DAWSON COLLEGE

Mathematics Department
201-NYA-05 Calculus I
Social Science

COURSE OBJECTIVES

Calculus stands as one of the greatest achievements of human intellectual endeavour. The discovery of calculus in the seventeenth century immediately led to the solutions of problems in physics and metaphysics that had baffled mankind for thousands of years. Since that time calculus has found applications to virtually every branch of science, social science. The objective of this course is to introduce the student to these profound ideas, and to give the student the basic skills to apply these concepts to other disciplines.

COURSE COMPETENCIES

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

022X: To apply methods of differential calculus to the study of functional models in the field of Social Science.

Elements of the Competency:

1. To situate the historical context of the development of differential calculus.
2. To recognize and describe the characteristics of algebraic, exponential, logarithmic and trigonometric functions expressed in symbolic or graphic form.
3. To analyze the behaviour of a function represented in symbolic or graphic form using an intuitive approach to the concept of limits.
4. To define the derivative of a function, to interpret it and apply derivative techniques.
5. To analyze the variations of a function using differential calculus.
6. To solve optimization and rate of change problems.

022N: To identify the contribution of knowledge related to Social Science disciplines to the understanding of the human phenomena.

Elements of the Competency:

1. To understand the development of the body of knowledge being studied.
2. To know and understand the main facts, notions, concepts, theories, methods and other key components of this body of knowledge.

3. To demonstrate the relevance and scope of these components in the understanding of the human phenomena.

PRE-REQUISITE

High School Functions or the equivalent CEGEP Mathematics course (Math 201-015-50).

PONDERATION

3-2-3

EVALUATION SCHEME AND SCHEDULE

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.

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.

Grading Policy

The final grade is the greatest between:

Option A

1. Term Mark (tests, quizzes, assignments) 50%
2. Final Examination 50%

Option B

1. Term Mark (tests, quizzes, assignments) 25%
2. Final Examination 75%

To pass the course the students must obtain at least 60%.

REQUIRED TEXT AND MATERIALS

Text: ***Applied Calculus for the Managerial, life and Social Sciences***, Ninth Edition by S.T. Tan, Brooks/Cole Publishers.

References:

Calculus with Applications, by Lial, Greenwell, Ritchey Ninth Edition, Addison Wesley.
Brief Calculus: An Applied Approach, Eighth Edition, Ron Larson, Bruce Edwards, Houghton Mifflin.

Calculators: Students are only permitted to use the Sharp EL-531X, XG or XT calculator during tests and examinations.

TEACHING METHODS ICEP STATEMENT

Lectures and problem sessions.

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.

ATTENDANCE AND COURSE PARTICIPATION REQUIREMENTS

Students should refer to the Institutional Student Evaluation Policy (ISEP section III-C) regarding attendance.

Attendance is recommended for the successful completion of the course.

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

(a) Students have an obligation to arrive on time and remain in the classroom for the duration of scheduled classes and activities.

(b) 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.

(c) 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.

(d) 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.

(e) Students are reminded that they must conduct themselves according to the Professional Conduct Policy of their program. (ISEP Section IV-N.2)

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)

ACADEMIC INTEGRITY

Cheating in Examinations, Tests, and Quizzes

Cheating includes any dishonest or deceptive practice relative to formal final examinations, in-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:

a. copying or attempting to copy another's work.

b. obtaining or attempting to obtain unauthorized assistance of any kind.

c. providing or attempting to provide unauthorized assistance of any kind.

d. using or possessing any unauthorized material or instruments which can be used as information storage and retrieval devices.

e. taking an examination, test, or quiz for someone else.

f. 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 Assessment 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 IV-C.)

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 at the end of this document.

MATH 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).

