

DEPARTMENT of Science

COURSE OUTLINE – Winter 2023

CS 2720 (A3, S1, S2, L1, L2): Formal Systems and Logic in Computing Science

3 (3-1-1.5) 82.5 Hours for 15 Weeks

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR: Dr. Brian Redmond
OFFICE: L215
OFFICE HOURS: TBA

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CALENDAR DESCRIPTION:

An introductory course to present the tools of set theory, logic and induction, and their use in the practice of reasoning about algorithms and programs. Basic set theory. The notion of a function. Counting. Propositional and predicate logic and their proof system will be studied. Inductive definitions and proofs by induction will be covered along with program specification and correctness.

PREREQUISITE(S)/COREQUISITE:

1000-Level CST course

REQUIRED TEXT/RESOURCE MATERIALS:

Al Doerr, Ken Levasseur: [Applied Discrete Structures](#), 3rd Edition – version 9 (2022)

DELIVERY MODE(S):

On campus, in-person.

Lectures:	Tuesdays (A3) and Thursdays (A3)	8:30 AM – 9:50 AM	in J202
Labs:	Mondays (L1) or Tuesdays (L2)	2:30 PM – 3:50 PM	in G111
Seminars:	Mondays (S1) or Tuesdays (S2)	4:00 PM – 4:50 PM	in H211

COURSE OBJECTIVES:

This course is an introduction to discrete mathematics for reasoning about algorithms and programs. The main topics covered include propositional and predicate logic, proofs, basic set theory, algorithms, induction, and recursion (along with program correctness), functions and relations, and Boolean algebras.

LEARNING OUTCOMES:

To demonstrate basic knowledge of set theory, logic and induction, and their use in the practice of reasoning about algorithms and programs. To implement these concepts by writing simple programs in the programming language SageMath and Python.

TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page <http://www.transferalberta.ca>.

**** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS:

Assignments: 20%
Labs: 15%
Midterm: 25%
Final: 40%

GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

Tentative Timeline (subject to change):

Week	Topics	Important Dates
2 January – 8 January	Introduction	Course begins on Thursday, January 5
9 January – 15 January	Set Theory	
16 January – 22 January		Assignment #1, Lab #1 Due: Friday, January 20

23 January – 29 January	Combinatorics	Assignment #2, Lab #2 Due: Friday, January 27
30 January – 5 February	Logic	Assignment #3, Lab #3 Due: Friday, February 3
6 February – 12 February		Assignment #4, Lab #4 Due: Friday, February 10
13 February – 19 February		Assignment #5, Lab #5 Due: Friday, February 17
20 February – 26 February	Winter Break	
27 February – 5 March	Boolean Algebra	Midterm: Tuesday, February 28
6 March – 12 March		Assignment #6, Lab #6 Friday, March 10
13 March – 19 March	Functions & Relations	Assignment #7, Lab #7 Due: Friday, March 17
20 March – 26 March		Assignment #8, Lab #8 Due: Friday, March 24
27 March – 2 April	Induction, Recursion, and Program Correctness	Assignment #9, Lab #9 Due: Friday, March 31
3 April – 9 April		Assignment #10, Lab #10 Due: Thursday, April 6
10 April – 16 April	Review	Assignment #11, Lab #11 Due: Friday, April 14
17 April – 23 April	Final exam period	
24 April – 30 April	Final exam period	

STUDENT RESPONSIBILITIES:

Regular attendance and participation (including homework) is required for the successful completion of this course. Please expect to spend a minimum of 10 hours per week doing homework.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the Northwestern Polytechnic Calendar at <https://www.nwpolytech.ca/programs/calendar/> or the Student Rights and Responsibilities policy which can be found at <https://www.nwpolytech.ca/about/administration/policies/index.html>.

**Note: all Academic and Administrative policies are available on the same page.

Additional Information (Optional):

Instructors may add whatever they want here.