UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1995
REVISED COURSE IMPLEMENTATION DATE: September 2026
COURSE TO BE REVIEWED (six years after UEC approval)**:** December 2031
Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: MATH 125	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: Introduction to Discrete Mathematics **Course Short Title:** Intro to Discrete Mathematics	
Faculty: Faculty of Science	**Department/School:** Mathematics & Statistics

Calendar Description:

Serves as an introduction to some basic techniques in discrete mathematics, including methods of counting, recursion, and formal logic. The focus will be on formulating problems into mathematical models and on methods applicable to the analysis of these models.

Prerequisites (or NONE):	One of the following: (B or better in Applications of Mathematics 12) or (C+ or better in Principles of Mathematics 12) or (C+ or better in both Pre-calculus 11 and Geometry 12) or (C+ or better in both Pre-calculus 11 and Statistics 12) or (C or better in one of Foundations of Mathematics 12 or Pre-calculus 12,) or (C or better in both MATH 094 and MATH 095) or (one of MATH 092, MATH 096, MATH 110, or MATH 124) or (a score of 17/25 or better on Part B of the MSAT together with a score of 34/50 on Parts A and B combined).
Corequisites (if applicable):	None.
Pre/corequisites (if applicable):	None.

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	60
Total hours	**60**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **[click to select]**

Course Details

Special Topics course: **No**
(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **[click to select]**
(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Every semester**

Maximum enrolment (for information only)**: 36**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See **bctransferguide.ca**.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: **No**
(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:**	June 16, 2025
Faculty Council approval	**Date of meeting:**	September 5, 2025
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	December 19, 2025

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Use basic counting techniques such as addition rule, multiplication rule, and inclusion/exclusion rule for 2 or 3 sets.
2. Calculate discrete probabilities.
3. Use techniques of formal logic to establish logical equivalence and verify validity of arguments.
4. Construct statements and arguments using logical connectives and quantifiers.
5. Apply (weak) induction to simple problems.
6. Manipulate and solve 1st and 2nd degree recurrence relations.
7. Model problems using recurrence relations.
8. Use set notation and perform set operations.
9. Prove basic set properties.
10. Identify basic properties and calculate basic parameters of graphs, including trees and rooted trees.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Quizzes/tests/midterm:	50%	Assignments:	10%
	%		%		%

Details: Students must obtain at least 40% on the final exam in order to pass this course.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lecture

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	OER	Koshy	Discrete Mathematics with Applications	2004
2.	OER	Levin	Discrete Mathematics: An Open Introduction	2024
3.	OER	Fortney	Discrete Mathematics for Computer Science	2021
4.	Textbook	Epp	Discrete Mathematics with Applications, 5th Ed.	2019

Course Content and Topics

1. Counting:
   a. Induction
   b. Sums and products
   c. Permutations and combinations
   d. Binomial theorem
   e. Inclusion/exclusion arguments
   f. Introduction to probability
2. Recurrence relations:
   a. Solve 1st order recurrence relations using iteration
   b. Solve 2nd order linear homogeneous recurrence relations with constants coefficients using theorems
   c. Use to analyze and model problems
3. Set theory:
   a. Basic terminology and symbols
   b. Proofs using element arguments and set law
   c. Cartesian products
4. Logical syntax/semantics:
   a. Informal versus formal arguments
   b. Statement logic
   c. Logical equivalency
   d. Validity of arguments
   e. Boolean algebras
   f. Predicates
   g. Quantified statements
5. Graphs and trees:
   a. Definitions and basic properties for simple graphs
   b. Walks, closed walks, trails, paths, circuits, simple circuits
   c. Trees and their properties
   d. Rooted trees and their properties