

Mathematics Department
Calculus 1 – Social Science
201-103-DW

COURSE OBJECTIVES

This version of Calculus 1 is intended for Social Science and Commerce students. As well as introducing the students to the techniques of Calculus, this course will also illustrate the power of Calculus in solving certain optimization problems in business and economics.

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 behavior 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.

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

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 Math 506 or equivalent.

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, computer quizzes, assignments) | 50% |
| 2. Final Examination | 50% |

Option B

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

In order to pass the course, the students must obtain at least **60%**.

REQUIRED TEXT AND MATERIALS

Text: The required text is Applied Calculus for the Managerial, Life and Social Sciences (10th Edition) by S.T. Tan (Thomson Brooks/Cole Publishers)

- References:**
- | | |
|-----|--|
| (1) | <u>Calculus with Applications</u> (9 th edition) by Lial, Greenwell and Ritchey (Addison Wesley Publishers) |
| (2) | <u>Brief Calculus: An Applied Approach</u> (8 th edition) by Ron Larson and Bruce Edwards (Houghton Mifflin Publishers) |

Calculators: Students are only permitted to use the Sharp EL-531X, **XG, 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 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 within the **first two weeks of the semester** as prescribed in the ISEP Policy on Religious Observance. (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.

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

[Note – the Self-Check Exercises found in each section are an excellent supplement to the class lectures.]

<u>Topic</u>	<u>Specific Competencies</u>	<u>Learning Activities</u>		
Review	Pre-Calculus (4 classes*)	Section	Pages	Exercises
	Basic Factoring	1.1	14	99-120
	Rationalizing Algebraic Fractions	1.2	23	29-34, 37-40
	Composition of Functions	2.2	74	25-28, 35-42
	Exponential Functions	5.1	342	9-16
	Logarithmic Functions	5.2	351-2	17-28
	The Trigonometric Functions	12.2	810	1-7

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

Limits and Continuity (7 classes*)	Section	Pages	Exercises
The Definition of Limit			
Techniques for Evaluating Limits	2.4	115-7	1-12, 17-68, 73-80
Class Notes (additional problems)			1-22
One-sided Limits	2.5	130	1-38
Continuity	2.5	131-3	39-60, 73-74
The Derivative	2.6	149-50	1-2, 9-24
Chapter 2: Review Exercises		157	11-30

Differentiation (16 classes*)	Section	Pages	Exercises
Basic Rules of Differentiation	3.1	169-72	1-36, 41-46, 51-75
The Product and Quotient Rules	3.2	181-3	1-30, 35-42, 45-48, 56-58
General Power Rule	3.3	194-5	1-54, 63-68
Marginal Functions in Economics	3.4	210-11	3-17
Higher Order Derivatives	3.5	218	1-28

Implicit Differentiation	3.6	231	1-16, 21-22, 25-26, 29-37
Related Rates	3.6	231	41-45, 50-52, 58-65
Chapter 3: Review Exercises		247	1-42

Applications of Derivatives (12 classes*)	Section	Pages	Exercises
Applications of 1 st Derivative	4.1	264-6	1-8, 14-29, 36-45, 54-57, 60-73
Applications of 2 nd Derivative	4.2	282-6	1-8, 11-12, 25-26, 29-34, 39-44, 49-54, 59-70
Curve Sketching	4.3	298-300	1-8, 11-28, 37-44, 49-56
Optimization I (function given)	4.4	314	9-10, 13-26, 35-36, 40, 46-53, 56-57
Optimization II (function <u>not</u> given) (& supplementary notes)	4.5	327-8	1-13
Transcendental Functions (6 classes*)	Section	Pages	Exercises
Differentiation of Exponential Fcn.s	5.4	376-8	1-34, 67
Differentiation of Logarithmic Fcn.s	5.5	387	1-54
Differentiation of Trigonometric Fcn.s (sine, cosine and tangent only)	12.3	820-1	1-7, 9-11, 13-15, 19-27, 31-33
Differentiation of Inverse Trigonometric Fcn.s		Class Notes	

*** The times indicated are approximate.**

RELIGIOUS OBSERVANCE/ INTENSIVE COURSES FORM

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)

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

Name: _____

Student Number: _____

Course: _____

Teacher: _____

Date:	Description:
_____	_____
_____	_____
_____	_____
_____	_____