DAWSON
COLLEGE

Mathematics Department
Principles of Mathematics and Logic
360-124-DW Section 1
Winter 2013

Instructor:	Yann Lamontagne
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Office Hours:	Office hours are posted beside the door of office 7B.16 and on the website.
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Website:	`http://www.obeymath.org` The solutions to the quizzes and tests as well as additional examples are posted on the website. The material of previously taught courses is also available.
Teacher Accessability:	For out of class communication please see me during my office hours.

Term Work: *(40% of final grade, see GRADING POLICY)*:

2 Class Tests	worth a total of 30%	on:
	Test 1	**Thursday March 7th**
	Test 2	**during the final examination period**
Activities*	worth a total of 10%	

* including but not limited to quizzes, assignments.

Important:

- Students who will be absent for any predictable reason on a quiz/test day must inform their teacher in writing within the first two weeks of the semester of their intent to be absent so that alternative arrangements can be made at the earliest opportunity. 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.

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COURSE OBJECTIVES

The purpose of this course is to introduce students in the Liberal Arts program to the nature of mathematics from the point of view of the professional mathematician. We will not only describe what the professional mathematician does, but actually engage in this kind of activity within the limits of the background of the students and the time constraints of the course.

This course intends to introduce students to the nature of mathematical reasoning, and to certain theoretical considerations central to it, such as validity, proof, axiom, postulate, etc. Among the subjects included in this course are deductive systems, inductive logic, and axiomatic structures and their importance in much of ordinary mathematics (the decimal system, alternative number system, elementary arithmetic and algebra, Euclidian and non-Euclidian geometries, functions, calculus, etc.). The course also examines the distinction between pure and applied mathematics, and the reasons that mathematics seems to be virtually indispensable as the language of science.

COURSE COMPETENCIES

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

032B: To demonstrate the importance of the principles, ideas and methods of logic and mathematics as disciplines.

Elements of the Competency:

1. To recognize the nature of logical reasoning and of mathematical reasoning.
2. To formulate arguments in accordance with the central concepts of mathematics and logic.
3. To explain relationships between mathematics, logic and other disciplines.
4. To apply deductive systems and inductive systems in various instances.
5. To do an assignment in an area of mathematics and logic.

COURSE ORGANISATION

The course is divided into two components: the mathematics component and the logic component. The latter consisting of two hours *(Lab.)* per week and the former of three hours *(Lecture)*. The contents of the components are listed under the section **COURSE CONTENT & TENTATIVE SCHEDULE.**

TEACHING METHODS

A lecture/discussion/problem session will be employed. It is important for the student to keep up with the classroom material, and to do the homework on time.

Problem solving is an essential component of this course. The student is expected to solve problems, and to present his solutions in a logical and coherent fashion.

PRE-REQUISITE

Registration in the Liberal Arts Program.

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.

GRADING POLICY

The final grade is based on the two course components:

Mathematics Component:	60%
Logic Component:	40%

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.

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 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 III-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

Mathematics Component:

- Empirical truth versus mathematical truth: Experiment and proof
- Geometry: The Pythagorean Theorem and proof by construction
- Number: Irrational numbers and proof by contradiction
- Infinitely many things: Prime numbers
- Infinitely small things: Calculus
- Geometry again: Euclidian and non Euclidean Geometry
- Many infinities: Cantor
- The foundations: Peano, Hilbert, Russell, and Gödel

Logic Component:

Logic in Philosophy, Sciences, Mathematics & Liberal Arts *(week 1)*
Introduction to Logic
Logic Definitions *(statements, arguments, premises, conclusions, ...)* *(week 2)*
Inductive Logic
Deductive Logic *(valid and sound arguments, ...)* *(week 3)*

Propositional Logic
- Symbolizing Arguments
- Truth-Functional Connectives *(week 4)*
- Truth Tables of Arguments
- Tautologies, Contradictions, and Contingent Arguments *(week 5)*
- Logical Equivalence, Converse and Contra-positive
- Natural Deduction *(week 7)*
  - *proofs*
  - *sub-proofs*
  - *proof by contradiction*

Predicate Logic *(week 10)*
- Quantifiers
- Symbolizing Arguments
- Multiple Quantifiers, Negations, Equality *(week 11)*
- Vacuous Truth
- Uniqueness
- Bound Variables
- Natural Deduction *(week 12)*

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 III-D)

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

Name: _____

Student Number: _____

Course: _____

Teacher:_____

Date: **Description:**

_____ _____

_____ _____

_____ _____

_____ _____