

COURSE NAME: GDD302 Discrete Mathematics

Credit Value: 4
Total Course Hours: 56
Prerequisite Course(s): Prerequisites:GDD203 - Computer Mathematics 2
Corequisite Course(s): None

COURSE DESCRIPTION

Course Description:This course provides an overview of various computer science concepts and structures. Students will identify and apply theories and models relating to sets, functions, counting, and probability, with an emphasis on applications in game development.

LAND ACKNOWLEDGEMENT

Canadore College resides on the traditional territory of the Anishinaabeg and within lands protected by the Robinson Huron Treaty of 1850. This land is occupied by the people of Nipissing First Nation, Treaty #10 in the Robinson Huron Treaty of 1850 since time immemorial.

PLAR INFORMATION

This course is not eligible for Prior Learning Assessment and Recognition.

COURSE LEARNING OUTCOMES

Upon completion of this course, the student will have reliably demonstrated the ability to:

- 1.0 Evaluate the basics of set theory.
 - 1.1 Demonstrate ability to recognize, explain and use notation of sets.
 - 1.2 Demonstrate ability to determine the number of subsets in a given set, as well as to write all subsets of a given set.
 - 1.3 Discuss the difference between equal and equivalent sets.
 - 1.4 Demonstrate ability to perform operations such as complement, intersection, union and set difference.
 - 1.5 Describe relationships among the sets of natural and whole numbers, integers, and rational numbers.
 - 1.6 Demonstrate ability to visualize sets in Venn diagrams.
 - 1.7 Describe differences between and numbers and a numerals.
- 2.0 Evaluate the basics of logic.
 - 2.1 Demonstrate ability to write arguments using logical notation and determine if the argument is or is not valid.
 - 2.2 Demonstrate ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
- 2.3 Demonstrate ability to evaluate propositional logic statements.
- 2.4 Understand basic logic rules such as negation, conjunction, disjunction, conditional and biconditional.
- 2.5 Demonstrate ability to define arguments in mathematical terms.
- 2.6 Demonstrate ability to determine if an argument is valid or invalid via truth table, analysis, syllogisms, and Venn diagrams.
- 2.7 Demonstrate ability to construct truth tables.
- 3.0 Evaluate the basics of graph theory.
 - 3.1 Demonstrate ability to write mathematical definitions of objects in graph theory.
 - 3.2 Describe how to use mathematical definitions to identify and construct examples.
 - 3.3 Demonstrate ability to validate and critically assess a mathematical proof.
 - 3.4 Describe how to use theoretical knowledge as well as independent mathematical thinking in investigating questions in graph theory.
 - 3.5 Demonstrate ability to reason from

definitions to construct mathematical proofs.

3.6 Describe the difference between directed and undirected graphs.

4.0 Evaluate the basics of mathematical systems.

4.1 Demonstrate ability to identify properties of mathematical systems such as closure, associative, commutative, identity, and inverse.

4.2 Describe how to identify numbers as rational or irrational.

4.3 Describe how to write infinite sets as finite sets via modular systems.

4.4 Demonstrate ability to determine equivalence of two numbers in a modular system.

5.0 Evaluate the basics of advanced discrete

mathematical topics.

5.1 Demonstrate ability to solve problems in basic counting theory involving combinations and permutations.

5.2 Discuss sequences, including arithmetic and geometric sequencing, recurrence, and induction.

5.3 Describe the basics of the generating function, including how they are built.

5.4 Describe the basics of number theory, including divisibility, remainder classes, congruence.

5.5 Demonstrate ability to illustrate basic graph algorithms such as minimal spanning trees and shortest path.

GENERAL EDUCATION

This is not a General Education course.

ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES

This course contributes to the following Ministry of Colleges and Universities approved essential employability skills (EES) outcomes:

3. Execute mathematical operations accurately
4. Apply a systematic approach to solve problems
5. Use a variety of thinking skills to anticipate and solve problems

EXTERNAL COURSE ACCREDITATIONS AND CONDITIONS

There are no external accreditations or conditions identified for this course.

COURSE EVALUATION

Course Evaluation Strategy (Assignments, Case Studies, Debates, Portfolio, Quizzes, Tests, Exams, etc.) Tests and Quizzes - 40%

Assignments - 40%

Labs / Studies - 20%

PROGRAM SPECIFIC GRADING

As per College Grading System

GRADING SYSTEM

A+:	90-100%	B+:	77-79%	C+:	65-69%	D:	50-54%	S - Satisfactory
A:	85-89%	B:	73-76%	C:	60-64%	F:	0-49%	I - Incomplete
A-:	80-84%	B-:	70-72%	D+:	55-59%			F- Repeat Course, included in GPA
								FS- Failure Supplemental
								FR- Repeat course, excluded from GPA

*For a complete chart of grades and descriptions, please see the Grading Policy.

LEARNING RESOURCES

No textbooks have been identified for this course.

Other Resources:

Oscar Levin - Discrete Mathematics: An Open Introduction (3rd Edition) ISBN: 978-1792901690

Resources listed on the course outline support the achievement of learning outcomes, and may be used throughout the course to varying degrees depending on the instructor's teaching methodology and the nature of the resource.

Technology requirements - <https://www.canadorecollege.ca/BYOD>

The Harris Learning Library's staff can help you find resources to support your learning - www.eclibrary.ca

LEARNING ACTIVITIES

In Class instruction/discussion

Instructor demonstration

Individual hands-on practice

In-class assignments

DELIVERY MODE

This course may be delivered, in whole or in part, in a number of modalities, including in class, online, hybrid, in a synchronous or asynchronous manner or a combination thereof, as per accreditation and/or regulatory standards where appropriate.

RECORDING GUIDELINES

This class may be recorded by faculty of the College. Faculty will inform students when recording of the class commences and ceases. 'Recorded' means that the audio-visual and chat portions of the class will be recorded and then be stored on the College or vendor provider server. They will be made available to students, but only for the express and sole use of those registered in this course. If you have any questions or concerns about this recording, please contact your instructor or the College's privacy officer at privacy.officer@canadorecollege.ca. Full recording guidelines can be found at: <https://cdn.agilitycms.com/canadore-college/academic-centre-of-excellence/Canadore%20Recording%20Guidelines.pdf>

ACADEMIC POLICIES

Canadore College is committed to the highest standards of academic integrity, and expects students to adhere to these standards as part of the learning process in all environments. The College's Academic Integrity policy seeks to ensure that all students understand their rights and responsibilities in upholding academic integrity and that students receive an accurate and fair assessment of their work. Please review the Academic Integrity policy (A-18) and other academic policies found on our website:

<https://www.canadorecollege.ca/about/policies>.

COLLEGE POLICIES

- Protecting human rights in support of a respectful college community

For college policies please see: <http://www.canadorecollege.ca/about-us/college-policies>.

STUDENT SUCCESS SERVICES - Your Success Matters!

Student Success Services provides student-focused services to facilitate students' success in their studies. Staff provide support by reducing and/or removing educational-related barriers through individualized accommodations and supports to students with disabilities.

Please visit our webpage to learn more: <https://www.canadorecollege.ca/support/student-success-services> or look for our events on social media.

To connect with Student Success Services email studentsuccessnow@canadorecollege.ca or call 705.474.7600 ext 5205.

FIRST PEOPLES' CENTRE:

A culturally safe environment offering CONFIDENTIAL student focused services, drop in or make an appointment to access:

- One on one counselling

- Elder in residence program
- Peer tutoring
- Peer mentorship
- Lunch & learn workshops on study skills, self-care, life skills
- Learning Resource Centre

Drop by our offices at C254 College Drive, E101 Commerce Court or call 705 474 7600 Ext. 5961 College Drive / 5647 Commerce Court.

<https://www.canadorecollege.ca/experience/indigenous-student-experience>

WAIVER OF RESPONSIBILITY

Every attempt is made to ensure the accuracy of this information as of the date of publication. The college reserves the right to modify, change, add, or delete content.

HISTORICAL COURSE OUTLINES

Students use course outlines to support their learning. Students are responsible for retaining course outlines for future use in applications for transfer of credit to other educational institutions.