p>Chapter 5 True-False Quiz* (p. 308) 1 –13 Chapter 5 Review (p. 309) 7 –29, 31, 32, 35 –39, 42, 46, 50*</p> |
| <p>Techniques of Integration</p> <p>[O] Numerical Integration</p> <p>[R] Indeterminate Forms and L'Hôpital's Rule</p> <p>Improper Integrals</p> | <ul style="list-style-type: none"> • Integration by parts • Trigonometric integrals using identities • Trigonometric substitutions • Partial fractions • [O] Approximate certain integrals using Simpson's Rule • [R] Evaluate limits of indeterminate forms using L'Hôpital's Rule • Determine the convergence of improper integrals | <p>Chapter 6: 4 WEEKS §6.1: Integration by Parts (p. 316) 1 –20, 22 –33, 44* –46* §6.2: Trigonometric Integrals and Substitutions (p. 326) 1–64 §6.3: Partial Fractions (p. 334) 1 –42, 44*, 46* [O] §6.5: Approximate Integration (p. 350) 7–16 [R] §3.7: Indeterminate Forms and l'Hospital's Rule (p. 197) 1 – 38</p> <p>[R] Chapter 3 Review (p. 201) 61 –64, 66 –76 §6.6: Improper Integrals (p. 360) 1, 2, 5 –32, 47, 48*, 49, 52, 61, 62</p> <p>Chapter 6 True-False Quiz* (p. 362) 1 –7, 9 –14 Chapter 6 Review (p. 363) 1 –50 ([O]: 57,58)</p> |
| <p>Applications of Integration</p> | <p>Extend the notion of the definite integral to calculate:</p> <ul style="list-style-type: none"> • The area bounded between two curves • The volume of a solid of revolution: disk, washer, shell methods • Arc length | <p>Chapter 7: 2 and 1/2 WEEKS §7.1: Areas between Curves (p. 369) 1 –21, 33*, 35* –41* §7.2: Volumes (p. 378) 1 –18, 27, 28, 31 §7.3: Volumes by Cylindrical Shells (p. 384) 1 –20, 21 –26 (part (a) only), 33 –39, 41 §7.4: Arc Length (p. 391) 1, 2, 7 –13, 15 –18</p> <p>§7.6: Applications to Physics and Engineering (p. 408) Chapter 7 Review (p. 422) 1 – 14, 25, 26</p> |
| <p>Infinite Sequences</p> <p>Infinite Series</p> <p>Taylor and Maclaurin Series</p> | <ul style="list-style-type: none"> • Convergence or divergence of infinite sequences • Sum of an infinite series from the definition. • Geometric and telescoping series; applications • Tests for convergence of series: <ul style="list-style-type: none"> — Integral test, Comparison test, Limit comparison test, Ratio test, Root test, Alternating series test • Absolute and conditional convergence • Interval of convergence of a power series • Finding Maclaurin and Taylor series using definitions | <p>Chapter 8: 3 and 1/2 WEEKS §8.1: Sequences (p. 434) 1 – 32, 37 – 40, 52*</p> <p>§8.2: Series (p. 443) 1 – 28, 31 – 40, 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 – 40, 43, 44*, 46a* §8.5: Power Series (p. 468) 3 – 25</p> <p>§8.7: Taylor and Maclaurin Series (p. 487) 1 – 8, 11 – 18</p> <p>Chapter 8 True-False Quiz* (p. 497) 1 – 18, 20, 21 Chapter 8 Review (p. 498) 1 – 29, 36 – 40, 43 – 50</p> |

* = enriched or theoretical questions; [R] = review topic; [O] = optional topic

Last updated: June 3, 2021