



**Mathematics Department**  
**Topics in Mathematics: Discrete Mathematics**  
**201-BZT-DW**

**COURSE OBJECTIVES**

For details, see “Dawson Science Program”.

**COURSE COMPETENCIES**

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

00UV: To apply the experimental method in a scientific field.

1. To represent various situations, drawing upon relevant concepts, laws and principles of science.
2. To solve problems using a method proper to science.
3. To apply techniques of experimentation or validation specific to science.

**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 ½ hours of in-class tests and/or quizzes is required.

## Final Examination

There is no final examination in this course

## Grading Policy

A student shall be graded based on a combination of assignments and/or quizzes and/or tests, which will cumulatively be worth 75% of their final grade. A final project, which is the summative assessment for this course, will be worth 25% of their final grade.

To pass the course the student must obtain (a) an overall grade of at least 60%, and (b) a grade of at least 60% on the final project.

## Comprehensive Examination

***N.B.*** For a Science (200.xx) student who elects to do the Comprehensive Examination (CE) in this section, the teacher will evaluate the CE on a pass/fail basis.

***A STUDENT CANNOT GRADUATE UNTIL ALL ASPECTS OF THE COMPREHENSIVE EXAMINATION INCLUDING THE INDEPENDENT PROJECT ARE SUCCESSFULLY COMPLETED.***

## REQUIRED TEXT AND MATERIALS

**Text:** The required text is *Discrete Mathematics and its Applications*, by Kenneth H. Rosen, 7<sup>th</sup> or 8<sup>th</sup> Edition (ISBN-10: 125967651X or 0073383090)

**References:**

- (1) *Discrete Mathematics with Graph Theory*, by Edgar G. Goodaire and Michael M. Parmenter
- (2) *Discrete and Combinatorial Mathematics: An Applied*, by Ralph P. Grimaldi
- (3) Book of Proof, by Richard Hammack (available online at <https://www.people.vcu.edu/~rhammack/BookOfProof/>)

**Calculators:** No calculators are permitted during in-class evaluations

## 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

Each section is accompanied by a **suggested** number of lectures. Suggested corresponding sections from the required textbook are listed for each section.

**I. Logic & Set Theory** (10 classes)

§ 1.1—1.8, 2.1—2.5, 9.1, 9.5, 9.6

- Proposition and predicate logic
- Proof techniques (direct, contrapositive, contradiction, induction)
- Sets (terminology, operations)
- Functions (surjections, injections, bijections)
- Relations (equivalence relations and partially ordered sets)

**II. Number Theory** (7 classes)

§ 4.1—4.4

- Representation of integers
- Divisors and the Euclidean Algorithm
- Modular Arithmetic

**III. Combinatorics** (10 classes)

§ 5.1—5.3, 6.1—6.4, 8.2

- Recursion
- Permutations and combinations
- Binomial Theorem
- Pigeon Hole Principle
- Principle of Inclusion-Exclusion

**IV. Graph Theory** (10 classes)

§ 10.1—10.8, 11.1, 11.4

- Terminology and modeling
- Eulerian circuits and Hamiltonian cycles
- Graph colouring
- Trees and planar graphs

The instructor may add additional topics in accordance with the competencies of the course. In particular, applications of the above topics may be covered, time permitting. Possible optional topics: Logical circuits, axiomatic systems, Fermat's Little Theorem, Chinese Remainder Theorem, cryptography, algorithm design and analysis, graph algorithms, graph parameters, scheduling problems.

## 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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