COURSE CONTENT & Tentative SCHEDULE

(the number of classes listed is approximate)

Pre-calculus Review (6 classes)	**Section**	**Pages**	**Exercises**
Reviewing of basic Algebra, function and graphing	1.1	03-14	7-73
Solving polynomial equations	class notes		
Functions and Graphs	2.1	50-59	1-50
Mathematical Models (algebraic functions)	2.3	75-91	1-23, 51-75

Limits and Continuity (7 classes)			
The definition of the limit of a function			
Techniques for evaluating limits	2.4	97-113	1-67
Class Note 1:	P. 42-44, Prob. 1-7, 10-28, 31, 33-42, 49-56		
One-sided Limits and Continuity	2.5	117-129	1-60, 73-76
Class Note 2:	PP. 54-55, Prob. 1-4, 11, 15-18, 29-31, 33-35		
Class Note 3: Limits Involving Infinity.	PP. 67-68, Prob. 1-8, 10, 13-15, 18-24		

Differentiation (12 classes)			
The definition of the derivative and the Tangent Line	2.6	133-154	1-27, 35, 37
Class Note 4:	PP. 80-81, Prob. 1, 5, 8, 11-16, 19-23, 25-30		
Basic Rules of Differentiation	3.1	158-168	1-51, 67
The Product and Quotient Rules	3.2	171-179	1-59
Class Note 5:	PP. 105-106, Prob. 1-35, 38-40, 43, 47-50, 53 PP. 112-113, Prob. 1-35, 37-42		
The Chain Rule	3.3	182-190	1-57, 61-65
Class Note 6:	PP. 120-121, Prob. 1-48, 55-56, 63		
Rate of Change: Marginal's	3.4	195-208	3-17, 23-33
Higher-Order Derivatives	3.5	209-213	1-28
Implicit Differentiation & Related Rates	3.6	216-226	3-7, 9-33, 41-47
Class Note 7:	PP. 127-128, Prob. 1-16, 19-28 PP. 132-134, Prob. 1-33, 37-40		

Differentials (formulas only)	3.7	229-235	1-13
Chapter 3:	Review Exercises	241-243	1-55

Applications of the Derivatives (10 classes)

Applications of the First Derivative	4.1	246-261	1-10, 13-73, 85
Applications of the Second Derivative	4.2	266-280	1-8, 11-76, 85
Curve Sketching	4.3	284-294	1-29, 33-44
Class Note 11:	PP. 222-223, Prob. 1-4, 12, 17-19, 25-30 PP. 230, Prob. 1-16		
Optimization I: Absolute Extrema	4.4	298-308	1-59
Class Note 10:	PP. 208-209, Prob. 1, 3-10, 23-30, 37-44		
Optimization II: Optimization Problems	4.5	312-321	1-19, 25
Class Note 12:	PP. 238-239, Prob. 1-28		
Chapter 4:	Review Exercises	324-326	1-34, 38-40

Exponential and Logarithmic Function (6 classes)

Exponential Functions and their Graphs	5.1	330-334	1-26
Logarithmic Functions	5.2	338-344	1-43
Differentiation of Exponential Functions	5.4	360-368	1-53, 63
Differentiation of Logarithmic Functions	5.5	371-377	1-64
Class Note 8:	PP. 162, Prob. 43-57 PP. 169-170, Prob. 1-64		

Trigonometric Functions (4 classes)

Radian Measurement	12.1	764-768	1-25
The Trigonometric Functions	12.2	769-776	1-21, 31-35
Differentiation of Trigonometric Functions	12.3	777-785	1-32, 41-47
Class Note 9: Differentiation of Inverse Trigonometric Functions	PP. 183-184, Prob. 1-6, 16, 17, 19, 20, 22-28, 30-34		

RELIGIOUS OBSERVANCE/ INTENSIVE COURSES FORM

Students who intend to observe religious holidays must inform their teachers, in writing, within the f**irst two weeks of the semester** as prescribed in the ISEP Policy on Religious Observances. (ISEP, Section IV D). This includes any religious holidays that occur during the final exam period. Please refer to the academic calendar for the exact dates.

The following form must be submitted within the first two weeks of classes.

Name:

Student Number: _____

Course: _____

Teacher:_____

Date: Description: