



Introduction to Discrete Mathematics– MATH 102

University Studies Program

Course Outline

COURSE IMPLEMENTATION DATE: Pre 1998
OUTLINE EFFECTIVE DATE: September 2020
COURSE OUTLINE REVIEW DATE: March 2025

GENERAL COURSE DESCRIPTION:

Discrete mathematics plays an important role in logical thought and in computer science programming. This course provides an introduction to a variety of post-secondary mathematics which do not require calculus. MATH 102 is intended both for students who wish to see useful and real life applications of mathematics and for those needing to learn more about algorithms and problem solving in the context of computer science. Topics include: binary, octal, and hexadecimal number systems, formal logic, set theory and set algebra, Boolean algebra, introductory graph theory, algorithms and simple coding, and an introduction to formal mathematical proofs.

Program Information: This course may be used as three (3) credits towards an Associate of Arts or an Associate of Science degree from the College of the Rockies. .

Delivery: This course is delivered face to face.

COTR Credits: 3

Hours for this course: 45 hours

Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	
Practicum / Field Experience Hours	
Other Contact Hours	
Total	45

Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	N/A
Formal Work Experience	N/A
Other	N/A
Total	

Course Outline Author or Contact:

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Signature**APPROVAL SIGNATURES:**Department Head
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EDCO

Valid from: September 2020 - March 2025

Education Council Approval Date**COURSE PREREQUISITES AND TRANSFER CREDIT:****Prerequisites:** Either MATH 101, MATH 103, MATH 105, STAT 106, Pre-Calculus 12, Calculus 12, or equivalent; or minimum 65% in Foundations of Math 11, Pre-Calculus 11, Applications of Math 12, Principles of Math 11, MATH 080, or equivalent; or minimum 65% in both Statistics 12 and Computer Science 12; or any grade in Foundations of Math 11 and 70% or higher in Foundations of Math 12.**Corequisites:** None**Flexible Assessment (FA):**

Credit can be awarded for this course through FA

 Yes No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

Transfer Credit: For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Students should also contact an academic advisor at the institution where they want transfer credit.

Prior Course Number: N/A

Textbooks and Required Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Essentials of Discrete Mathematics, 3rd Edition by David J. Hunter, (2017) Jones and Bartlett Learning

Please see the instructor's syllabus or check COTR's online text calculator <http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.

LEARNING OUTCOMES:

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

- employ a variety of formal problem solving methods;
- examine, strengthen and formalize methods of approaching mathematical problem solving;
- read about, interpret and find applications for all the concepts studied;
- add, subtract, multiply and divide in binary, octal and hexadecimal number systems;
- identify the various symbols used in logic, and determine the validity of propositions and arguments;
- work with sets, Venn diagrams, and the laws which govern them;
- identify the components of a Boolean algebra, and solve problems in both general and specific cases;
- apply various techniques and laws to simplify Boolean expressions, including consensus and Karnaugh Maps;
- identify algorithms and the structures of decisions and loops;
- write simple programs in pseudocode and with flowcharts;
- recognize concepts of graph theory and be able to define the components of a graph, draw specified graphs, and make conclusions about the connectivity of graphs;
- prove whether or not Eulerian or Hamiltonian circuits exist, and find the ones that do;
- solve puzzles, using graph and logic theory;
- write simple, clean, mathematics proofs for statements about discrete structures, and
- possibly even discover that math can be both enjoyable and useful.

This course will help students

- use written and oral communication skills effectively, employing methods appropriate to message and context;
 - think clearly and critically, fusing experience, knowledge and reasoning into considered judgment;
 - identify, interpret, and solve problems, effectively implementing and evaluating proposed strategies; and
 - apply mathematics to real life applications.
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COURSE TOPICS:

- Binary, Octal, and Hexadecimal Number Systems
- Operations in Number Systems
- Logic and logical inference
- Conditional statements, propositions, truth tables, and logic laws
- Proof techniques (direct, contradiction, and induction)
- Set Theory, Venn Diagrams, and set algebra
- Boolean Algebra, Laws, and Simplification
- Introductory Graph Theory – graphs, digraphs, trees Euler and Hamiltonian graphs
- Algorithms and simple coding

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

EVALUATION AND ASSESSMENT:

Assignments	% Of Total Grade
Assignments/Quizzes	20%
Midterms (best two of three)	30%
Final Exam	<u>50%</u>
Total	100%

Please see the instructor syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments and use of electronic aids.

EXAM POLICY:

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

COURSE GRADE:

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

COURSE CHANGES:

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment, and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.