

**Mathematics Department**  
**Calculus I**  
**201-NYA-05**  
**Science Program**  
**Computer Science Program**

## **COURSE OBJECTIVES**

Limits and continuity, the derivative and differentiation, applications of the derivative to curve sketching, maximum/minimum and related rates problems, anti-differentiation and the indefinite integral are studied in this course.

## **COURSE COMPETENCIES**

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

***00UN: To apply the methods of differential calculus to the study of functions and problem solving.***

1. To recognize and describe the characteristics of a function expressed in symbolic or graphic form.
2. To determine whether a function has a limit, is continuous and is differentiable at a point or on an interval.
3. To apply the rules and techniques of differentiation.
4. To use the derivative and related concepts to analyze the variations of a function and graph it.
5. To solve optimization and rate of change problems.

For the student in the **Computer Science Program**, this course contributes to the partial achievement of the competency:

***00SW: Develop gaming or simulation applications.***

1. Analyze the application development project.
2. Prepare the computer development environment.
3. Generate real or virtual world representations.
4. Program the game or simulation logic.
5. Control the quality of the application.
6. Participate in the deployment of the application.
7. Produce the documentation.

## **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 ([Link](#)).

## **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 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:** The required text is Single Variable Essential Calculus (Early Transcendentals), 2<sup>nd</sup> Edition by James Stewart

**References:**

- (1) Calculus of a Single Variable, by Larson, Hostetler & Edwards, 8<sup>th</sup> Edition.
- (2) Calculus Single Variables - 5<sup>th</sup> edition by James Stewart.
- (3) 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-531X, XG or XT calculator during tests and examinations.

## **TEACHING METHODS**

Lectures and problem sessions.

## **ATTENDANCE AND COURSE PARTICIPATION REQUIREMENTS**

Students should refer to the Institutional Student Evaluation Policy (ISEP section IV-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.

*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 V-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 who wish to observe religious holidays must also inform each of their teachers in writing within the first two weeks of each semester of their intent to observe the holiday so that alternative arrangements convenient to both the student and the teacher can be made at the earliest opportunity. The written notice must be given even when the exact date of the holiday is not known until later. 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.*

Students who intend to observe religious holidays or who take intensive courses must inform their teachers in writing as prescribed in the ISEP Policy on Religious Observance. (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** (number of classes listed is approximate)

### **Algebra and Trigonometry Review (4 classes)**

Algebra Modules I, II, & III

1.1 PP. 8-10, Prob. 2-8, 21-35, 39-42

1.2 PP. 21-24, Prob. 37-53

Note: These topics can be covered separately or in conjunction with calculus concepts

### **Limits and Their Properties (8 classes)**

#### **Chapter 1**

1.3 The Limit of a Function. PP. 33-34, Prob. 3-6, 11, 12, 14

1.4 Calculating Limits. PP. 42-44, Prob. 1-7, 10-28, 31, 33-42, 49-56

1.5 Continuity. PP. 54-55, Prob. 1-4, 11, 15-18, 29-31, 33-35

1.6 Limits Involving Infinity. PP. 67-68, Prob. 1-8, 10, 13-15, 18-24, 27-30, 35, 36, 43\*

REVIEW EXERCISES PP. 70-72, 19, 22-32, 34-36, 39, 40, 45

### **Differentiation (8 classes)**

#### **Chapter 2**

2.1 Derivatives and Rates of Change. PP. 80-81, Prob. 1, 3, 5, 6, 8, 11-18, 19-23, 25-30

2.2 The Derivative as a Function. PP. 92-93, Prob. 3-11, 19-27, 33-36

2.3 Basic Differentiation Formulas. PP. 105-106, Prob. 1-35, 38-40, 43, 47-50, 53, 63\*, 67\*

2.4 The Product and Quotient Rules. PP. 112-113, Prob. 1-35, 37-42, 45, 46, 48\*

2.5 The Chain Rule. PP. 120-121, Prob. 1-48, 52-56, 61-63

2.6 Implicit Differentiation. PP. 127-128, Prob. 1-16, 19-28

2.7 Related Rates. PP. 132-134, Prob. 1-33, 37-40

2.8 Linear Approximations and Differentials. PP. 138, Prob. 17-20

REVIEW EXERCISES PP. 140-143, Prob. 10-48, 51, 53-64, 67-70, 74

### **Inverse Function (Exponential, Logarithmic and Inverse Trigonometry Functions) (7 classes)**

#### **Chapter 3**

3.1 Exponential Functions. Read PP. 145-149

3.2 Inverse Functions and Logarithms. PP. 161-162, Prob. 43-57

3.3 Derivatives of Logarithmic and Exponential Functions. PP. 169-170, Prob. 1-64, 69

3.5 Inverse Trigonometric Functions. PP. 183-184, Prob. 1-6, 16, 17, 19-28, 30-34

3.7 Indeterminate Forms and L'Hôpital's Rule. PP. 197, Prob. 1-38

REVIEW EXERCISES PP. 200-201, Prob. 17-26, 28-38, 40, 43, 49, 61-64, 66-76, 52

### **Applications of Differentiation (8 classes)**

#### **Chapter 4**

4.1 Maximum and Minimum Values. PP. 208-209, Prob. 1, 3-10, 23-32, 37-44

4.2 Mean Value Theorem

4.3 Derivatives and the Shapes of Graphs. PP. 222-223, Prob. 1-4, 12, 15\*, 17-19, 24\*, 25-30

4.4 Curve Sketching. PP. 230, Prob. 1-16, 17-26

4.5 Optimization Problems. PP. 238-239, Prob. 1-28

REVIEW EXERCISES PP. 254-255, Prob. 1-3, 9-10, 15-17, 18-20, 39, 40

### **Anti-Derivatives (3 classes)**

#### **Chapter 4 – 5**

4.7 Anti-Derivatives. PP. 252, Prob. 1-9, 12-13, 14\*, 15-34 35-36\*

5.5 The Substitution Rule. PP. 306, Prob. 1-20, 22-36

REVIEW EXERCISES PP. 256, Prob. 51-58

PP. 309, Prob. 19, 21-29, 31

### **Differential Equation (2 classes)**

#### **Chapter 7 and Handout**

Verification of Solutions of Differential Equations Handout. Prob. 1-24

7.7 Differential Equations. Read PP. 412-414, PP. 418, Prob. 1-4, 8-13

Handout Prob. 1, 2, 4, 9, 10, 14, 18

## RELIGIOUS OBSERVANCE/ INTENSIVE COURSES FORM

Students who intend to observe religious holidays must inform their teachers, in writing, within the **first 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:**

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